

Development Centre Studies

Securing the Livelihoods of Informal Economy Workers in Times of Global Changes



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Foreword

Informality – referring to work that takes place either in informal economic units or through informal employment relationships, including within formal firms, and is not adequately covered by labour regulation, taxation or social protection – remains the norm across low- and middle-income countries, affecting the daily lives of billions of workers and their families across the world. This comes with considerable risks and vulnerabilities. Global trends, such as demographic changes, automation and climate risks, further intensify existing vulnerabilities. Securing the livelihoods of informal workers is central to achieving the Sustainable Development Goals (SDGs) and calls for careful monitoring and evidence-based policy responses.

Understanding labour informality has been at the heart of research and policy work since the creation of the OECD Development Centre. An important milestone includes the compilation, since 2017, of the *Key Indicators of Informality based on Individuals and their Households* (KIIbIH) database – the OECD Development Centre's innovative and comparable data on informal employment. KIIbIH data support the analysis and monitoring of the informal economy across countries and has underpinned several recent OECD Development Centre publications, including: *Tackling Vulnerability in the Informal Economy* (2019); *Informality and Globalisation: In Search of a New Social Contract* (2023); and *Breaking the Vicious Circles of Informal Employment and Low-Paying Work* (2024). These reports and their policy recommendations have helped countries develop local strategies to tackle informality and have informed actors in various national and international fora, including the Global Partnership for Universal Social Protection (USP2030) and various standard-setting discussions at the International Labour Organization (ILO).

This latest report highlights the role of diverse policy instruments in tackling the informality challenge and in protecting informal workers and their families from the adverse effects of major global trends. First, it provides up-to-date and detailed portraits of informality in developing and emerging economies, applying a unique cross-country comparative perspective that identifies both common trends and country specificities. Second, it assesses the impact of global trends – such as ageing, automation and environmental degradation – on the opportunities and vulnerabilities of informal economy workers. In turn, the report provides detailed policy recommendations, underscoring the centrality of the social contract in mediating these impacts, the need for locally-led approaches and the importance of policy coherence.

Securing the livelihoods of informal economy workers in times of global changes was developed in the context of the OECD Development Centre's project "Informal employment in changing societies: Harnessing the potential of formalisation to support inclusive transitions", with financial support from the Swedish International Development Cooperation Agency (Sida).

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Abbreviations and acronyms

AAM	Automatic adjustment mechanisms
AI	Artificial intelligence
APY	Atal Pension Yojana
CBT	Community-based targeted
CI	Confidence interval
CMIP6	Coupled Model Intercomparison Project Phase 6
COBSI	Community-based smallholder irrigation
DB	Defined benefit
DC	Defined contribution
EM-DAT	Emergency Events Database
EMDE	Emerging markets and developing economies
ERA5	European Centre for Medium-Range Weather Forecasts (ECMWF) Reanalysis v5
FAO	Food and Agriculture Organization
FfD4	Fourth International Conference on Financing for Development
GAUL	Global Administrative Unit Layers
GDP	Gross domestic product
ICLS	International Conference of Labour Statisticians
ICSE	International Classification of Status of Employment
ICTs	Information and communication technologies
ILO	International Labour Organization
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
ISCED	International Standard Classification of Education
ISCO	International Standard Classification of Occupations
ISIC	International Standard Industrial Classification of All Economic Activities
JICA	Japan International Cooperation Agency
KIIbIH	Key Indicators of Informality based on Individuals and their Household
LLM	Large language models
LMIC	Low- and middle-income country
NDC	Notionally defined contribution
OECD	Organisation for Economic Co-operation and Development
OSH	Occupational safety and health
PIAAC	Survey of Adult Skills
PMT	Proxy-means tested

PPP	Purchasing power parity
PTR	Presumptive tax regime
R&D	Research and development
SDG	Sustainable Development Goal
SE	Standard error
SIDA	Swedish International Development Cooperation Agen
SME	Small and medium-sized enterprise
SP	Social protection
SSP	Shared Socio-economic Pathways
TFP	Total factor productivity
TVET	Technical and vocational education and training
UN	United Nations
USP2030	Global Partnership for Universal Social Protection
VAT	Value-added tax
VET	Vocational education and training
W	Watt
WGBT	Wet bulb globe temperature
WIEGO	Women in Informal Employment Globalizing and Organizing

Executive summary

The many dimensions of informality

Informality remains the norm for billions of workers, affecting 68% (on average) across countries included in the *Key Indicators of Informality based on Individuals and their Households* (KIIbIH) database. In some countries, economic growth has even coincided with rising informal employment. While most informal workers are employed in the informal sector, some operate in the formal sector. The division between formal and informal economies is further blurred when considering the household perspective and the prevalence of multiple job holding. Some informal workers, for example, live in households with formal workers. Likewise, many workers, including formal ones, hold more than one job, with such additional jobs often being informal.

Informality is closely associated with precarious work, poverty and inequality. The formal-informal earnings gap is extremely large: in fact, many informal employees earn less than the minimum wage. Informality also often (though not always) overlaps with poverty, with most of the working poor employed in the informal economy. The informal economy is far from homogeneous. High- and low-paid informal workers coexist with a large middle group, and workers' profiles differ substantially across the earnings distribution. Income inequality is highly pronounced within the informal economy itself and remains the primary factor of overall earnings inequality.

The dual challenge of ageing and informality

The entire world is ageing. But the pace of the demographic transition in developing countries is much faster than that previously experienced in developed countries, and it is unfolding in a context of high and persistent informality. Enrolment in contributory pension schemes remains low, translating into wide coverage gaps among older people, especially women, rural populations and poorer households. As a result, many older people continue to work informally or rely heavily on family support. For many informal workers, low and unstable earnings constrain their ability to contribute to pension schemes. At the same time, pension scheme contributions remain limited among high-paid informal workers, suggesting that barriers extend beyond income alone.

In this regard, pension systems in many countries continue to show institutional and structural gaps that hinder the adequate coverage of informal workers. Global evidence shows that effective pension systems combine contributory and non-contributory components in a coherent way to provide adequate benefits while protecting the livelihoods of the most vulnerable. Findings from the KIIbIH demonstrate that financing the expansion of pension systems in highly informal contexts is challenging but feasible. Universal social pensions could be financed through tax reforms – at a relatively low fiscal cost. In parallel, many countries have scope to collect more social security contributions to expand contributory schemes. The findings also underline that ageing deserves immediate policy attention, including in regions (such as Africa) that remain at an earlier stage of demographic transition, and where policy and fiscal space may be greater than in more rapidly ageing regions.

Automation and the employment prospects of informal workers

Technological change is reshaping the world of work and already impacts the lives of billions of workers globally. As traditional automation and artificial intelligence (AI) continue to advance, growing evidence from developed countries suggests that many jobs will disappear, others will be transformed, and new tasks and occupations will emerge. New evidence from KIIBIH data shows that informal workers face considerable risks from traditional automation, while the risks of AI-related automation are more concentrated among formal workers in more advanced economies. Exposure to traditional automation is uneven within the informal economy and disproportionately affects low-income workers. By contrast, although relatively few informal workers appear exposed to AI-related automation, those disproportionately at risk are women, young workers and highly educated workers in urban areas. These effects of automation on livelihoods are amplified at the household level, especially among workers living in informal households.

Informal workers and emerging environmental risks

Environmental degradation and climate-related risks (such as droughts, floods and extreme heat) pose an urgent and growing threat to economic activity and work worldwide. KIIBIH data show that these risks are particularly acute in developing countries, with severe consequences for workers in the informal economy whose livelihoods often depend heavily on the natural environment. Informal workers are not only more sensitive to droughts and floods, but their reduced adaptive capacity makes them more vulnerable. Likewise, heat stress has disproportionate effects on the productivity and earnings of informal workers. Across KIIBIH countries with available data, heat-related productivity losses already amounted to an average of 2.3% of GDP in 2025 and are significantly larger for informal workers. Under current labour market structures, these losses are projected to rise to 2.9% of GDP by 2055. These risks interact closely with poverty and household informality, compounding vulnerabilities across entire families.

Policy responses

Securing the livelihoods of informal workers in times of global changes calls for careful monitoring and evidence-based policy responses. The diverse, plural and segmented structure of the informal economy, as well as the way global changes affect informal workers, have deep and widespread policy implications. Policy responses must recognise the heterogeneity of the informal economy by addressing the specific needs and constraints of workers in diverse employment situations and household contexts. They must also be context-specific and embedded in coherent country-led development strategies. Fiscal space is a crucial factor in this regard. Yet, in many developing countries, such fiscal space remains constrained by narrow tax bases, debt pressures and external shocks. Against this backdrop, a strategy to secure the livelihoods of informal workers could be built around five mutually reinforcing pillars:

- **Strengthen social protection systems** to expand effective coverage for informal workers while ensuring adequate protection floors throughout the life cycle, combining contributory and non-contributory mechanisms and adapting their design to the contributory capacity of diverse groups.
- **Support firms and productive transformation** to create more and better jobs by lowering barriers to firm growth, encouraging productivity upgrading and making formalisation more feasible.
- **Invest in education, training and skills development** so that current and future workers can access more productive and secure employment, and adapt to changing labour market demands.
- **Support the development of local infrastructure, basic service delivery and care services** that shape workers' capacity – notably women – to cope with shocks and sustain livelihoods.
- **Mobilise sufficient domestic resources and public revenue** to finance more inclusive and sustainable policy frameworks, including through tax reform, improved efficiency of public spending and innovative contribution collection mechanisms, all adapted to the realities of informal work.

1 Overview

Across the world, jobs and livelihoods are under growing pressure linked to demographic changes, automation and technological disruption, and environmental and climate risks. These challenges are particularly acute in low- and middle-income countries (LMICs), where most workers depend on the informal economy for their livelihoods. Typically, such countries are characterised by limited fiscal space, which considerably constrains government action. Yet with strong political commitment and evidence-based policy action, these challenges can be turned into opportunities to build more resilient livelihoods.

This report examines the situation of informal economy workers today, and explores how these major global trends may affect their livelihoods in the near future. It asks three key questions: i) how societies can better protect the livelihoods of informal workers; ii) how countries with high levels of informality can adapt to these emerging pressures; and iii) how the OECD's *Key Indicators of Informality based on Individuals and their Household* (KIbIH) can help close important knowledge gaps and support evidence-based policy responses.

Two moral and economic imperatives motivate the report. The first is to advance the formalisation and decent work agenda embedded in multiple 2030 Sustainable Development Goals (SDGs), and notably Goal 8. The second is to create the conditions for individuals, families and communities that rely on the informal economy to not only survive, but to thrive in times of global change.

Portraits of informality

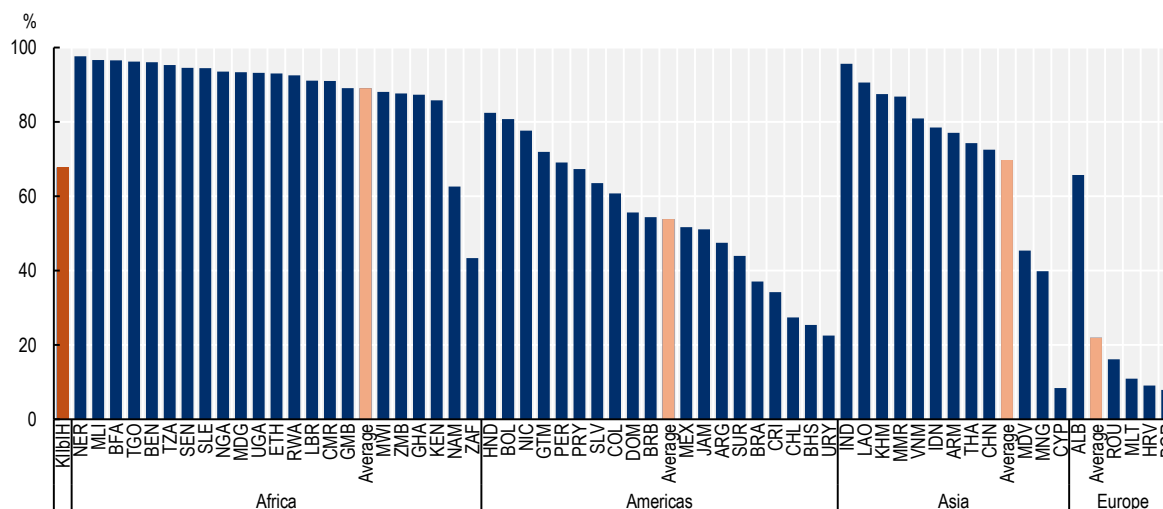
While the informal economy is widespread, it is far from monolithic or homogenous. It varies substantially across regions and countries, but also across workers, households and jobs. Understanding this diversity is crucial for policymakers seeking to reduce vulnerability and strengthen resilience in the informal economy. In fact, “one-size-fits-all” approaches are unlikely to be effective and may even prove harmful. Updated portraits of informality that reflect the heterogeneity of informal workers, as well as the wider household contexts in which they live, can support more effective policymaking.

Informality remains the norm in developing countries

Informality remains widespread among both men and women in emerging markets and developing economies (EMDEs). Across countries covered by the KIbIH, an average of 68% of workers aged more than 15 years are in informal employment, with similar levels for men and women. Rates vary sharply across countries and regions, from 89% in the KIbIH sample of African countries, to 70% in Asian countries, 54% in Latin American and Caribbean countries, and 22% in European countries (Figure 1.1).

Figure 1.1. Labour informality dominates in developing countries but varies across them

Share of workers aged above 15 years in informal employment, latest year available



Note: Informality rate refers to the number of workers aged above 15 years employed informally, expressed as a share of all workers aged above 15 years. KIbIH and regional averages are calculated as simple unweighted averages of countries for which data are available. Regional classification of countries follows the geographical grouping of the United Nations' M49 standard.

Source: (OECD, 2026^[1]), "Key Indicators of Informality based on Individuals and their Households (KIbIH)", <https://data-explorer.oecd.org>.

StatLink  <https://stat.link/b60v7i>

Informal workers face challenging labour conditions

Informal status is, first and foremost, associated with limited access to social protection. But informal workers also tend to face more precarious employment conditions than formal workers. On average, they are more likely to work fewer hours per week, to hold part-time jobs and to earn less, even after accounting for differences in hours worked. In some cases, these averages conceal a more complex reality. Informal workers are, for example, more likely to remain outside of standard hours arrangements – working either far fewer or far more hours. These precarious conditions tend to be even more pronounced for women.

Although most informal workers operate in the informal sector, some work in the formal sector

The majority of informal economy workers operate in the informal or household sectors. Across KIbIH countries, on average, 74% of informal workers are employed in the informal sector and 17% work in the household sector, which include forms of work such as subsistence farming. Yet a non-negligible share, 10% on average, works in the formal sector. In some countries (e.g. Guatemala, the Maldives, Namibia, Paraguay, South Africa and Suriname), the share exceeds 25%. This confirms that informal employment status extends across both the formal and informal sectors – and that even when they work in the formal sector, many workers still lack adequate social protection or labour rights. The potential for formalisation may be greater for these workers as they operate at the frontier between formality and informality.

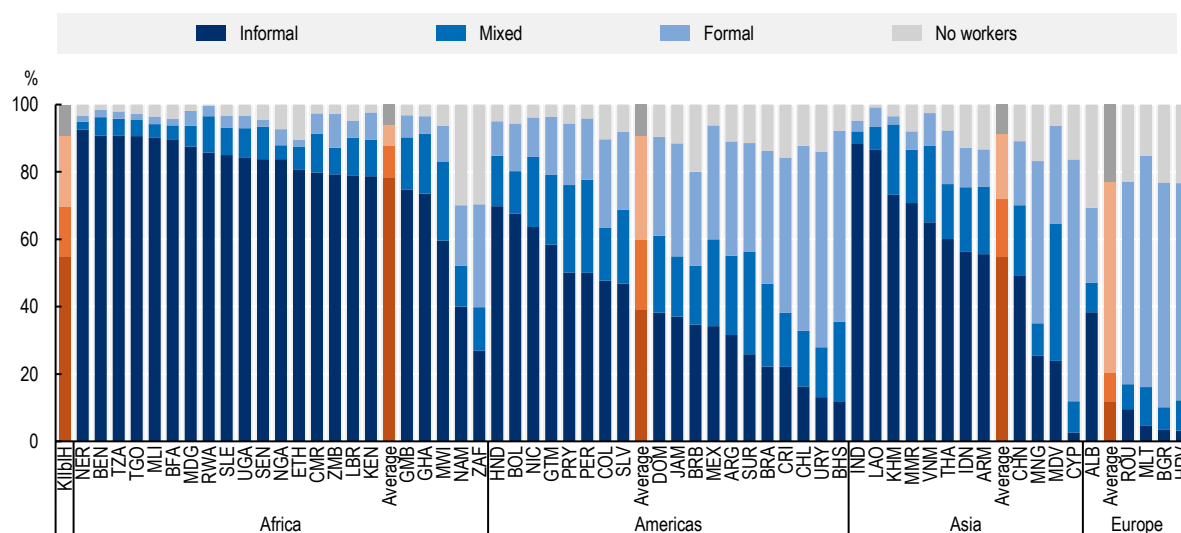
The household dimension further blurs the division between formal and informal workers

The household perspective and the reality of multiple job holding blurs the division between work in the formal and informal economies. Across KIbIH countries, 55% of the population lives in households where all earners are informal workers, 15% in mixed households with at least one informal and one formal

earner, 21% in households where all earners are formal workers, and 9% in households with no working member (Figure 1.2). Some informal workers live alongside formal workers and may benefit indirectly from their formal status, which often brings greater income stability and better social protection. This is notably the case, for example, when a formal worker's health insurance also covers other family members. Multiple job holding can also help formal and informal workers make ends meet when their main job does not provide enough hours or income. On average, across KIIBIH countries, 13% of informal workers and 11% of formal workers hold more than one job, with these additional jobs being mostly informal.

Figure 1.2. Labour informality affects many households

Distribution of the population by level of household informality, latest year available



Note: "Informal" refers to a household where all workers are informal workers; "mixed" refers to a household where at least one worker is an informal worker and one worker is a formal worker; "formal" refers to a household where all workers are formal workers; and "no workers" refers to a household with no working members. The distribution covers the entire population. KIIBIH and regional averages are calculated as simple unweighted averages of countries for which data are available. Regional classification of countries follows the geographical grouping of the United Nations' M49 standard.

Source: (OECD, 2026^[1]), "Key Indicators of Informality based on Individuals and their Households (KIIBIH)", <https://data-explorer.oecd.org>.

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Poverty and inequality are profoundly intertwined with informality

Poor people disproportionately live in fully informal households, in which poverty rates are highest. Across KIIBIH countries, individuals living in informal households face a greater risk of poverty, with poverty rates in informal households and in households with no workers consistently higher than in mixed and formal households. Most working poor are also employed in the informal economy. Overall, while not all informal workers are poor, and not all working poor are informal workers, a substantial overlap exists between informality and poverty.

Earnings inequality is high in the informal economy and explains most of the overall earnings inequality

Earnings inequality is high across KIIBIH countries in both formal and informal economies, but is highest among informal workers. The Gini coefficient (a standard measure of inequality) reaches 0.50 among informal workers, compared with 0.44 for formal workers. This raises the question of the effect of informality

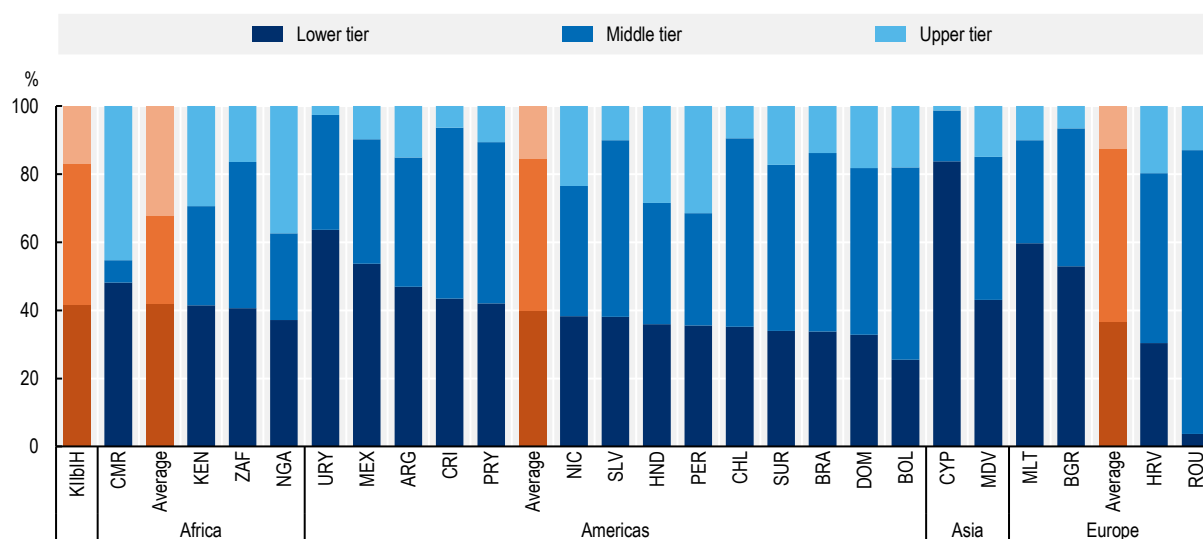
on overall earnings inequality. Decomposition results show that most of the overall earnings inequality comes from disparities within the informal economy itself. Inequality among informal workers accounts for 55% of total earnings inequality, compared with 32% for inequality among formal workers. By contrast, differences in earnings between formal and informal workers remain limited, accounting for only 13% of total earnings inequality.

High- and low-paid workers coexist in the informal economy, together with a large middle group

The informal economy encompasses very diverse employment situations. At one end, a relatively prosperous segment of high-paid workers may operate informally by choice and may have the capacity to contribute to social insurance. At the other end, a large, poorer segment of low-paid workers remains informal because they have few alternatives and cannot afford to contribute. Between these two groups lies a large segment of middle-income workers who often fall outside the scope of social assistance schemes without necessarily having the means or possibility to enrol in social insurance schemes. Across KILBIH countries, on average, 41% of informal workers belong to the lower tier of the earnings distribution, 43% to the middle tier and 16% to the upper tier (Figure 1.3). KILBIH data show that these groups also differ markedly in their characteristics. On average, rural workers, own account workers, workers with lower levels of education and women are overrepresented in the lower tier of the informal economy.

Figure 1.3. High- and low-paid informal workers coexist with a large middle group

Distribution of informal workers aged above 15 years by earnings categories, latest year available



Note: Earnings categories classify individuals based on their monthly labour earnings into three categories, defined relative to median earnings: i) low-paid individuals (or lower tier) ranging from the bottom of the earnings distribution to 50% of median earnings; ii) medium-paid individuals (or middle tier) ranging from 50% to 150% of median earnings; and iii) high-paid individuals (or upper tier) including anyone above 150% of median earnings. Within regions, countries are ordered by decreasing shares of low-paid workers. KILBIH and regional averages are calculated as simple unweighted averages of countries for which data are available. Regional classification of countries follows the geographical grouping of the United Nations' M49 standard.

Source: (OECD, 2026^[11]), "Key Indicators of Informality based on Individuals and their Households (KILBIH)", <https://data-explorer.oecd.org>.

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Addressing the challenge of ageing with informality

Population ageing is advancing rapidly in developing countries, many of which are expected to “grow old before they become rich”. This trend is unfolding alongside the persistence of a large informal economy. To date, most pension systems in developing countries remain incomplete and largely ignore the needs of informal economy workers. For governments seeking to secure the livelihoods of the elderly, addressing the combined challenge of ageing and informality will be a major policy priority in the years ahead.

Rapid ageing and widespread informality put at risk the livelihoods of current and future elderly in developing countries

Most developing countries are expected to transition from an “ageing” society to an “aged” one in just 15 to 35 years. In sharp contrast, this transition took place in developed countries over periods between 40 and 120 years. Ageing is a global phenomenon. Africa is the exception, as it remains at an early stage of the demographic transition, with a substantial youth bulge. Its countries are projected to become ageing societies only by 2075.

Widespread informality in developing countries adds a layer of complexity and translates into large gaps in effective pension coverage among older people. Although coverage varies widely across KIIbIH countries with available data, on average only 51% of people above the legal retirement age receive a pension, whether contributory or non-contributory, and 17% rely exclusively on a non-contributory pension. To cope with these gaps, many older people continue to work informally beyond retirement age or rely on family support, often through multigenerational households.

The large informality footprint also threatens the livelihoods of future older persons. On average across KIIbIH countries, only 40% of employed individuals between age 15 and the legal retirement age currently contribute to any type of pension scheme. Even among contributors, the share who will eventually qualify for a pension may be lower because of low contribution density and failure to meet eligibility requirements.

A combination of institutional and structural gaps prevents adequate pension coverage

Pensions systems encompass contributory and/or non-contributory schemes. Contributory pension schemes require members to make regular payments in return for the promise of a lump sum or regular income in retirement. In nearly all KIIbIH countries, fewer than 10% of informal workers contribute to such a pension scheme. Low-paid work is a binding constraint that disproportionately affects informal workers and limits their capacity to contribute to pension schemes. Yet low enrolment is not confined to low-paid informal workers with limited contributory capacity. It also affects medium- and high-paid informal workers, as well as formal self-employed workers who could, in principle, afford to participate. Besides affordability issues faced by low-paid workers, other barriers also discourage enrolment in contributory pension schemes. These include irregular earnings, lack of information, mistrust in the system and the absence of suitable contributory options, especially for non-employees. By contrast, non-contributory pension schemes (commonly known as social pensions) are funded through general government revenues and are chiefly designed to alleviate poverty. Where such schemes exist, they often suffer from serious shortcomings. In many developing countries, benefit levels may be too low to ensure a decent standard of living in old age, and the absence of automatic indexation may erode their value over time.

Financing the expansion of pension systems is challenging, but major opportunities exist

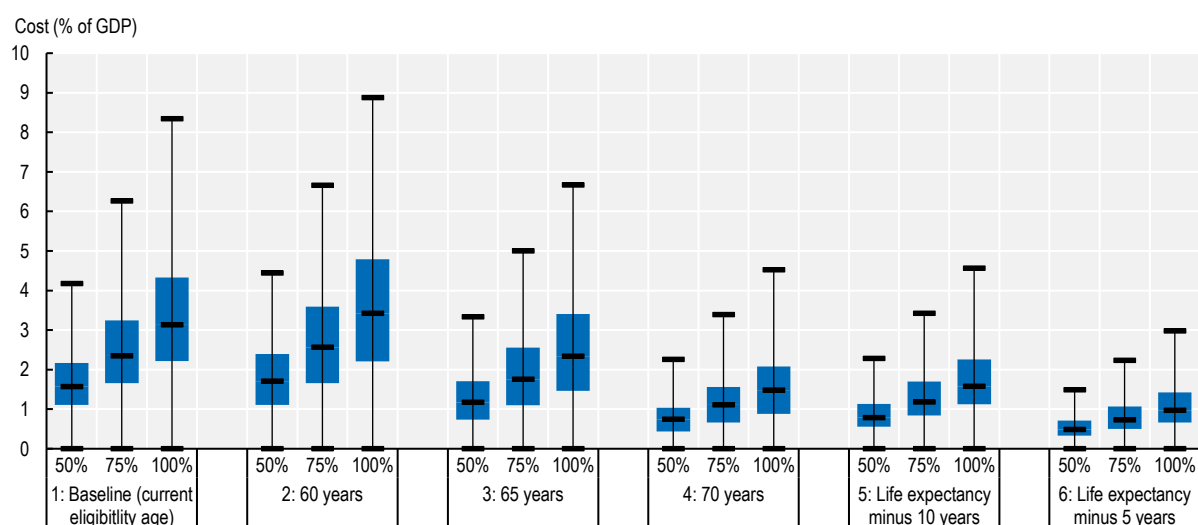
Expanding pensions systems and securing the livelihoods of older people requires building coherent multi-pillar systems that combine contributory and non-contributory schemes. Financing such multi-pillar systems is difficult, but opportunities exist on both the revenue and spending sides.

On the revenue side, a broad range of tax reforms could help mobilise additional public resources to finance the expansion of non-contributory pensions. These include broadening the personal income tax base, introducing simplified and compulsory tax regimes, implementing new health and environmental taxes, reassessing inefficient corporate tax incentives, and eliminating harmful subsidies. In parallel, specific mechanisms – such as presumptive tax regimes¹ – could help enrol large shares of informal workers with the capacity to contribute into contributory schemes.

On the spending side, KIIbIH estimates show that universal basic non-contributory pensions could be introduced at a relatively modest fiscal cost while generating substantial positive spillovers for other groups such as children or the working poor. In most KIIbIH countries, the cost of providing a universal basic pension set at 50% or 75% of the median per capita income² remains between 0.5% and 4% of GDP, depending on the age of eligibility (Figure 1.4).

Figure 1.4. Establishing universal non-contributory pensions could be done at a relatively low fiscal cost

Estimated cost of implementing a universal social pension as a share of GDP across KIIbIH countries



Note: The figure presents cost estimates based on six different scenarios of an age-based universal benefit (or universal non-contributory pension), without any means-test or pensions-test. The two main varying parameters are: i) the access age (age at which an individual becomes eligible); and ii) the level of benefits. For each scenario, the figure presents the cost estimates based on benefits equal to 50%, 75% and 100% of the median per-capita welfare. Depending on the country, median per-capita welfare is computed as the household total income or total consumption divided by the number of household members. The access age varies as follows. In Scenario 1, the access age is set at the current legal age of retirement. The access age is set at: 60 years for Scenario 2; 65 years in Scenario 3; and 70 years in Scenario 4. The access age is set at ten years prior to the life expectancy at age 60 in Scenario 5 and at five years prior in Scenario 6. For each scenario and level of benefits simulated, the statistical distribution of the cost (as a share of GDP) is calculated for each KIIbIH country. The lower bar corresponds to the lowest cost estimate, the upper bar to the highest cost estimate and the intermediary bar to the median cost estimate. For each scenario and level of benefits simulated, the box covers cost estimates ranging between the first and the third quartiles.

Source: Authors' simulations based on OECD (2026^[1]), IMF (2025^[2]) and United Nations (2021^[3]).

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Automation and the employment prospects of informal workers

Technological change is reshaping the world of work and affecting the lives of billions of workers worldwide. Growing evidence from developed countries suggests that, as automation technologies advance – both traditional forms and those linked to artificial intelligence (AI) – many jobs will disappear, others will be transformed in their task composition, and new jobs and occupations will emerge. It remains to be seen how such trends will affect workers in developing countries where informal employment is the norm.

The employment effects of automation differ between the formal and informal economy

Robots are already displacing industrial workers in routine manual occupations (such as assembly line jobs) while newer technologies such as generative AI are increasingly transforming non-routine cognitive tasks (e.g. interpreters). AI-enabled robots may also affect some non-routine manual occupations. Overall, workers' opportunities and challenges to adapt to these changes, use new technologies and upgrade their skills to match new forms of production differ markedly between the formal and informal economy.

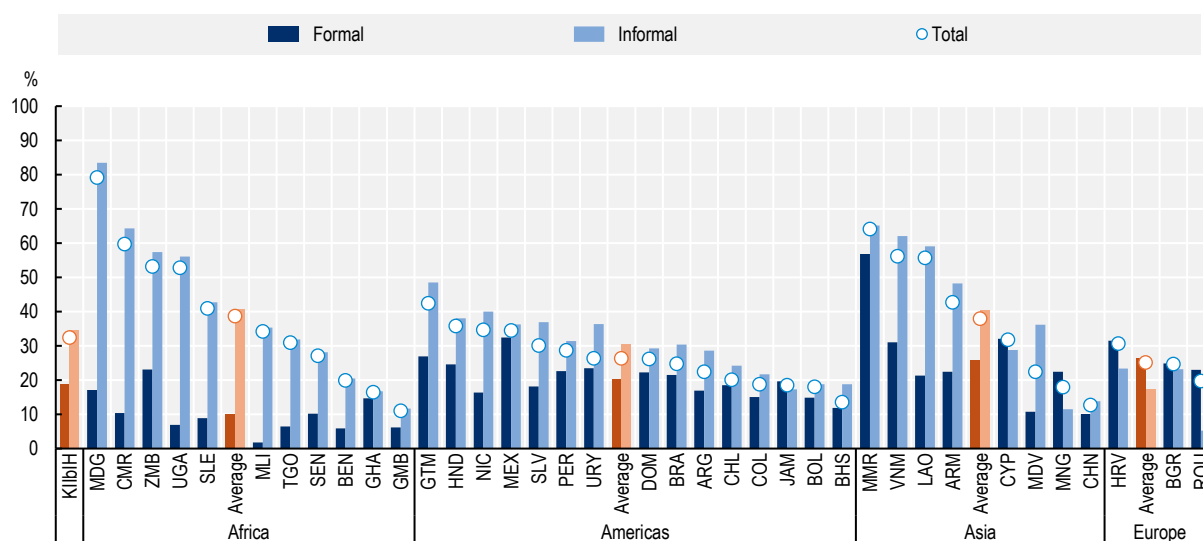
In developing countries, the informal economy not only dominates employment but is also heavily concentrated in manual and low-skilled work. On average across KIIbIH countries with available data, 77% of informal workers perform routine or non-routine manual tasks in their job, compared with 42% of formal workers. Informal workers are also disproportionately concentrated in low- and lower-middle-skilled occupations. Across KIIbIH countries, 17% of informal workers are in low-skilled jobs and 71% in lower-middle-skilled jobs, compared with 9% and 49% of formal workers, respectively.

Informal workers face considerable risks of traditional automation while AI-related risks are more of an issue for formal workers in more advanced countries

Because formal and informal workers differ substantially in their occupations and skills, traditional automation poses a much greater risk to informal workers. Conversely, the risks associated with AI automation are more concentrated among formal workers and in more advanced countries. Across KIIbIH countries, one in three workers holds a job at high risk of traditional automation. Informal workers are almost twice as likely to be exposed as formal workers, with 35% in high-risk jobs compared with 19% of formal workers (Figure 1.5). By contrast, only a small share of workers (2%) is exposed to the risks associated with AI automation. In this case, exposure is also lower among informal workers (1%) than among formal workers (5%). These AI-related risks are more concentrated in Latin America and the Caribbean and in Europe, reflecting differences in the distribution of high-skilled and cognitive tasks across workers by formality status and place of residence.

Figure 1.5. The risk of traditional automation is higher for informal jobs

Percentage of informal, formal and all workers aged above 15 years in occupations at high risk of traditional automation, latest year available



Note: Occupations are considered to be at high risk of automation if they have a significant share of important skills and abilities (more than 25%) that are highly automatable, following (Lassébie and Quintini, 2022^[4]). KilbIH and regional averages are calculated as simple unweighted averages of countries for which data are available. Regional classification of countries follows the geographical grouping of the United Nations' M49 standard.

Source: Authors' own estimates based on OECD (2026^[1]) and Lassébie and Quintini (2022^[4]).

StatLink  <https://stat.link/f1u5yl>

The risk of traditional automation is unevenly distributed within the informal economy

A particularly important concern within the informal economy is that the risk of traditional automation tends to fall disproportionately on the most vulnerable groups. Exposure is highest among younger and older workers, workers with little or no education, rural and agricultural workers, employees and unpaid family workers, low- and middle-paid workers, and workers living in poor households.

Automation risks to livelihoods are amplified at the household level, especially in informal households

The household dimension of informality further magnifies the effects of traditional automation, as many dependent household members rely on workers whose jobs are exposed to these risks. Across KilbIH countries with available data, 47% of people living in informal households are in a household in which at least one working member faces a high risk of traditional automation. In turn, 24% live in a household in which all working members face such risk. By contrast, in mixed households, in which formal and informal workers live together, these shares fall to 39% and 5%, respectively. In formal households, they stand at 18% and 9%, respectively. Importantly, informal workers who are at high risk of traditional automation are also more likely to be poor or near-poor than formal workers who face the same risks.

Informal workers and emerging environmental risks

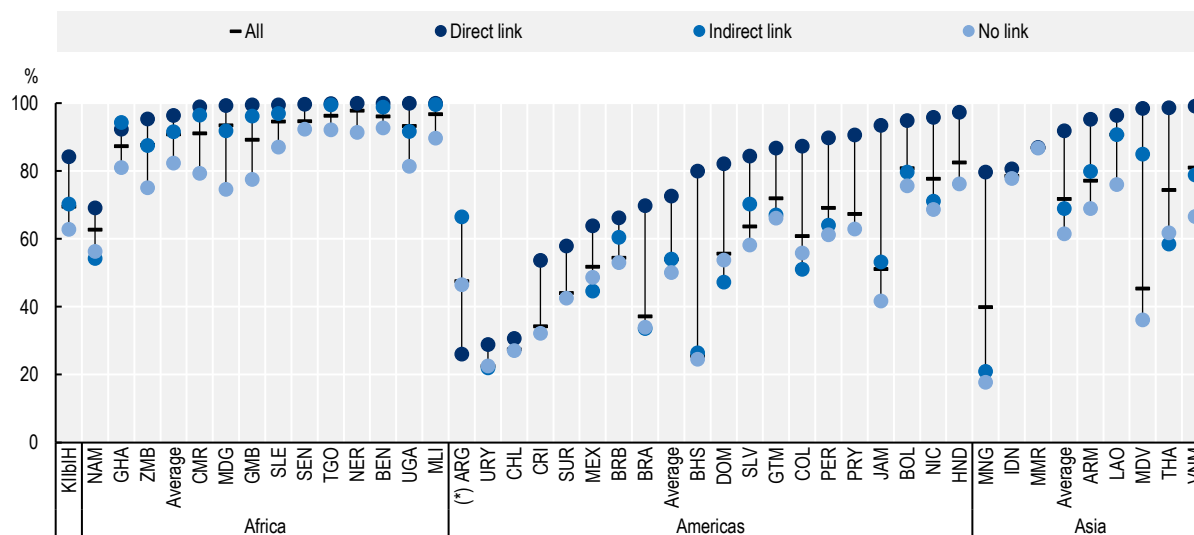
Environmental degradation is a complex and multifaceted concept that resists simple definition. Broadly, it refers to the deterioration of the environment caused by human activity or natural processes, including resource depletion, ecosystem and habitat destruction, species extinction, and rising pollution. Technological innovations have helped reduce some of the environmental damage associated with industrialisation. However, the combined effects of multiple factors throughout the 20th and into the 21st century – particularly accelerated industrialisation, natural resource depletion, urban sprawl and mass consumption – have placed growing pressure on the natural environment and generated new environmental risks. These risks have become multidimensional threats to societies worldwide, and to informal workers in particular.

Informal economy workers rely heavily on the natural environment for their livelihoods

Through the nature of their tasks, informal workers contribute in many ways to environmental sustainability. They rely heavily on the natural environment for their livelihoods and often have a smaller carbon footprint than formal workers. On average across KILBIH countries, 36% of workers' main jobs have a direct or indirect link to the environment.³ This share rises to 41% among informal workers but falls to 12% among formal ones. To a large extent, this strong dependence of informal workers on the natural environment reflects the larger share of informal workers employed in agriculture and, more broadly, the higher prevalence of informal employment in sectors with stronger environmental linkages (Figure 1.6). Informal workers' dependence on the natural environment is also reinforced at the household level, where access to resources, labour diversification and coping capacity depend heavily on household composition and living arrangements.

Figure 1.6. Sectors with stronger environmental links have higher shares of informal employment

Share of workers aged above 15 years in informal employment by sectoral link to the environment, latest year available



Note: KILBIH and regional averages are calculated as simple unweighted averages of countries for which data are available. Regional classification of countries follows the geographical grouping of the United Nations' M49 standard. Countries identified by (*) are surveys that cover only urban areas.

Source: (OECD, 2026^[1]), "Key Indicators of Informality based on Individuals and their Households (KILBIH)", <https://data-explorer.oecd.org>.

Informal workers are highly vulnerable to both droughts and floods

A combined measure of vulnerability based on exposure, sectoral sensitivity and adaptive capacity shows that informal workers are highly vulnerable to both droughts and floods. Across KIIbIH countries, more than 40% of informal workers face medium to high vulnerability to these hazards, compared with less than 2% of formal workers. This sharp difference mainly reflects the lower adaptive capacity of informal workers and their greater concentration in sectors exposed to environmental shocks. Should extreme weather events intensify, estimates suggest that the vulnerability of many informal workers could rapidly deteriorate further, putting their livelihoods at greater risk. Informal workers' vulnerability to droughts and floods is also amplified at the household level. Ample evidence shows that women and girls are significantly more likely to suffer severe consequences, including death, in the aftermath of natural disasters.

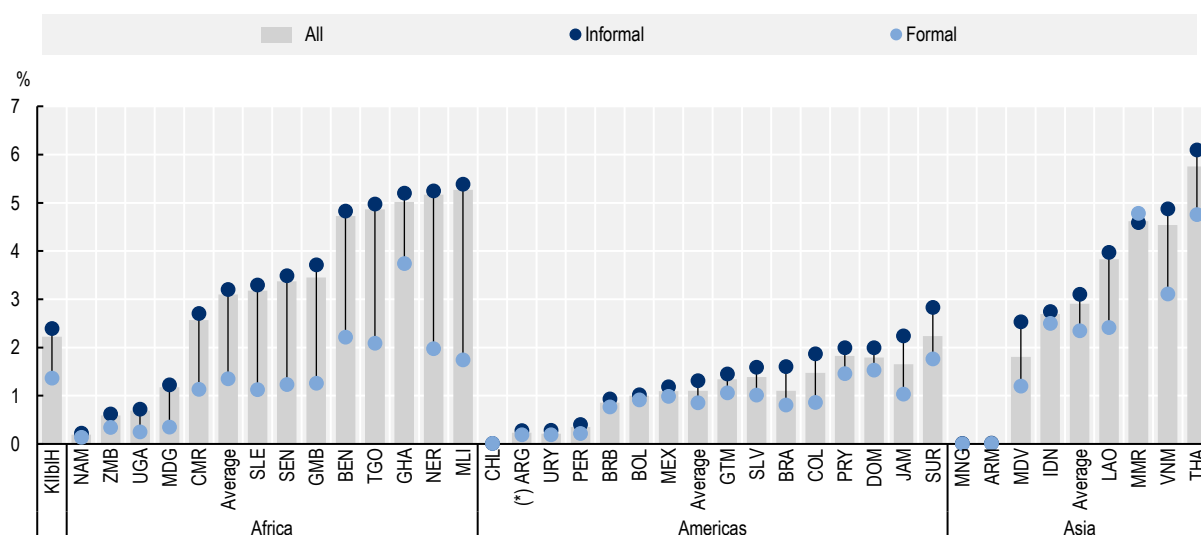
Heat stress disproportionately affects the productivity and income of informal economy workers

Extreme heat poses a particularly serious threat to populations from developing countries. Not only are high temperatures concentrated in countries and areas with large informal economies, but informal workers are also overrepresented in physically demanding jobs across sectors (e.g. construction and agricultural activities) in which heat-related productivity losses are greatest. Across KIIbIH countries, 55% of informal workers are employed in sectors with heavy (44%) or moderate (11%) physical intensity. By contrast, only 25% of formal workers are employed in sectors with heavy (9%) or moderate (16%) physical intensity.

As a result, heat stress is causing large and disproportionate productivity losses among informal workers. In 2025, excessive heat reduced GDP by 2.2% across the countries included in the analysis, equivalent to USD 510 billion in terms of purchasing power parity (PPP). This corresponds to nearly 60 billion hours of work lost, or about 28.8 million full-time jobs. Heat-related productivity losses in 2025 were substantially larger for informal workers (2.4%) than for formal workers (1.4%) (Figure 1.7). Under current labour market structures, these losses are projected to rise to 2.8% of GDP by 2055, equivalent to an additional 8 million full-time jobs lost. Informal workers are expected to face the steepest increase, with productivity losses rising by 0.6 percentage points, compared with 0.4 percentage points for formal workers.

Figure 1.7. Productivity losses due to excessive heat are substantially larger for informal workers

Heat-related productivity losses of informal, formal and all workers aged above 15 years, 2025



Note: Productivity losses for 2025 refer to average heat-related productivity losses computed over the period 2010-39. KIBIH and regional averages are calculated as simple unweighted averages of countries for which data are available. Regional classification of countries follows the geographical grouping of the United Nations' M49 standard. Countries identified by (*) are surveys that cover only urban areas.

Source: Authors' own estimates based on OECD (2026^[11]), Copernicus Climate Change Service CDS (2026^[5]) and Copernicus Climate Change Service CDS (2026^[6]).

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Policy recommendations

Securing the livelihoods of informal workers in times of global changes calls for careful monitoring and evidence-based policy responses. Analysis of the KIBIH data in this report shows that the diverse, plural and segmented structure of the informal economy, as well as the way global changes affect informal workers, have widespread and deep policy implications. To be effective, policy responses need to recognise the heterogeneity in the informal economy while also addressing the specific needs and constraints of workers with different characteristics and in diverse employment situations and household contexts. Such policies need to be both context-specific and integrated into a coherent development strategy. Importantly, informal workers often have the potential to be a central part of the solution – for instance, to address environmental degradation. Investing in them and ensuring that they are better equipped and protected is therefore in the interest of the broader society. A critical factor, however, is the fiscal space available to policymakers, which in many developing countries remains constrained by a narrow tax base, debt pressures and exposure to external shocks.

Against this backdrop, a strategy to secure the livelihoods of informal workers could be articulated around the following six mutually reinforcing pillars: i) strengthen social protection systems; ii) support firms and the private sector in creating more and better jobs; iii) invest in education, training and skills development; iv) tailor specific measures to vulnerable groups; v) support development of local infrastructure, basic service delivery and care services; and vi) further mobilise domestic resources.

Strengthen existing social protection systems to expand coverage for informal workers while ensuring adequate social protection floors throughout the different life stages

The unequal employment situations and uneven contributory capacities of workers in the informal economy call for differentiated strategies to extend social protection coverage. These strategies should rest on multiple pillars, combining contributory pathways with adequate non-contributory social protection floors.

For informal workers who belong to the upper and upper-middle tiers of the earnings' distribution, and who are typically more responsive to conventional formalisation incentives, policy design should emphasise regulatory inclusion policies. This includes: ensuring effective coverage by the labour legislation and tax framework; encouraging voluntary contributions to social insurance systems; providing appropriate contribution subsidies; simplifying registration and payment procedures, notably for the self-employed who run micro-enterprises; and strengthening enforcement of regulations for both employers and self-employed workers.

For informal workers who belong to the lower and lower-middle tiers of the earnings' distribution, policies should acknowledge that a substantial share of workers may remain in low-productivity and informal occupations over the long term. Rather than focusing only on hypothetical formalisation objectives, priorities should shift towards mitigating the immediate dual disadvantage of informality and low earnings. This notably includes enhancing collective bargaining capacities for low-paid informal workers and extending social protection via non-contributory benefits, such as social pensions and cash transfers.

It is equally important to ensure that, as investment in social protection expands, systems cover the full range of risks individuals face across the life course, from infancy to old age. This requires a clear understanding of tight fiscal constraints and of the effects that major global trends, including ageing, environmental degradation and automation, may have on jobs and livelihoods.

Support firms and the private sector in creating more and better-quality jobs

Public policies can play a strategic role in fostering private investments in decent job creation and supporting firms with the greatest employment potential. Achieving these objectives requires a policy mix that supports firms across three main axes: to grow, upgrade and formalise.

Growth-friendly policies should focus on removing the structural barriers that prevent firms, especially micro, small and medium-sized enterprises, from expanding and investing. From a policy point of view, it notably includes improving access to reliable infrastructure, addressing transport and logistics bottlenecks, strengthening firms' access to markets, and expanding access to finance for firms with high growth potential.

In parallel, well-designed industrial, trade and investment policies can help firms upgrade and move into higher value-added activities with stronger employment potential. This is particularly important in sectors in which informal employment remains concentrated. In practice, these policies entail supporting technology adoption, strengthening managerial capabilities, facilitating compliance with product and quality standards, and helping firms integrate into local, regional, and global value chains. Accompanying the development of these value chains should also involve: promoting the use of written rather than oral contracts by national and foreign enterprises and local suppliers; regulating subcontracting arrangements to ensure the fair treatment of locally employed workers, including dependent contractors; and, in the case of transnational companies, raising awareness and uptake among firms about responsible business conduct best practices. The *OECD Guidelines for Multinational Enterprises* and the *OECD Due Diligence Guidance for Responsible Business Conduct* – together with the detailed OECD due diligence recommendations for specific sectors and supply chains, including minerals, agriculture, garments and footwear, extractives, and finance – outline important principles and provide implementation tools.

Governments should consider, where possible, incorporating these frameworks into binding national regulations.

Regulatory and legal frameworks should also make formal job creation more feasible and more attractive for firms through a combination of administrative simplification, appropriate incentives and credible enforcement. Simplifying business registration, taxation and social security contribution procedures, for example through presumptive tax regimes, can facilitate formalisation, especially for small firms and self-employed workers. Creating clear incentives for formalisation is also essential. These may include reserving access to certain public procurement opportunities and SME support programmes for registered firms. They could also entail linking subsidised credit and credit guarantees to compliance with tax and labour obligations, and introducing temporary contribution subsidies or phased contribution schedules for newly formalised firms and self-employed workers.

Finally, policy efforts should focus on the quality of the jobs created. Supporting private sector development should go hand in hand with efforts to improve working conditions and to strengthen compliance with occupational safety and health and other labour standards. They should also expand access to social protection, promote safer and more stable employment relationships, and encourage social dialogue.

Invest in human capital through education, training and skills development

Creating more and better-quality jobs requires ensuring workers have the skills and human capital needed to move into, remain in and succeed in formal employment. This is especially important for informal workers with low levels of education, many of whom are concentrated in sectors that are highly exposed to global changes, including traditional automation and environmental degradation. Skills policies can reduce informal workers' vulnerability in two complementary ways: i) by helping them adapt within their current jobs; and ii) by supporting transitions towards more productive sectors and occupations that are less exposed to these risks.

To be effective for informal workers, skills strategies must be designed around their specific needs and constraints, while also responding to rapid changes in the labour market. First, they should prioritise task-focused lifelong learning, vocational training and digital literacy, so that workers can respond to changing technologies, production processes and market demands. Second, stronger co-ordination is needed among policymakers, training providers and the private sector to ensure that training content aligns with labour-market needs. This also applies to formal education systems: in most countries, secondary and tertiary curricula should better equip young people with the skills most in demand in the labour market. Third, skills policies should strengthen the recognition and certification of prior learning and work experience across jobs and sectors, helping informal workers build on what they already know, make their skills more visible and reassure potential employers.

The design and delivery of training are equally important. Programmes should be tailored to the practical constraints faced by informal workers. This means making them short, modular, locally delivered, compatible with workers' schedules and adapted to low literacy levels where needed. Participation costs should also be reduced through stipends, transport support, or links with cash-transfer and public employment programmes.

Skills policies should also address the gender-specific barriers that limit access to training and labour-market transitions. Gender gaps remain a major constraint to skills development, including in foundational skills, participation in technical and vocational education and training, and access to more productive activities. Informal female workers often face lower literacy levels, limited mobility, higher care responsibilities while also having weaker access to information, finance and employer networks. Training programmes should therefore include targeted outreach to women, flexible schedules, childcare support, and links with women's organisations, co-operatives and local employers.

Address the specific disadvantages faced by groups of informal workers in situations of heightened vulnerability

The informal economy is not a monolithic block. For example, women in informal employment tend to earn less than men, work fewer hours and are more likely to hold part-time jobs; pension coverage is much lower among older women or in rural areas; informal workers in agriculture and construction are far more exposed to heat stress and the resulting income losses than workers in other sectors; digitalisation and AI may drive the expansion of platform jobs, which are often associated with weak legal protection and limited access to social insurance. All these examples show that many workers of the informal economy face overlapping vulnerabilities or specific challenges linked to their social, demographic, gender and economic characteristics.

Addressing the specific vulnerabilities that some groups of informal workers face calls for tailored policies. A one-size-fits-all approach to formalisation and the expansion of social protection is not sufficient and risks leaving many individuals and households behind. Effective responses depend on a solid understanding of local challenges, supported by disaggregated data – including by gender – and robust analysis. It also requires developing specific mechanisms for the most vulnerable segments of the informal economy. These can take many forms, ranging from targeted instruments, such as matching contributions to boost pension contributions among low earners who remain outside the scope of contributory pension systems, to broader and full-fledged programmes such as women’s entrepreneurship initiatives that help women start, formalise, sustain and grow their businesses.

Support the development of local infrastructure, basic service delivery and care services

Turning the current challenges linked to jobs and livelihoods of informal workers into opportunities calls for a broad policy approach that goes beyond labour market interventions. Housing quality, public infrastructure, access to basic services, care responsibilities, health constraints and digital connectivity all shape workers’ ability to sustain their livelihoods and to cope with potential shocks. Policy responses should therefore complement labour market and social protection measures with broader investments in local infrastructure and essential services, especially in low-income urban and rural areas in which informal workers are concentrated.

This broader perspective is particularly important in the context of major global trends such as ageing, automation and environmental degradation. In responding to these trends, non-labour policies can have a decisive influence on the livelihoods of informal workers and their families. For example, informal workers are often disproportionately exposed to heat stress, floods and droughts because they are concentrated in high-risk sectors and physically demanding jobs. But the risks are amplified because many also live in poor-quality housing, underserved neighbourhoods or informal settlements, and areas with limited access to water, sanitation, drainage, cooling and healthcare. Addressing these risks requires stronger co-ordination across policies linked to labour, social, housing, infrastructure and urban planning, including upgrading low-income housing, expanding basic services, investing in greener and cooler neighbourhoods, implementing stronger local disaster risk management, and integrating informal settlements into climate adaptation strategies. In contexts of persistent informality, old-age insecurity is characterised not only by low pension coverage but also limited access to healthcare, long-term care and support services for dependent older persons. Strengthening income support in old age should therefore be accompanied by the expansion of affordable care services, support for community-based care and measures to reduce the unpaid care burdens that often fall on women within households. In the context of digitalisation and automation, adaptation also depends on whether workers can reliably connect to digital systems and services. Expanding access to electricity, internet connectivity, devices and digital public infrastructure can help informal workers use digital payments, reach customers and suppliers, access online training, and interact more easily with administrative and social protection systems.

Mobilise sufficient domestic resources

To finance more inclusive and sustainable policy frameworks that can secure the livelihoods of informal workers, governments need to mobilise more domestic resources. These efforts include fiscal reform, improved spending efficiency and innovative contribution collection mechanisms adapted to the realities of informal work. Fiscal reforms can aim to: eliminate deductions on personal income tax or lower excessively high exemption thresholds; reassess corporate tax incentives to ensure they effectively promote investment and formal employment; introduce new excise taxes – such as health taxes on tobacco, alcohol and sugar-sweetened beverages – and reduce fossil fuel subsidies; and consider introducing personalised value added tax (VAT)⁴ to broaden the revenue base.

Financing social protection is a particularly urgent issue. In 2025, the Fourth International Conference on Financing for Development (FfD4), held in Sevilla, stressed the crucial role of mobilising additional domestic public resources and ensuring their effective and efficient use to achieve the objective of increasing social protection coverage in developing countries by at least 2 percentage points per year (United Nations General Assembly, 2025^[7]). As non-contributory social protection schemes are usually financed through taxes or other state revenues, their expansion would typically require an increase in the tax base. For the contributory pillars of social protection, raising social security contributions will be essential. This requires promoting the formalisation of workers and businesses – especially for self-employed workers, who are often excluded by design. Acknowledging that there is no single solution to achieve full formalisation, policymakers should also consider alternative and innovative ways to expand contribution collection. One promising option is the implementation of presumptive tax regimes (or monotax systems), which consolidate multiple tax obligations – including social security contributions – into a single payment. To be effective, presumptive tax regimes must be carefully designed, with eligibility criteria and tax structures calibrated to preserve incentives for formalisation, protect the integrity of the standard tax regime, and ensure equity across taxpayers. Additionally, policymakers can leverage the growing digitalisation of payments to create voluntary micro-contribution channels at points of sale. These innovative mechanisms may become particularly relevant as platform work and other forms of gig work expand.

Notes

¹ Presumptive tax regimes (PTR), also known as monotax systems, allow micro and small enterprises, as well as self-employed individuals, to pay a single, consolidated tax that covers multiple obligations – including social security contributions. This approach reduces administrative burdens for tax authorities and lowers compliance costs for taxpayers. The revenue generated is allocated by the administering authority among relevant institutions, such as tax administrations and social security funds. In recent years, these regimes have become increasingly popular, notably in Latin America and the Caribbean, with examples including the *monotributo* systems in Argentina and Uruguay. For more details, see Mas-Montserrat et al. (2023^[9]) and Mas-Montserrat, Colin and Brys (2024^[8]).

² Depending on data availability, median per-capita consumption was used to proxy income in certain countries.

³ To measure the environmental link of workers to the environment, jobs are classified into three categories based on their codes in the fourth revision of the International Standard Industrial Classification of All Economic Activities (ISIC-04). Sectors with a *direct* environmental link either rely directly on natural resources or play a key role in environmental management. They include all activities within agriculture,

forestry and fishing (Sector A) and within mining and quarrying (Sector B). Sectors with an *indirect* environmental link are those in which most activities depend on the environment without directly exploiting natural resources. They include a subset of activities belonging to manufacture of food products (Sector C-10); manufacture of beverages (Sector C-11); manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials (Sector C-16); manufacture of paper and paper products (Sector C-17); wholesale of agricultural raw materials and live animals (Sector G-462); wholesale of food, beverages and tobacco (Sector G-463); retail sale via stalls and markets of food, beverages and tobacco products (G-4781); camping grounds, recreational vehicle parks and trailer parks (Sector I-552); travel agency and tour operator activities (Sector N-791); and botanical and zoological gardens and nature reserves activities (Sector R-9103). All remaining sectors are classified as having no environmental link. Together, sectors with direct and indirect links are referred to as *environmentally linked* sectors. See Chapter 5 for more details on the methodology.

⁴ A personalised VAT is a proposed mechanism designed to address the so-called “impossible trinity of consumption taxes” – a broad base, a single rate and targeted relief for those most in need. In practice, it combines three elements: i) universal application, implying a general tax base; ii) a single VAT rate, achieved by eliminating exemptions and reduced rates for specific goods; and iii) targeted transfers to the poorest population deciles, in the form of self-financed tax refunds, to offset the resulting increase in tax burden. See Barreix et al. (2022^[10]) for further details.

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2 Portraits of informality

The informal economy is not a monolithic entity: it varies substantially across regions and countries, and also across individual workers, households and jobs. Drawing upon new data from the OECD's *Key Indicators of Informality based on Individuals and their Household* (KIbIH), which covers 58 emerging markets and developing economies (EMDEs), the chapter presents updated and comprehensive portraits of informality. Notably, the KIbIH refers to the International Conference of Labour Statisticians (ICLS) guidelines for measuring the informal economy, which includes employment in the informal sector, informal employment in the formal sector, and household-based employment. The resulting portraits of informal workers and their dependents show that the informal economy is highly heterogeneous and consists of multiple and largely unequal employment situations across regions and countries. The division between work in formal and informal economies is also increasingly blurred when adding a household perspective and recognising the reality of multiple job holding. Understanding the diverse and multi-faceted realities of informal work is crucial for policymaking, as one-size-fits-all approaches are unlikely to succeed. Major global trends – including demographic changes, automation and climate risks, as well as other structural transformations – are set to have profound implications for informal workers across the world, making strategic policy action all the more urgent.

In brief

Portraits of informality: Facts and lessons from the KILBIH database

- Informality – referring to work that takes place either in informal economic units or through informal employment relationships, including within formal firms, and is not adequately covered by labour regulation, taxation or social protection – remains the norm across most developing countries. It often creates vulnerabilities for workers. Large regional disparities exist, with informality being the highest in countries in Africa and Asia.
- Although most informal workers operate in the informal sector, some work in the formal sector. Recent economic growth and its patterns were not sufficient to robustly curb informality.
- Adding a household perspective and recognising the reality of multiple job holding further blurs the division between the formal and informal economies. While most informal workers live in completely informal households, one in three individuals live in households with at least one formal worker, who may provide some sort of social protection to the other members. A non-negligible share of formal and informal workers has a second job which is informal.
- Compared with formal workers, informal workers are more likely to work either fewer or many more hours per week, to work part-time and to earn substantially less, with women and rural individuals particularly disadvantaged in multiple ways. Overall, a much larger share of informal employees (than formal ones) earn less than the statutory minimum wage.

Informality, poverty and inequality are deeply intertwined

- Most of the working poor are informal, and most of the poor live in fully informal households. Yet not all of the working poor are informal and not all informal workers are poor.
- The informal economy largely consists of three tiers. A relatively prosperous segment of high-paid workers may operate informally by choice; a large proportion of middle-paid workers are often overlooked by policymakers; and an impoverished segment of low-paid workers lack better alternatives. Informal workers in different tiers have different characteristics. Women, the self-employed, rural workers and less educated workers are disproportionately located in the lower tier of the earnings distribution.
- Overall inequality in earnings primarily originates from differences among individual characteristics of informal workers and, to a lesser extent, among formal workers (within-group). Conversely, the contribution of the mean differences between formal and informal workers (between-group) is small. Thus, without addressing skill or productivity gaps, formalisation is unlikely to reduce substantially overall earnings inequality.

Tackling the diverse realities of the informal economy requires differentiated and targeted policies

- Policy interventions must move beyond a monolithic view of the informal economy and adopt differentiated and targeted strategies across four areas: i) adapt formalisation strategies and extension of social protection to the diverse characteristics of different tiers of informal workers; ii) establish and implement minimum or decent wage regulations that carefully balance poverty reduction objectives with employment effects; iii) address structural and deeply ingrained gender discrimination that constrain women's formal labour supply and earning potential; and iv) reduce overall inequality by focusing on skill acquisition, stimulating productivity and reducing labour market segmentation within the informal economy itself.

Introduction

Addressing the challenge of informality is central to achieving sustainable development. Indeed, there is growing recognition that leaving informal workers behind constitutes a major barrier to realising the UN Sustainable Development Goals (SDGs). The informal economy refers to working arrangements that are – in practice or by law – not subject to national labour legislation, income taxation, or entitlement to social protection or other employment guarantees (see Annex 2.B for more details on the definition and measurement of the informal economy). Such situations can exist even in the formal sector. The challenge informality poses is reflected in three specific goals of the 2030 Agenda for Sustainable Development: SDG1 related to poverty eradication; SDG8 related to decent work and economic growth; and SDG10 concerning the reduction of inequalities. With less than four years remaining to achieve these SDGs, it is essential to assess the current situation of informal workers and build a case outlining why understanding the diverse realities of informality is crucial for policymakers.

Despite recent tangible progress in the formalisation agenda, the pace of change and the benefits of formalisation remain insufficient, especially for women and rural and low-educated workers. Informality remains part of the daily lives of billions of workers globally. It comes with considerable risks and vulnerabilities, especially for those in the lower tier of the informal economy. This situation calls for policy solutions that go beyond the formalisation agenda and embrace the goals of social justice and decent job creation.

The broader context in which policymakers operate is also increasingly complex. Global trends such as demographic changes, automation and climate risks, as well as other broad structural changes of the economy and society are bound to have profound implications for informal workers across the planet. More than ever, it is vital to support policy design and implementation with updated portraits of informality that capture the heterogeneity of informal workers and account for the broader context of their households.

This chapter presents comprehensive portraits of informal workers and their dependents, drawing upon data from the *Key Indicators of Informality based on Individuals and their Household* (KIIBIH). Such data are available for a large sample of emerging markets and developing economies (EMDEs) at different stages of development (Box 2.1). The first section of the chapter examines the magnitude and the evolution of informal employment, at both individual and household levels. The second section identifies formal-informal employment gaps in terms of earnings, working hours, part-time work and multiple job holding. The poverty impacts of informality are explored in the third section. The fourth section analyses the distribution of earnings, the contribution of the informal economy to overall earnings inequality, and the diversity of situations in the informal economy. The chapter concludes by summarising the main findings and discussing the policy implications.

Overall, the analysis shows that informal labour markets are composed of multiple and largely unequal employment situations. The boundary between work in formal and informal economies is increasingly blurred, particularly when adding a household perspective and recognising the reality of multiple job holding. Understanding these diverse realities of informality is crucial for policymakers determined to tackle the vulnerability challenges in the informal economy, as “one-size-fits-all” policies will likely fail and may even be harmful.

Box 2.1. What is the KIbIH?

The *Key Indicators of Informality based on Individuals and their Household* (KIbIH) is a database compiled by the OECD Development Centre since 2017. To compute harmonised and aggregated indicators, the KIbIH relies on household surveys data – either household living conditions or household income surveys – as primary sources. While other publicly available harmonised statistics on informality largely draw upon labour force surveys to estimate the size of informal employment, the KIbIH uses household socio-economic surveys. This unique approach provides more information on the socio-demographic, welfare, and economic status of workers and their households.

As of June 2026, the KIbIH covers 81 countries, spanning Africa, Asia, Latin America and the Caribbean, and Europe. For several countries, the KIbIH provides a time series dimension though harmonised indicators available for more than one year.

Across this report, unless specified otherwise, KIbIH and regional averages are computed as simple unweighted averages across countries for which data are available. These estimates rely on available household surveys at the national level, and do not aim to be representative at the regional level.

For ease of readability, 2023 is used as the reference year for the KIbIH data presented in the report, although the latest year of reference may differ for each country included. Annex 2.A provides detailed information on the latest year and survey available for each country. All harmonised indicators of the KIbIH, including multiple years, can be accessed on [OECD Data Explorer](#).

Informality remains the norm in developing countries

Decent work is a critical objective of the development and human rights agendas. Both the quantity and quality of employment play key roles in reducing poverty and inequality, securing livelihoods and promoting inclusive growth. In most EMDEs for which data are available, informal employment is more common than formal employment; in fact, past economic growth performance has barely reduced the proportion of people working informally. It remains the case that most informal workers live in purely informal households – i.e. they do not cohabit with formal workers – and depend exclusively on informal labour for their livelihoods. As such, they are more vulnerable than formal workers in many socio-economic contexts. These realities bring urgency to the importance of tackling the vulnerability challenges of informal workers, creating more and better jobs, and improving incentives for formalisation.

While slightly declining, informality remains widespread for both men and women in developing economies

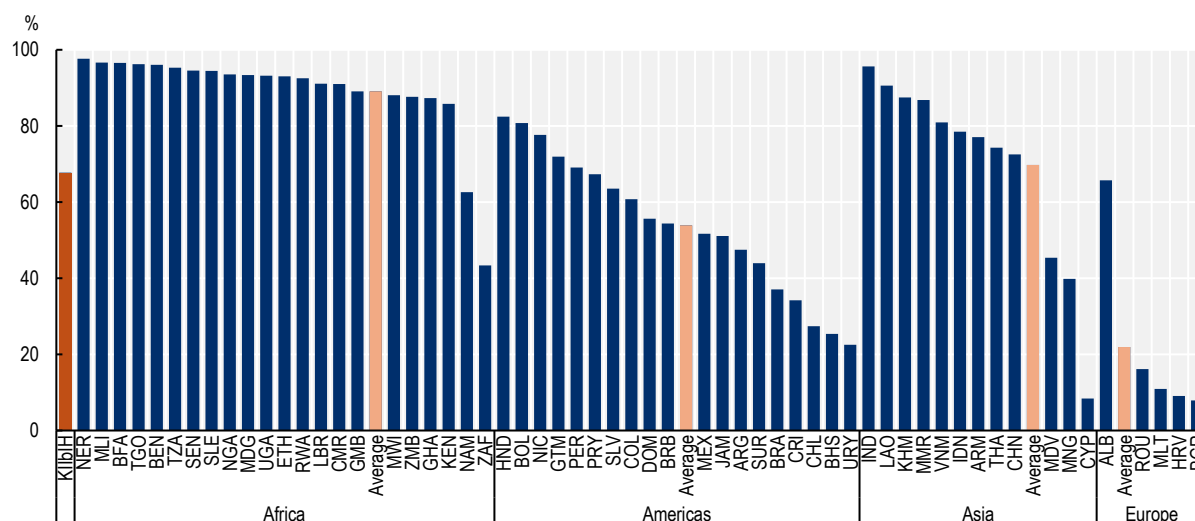
Across countries covered by the KIbIH, on average, 68% of workers aged more than 15 years are informally employed (Figure 2.1). In reality, informal employment varies widely across countries and regions. In the sample of African countries in the KIbIH, nearly nine out of ten workers (89%) are employed informally. In Asia countries, the figure declines to seven out of ten (70%). In sharp contrast, the figures are an average of more than five out of ten (54%) for all countries from the Americas and just slightly more than two out of ten (22%) in European countries covered by the KIbIH.

Within regions, the situation is very diverse. In Africa, informality is extremely dominant with limited variations across countries. In 15 of the 22 African countries (68%) covered by the KIbIH, informality rates stand above 90%; the informality rate drops below 80% in only 2 countries. The situation is much more heterogeneous in other global regions but still with wide variations across countries. In Latin America and

the Caribbean, informality rates range from less than 25% in the Bahamas, Chile and Uruguay, to more than 70% in Bolivia, Guatemala, Honduras and Nicaragua. In Asia, it ranges from less than 50% in Cyprus, the Maldives and Mongolia to more than 90% in Cambodia, India, Lao PDR and Myanmar.

Figure 2.1. Labour informality dominates in – but varies across – developing countries

Share of workers aged above 15 years in informal employment, latest year available



Note: Informal employment rate refers to the number of workers aged above 15 years employed informally, expressed as a share of all workers aged above 15 years. The definition of informal employment follows the guidelines of the International Labour Organization (ILO). KILBIH and regional averages are calculated as simple unweighted averages of countries for which data are available. Regional classification of countries follows the geographical grouping of the United Nations' M49 standard.

Source: (OECD, 2026^[1]), "Key Indicators of Informality based on Individuals and their Households (KILBIH)", <https://data-explorer.oecd.org>.

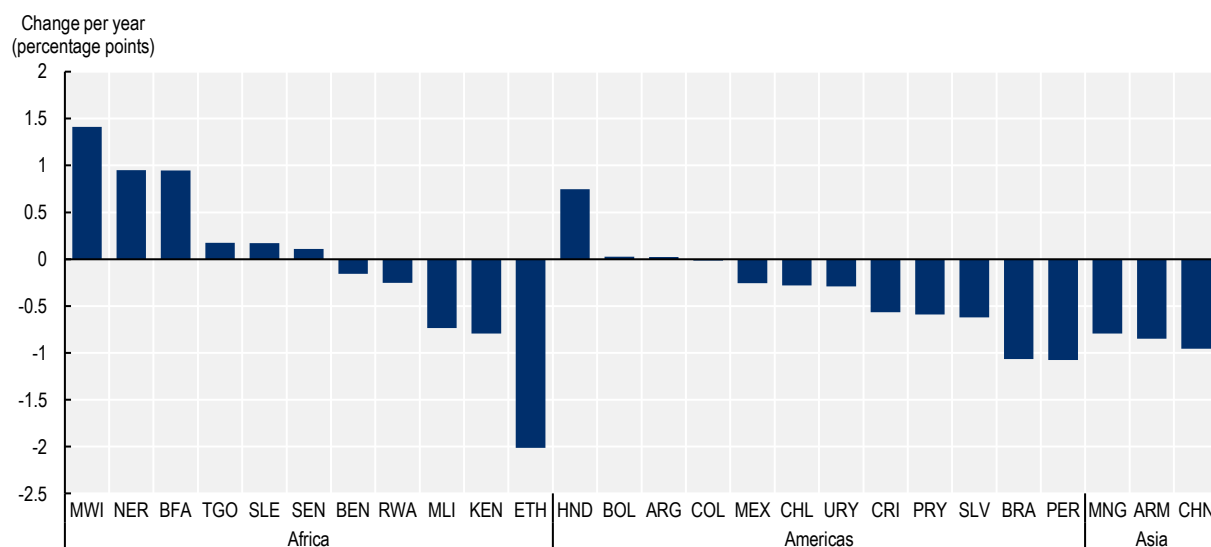
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Globally, informality affects both men and women but variations exist across countries and regions. On average in the 58 KILBIH countries included in the analysis, 67% of both male and female workers are informal. However, women are more likely to hold an informal job in 34 of the 58 countries from different world regions, and in 21 of the 22 African countries, where informality is generally very pervasive in the labour market.

KILBIH data for 26 countries for which data are available in years close to 2018 and 2023 show that informal employment has increased in some countries and declined in others (Figure 2.2). As the data cover the period of the COVID-19 outbreak, during which lockdown measures were sometimes introduced, these trends should be considered with some caution. In fact, restrictive measures put in place by governments in some countries during the pandemic disproportionately affected informal workers, leading to a drop in informal employment that was only temporary (OECD, 2023^[2]; ILO, 2022^[3]).

Figure 2.2. Changes in the prevalence of informal employment vary across countries

Annualised change in informal employment rates of workers aged above 15 years, various periods



Note: For each country, the change in the informal employment rate is annualised and calculated as the absolute change in the informal employment rate over the entire period of reference, divided by the length of the period of reference in years. Data are presented for all countries with at least two years of data and for the longest possible period of reference.

Source: (OECD, 2026^[1]), "Key Indicators of Informality based on Individuals and their Households (KIIbIH)", <https://data-explorer.oecd.org>.

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The ways in which informal employment interacts with economic growth and poverty vary across countries

Examination of the dynamics of informal employment, economic growth, educational outcomes and the evolution of poverty shows that the links between informality and development are complex. Earlier studies usually found that, across countries, a negative association exists between the level of informal employment and gross domestic product (GDP), the Human Development Index and labour productivity (OECD/ILO, 2019^[4]; Loayza, 1997^[5]; Johnson, Kaufmann and Shleifer, 1997^[6]). In contrast, informality shows a positive correlation with poverty (OECD/ILO, 2019^[4]). Within countries, these associations often disappear over time, indicating that reducing informality is not always associated with economic development; indeed, patterns of growth vary across countries and can sometimes drive informality (OECD/ILO, 2019^[4]; Elgin and Birinci, 2016^[7]).

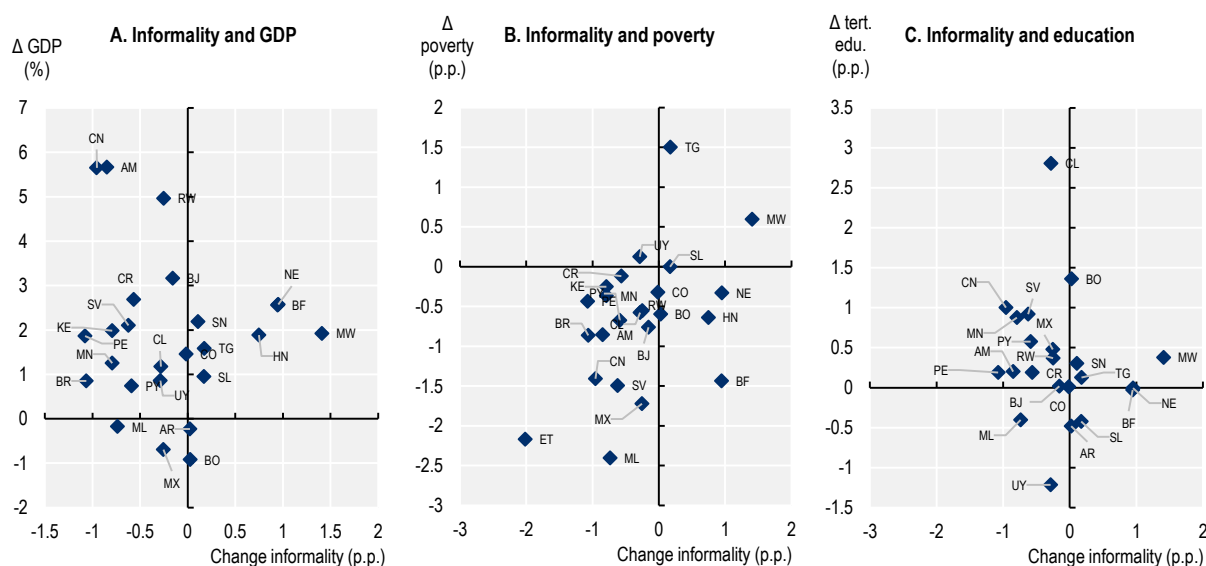
Recent evidence confirms that the ways in which informality interacts with economic growth and poverty vary substantially across countries. For the period mostly covering 2018 to 2023, Figure 2.3 represents (respectively) the simple relationships between the change in informality rates and GDP growth (Panel A), the change in the poverty rate (Panel B) and the change in tertiary education attainment (Panel C). Panel A shows that in 15 of 26 countries for which data are available, economic growth aligns with reduced informality. In 7 of 26 countries, however, economic growth is associated with an increase of informality. This apparent growth-informality paradox is particularly visible in Burkina Faso, Honduras, Malawi, Niger and Togo. Remarkably, even in some countries that experienced economic stagnation in recent years, the change in informality rates may be either negative (e.g. Mexico and Mali) or positive (e.g. Argentina and Bolivia). Differences in some pillars of growth policies – including good governance, political will, an enabling environment for the transition to formality, inclusive social dialogue and gradual approaches

leaving no one behind – obviously may play important roles in explaining such differences in outcomes (ILO, 2025^[8]; ILO, 2025^[9]).

Panel B of Figure 2.3 shows that, over time within countries, the relationship between informality and poverty is not always positive. Indeed, many countries in the KIbIH database that experienced in recent years a reduction in poverty have seen a concomitant decrease in informality; in others, however, poverty has decreased along with an increase in informality (e.g. in Bolivia, Burkina Faso, Honduras and Niger). Improvement in educational outcomes, expressed as the increase in the share of people aged 25 or more with a tertiary degree, are also correlated with lower informality (Figure 2.3, Panel C). In 12 countries, tertiary attainment increased while informality rates declined; in 5 countries educational achievements declined slightly while informality increased. The relation is far from being deterministic, however: in four countries, better educational achievements came with an increase in informality. Three of these four countries are African (Malawi, Senegal and Togo), signalling the time persistence of informality in this region.

Figure 2.3. Interactions among informality, economic growth, poverty and education are complex

Change in informal employment rates for workers aged above 15 years compared with changes in GDP (Panel A), poverty rates (Panel B), and tertiary education attainment (Panel C), various periods



Note: For each country, the change in each indicator (informal employment rate, gross domestic product (GDP), poverty and tertiary education attainment) is annualised, expressed in percentage (%) or percentage points (p.p.). Data are presented for all countries with at least two years of data and for the longest possible period of reference. Change in the informal employment rate refers to the annualised change in the informal employment rate of workers aged above 15 years. Change in GDP refers to the annualised change in GDP in constant prices. Change in the poverty rate refers to the annualised change in the poverty rate measured at the international poverty line of USD 6.85 in 2017 purchasing power parity (PPP). Change in tertiary education attainment refers to the annualised change in the share of individuals aged above 25 years with at least a tertiary degree.

Source: (OECD, 2026^[11]), "Key Indicators of Informality based on Individuals and their Households (KIbIH)", <https://data-explorer.oecd.org>; and (World Bank, 2023), "World Development Indicators", <https://databank.worldbank.org/source/world-development-indicators>.

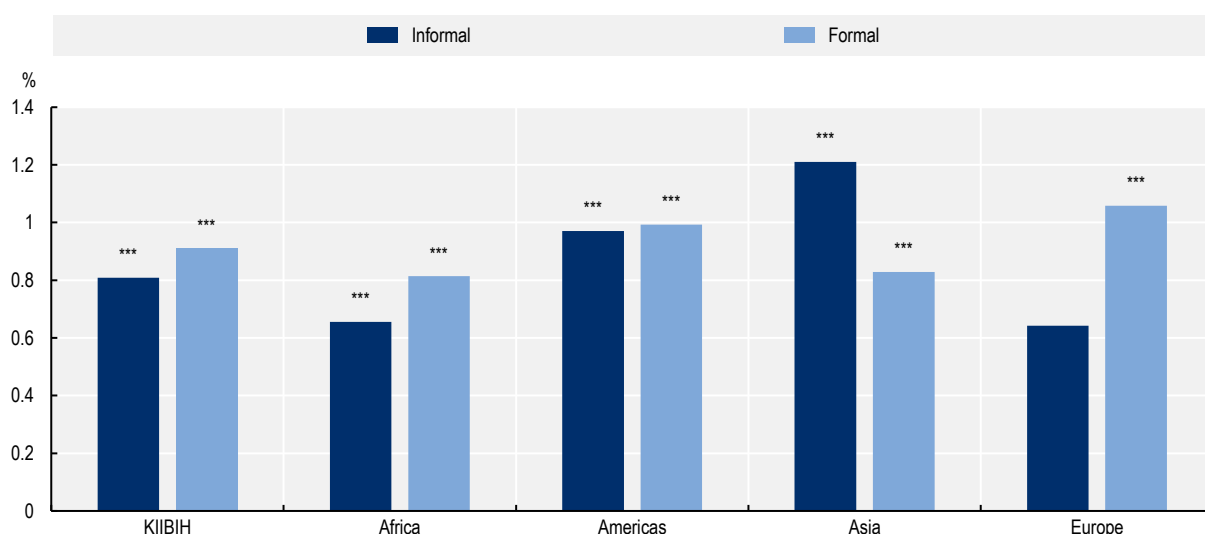
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Employment-growth elasticities (i.e. the percentage change in employment associated with one percentage change in GDP) for formal and informal employment show that the labour intensity of growth

varies significantly across countries and between formal and informal economies. In most cases, these country elasticities are below 1, implying that employment grows less than GDP due to increasing productivity. For countries in Asia, GDP growth is associated with higher job creation in the informal economy, while the opposite is true for countries in Africa, Latin American and the Caribbean, and Europe (Figure 2.4). Yet, the aggregate elasticities hide very different sectoral patterns of job creation. Across KIIBIH countries, the sectoral distribution of informal workers differs substantially from that of formal workers. Informal workers are overrepresented in agriculture (36% versus 8% for formal workers) and underrepresented in services (46% versus 74% for formal workers).

Figure 2.4. Employment-to-GDP elasticities vary across regions and between informal and formal economies

Percentage change in informal and formal employment associated with a 1% change in GDP



Note: Gross domestic product (GDP) is expressed in USD in 2021 purchasing power parity (PPP). Statistical significance of coefficients is reported at 5% (*), 1% (**) and 0.1% (***). KIIBIH estimates cover 57 countries; regional estimates cover 22 countries in Africa, 19 countries in the Americas, 11 countries in Asia, and 5 countries in Europe. The People's Republic of China is not included as sample population weights do not allow to compute employment changes in absolute terms.

Source: Authors' estimates based on (OECD, 2026_[1]), "Key Indicators of Informality based on Individuals and their Households (KIIBIH)", <https://data-explorer.oecd.org>.

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Although most informal workers operate in the informal sector, some work in the formal sector

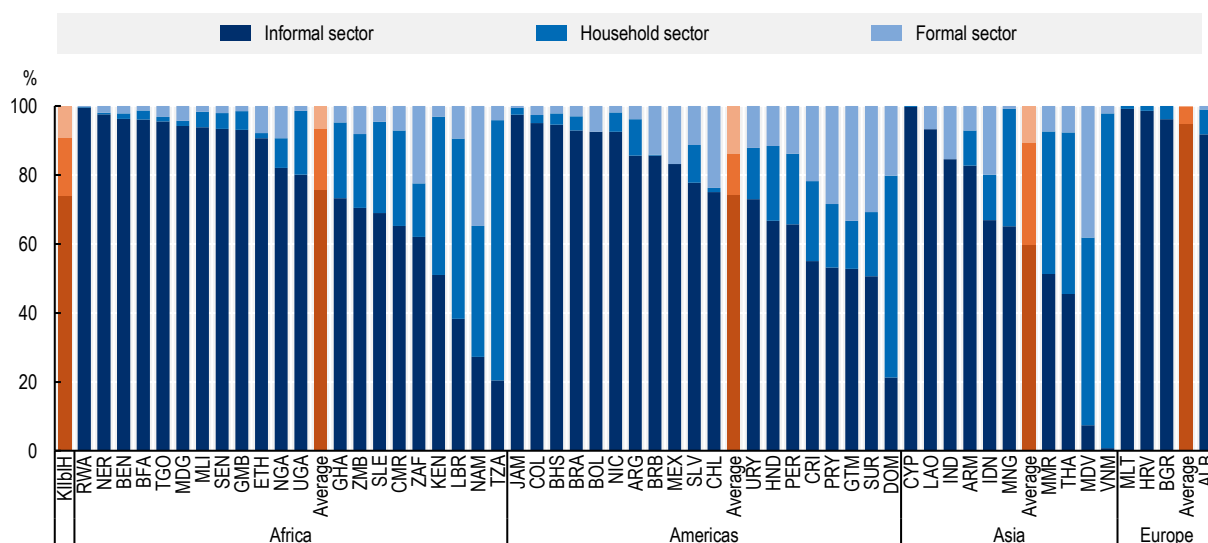
By and large, most informal economy workers operate in the informal or household sectors (see Annex 2.B for more details on the definition and measurement of the economy's three institutional sectors). Across the KIIBIH, on average, 74% of informal worker are employed in the informal sector and 17% work in the household sector, which includes forms of work other than employment (e.g. subsistence farming) (Figure 2.5). For comparison, according to the International Labour Organization (ILO), globally, 79% of informal workers are employed in the informal sector (ILO, 2023_[10]).

The concentration of informal employment within the informal sector varies across regions. In Europe, nearly all informal workers operate in the informal sector (95% of informal workers), whereas this proportion is lower in Latin America and the Caribbean (74%), Africa (76%) and Asia (60%). The household sector

employs a substantial share of informal workers in Asia (28%) and Africa (18%), with lower rates in Latin America and the Caribbean (12%) and in Europe (5%). These data underline that family businesses remain an important – although informal – source of jobs and income in developing countries (Ohnsorge and Yu, 2022^[11]; Aberra et al., 2023^[12])

Figure 2.5. Most informal workers are employed in the informal or household sectors

Distribution of workers in informal employment aged above 15 years by institutional sector, latest year available



Note: The definition of the formal, informal and household sectors follows guidelines and statistical concepts defined by the 20th International Conference of Labour Statisticians (ICLS). The formal sector comprises economic units that are formally recognised as producers of goods and services and are covered by formal arrangements. The informal sector comprises household unincorporated market enterprises – i.e. economic units producing goods or services mainly for the market with the purpose of generating income or profit. The household own-use production and community sector (or household sector) covers households and non-formal, non-profit organisations producing goods or services mainly for own final use or for the use of others without the purpose of generating income or profit. KILBIH and regional averages are calculated as simple unweighted averages of countries for which data are available.

Source: (OECD, 2026^[11]), “Key Indicators of Informality based on Individuals and their Households (KILBIH)”, <https://data-explorer.oecd.org>.

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A substantial proportion of informal workers also operate in the formal sector and are closer to the formal economy. Across the KILBIH, on average, 9% of informal workers are employed in the formal sector. In some countries (e.g. Chile, the People’s Republic of China, Guatemala, the Maldives, Namibia, Paraguay and Suriname), more than 25% of informal workers are employed in the formal sector. These data not only show that informal employment spans the formal and informal sectors, but also that many workers – even when they operate in the formal sector – lack adequate social protection or labour rights. Generally, the potential for formalisation is higher for those informal workers working in the formal sector, as their contractual arrangements can more easily be modified, with the right incentives (OECD/ILO, 2019^[4]; Kanbur, 2017^[13]; Loayza, 2018^[14]).

Few informal workers live in households with formal workers

Labour informality affects people’s livelihood not only at the individual level but also at the household level, which blurs the division between work in the formal and informal sectors. As a driver of low wages, as well as gaps in social insurance coverage and other forms of social protection, informality may have deep

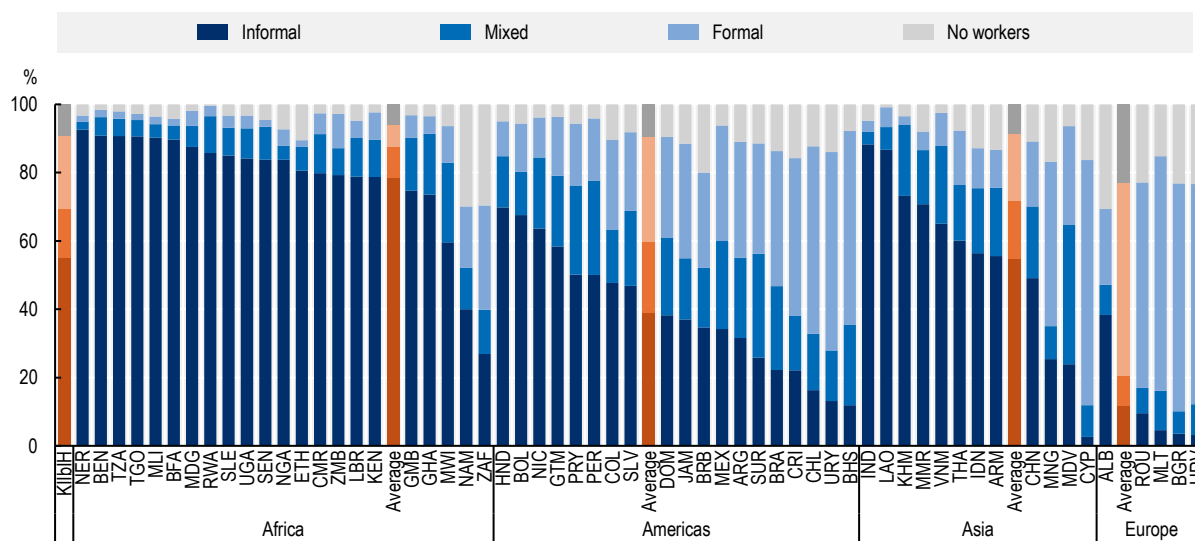
consequences on households' welfare, especially if informal workers live in households with no formal workers. The household dimension of informal work is therefore critical; understanding its realities can help shape policies that can improve the well-being of people, including non-working individuals (OECD, 2024^[15]; OECD, 2023^[2]; OECD/ILO, 2019^[4]).

Across the KIbIH countries, on average, 55% of the population live in households in which all earners are informal workers. An estimated 15% live in mixed households in which at least one earner is informal and one is formal. Of the remainder, 21% live in households in which all earners are formal workers and 9% in households without any working member (Figure 2.6). In other words, only one of three individuals lives in mixed or formal households and may therefore benefit from the formal status of other household members. Indeed, the formal status of one household member often enhances income stability and/or social protection. This is the case, for instance, when health insurance of the formal worker covers other family members. In mixed households, women are more likely to hold the informal jobs: 51% of informal workers in mixed households are women, while they represent only 41% of formal jobs in this household typology.

Distribution of the population by level of household informality also tends to vary across countries and regions. Across the KIbIH, the share of the population who lives in completely informal households is substantial in countries from Africa (78%) and Asia (55%), whereas it is lower in Latin America and the Caribbean (39%), and very low in European countries (12%). Overall, the share of individuals living in completely formal households tends to be larger in more advanced countries, suggesting that the development stage of economies matters and influences households' material living conditions.

Figure 2.6. Labour informality affects many households

Distribution of the population by level of household informality, latest year available



Note: "Informal" refers to a household where all workers are informal workers; "mixed" refers to a household where at least one worker is an informal worker and one worker is a formal worker; "formal" refers to a household where all workers are formal workers; and "no workers" refers to a household with no working members. The distribution covers the entire population. KIbIH and regional averages are calculated as simple unweighted averages of countries for which data are available.

Source: (OECD, 2026^[11]), "Key Indicators of Informality based on Individuals and their Households (KIbIH)", <https://data-explorer.oecd.org>.

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Informal employment often means working fewer hours and for a lower pay

Workers from the informal economy often hold jobs that fail to meet one or more of the legal requirements usually associated with formal employment. This includes variations from lack of a regular employment contract to work outside normal working hours and jobs that are paid less than the legal minimum wage.

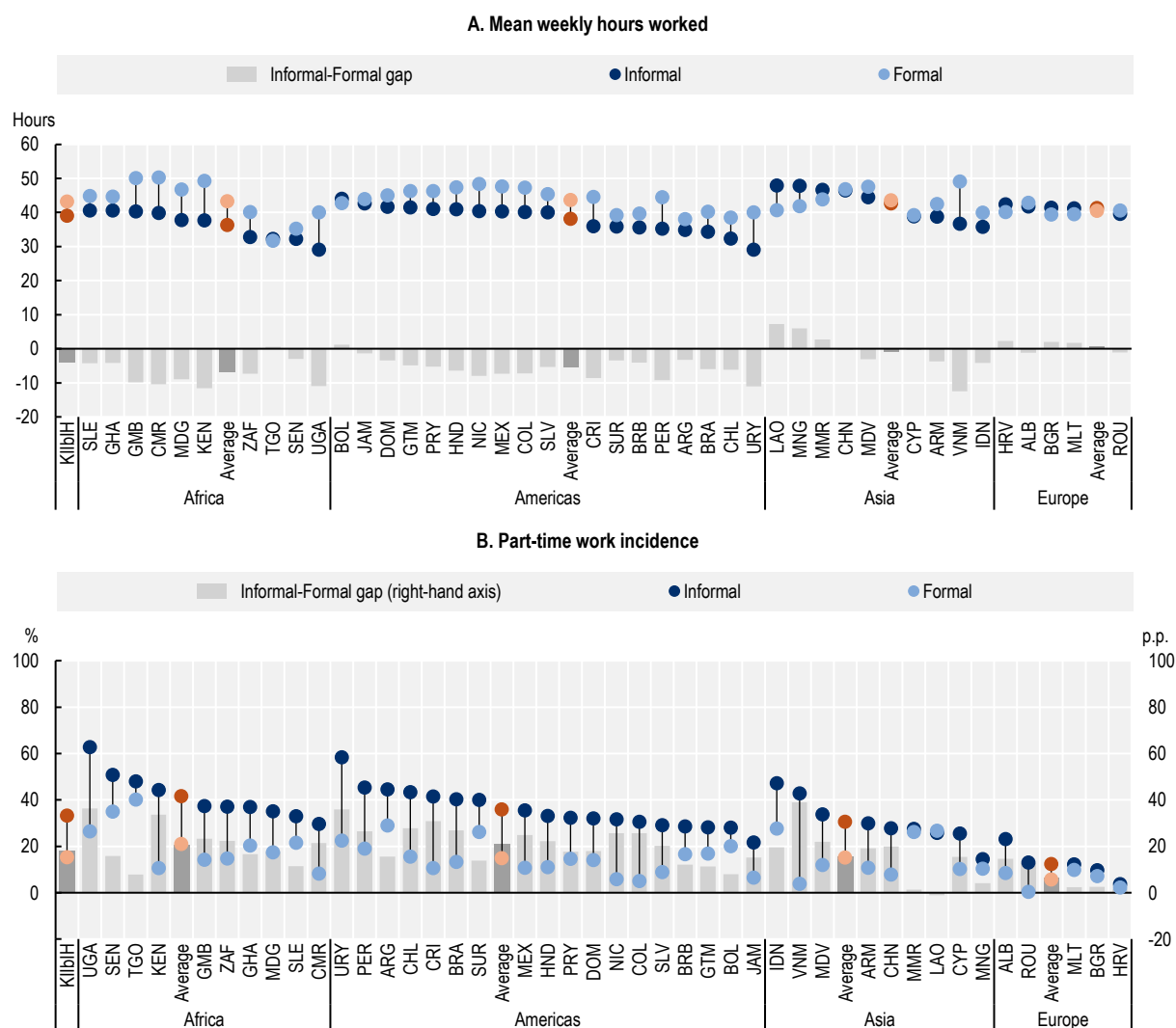
Informal workers work fewer hours per week in their main job and are more likely to hold part-time jobs compared with formal workers

Formal and informal employment differ in the level of protection they offer to workers and in terms of the number of hours worked (ILO, 2023^[10]; Ohnsorge and Yu, 2022^[11]; Gallo and Thinyane, 2021^[16]). Informal workers generally work fewer hours per week compared with formal workers. Across the KILBIH, on average, informal workers work 39 hours per week in their main job, which is 4 hours less than formal workers (Figure 2.7, Panel A), with negative effects on their income. They also generally have large gaps in working conditions and employment protection, including in the areas of occupational safety and health, job security and legal recognition, unionisation and collective bargaining coverage (Benavides, Silva-Peñaherrera and Vives, 2022^[17]; Schmidt et al., 2023^[18]).

Large disparities exist across countries and regions (Figure 2.7). Across countries, the number of weekly hours worked by informal workers can differ substantially, ranging from 29 in Uruguay to 48 in Lao PDR and Mongolia. Average working hours per week for informal workers range from 36 in Africa and 38 in Latin America and the Caribbean to 41 in Europe and 43 in Asia. Regional variations are also evident regarding the extent to which formal workers work more hours per week than informal workers: the difference is minimal in Asia and in Europe (less than 1 hour) but reaches 6 hours in Latin America and the Caribbean and 7 hours in Africa. This suggests that underemployment within the informal economy is a more pressing issue in KILBIH countries in Africa and Latin America and the Caribbean than in Europe or Asia.

Figure 2.7. Informal workers work fewer hours and are more likely to hold part-time jobs than formal workers

Mean weekly hours worked in the main job (Panel A) and share of workers aged above 15 years working part time (Panel B), latest year available



Note: Data refer to actual hours worked during the reference week. If data on actual hours are not available, usual hours are used. A job is defined as part-time if a worker works less than 30 hours per week. In Panel B, the informal-formal gap is expressed in percentage points (p.p.), shown on the right-hand axis. KilbIH and regional averages are calculated as simple unweighted averages of countries for which data are available.

Source: (OECD, 2026^[1]), "Key Indicators of Informality based on Individuals and their Households (KilbIH)", <https://data-explorer.oecd.org>.

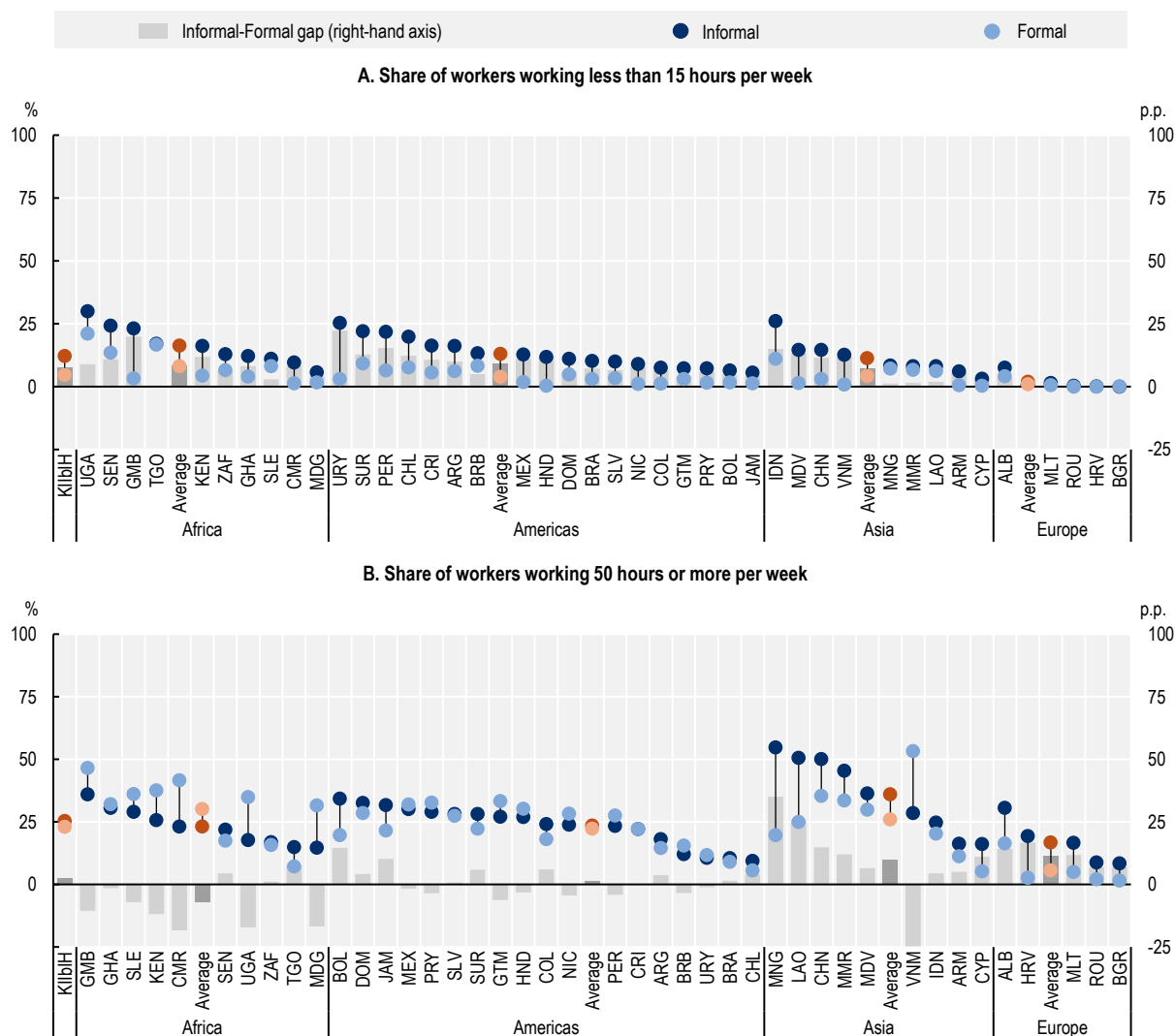
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Analysis of the distribution of working hours in the main job shows that, by and large, informal workers tend to work outside the range of normal hours arrangements, with some working either much less or much more (ILO, 2022^[19]). In all KilbIH countries, the share of informal workers working less than 15 hours is higher than for formal workers: 16% in Africa for informal versus 8% for formal, 13% versus 4% in Latin America and the Caribbean, 11% versus 4% in Asia, and 2% versus less than 1% in Europe (Figure 2.8). Conversely, some informal workers may work for very long hours, much more than formal workers: the

share of informal workers working more than 50 hours per week is 23% versus 22% for formal in Latin America and the Caribbean, 36% versus 26% in Asia, and 17% versus 6% in Europe. Africa is the only exception, with informal workers being less likely to work for 50 hours or more (23% versus 30% of the total).

Figure 2.8. Informal workers tend to work outside the range of normal hours arrangements, either for few hours or for very long hours

Share of workers aged above 15 years working in their main job less than 15 hours per week (Panel A) and more than 50 hours per week (Panel B), latest year available



Note: Data refer to actual hours worked during the reference week. If data on actual hours are not available, usual hours are used. KIBI and regional averages are calculated as simple unweighted averages of countries for which data are available.

Source: (OECD, 2026^[1]), "Key Indicators of Informality based on Individuals and their Households (KIBI)", <https://data-explorer.oecd.org>.

StatLink  <https://stat.link/0o4ukg>

The prevalence of part-time jobs is also much higher among informal workers. On average, 33% of informal workers work part-time against just 15% of formal workers (Figure 2.7, Panel B). The incidence of part-time work among informal workers varies across countries and is highest in African countries both in absolute terms (42%) and compared with formal workers (+21 percentage points). Data are similar for Latin America and the Caribbean countries (36%, +21 percentage points).

In most countries, women and rural workers in the informal economy work fewer hours

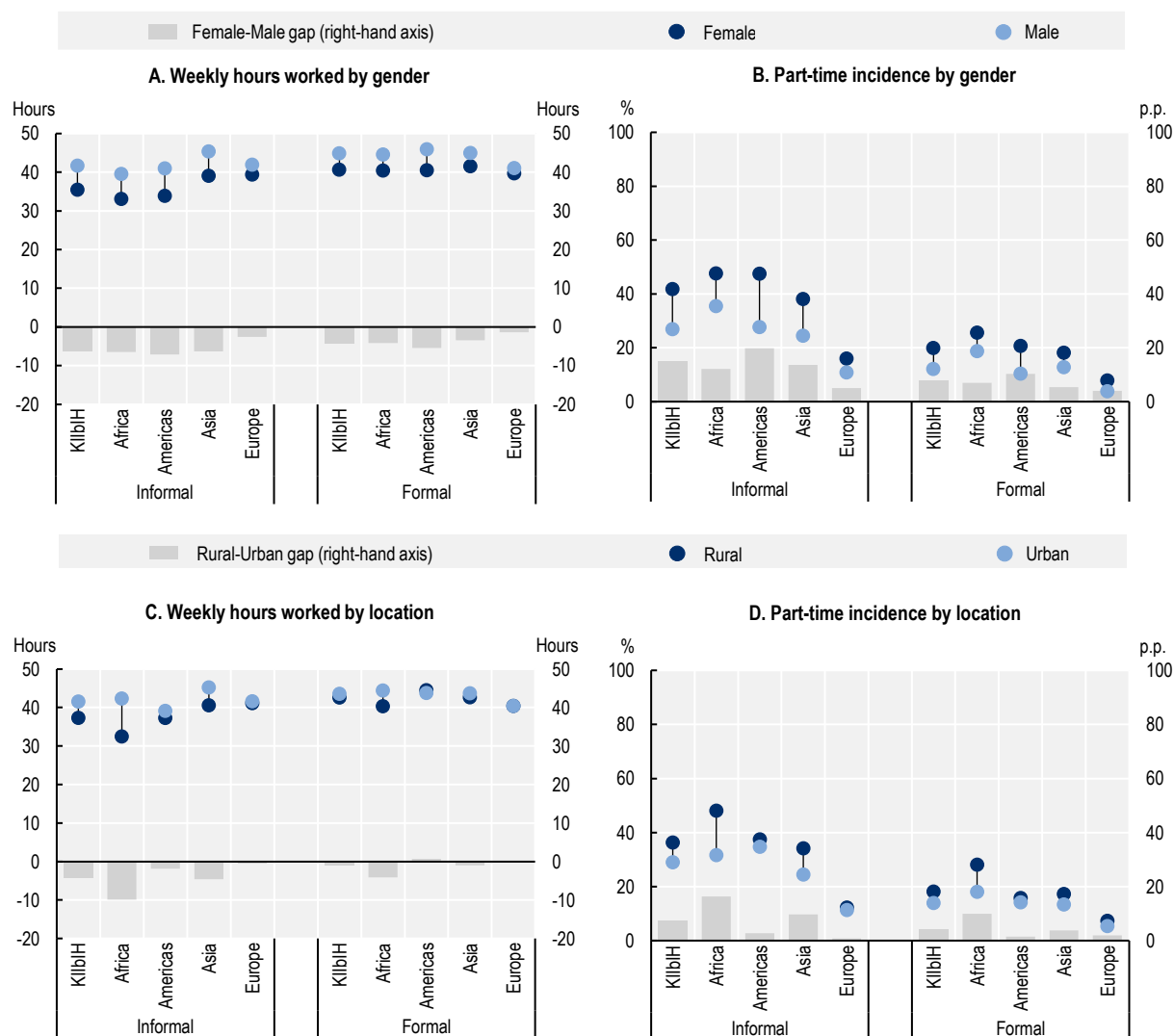
Globally, women's labour force participation is drastically lower than for men, with a gender gap estimated by the ILO at 25 percentage points in 2026 (ILO, 2026^[20]). Among the multiple factors that explain women's unequal standing on the labour market, discriminatory social institutions play a crucial role; more precisely, this includes practices and beliefs that assign women the role of caregivers and make them responsible for all domestic chores (OECD, 2023^[21]). Even when women are able to engage in paid work despite their disproportionate care responsibilities, many opt for informal jobs due to the flexibility these arrangements offer (ILO, 2023^[10]; Rubiano-Matulevich and Viollaz, 2019^[22]; ILO, 2018^[23]).

Among informal workers in nearly all KIIbIH countries, women tend to work fewer hours than men and are more likely to hold part-time jobs, which may reflect their need for flexibility to accommodate the care responsibilities that society expects them to undertake. On average, women in informal employment work 35 hours per week in their main job compared with 42 hours for informal male workers (Figure 2.9, Panel A). The gender difference in working hours is slightly less pronounced for formal workers, where women work 41 hours and men 45. Africa and Latin America and the Caribbean stand out as regions in which informal female workers experience the shortest weeks in terms of hours of work. Women in informal employment are also more likely than men to work part-time. On average, across KIIbIH countries, 42% of women in informal employment work part-time compared with 27% for informal male workers (Figure 2.9, Panel B).

A large gap in working hours is also observed between rural and urban workers, especially among informal economy workers.¹ In KIIbIH countries, informal workers living in rural areas work on average 37 hours per week and 36% of them hold part-time jobs while urban informal workers work 41 hours and 29% have part-time jobs (Figure 2.9, Panels C and D). For comparison, in the formal economy, workers living in rural areas work 43 hours and 18% hold a part-time job, while urban workers work 44 hours and 14% have a part-time job. The rural-urban gap in working hours and part-time job among informal workers is particularly marked in countries from Africa, followed by Asia, Latin America and the Caribbean, and Europe.

Figure 2.9. Female and rural informal workers work fewer hours than male and urban counterparts

Mean weekly hours worked in the main job and share of workers aged above 15 years working part-time by gender (Panels A and B) and location (Panels C and D), latest year available



Note: Data refer to actual hours worked during the reference week. If data on actual hours are not available, usual hours are used. A job is defined as part-time if the worker works less than 30 hours per week. KILBIH and regional averages are calculated as simple unweighted averages of countries for which data are available. KILBIH average covers 42 countries; regional averages cover 10 countries in Africa, 18 countries in the Americas, 9 countries in Asia, and 5 countries in Europe.

Source: (OECD, 2026^[1]), "Key Indicators of Informality based on Individuals and their Households (KILBIH)", <https://data-explorer.oecd.org>.

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Many workers hold multiple jobs, notably in countries where informality is high and hours of work are low, and these additional jobs are mostly informal

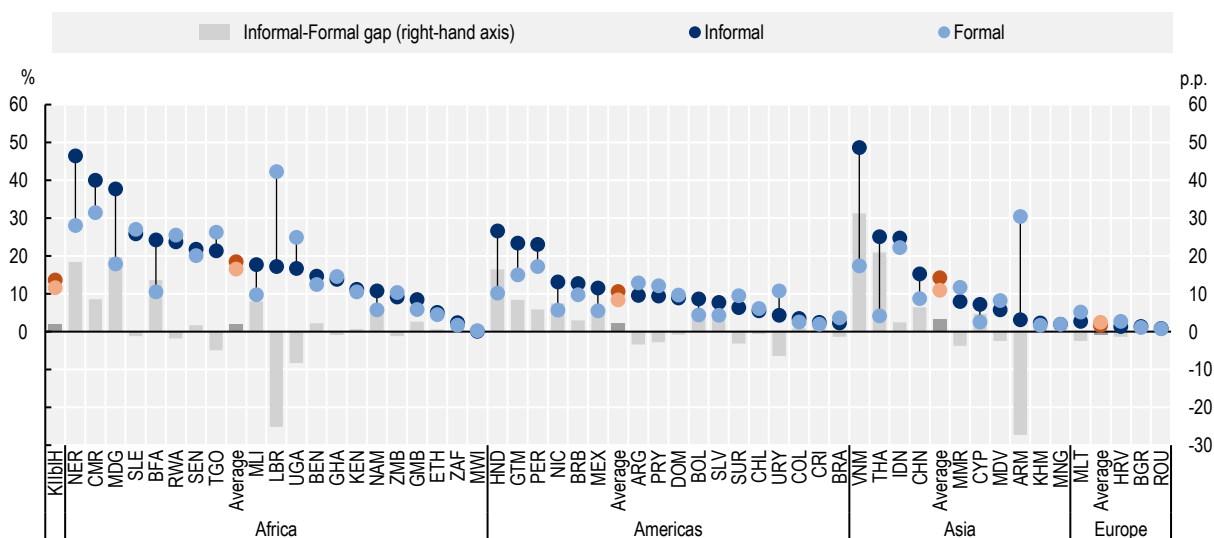
Multiple job holding can help formal and informal workers make ends meet when their main job does not provide adequate hours or income. Skills acquired when moonlighting can also influence subsequent occupational mobility. Yet a second job may be associated with greater physical and mental hardship as well as overall lower job quality.

Across KIIBIH countries, the likelihood of holding multiple jobs is quite significant and overall similar for informal and formal workers. On average 14% of informal workers and 12% of formal workers hold more than one job (Figure 2.10). In almost all cases (93% of total secondary jobs), the second job is informal, for the sample of KIIBIH countries in which the informality status of the second job could be measured. On average in KIIBIH countries for which data are available, the percentage of secondary job holders who are informal is 90% for formal main job holders and 95% for informal main job holders. This shows that, when recognising the reality of multiple job holding, the division between work in the formal and informal economies is increasingly blurred.

The reality of multiple job holding varies across regions and countries. In the sample of African countries, the share of informal workers holding multiple jobs ranges from less than 10% in Gambia, Ethiopia, Malawi, South Africa and Zambia to more than 25% in Cameroon, Madagascar, Niger and Sierra Leone. In Latin America and the Caribbean, the proportion varies from less than 5% in Brazil, Chile, Colombia, Costa Rica and Uruguay to more than 20% in Guatemala, Honduras and Peru. In Asia, the rate is as low as 3% or below in Armenia, Cambodia and Mongolia but as high as nearly 50% in Viet Nam. In European countries, the likelihood of holding more than one job is generally very low.

Figure 2.10. The proportion of informal workers with multiple jobs varies substantially across countries

Share of informal and formal workers aged above 15 years with more than one job, latest year available



Note: KIIBIH and regional averages are calculated as simple unweighted averages of countries for which data are available.

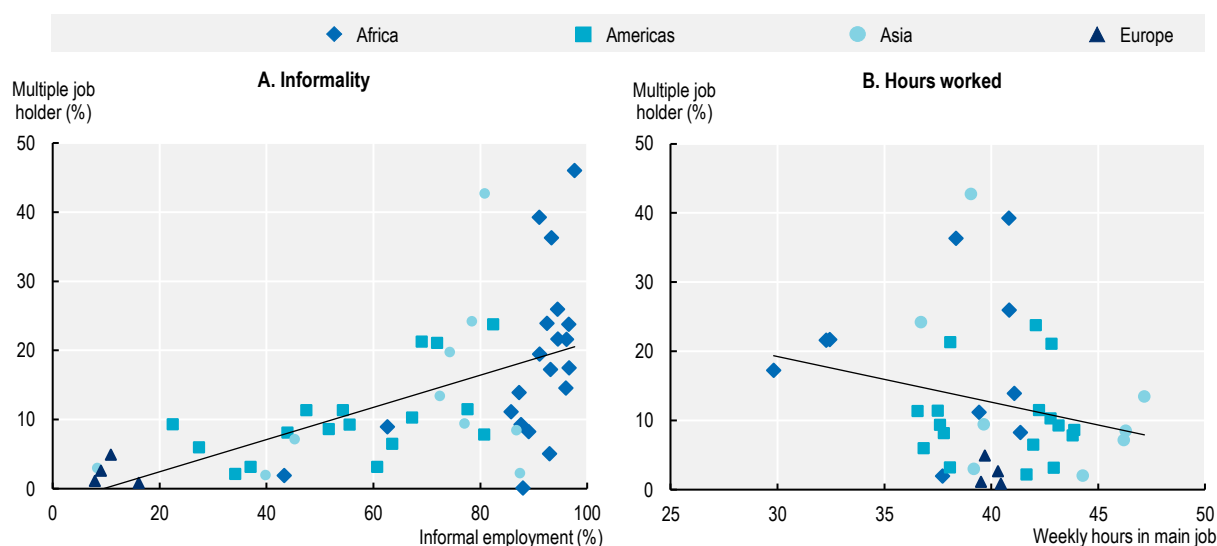
Source: (OECD, 2026^[1]), "Key Indicators of Informality based on Individuals and their Households (KIIBIH)", <https://data-explorer.oecd.org>.

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Across KIIbIH countries, the likelihood of informal workers holding more than one job tends to be positively associated with the incidence of informality and negatively associated with the number of hours worked in the main job (Figure 2.11). The association of multiple job holding with informality rates is particularly strong across countries in Latin America and the Caribbean and is significantly high with hours of work for countries from Asia.

Figure 2.11. Informal workers with multiple jobs are associated with a larger prevalence of informality but fewer hours of work in the main job

Correlation between the share of workers aged above 15 years who hold multiple jobs and informal employment rates (Panel A) and weekly hours worked in the main job (Panel B), latest year available



Note: Data on hours in Panel B refer to actual hours worked during the reference week. If data on actual hours are not available, usual hours are used.

Source: (OECD, 2026^[11]), "Key Indicators of Informality based on Individuals and their Households (KIIbIH)", <https://data-explorer.oecd.org>.

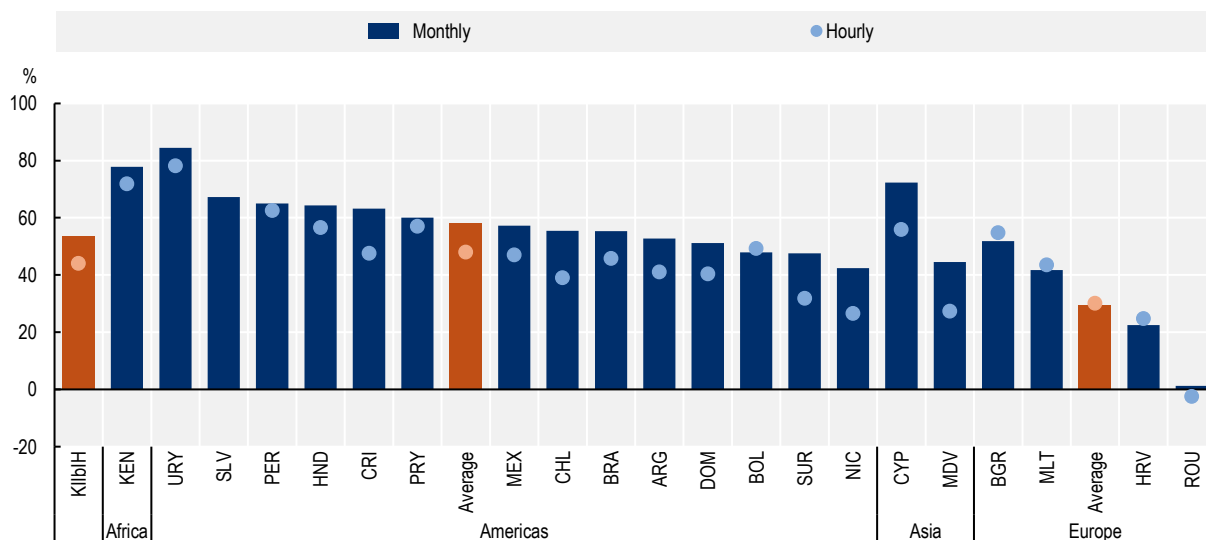
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The formal-informal earnings gap is extremely wide

A large earning gap is observed across the KIIbIH countries: on average, informal workers earn 54% less than formal workers. This gap, calculated in monthly earnings, varies substantially across region, ranging from nearly zero in Romania to more than 80% in Uruguay (Figure 2.12). These findings are consistent with many empirical results showing that informal work is generally associated with lower levels of income and larger income volatility (OECD, 2024^[15]; ILO, 2023^[10]; ILO, 2022^[3]; Ohnsorge and Yu, 2022^[11]; ILO, 2018^[23]). Remarkably, the large earnings gap between formal and informal workers is robust even when controlling for the number of hours worked. Data on hourly earnings show that the informal-formal gap remains substantial. Across KIIbIH countries in terms of hourly earnings, on average, informal workers earn 44% less than formal workers (Figure 2.12). Large disparities also exist across countries: in 14 of 21 countries for which data are available, the formal-informal monthly wage gap exceeds 50%, while the hourly gap is more than 40% in 16. These findings suggest that the large informal-formal earnings gap cannot be attributed solely to the difference in working hours and part-time work between informal and formal workers.

Figure 2.12. Informal workers earn substantially less than formal workers

Gap in mean monthly and hourly earnings between informal and formal workers aged above 15 years, latest year available



Note: The monthly (or hourly) earnings gap between formal and informal workers is computed as the difference between the mean monthly (hourly) earnings of formal workers and the mean monthly (hourly) earnings of informal workers in their main job, expressed as a share of the mean monthly (hourly) earnings of formal workers in their main job. A positive value means that formal workers earn more than informal workers; a negative value means that informal workers earn more than formal workers. Earnings refer to gross wages and salaries for employees, and income for own-account workers. These figures include bonuses and in-kind payments. In some surveys, earnings are reported net of social security contributions and taxes. Hourly rates are calculated by dividing monthly figures by the actual number of hours worked in a week multiplied by 4.33 – the mean number of weeks in a month. If data on actual hours worked per week are missing, usual hours are used. KILBIH and regional averages are calculated as simple unweighted averages of countries for which data are available.

Source: (OECD, 2026^[1]), “Key Indicators of Informality based on Individuals and their Households (KILBIH)”, <https://data-explorer.oecd.org>.

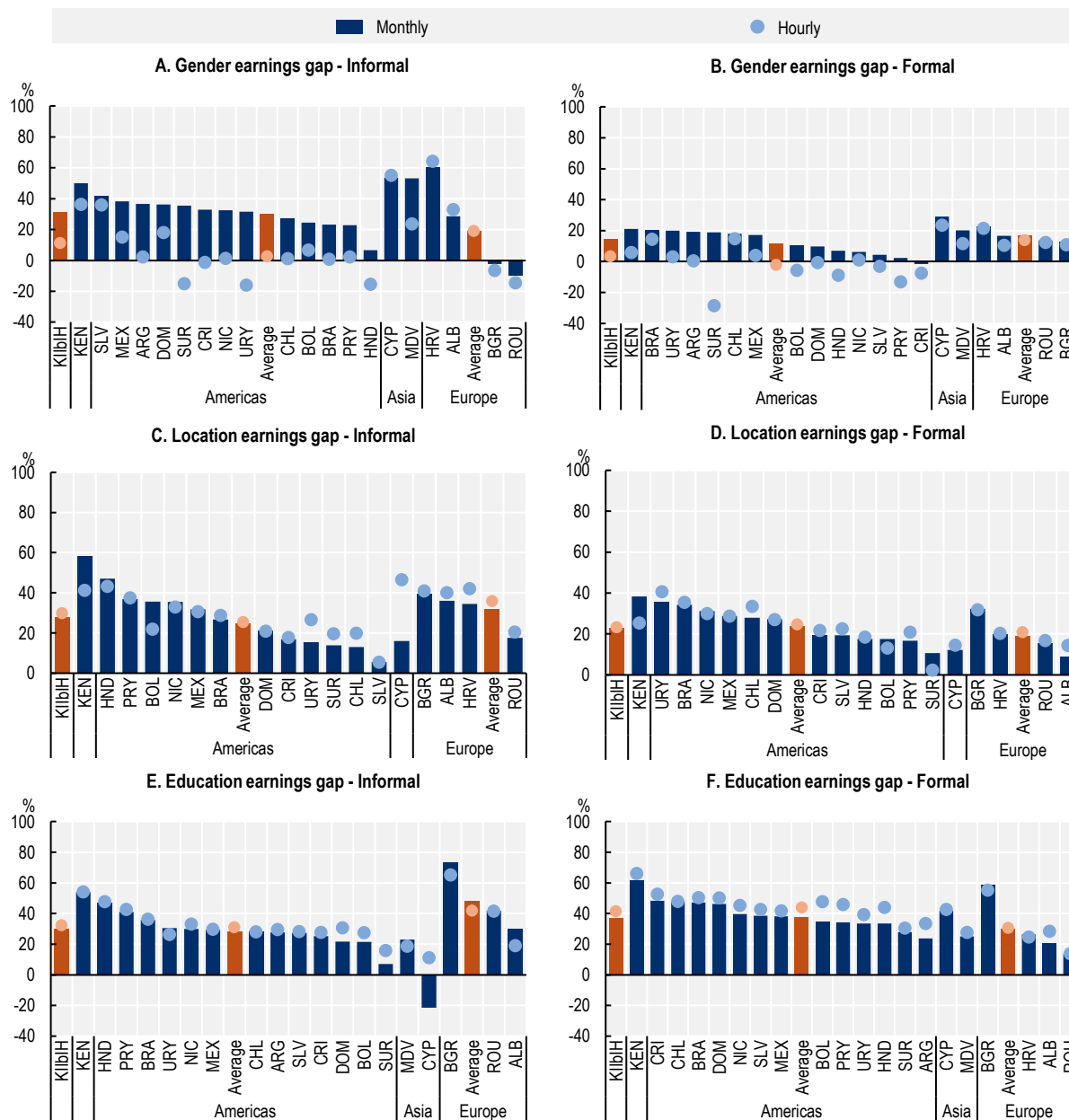
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In many countries, earnings gaps for women and rural workers are more pronounced in the informal economy, in which equal pay principles are not binding

The gender earnings gap, in terms of both monthly earnings and, to some extent, hourly earnings, tends to be larger among informal workers than among formal workers (ILO, 2023^[10]; Gardner, Walsh and Frosch, 2022^[24]). On average, on a monthly basis, women earn 31% less than men in the informal economy and 11% less than men in the formal economy (Figure 2.13, Panels A and B). By contrast, the gap on a monthly basis stands at just 13% across OECD countries for the overall workforce (OECD, 2026^[25]).

Figure 2.13. Female, rural and less educated workers face large earnings gaps, notably in the informal economy

Gender (Panel A and B), urban-rural (Panel C and D) and educational (Panel E and F) gaps in mean monthly and hourly earnings by informality status, latest year available



Note: The monthly and hourly earnings gaps between men and women are computed as the difference between the mean value for men and the mean value for women, expressed as a share of the mean value for men. A positive gap means that men earn more than women; a negative gap means that women earn more than men. The same approach is used to compute the earnings gap between urban and rural workers (Panels C and D) and between workers with secondary (or more) education attainment and workers with primary (or less) education attainment (Panels E and F). KIBI and regional averages are calculated as simple unweighted averages of countries for which data are available.

Source: (OECD, 2026^[1]), "Key Indicators of Informality based on Individuals and their Households (KIBI)", <https://data-explorer.oecd.org>.

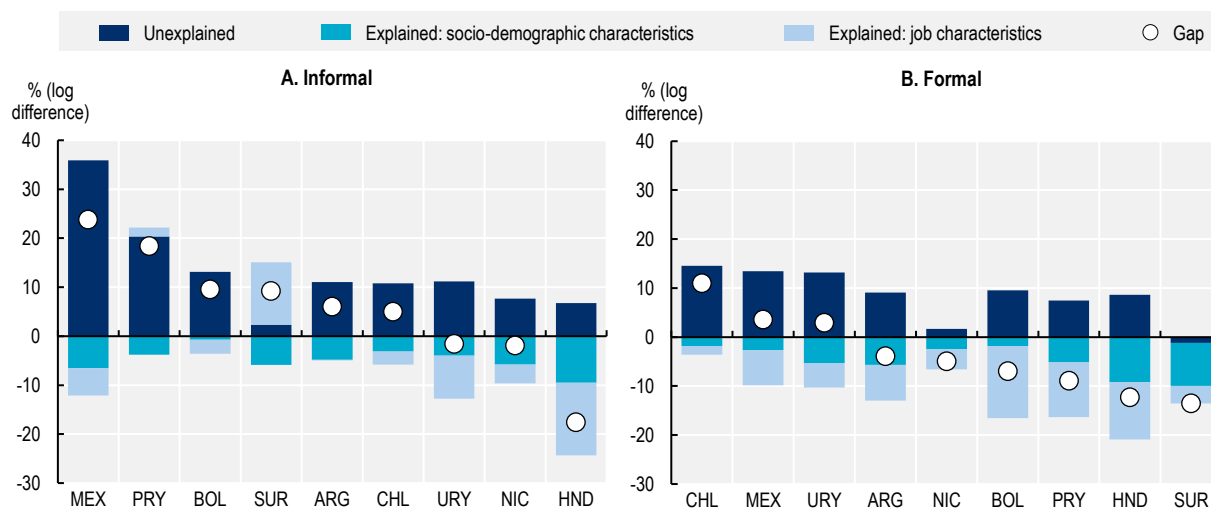
The earnings gap is not monotonic across segments of the labour market: in effect, women are penalised twice. Although the gender pay gap narrows when considering the hourly rate, it remains important, especially for informal workers. Controlling for gender differences in number of hours worked, the gender hourly wage gap reaches 11% among informal workers – corresponding to about one-third of the gender earnings gap among informal workers on a monthly basis. By contrast, the hourly wage gap is just 3% among formal workers – nearly three times less than the monthly wage gender gap among formal workers (Figure 2.13, Panel A). In other words, in the informal sector, women’s earnings penalty comes from both fewer hours worked and from lower hourly compensation.

Gender gaps in monthly pay for informal workers are substantial in all regions, generally close to the average (30%) in Latin America and the Caribbean while significantly lower (19%) in Europe. Working fewer hours than men affects the monthly pay gaps for women particularly in Latin America and the Caribbean, for which the hourly gap shrinks to 3%. In Europe, it remains unchanged (19%).

The hourly gender pay gap is not fully explained by differences in observable demographic, socio-economic and job characteristics. Other factors are at play, such as productivity, labour market efficiency or pure discrimination. In nearly all the nine Latin American and Caribbean countries for which data are available, explained components of the hourly gender pay gap (related to workers’ socio-demographic and job characteristics) are in favour of women (Figure 2.14). In other words, in the absence of unexplained factors such as discrimination, women would earn more than men on an hourly basis. However, in all countries (except for formal workers in Suriname), the unexplained component of the gender gap is largely in favour of men for both informal and formal workers and accounts for much of the total difference. The effect of gender-based unexplained discrimination is particularly elevated for informal workers.

Figure 2.14. A substantial part of the gender hourly pay gap remains unexplained

Decomposition of gender hourly pay gap by informality status, latest year available



Note: The gender earnings gap is computed as the (log) difference between the mean hourly earnings of men and the mean hourly earnings of women, which approximates the percentage difference between the two groups. A positive value means that men earn more than women; a negative value means that women earn more than men. Hourly earnings refer to gross hourly wages and salaries for employees, and include bonuses and in-kind payments. In some surveys, earnings are reported net of social security contributions and taxes. Hourly rates are calculated by dividing monthly figures by the actual numbers of hours worked in a week, multiplied by 4.33 (the mean numbers of week in a month). If actual figures are missing, usual hours worked in a week are used. The variables used in the decomposition are grouped in two main components: i) socio-economic characteristics, including age, age squared, a full set of dummies for civil status, highest educational attainment, and the zone in which workers live (urban or rural); and ii) job characteristics, including a full set of dummies for industry, occupation (at one digit level) and firm size of the main job.

Source: (OECD, 2026^[1]), “Key Indicators of Informality based on Individuals and their Households (KIbIH)”, <https://data-explorer.oecd.org>.

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KIIBIH data also show that pay gaps between workers living in rural versus urban areas are substantial, but not significantly larger than in the informal versus formal economies. On a monthly basis, informal workers in rural areas are paid 28% less than those in urban areas. This penalty is nearly unchanged when controlling for the number of hours worked, with a pay gap of 30% on an hourly basis (Figure 2.13, Panel C). Findings are similar for formal workers, with a rural pay gap of 23% on both a monthly and hourly basis (Figure 2.13, Panel D). Together, these data underscore the role of productivity in explaining the rural pay gap of both informal and formal workers.

Interestingly, earnings gaps for workers holding at most a primary degree, compared with those having at least a secondary degree, are lower for informal than formal workers (Figure 2.13, Panels E and F). In KIIBIH countries, this gap is 30% for informal workers against 37% for formal – a figure that holds across all regions. This is an indication of how education is rewarded more for formal workers, or of how workers with similar, higher level of education tend to sort in the formal or informal sectors due to other reasons, such as their actual skills or the productivity levels of the firms for which they work. Generally, monthly education pay gaps are close to or slightly lower than hourly gaps for both informal and formal workers. This suggests that, in most countries, workers with different levels of educational attainment tend to work the same amount of hours and differences in earnings primarily reflect differences in productivity.

A large share of informal employees earn much less than the minimum wage and the shortfall can be substantial

Minimum wages can affect the earnings distribution of workers in different ways, including according to their informality status (Maloney and Mendez, 2004^[26]). The economic literature has long hypothesised that minimum wages – when set at very high levels and effectively enforced – instead of causing lower employment may cause employees to be displaced or shifted from the formal to the informal economy. In turn, this leads to higher rates of non-compliance and downward pressure on wages in the informal economy (ILO, 2013^[27]). Several studies document that more stringent labour regulations are associated with lower formal sector employment and higher informal sector employment (Nataraj et al., 2013^[28]). Yet, many evidences point towards a small or insignificant effect of minimum wages on employment, although more vulnerable groups (youth and low-skilled workers) are somewhat more negatively affected (Kuddo, Robalino and Weber, 2015^[29]; Broecke, Forti and Vandeweyer, 2017^[30]; Fang and Ha, 2022^[31]; Gindling and Ronconi, 2025^[32]).

Contrary to their effects in the formal economy, statutory minimum wages are not binding for workers in the informal economy. Not surprisingly, enforcement of legal or regulatory frameworks is much more challenging when employees are not registered or are employed in unregistered enterprises. Thus, informal workers are more likely to be paid below the legal minimum wage.

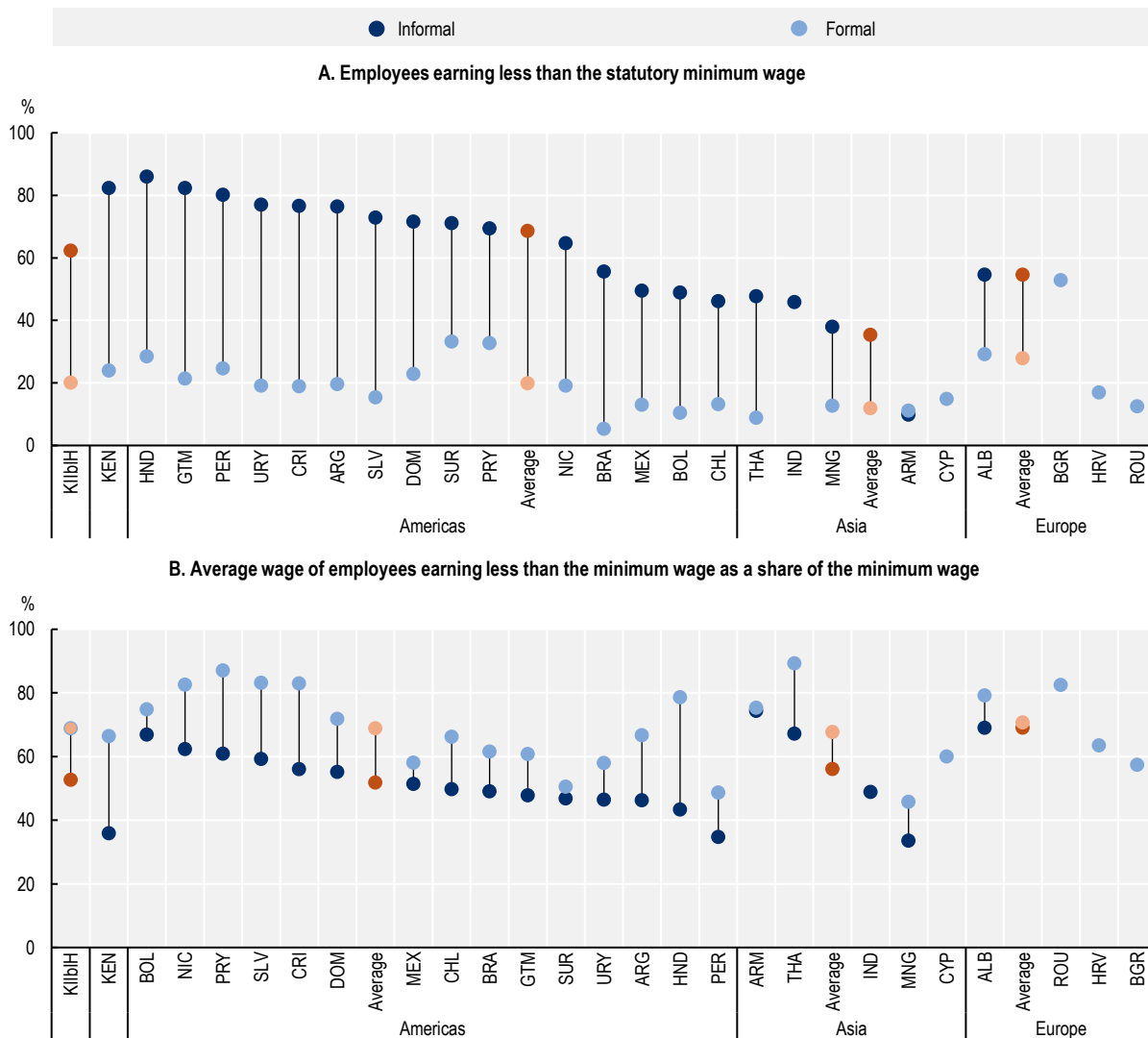
Nevertheless, minimum wage can have direct and indirect impacts on the informal labour market. In Latin America and the Caribbean, where studies have been more frequent, a review of employment effects shows that minimum wages can positively influence informal workers' wages in developing economies (Maloney and Mendez, 2004^[26]). One explanation is the so-called “lighthouse effect”, i.e. the stated minimum wage gives a signal to workers and employers in the informal economy about socially acceptable minimum levels of pay. In effect, the minimum wage established for the formal economy can serve as a reference throughout the economy, including for sectors not legally bound by it (Derenoncourt et al., 2025^[33]; Neri, Gonzaga and Camargo, 2000^[34]; Amadeo, Gill and Neri, 2000^[35]).

Minimum wage legislation – which usually only applies to workers with the specific labour status of employee – often exists in developing economies, although its effectiveness is generally weak. Evidence from the 25 KIIBIH countries for which data are available shows almost two-thirds (62%) of informal employees – for whom statutory minimum wages are not legally binding – earn less than the legal minimum wage. In contrast, only 20% of formal employees – who are covered by statutory minimum wages – are paid below it (which still indicates that legal regulations may not be enforced for some formal employees)

(Figure 2.15, Panel A). The share of informal employees paid below the legal minimum standard is particularly high (69%) in Latin America and the Caribbean, probably reflecting high minimum wage thresholds set in several countries of the region. In Asia, the share is relatively lower but remains substantial, with 35% of informal employees earning less than the minimum wage.

Figure 2.15. A large majority of informal employees earn much less than the minimum wage

Share of informal and formal employees aged above 15 years earning less than the statutory minimum wage (Panel A) and average wage of informal and formal employees who earn less than the minimum wage as a share of the minimum wage (Panel B), latest year available



Note: Monthly earnings refer to gross wages and salaries in national local currency. The minimum wage refers the monthly statutory minimum wage as compiled and disseminated by the International Labour Organization (ILO). Data refer only to workers employed as employees. KILBH and regional averages are calculated as simple unweighted averages of countries for which data are available.

Source: (OECD, 2026^[1]), "Key Indicators of Informality based on Individuals and their Households (KILBH)", <https://data-explorer.oecd.org>; and (ILO, 2026^[36]), "Statistics on earnings and labour income", ILOSTAT, <https://ilostat.ilo.org/topics/wages>.

For both formal and informal employees who are paid below the minimum wage, the wage shortfall can be substantial. On average, across the KILBIH countries, informal and formal employees who are paid below the minimum wage earn, respectively, only 53% and 69% of the legal minimum wage (Figure 2.15, Panel B). Looking beyond average reveals important differences across countries, with wages for employees being less than half of the minimum wage in Argentina, Brazil, Chile, Cyprus, Guatemala, Honduras, India, Mongolia, Suriname, Peru and Uruguay. In contrast, wages for employees are closer to 80% of the minimum wage in countries such as Albania, Armenia, Romania and Thailand. Such variations may reflect the different ability of countries to address much more complex problems of labour law enforcement, as well as different levels of statutory minimum wages.

Often, but not always, informality and poverty are experienced together

Most empirical studies indicate that, across countries, the incidence of informality and monetary poverty are positively correlated. In fact, poverty and informal employment tend to reinforce each other. Past poverty can determine current informal employment; in turn, past informal employment can lead to higher chances of current poverty (Devicienti, Groisman and Poggi, 2010^[37]). Often, the poverty footprint of informality mirrors the earnings disadvantage of informal workers (Pham, 2022^[38]; Amuedo-Dorantes, 2004^[39]; Devicienti, Groisman and Poggi, 2010^[37]; Tassot, Pellerano and La, 2018^[40]). This is especially true for low-paid workers who belong to the lower tier of the informal economy (OECD, 2024^[15]; OECD/ILO, 2019^[4]; Kanbur, 2017^[13]).

Poor people disproportionately live in completely informal households, where the incidence of poverty is the highest

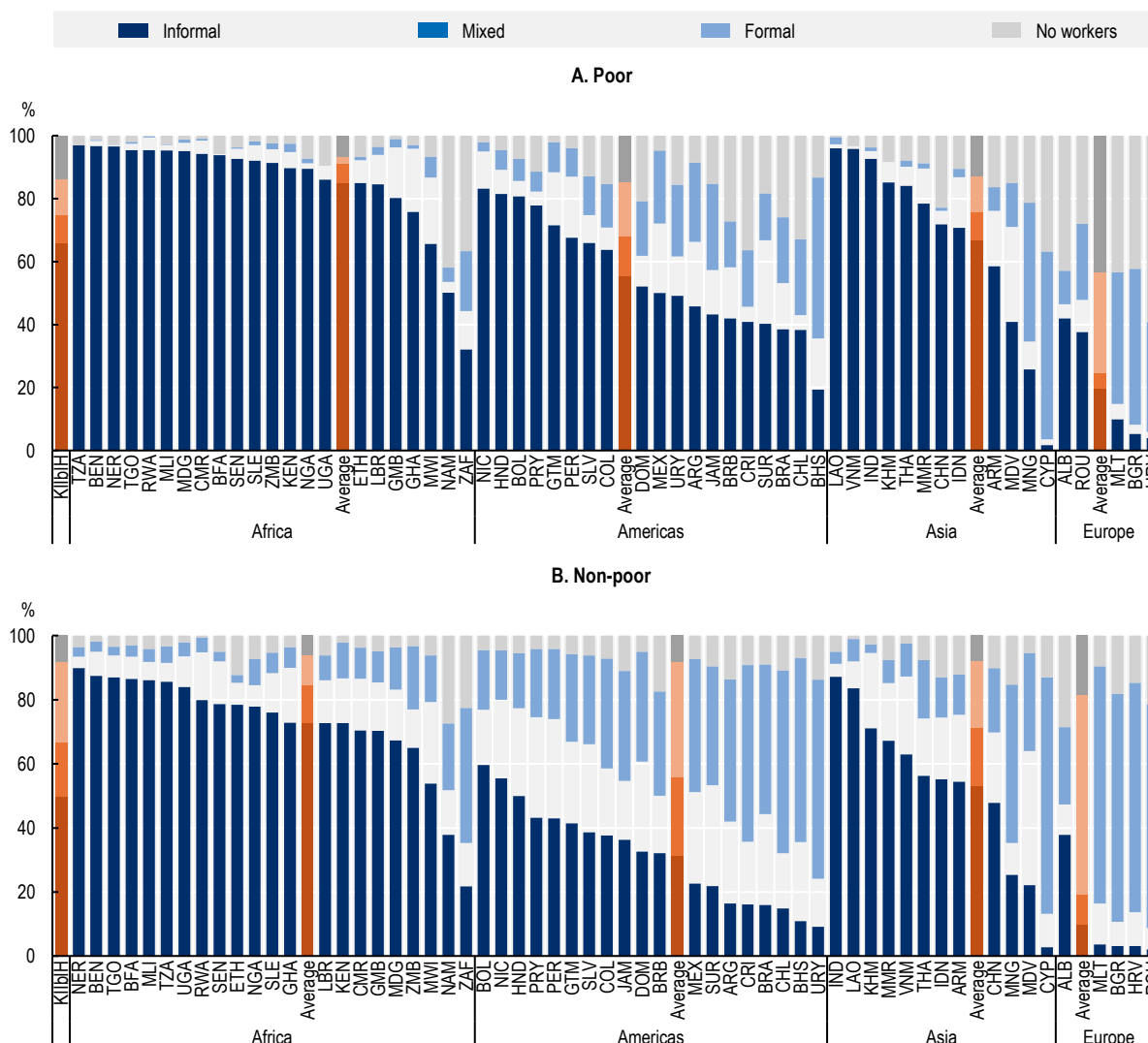
Evidence from the KILBIH confirms the links between poverty and the formality status of households. In all countries covered, the share of the poor population is systematically highest among completely informal households: 66% of poor people live in households in which all earners are informal workers. This compares with 9% in households in which earners are both formal and informal, 12% among households where all earners are formal, and 14% in households with no workers at all (Figure 2.16, Panel A). However, a significant proportion (50%) of non-poor people still live in completely informal households, compared with mixed (17%), formal (25%) and households with no workers (8%) (Figure 2.16, Panel B). If people are poor, they have a very high chance of living in a fully informal household. But living in households in which income comes from informal labour does not necessarily mean being poor.

KILBIH data expose large country disparities as regards the distribution of poverty across informality status (Figure 2.16, Panel A). In Africa, the share of the poor living in informal households is exceptionally high (95% of the total) in Madagascar, Mali, Rwanda and Togo (95% of the total) and even higher (97%) in Benin, Niger and Tanzania. In Latin America and the Caribbean, this share is well above the regional average in Nicaragua (83%), Bolivia and Honduras (81%) and Paraguay (78%). In Asia, data are similar for Lao PDR and Viet Nam (96%), India (93%) and Cambodia and Thailand (close to 85%). In Europe, even in the countries with the highest shares, the rates are much lower, as shown by data for Albania (42%) and Romania (38%).

The distribution of non-poor people also varies substantially across regions (Figure 2.16, Panel B). In Africa, the shares of non-poor living in completely informal households are above 80% of the total in Benin, Burkina Faso, Mali, Niger, Rwanda, Tanzania, Togo and Uganda, while the share drops to less than 40% in Namibia and South Africa. In Latin America and the Caribbean, the share of non-poor people living in informal households is 50% or higher in Bolivia, Honduras and Nicaragua, but less than 15% in Bahamas, Chile and Uruguay. In Asia, it is higher than 80% in India and Lao PDR but 25% or less in Cyprus, the Maldives and Mongolia. In Europe, it is lower than 4% in all countries covered except Albania (38%).

Figure 2.16. Most of the poor live in completely informal households

Distribution of the poor (Panel A) and non-poor (Panel B) by level of household informality, latest year available



Note: "Informal" refers to a household where all workers are informal workers; "mixed" refers to a household where at least one worker is an informal worker and one worker is a formal worker; "formal" refers to a household where all workers are formal workers; and "no workers" refers to a household with no working members. The poor are defined as individuals living in households in which the per-capita monthly income or consumption (depending on the survey) is below the national poverty line. KilbIH and regional averages are calculated as simple unweighted averages of countries for which data are available.

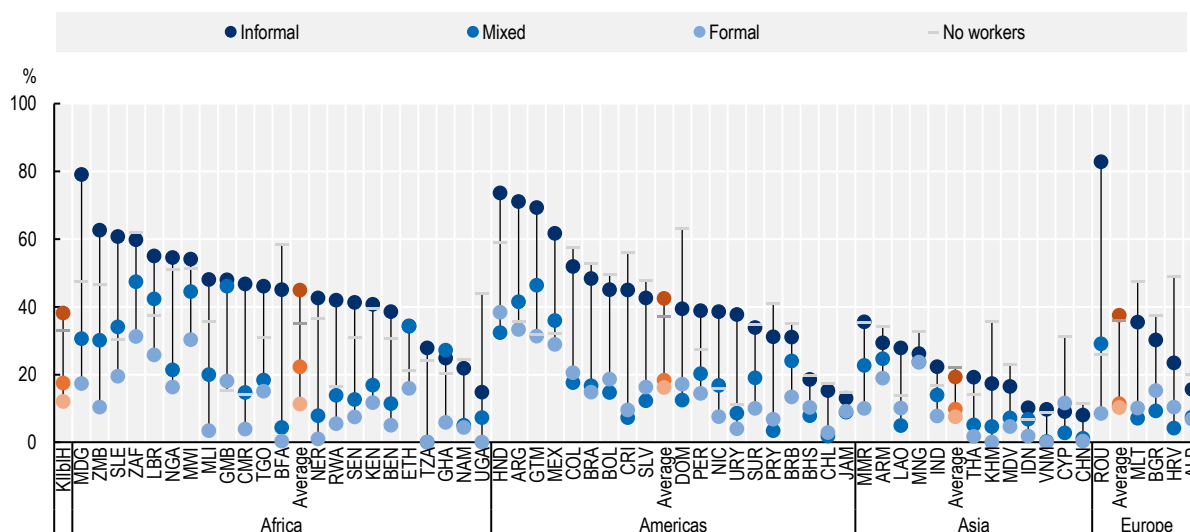
Source: (OECD, 2026^[1]), "Key Indicators of Informality based on Individuals and their Households (KilbIH)", <https://data-explorer.oecd.org>.

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Not only do a disproportionate share of the poor live in informal households, but individuals who live in informal households are also more at risk of poverty (Pham, 2022^[38]; Amuedo-Dorantes, 2004^[39]; Devicienti, Groisman and Poggi, 2010^[37]; Tassot, Pellerano and La, 2018^[40]; Kanbur, 2017^[13]; OECD/ILO, 2019^[4]). Across KilbIH countries, the poverty rate among informal households stands at 38% and at 33% in households with no workers. In contrast, the poverty rate is much lower in mixed (17%) and formal (12%) households (Figure 2.17). This poverty footprint of household informality varies widely across countries and is particularly important in some places. Poverty rates among informal households are notably higher than the KilbIH average in 17 African countries and in 12 Latin American and Caribbean countries.

Figure 2.17. Poverty rates significantly drop as households' formality status improves

Poverty rates at national poverty line by household level of informality, latest year available



Note: "Informal" refers to a household where all workers are informal workers; "mixed" refers to a household where at least one worker is an informal worker and one worker is a formal worker; "formal" refers to a household where all workers are formal workers; and "no workers" refers to a household with no working members. Poverty rates are computed as the headcount measure of individuals living in households with a per-capita monthly income or consumption (depending on the survey) below the national poverty line. KIIbIH and regional averages are calculated as simple unweighted averages of countries for which data are available.

Source: (OECD, 2026^[1]), "Key Indicators of Informality based on Individuals and their Households (KIIbIH)", <https://data-explorer.oecd.org>.

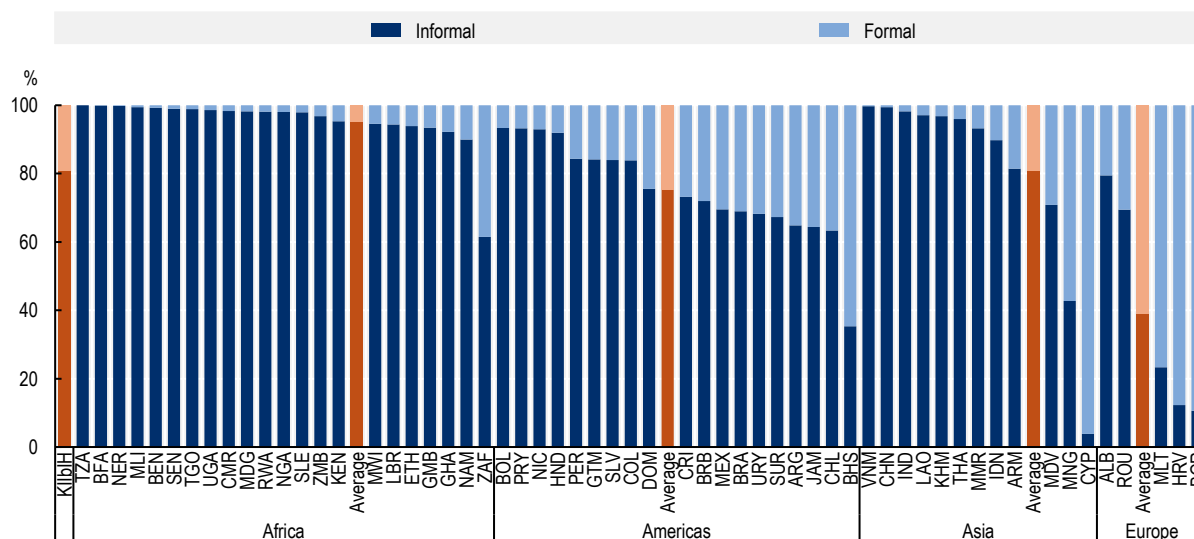
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Most of the working poor operate in the informal economy

Not all informal workers are poor and not all working poor are engaged in the informal economy. Yet a significant overlap exists between informality and working poverty. The composition of workers living in poor households shows that most hold informal jobs. Across the KIIbIH, on average, more than eight out of ten working poor (81%) are employed informally, with the statistics being quite common across all countries (Figure 2.18). This means that, although informal workers have a paid work, it is seldom a living wage: their labour income is not sufficient to lift them and their families out of poverty or to ensure decent living conditions. Several factors drive the phenomenon of the working poor, including low wages, high costs of living, underemployment and high dependency ratios.

Figure 2.18. Most of the working poor are informal workers

Distribution of working poor aged above 15 years by informal employment status, latest year available



Note: "Working poor" refers to workers who live in households in which the monthly per-capita income or consumption (depending on the survey) is below the national poverty line. KILBIH and regional averages are calculated as simple unweighted averages of countries for which data are available. Source: (OECD, 2026^[1]), "Key Indicators of Informality based on Individuals and their Households (KILBIH)", <https://data-explorer.oecd.org>.

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Formalisation does not systematically contribute to poverty reduction, nor does informal employment always correlate with poverty

Although poverty and informality are often experienced together, formalisation does not systematically translate into poverty reduction across countries, nor does informality always mean poverty (OECD/ILO, 2019^[4]; Ohnsorge and Yu, 2022^[11]). Historically, in many countries, the decline in informal employment aligns with a reduction in poverty, but not merely through a direct effect as many socio-economic and economic factors collectively affect the reduction of informality and poverty.

This pattern is not universal. For instance, during the 2010s, poverty levels increased even as informality declined in Honduras and South Africa. Conversely, over the same period, expansion of the informal sector in some countries coincided with stagnant poverty rates (e.g. in Costa Rica and Serbia) or with a reduction in poverty (e.g. in Egypt and Pakistan) (OECD/ILO, 2019^[4]). The lack of a clear relationship between formalisation and poverty reduction suggests that the poverty-informality nexus is mediated by country-specific factors, notably the quality of formal job creation and the distribution of earnings in the informal economy. In particular, a shift towards formal employment may not alleviate poverty if it is underpinned by the creation of low-paid formal jobs offering reduced labour income. Conversely, an increase in informal employment may not necessarily associate with an increase in poverty if most of the informal jobs created are in the upper tier of the informal economy.

Similarly, the association between poverty and informality is not systematic at the household level. In many countries, a non-negligible share of the non-poor population live in informal households: 50% on average across KILBIH countries. However, substantial regional differences exist: 73% across countries in Africa, 53% in Asia, 31% in Latin America and the Caribbean and 10% in Europe (Figure 2.16, Panel B). For certain households, the fact that informality does not correlate with poverty is linked to the structure of the informal economy, whereby several informal workers in a given household may benefit from relatively high labour incomes (OECD, 2024^[15]).

Earnings inequality is high in the informal economy, reflecting the diverse realities of workers

The informal economy has multiple drivers, many of which undeniably reflect the realities of different workers. Building on earlier insights and models of development economics (Harris and Todaro, 1970^[41]), some studies argue that labour markets are segmented, and that workers are rationed out of the formal sector due to excessive regulations. As a result, informality is largely involuntary. Other studies challenge these findings, pointing to the fact that a majority of informal jobs reflect a voluntary choice, better fit workers' preferences and skill endowments, and offer better earnings prospects (Maloney, 2004^[42]; De Soto, 1989^[43]). Both views may hold some validity: informal employment can be a choice for some individuals and a solution of last resort for others (Maloney et al., 2026^[44]; Günther and Launov, 2012^[45]; Fields, 1990^[46]). Informality may also become the norm where weak or costly formal institutions exist, especially regarding contract enforcement, credit/insurance markets and legal sanctions. Burdensome requirements may lead firms and traders to rely on reputation, kinship, social networks and relational contracting as substitute “informal market institutions” (Fafchamps, 2020^[47])

KIbIH data clearly show that the informal economy consists of multiple and largely unequal employment situations. In most KIbIH countries, the informal economy can be depicted as being three-tiered, with one prosperous segment in which agents may operate by choice, one large intermediary segment of middle-paid workers with some capacities to contribute to social insurance, and one impoverished segment which individuals end up in for lack of a better alternative.

The distribution of earnings is highly unequal within the informal economy

Globally, earnings inequality has declined since the early 2000s but gaps remain very wide. In 2024, the ILO estimated that the bottom 10% of wage earners received just 0.5% of total wages whereas the top 10% received nearly 38% (ILO, 2024^[48]). Moreover, many wage workers, a relatively small fraction of informal workers, continue to be low paid. In 2024, in low-income countries, 22% of wage workers earned less than half of the median hourly wage of their country, compared with 17% in lower-middle-income and 11% in upper-middle-income countries (ILO, 2024^[48])

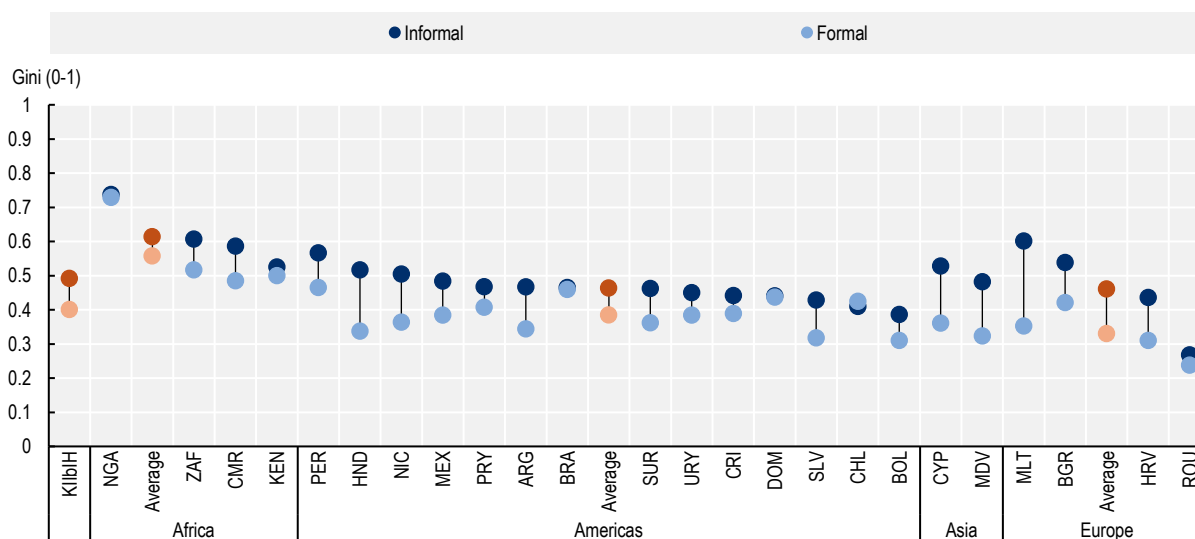
Labour market institutions and regulations play key roles in reducing earnings inequality. Typically, labour law enforcement is considered as a crucial factor, as it empowers the State to force firms and workers to comply with labour regulations, including (among others) remuneration, unionisations and occupational safety and health.

However, these positive effects on inequality are often limited to the formal economy, with only limited spillovers for the informal economy. Not surprisingly, non-compliance is more common in the latter. Many informal workers remain out of the reach of the legislation and end up working with no work contracts, with flexible working hours and wages below the legal minimum standard. Some positive spillovers may exist, though. For instance, regulations such as minimum or decent wage provisions, which theoretically apply only to the formal economy, may nevertheless set a standard for the economy as a whole. By sending a positive signal, they can result in an upward pressure on wages across the informal economy.

The Gini coefficient (a standard measure of inequality) shows that earnings inequality is high across KIbIH countries, in both the formal and informal economy, being highest in the latter (Figure 2.19). On average, the Gini coefficient is as high as 0.49 among informal workers and 0.40 for formal workers. Africa stands out as having the highest earnings inequality, the Gini index reaching 0.61 for informal workers and 0.56 for formal workers.

Figure 2.19. Inequality in earnings is wider among workers in informal employment

Gini coefficients of monthly earnings for informal and formal workers aged above 15 years, latest year available



Note: Monthly earnings refer to gross wages and salaries for employees and income for own-account workers, and include bonuses and in-kind payments. Some surveys report earnings net of social security contributions and taxes. KILBH and regional averages are calculated as simple unweighted averages of countries for which data are available.

Source: Authors' estimates based on (OECD, 2026^[1]), "Key Indicators of Informality based on Individuals and their Households (KILBH)", <https://data-explorer.oecd.org>.

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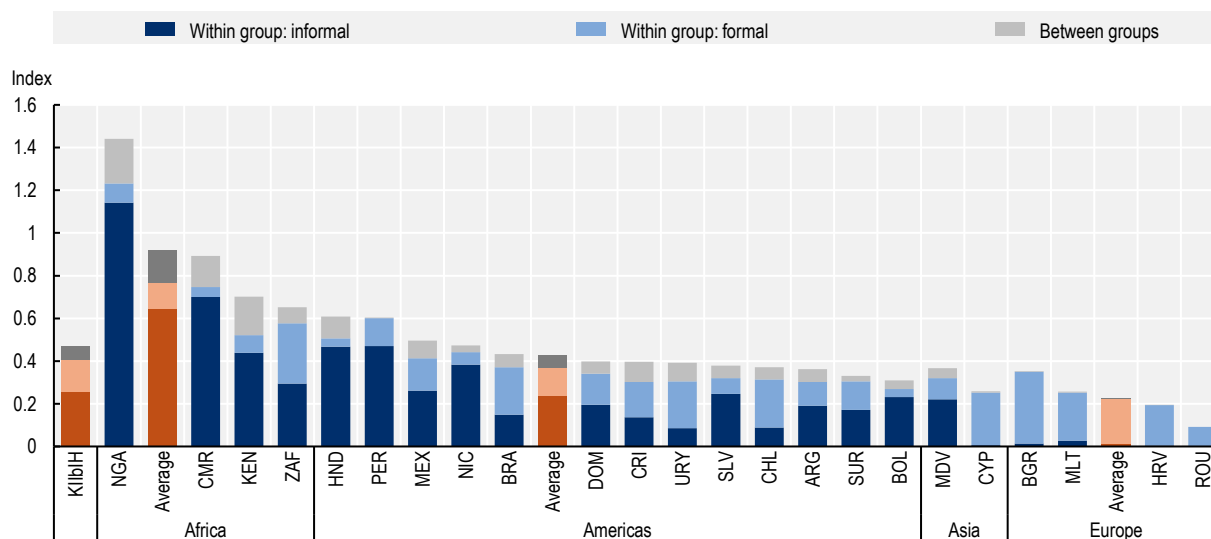
Overall inequality in earnings stems primarily from inequality within the informal economy

The prevalence of a large informal economy raises the question of its influence on overall earnings inequality. Using a Theil-L index allows to decompose inequality and to identify the proportion of it that can be attributed to the between-group (formal vs. informal sector) and the within-group components. For a given labour market, the Theil-L decomposition notably isolates: i) inequality in earnings that stem from structural differences between the formal and informal segments; and ii) the dispersion of income within the formal and informal segments, separately. The latter stems from the heterogeneity found in each of these groups and the unique characteristics of their members (see Box 2.2 for more details on the Theil-L index and its decomposition).

The decomposition analysis shows that, on average across countries, the overall earnings inequality is largely due to earnings inequality within the group of informal workers (Figure 2.20). Inequality within this group accounts for 55% of the total inequality in earnings. Earnings inequality within the group of formal workers accounts for 32%, while the contribution of earnings differences between the formal and informal segments of the labour market is relatively limited, accounting for only 13% of overall earnings inequality. Interestingly, the fact that earnings inequality within the informal economy contributes the most to overall earnings inequality is consistent across all KILBH countries. These significant earnings differences among informal economy workers is a key factor of its tiered structure and the main driver of a country's overall level of earnings inequality.

Figure 2.20. Most of overall inequality in earnings stems from inequality within the informal economy

Theil-L inequality decomposition for informal and formal workers aged above 15 years, latest year available



Note: The Theil-L index decomposes inequality into two components: i) the between-group component isolates the portion of inequality attributable exclusively to differences in the average labour monthly income of formal workers and informal workers; and ii) for each group, the within-group component measures separately the dispersion of income within each group (formal and informal workers). KILBH and regional averages are calculated as simple unweighted averages of countries for which data are available.

Source: Authors' estimates based on (OECD, 2026^[1]), "Key Indicators of Informality based on Individuals and their Households (KILBH)", <https://data-explorer.oecd.org>.

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These results carry several major implications. First, although, on average, informal workers earn less than formal workers, this mean difference explains overall earnings inequality in developing countries only at the margin. Second, large within-group earnings inequality, especially within the informal economy, plays a much more important role in explaining the observed inequality. This suggests a large heterogeneity across workers, notably in the informal economy, in terms of skill levels, difference in productivity or occupation. Third, the relatively lower level of earnings inequality within the formal economy, and the difference in overall earnings inequality across countries, likely reflect the role of labour market institutions such as the presence of collective bargaining and binding legal labour regulations (Machado Parente, 2024^[49]; Eklou and Foster, 2023^[50]; Dao et al., 2017^[51]; Jaumotte and Osorio Buitron, 2015^[52]; OECD, 2011^[53]). In other words, formal workers generally benefit from a higher level of protection that tend to reduce the differences in earnings among themselves.

Box 2.2. Measuring inequality in earnings with the Theil-L index

The Theil-L index is a specialised measure of inequality. It is particularly valued by economists and policy analysts due to its statistical robustness, its foundation in information theory and its unique characteristic of exact additive decomposability.

To ensure that the resulting metrics are consistent and ethically relevant across different distributions and populations, measuring inequality necessitates adherence to defined criteria. The Theil-L index,

along with its Theil-T counterpart, satisfies the fundamental ordinal axioms required for rigorous inequality analysis. These axioms are:

- **Scale invariant** (or mean independent), meaning that multiplying all incomes by a positive constant does not affect the measure, making comparisons robust to changes in inflation or currency units.
- **Principle of transfers** (Pigou-Dalton principle), which requires that any transfer of income from a wealthier individual to a poorer individual (provided the ranks are not reversed) must result in a decrease in the measured inequality.

The mathematical parameterisation of the Theil-L index gives disproportionate weight to income changes occurring at the lower end of the income scale (opposite to what happens for Theil-T). This aligns the index with analytical perspectives that prioritise welfare and inequality reduction among the poorest demographic segments. As such, the Theil-L index is highly suitable for analysis of inequality in the context of EMDEs, where the empirical distribution of earnings and income is highly skewed in the lower end segment.

The Theil-L index also satisfies the cardinal axiom of exact additive decomposability, which is crucial for structural economic analysis. This characteristic allows the total measured inequality to be perfectly partitioned into two distinct components among groups – a feature that is lacking in more intuitive measures (e.g. Atkinson indexes or Gini coefficients).

- The **between-group component** isolates the portion of inequality attributable exclusively to differences in the average income of each group. It measures the inequality that would exist if every individual within a given group would receive precisely the mean income of that group, eliminating all internal dispersion.
- The **within-group component** measures the residual inequality. It is calculated as the weighted sum (by each group shares in the overall population) of the inequality found within each subgroup. This component reflects the dispersion of income that persists even after accounting for the structural differences in group means. A high within-group contribution indicates that the underlying heterogeneity within groups (e.g. individual skills, sector and occupation, productivity levels and local market failures) is the dominant driver of overall inequality.

Source: (Neves Coasta and Pérez-Duarte, 2019^[54]; Bellù and Liberati, 2006^[55]; Akita, Lukman and Yamada, 1999^[56]).

High- and low-paid workers coexist in the informal economy, together with a large missing middle

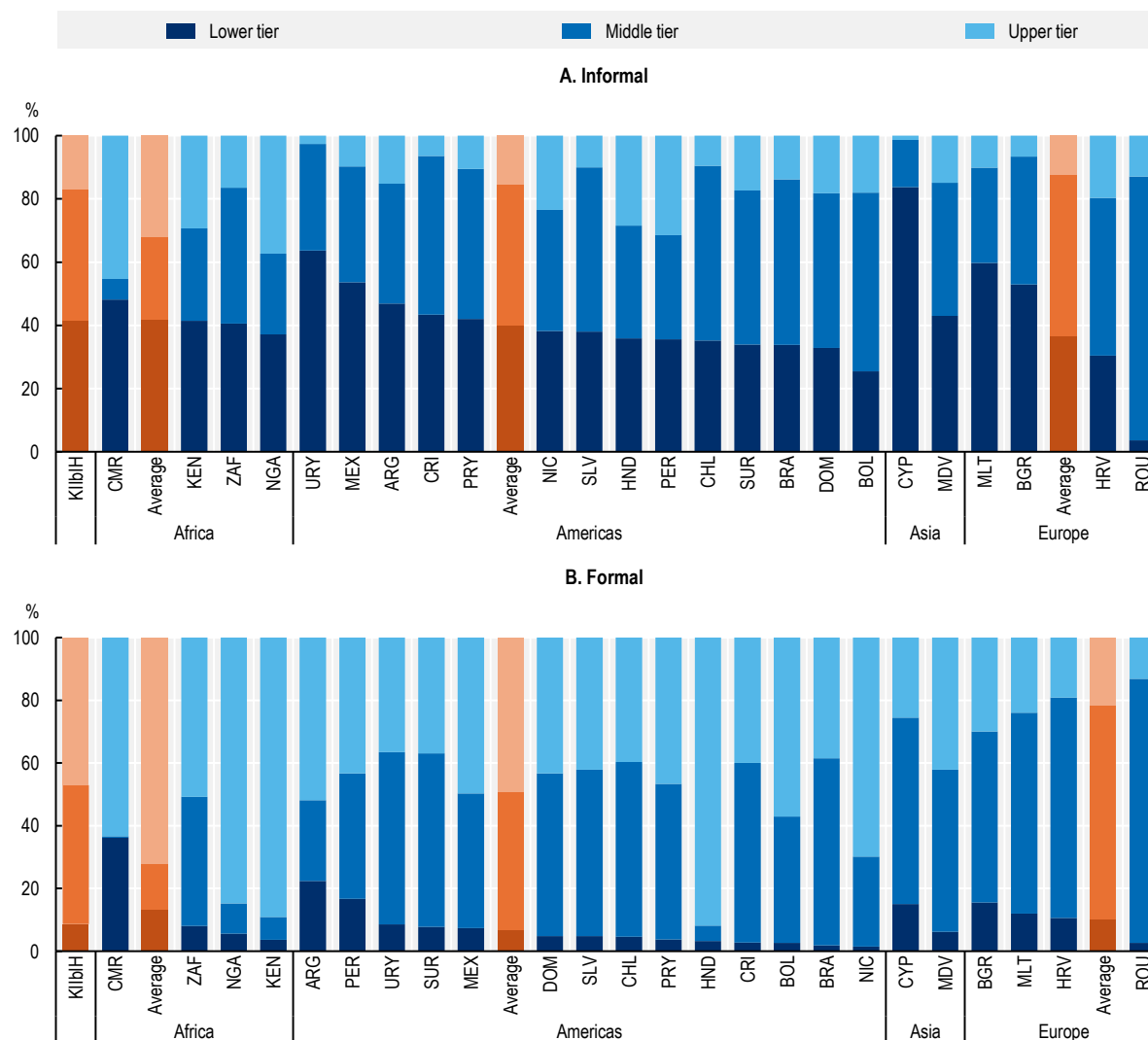
The informal economy is often referred to as being two-tiered, comprising a prosperous segment of high-paid workers, who may operate within it by choice, and an impoverished segment of low-paid workers, who lack better alternatives (Maloney et al., 2026^[44]; Günther and Launov, 2012^[45]; Fields, 1990^[46]). Compared with both formal and informal workers who belong to the upper tier, informal workers in the lower tier face a greater probability of falling into poverty and of facing greater health-related and old-age adversities (OECD, 2024^[15]). These conditions are also experienced by members of their households. Data from the KIlbIH support the co-existence of high- and low-paid workers in the informal economy. Data also confirm the presence of a large proportion of middle-paid informal workers – the so-called “missing middle” – who are often overlooked by policymakers. These workers tend to not qualify for social assistance while also being largely excluded from social insurance schemes.

Based on a three-tier classification of workers relative to median earnings, data reveal that formal workers are predominantly clustered in the high- and medium-earners categories whereas informal workers are predominantly found in the medium- and low-earners categories (Figure 2.21). Across KIlbIH countries, on

average within the earnings distribution, informal workers are split quite evenly between the lower tier (42% are “low-paid individuals”) and middle tier (41% are “medium-paid individuals”). Only 17% belong to the upper tier (“high-paid individuals”). For formal workers, these averages are reversed with only 9% being low-paid individuals while the shares are more even for medium-paid individuals (44%) and high-paid individuals (47%). From a social policy point of view, analysis of the earnings distribution of informal workers is crucial to understanding the capacity of different types of informal workers to contribute to social insurance schemes and the extent to which affordability is potentially an issue.

Figure 2.21. Informal workers are less likely to belong to the upper tier of the earnings distribution

Distribution of informal (Panel A) and formal (Panel B) workers aged above 15 years by earnings categories, latest year available



Note: Earnings categories classify individuals based on their monthly labour earnings into three categories, defined relative to median earnings: i) low-paid individuals (or lower tier) ranging from the bottom of the earnings distribution to 50% of median earnings; ii) medium-paid individuals (or middle tier) ranging from 50% to 150% of median earnings; and iii) high-paid individuals (or upper tier) including anyone above 150% of median earnings. Within regions, countries are ordered by decreasing shares of low-paid workers. KilbIH and regional averages are calculated as simple unweighted averages of countries for which data are available.

Source: (OECD, 2026^[1]), “Key Indicators of Informality based on Individuals and their Households (KilbIH)”, <https://data-explorer.oecd.org>.

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Workers' profiles vary substantially across the different tiers of the earnings distribution

The informal economy is a vast and complex swathe of society. The understanding of this sector is still incomplete and continues to evolve as more detailed information is obtained on the diverse profiles of informal workers across developing countries (Box 2.3). KILBIH data show that informal economy workers constitute a highly heterogeneous group, displaying large differences in workers' characteristics across the different tiers of the earnings distribution.

Box 2.3. Portraits of informality: Qualitative insights

Most earnings inequality originates within the informal economy, in which a sizeable middle tier coexists with a lower-tier segment that faces acute vulnerability. It is also clear that household composition shapes exposure to poverty risks. These findings resonate with the integrated approach set out in ILO Recommendation No. 204 concerning the transition from the informal to the formal economy (ILO, 2015^[57]). Critically, the ILO approach recognises that informality is not only a labour market status, but the result of institutional, economic and social arrangements that leave workers insufficiently covered by formal frameworks.

The use of stylised worker trajectories, of which three examples are given, helps to illuminate these structural dimensions.

Consider a street vendor in a growing African city. She may work long hours and generate earnings above the poverty line. Yet her productivity depends on three key factors: i) whether urban regulations recognise her activity; ii) whether she has secure access to trading space, and iii) whether basic services (e.g. storage, water and sanitation and electricity) are available. In contexts where informal traders operate in conditions of legal ambiguity or periodic displacement, investment is risky and building the business is difficult. Increasingly, climate-related risks – including extreme heat, flooding or more frequent storms – constrain working hours, damage stock and raise health risks. Where urban planning and climate adaptation strategies do not explicitly include informal workers, these shocks directly reduce earnings and deepen vulnerability.

Consider a home-based worker in Asia, producing within a subcontracted garment value chain. She may fall into the middle tier of earners identified in this chapter. However, prices and orders are typically determined upstream. Irregular demand, delayed payments and rising input costs shape her income stability. Here, inequality within informality reflects asymmetrical market power and limited agency in the value chain. Formal registration alone would not necessarily alter these dynamics without addressing bargaining power and collective representation, both central elements of Recommendation No. 204's framework.

Consider a waste picker providing environmental services within an urban waste system. Where municipalities integrate informal recyclers into public systems, income stability and occupational safety may improve. Where they are excluded, earnings volatility and health risks deepen. For women waste pickers in particular, income generation is closely linked with care responsibilities. In the absence of accessible and affordable childcare, women may have no option other than to bring young children to sorting areas, exposing them to health and safety risks, or women may reduce working hours in order to manage unpaid care. Access to childcare infrastructure can improve productivity, occupational safety and children's long-term outcomes.

Across these examples, recurring structural constraints are evident:

- Regulatory and spatial exclusion from urban and economic systems.
- Unequal access to infrastructure and public services.

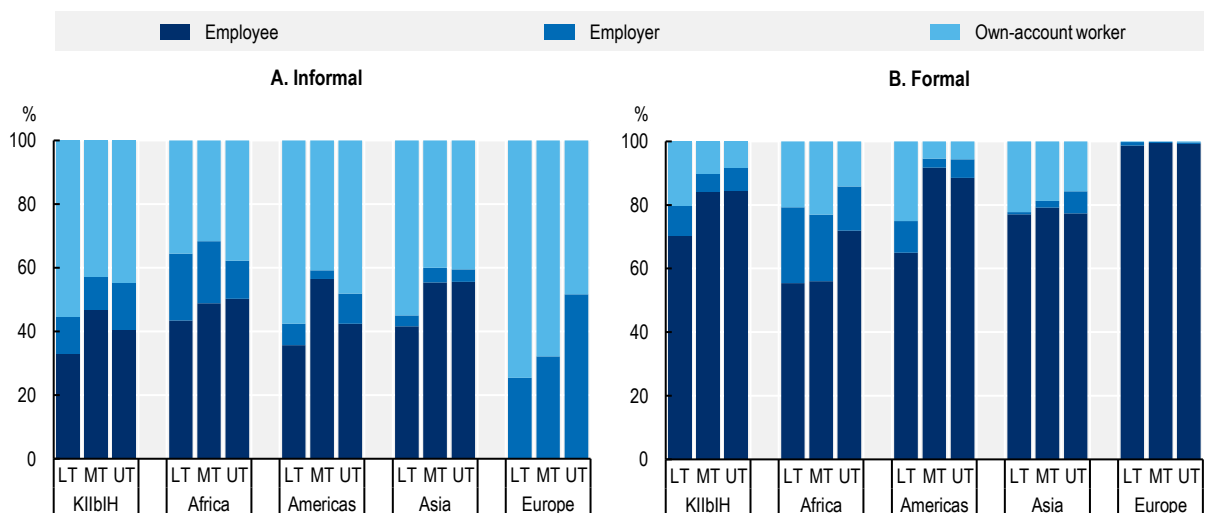
- Asymmetric market power within supply chains.
- Gendered care burdens that shape working time and income.
- Heightened exposure to climate and health risks without adequate protection.

These examples illustrate that productivity, income stability and vulnerability in the informal economy are shaped not only by workers' individual characteristics, but by the design of urban systems, market structures and social infrastructure. As such, strengthening transitions to formality requires attention not only to regulatory status, but to the broader economic systems that structure opportunity, risk and bargaining power. Effective transitions require an integrated policy approach combining rights at work, social protection, support to sustainable enterprises, and inclusive governance approaches that prioritise social dialogue.

Employment status is an important characteristic that influences workers' legal rights, protections and obligations. In reality, such status varies considerably across the earnings distribution and the formal-informal economy nexus. On average across KIIbIH countries, own-account workers are disproportionately concentrated in the informal economy, particularly in its lower tier, where they account for 56% of all lower tier informal workers, compared with 33% for employees and 11% for employers. In contrast, employees dominate in the formal economy and are also a larger share (40%) in the upper tier of the informal economy, compared with 45% for own-account workers and 15% for employers. The over-representation of own-account workers in low-paid informal jobs is particularly evident in Latin America and the Caribbean and in Europe (Figure 2.22).

Figure 2.22. Own-account workers are over-represented in the lower tier of the informal economy

Distribution of informal (Panel A) and formal (Panel B) workers aged above 15 years by earnings categories and employment status



Note: Earnings categories classify individuals into three categories, defined relative to the median monthly labour earnings of all workers: i) low-paid individuals (or lower tier [LT]) ranging from the bottom of the earnings distribution to 50% of median earnings; ii) medium-paid individuals (or middle tier [MT]) ranging from 50% of median earnings to 150% of median earnings; and iii) high-paid individuals (or upper tier [UT]) include anyone above 150% of median earnings. KIIbIH and regional averages are calculated as simple unweighted averages of countries for which data are available. KIIbIH average covers 29 countries; regional averages cover 6 countries in Africa, 14 countries in the Americas, 5 countries in Asia, and 4 countries in Europe.

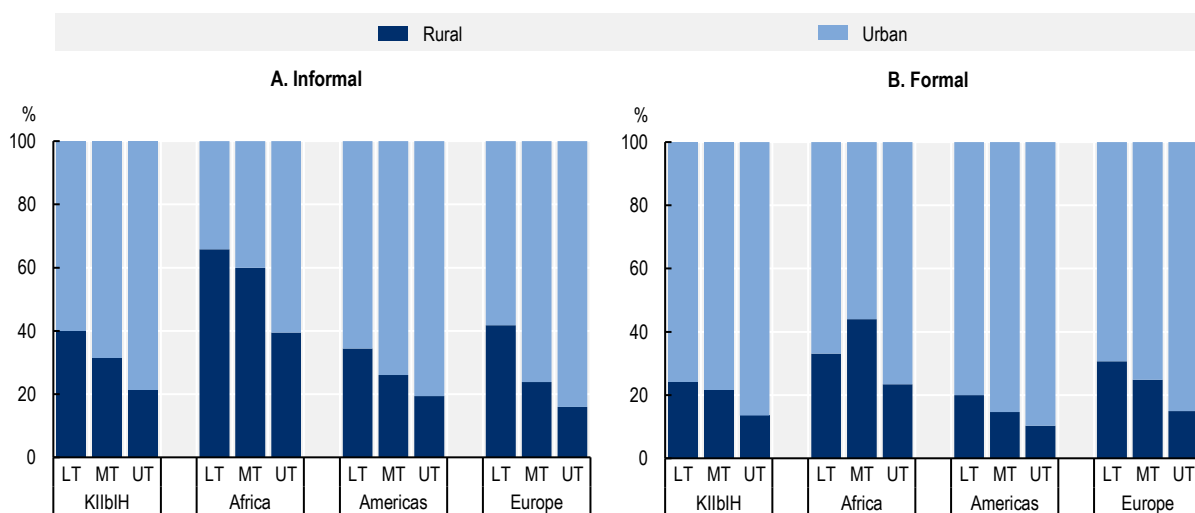
Source: (OECD, 2026^[1]), "Key Indicators of Informality based on Individuals and their Households (KIIbIH)", <https://data-explorer.oecd.org>.

A large rural-urban divide is another reality that differentiates the profile of workers across the diverse segments of the formal and informal economies. Past evidence shows that rurality is a key component of vulnerability among informal workers. Workers living in rural areas are particularly likely of being in informal employment. They also have a lower probability of moving out of informal and into formal employment (Aleksynska, La and Manfredi, 2023^[58]; OECD, 2023^[2]). Informal workers in rural areas have scarce access to education and training, and a higher probability of dropping out of school. They are therefore more vulnerable to at risk of falling into poverty – or remaining trapped in it. Notably, informal urban workers tend to have better access to social insurance, whereas informal rural workers are better covered by social assistance programmes (OECD, 2024^[15]).

In addition to being more likely to be in the informal economy, rural workers tend to be over-represented in the lower tier of the earnings distribution. Across KILBIH countries, 40% of informal workers in the lower tier of the earnings distribution live in rural areas, whereas only 21% of informal workers in the upper tier do so (Figure 2.23). In contrast, urban workers dominate in the formal economy, as well as in the middle and upper tiers of the informal economy.

Figure 2.23. Informal workers in the lower tier of the earnings distribution are more likely to live in rural areas

Distribution of informal (Panel A) and formal (Panel B) workers aged above 15 years by earnings categories and location



Note: Earnings categories classify individuals into three categories, defined relative to the median monthly labour earnings of all workers: i) low-paid individuals (or lower tier [LT]) ranging from the bottom of the earnings distribution to 50% of median earnings; ii) medium-paid individuals (or middle tier [MT]) ranging from 50% of median earnings to 150% of median earnings; and iii) high-paid individuals (or upper tier [UT]) include anyone above 150% of median earnings. KILBIH and regional averages are calculated as simple unweighted averages of countries for which data are available. KILBIH average covers 24 countries; regional averages cover 4 countries in Africa, 14 countries in the Americas, 2 countries in Asia, and 4 countries in Europe.

Source: (OECD, 2026^[1]), "Key Indicators of Informality based on Individuals and their Households (KILBIH)", <https://data-explorer.oecd.org>.

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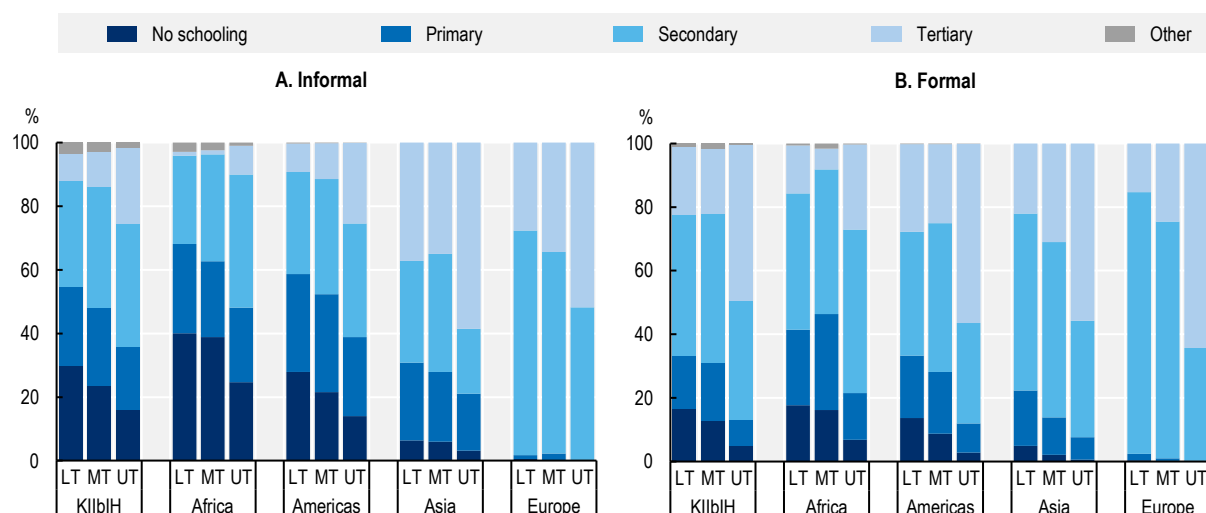
Education level also influences the distribution of workers in formal and informal economies and across the different earnings categories. Across most regions and employment categories, low educational attainment (primary education or below) is markedly higher among informal workers, whereas those with

secondary and tertiary qualifications are disproportionately represented among formal workers (OECD, 2024^[15]; ILO, 2023^[10]). Generally, informality is more common for people attaining lower educational levels. In KIbIH countries, 82% of workers holding no formal degree are informal, compared with 79% for those who completed primary education, 63% for those with complete secondary education, and 37% for those with complete tertiary education. Across all regions, achieving higher education brings better opportunities of having a formal job: in Africa, the informality rate for workers with primary (93%) and secondary (80%) education is far greater than for those with tertiary (48%). Similar trends are evident in Latin America and the Caribbean (respectively 70%, 52% and 28%), in Asia (83%, 69% and 42%), and in Europe (42%, 23% and 9%). In parallel, most informal workers attain lower educational levels. In KIbIH countries on average, 32% of informal workers have no education and 25% have completed primary education. These shares are higher in Africa (52% and 24%, respectively), than in Latin America and the Caribbean (20% and 27%), in Asia (23% and 26%), and in Europe (2% and 13%). The difference in educational attainment is striking compared with that of formal workers in KIbIH countries: just 10% have no schooling and 12% hold a primary degree, with little regional variation.

Educational attainment also varies strikingly across formality status and earnings categories. Among informal workers belonging to the lower tier of the earning distribution, 30% have no formal education, 25% have a primary education, 33% have secondary but only 8% have completed a tertiary grade (Figure 2.24). In contrast, in the upper tier of the informal sector, only 16% of workers have no schooling, 20% have a primary grade, 39% have secondary and 24% have attained a tertiary level. Workers with higher levels of education are more likely to work in the formal economy and, within it, in the upper tiers of the earnings categories.

Figure 2.24. In the lower tier of the earnings distribution, informal workers have lower educational attainment than formal ones

Distribution of informal (Panel A) and formal (Panel B) workers aged above 15 years by earnings categories and educational attainment



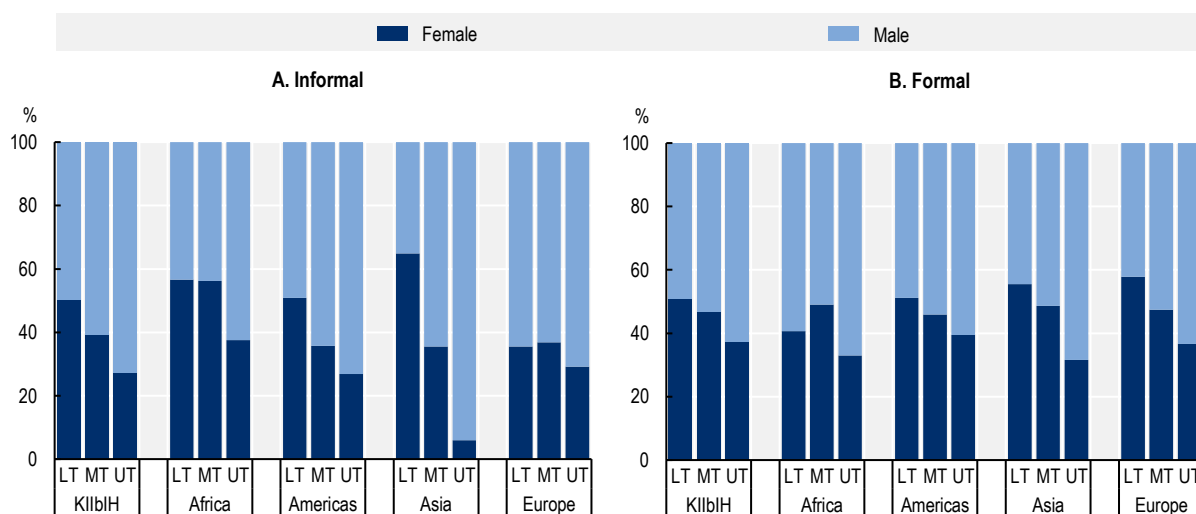
Note: Earnings categories classify individuals into three categories, defined relative to the median monthly labour earnings of all workers: i) low-paid individuals (or lower tier [LT]) ranging from the bottom of the earnings distribution to 50% of median earnings; ii) medium-paid individuals (or middle tier [MT]) ranging from 50% of median earnings to 150% of median earnings; and iii) high-paid individuals (or upper tier [UT]) include anyone above 150% of median earnings. KIbIH and regional averages are calculated as simple unweighted averages of countries for which data are available. KIbIH average covers 24 countries; regional averages cover 4 countries in Africa, 14 countries in the Americas, 2 countries in Asia, and 4 countries in Europe.

Source: (OECD, 2026^[11]), "Key Indicators of Informality based on Individuals and their Households (KIbIH)", <https://data-explorer.oecd.org>.

Finally, female workers – both informal and formal – tend to be underrepresented in the middle and upper tiers of the earnings distribution. Across KIbIH countries, women represent on average about half of both informal and formal workers within the lower tier of the earnings distribution. The share drops to 39% of all formal workers in the middle tier, and reaches 27% of informal workers and 37% of formal workers in the upper tier (Figure 2.25). These figures point to a relative disadvantage of women in the middle and upper tiers of the earnings distribution, which is more pronounced in the informal economy.

Figure 2.25. Informal female workers are under-represented in the middle and upper tiers of the earnings distribution

Distribution of informal (Panel A) and formal (Panel B) workers aged above 15 years by earnings categories and gender



Note: Earnings categories classify individuals into three categories, defined relative to the median monthly labour earnings of all workers: i) low-paid individuals (or lower tier [LT]) ranging from the bottom of the earnings distribution to 50% of median earnings; ii) medium-paid individuals (or middle tier [MT]) ranging from 50% of median earnings to 150% of median earnings; and iii) high-paid individuals (or upper tier [UT]) include anyone above 150% of median earnings. KIbIH and regional averages are calculated as simple unweighted averages of countries for which data are available. KIbIH average covers 24 countries; regional averages cover 4 countries in Africa, 14 countries in the Americas, 2 countries in Asia, and 4 countries in Europe.

Source: (OECD, 2026^[1]), "Key Indicators of Informality based on Individuals and their Households (KIbIH)", <https://data-explorer.oecd.org>.

StatLink  <https://stat.link/z74815>

Conclusion and policy discussion

Informality remains the norm in developing countries, yet it is far from a monolithic block. Patterns and correlations observed at the aggregate level may not represent associations that exist within the informal economy at the individual level. KIbIH data reveal that workers who operate in the informal economy face an overall disadvantage vis-à-vis formal workers. However, informal workers are also very diverse and face rather different challenges and risks, depending on their socio-economic characteristics and the structure of their household. The boundary between work in formal and informal economies becomes increasingly blurred when adding a household perspective and recognising the reality of multiple job holding. Three main findings warrant policy attention and action.

First, at the aggregate level, KILBIH data show that, beyond the lack of access to employment-based social protection, informal workers face four distinct disadvantages in relation for formal workers in that they: i) tend to work fewer hours; ii) receive lower labour income; iii) are more likely to earn less than the statutory minimum wage; and iv) are more prone to hold multiple jobs. Across all these dimensions, socio-demographic characteristics play key roles in exacerbating vulnerabilities. Women as well as rural and less-educated workers in the informal economy are particularly disadvantaged. Ultimately, informal workers' shortcomings in earnings and hours have far-reaching consequences for poverty and inequality. Although the association between poverty and informality is not systematic, KILBIH data confirm a cumulative impact in that informal workers are more at risk of falling into poverty, that poverty is greater in households that are fully informal, and that most of the working poor are informal workers.

Second, KILBIH data point to heightened earnings inequality among informal workers, reflecting broad heterogeneity in the informal economy. While informal workers earn less, on average, than formal workers, the dual structure of the labour market explains overall earnings inequality only at the margin. In reality, most of overall earnings inequality stems from earning inequality within the informal economy and can be explained by the heterogeneity across informal workers in terms of skill levels, productivity, occupations, location, and exposure to potential discriminatory practices. Digging deeper confirms that the informal economy consists of multiple and largely unequal employment situations. In all KILBIH countries, the informal economy exhibits a three-tiered structure – including one prosperous segment of high-paid workers who may operate by choice, one large intermediary segment of middle-paid workers and one impoverished segment of low-paid workers who lack better alternatives. The profile of informal workers belonging to the upper tier of the earnings distribution differ significantly from those in the lower tier. Compared with the middle and upper tiers, informal workers in the lower tier are more likely to be self-employed and less educated, to live in rural areas, and to be female workers.

Third, the divide between work in formal and informal economies is increasingly blurred when adding a household perspective and recognising the reality of multiple job holding. While the majority of informal workers live in households with no formal workers, some informal workers do live in households with formal workers, which lowers the levels of risks and vulnerabilities. At the same time, a significant share of workers in both formal and informal economies hold multiple jobs, most of which are informal. In such cases, informality and formality partially overlap.

The diverse, plural and segmented structure of the informal economy has several policy implications. It constitutes a call for interventions that recognise heterogeneity in the informal economy while also acknowledging that informality is not merely a labour-market condition. As regards the latter, policymakers should view informality as a structural outcome produced by the complex interactions of the design and enforcement of regulations, taxes and social protection systems (Bobba, Flabbi and Levy, 2022^[59]; Levy, 2021^[60]; Levy, 2008^[61]). Clearly, policy interventions should address these complex interactions and respond to the specific needs of workers with different characteristics and in diverse employment situations and household contexts.

Such interventions should aim to both reduce the inequality and poverty that impact disproportionately the informal economy and create the conditions for small and medium enterprises (SMEs) to grow and drive decent work. These objectives could be articulated around four policy interventions: i) investment in human capital development; ii) expansion of social protection coverage; iii) implementation of efficient minimum wage policies; and iv) support job creation and address the specific disadvantages of female and rural informal workers.

Invest in human capital development

Inclusive growth and access to quality jobs must remain at the heart of any formalisation strategies, for all workers of the informal economy. For policymakers, it is crucial to expand access to employer-financed

training and provide skills development programmes that are explicitly designed to accommodate the constraints and needs of informal workers.

Mechanisms that recognise prior learning should be institutionalised to validate skills acquired through informal work experience. To enhance the long-term skill endowments of future labour market entrants, governments should continue to prioritise investment in universal, high-quality education, implement measures to reduce school dropouts, and facilitate efficient school-to-work transitions.

Expand social protection coverage

The uneven capacities across informal economy workers to contribute to social protection schemes clearly calls for differentiated strategies based on the level of earnings of workers and their distance towards formalisation.

For informal workers in the upper- and upper-middle tiers of the earnings distribution, who are typically more responsive to conventional formalisation incentives, policy design should emphasise regulatory inclusion policies. This includes: ensuring effective coverage by labour legislation systems and tax frameworks; encouraging voluntary contributions to social insurance systems; providing appropriate contribution subsidies; simplifying registration and payment procedures, notably for the self-employed who run micro-enterprises; and strengthening enforcement of regulations for both employers and the self-employed.

For informal workers in the lower and lower-middle tiers of the earnings distribution, policies should acknowledge that a subset of workers may remain in low-productivity, informal occupations over the long term. In this regard, priorities should shift towards mitigating the dual disadvantage of informality and low earnings. This notably includes enhancing collective bargaining capacities for low-paid informal workers and extending social protection via non-contributory benefits (e.g. social pensions). In addition to enhancing individual welfare, such investments serve as instruments for poverty mitigation and labour market stabilisation.

Implement efficient minimum wage policies

By establishing minimum or decent wage regulations, policymakers can trigger a “lighthouse effect” – whereby a statutory minimum wage signals socially acceptable income levels to the informal economy. This can have strong spillover effects on the informal economy and, more specifically, on low-paid informal workers. To reduce non-compliance and potential adverse employment effects, minimum wage policies should carefully balance employer and worker perspectives and take into account economic factors to fix the effective level and rate structure of minimum wages.

Support job creation and address the specific disadvantage of female and rural informal workers

Creating decent jobs remains core to any development strategies. It requires measures to support job-rich sectors and help high-potential SMEs and entrepreneurs grow their businesses and create more formal wage jobs. Important levers include access to financial services, technology transfers, training and a conducive business environment. Dialogue with the private sector and local SMEs is essential to better understand labour market needs.

The stark disadvantages faced by certain sub-groups of the informal economy, such as women or rural workers, should also be addressed through specific measures. In particular, labour market and formalisation policies must address the disproportionate care burden of women and the reduced access to decent job opportunities and basic services experienced by people living in rural areas. Both situations often prevent these sub-groups from joining the labour market and/or from holding a formal job.

Annex 2.A. Country and time coverage of KIbIH primary sources

Annex Table 2.A.1. Country coverage, summary statistics and primary sources of the KIbIH

Country	ISO	Year	Income level	Survey
Africa				
Benin	BEN	2021	Lower-middle	Enquête Harmonisée sur le Conditions de Vie des Ménages (EHCVM 2021/22)
Burkina Faso	BFA	2021	Low	Enquête Harmonisée sur le Conditions de Vie des Ménages (EHCVM 2021/22)
Cameroon	CMR	2007	Lower-middle	Enquête Camerounaise Auprès des Ménages (ECAM III)
Ethiopia	ETH	2018	Low	Ethiopian Socioeconomic Survey (ESS 2018/19)
Gambia	GMB	2015	Low	Integrated Household Survey (HIS 2015)
Ghana	GHA	2013	Lower-middle	Ghana Living Standard Survey (GLSS 2013)
Kenya	KEN	2015	Lower-middle	Kenya Integrated Household Budget Survey (KIHBS 2015/16)
Liberia	LBR	2016	Low	Household Income and Expenditure Survey (HIES 2016)
Madagascar	MDG	2012	Low	Enquêtes Périodiques auprès des Ménages (EPM 2012)
Malawi	MWI	2019	Low	Integrated Household Panel Survey (IHPS 2019)
Mali	MLI	2021	Low	Enquête Harmonisée sur le Conditions de Vie des Ménages (EHCVM 2021/22)
Namibia	NAM	2015	Upper-middle	Namibia Household Income and Expenditure Survey (NHIES 2015/16)
Niger	NER	2018	Low	Enquête Harmonisée sur le Conditions de Vie des Ménages (EHCVM 2018-2019)
Nigeria	NGA	2015	Lower-middle	Nigeria General Household Survey (GHS 2015)
Rwanda	RWA	2016	Low	Enquête Intégrale sur les Conditions de Vie des Ménages (EICV 5)
Senegal	SEN	2021	Lower-middle	Enquête Harmonisée sur le Conditions de Vie des Ménages (EHCVM 2021/22)
Sierra Leone	SLE	2018	Low	Sierra Leone Integrated Household Survey (SLIHS 2018)
South Africa	ZAF	2016	Upper-middle	National Income Dynamics Study (NIDS 2016)
Tanzania	TZA	2019	Lower-middle	National Panel Survey (NPS 2018/19)
Togo	TGO	2021	Low	Enquête Harmonisée sur le Conditions de Vie des Ménages (EHCVM 2021/22)
Uganda	UGA	2019	Low	Uganda National Panel Survey (UNPS 2019/20)
Zambia	ZMB	2015	Lower-middle	Living Conditions Monitoring Survey (LCMS 2015)
Americas				
Argentina	ARG	2023	Upper-middle	Encuesta Permanente de Hogares (EPH 2023)
Bahamas	BHS	2013	High	Bahamas Household Expenditure Survey (HES 2013)
Barbados	BRB	2016	High	Barbados Survey of Living Conditions 2016
Bolivia	BOL	2022	Lower-middle	Encuesta de Hogares (2022)
Brazil	BRA	2023	Upper-middle	Pesquisa Nacional por Amostra de Domicílios Contínua (PNAD 2023)
Chile	CHL	2022	High	Encuesta de Caracterización Socioeconómica Nacional (CASEN 2022)
Colombia	COL	2023	Upper-middle	Encuesta Nacional de Calidad de Vida (ECV) 2023
Costa Rica	CRI	2023	Upper-middle	Encuesta Nacional De Hogares (ENAH) 2023
Dominican Republic	DOM	2018	Upper-middle	Encuesta Nacional de Gastos e Ingresos de los Hogares (ENGIH 2018)
El Salvador	SLV	2023	Upper-middle	Encuesta de Hogares de Propósitos Múltiples (EHMP 2023)
Guatemala	GTM	2022	Upper-middle	Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH 2022)
Honduras	HND	2019	Lower-middle	Encuesta de Hogares de Propósitos Múltiples (EHMP 2019)
Jamaica	JAM	2019	Upper-middle	Jamaica Survey of Living Conditions (JSLC 2019)
Mexico	MEX	2022	Upper-middle	Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH 2022)
Nicaragua	NIC	2014	Lower-middle	Encuesta de Medición de Nivel de Vida (EMNV 2014)
Paraguay	PRY	2024	Upper-middle	Encuesta Permanente de Hogares (EPH 2024)
Peru	PER	2023	Upper-middle	Encuesta Nacional de Hogares (ENAH) 2023
Suriname	SUR	2022	Upper-middle	Suriname Survey of Living Conditions (SSLC 2022)
Uruguay	URY	2023	High	Encuesta Continua de Hogares (ECH 2023)

Country	ISO	Year	Income level	Survey
Asia				
Armenia	ARM	2023	Upper-middle	Integrated Living Condition Survey (ILCS 2023)
Cambodia	KHM	2019	Lower-middle	Cambodia Living Standards Measurement Study – Plus 2019/20
China	CHN	2020	Upper-middle	China Family Panel Studies (CFPS 2020)
Cyprus	CYP	2023	High	EU Statistics on Income and Living Conditions (EU-SILC 2023)
India	IND	2012	Lower-middle	India Human Development Survey-II (IHDS-II 2011/12)
Indonesia	IDN	2014	Lower-middle	Indonesia Family Life Survey (IFLS 2014)
Lao PDR	LAO	2012	Lower-middle	STEP Skills Measurement Household Survey 2012
Maldives	MDV	2019	Upper-middle	Household Income and Expenditure Survey (HIES 2019/20)
Mongolia	MNG	2021	Lower-middle	Household Socio Economic Survey (HSES 2021)
Myanmar	MMR	2015	Lower-middle	Myanmar Poverty and Living Conditions Survey (MPLCS 2014-15)
Thailand	THA	2017	Upper-middle	Survey of the Economic and Social Situation of the Household (SES 2017)
Viet Nam	VNM	2016	Lower-middle	Vietnam Household Living Standard Survey (VHLSS 2016)
Europe				
Albania	ALB	2012	Upper-middle	Living Standards Measurement Study (LSMS 2012)
Bulgaria	BGR	2023	High	EU Statistics on Income and Living Conditions (EU-SILC 2023)
Croatia	HRV	2023	High	EU Statistics on Income and Living Conditions (EU-SILC 2023)
Malta	MLT	2023	High	EU Statistics on Income and Living Conditions (EU-SILC 2023)
Romania	ROU	2023	High	EU Statistics on Income and Living Conditions (EU-SILC 2023)

Note: Income levels refer to the income classification developed by the World Bank. Regional classification of countries follows the geographical grouping of the United Nations' M49 standard.

Source: (OECD, 2026^[1]), "Key Indicators of Informality based on Individuals and their Households (KIIBIH)", <https://data-explorer.oecd.org>.

Annex 2.B. How to define and measure informality?

The definition of the informal economy

The International Labour Organization (ILO) employs a precise and comprehensive conceptual framework to delineate and analyse the informal economy. This framework is essential for understanding the structure of labour markets, identifying key challenges, and developing effective policy interventions aimed at poverty reduction and the promotion of decent work. Recognising that a simple binary view of the economy is insufficient, the ILO approach highlights the complexity of informality and the need for context-specific policy responses. Policymakers must therefore tailor interventions to address the underlying drivers of formality and the barriers to formalisation.

Over time, the definition of the informal economy has evolved. The first international standard addressing the measurement of informality (adopted in 1993 during the 15th International Conference of Labour Statisticians [ICLS]) focused on employment in the informal sector (ILO, 1993^[62]). Subsequent revisions have progressively transformed the definition. In 2023, the 21st ICLS adopted a resolution concerning relevant statistics that introduced major changes to the definition and measurement of the informal economy (ILO, 2024^[63]).

At present, the ILO defines the informal economy as all informal productive activities carried out by persons or economic units, whether or not these activities are undertaken for pay or profit. Informal productive activities are those that are, in law or in practice, not covered by formal arrangements. Within this broad framework, the 21st ICLS resolution introduces the concept of the informal market economy, defined as “all production for pay or profit in the informal sector and all productive activities of workers in employment that are not covered by formal arrangements” (ILO, 2024^[63]). This concept is particularly useful as it identifies the core forms of labour-market informality: informality linked to the economic unit in which production takes place; and informality linked to the job or work activity itself. The ILO framework thus distinguishes between three sectors of production – formal, informal, and household own-use production and community sectors – before defining informal employment across different types of workers.

The three sectors: Operational definitions

Based on their characteristics, all economic units can be categorised into one of three sectors: formal, informal, and household own-use production and community.

The **formal sector** comprises economic units that are formally recognised as producers of goods and services and are covered by formal arrangements. Such units possess a formal status, for example by being owned or controlled by the government, being legally separated from their owners, being registered in a government-established system keeping complete accounts for tax purposes, or producing mainly for the market while employing one or more persons in formal jobs.

The **informal sector** comprises household unincorporated market enterprises – i.e. economic units producing goods or services mainly for the market with the purpose of generating income or profit. Because there is no separate legal entity for these enterprises, they are treated as part of the household. These enterprises are not formally recognised by government authorities as distinct market producers. These units are not government-owned, are not legally separated from their owners, do not keep complete accounts for tax purposes, and are not registered in a relevant government system. Additionally, they do

not employ any employee with a formal job. Importantly, production mainly intended for own final use is excluded from the informal sector.

The **household own-use production and community sector** covers households and non-formal, non-profit organisations producing goods or services mainly for own final use or for the use of others without the purpose of generating income or profit. This includes own-use production by households, direct volunteer work, and work carried out for non-formal, non-profit organisations.

Informal and formal employment

Employment classification focuses on the formal or informal status of the job or work activity itself (in contrast to the sector classification, which focuses on the type of economic unit in which production takes place).

Formal employment is characterised by legal protection, regulatory compliance, and access to employment and social security benefits. Depending on local guidelines, workers in formal employment are subject to national labour legislation and have social protection rights, such as contributions to pension funds or retirement schemes, paid annual leave, paid sick leave, and other employment benefits.

Conversely, **informal employment** refers to activities undertaken to produce goods or services for pay or profit that are, in law or in practice, not covered by such formal arrangements. As a result, workers in informal employment may lack legal protection, social security coverage, and access to employment-related benefits.

Informal employment can occur across different types of workers. For independent workers, it concerns those who own or operate an informal and unincorporated household market enterprise. For dependent contractors, it refers to workers who lack formal status in relation to legal and administrative frameworks, or whose activities are not effectively covered by formal arrangements. For employees, informal employment applies when the employment relationship is not formally recognised by the employer or when it does not provide effective access to formal arrangements. Contributing family workers are considered informally employed when their work relationship is not formally recognised or protected.

The overlap between sectors and informal employment

The definition of informal employment means that such work is not limited to the informal sector. Depending on the type of economic unit for which work is carried out, individuals holding informal jobs may work in the informal, formal, or the household own-use production and community sector. The distinction is important: the sector classification identifies the status of the production unit, while the employment classification identifies whether the worker's specific job is formally recognised and effectively protected.

The complexity of the informal economy goes beyond the sector-employment dichotomy and can stem from different regulatory frameworks that do not necessarily mandate social security contributions. In countries where such contributions are not mandatory, workers may comply with all labour laws while remaining outside social insurance systems – therefore being counted as informally employed. This challenge regarding the link between formality and social protection requires to examine informality as a complex, multidimensional and diverse phenomenon and to analyse it from different angles. For instance, Fietz et al. (2025^[64]) use a distinct and specific approach regarding social protection (SP) coverage, which goes beyond being informally employed. They recognise four sub-categories: SP mandated and complying; SP exempted and participating; SP mandated and noncomplying; and SP exempted and nonparticipating (Fietz et al., 2025^[64]).

How does the KIbIH measure the informal sector and the informal employment?

A practical limitation to studying informality is that not all countries have fully implemented the statistical standards on which the ILO builds the latest framework for measuring informality. In particular, some labour-force surveys may not yet fully reflect the 19th ICLS distinction between employment and other forms of work, with consequences for the treatment of own-use production of goods. Similarly, the lack of full implementation of the International Classification of Status in Employment (ICSE-18) may limit the identification of new categories of the status in employment, especially that of dependent contractors. However, many of the core criteria used to identify informal employment among employees, independent workers and contributing family workers are already collected in labour-force surveys, including information on enterprise registration, social security contributions, paid leave, contracts, taxation, and/or formal recognition of the work relationship.

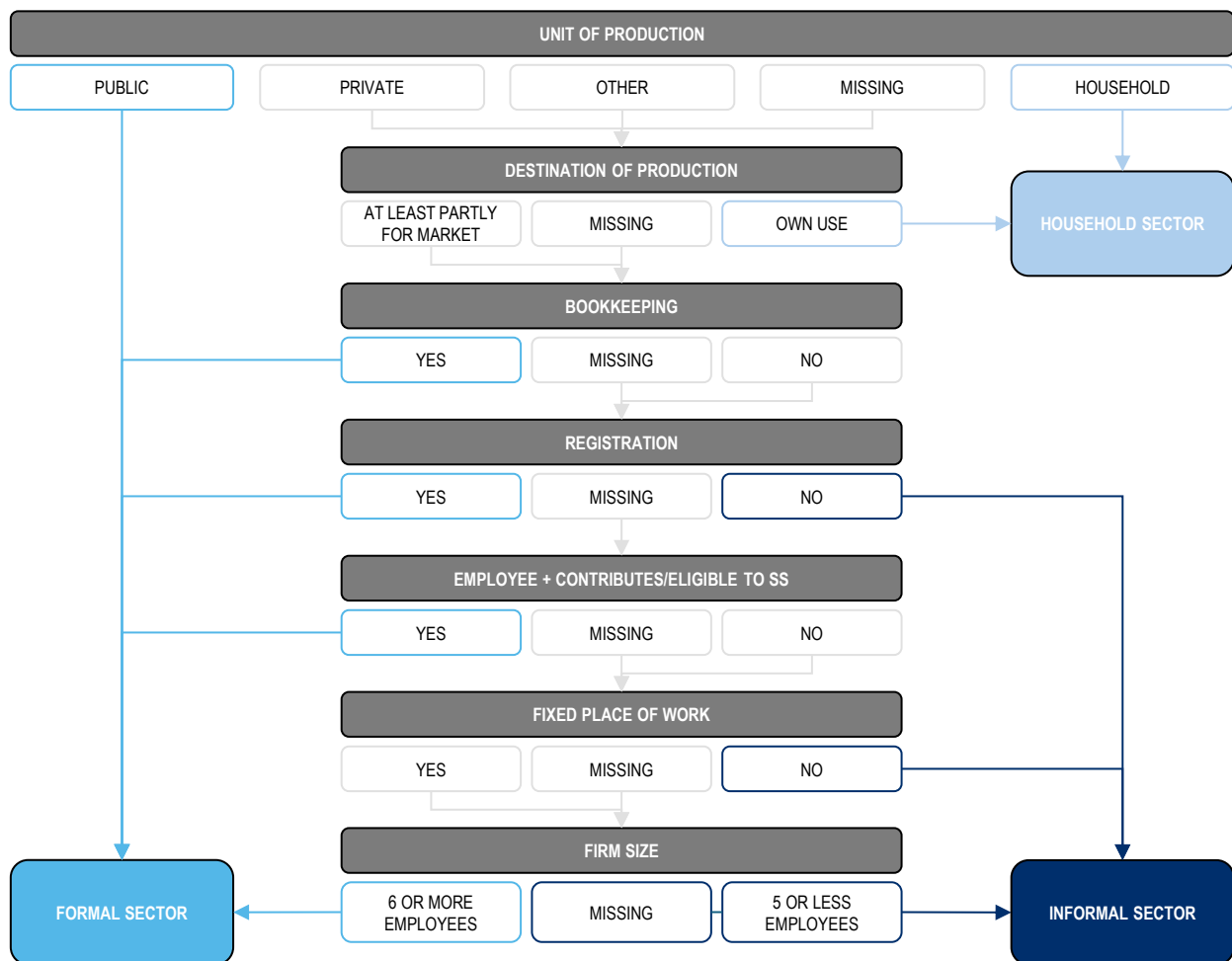
As of 2026, the KIbIH follows the ILO guidelines and statistical concepts defined by the **20th ICLS**, which provide the basis for classifying workers according to both their status in employment and the work relationship. This allows the KIbIH to distinguish between employees, independent workers, dependent workers and contributing family workers in a way that is broadly comparable across countries, while using available survey variables to identify informal employment and the informal sector. The resulting measures should therefore be understood as a harmonised operational approximation of informality, sectors and employment, based on the 20th ICLS framework and the statistical concepts defined therein (ILO, 2018^[65]). Indicators are built by combining data from different variables of the underlying household surveys.

To identify whether workers operate in the informal sector, the KIbIH uses the following information:

- **Unit of production:** What is the institutional sector in which the employed individual works – public, private, household or other?
- **Destination of the production:** Is the production of the economic unit mainly destined to the market, or is it for own final use or consumption?
- **Bookkeeping of the business:** Does the economic unit (owned by the self-employed or in which the worker is employed) keep regular books?
- **Registration of the business:** Is the economic unit (owned by the self-employed or in which the worker is employed) registered in the tax authority registry?
- **Contribution to social security** (for employees only): Is the employed individual an employee and does the economic unit in which he/she is employed pay social security contributions?
- **Place of work:** Does the employed individual work in a fixed place of work?
- **Firm size:** Does the economic unit (owned by the self-employed or in which the worker is employed) have five employees or less, or six employees and more?

This information feeds into a decision tree that defines the institutional sectors, in line with the functional statistical rules employed by the ILO (ILO, 2018^[65]; ILO, 2013^[27]). Annex Figure 2.B.1 presents the decision tree to compute the institutional sectors.

Annex Figure 2.B.1. Decision tree to compute indicators on formal, informal and household sectors

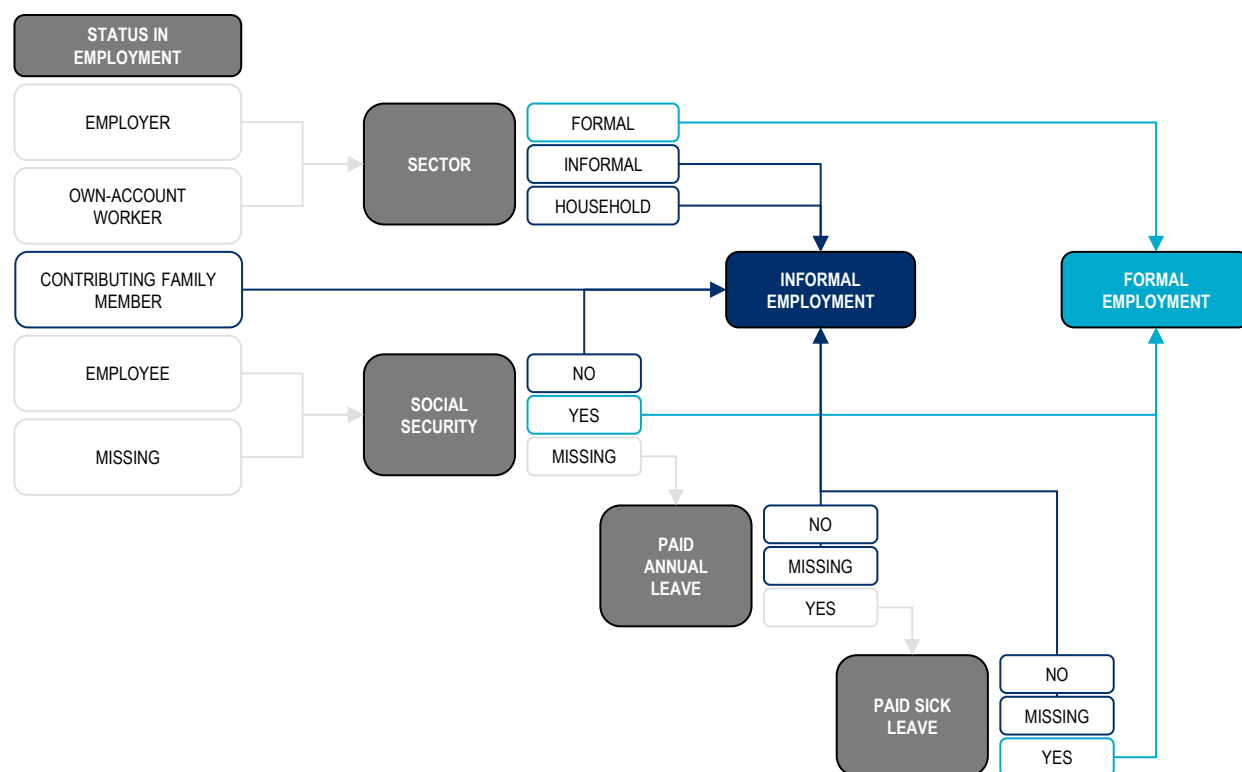


Source: Authors' own elaboration based on ILO (2018_[65]).

To identify whether workers are in informal employment the KIIbIH uses the following information:

- **Status in employment:** Does the employed individual work as an employee, an employer, an own-account worker or a contributing family worker?
- For an employer or an own-account worker:
 - **Status of the economic unit:** Does the economic unit belong to the formal, informal or household sector?
- For an employee (and missing information on status in employment):
 - **Social security:** Is the worker covered by a social insurance scheme?
 - **Paid leave:** Does the worker benefit from paid annual and sick leave?

This information feeds into a decision tree that defines the employment status, in line with the functional statistical rules employed by the ILO (ILO, 2018_[65]; ILO, 2013_[27]). Annex Figure 2.B.2 presents the decision tree to compute formal and informal employment.

Annex Figure 2.B.2. Decision tree to compute indicators on formal and informal employment

Source: Authors' own elaboration based on ILO (2018^[65]).

Notes

¹ It must be stressed that some of these gaps are partly explained by the higher difficulty to adequately capture working time in agriculture (ILO, 2022^[19]).

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3

Addressing the challenge of ageing with informality

As the global population ages rapidly, the high incidence of informality in developing countries presents unique challenges for the livelihoods of the elderly. Informality leads to significant income risks during old age reflecting limited accumulation of retirement rights during working years and the subsequent lack of adequate retirement income. Using data from the *Key Indicators of Informality based on Individuals and their Households* (KIIbIH), which covers over 50 developing countries, this chapter begins by assessing the livelihoods of elderly individuals and their coping strategies in the face of substantial pension gaps. It then examines the current enrolment of workers in contributory pension schemes and their capacity to contribute, highlighting large coverage gaps among informal economy workers, even among relatively high-paid workers. Finally, the chapter reviews the strengths and weaknesses of various pension models and discusses the financing of pension systems in contexts of widespread informality. To conclude, the chapter outlines several policy options that governments should consider to secure the livelihoods of elderly individuals in such contexts.

In brief

Rapid ageing and persistent informality create unique policy challenges to secure the livelihoods of the elderly of today and in years to come

- Rapid ageing is one of the most pressing socio-economic megatrends. Globally, the share of the population aged above 65 years is expected to rise from 10% in 2022 to 16% in 2050, reaching 24% in 2100. In developing countries, ageing is taking place in contexts in which informality remains the dominant form of employment. This adds complexity to the quest to develop robust pension systems that can achieve decent coverage and offer adequate old-age benefits.

Income insecurity is widespread for the current elderly population

- Across KIIbIH countries, 51% of elderly receive pension benefits – either contributory or non-contributory. However, the coverage varies drastically across countries, depending on their level of development, region and status in the demographic transition.
- On average, urban men who belong to the richest households are more likely to receive contributory pension benefits, whereas women, people living in rural areas and the poor are more likely to be covered by non-contributory schemes.
- In the absence of adequate retirement income, the elderly have adopted diverse coping strategies to secure their livelihoods, including delaying retirement for workers of the informal economy and relying on inter-generational support.

Few working-age workers participate in contributory schemes, putting their future old-age income at risk

- Across KIIbIH countries, only 40% of employed individuals, and 8% of informal workers, contribute to some type of pension scheme.
- Low enrolment affects not only low-paid informal economy workers with limited contributory capacities, but also medium- and high-paid informal workers and formal self-employed workers who could afford to contribute. This reflects a variety of barriers, ranging from low earnings and irregular income to lack of information, mistrust in the system and/or lack of relevant options, especially for non-employees.

Policies must focus on the triple challenge of coverage, adequacy and fiscal/financial sustainability

- Policies should aim to coherently articulate non-contributory and contributory schemes, ensuring consistency and synergy to balance retirement income security with incentives for formalisation.
- Non-contributory schemes are crucial to cover the elderly's basic needs and shield them from poverty. They need to be complemented by contributory schemes that fit the needs of informal economy workers, with a view to gradually integrate both formal and informal workers in common schemes to avoid fragmentation and achieve meaningful scale.
- Financing the expansion of pension systems is challenging but opportunities exist. Expanding non-contributory pensions – achievable at relatively low fiscal cost for basic anti-poverty benefits – offers significant social returns and large positive spillovers, but requires fiscal reforms to better mobilise domestic resources. In parallel, some scope exists to broaden the base of social security contributors and extend contributory pension coverage by reaching informal economy workers with the largest contributory capacity.

Introduction

Population ageing has become one of the most salient global trends of the 21st century. Between 2022 and 2050, the share of elderly people in the world – those aged more than 65 years – is expected to sharply increase from 10% to 16% (United Nations, 2023^[1]). This trend is particularly evident and rapid in emerging markets and developing economies (EMDEs). As a result, many low-income and lower-middle income countries are expected to become “old” before they become “rich”.

Old age is fundamentally characterised by physical and cognitive decline, which progressively hampers individuals’ ability to work and earn an income. For more than 150 years, in a historical process that started in more advanced countries but progressively expanded to the entire world, governments have established pension systems as a means to better protect the elderly from the risk of income loss associated with old age. Although pension systems are complex and diverse policy instruments, most share the fundamental common characteristic of being structured as an insurance product whereby workers are expected to provide regular contributions in exchange for a future income during old age. Historically, the right to a pension has materialised through formal working arrangements and has been closely tied to the employer-employee relationship via co-payments of contributions.

To date, the design, establishment and development of pension systems have largely ignored the needs of informal economy workers, who dominate the labour force in developing countries (see Chapter 1). By and large, workers in the informal economy do not have secure access to contributory pension schemes. Rather, they have to rely on social pensions when these exist, or on *ad hoc* mechanisms such as private saving, intra-family transfers or delayed retirement.

In this context, navigating the challenges of ageing and informality is critical for governments in EMDEs. Informality undermines not only the current livelihoods of the elderly by limiting their pension entitlements, it also threatens the future well-being of today’s informal economy workers who are not contributing to any pension scheme and risk inadequate income once retired. Addressing this dual challenge will require policymakers to pursue a three-pronged approach of: i) improving income security for the current elderly who do not or inadequately benefit from contributory and/or non-contributory schemes; ii) enrolling informal economy workers in contributory pension schemes during their working life to protect their income during old age; and iii) ensuring the sustainable financing of pension systems.

Drawing upon KIIbIH data, this chapter investigates the multiple impacts ageing and informality have on the livelihoods of current and future elderly. The chapter starts by painting a global picture of the ageing transition, placing it in the context of the world’s large informality footprint. It then examines the livelihoods of current elderly people, analysing the main social protection gaps during old age and identifying the mechanisms the elderly adopt to cope with large deficits in pension systems. In turn, the chapter explores the livelihoods of the future elderly population, highlighting the links between informal employment and low participation in contributory pension schemes. Critically, the chapter reviews the strengths and weaknesses of diverse pension models in the context of high informality and provides some cost estimates of extending social pensions. Finally, the chapter identifies short- and long-term policy options to develop robust pension systems that can successfully blend non-contributory and contributory schemes, include informal economy workers, reconcile incentives for formal work and decent retirement income, and account for the diverse socio-economic, demographic and fiscal contexts of the countries covered by the KIIbIH.

Developing countries face the double challenge of ageing and informality

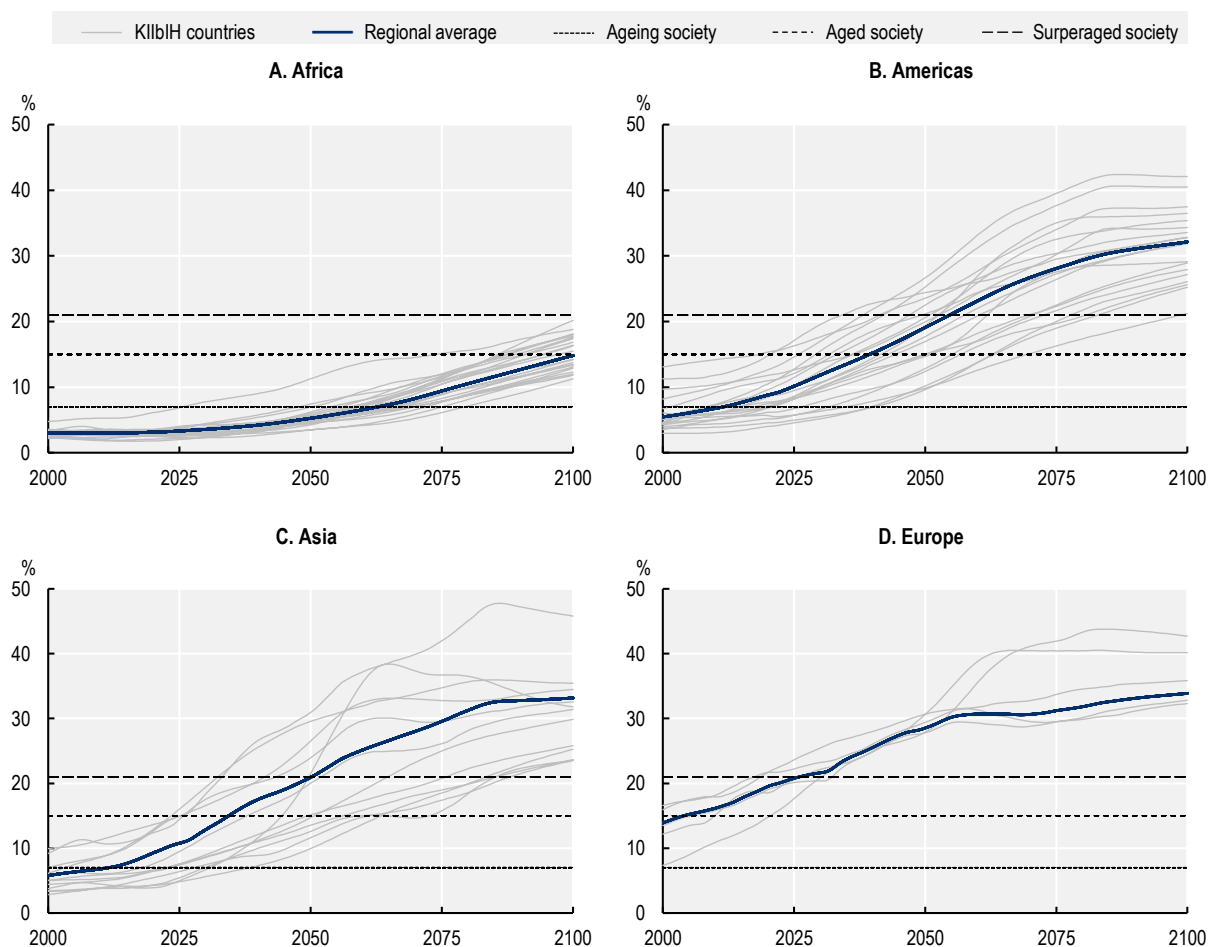
The entire world is ageing and developing countries are ageing faster

The world is ageing quickly, especially in EMDEs. The share of the global population aged above 65 years is expected to rise from 10% in 2022 to 16% in 2050 (United Nations, 2023^[1]). Although the ageing trend

started in developed countries, it is now affecting developing countries. By 2050, estimates predict that the majority of the population aged above 65 years will live in developing countries. As of 2025, most countries in Asia and in Latin America and the Caribbean are considered ageing societies,¹ defined as having between 7% and 14% of the population aged above 65 years. In the next 30 to 40 years, most countries in these regions will be considered aged or superaged societies, meaning that the share of the population aged above 65 years will range from 15% to 20%, or will be superior to 21%. In Africa, the demographic transition is projected to take place later. This reflects a young population at present, with a median age of 19.3 years in 2025, and a total fertility rate of 3.95 live births per woman, which remains substantially above the replacement fertility rate (around 2.1 children per woman) and will fall below it only by the end of the 21st century (United Nations, 2024_[2]). Despite this demographic resilience, nearly all African countries are expected to become ageing societies by 2075 (Figure 3.1).

Figure 3.1. The share of elderly is rapidly increasing across the world

Share of individuals aged above 65 years as a proportion of total population, 2000-2100



Source: (United Nations, 2024_[2]), "World Population Prospects 2024", <https://population.un.org/wpp/>.

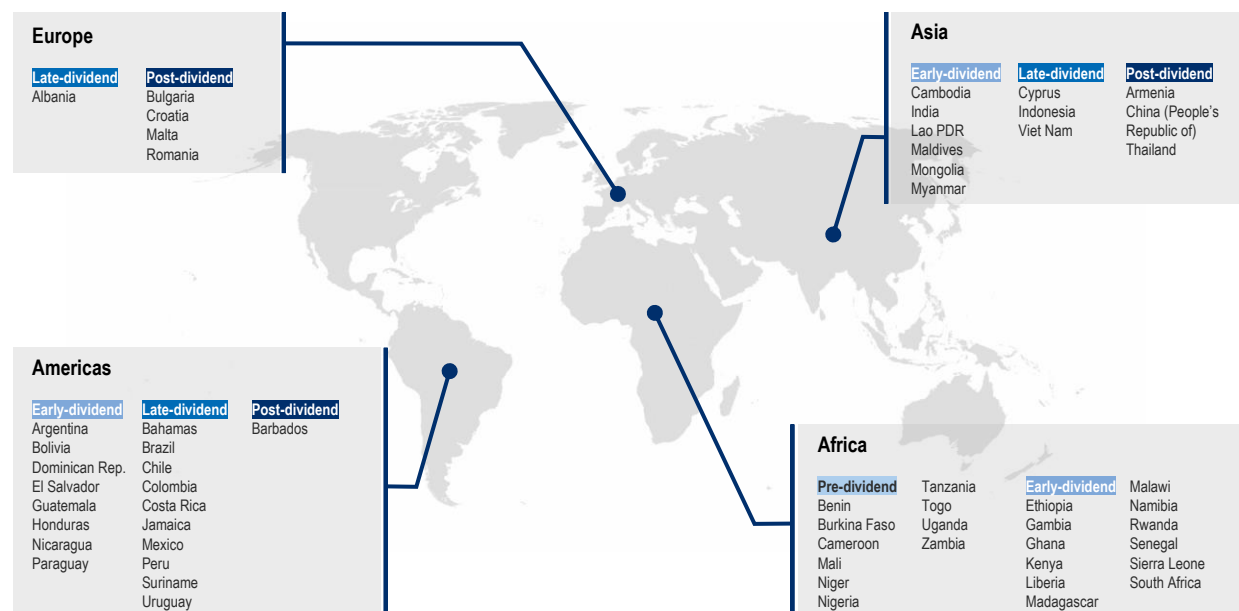
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A key feature of this societal ageing trend is that developing countries are ageing much more rapidly than developed countries. In most developed countries, it took between 40 and 120 years for the proportion of the population aged above 65 years to rise from 7% to 14% – that is, to transition from an ageing society to an aged one. In turn, it took (or will take) between 20 and 50 years for the share to increase from 14% to 21%, that is to transition further to a superaged society. By contrast, most developing countries will experience the initial doubling of the share of older persons (from 7% to 14%) in only 15 to 35 years and will experience the increase to 21% in just 10 to 30 years (United Nations, 2023^[1]).

The KILBIH dataset includes a heterogeneous set of countries at different stages of the demographic transition and ageing process. Using a demographic typology adapted from that of Ahmed et al. (2016^[3]), KILBIH countries can be classified in four broad categories depending on where they stand relative to the demographic dividend (i.e. the automatic increase in the share of working-age individuals relative to the share of dependents induced by the decline of fertility rates): pre-dividend, early-dividend, late-dividend and post-dividend countries (Figure 3.2 and Annex 3.A for methodological details on the demographic typology). As regards old-age income security, this demographic typology is crucial to identify key policy challenges and constraints. It offers insights on whether countries are still able to rely on a young and growing workforce that could ease the establishment or consolidation of contributory schemes. It also provides insights on the respective share of the elderly population to be covered and the associated magnitude of the fiscal cost of non-contributory pensions.

Figure 3.2. Countries covered by the KILBIH dataset are at different stages of the demographic transition and ageing process

Demographic typology of countries



Note: See Annex 3.A for methodological details on the demographic typology. Regional classification of countries follows the geographical grouping of the United Nations' M49 standard.

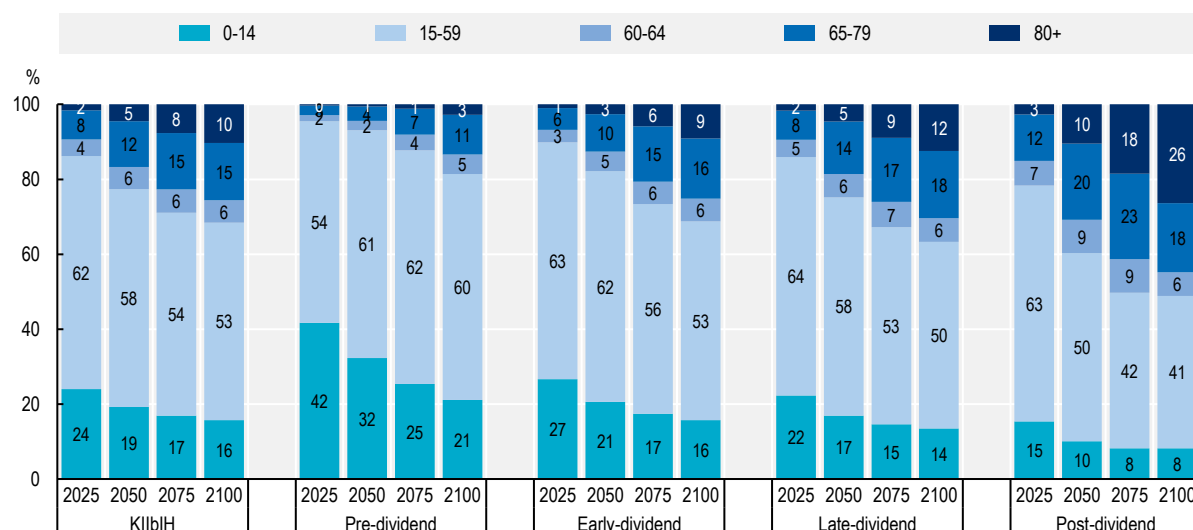
Source: Adapted from Ahmed et al. (2016^[3]) based on data from United Nations (2024^[2]).

Current evidence shows that between 2025 and 2100, ageing will be particularly severe in late- and post-dividend countries. In these countries by 2050, on average, the share of the population aged above 65 years will reach 19% and 30% respectively, increasing to 30% and 44% by 2100 (Figure 3.3). In post-dividend countries, the share of individuals aged above 80 years will also drastically increase, attaining,

on average, 18% by 2075 and 26% by 2100. Over the period to 2100, the share of the working-age population will shrink to 59% of the total population across all KIIbIH countries, and to only 47% in post-dividend countries.

Figure 3.3. Ageing will be particularly severe in late- and post-dividend countries

Distribution of age groups over time (2025-2100) and across the demographic dividend-based typology



Source: (United Nations, 2024^[2]), "World Population Prospects 2024", <https://population.un.org/wpp/>.

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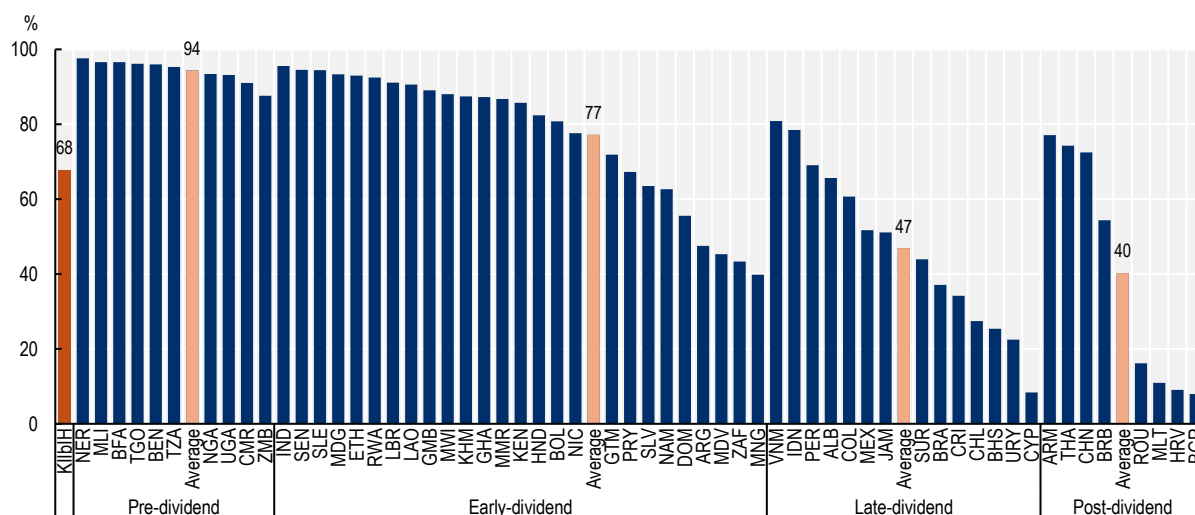
Rapid ageing is taking place in a context of high and persistent informality

In developing countries, rapid ageing of the population is taking place while informal employment remains widespread – or even dominates (see Chapter 1). In fact, informality is more prevalent in countries that are still at the beginning of the demographic transition. In pre-dividend countries, the unweighted average informality rate is 94% compared to 77% across early-dividend countries, and 47% among late-dividend countries (Figure 3.4).

The high incidence of informality adds complexity to the ability of countries at different stages of their demographic transition to develop robust and sustainable pension systems that can achieve decent coverage and offer adequate old-age benefits for the elderly of today and the future. Where a large majority of workers operate in the informal economy and have little access to social insurance, retirement comes with no replacement income from contributory pension schemes. In such situations, the elderly have to rely primarily on private transfers, private savings and/or non-contributory pensions – when available. In EMDEs, contributory pension systems typically lack the three things that enable the wide coverage observed in advanced and OECD economies: a large formal labour base, delivery capacity and strong institutions. As such countries struggle to develop multi-pillar and integrated pension systems, the informality footprint poses unique challenges that must inform policy decisions and guide the design of pension systems that address the needs and expectations of informal workers.

Figure 3.4. Rapid ageing is taking place in a context of high and persistent informality

Share of workers aged above 15 years in informal employment, latest year available



Note: Averages of the KIIbH and demographic groups are calculated as simple unweighted averages of countries for which data are available.
Source: (OECD, 2026^[4]), "Key Indicators of Informality based on Individuals and their Households (KIIbH)", <https://data-explorer.oecd.org/>.

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In developing countries, the large informality footprint jeopardises the livelihoods of many elderly

A large gap in effective pension coverage exists among the elderly

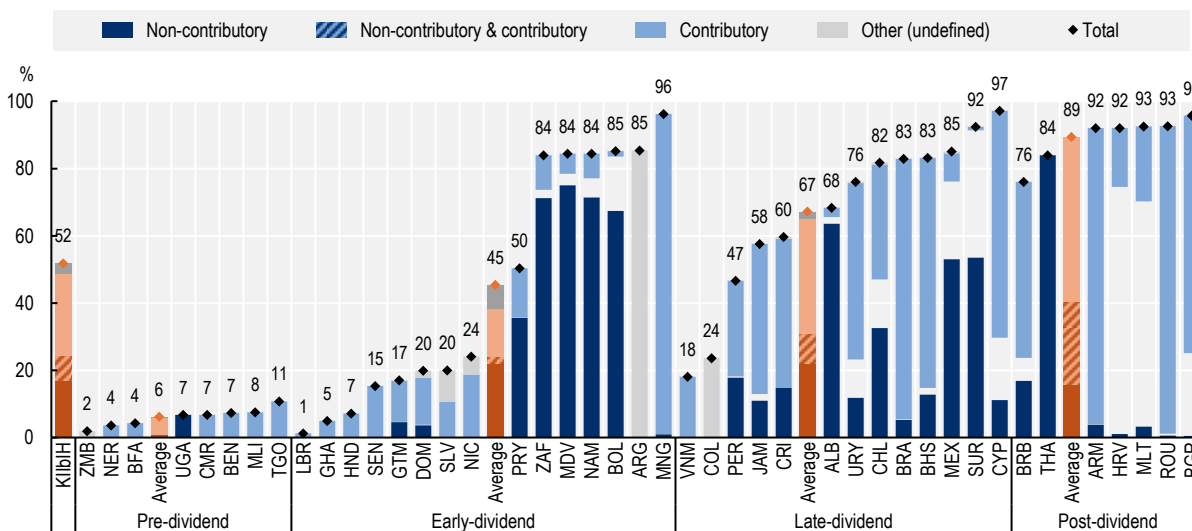
At the global level, pensions are the most prevalent form of social protection (ILO, 2024^[5]). The existence of many different designs across the world reflects the fact that pension schemes are among the most diverse and complex social protection mechanisms. Depending on the policy objectives of each scheme, a wide range of parameters can be customised, adapted and combined in many distinct ways, as discussed later in this chapter.

Progress in pension coverage has been uneven across countries, demographic groups and world regions

Over the last decades, EMDEs have undertaken substantial efforts to expand pension coverage with mixed results (see Box 3.1 on the definition and scope of pension coverage). Across KIIbH countries for which data are available, only 52% of the population aged above the respective legal age of retirement receive pension benefits – either contributory or non-contributory (Figure 3.5). In reality, the situation varies drastically across countries.

Figure 3.5. Progress towards expanding pension coverage has been more limited in countries at the early stages of their demographic transition

Share of individuals aged above the legal age of retirement who receive contributory and non-contributory pension benefits by demographic typology of countries, latest year available



Note: Averages of the KilbIH and demographic groups are calculated as simple unweighted averages of countries for which data are available.
Source: (OECD, 2026^[4]), "Key Indicators of Informality based on Individuals and their Households (KilbIH)", <https://data-explorer.oecd.org/>.

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In countries in the early stages of their demographic transition, expansion of coverage of contributory pensions has not been fast enough to guarantee adequate income security in old age. KilbIH estimates show average rates of pension coverage at 89% in post-dividend countries and 67% in late-dividend countries, compared with 45% among early-dividend countries and only 6% among pre-dividend countries (Figure 3.5).

Geographically, progress in expanding pension coverage has been concentrated in the Latin America and Caribbean region, as well as in a small number of countries from other regions of the world. In two-thirds of the Latin American and Caribbean countries included in the analysis (12 countries out of 19), more than half of the elderly population receives pension benefits; in seven of these countries, the pension coverage rate is higher than 80%.² Likewise, certain countries in Asia (e.g. Armenia, Mongolia and Thailand) and Africa (e.g. Namibia and South Africa) have achieved high rates of pension coverage.

In many of these countries, development of large social pension schemes underpins the high rates of pension coverage. This is notably the case in early-dividend countries that have achieved high rates of coverage, such as Bolivia, the Maldives, Namibia and South Africa. In these countries, more than 75% of the population above the legal age of retirement is covered by non-contributory pension benefits, with only a tiny fraction receiving both contributory and non-contributory benefits.

Box 3.1. Definition and scope of pension coverage according to the KILBIH

Data from the KILBIH rely on the harmonisation of data collected through household surveys by national statistical offices. Data and rates may differ from other official sources such as the International Labour Organization (ILO), which usually rely on administrative records (e.g. the Social Security Inquiry questionnaire to monitor Target 1.3 of the Sustainable Development Goals [SDGs], i.e. the proportion of persons effectively covered by a social protection system, including social protection floors). Data may also differ from estimates based on labour force surveys as the KILBIH uses household consumption or income surveys that contain a labour module that captures enough information to compute adequate informality estimates.

Indicators on access to social protection in general, and to pension coverage in particular, refer to effective coverage and not legal coverage. In line with the ILO's approach, effective coverage of pension schemes can then be measured by two complementary indicators: i) people contributing to a pension scheme (contributors); and ii) people actually receiving benefits (beneficiaries). In the second section of this chapter, coverage refers to the share of elderly who receive benefits from pension schemes. In the third section, coverage (also noted as enrolment) refers to the share of individuals who contribute to a pension scheme.

Another potential source of discrepancy compared to alternate sources of data is the population base. Unless specified otherwise, the KILBIH reports statistics for contributors' coverage for individuals aged between 15 years and the statutory age of retirement; statistics for beneficiaries' coverage apply to individuals aged above the statutory age of retirement.

Elderly from wealthier households enjoy a higher coverage of contributory schemes while elderly in poorer households tend to rely more on non-contributory schemes

Elderly from wealthier households tend to be better covered by pensions systems than elderly who are poorer. Across all demographic groups – except in post-dividend countries – as well as all regions, the share of individuals aged above the legal age of retirement who receive a pension is larger among wealthier quintiles and deciles of welfare than among the poorest quintiles and deciles (Figure 3.6). Overall, across all KILBIH countries, the average coverage difference between elderly belonging to the first quintile and the fifth quintile is 12 percentage points. In late-dividend countries, this difference rises to 19 percentage points. Regionally, the largest difference is found in Latin America and the Caribbean, where the coverage gap between the first and the fifth quintile reaches 17 percentage points.

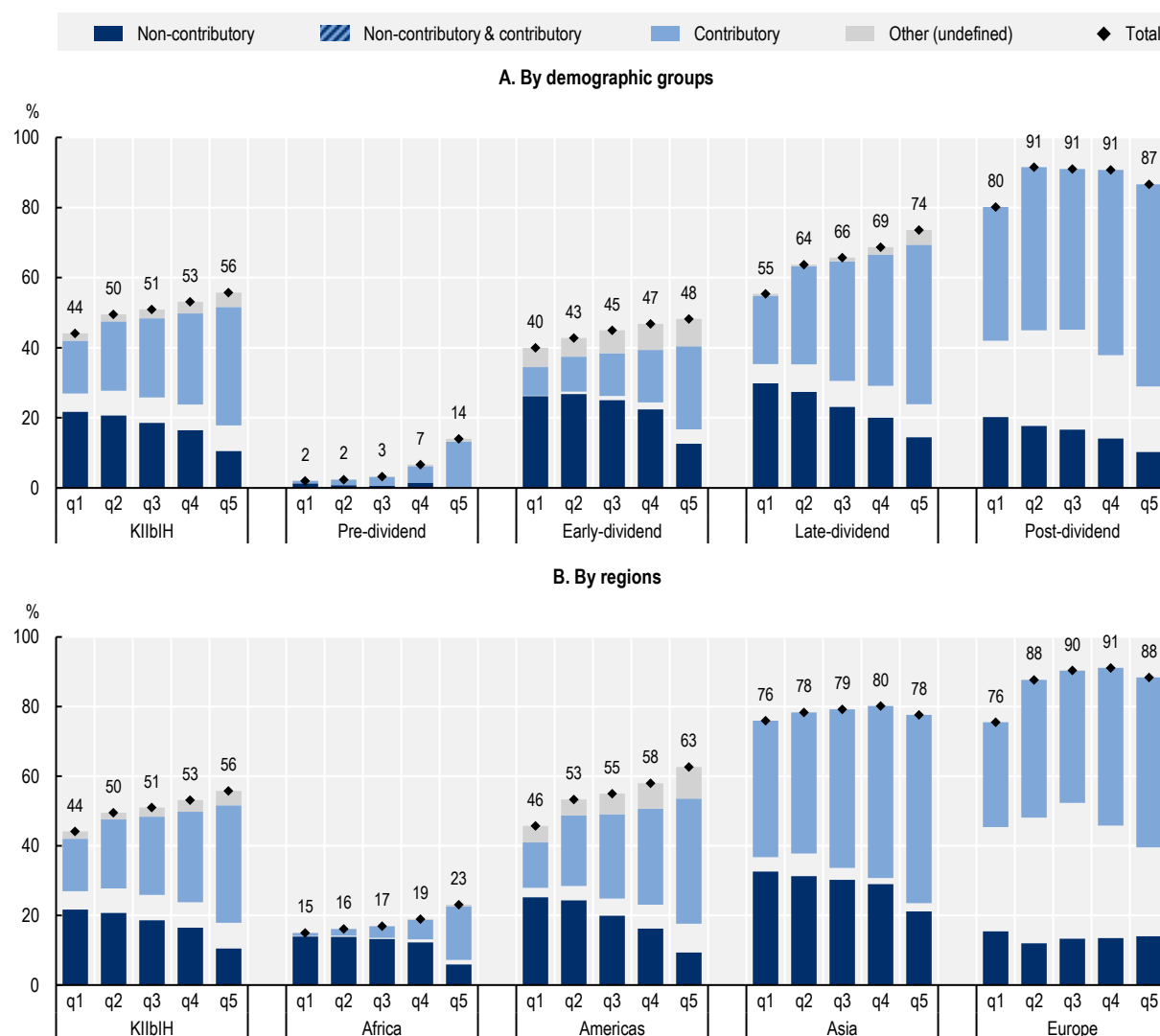
To a large extent, the higher pension coverage rate observed among elderly people who belong to the richest quintiles reflects participation in contributory schemes. According to KILBIH data, in early-dividend countries, 28% of the elderly from the fifth quintile receive a contributory pension, compared to only 8% of the elderly belonging to the first quintile. In late- and post-dividend countries, the coverage differences for contributory pensions between old individuals belonging to the first and fifth quintiles is, respectively, 29 and 17 percentage points. Such large inter-quintiles discrepancies³ tend to reflect past labour history: current recipients of contributory pensions are more likely to have worked in formal and better paid jobs during their working life.

In contrast, poorer elderly are more likely to be covered by non-contributory schemes. Across demographic groups and regions, a larger proportion of elderly people belonging to the poorest quintiles receive non-contributory pensions than those belonging to the richest quintiles. This is notably the case in late-dividend and post-dividend countries as well as in Latin America and the Caribbean, where non-contributory schemes appear particularly progressive and redistributive. This likely underlines the successful

development of non-contributory schemes targeting the poorest segments of the elderly population, notably those who are not eligible to contributory pensions.

Figure 3.6. Pension coverage tends to be larger for individuals in richer households

Share of individuals aged above the legal age of retirement who receive contributory and non-contributory pension benefits by quintiles of household welfare



Note: Averages of the KILBIH, regions and demographic groups are calculated as simple unweighted averages of countries for which data are available. KILBIH average covers 43 countries. Demographic group averages cover 8 countries in pre-dividend, 15 countries in early-dividend, 13 countries in late-dividend, and 7 countries in post-dividend. Regional averages cover 13 countries in Africa, 19 countries in the Americas, 6 countries in Asia, and 5 countries in Europe.

Source: (OECD, 2026^[4]), "Key Indicators of Informality based on Individuals and their Households (KILBIH)", <https://data-explorer.oecd.org/>.

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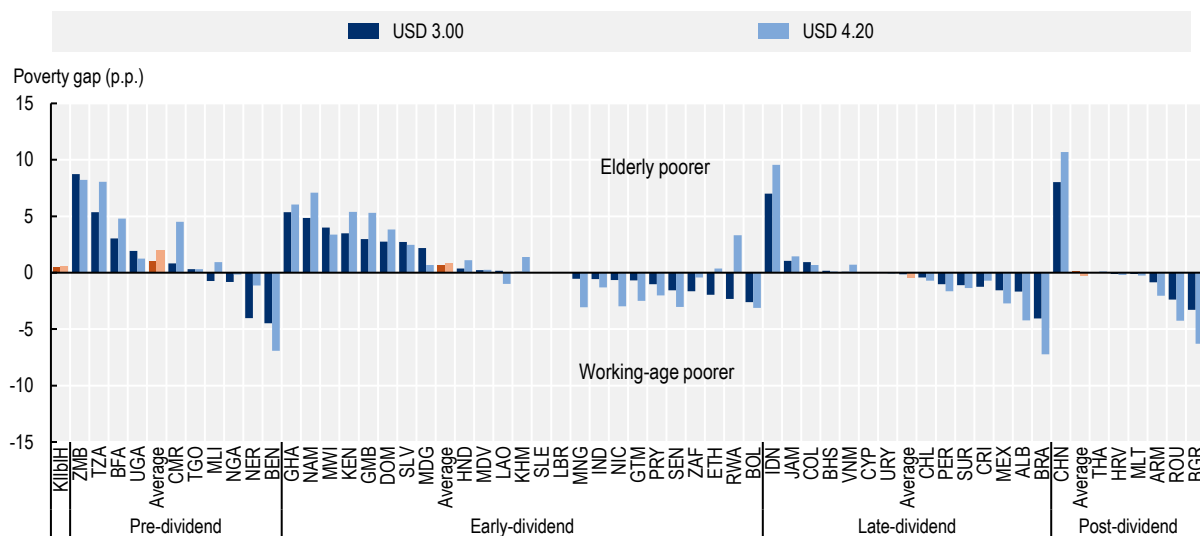
Old-age poverty is disproportionately high in countries with limited pension schemes

In terms poverty, the elderly are not necessarily more affected than working-age individuals. Using both the poverty line of USD 3.00 in 2021 PPP (otherwise often referred to as the “extreme poverty line”) and the poverty line of USD 4.20 in 2021 PPP, the difference in average poverty rates of the elderly compared with working-age individuals is less than one percentage point (Figure 3.7).

However, large differences exist across countries, demographic groups and world regions. In many African countries, the elderly have much higher poverty rates than working-age individuals. Conversely, in most Latin American and Caribbean countries, the elderly are less likely to be poor than working-age individuals, pointing towards the success of dramatic expansion of non-contributory pensions since the early 2000s (Reyes Hartley and Abels, 2025^[6]). Poverty is also disproportionately high among the elderly in pre- and early-dividend countries, where pensions systems tend to be less developed. In pre- and early-dividend countries such as Gambia, Ghana, Kenya, Namibia and Zambia, the poverty rate (at USD 4.20) for the elderly exceeds that for working-age individuals by more than 5 percentage points. From a policy point of view, introducing anti-poverty measures targeted at the elderly, such as social pensions, could have large welfare effects. This is notably the case in Indonesia where poverty rates of the elderly have been markedly higher than the rest of the population for decades and the existing non-contributory targeted pension scheme has very low coverage. Introducing a modest social pension could have substantial welfare consequences (Kudrna, Piggott and Poonpolku, 2024^[7]; OECD, 2024^[8]; Priebe, 2017^[9]).

Figure 3.7. Old-age poverty is disproportionately high in countries with limited pension schemes

Poverty gap between the elderly and working-age individuals at USD 3.00 and USD 4.20 per day (2021 PPP), latest year available



Note: Elderly are defined as individuals aged above the legal age of retirement and working-age individuals are defined as those aged between 15 years and the legal age of retirement. Averages of the KILBIH and demographic groups are calculated as simple unweighted averages of countries for which data are available. A positive poverty gap (in percentage points) means that the elderly are poorer than working-age individuals; a negative poverty gap means that the elderly are less poor than the working-age individuals. Within dividend categories, countries are ordered by decreasing poverty gaps at USD 3.00 per day (2021 PPP) between the elderly and the working-age individuals.

Source: (OECD, 2026^[4]), “Key Indicators of Informality based on Individuals and their Households (KILBIH)”, <https://data-explorer.oecd.org/>.

Substantial gender gaps in overall pension coverage prevail in most KILBIH countries, largely reflecting gender gaps in contributory schemes

In most KILBIH countries, pension coverage of elderly women is lower than for elderly men. On average, the gender gap in pension coverage stands at only four percentage points, with 50% of women aged above the legal age of retirement receiving a pension, compared with 54% of men (Figure 3.8). However, in 31 of 43 countries (or 72%) for which sex-disaggregated data on pension coverage are available, the proportion of men receiving pension benefits is higher than the share of women. In nine of these countries, the coverage difference between elderly men and elderly women is superior to 10 percentage points.

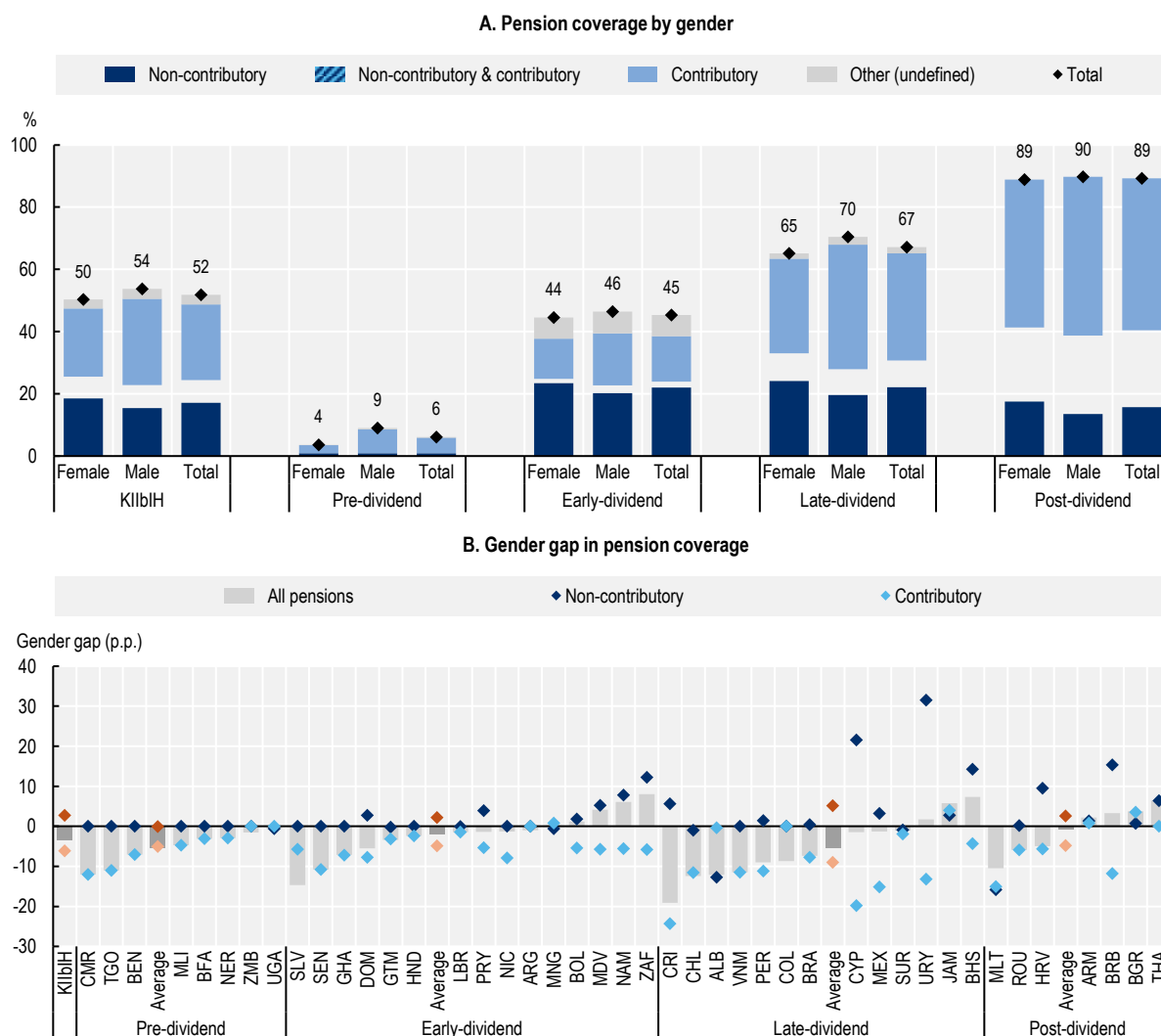
Gender gaps in overall pension coverage primarily reflect large differences in favour of men in terms of contributory pensions. In nearly all KILBIH countries, the share of men aged above the legal age of retirement who benefit from a contributory pension is substantially higher than for women. On average, in pre-, early- and post-dividend countries, the gap is five percentage points in favour of men. It reaches nine percentage points in late-dividend countries. This is largely in line with findings at the OECD level, which show that women are underrepresented among earnings-related pension recipients (OECD, 2025^[10]).

In contrast, women tend to be slightly better covered than men by non-contributory pension schemes. On average, across KILBIH countries, the average share of women aged above the legal age of retirement receiving a non-contributory pension is 25%, compared with 22% for elderly men. In certain countries, this gender gap in favour of women is substantial. For instance, in Uruguay, 37% of elderly women receive non-contributory pension benefits, compared with 5% of men. In the Bahamas, Barbados, Cyprus and South Africa, the gap in favour of women exceeds 10 percentage points.

Gender differences in contributory and non-contributory pension coverage largely reflect gender dynamics in the labour market and prevailing social norms regarding the role of women. Globally, women remain significantly less likely than men to participate in the labour force because of deeply entrenched discriminatory social norms that create structural barriers, discourage women from entering the labour market and confine them to care and reproductive roles. In 2022, men's participation rate was 25 percentage points higher than women's (OECD, 2023^[11]). Since most contributory pension schemes are tied to the employment status of individuals, these labour market disparities directly translate into gender gaps in contributory pension coverage. Conversely, more limited employment history often means that women are overrepresented among recipients of non-contributory pensions, notably in countries where eligibility is determined by means or pension testing (e.g. the Bahamas, Barbados, Costa Rica, South Africa, Thailand and Uruguay). Because contributory benefits tend to be much lower than non-contributory benefits, these gender asymmetries in coverage raise important questions regarding the adequacy of revenue received by elderly women compared with men.

Figure 3.8. Gender gaps in pension coverage largely reflect gender gaps in contributory schemes

Share of individuals aged above the legal age of retirement who receive contributory and non-contributory pension benefits by gender (Panel A) and gender gaps in the coverage of pension schemes among individuals aged above the legal age of retirement (Panel B)



Note: Averages of the KILBIH and demographic groups are calculated as simple unweighted averages of countries for which data are available. KILBIH average covers 43 countries. Demographic group averages cover 8 countries in pre-dividend, 15 countries in early-dividend, 13 countries in late-dividend, and 7 countries in post-dividend. In Panel B, a positive gender gap (in percentage points) means that pension coverage is larger for women than for men; a negative gender gap means that pension coverage is lower for women than for men.

Source: (OECD, 2026^[4]), "Key Indicators of Informality based on Individuals and their Households (KILBIH)", <https://data-explorer.oecd.org/>.

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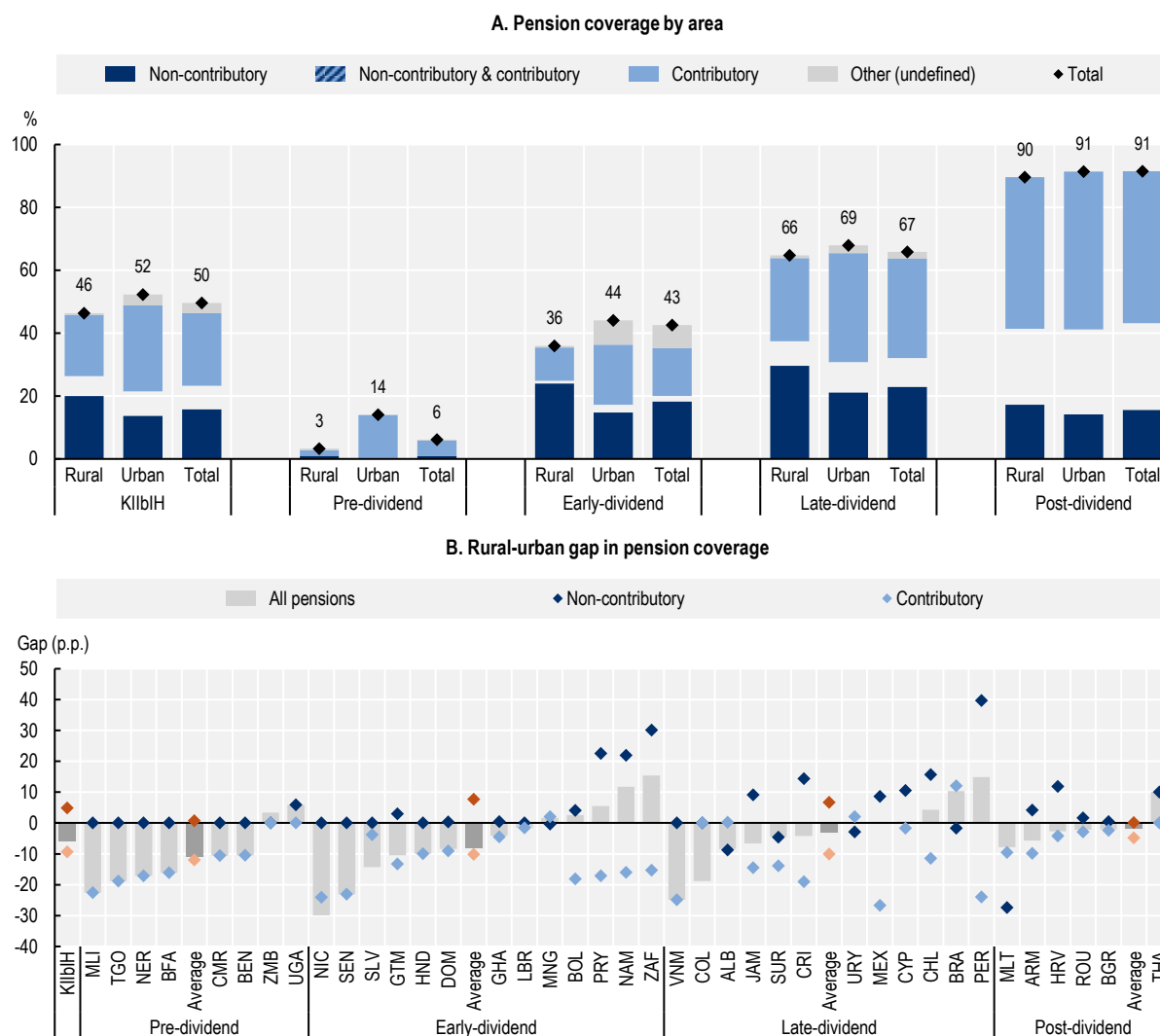
Elderly people in urban areas are better covered by contributory schemes while larger proportions of elderly people in rural areas receive non-contributory pensions

Overall pension coverage among the elderly is higher in urban areas than in rural ones. On average, across KILBIH countries, pension coverage in urban areas is six percentage points higher than in rural ones, with 52% of urban elderly receiving a pension, compared with 46% of rural individuals (Figure 3.9). This gap in

favour of urban individuals is found in nearly all countries for which data are available and is particularly marked in pre-dividend countries where it reaches, on average, 11 percentage points.

Figure 3.9. Overall pension coverage is higher in urban areas, stemming from large rural-urban gaps in contributory pension coverage

Share of individuals aged above the legal age of retirement who receive contributory and non-contributory pension benefits by location (Panel A) and rural-urban gaps in the coverage of pension schemes among individuals aged above the legal age of retirement (Panel B)



Note: Averages of the KIIBIH and demographic groups are calculated as simple unweighted averages of countries for which data are available. KIIBIH average covers 40 countries. Demographic group averages cover 8 countries in pre-dividend, 14 countries in early-dividend, 12 countries in late-dividend, and 6 countries in post-dividend. In Panel B, a positive rural-urban gap (in percentage points) means that the pension coverage in rural areas is larger than in urban areas; a negative rural-urban gap means that the pension coverage in rural areas is lower than in urban areas.

Source: (OECD, 2026^[4]), "Key Indicators of Informality based on Individuals and their Households (KIIBIH)", <https://data-explorer.oecd.org/>.

This overall gap in favour of urban areas largely reflects a higher coverage of contributory pension schemes in urban areas. In nearly all KIIbIH countries, the share of urban individuals aged above the legal age of retirement who benefit from a contributory pension is substantially higher than for the rural elderly (Figure 3.9). Non-contributory pension schemes, in contrast, tend to benefit more rural than urban elderly, notably because many non-contributory schemes are progressive by design and target poorer individuals who tend to be disproportionately concentrated in rural areas.

Elderly people rely on a variety of coping strategies to protect their livelihoods

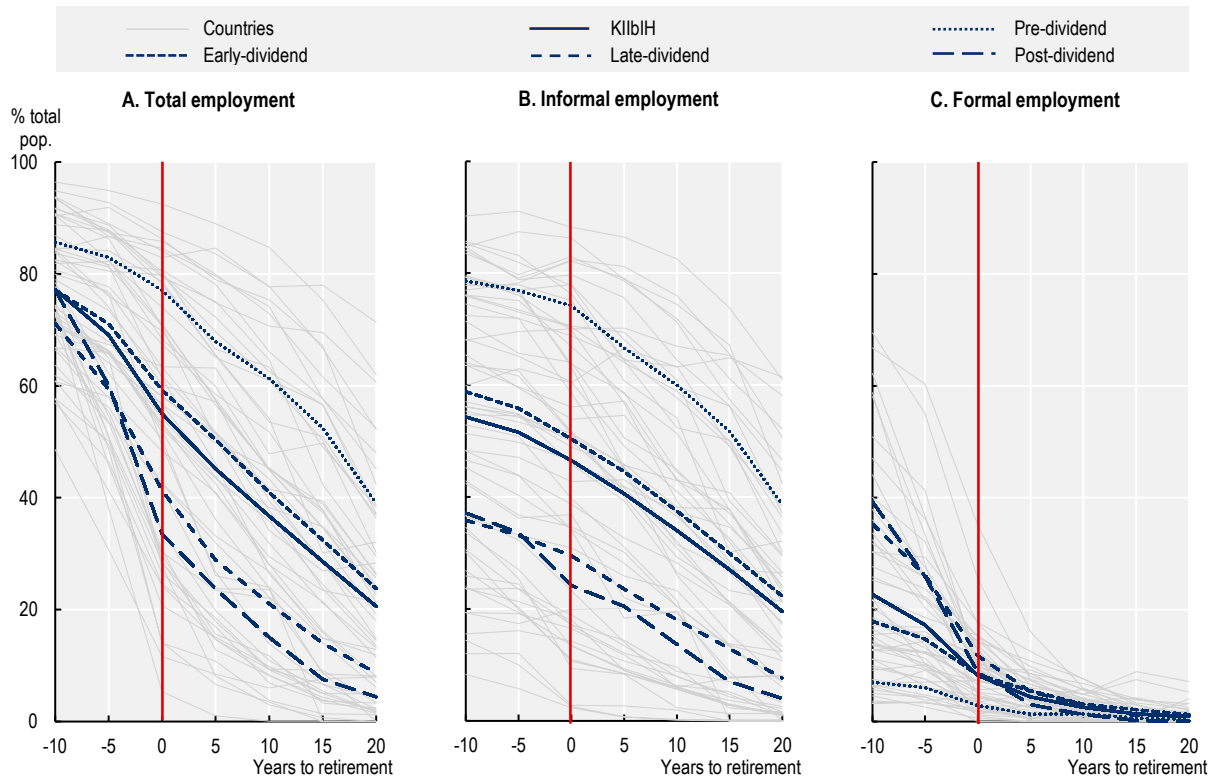
Most informal workers have to continue working past the official retirement age

For many workers in the informal economy, reaching the legal retirement age makes no or little difference. In the absence of a decent old-age pension, many informal workers above the official retirement age have to continue working to sustain their livelihoods. Notably, weaker occupational safety and health protections, and limited access to health coverage over the working life may result in many such workers entering old age in poorer physical condition. KIIbIH data show a natural decline in the overall employment ratio of the elderly (Figure 3.10, Panel A). However, this decline conceals two different dynamics for formal and informal workers. For formal workers (i.e. those most likely to have accumulated enough pension rights), employment ratios sharply drop after retirement age. The average employment-to-population ratio of formal workers goes from 23% for those aged between 10 and 5 years younger than the legal age of retirement, to 4% for those aged between 5 and 10 years older than the legal age of retirement, and to less than 3% beyond 10 years (Figure 3.10, Panel C). Conversely, although employment ratios also decline for informal workers, informal employment remains substantial in many countries until an advanced age. Across KIIbIH countries, the average employment-to-population ratio of informal workers remains at 41% for those aged between 5 and 10 years older than the legal age of retirement, and at 27% for those 15 to 20 years older than the legal age of retirement (Figure 3.10, Panel B).

The contrast in informal versus formal employment dynamics after retirement age is especially stark in late- and post-dividend countries. In these regions, employment rates show a sharp decline: on average, the gap between the employment rate of the working-age population and that of individuals aged between the official retirement age and 74 is larger than 20 percentage points. This decline largely stems from formal workers exiting the labour force. In contrast, pre- and early-dividend countries – where formal employment is less prevalent – show a more gradual drop in employment rates after retirement age. This is mainly due to the slower decrease in informal employment among older individuals.

Figure 3.10. Employment ratios remain high for informal workers past the legal retirement age

Total, formal and informal employment-to-population ratios by age brackets, from 10 years prior to the legal age of retirement to 20 years past the legal age of retirement, latest year available



Note: Averages of the KIbIH and demographic groups are calculated as simple unweighted averages of countries for which data are available.
Source: (OECD, 2026^[4]), "Key Indicators of Informality based on Individuals and their Households (KIbIH)", <https://data-explorer.oecd.org/>.

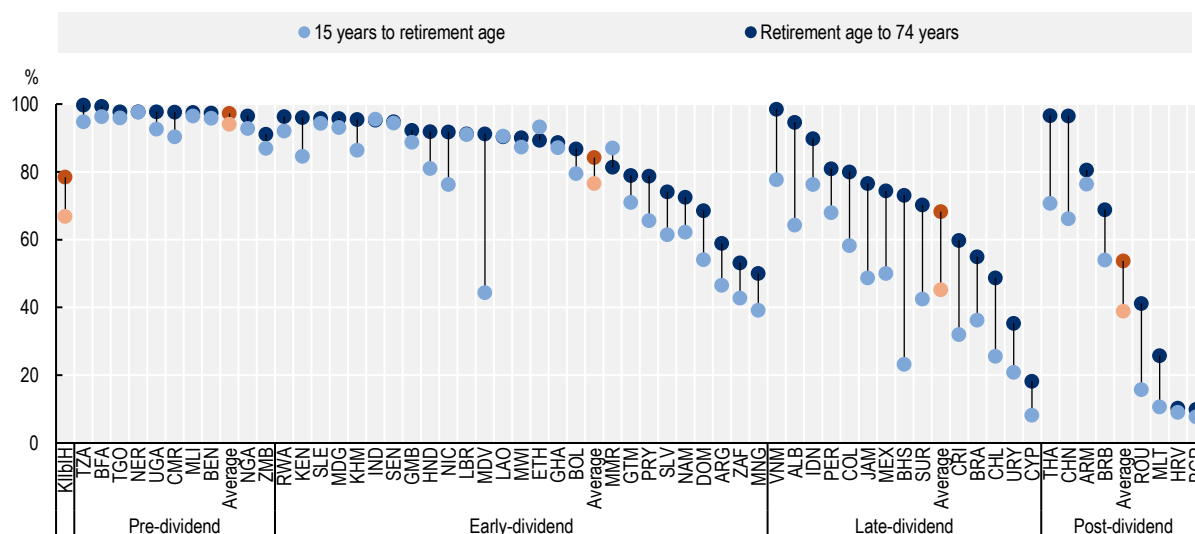
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After retirement age, vulnerable forms of employment increase

Past the age of retirement, the nature of employment changes and becomes more vulnerable. One characteristic is the higher prevalence of informal employment among old-age workers. The underlying mechanism is a combination of three factors: i) formal workers exiting the labour force upon reaching the age of retirement (thereby automatically reducing the relative share of formal workers and increasing the share of informal workers); ii) formal workers joining the informal economy to continue working when pension benefits are too low; and iii) informal workers continuing to work until an advanced age. In Indonesia, for instance, research indicates that workers rarely move between the formal and informal economies during their careers (Kudrna, Piggott and Poonpolku, 2024^[7]). However, after reaching the age at which they can access their pension, a notable share of Indonesia's formal economy workers shift into the informal economy. This trend is particularly evident in late- and post-dividend countries. On average, in the former, informality rates for working-age workers and for those aged between the official age of retirement and 74 years increase from 45% to 68%. In the latter, it increases from 39% to 54% (Figure 3.11).

Figure 3.11. The relative importance of informal employment increases after the legal age of retirement

Rate of informal employment among working-age workers and elderly workers, latest year available



Note: Working-age individuals are defined as those aged between 15 years and the legal age of retirement. Elderly workers are defined as those aged between the legal age of retirement and 74 years. Averages of the KIIbIH and demographic groups are calculated as simple unweighted averages of countries for which data are available.

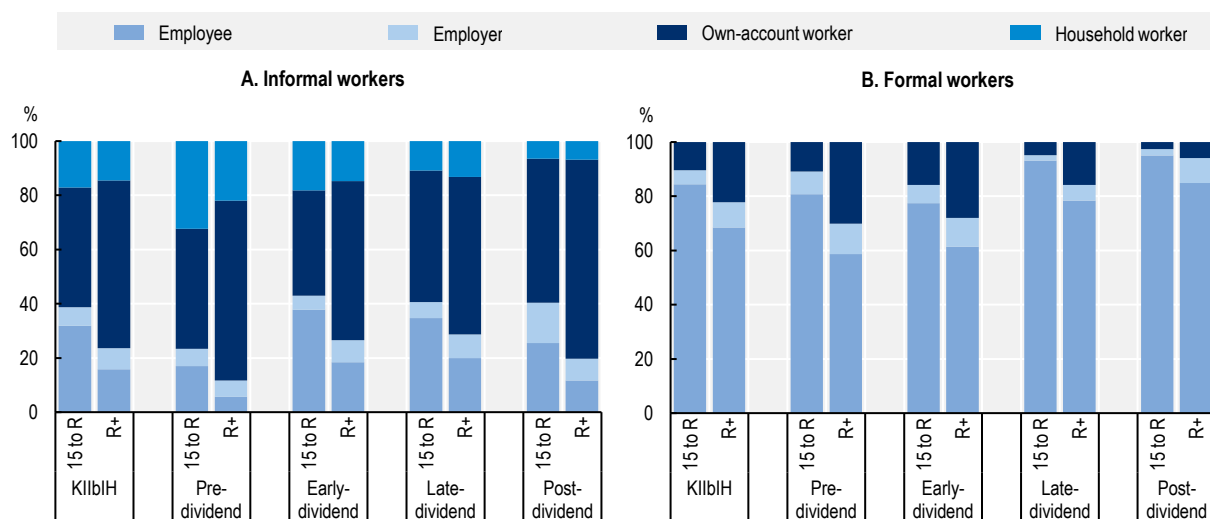
Source: (OECD, 2026^[4]), "Key Indicators of Informality based on Individuals and their Households (KIIbIH)", <https://data-explorer.oecd.org/>.

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A rise in own-account work and the decline in wage employment are other key characteristics of the change in the nature of employment after retirement age. The shift towards own-account work is observed for both formal and informal workers but is even more pronounced for the latter. Across KIIbIH countries, the average share of own-account workers before and after retirement age increases from 44% to 62% for informal workers, and from 10% to 22% for formal workers. Conversely, the average share of employees before and after retirement age drops from 32% to 16% for informal workers, and from 84% to 69% for formal workers (Figure 3.12).

Figure 3.12. Past the age of retirement, elderly workers are overrepresented in own-account work

Employment status of informal (Panel A) and formal (Panel B) workers, prior and past the legal age of retirement



Note: Averages of the KILBIH and demographic groups are calculated as simple unweighted averages of countries for which data are available. KILBIH average covers 53 countries. Demographic group averages cover 9 countries in pre-dividend, 23 countries in early-dividend, 14 countries in late-dividend, and 7 countries in post-dividend. "15 to R" indicates employed individuals aged between 15 years and the legal age of retirement (R); "R+" indicates employed individuals aged above the legal age of retirement (R).

Source: (OECD, 2026^[4]), "Key Indicators of Informality based on Individuals and their Households (KILBIH)", <https://data-explorer.oecd.org/>.

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Statistically, this clustering of elderly workers into self-employment could stem from intertwined dynamics: an exit from the labour force combined with a shift towards self-employment. On one side, employees claiming pension benefits and exiting the labour force can increase the relative proportion of own-account workers among the elderly. In parallel, the elderly previously working as employees may shift towards own-account work, particularly when pension benefits are too low and they need to continue working to sustain their livelihoods. In some countries (e.g. the People's Republic of China, hereafter "China"), these dynamics may also be shaped by policies: the pension system does not allow individuals to continue working as a formal employee once in receipt of a formal sector pension. Individuals who wish to keep working (whether by necessity or choice) are forced to switch to a different form of work. From a policy point of view, this situation underlines the important question of whether retirement age in contributory systems is mandatory (or not) and whether the rules may differ between civil service/public and private sector workers who operate in the formal sector.

Beyond the transition towards more vulnerable forms of employment, elderly workers also face additional vulnerabilities. These notably include decent work deficits such as occupational and health issues, lack of representativity, risk of harassment and absence of employment-based injury protection.

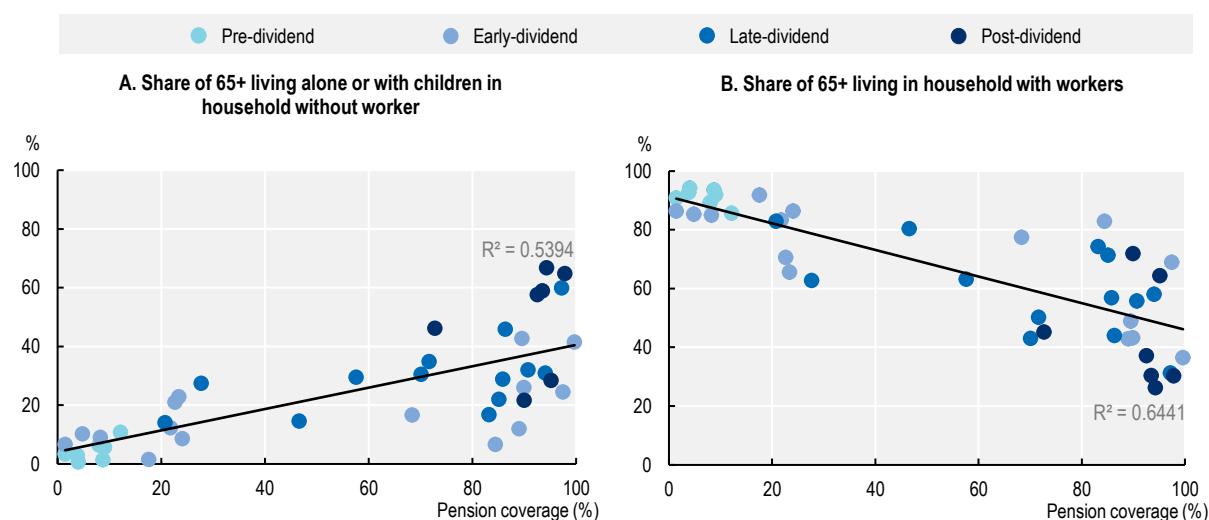
In the absence of adequate pension systems, inter-generational support remains the norm

In countries where pensions schemes have a limited reach, elderly people are more likely to continue living in multi-generational households. In the absence of adequate old-age income, living arrangements whereby the elderly cohabitate with members of younger generations who work and earn an income are crucial to guarantee the former's access to basic necessities such as food and shelter. KILBIH data show

that in countries with a larger share of individuals aged above 65 years receiving a pension, a greater proportion of elderly people live in households with no workers and/or only old individuals or children (Figure 3.13, Panel A). This is notably the case in late- and post-dividend countries in which pension systems have larger coverage and the demographic transition is profoundly affecting social structures. For instance, in late-dividend countries, 30% of individuals aged above 65 years live in households composed only of other non-working elderly people or children. In post-dividend countries, this share jumps to 49%. Conversely, in countries where coverage of the pension system among elderly is low, most of them continue living together with other working individuals (Figure 3.13, Panel B). On average, across pre-dividend countries, only 4% of individuals aged above 65 years live in households composed only of other non-working elderly people or children. Earlier studies have also found that the level of income directly received by the elderly influences elderly co-residence rates – which increase significantly as pension income decreases (Evans and Palacios, 2015^[12])

Figure 3.13. The lower the coverage of pension, the higher the share of elderly living with other working individuals

Correlation between the pension coverage of individuals aged above 65 years and the share of elderly living alone or together with other non-working elderly or children (Panel A) and the share of elderly living together with workers (Panel B)



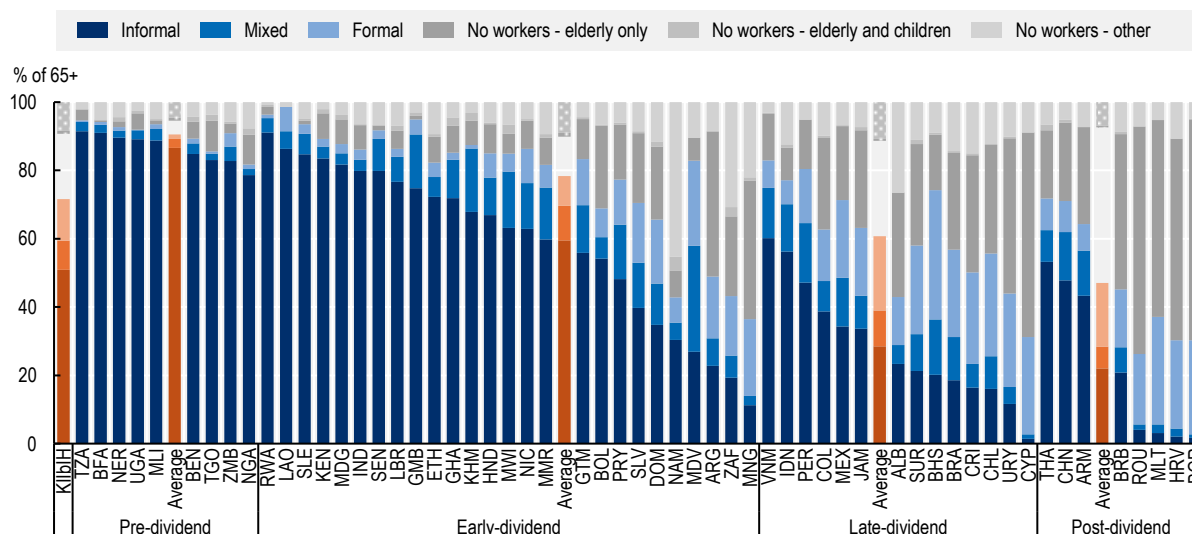
Source: (OECD, 2026^[4]), "Key Indicators of Informality based on Individuals and their Households (KIIbIH)", <https://data-explorer.oecd.org/>.

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When elderly people live in households together with other workers, they tend to disproportionately live in households that are fully or partially informal. Across KIIbIH countries, on average, 72% of individuals aged above 65 years live together with other individuals who work; and 51% of the elderly live in households with other individuals who all work in informal employment. Conversely, only 12% of elderly people live in fully formal households (Figure 3.14). This is notably the case in pre-dividend and most early-dividend countries. In late- and post-dividend countries, where pension systems are more developed and the informality footprint is less pronounced, the distribution of elderly people is more spread across the different types of households, including fully informal households, fully formal ones and households in which only non-working elderly people live.

Figure 3.14. Elderly people disproportionately live in households exposed to informality

Distribution of individuals aged above 65 years by types of households in which they live, latest year available



Note: "Informal" refers to a household where all workers are informal workers; "mixed" refers to a household where at least one worker is an informal worker and one worker is a formal worker; "formal" refers to a household where all workers are formal workers; and "no workers" refers to a household with no working members. "No workers – other" includes households in which no individuals work and members are one of the following: working-age and elderly; or all generations (children, working-age and elderly). Children are defined as any individual aged below 15 years; working-age individuals as between 15 and 64 years; and elderly as aged above 65 years. Averages of the KIIbIH and demographic groups are calculated as simple unweighted averages of countries for which data are available.

Source: (OECD, 2026^[4]), "Key Indicators of Informality based on Individuals and their Households (KIIbIH)", <https://data-explorer.oecd.org/>.

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The propensity of elderly people to live in multi-generational households, many of which are primarily composed of informal workers, offers crucial insights on the potential role of social pension. Through different channels, old-age benefits can have positive effects that span beyond the well-being of the elderly alone and can accrue to other generations (O’Keefe and Rongen, 2025^[13]). In settings where they live in multi-generational households, elderly people receiving social transfers (e.g. non-contributory pensions or cash transfers) can use such funds to: i) strengthen investment in human capital and education of other members of the household; ii) channel resources to the household’s productive investment; and iii) improve the ability to face shocks of other individuals living in the same household.

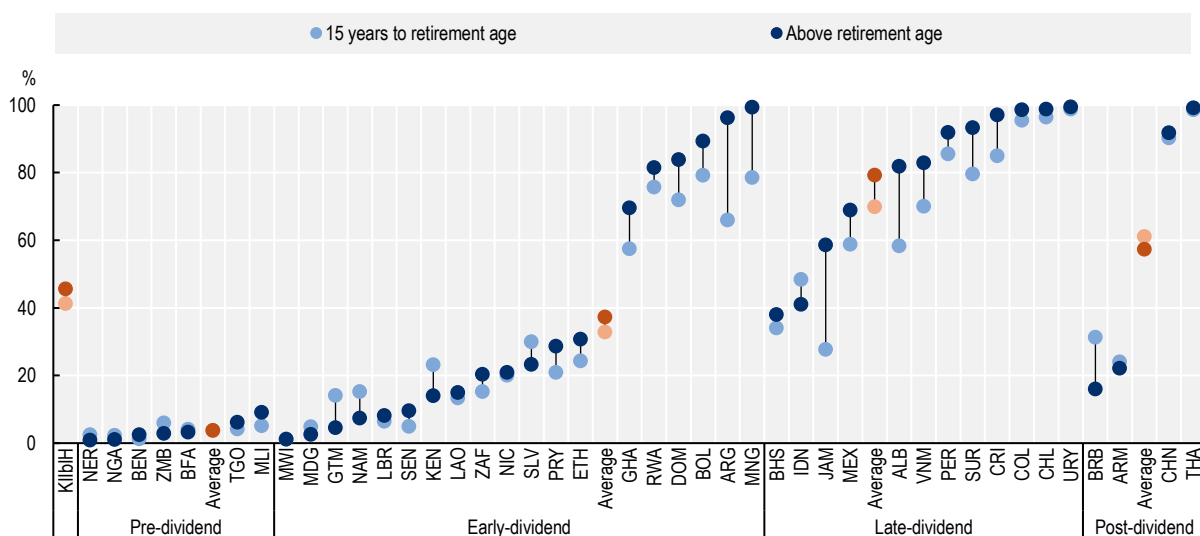
Beyond the potential intra-household spillovers of social assistance, elderly co-residence with other generations is a complex but crucial dimension of household livelihoods that can have both positive and negative implications. In the absence of other means, the elderly may provide informal childcare services as well as opportunities for other household members, notably women, to participate in income-generating activities. Conversely, in contexts where income-support for the elderly and old-age care options are limited, this clustering can add strain on the household resource, increase medical costs and attention, and generate more unpaid care needs, likely provided by women, which would hamper their participation in the labour market. For the younger generations of the household, such co-habitation may also limit their ability to save, either for productive investment and/or for retirement, perpetuating the retirement challenge across generations.

Beyond income security, the livelihood of elderly people is further threatened by a lack of access to health insurance and long-term care

Most elderly are not covered by health insurance, even though they constitute a segment of the population with the largest short- and long-term care needs. Across KIbIH countries with available data, the average health insurance coverage rate of the elderly is 46%. Although in most countries the elderly tend to be better covered than the working-age population, absolute coverage remains very low, notably in pre- and early-dividend countries (Figure 3.15). Limited coverage among the elderly constitutes a crucial vulnerability as older persons have higher needs for acute and potentially high-cost care. Combined with lower income in old age, these factors can lead to catastrophic health spending events (ILO, 2024^[5]).

Figure 3.15. Health insurance coverage remains limited in many countries

Health insurance coverage of individuals aged between 15 years and the legal age of retirement and individuals aged above the legal age of retirement, latest year available



Note: Averages of the KIbIH and demographic groups are calculated as simple unweighted averages of countries for which data are available. Health insurance includes both non-contributory and contributory health insurance (both employment-based and voluntary).

Source: (OECD, 2026^[4]), "Key Indicators of Informality based on Individuals and their Households (KIbIH)", <https://data-explorer.oecd.org/>.

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Even when health insurance coverage is high, it may concern only basic health services and not cover the cost of expensive, long-term care needs. Depending on countries, coverage by health insurance spans very different realities. Coverage may be fully or partly subsidised by the state, as is the case in countries such as China, Thailand and Viet Nam, and to some extent Indonesia and India. But subsidised schemes for informal workers or vulnerable individuals may provide lower financial protection, for instance through higher co-payments or tighter benefit packages. As the population ages, demand for long-term care services will likely increase. In the absence of adequate entitlements and levels of service provision, this puts additional pressure on household resources. The financial implications could be particularly severe for households that are already poor and/or informal, notably by potentially crowding out resources from contributory schemes and retirement savings and, ultimately, perpetuating the cycle of informality.

Increased demand for long-term care is taking place in a global context of changing demographics and social norms that transform traditional structures of support. A combination of factors – including economic development, increased participation of women in the labour market, reduced family size and rapid ageing of the population – exert downward pressure on family-based informal care (OECD, 2024^[14]). These transformations will have lasting impacts on the livelihoods of the elderly. They will also require additional financial resources at the individual and household level to cover the cost of medical and formal care services. Importantly, these trends may also open an opportunity to develop more tax-financed care services, including as a pathway to formalisation (OECD, 2024^[14]).

Low enrolment in contributory pension schemes threatens the livelihoods of future retirees

In a context of rapid ageing, enrolment of current workers in pension schemes is crucial to accumulate pension rights that can sustain their livelihoods during old age. The portraits of informality presented in Chapter 2 show that the informal economy encompasses workers with very different realities in terms of income, employment status and sectors of activity. Such diversity has impacts on the types of risks workers face and the barriers that exclude them from pension systems. It also renders unrealistic uniform and “silver-bullet” solutions. Attempts to extend pension coverage to informal workers need to take into account this diversity within the informal economy, especially when it comes to differences in terms of potential eligibility, capacity to build-up entitlement or the existence of a disguised employment relationship.

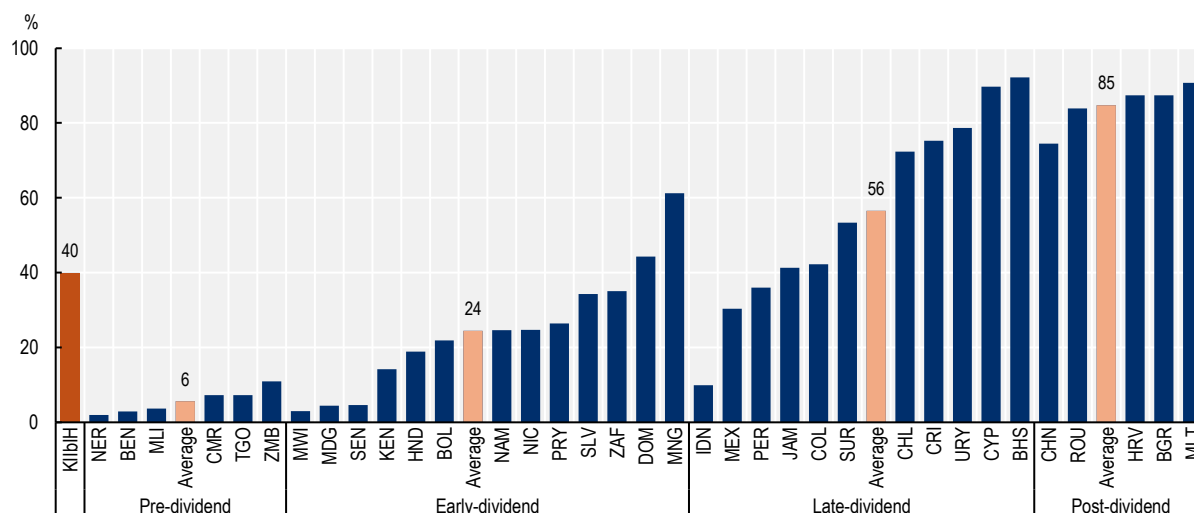
A large pension gap exists between formal and informal workers

Globally, based on administrative data, the ILO estimates that 35% of the working-age population and 59% of the labour force actively contributed to a pension scheme in 2023 (ILO, 2024^[5]). These shares are even lower among KIIbIH countries, which mostly include EMDEs with less-developed pension systems and for which data are based on household surveys.⁴ On average, across KIIbIH countries, only 40% of employed individuals aged between 15 years and the legal age of retirement contribute to any type of pension scheme. Of these, the proportion of individuals that can expect to receive a pension upon retirement may be even lower because of low contribution density and failure to meet different eligibility criteria.

Contributory gaps vary widely across countries at different stages of their demographic transition. Pension enrolment remains extremely low in pre-dividend countries and across many early-dividend countries, whereas the proportion of contributors is much larger in many late- and post-dividend countries. In 12 countries – most of which are late- and post-dividend countries – of the 35 with available data, more than 50% of workers aged between 15 years and the legal age of retirement contribute to a pension scheme (Figure 3.16). In countries such as the Bahamas, Bulgaria, Chile, China,⁵ Costa Rica, Croatia, Cyprus, Malta, Romania and Uruguay, this share is superior to 70%.

Figure 3.16. In some countries, enrolment in contributory pension schemes is alarmingly low

Share of workers aged between 15 years and the legal age of retirement who contribute to a pension scheme, latest year available



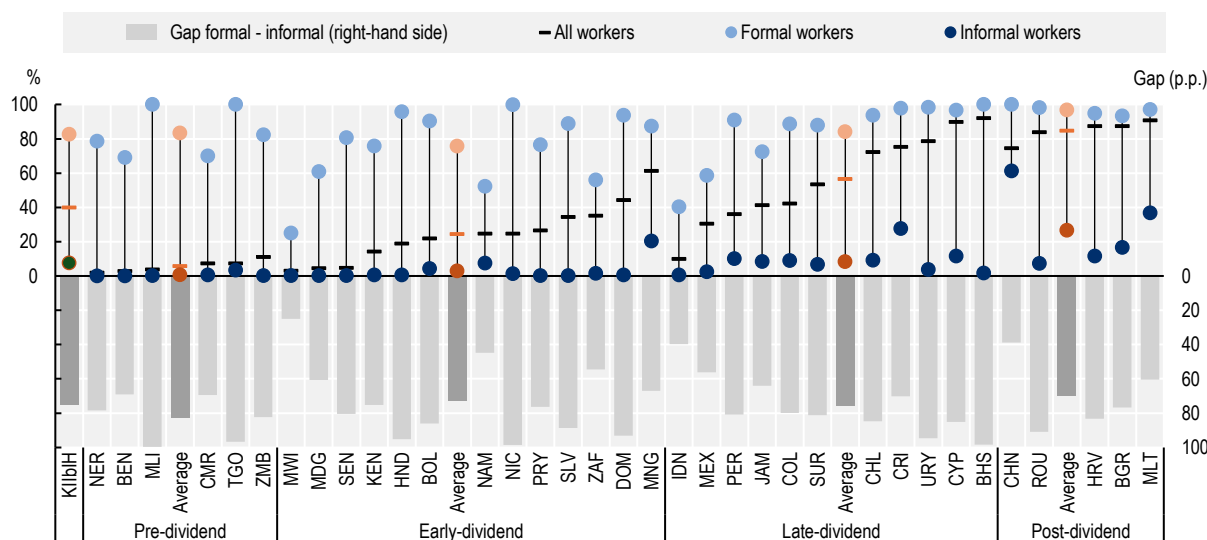
Note: Averages of the KILBIH and demographic groups are calculated as simple unweighted averages of countries for which data are available.
Source: (OECD, 2026^[4]), "Key Indicators of Informality based on Individuals and their Households (KILBIH)", <https://data-explorer.oecd.org/>.

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Generally, the overall low share of contributors to pension schemes stems from a huge coverage gap among informal workers, who constitute the majority of the workforce in many countries. Across KILBIH countries, the average coverage gap (i.e. the proportion of workers covered by a contributory scheme to workers not covered by it) between formal and informal workers stands at 75 percentage points. The average proportion of informal workers contributing to a pension scheme is just 8% (Figure 3.17). In nearly all KILBIH countries, less than 10% of informal workers contribute to a pension scheme. By contrast, in only 8⁶ of 35 countries included in the KILBIH, this proportion is superior to 10%, reaching 61% in China.⁷

Figure 3.17. Low enrolment rates in pension schemes stem from large coverage gaps among informal workers

Share of formal and informal workers aged between 15 years and the legal age of retirement who contribute to a pension scheme, latest year available



Note: Averages of the KilbIH and demographic groups are calculated as simple unweighted averages of countries for which data are available. Within dividend categories, countries are ordered by increasing shares of all workers who contribute to a pension scheme.

Source: (OECD, 2026^[4]), "Key Indicators of Informality based on Individuals and their Households (KilbIH)", <https://data-explorer.oecd.org/>.

StatLink  <https://stat.link/7i15qn>

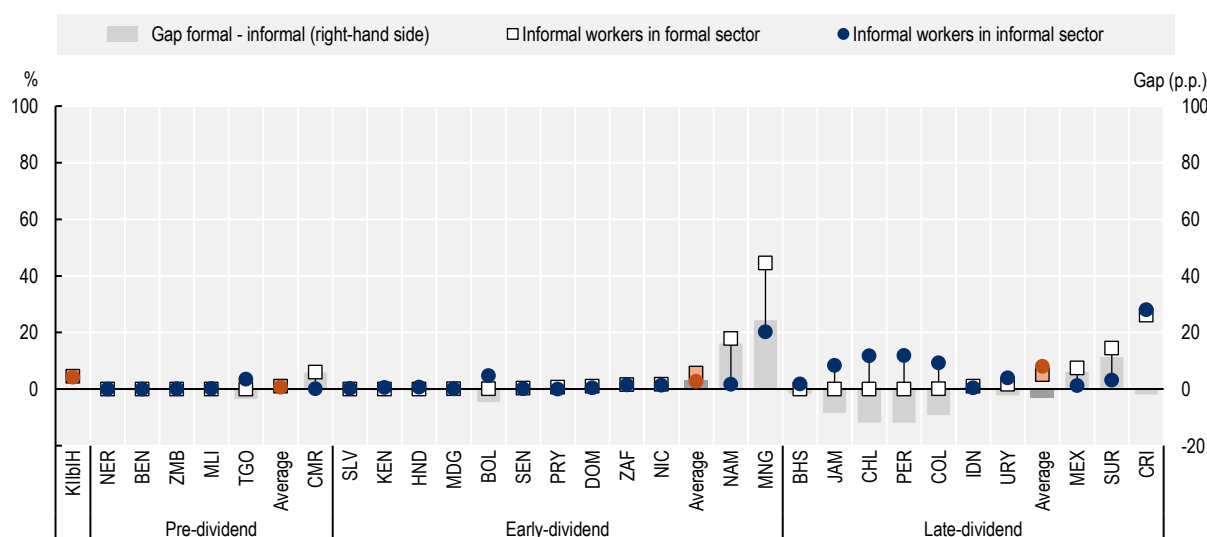
Although many informal workers operate in the formal sector, most do not contribute to any pension schemes, which is largely due to their specific employment arrangements and the design of contributory systems. Across KilbIH countries, on average, 83% of formally employed workers contribute to pension schemes but only 70% of workers from the formal sector – which can comprise workers both formally and informally employed – do so. The discrepancy largely stems from countries in which large shares of the formal sector workers operate under informal arrangements and are not covered by social protection, thereby not contributing to any pension scheme. Overall, across KilbIH countries, the average share of informal workers who operate in the formal sector and pay pension contributions is only 4%, a share similar to that of informal workers of the informal sector (Figure 3.18). Apart from a few exceptions, such as Costa Rica, Mongolia and Namibia, enrolment of informal workers who work for formal companies is extremely low, sometimes even lower than the enrolment of informal workers operating in the informal sector.

From a policy point of view, these results underscore the fact that many countries could expand enrolment in contributory pension schemes at a relatively low cost by integrating informal workers who already operate in the formal sector and are, thus, at the margin of informality. However, the factors that underpin this failure to contribute (even where social insurance legislation mandates it for workers of the formal sector) may be complex to address. For example, this failure to contribute may result from a tacit and mutual agreement between workers and employers to trade higher wages for lower social protection entitlements, notably for mobile workers whose portability of pension rights across subnational jurisdictions may not be assured. Where pension contribution rates are high, the conversion process cannot be assumed to be costless in terms of wages or labour market competitiveness, which may deter actors from the formal sector to contribute. Finally, the rapid transformation of labour market dynamics and the

emergence of new forms of employment may also play significant roles. Typically, platform or gig workers – who are neither properly formal nor fully informal – continue to often fall in a grey area for whom pension schemes (and more generally, social protection systems) have yet to adapt in most countries. In this regard, emerging approaches, such as the monotax regimes in many countries of Latin America and the Caribbean, look promising.

Figure 3.18. Most informal workers who operate in the formal sector do not contribute to pension schemes

Share of informal workers of the informal and formal sectors aged between 15 years and the legal age of retirement who contribute to a pension scheme, latest year available



Note: Averages of the KIbIH and demographic groups are calculated as simple unweighted averages of countries for which data are available. Within dividend categories, countries are ordered by increasing shares of informal workers who operate in the formal sector and contribute to a pension scheme. No data are available for post-dividend countries.

Source: (OECD, 2026^[4]), "Key Indicators of Informality based on Individuals and their Households (KIbIH)", <https://data-explorer.oecd.org/>.

StatLink  <https://stat.link/28evmy>

Enrolment in contributory pension schemes mirrors the traditional design of pension schemes, which is grounded in the formal employer-employee relationship

Employment status is an important driver that helps differentiate workers regarding the type of pension scheme they need to cover their old-age risks, the reasons explaining their exclusion from pension schemes, and the channels through which they could access pension schemes. Evidence from KIbIH shows that the share of workers contributing to pension schemes is primarily driven by large shares (92%) of formal employees contributing to pension schemes. In contrast, the proportion of workers who contribute to pension schemes remains substantially lower for formal employers (35%) and formal, own-account workers (21%). It is extremely limited (below 15%) for all informal workers, regardless of their employment status (Figure 3.19).

Figure 3.19. Contributory pension schemes largely exclude informal workers and non-wage formal workers

Share of workers aged between 15 years and the legal age of retirement who contribute to a pension scheme by employment and informality status



Note: Averages of the KILBIH and demographic groups are calculated as simple unweighted averages of countries for which data are available. By definition, contributing family workers are all informal workers. KILBIH average covers 34 countries. Demographic group averages cover 6 countries in pre-dividend, 13 countries in early-dividend, 11 countries in late-dividend, and 4 countries in post-dividend.

Source: (OECD, 2026_[4]), "Key Indicators of Informality based on Individuals and their Households (KILBIH)", <https://data-explorer.oecd.org/>.

StatLink  <https://stat.link/2c9nh6>

The data largely reflect the traditional design of pension schemes, which is grounded in the formal employer-employee relationship. For self-employed workers (own-account workers and employers), as well as for unpaid family workers, a common challenge is their exclusion from statutory access to social protection that tends to primarily cover the needs of salaried employees. In particular, although the design of pension schemes may offer self-employed workers the opportunity to opt in on a voluntary basis, they cannot rely on co-payments and must often pay both the employer's and worker's contributions, which can prove too costly. For wage workers without a contract and for own-account workers who are in disguised employment relationships (such as dependant contractors), a fundamental issue is the recognition of the employment relationship and the possibility to benefit from an extension of social protection schemes financed through employer and worker contributions.

Irrespective of employment status, many informal economy workers may have difficulties fulfilling the eligibility conditions for receiving benefits from insurance-based schemes. Their income may be too low and/or irregular to comply with the contributions required. The priorities and needs of informal workers may also differ from those of formal workers. For example, the long contribution periods required to qualify for certain benefits – notably in the case of pensions – can be discouraging and may deter informal workers from participating in these schemes. In Paraguay, workers can retire with a full or partial pension only under one of three conditions: i) 60 years of age and a minimum of 25 years of contributions; ii) 55 years of age and a minimum of 30 years of contributions; or iii) 65 years of age and a minimum of 15 years of contributions. Workers who fail to meet one of these three conditions cannot claim a pension and effectively lose their contributions. Simulations estimate that most workers who fail to fulfil these conditions belong to the poorest two quintiles of the labour income distribution (Bai and Zelko, 2022_[15]). In this sort of

architecture, entering the pension system comes with a high risk of never seeing contributions materialise. This might discourage low-income and/or informal workers with less long-term predictability in terms of employment and income opportunities.

For a substantial share of informal workers, low-paid work is a binding constraint that limits their capacity to contribute to pension schemes

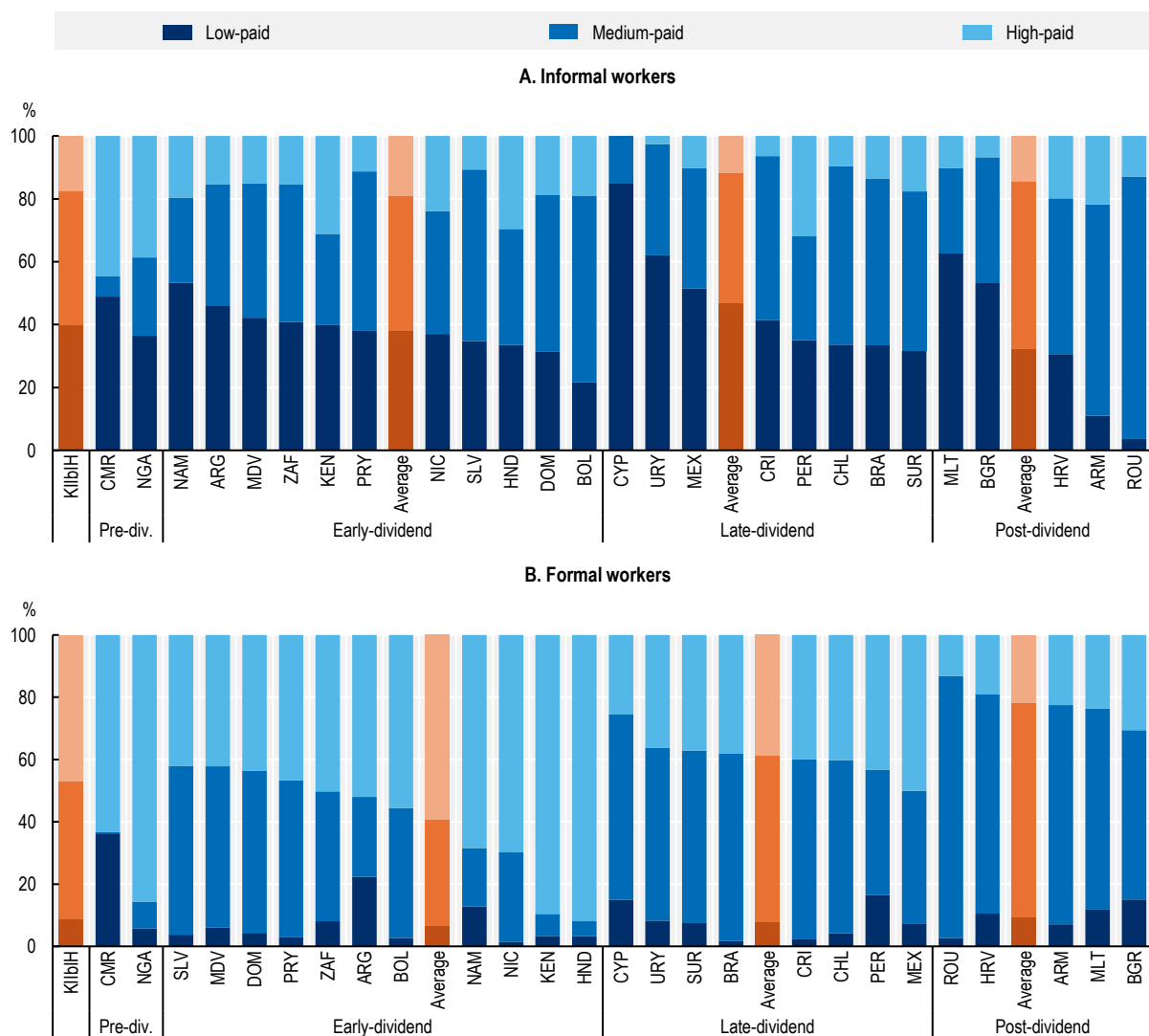
Evidence from the KIIbIH indicates that low-pay work affects disproportionately informal workers and negatively impacts their contributory capacity. Based on a three-tier classification of workers relative to median labour earnings,⁸ Figure 3.20 reveals that formal workers are predominantly clustered in the high and medium earnings' categories whereas informal workers tend to be more present in the medium and low earnings' categories (see also Chapter 2).

In general, this concentration of informal workers in the lower tier of the earnings' distribution primarily reflects well-documented differences in skills and productivity (Ohnsorge and Yu, 2022^[16]). It also underlines the limited contributory capacity of such low-paid workers, whose present income is not enough to secure their future needs. Across the 21 countries for which data are available (which do not include any pre-dividend countries), only 24% of low-paid informal workers participate in contributory schemes. Across the nine early-dividend countries with available data, this share drops to 1%.

However, the relationship between skills, informality and ability to contribute may differ widely across countries. In many countries where the informal economy is extremely large and informal employment accounts for most of the workforce, most informal workers operate in jobs that require medium skills (level 2 in the International Standard Classification of Occupations [ISCO-08] classification). This includes clerical support workers, service and sales workers, skilled agricultural, forestry and fishery workers, and craft and related trade workers, as well as plant and machine operators and assemblers. This is notably the case in countries such as Benin, Gambia, Lao PDR, Madagascar, Mali, Niger and Togo, where more than 90% of the labour force is informal and more than 90% of these informal workers operate in medium skilled jobs. In other countries (e.g. Argentina, the Bahamas, China, Colombia, Cyprus and the Maldives), informality rates are relatively lower. However, informal workers are disproportionately concentrated in high skilled occupations (levels 3 and 4 in the ISCO-08 classification) such as managers, professionals or technicians and associate professionals. In these countries, informal workers have a higher capacity to finance contributory schemes. In countries such as Costa Rica, Suriname and Uruguay, informality rates are relatively lower but informal workers are disproportionately concentrated in low-skilled and elementary occupations. In these countries, policy instruments – such as fixed nominal subsidies and matching contributions – may have the most impact in raising the contributions of low earners who remain outside the scope of contributory pension systems (OECD, 2024^[17]).

Figure 3.20. Low-paid work disproportionately impacts informal economy workers

Distribution of informal (Panel A) and formal (Panel B) workers aged above 15 years by earnings categories, latest year available



Note: Earnings categories classify individuals based on their monthly labour earnings into three categories, defined relative to median earnings: i) low-paid individuals ranging from the bottom of the earnings distribution to 50% of median earnings; ii) medium-paid individuals ranging from 50% to 150% of median earnings; and iii) high-paid individuals including anyone above 150% of median earnings. Averages of the KIbIH and demographic groups are calculated as simple unweighted averages of countries for which data are available. In Panel A, within dividend categories, countries are ordered by decreasing shares of low-paid workers. In Panel B, within dividend categories, countries are ordered by increasing shares of high-paid workers.

Source: (OECD, 2026_[4]), "Key Indicators of Informality based on Individuals and their Households (KIbIH)", <https://data-explorer.oecd.org/>.

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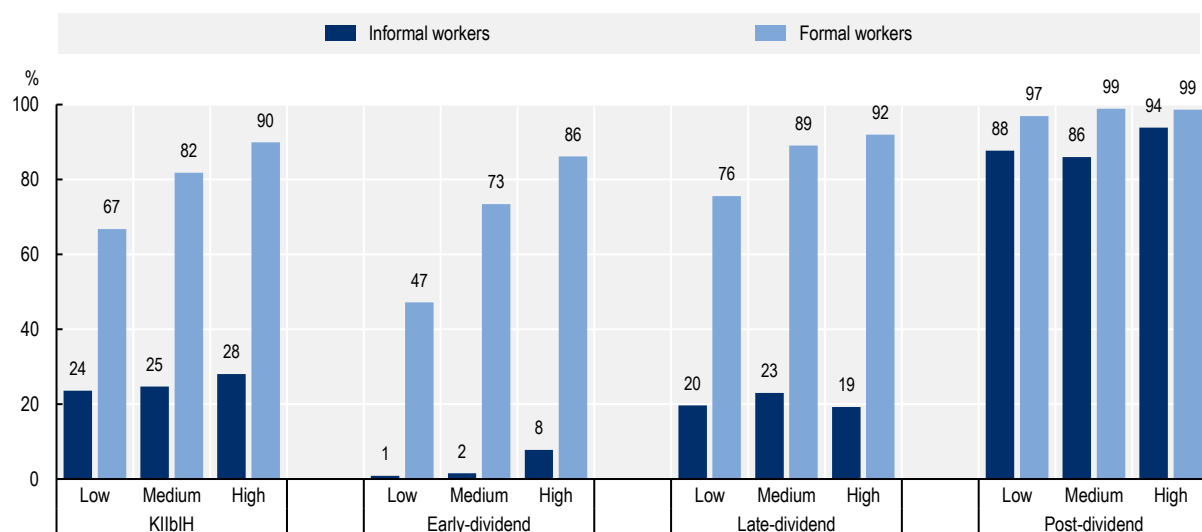
Enrolment in contributory pension schemes remains limited for high-paid informal workers, pointing towards other factors that hinder their ability to contribute

Not all informal workers are low earners; in pre- and early-dividend countries where the informal economy is particularly large, some belong to the upper tier of the earnings distribution. Across KILBIH countries, on average, 18% of informal workers belong to the high wage category. In certain countries (e.g. Honduras, Kenya, Nigeria and Peru), the share of informal workers clustered in the upper tier exceeds 25%.

Strikingly, most informal workers who belong to the upper and medium tiers of the earnings distribution do not contribute to any pension scheme. Overall, across KILBIH countries, as high as 72% of high-paid informal workers do not contribute to any pension schemes, compared to 75% for medium-paid informal workers and 76% for low-paid informal workers. The results underline the difficulty of most existing pension schemes to include informal economy workers, even when they might be able to afford contributions. Conversely, most formal workers, including those who belong the lower tier of the earnings distribution, contribute to pension schemes. The average share of formal low-paid workers contributing to pension schemes stands at 67% (Figure 3.21).

Figure 3.21. Even among relatively well-paid informal workers, contributions to pension schemes remain limited

Share of formal and informal workers aged between 15 years and the legal age of retirement who contribute to pension schemes, by earnings categories



Note: Earnings categories classify individuals based on their monthly labour earnings into three categories, defined relative to median earnings: i) low-paid individuals ranging from the bottom of the earnings distribution to 50% of median earnings; ii) medium-paid individuals ranging from 50% to 150% of median earnings; and iii) high-paid individuals including anyone above 150% of median earnings. Averages of the KILBIH and demographic groups are calculated as simple unweighted averages of countries for which data are available. KILBIH average covers 21 countries, including one pre-dividend country. Demographic group averages cover 9 countries in early-dividend, 7 countries in late-dividend, and 4 countries in post-dividend.

Source: (OECD, 2026^[4]), "Key Indicators of Informality based on Individuals and their Households (KILBIH)", <https://data-explorer.oecd.org/>.

StatLink  <https://stat.link/vumwds>

Pension scheme enrolment rates across KILBIH countries show that only a few have been able to integrate informal workers into contributory pension schemes, and that these few contributors are mostly in the upper

tier of the earnings distribution. Some countries, such as Costa Rica and Namibia, show a relative high enrolment of informal workers in contributory schemes, but only for the upper tier of the earning distribution, with respectively 50% and 35% of high-paid informal workers contributing. In China, around 60% of informal workers contribute to pensions schemes, regardless of their level of earnings (but data primarily reflect the unique architecture of the Chinese pension system). While most of China's pension schemes are purely contributory, some important programmes in terms of size and coverage (e.g. the New Rural Pension Insurance scheme) consist of the payment of regular flat insurance premium that opens eligibility rights for a basic social pension, funded via general revenue. These schemes contain an element akin to a contribution (insurance premium), but are not traditional contributory schemes per se, whereby benefits are tied to employment and to the level and density of contributions. Rather, China's schemes consist of the acquisition of future rights to benefit from a non-contributory pension. These recent schemes have been instrumental in drastically boosting the share of the informal workers covered by the pension system.

Despite the challenge of low contributory pension coverage, the opportunity exists in many countries to channel the earnings of high- and medium-level earners towards contributory schemes. In settings where pension systems are underdeveloped, have limited coverage, or are inaccessible to informal workers, evidence from various contexts indicates that excluded individuals and their households are nonetheless able to accumulate and maintain significant savings through alternative means (e.g. investing in property or participating in voluntary savings schemes) (Joubert and Kanth, 2022^[18]; Guven, Jain and Joubert, 2021^[19]). The remaining challenges centre around ways to include informal economy workers into general pension schemes, avoid fragmentation and achieve meaningful scale (Joubert et al., 2026^[20]).

These findings highlight the difficulty many existing pension systems face, particularly in developing countries, in trying to address specific barriers that prevent different types of workers from enrolling in contributory pension schemes. These include not only the limited contributory capacity among low-paid informal workers, but also the way pension schemes are designed and their inability to serve workers outside the traditional formal employer-employee relationship. As such, a common objective must be to make pension schemes more inclusive of informal workers with limited and/or irregular earnings and more compatible with formal or informal workers who are not employees.

Many pension systems display institutional and structural gaps that prevent adequate coverage of informal workers

The notion of old-age pension encompasses a wide range of instruments and mechanisms that share the common objective of providing individuals above a certain age with an adequate, affordable and sustainable income to sustain their livelihoods. From a conceptual point of view, pensions can be classified in two main, broad categories: contributory and non-contributory schemes. Contributory pension schemes, which primarily serve consumption-smoothing objectives, require contributors to make regular payments in return for the promise of a lump sum or a steady income upon retirement. By contrast, non-contributory pension schemes – commonly known as social pensions – are funded by general government revenues and are chiefly designed to alleviate poverty among individuals past the retirement age. Eligibility is often based on reaching a certain age (categorical) or meeting certain welfare conditions (means-tested), or a combination of both. Depending on how these conditions are structured and implemented, eligibility can range from being highly targeted to more inclusive and universal.

Beyond this broad categorisation, pension systems structures are extremely diverse across countries and design features can be combined in many different ways (Chomik, O'Keefe and Piggott, 2024^[21]).

Contributory schemes are essential to provide workers with adequate benefits

The principles of insurance lie at the heart of the concept behind pensions and old-age income. As individual insurance instruments, contributory schemes play a crucial role in financing pension systems. By offering a reliable and stable financing mechanism, they can reduce the fiscal pressure on a government budget. Generally, contributory pension schemes offer a higher level of protection than non-contributory schemes. Nonetheless, many existing contributory schemes suffer from severe design flaws that limit their coverage, weaken the adequacy of their benefits and/or jeopardise their financial sustainability.

The low coverage of contributory schemes, notably among informal workers, appears to be equally linked to low capacity to contribute for some workers as to a design issue for many others who could contribute. As shown earlier, the large informality footprint in most EMDEs is a substantial factor explaining the low coverage of contributory schemes; in fact, it excludes most informal workers. Historically, these schemes have been developed within the framework of formal working arrangements and the employer-employee relationship. By design, they remain limited to formal employees with contributions typically shared between workers and employers via co-payments. At the same time, as traditional systems of elderly care provided through the family weaken and more women join the labour force, evidence shows that individuals have a capacity to save – often in illiquid form under the form of housing – and that many informal workers may have a strong interest in participating in pension schemes, provided that the right conditions exist (Giles, Joubert and Tanaka, 2025^[22]).

Other barriers also play critical roles, such as workers' myopia to long-term savings, lack of trust in pension systems and fear of changes in parameters. Alternative savings options with higher rates of return and greater accessibility in case of shocks may also be more attractive.

As countries look for ways to extend contributory pension schemes to informal workers, governments must take into consideration some key design and policy questions. The first question is the type of system that is best suited to the needs of informal workers – between so-called defined-contributions (DC) or defined-benefits (DB) schemes. The second question is the interactions among various contributory schemes targeting different types of workers and whether these schemes should be operated separately or in an integrated fashion. The third question revolves around the key specific features that should be integrated to make contributory schemes attractive for informal workers.

Defined-benefits and defined-contribution schemes carry clear policy and fiscal trade-offs that need to be carefully assessed

All existing contributory schemes fall across the spectrum between defined contributions (DC) or defined benefits (DB), with variations, including hybrid structures, combining elements of both such as notionally defined contribution (NDC)⁹ schemes. All types of schemes carry clear trade-offs. In DC schemes, which rely on individual pension accounts, pension benefits are a product of the amount of money accumulated by a given contributor, including the returns on investment minus the administrative commission (OECD, 2022^[23]). In DB schemes, pension benefits are guaranteed at a certain level in exchange for meeting minimum contribution requirements. DB benefits, therefore, are not a product of the amount of money accumulated but are set according to the number of years of contribution and constitute one of the key internal parameters of the scheme.

The nature and holder – i.e. the individual or the state – of risk are another crucial difference between DC and DB schemes. For DC schemes, in the absence of a minimum guarantee from the state, the main potential drawback is the low adequacy of benefits and the fact that workers bear all the risks. For DB schemes, mutualisation of risks and solidarity principles are embedded; the main drawback is a fiscal risk that usually sits with the sponsor of the scheme – often the state.

Worldwide, primarily for historical reasons, DB schemes constitute the most frequent type of pension schemes implemented. In 2023, the ILO estimated that 84% of countries rely on at least one DB scheme and 64% of countries rely exclusively on DB schemes (ILO, 2024^[5]). These schemes currently remain the main entry point to receive pension support. Historically, most were initially developed for the public workforce. As such, they were underpinned by strong financial guarantees from the state.

While these schemes share the same objective of guaranteeing an adequate level of pension to future retirees, they have different long-term consequences in terms of coverage, level of benefits, and financial and fiscal sustainability.

DC schemes are financially sustainable by design, but levels of benefits may not be adequate

In DC schemes, financial sustainability is guaranteed by design (in the absence of generous minimum benefit guarantees). Because the level of benefits is a product only of the contributions accumulated by an individual and the returns on such accumulations, pure DC schemes do not rely on fiscal resources. They offer an interesting option to governments that face tight budgetary constraints and make it possible to mobilise resources to finance social protection systems. Moreover, as individual, accounts-based mechanisms, DC schemes tend to offer better transparency of information: any worker can know – at any given point – how much resources they have accumulated. Individual pension accounts establish a transparent link between contributions and subsequent retirement benefits (Joubert, 2014^[24]). In particular, and contrary to DB schemes, DC schemes are immune from political considerations regarding the level of benefits distributed to pensioners. In this regard, DC systems (when no minimum benefit guarantee is provided) tend to act as automatic stabilisers, as no fixed promise is made about the level of pension until the point of retirement (i.e. longer life expectancies automatically mean the flow of benefits will be lower or last less long) (Chomik, O’Keefe and Piggott, 2024^[21]). Political interference can still materialise from factors such as politically directed investment or through nationalisation of the assets of private pension funds (Price, 2018^[25]).

The main challenge of DC schemes lies in their ability to deliver meaningful and adequate income during old age, notably because of low or incomplete contribution density, generous early withdrawal rules, low investment returns and lack of intergenerational solidarity across workers. The level of resources accumulated may not be sufficient to guarantee an adequate level of pension benefits for workers that have low and/or irregular contributions. For informal workers with low levels of contributions, this can become a major barrier to securing old-age income. Also, the fact that informal workers do not benefit from employer co-payments means that the burden of contributing falls entirely on their own shoulders. Even when DC accumulations are more substantial, lump sum withdrawal rules can compromise adequacy, particularly in contexts where annuity markets¹⁰ are absent or underdeveloped, and fail to ensure an income stream across retirement (Rusconi, 2008^[26]). In contrast to many DB schemes, when the capital in a DC scheme is converted into an annuity or withdrawn in phases, benefits are rarely indexed and thus provide more limited protection against future inflation.

As their design relies on investment returns, DC schemes are also severely exposed to market-based risks. In 2008, for instance, the global financial crisis had dramatic impacts on DC pension plans: in countries with mandatory DC systems, pensions funds experienced investment losses as high as 20-25% (Antolín et al., 2009^[27]). Often, these risks are mitigated via life-long investment strategies whereby, as individuals get closer to retirement, the portfolio investment progressively shifts towards low-risk and liquid assets (such as sovereign bonds). In some countries, in the absence of competition and adequate regulation, investment fees have sharply reduced investment returns over time.

DB schemes provide stronger guarantees of old-age income but can face large risks of financial unsustainability

DB systems provide clarity and predictability in terms of future pensions. Although DB systems can exhibit weaker contribution-benefit links because of embedded redistribution mechanisms, by definition, benefits are guaranteed and known in advance by any contributing individual. Apart from the contributions, the financial burden therefore weighs on the pension provider, usually the state. From the workers' perspective, DB systems translate into stronger guarantees of future revenue. Conversely, DC schemes come with greater uncertainties about the future level of pension and require a basic understanding of capital accumulation and compounded interest rates. In India, for instance, the Atal Pension Yojana (APY) scheme, is a government-backed pension scheme for unorganised sector workers. Subscribers are requested to indicate the level of guaranteed pension they would like to obtain upon retirement, and the corresponding contribution is calculated accordingly. In contexts where financial literacy is low, DB schemes may constitute a more attractive and successful option to enrol workers (as compared with DC schemes).

Ensuring the financial sustainability of DB schemes, however, may be more complex. Evolving contexts and design assumptions, notably when underlying demographic trends start shifting rapidly, often require undertaking parametric reforms. These reforms notably include options such as: raising the statutory age of retirement; extending the minimum contribution period; increasing the level of contributions from workers; shifting indexation rules for benefits in payment (e.g. from wage to price indexation); reducing the accrual rate on contributions; and/or lowering pension benefits. All these types of reforms can prove very costly politically and can lead to inaction and fiscal degradation over the long term.

A small contributory base and a contraction in the number of contributors, together with generous guaranteed benefits, can rapidly jeopardise the sustainability of the DB scheme and lead to severe financial liabilities. Across EMDEs, this vicious circle has materialised for many DB schemes for public servants (and, to some extent, for private sector workers). A review of civil service pension schemes in six major economies – Brazil, Chile, China, India, Malawi and South Africa – showed that many have been structured as completely separate from the general scheme, often with lower funding ratios, higher liabilities per member than other arrangements, and no accumulation of reserves (OECD, 2020^[28]). In many cases, because of their political sensitivity, imbalances of public DB schemes have been increasingly covered by resources stemming from general revenue instead of standard contributions (OECD, 2020^[28]).

In NDC schemes, which are akin to DB schemes in that they operate as pay-as-you-go mechanisms, the benefit level is adjusted according to life expectancy at retirement of each cohort. This ensures fiscal sustainability but may compromise adequacy.

Overall, DB schemes have largely failed to integrate informal workers in a meaningful and scaled way. In most cases, to qualify for a DB pension, a worker is required to make substantial contributions over an extended period of time and for a minimum number of years. These contribution requirements do not necessarily suit the profile of informal workers, who often have unpredictable and irregular income, or show a tendency towards partial withdrawal. Strict vesting rules¹¹ may also penalise certain individuals, such as women who may take career breaks to raise children or for those who switch between formal and informal sectors over their careers.

Raising the economic value of contributions via subsidies or matching mechanisms can help attract more workers

Increasing the economic value of contributions via financial incentives is crucial to make contributory pension schemes attractive. Historically, tax incentives have dominated, providing favourable tax treatment to retirement savings as compared to other types of savings. However, tax incentives tend to favour the

richest who are subjected to income tax while yielding only limited benefits for the poorest segments of the population (Tanzi and Zee, 2001^[29]).

More recently, new forms of financial incentives have emerged that are weakly linked to the tax system. Notably, these include matching contributions, by which the government matches a worker's payment into a pension scheme – typically up to a nominal ceiling – and nominal subsidies, by which the government directly deposits funds into the pension accounts of eligible individuals. These mechanisms can be applied in both DB and DC schemes. Importantly, such incentives are financed through general revenues – such as value-added tax (VAT) – that are collected from all taxpayers. As a result, they may subsidise workers who are not among the poorest, thereby creating implicit transfers from lower-income individuals to relatively better-off segments of the population. In reality, it could be argued that, by covering their deficits with general revenues, many governments have long subsidised unfunded and financially imbalanced DB schemes.

The tools described above could substantially encourage enrolment in pension schemes, but the evidence remains mixed due to their relative novelty and the lack of long-term evaluations of their effectiveness. Evidence from OECD countries underlines that non-tax incentives, such as fixed nominal subsidies, are better tools to encourage retirement savings among low-income earners, who are less sensitive to tax incentives (OECD, 2018^[30]). In EMDEs, evidence on the impact of such tools is more limited, although recent research suggests that they could have real impacts, notably for workers with low income and limited contributory capacities and, more generally, for salaried workers (Giles, Joubert and Tanaka, 2025^[22]). Important uncertainties remain regarding the optimal design of these mechanisms, notably because of the multiplicity of systems and designs existing across the world (Joubert et al., 2026^[20]).

Fragmentation of pension systems is a challenge in many countries

How to articulate diverse contributory pension schemes that target different types of workers remains an important challenge for many governments throughout the world. Pension schemes have often been fragmented between public and private formal employees. In addition, many countries have established new, dedicated and separate schemes to enrol informal workers (OECD, 2024^[31]). These schemes tend to differ greatly from pension schemes offered to formal employees in terms of design features, level of contribution and level of benefits. Institutional fragmentation of the pension system can result in the concentration of high-risk workers in atypical forms of employment into specific schemes, increase administrative inefficiencies and hinder portability of pension rights (OECD, 2025^[32]; IMF, ILO and the World Bank, 2024^[33]). Instead, policies should aim to pool as many people as possible in the same scheme, even if access can be differentiated to maximise enrolment, for instance through different registration procedures, methods to collect contributions and so forth.

Increasingly, pension systems seek to integrate innovative design features to encourage the participation of informal workers

In recent years, certain countries have taken more innovative approaches to expand the coverage of contributory schemes to uncovered segments of the population and, notably, informal workers. These approaches seek to build on existing structures and mechanisms to bolster enrolment, while also developing new features designed to meet the expectations of informal workers and raise the attractiveness of pension schemes.

To overcome the hurdles of administrative procedures and lack of trust, some contributory schemes have leveraged local aggregators and networks (Reyes Hartley and Abels, 2025^[6]). In Rwanda, co-operatives play a central role in enrolling members into *Ejo Heza* – the country's flagship voluntary DC scheme, primarily targeted at informal workers. In 2023, estimates indicated that over 60% of *Ejo Heza* members joined through cooperatives (Guyen and Jain, 2023^[34]). In Kenya, the *Haba Haba* scheme – a voluntary

pension scheme targeting workers in informal employment – specifically targets organised groups in peri-urban areas, such as transport service providers and market vendors (World Bank, 2024^[35]). Overall, aggregators and local networks can boost enrolment through peer effects. They can also improve outreach by facilitating default contributions, collecting payments (notably in remote and rural areas), enhancing trust, and providing information (Giles, Joubert and Tanaka, 2025^[22]). Such mechanisms can also help reduce the cost of recruiting informal economy workers into pension schemes (Joubert et al., 2026^[20]). Despite these successes in attracting and registering participants, contribution levels remain too low to ensure adequate retirement benefits. Many members express a stronger preference for short-term emergency savings, suggesting that these schemes often reach individuals with incomes too low to sustain long-term savings. This highlights the need for better targeting and for aligning product design and benefit packages with the actual needs of participants.

To better meet the needs and expectations of informal workers, some countries have started to bundle pension benefits with other types of benefits. These bundles may include short-term benefits (e.g. microloans, maternity coverage, health insurance, sickness and unemployment benefits) and/or long-term benefits (e.g. funeral expenses, life insurance, and survivor or disability pension) (Reyes Hartley and Abels, 2025^[6]; Joubert et al., 2026^[20]). Bundling offers two main advantages. First, it provides informal workers with a risk coverage similar to that of formal workers. Second, it encourages informal workers to participate in pension schemes by offering them products that may be more immediately appealing.

Evidence across the world shows that schemes that have successfully enrolled a substantial share of informal workers often hinge on mechanisms that allow for flexible contributions. While KILBIH data show that a non-negligible share of informal workers tends to have some contributory capacities, their income is often volatile and irregular. This means they cannot comply with mandatory contribution rules that characterise most pension schemes – and ultimately results in their exclusion from pension schemes. To address this barrier, many pension schemes designed for informal workers have introduced mechanisms that allow flexible and irregular contributions. Often, this flexibility takes the form of minimum annual mandatory contributions instead of monthly fixed contributions (as required in traditional pension schemes) (Joubert et al., 2026^[20]). Flexibility in pension contributions can be enhanced through increased use of digital tools that allow informal workers to make small contributions at any time – or so-called “consumption-based” pensions (Rupper Bulmer, Winkler and Mote, 2017^[36]).

Pensions schemes for informal workers also increasingly include options for early withdrawals but these features carry significant risks. For low-income, informal workers with limited savings and no social protection, the possibility to tap into pensions savings – after a vesting period or for a portion of contributions – can constitute an attractive safety net in emergencies. Provident funds often formalise this through separate accounts: one for retirement income and another for short-term contingencies, which may cover specified needs (e.g. health shocks, housing, education) and can be used more flexibly. A major challenge is that early withdrawals can substantially undermine investment returns. Schemes that allow for short-term access must maintain liquidity, which can weaken overall portfolio performance (Joubert et al., 2026^[20]). Early withdrawals can also compromise future retirement adequacy. In Peru, authorised early withdrawals from pension funds between 2020 and 2024 led to disinvestment equivalent to nearly 11% of GDP (Reyes Hartley and Abels, 2025^[6]). In Chile, exceptional withdrawals authorised during the COVID-19 pandemic resulted in 37% of social security affiliates fully depleting their contributory pension balances by 2021 (Inzunza and Madeira, 2025^[37]).

Non-contributory schemes are crucial to protect the livelihoods of the most vulnerable

Non-contributory pension schemes, used alongside contributory schemes, are crucial to pension systems. This is particularly true where a large share of the working-age population is inactive or lacks sufficient contributory capacity to secure an adequate stream of income during retirement. In many countries, wide pension coverage gaps stem from a substantial low-paid, informal workforce and a large segment of the

population that is inactive, especially among women who may be incited to stay at home to care for the household and its members. To address these challenges, numerous countries have established non-contributory pension schemes, often referred to as social pensions. By design, entitlement to these tax-financed schemes is not tied to employment or payroll contribution records. This allows such schemes to bridge large gaps in contributory pension beneficiaries. Since the early 2000s, the expansion of non-contributory pensions has been particularly pronounced across the world, notably in countries in Latin America and the Caribbean and in Asia and the Pacific (ILO, 2024^[5]). This growth has provided workers of the informal economy with a minimum income in old age and has notably supported the most vulnerable segments of society, including the poorest households and women.

Non-contributory pension benefits are often insufficient to ensure older persons can maintain a decent standard of living

The effectiveness of non-contributory schemes as an anti-poverty measure and to provide the elderly with a basic minimum income varies widely across countries. It depends largely on factors such as the benefit levels and eligibility conditions, both of which are closely intertwined with fiscal sustainability. Since non-contributory schemes are financed via governments' general revenues, any increase in benefit levels or in the number of beneficiaries can significantly raise government spending and negatively impact fiscal balance. Article 67(c) of the ILO Convention No. 102 of 1952 stipulates that non-contributory pensions, including those subject to means-testing, should be sufficient to maintain beneficiaries and their families in health and decency (ILO, 1952^[38]). In practice, however, many countries prioritise other fiscal objectives resulting in low coverage of social pensions and/or inadequate benefit levels (United Nations, 2018^[39]).

In many countries, non-contributory pension benefits are too low to adequately sustain the livelihood of the elderly, even when conceived as a basic and anti-poverty measure. In 2023, a review of 100 schemes from 79 countries estimated that the average amount of benefits offered by non-contributory pension schemes accounted for 28% of the minimum wage, and the minimum amount of benefits offered represented only 20% (ILO, 2024^[5]). In many countries, the level of non-contributory benefits stood well below the national poverty line. In Bangladesh, India and Sri Lanka, the minimum level of tax-financed, old-age pension benefits for a single person accounted for less than 15% of the national poverty line.

Legal age of eligibility to claim non-contributory benefits are sometimes too low in relation to changing demographics

Countries have adopted diverse approaches to determine eligibility for non-contributory pensions. These schemes may form part of broader social assistance programmes (e.g. cash transfers) targeted at poor households, thereby including older persons who fall within this category. Alternatively, they can be established as stand-alone programmes, consisting of dedicated non-contributory pension schemes that focus explicitly on older individuals, regardless of their economic status (Reyes Hartley and Abels, 2025^[6]).

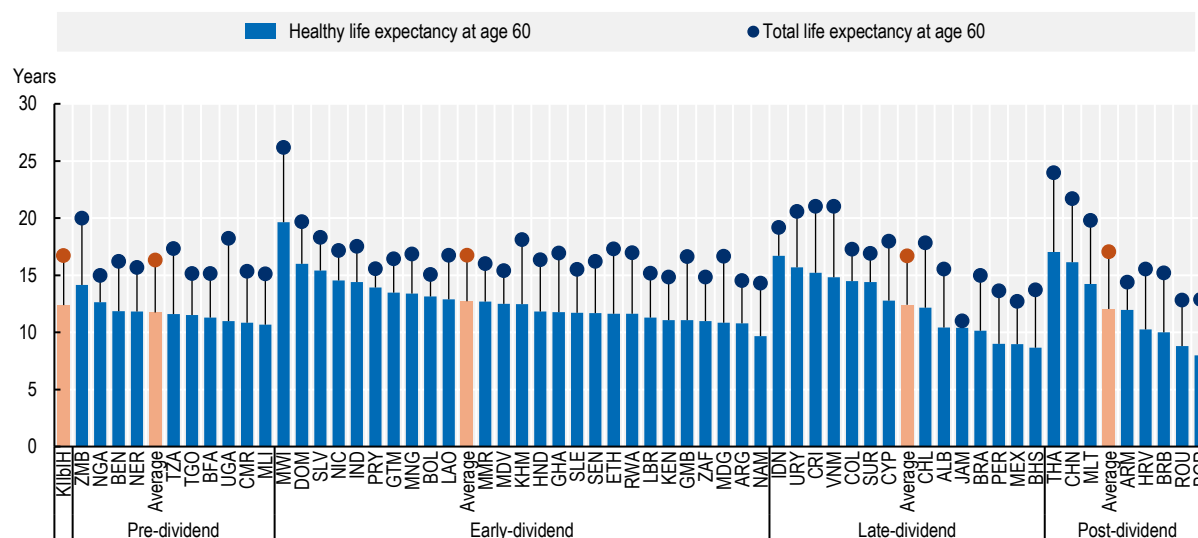
Irrespective of the form under which non-contributory old-age income is provided, eligibility criteria remain a key parameter of both coverage and benefit adequacy. Universal non-contributory pensions – for which anyone above the eligibility age qualifies – tend to naturally achieve the broadest coverage. However, depending on the size of the eligible population, this approach can entail substantial fiscal costs, which may become unsustainable in the context of population ageing coupled with low capacity to collect tax and generate sufficient public revenue. In this regard, the eligibility age is crucial to balancing two objectives: providing a minimum basic income to older individuals who can no longer work and maintaining fiscal sustainability.

Comparisons between objective measures of life expectancy and the legal age for claiming non-contributory benefits indicate that eligibility ages are relatively low in several countries. In nearly all KIIbIH countries, individuals who reach the eligibility age for a social pension still have more than 10 years of

healthy life remaining, based on healthy life expectancy at age 60. In 8 countries, this period exceeds 15 years, reaching up to 20 years in Malawi (Figure 3.22).

Figure 3.22. The legal age of pension eligibility is relatively low compared to life expectancy

Difference, in years, between total and healthy life expectancy at age 60 and men's legal age of eligibility to claim non-contributory benefits



Note: Healthy life expectancy is defined as the number of years that a person at a given age can expect to live in good health, taking into account mortality and disability (IHME, 2024^[40]). Total life expectancy is defined as the average number of years remaining to be lived by those surviving at a certain age, based on a given set of age-specific rates of dying. The figure shows the difference, for men, between these two metrics computed at age 60 and the legal age of eligibility to claim non-contributory benefits. The difference corresponds to the remaining number of total and healthy years that a man who reaches the age of 60 years can expect to live as a pensioner. Data for men are used as conservative estimates. Because women tend to live longer than men and women's legal age of eligibility is lower in some countries, differences would likely be wider using data for women. Averages of the KIR and demographic groups are calculated as simple unweighted averages.

Source: Vollset et al. (2024^[41]) and IHME (2022^[42]) for data on healthy life expectancy at age 60 years; and United Nations (2021^[43]) for data on total life expectancy at age 60 years.

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A relatively low eligibility age has become a growing challenge for many countries that struggle to ensure the financial sustainability of non-contributory pension schemes. Rather than raising the eligibility age – which is often politically sensitive – governments have frequently opted to keep benefit levels low. In some cases, this has been exacerbated by de-indexation, such that the real value of benefits has eroded over time due to inflation. This approach disproportionately affects informal workers, who often continue working beyond the legal eligibility age and, once they stop working, must rely solely on these modest non-contributory benefits.

Reforming the eligibility age is, therefore, critical not only for improving the financial sustainability of non-contributory schemes but also for ensuring adequate and equitable support in old age. To be effective and fair, the retirement age should be informed by key indicators such as the median age at which informal workers exit the labour force. Combined with efforts to maintain or increase benefit levels, adjusting the eligibility age offers a more sustainable and equitable path forward for informal workers.

Non-contributory schemes often integrate additional targeting and eligibility criteria that substantially restrict the number of beneficiaries and increase administrative costs

To contain fiscal cost and channel resources towards those most in need, many countries have introduced targeting mechanisms and eligibility criteria other than age, effectively restricting non-contributory benefits based on observable measures of welfare. For various reasons, including fiscal constraints and political economy considerations, many social pensions are means-tested or proxy-means-tested (PMT) and, in some cases, community-based-targeted (CBT). Under these approaches, eligibility is determined by an individual's or household's income, assets or any other proxy for welfare. Some countries combine means tests with pensions tests, granting non-contributory benefits only to those who do not receive contributory benefits. In Viet Nam, individuals aged between 60 and 79 years are subject to strict means-testing, which results in only about 2% of that cohort receiving benefits. Conversely, those over the age of 80 years are pension-tested, resulting in about three-quarters of that cohort receiving benefits (Chomik, O'Keefe and Piggott, 2024^[21]).

Recent evidence suggests that targeting – notably means-testing – has yielded mixed to negative results. Widespread informality in many countries often renders the pre-retirement incomes of informal workers as largely unobservable. This limits the ability of governments to effectively restrict social pensions to the poorest (Joubert et al., 2026^[20]). Even when eligibility to non-contributory benefits relies on proxies that are theoretically easier to observe (e.g. demographics, education, housing type, durable goods or means of production), exclusion errors of intended recipients remain substantial. A 2020 review of 38 poverty-targeted social assistance programmes across 25 low- and middle-income countries found exclusion errors ranging from 44% to 97%. In other words, between 44% and 97% of intended beneficiaries were excluded from these programmes (Kidd and Athias, 2020^[44]).

Automatic adjustment mechanisms have been crucial to maintain the adequacy of benefits over the long term

Country experiences show that benefits indexation to price inflation and/or wage growth is critical for maintaining the adequacy of benefits. Without indexation, benefit levels can erode substantially over time, bringing their real value below the poverty line and undermining the social objective of non-contributory schemes. However, indexation can substantially increase nominal costs, notably in high inflation contexts, and can pose technical difficulties in calibrating and benchmarking adjustment mechanisms (Gentilini et al., 2021^[45]). These potential long-term cost increases primarily depend on the objective, size and design of the scheme and, in particular, on its adjustment mechanism. Broadly, indexation policies hinge on three main parameters: i) the method of indexation (whether adjustments are automatic, *ad hoc*, or absent); ii) the underlying benchmark or indicator to determine the level of adjustment (e.g. price inflation, wage growth or a combination of both); and iii) the frequency and timing of adjustments.

In 2021, a World Bank review of 56 social pension programmes across developed and developing countries found that 38% (i.e. 21 programmes) had automatic indexation, 55% relied on *ad hoc* adjustments, and 5% had no mechanism. An additional 2% lacked sufficient data to be assessed (Gentilini et al., 2021^[45]). Most automatic adjustments were anchored against inflation, with only a small fraction tied to wages or a combination of both. By contrast, *ad hoc* adjustments were largely discretionary and not informed by any clear underlying indicator, depending rather on factors such as budget availability or political considerations (e.g. benefit increases before elections).

In response to rapidly evolving demographic conditions, countries are increasingly introducing automatic adjustment mechanisms (AAMs) in their pension systems. AAMs are predefined rules that automatically adjust pension parameters (e.g. eligibility age or benefit levels) based on the evolution of demographic, economic or financial indicators. These mechanisms can apply to both contributory and non-contributory schemes. They can also take multiple forms, including: linking eligibility age to life expectancy; indexing benefits to life expectancy, demographic ratios, wage bill or GDP; and ensuring short- and long-term

financial balance of schemes through combined changes in level of benefits, contribution rates or pension points (Chomik, O’Keefe and Piggott, 2024^[21]). While AAMs are not immune to political interference, and their parameters can be changed, diluted or cancelled, they can help insulate pension systems and protect financial stability from the impacts of a changing and uncertain environment (de Tavernier and Boulhol, 2021^[46]).

The fiscal implications of automatic adjustment mechanisms vary, depending on the parameters used

From a policy perspective, indexing non-contributory benefits is essential and widely considered best practice. However, adjustment parameters must be carefully tailored and calibrated to each country’s fiscal and economic context. Recent high-inflation episodes have renewed attention on indexation rules. The two main indicators for indexation – prices and wages – carry trade-offs with different fiscal implications. Price indexation, the most common approach, tends to reduce the relative value of pension benefits over time, particularly during periods of real-wage growth that are fuelled by productivity gains. Conversely, in high-inflation episodes and when real wages stagnate or decrease, price indexation can become more favourable for pensioners but sharply deteriorate the situation of public finances or pension providers, as seen recently in OECD countries (OECD, 2023^[47]). Wage indexation preserves benefits relative to average wages throughout the retirement period, reducing future poverty risks and maintaining retirees’ living standards. However, this method requires reliable wage data that are often less readily available in EMDEs, making price-based adjustments more practical despite their limitations.

Successful pension systems coherently articulate non-contributory and contributory schemes

In context of widespread informality, a well-functioning pension system requires coherent integration of contributory and non-contributory components. Countries that rely heavily on a single, dominant non-contributory scheme often face sustainability challenges, while those that depend exclusively on contributory schemes fail to provide adequate coverage across the entire population (Price, 2019^[48]).

Ideally, non-contributory and contributory schemes should form complementary elements within a multi-pillar system that pools risks across the population and reconciles key policy objectives, notably solidarity and economic efficiency. In recent years, several countries have pursued this approach, with some evident success. Landmark reforms establishing efficient multi-pillar systems include those in China and Chile (OECD, 2020^[28]). In Chile, universal non-contributory benefits begin to decrease once a pensioner’s contributory benefits exceed a certain threshold and are gradually reduced as those benefits rise (Inzunza and Madeira, 2025^[37]; Ugarte and Vergara, 2022^[49]; Joubert, 2014^[24]).

Financing the expansion of pension systems is challenging but significant opportunities exist

In many developing countries, low pension coverage is closely tied to limited financing for social protection, often reflecting low public revenue. According to ILO estimates, in 2023, high-income countries allocated 16.2% of GDP to social protection (excluding healthcare), compared with 8.5% in upper-middle income countries, 4.2% in lower-middle income countries, and less than 1% in low-income countries (ILO, 2024^[5]). Tax revenues as a share of GDP also remain limited in many developing countries, standing at 15% to 20% of GDP – roughly half the level observed in OECD countries (34% on average in 2022) (OECD, 2025^[50]). These figures underscore the challenge of financing the expansion of pension systems. But they also reveal strong potential for governments to mobilise additional domestic resources, through both

general taxation (i.e. extension of non-contributory pensions) and social security contributions (i.e. extension of contributory schemes).

Tax reforms can generate more public revenue to finance the expansion of non-contributory pension

The establishment and expansion of multi-pillar pension systems, with a basic non-contributory component, hinges on a given country's ability to mobilise sufficient public revenue. Reprioritising government expenditure and improving spending efficiency, while important, will not be sufficient on their own. Importantly, in such contexts, most developing countries have significant untapped tax potential. Although potential gains differ greatly across regions and countries, the tax revenue frontier (i.e. the tax revenue attainable given a country's structural characteristics) is 5% of GDP higher than current revenue for low-income countries and about 9% of GDP for lower-middle-income countries (Brys et al., 2025^[51]; OECD, 2024^[31]). For most developing countries, raising the tax-to-GDP ratio by five percentage points over a decade is ambitious but considered feasible (IMF, OECD, United Nations and the World Bank, 2016^[52]). Achieving such an increase also depends on tax buoyancy, i.e. the extent to which tax revenues rise as the economy grows. In practice, sustained gains in the tax-to-GDP ratio require a buoyant tax system, in which existing taxes naturally generate more revenue as incomes and consumption expand. This, in turn, depends on reforms that broaden the tax base, reduce exemptions, improve compliance and strengthen tax administration.

To generate the necessary resources, governments can rely on a range of fiscal instruments. These include broadening the personal income tax base, introducing simplified and compulsory tax regimes (including presumptive contributions for microenterprises and their workers), and implementing new health and environmental taxes on products (such as tobacco, alcohol, sugar-sweetened beverages and carbon emissions) (OECD, 2025^[32]; Coxhead and Grainger, 2018^[53]). Reassessing and reducing inefficient corporate tax incentives, as well as redesigning or eliminating detrimental subsidies (e.g. on fuel) can also free up fiscal space for financing non-contributory pensions. In recent years, some countries (e.g. Mongolia or Zambia) have also earmarked revenues from natural resources to support social pensions (UNICEF, 2025^[54]; ILO, 2016^[55]). Other countries have sought to maximise indirect tax revenues (e.g. VAT or sales taxes) by reducing exemptions on non-essential goods and channelling these funds towards social protection programmes.

Any strategy to increase tax revenue must be carefully designed and evaluated at the country level to assess its revenue generation potential against its broader effects on social, economic and environmental dynamics. The design and implementation of reforms should reflect each country's unique structural characteristics and remain adaptable to evolving circumstances. When evaluating potential tax measures, countries should systematically consider whether there is scope to achieve four things (one, a combination or all): i) improve compliance; ii) limit international leakages; iii) broaden the tax base and minimise domestic leakages; or iv) raise rates or introduce new taxes (OECD, 2024^[31]). Most importantly, it is essential to assess the impacts of tax reforms on economic development and investment, ensuring that fiscal policy supports inclusive and sustainable growth. In this regard, taxes that are generally less harmful to economic growth (e.g. property and indirect taxes) may constitute better options (IMF, OECD, United Nations and the World Bank, 2016^[52]).

Universal social pensions could be established at a relatively low fiscal cost and would generate large positive spillover effects on other groups of the population

The principle of universal social protection is rooted in social justice and human solidarity. Both the ILO "Social Protection Floors Recommendation" (Recommendation No. 202) and the ILO "Resolution concerning the second recurrent discussion on social protection" emphasise that access to universal social protection is fundamental for achieving social justice, decent work, and inclusive and sustainable

development (ILO, 2021^[56]; ILO, 2012^[57]). The approach recognises social security as a human right and seeks to promote health and dignity. In this context, non-contributory pension schemes play a vital role in closing social protection gaps for older people.

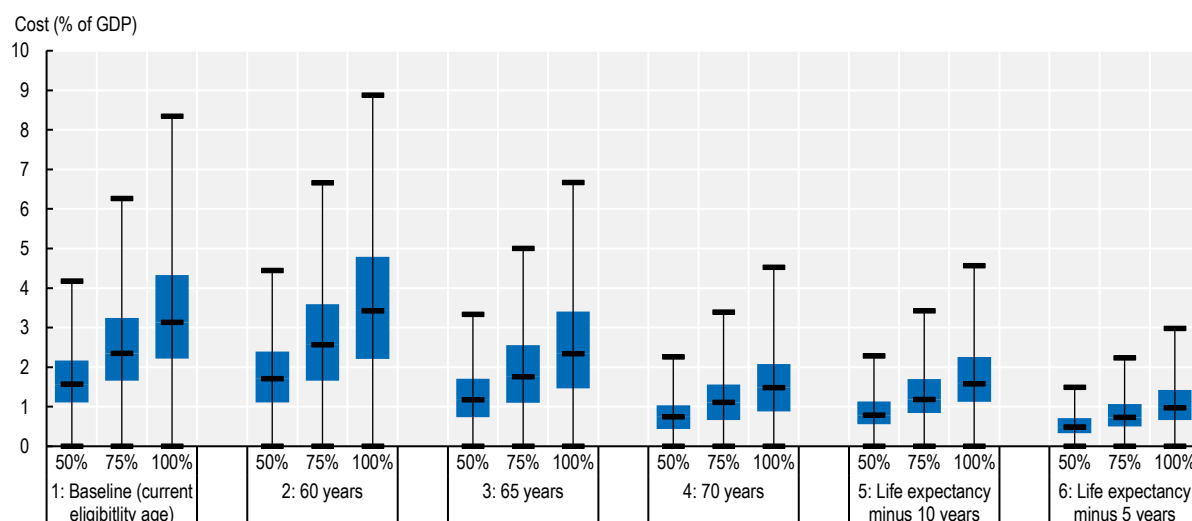
Beyond this developmental and rights-based perspective, recent evidence suggests that establishing universal non-contributory pensions (allocated exclusively on the basis of age) would have limited fiscal cost – provided the eligibility age is not set too low and benefits remain reasonable, consistent with anti-poverty objectives. Recent simulations in Indonesia, which is characterised by large informality (80% of employment) and rapid ageing, show that two combined reforms – an increase in the access age for the formal pension and the introduction of a social pension – could yield large welfare gains for the entire society and better shield most of the population against old-age adverse uncertainties while keeping the fiscal cost of the contributory pension system under control (Kudrna, Piggott and Poonpolku, 2024^[7]).

New estimates from KIIbIH data confirm that universal social pensions can be fiscally affordable. Based on country-level data for the latest year available, Figure 3.23 presents cost simulations for universal non-contributory pensions under varying assumptions regarding access age and benefit levels (see Annex 3.B for more details on the methodology and results for all scenarios). Across most KIIbIH countries, the cost of providing a universal basic pension equal to 50% or 75% of the median per-capita income¹² remains within a range of 0.5% to 4% of GDP, depending on the access age. More specifically:

- Providing a benefit equal to 50% of median per-capita income to all individuals above the current legal retirement age would cost less than 1.6% of GDP in half of the KIIbIH countries, and less than 2.2% in three-quarters of them (Scenario 1).
- Providing a similar level of benefit (50% of median per-capita income) to individuals aged 60 and over (Scenario 2), 65 and over (Scenario 3) and 70 and over (Scenario 4) would cost, respectively, less than 1.7%, 1.2%, and 0.7% of GDP in half the KIIbIH countries, and less than 2.4%, 1.7% and 1% in three-quarters of them.
- By setting the access age to life expectancy at age 60 minus 10 years (Scenario 5), the cost of providing a benefit equal to 50% the median per-capita income is less than 1.1% of GDP in three-quarters of the countries.
- By tying the access age to life expectancy at age 60 minus 5 years (Scenario 6), the cost of providing a benefit equal to 50% the median per-capita income would fall below 0.7% of GDP in three-quarters of the KIIbIH countries. Increasing the level of benefits to 75% of the median per-capita income maintains the cost below 1.1% of GDP in three-quarters of the countries.

Figure 3.23. Establishing universal non-contributory pensions could be done at a relatively low fiscal cost

Estimated cost of universal social pension as a share of GDP across KIIbIH countries



Note: The figure presents cost estimates based on six different scenarios of an age-based universal benefit (or universal non-contributory pension), without any means-test nor pensions-test. The two main varying parameters are: i) the access age (age at which an individual becomes eligible); and ii) the level of benefits. For each scenario, cost estimates are based on benefits equal to 50%, 75% and 100% of the median per-capita welfare. Depending on the country, median per-capita welfare is computed as the household total income or total consumption divided by the number of household members. The access age varies as follows. In Scenario 1, the access age is set at the current legal age of retirement. The access age is set at: 60 years for Scenario 2; 65 years in Scenario 3; and 70 years in Scenario 4. The access age is set at ten years prior to the life expectancy at age 60 in Scenario 5 and at five years prior in Scenario 6. For each scenario and level of benefits simulated, the statistical distribution of the cost (as a share of GDP) is calculated for each KIIbIH country. The lower bar corresponds to the lowest cost estimate, the upper bar to the highest cost estimate and the intermediary bar to the median cost estimate. For each scenario and level of benefits simulated, the box covers cost estimates ranging between the first and the third quartiles. For all countries, GDP data are based on the latest year available in the KIIbIH.

Source: Authors' simulations based on OECD (2026^[4]), IMF (2025^[58]) and United Nations (2021^[43]).

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In addition to the potential to deliver on policy objectives at relatively limited fiscal cost, establishing universal, non-contributory pensions could also produce significant indirect, positive effects on children and poor households, specifically through intra-household transfers. This is notably true in countries where the elderly tend to live in intragenerational households. For instance, under a scenario in which universal benefits are distributed to all individuals aged above 65 years (Scenario 3), on average across all KIIbIH countries, the median share of beneficiaries would be 7.2% of the population. Meanwhile, positive impacts would reach a median share of 13.8% children and 23.3% of poor households (Table 3.1).

Table 3.1. Universal non-contributory pensions could have substantial direct and indirect effects on different segments of the population at a limited fiscal cost

	Median share (%) impacted:					Median cost (% of GDP) at:		
	Individuals	Households	Poor individuals	Poor households	Children	50% of median per-capita income	75% of median per-capita income	Median per-capita income
Scenario 1: Benefits claimed at current legal age of retirement								
KIIBIH	10.2	30.1	6.9	31.7	18.6	1.6	2.3	3.1
Pre-dividend	5.7	24.4	5.4	25.7	19.2	1.2	1.8	2.4
Early-dividend	8.4	29.3	6.9	32.5	20.7	1.4	2.1	2.7
Late-dividend	14.7	32.1	8.8	30.6	15.7	1.9	2.9	3.8
Post-dividend	22.4	39.7	25.0	46.4	17.0	2.3	3.5	4.6
Scenario 3: Benefits claimed at age 65 years								
KIIBIH	7.2	23.2	5.0	23.3	13.8	1.2	1.8	2.3
Pre-dividend	3.7	15.9	3.5	18.1	12.8	0.8	1.2	1.6
Early-dividend	5.4	22.1	4.8	23.0	13.8	0.9	1.3	1.8
Late-dividend	10.5	24.5	7.1	21.2	12.0	1.4	2.1	2.8
Post-dividend	17.2	36.0	22.0	39.9	14.8	1.9	2.8	3.7
Scenario 5: Benefits claimed 10 years prior to life expectancy age								
KIIBIH	5.5	17.5	4.1	17.4	10.6	0.8	1.2	1.6
Pre-dividend	3.1	13.7	3.2	15.3	10.9	0.6	1.0	1.3
Early-dividend	4.5	17.9	4.1	18.4	11.4	0.7	1.0	1.4
Late-dividend	6.7	16.6	4.9	14.9	8.7	1.0	1.5	1.9
Post-dividend	11.0	22.1	13.6	26.5	10.4	1.2	1.8	2.3

Note: For each selected scenario, the table presents coverage and cost estimates. In Scenario 1, the access age is set at the current legal age of retirement. In Scenario 3, the access age is 65 years. In Scenario 5, the access age is set 10 years prior to life expectancy at age 60. Depending on the country, median per-capita income is computed as the household total income or total consumption divided by the number of household members. For all countries, GDP data are based on the latest year available in the KIIBIH.

Source: Authors' simulations based on OECD (2026^[4]), IMF (2025^[58]) and United Nations (2021^[43]).

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In many countries, opportunities exist to collect more social security contributions to support expansion of contributory schemes

For many countries, increasing contributory revenues remains challenging – but not impossible. Since the early 2000s, revenues from social insurance contributions have remained stable or even grown in numerous contexts, serving as a major source of financing for social protection systems. Globally, social security contributions accounted for 18.7% of total tax revenue and 5.3% of GDP in 2023 (OECD, 2025^[50]).

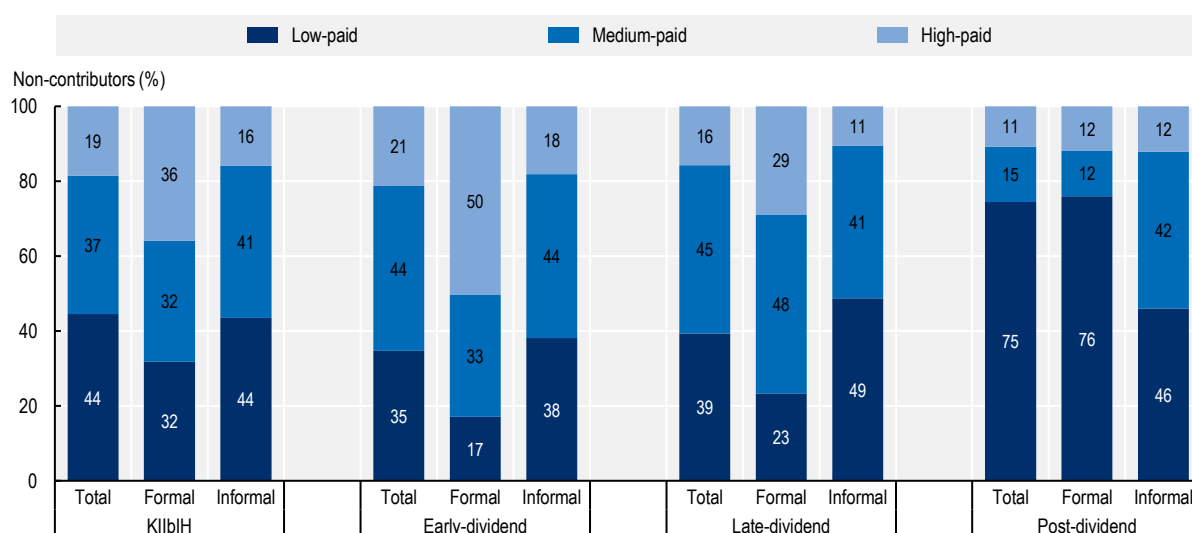
Income-based social security contributions should remain the foundation of contributory pension schemes, as this model offers several advantages. First, it relies on the administrative and operational simplicity of collecting payroll taxes. Second, it directly links benefits to workers' earnings and contributions, thereby incentivising formal employment. This model also enhances transparency, as individuals can clearly see the relationship between their contributions and future benefits. Additionally, it allows to better control programme costs and provides financial stability through earmarked funding (Calligaro and Cetrangolo, 2023^[59]).

Data from the KIIBIH further highlight the potential to mobilise greater social security contributions, particularly by tapping into the substantial share of informal workers with the capacity to contribute. Across KIIBIH countries, high-income individuals account for 16% of informal workers who do not contribute to any

pension scheme (Figure 3.24). With appropriate mechanisms in place, these workers could represent a valuable source of additional financing. As a large proportion of non-contributing informal workers remain in the medium- and low-income brackets, governments will still need to provide subsidies and matching contributions as part of a broader strategy to increase the coverage of contributory pension schemes among low-paid workers and ensure the financial sustainability of such schemes.

Figure 3.24. Many informal workers who do not contribute may have sufficient contributory capacity

Distribution by earnings categories of all, formal and informal workers aged between 15 years and the legal age of retirement who do not contribute to pension schemes



Note: Earnings categories classify individuals based on their monthly labour earnings into three categories, defined relative to median earnings: i) low-paid individuals ranging from the bottom of the earnings distribution to 50% of median earnings; ii) medium-paid individuals ranging from 50% to 150% of median earnings; and iii) high-paid individuals including anyone above 150% of median earnings. Averages of the KILBIH and demographic groups are calculated as simple unweighted averages of countries for which data are available. KILBIH average covers 21 countries, including one pre-dividend country. Demographic group averages cover 9 countries in early-dividend, 7 countries in late-dividend, and 4 countries in post-dividend.

Source: (OECD, 2026^[4]), “Key Indicators of Informality based on Individuals and their Households (KILBIH)”, <https://data-explorer.oecd.org/>.

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Introducing presumptive tax regimes (PTR), also known as monotax systems, could boost revenue collection for social security contributions. In recent years, these regimes have become increasingly popular, notably in Latin America and the Caribbean, with examples including the *monotributo* systems in Argentina and Uruguay. PTRs allow micro and small enterprises, as well as self-employed individuals, to pay a single, consolidated tax that covers multiple obligations – including social security contributions. This approach reduces administrative burdens for tax authorities and lowers compliance costs for taxpayers. The revenue generated is allocated, by the administering authority, among relevant institutions, such as tax administrations and social security funds (OECD, 2024^[60]). Importantly, successful implementation of this approach requires careful calibration of the eligibility criteria and the tax structure in order to balance i) incentives to join the PTR and formalise, ii) the integrity of the standard tax regime, and iii) equity among taxpayers (OECD, 2025^[61]; Mas-Montserrat, Colin and Brys, 2024^[62]; Mas-Montserrat et al., 2023^[63]). This approach would also entail making it mandatory for independent workers to contribute to social security.

Conclusion and policy discussion

The demographic transition towards ageing and aged societies is accelerating across all regions and countries of the world. Africa is still at an earlier stage of this transition, but ageing pressures are expected to intensify over the coming decades. Globally, the pace of the transition, coupled with the fact that it is advancing in contexts in which labour informality continues to dominate, may threaten the livelihoods of millions of people and trigger crucial policy challenges. Urgent action and forward-looking planning are needed, even in countries that still have a youth bulge. While most countries use both contributory and non-contributory pension schemes to support the income needs of elderly people, pension coverage gaps remain enormous in many. In most countries, limited fiscal space challenges the ability of non-contributory schemes to ensure adequate livelihoods for the elderly, reflecting both low levels of domestic resource mobilisation and the growing number of older individuals requiring protection. The coverage and adequacy of contributory schemes are, in parallel, constrained by the prevalence of informal employment, which often limits the contributory base and the level of contributions.

Looking ahead, policymakers must develop strategies that address the triple challenge of coverage, benefit adequacy and fiscal sustainability. Effective approaches should aim to provide the largest possible share of the population (*coverage*) with pension benefits that are high enough (*adequacy*), without jeopardising the fiscal balance or the internal financial equilibrium of pension schemes (*sustainability*) (Rupper Bulmer, Winkler and Mote, 2017^[36]; United Nations, 2018^[39]). In addition to these core principles, considerations of fairness, equity and administrative feasibility are essential for building broad support and ensuring successful implementation. Policymakers should also consider the increasing role of technology and digital public infrastructure to advance financial inclusion of informal workers, and to better target and deliver social benefits. Finally, any national strategy should be informed by a thorough understanding of the policy space available, which varies across countries according to the prevalence of informal employment, the demographic situation and the level of tax revenues.

Identify how informality, demographic dynamics and fiscal revenues shape the policy space

To be successful, policy strategies for pensions must account for diverse local realities across three key dimensions: demographic transition, informality prevalence and ability to increase the fiscal space. Figure 3.25 provides simple correlations of the informal employment rate with the projected share of individuals aged above 65 years by 2050 (Panel A) and with the tax-to-GDP ratio (Panel B). From this figure, it is possible to extract useful patterns and to develop a typology of seven groups of countries according to country-level priorities and available policy options.

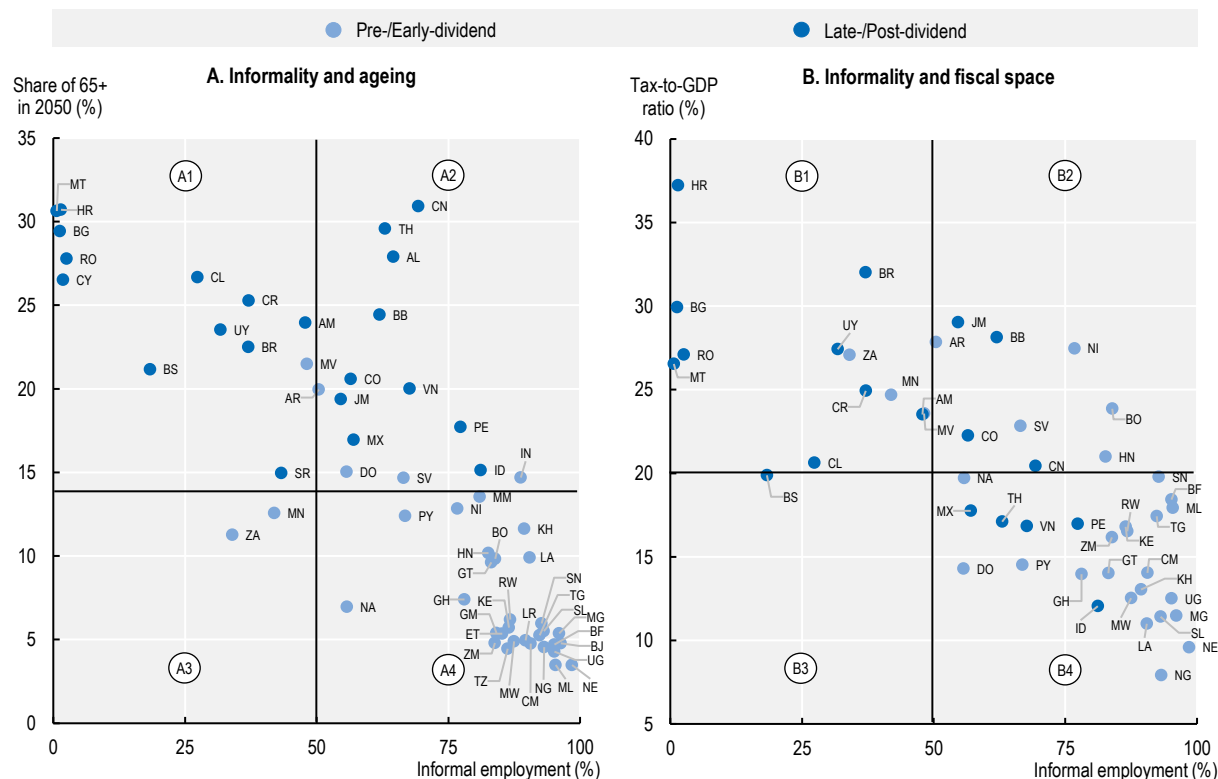
- **Group 1: Countries with low informality but at a later stage of the ageing process and with already high tax-to-GDP ratios** (quadrants A1 and B1). This group includes a mix of European and Latin American countries such as Brazil, Bulgaria, Costa Rica, Croatia, Malta, Romania and Uruguay, as well as Armenia and the Maldives. Nearly all are in the late- or post-dividend phase. While all have made substantial progress towards formalisation and domestic resource mobilisation, they face imminent demographic pressures. Such countries should prioritise leveraging their formal workforce to quickly consolidate the financial sustainability of contributory pension schemes. This would allow them to address the needs of a rapidly growing elderly population by reprioritising expenditures and channelling existing resources towards pension schemes.
- **Group 2: Countries with low informality but at a later stage of the ageing process and with relatively low tax-to-GDP ratios** (quadrants A1 and B3). These countries typically have tax-to-GDP ratios close to 20% (examples include the Bahamas and Chile). Their situation is similar to Group 1 countries, except that their current fiscal space is much more limited. The main objective

should be to increase markedly their fiscal revenues to enhance non-contributory pension schemes.

- **Group 3: Countries with low informality, at an early stage of the ageing process and with already high tax-to-GDP ratios** (quadrants A3 and B1). These countries are in a favourable position to develop robust pension systems (examples include Mongolia and South Africa). With more time left before demographic pressures intensify, they can rely on a relatively large formal workforce to strengthen and expand contributory pension schemes. As the scope of these countries to increase substantially tax revenues may be constrained, they should carefully manage their fiscal space and reprioritise expenditures according to the evolving needs of their population.
- **Group 4: Countries with high informality and at a later stage of the ageing process but with relatively low tax-to-GDP ratios** (quadrants A2 and B4). These countries (which include the Dominican Republic, Indonesia, Mexico, Peru, Thailand and Viet Nam) face an important policy challenge. They have little time before becoming “aged” or “superaged” societies, while widespread informality limits the coverage of contributory pension schemes. These countries should pursue formalisation efforts and expand tax revenues (through a mix of contributory and non-contributory pensions) to meet the needs of a growing elderly population. Importantly, high levels of informality may not necessarily constitute a barrier to mobilise more fiscal resources in these countries. Indeed, several countries with similar or higher levels of informality still manage to collect revenues exceeding 20% of the GDP (Figure 3.25, Panel B).
- **Group 5: Countries with high informality, at a later stage of the ageing process and with already high tax-to-GDP ratios** (quadrants A2 and B2). These countries face the greatest policy challenge (examples include Argentina, Barbados, China, Colombia, El Salvador and Jamaica). In context of substantial informality, they must address urgently the needs of their rapidly ageing societies – but with probably little room left to leverage additional fiscal resources. Public policies should address this by focusing on public expenditure reforms and formalisation efforts.
- **Group 6: Countries with high informality, at an early stage of the ageing process and with relatively low tax-to-GDP ratios** (quadrants A4 and B4). Some 20 countries¹³ covered by the KIIbIH (all located in Africa except for Cambodia, Guatemala, Lao PDR and Paraguay) have time to prepare. Still, they must prioritise formalisation and tax collection. Policy efforts should focus on structuring the pension system, which implies both building adequate non-contributory schemes financed through tax reforms and enrolling informal workers in mandatory contributory schemes through regulatory reforms and incentives.
- **Group 7: Countries with high informality, at an early stage of the ageing process and with already high tax-to-GDP ratios** (quadrants A4 and B2). These countries face a situation similar to Group 6, although they have already managed to increase their fiscal space. For such countries (examples include Bolivia, Honduras and Nicaragua), the time left until they become aged societies should be used to boost formalisation efforts and maximise public spending efficiency.

Figure 3.25. Cross-tabulating informality with ageing and fiscal space can help determine country policy priorities and available options to reform pension systems

Correlations of the informal employment rate with the projected share of individuals aged above 65 years by 2050 (Panel A) and with the tax-to-GDP ratio (Panel B)



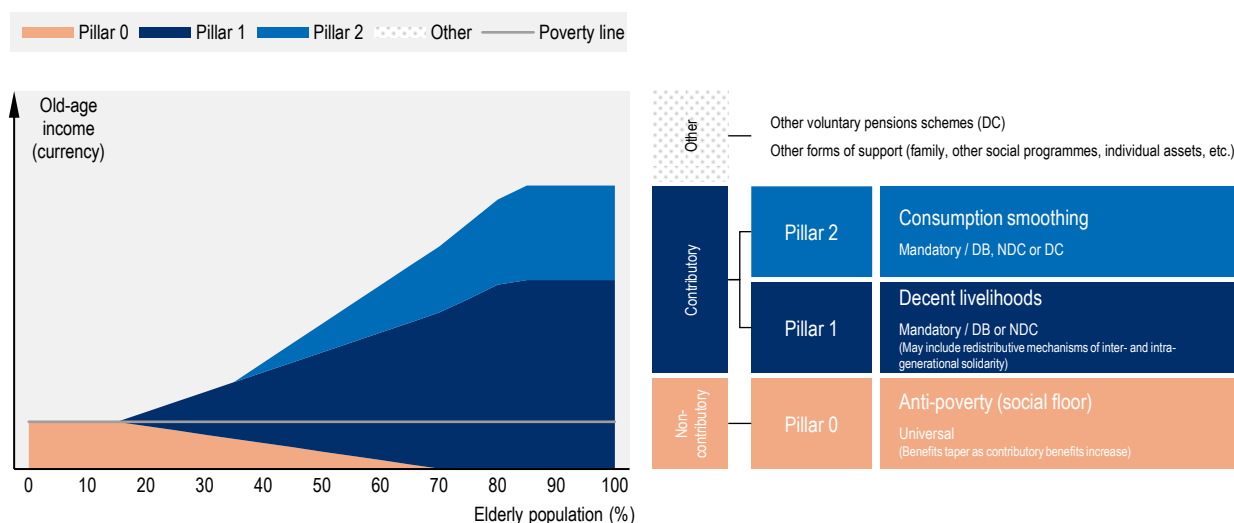
Note: Informal employment rates are based on ILO data for the latest year available. For Albania, Cameroon, China, Malawi, Nicaragua and Suriname, rates for the population aged 15 to 64 years are based on KILBIH data due to data availability. The tax-to-GDP ratio refers to 2023 and is missing for 10 countries: Albania, Benin, Cyprus, Ethiopia, Gambia, India, Liberia, Myanmar, Suriname and Tanzania.

Source: (United Nations, 2024^[2]), "World Population Prospects 2024", <https://population.un.org/wpp/>; (OECD, 2025^[50]), "Global Revenue Statistics - Comparative tax revenues", <https://data-explorer.oecd.org/s/3mw>; (ILO, 2025^[64]), "Informal employment rate by sex (%) – Annual", ILOSTAT, <https://ilostat.ilo.org/data/>; and (OECD, 2026^[4]), "Key Indicators of Informality based on Individuals and their Households (KILBIH)", <https://data-explorer.oecd.org/>.

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Build multi-pillar pension systems that combine non-contributory and contributory schemes

As part of their strategies to achieve the triple goal of coverage, benefit adequacy and fiscal sustainability, and within the policy space available to them, countries should adopt multi-pillar pension systems that integrate and articulate contributory and non-contributory schemes (Figure 3.26). Country evidence shows that strong and adequate pensions systems – i.e. those that protect the income of elderly people and shield them from the risk of old-age poverty – all rely on different tiers that mix non-contributory and contributory mechanisms (OECD, 2023^[47]). The design of multi-pillar systems should also incentivise formal employment, encourage the participation of more women in the labour force and their formalisation, boost productivity, and enhance the collection of contributions and taxes.

Figure 3.26. Stylised structure of multi-pillar pension systems

Source: Authors' own elaboration.

Non-contributory pension schemes (**Pillar 0**) should protect from poverty the most vulnerable segments of the population. This typically includes individuals who are not and may never be covered by contributory pension schemes: informal workers with low contributory capacities, rural women, inactive individuals, part-time workers, etc. The level of benefits should be sufficient to operate as a relevant anti-poverty measure and benefits should be universal (to the degree that the fiscal space allows), avoiding means tests. Policymakers should consider using pension tests with a relatively low “taper” rate – i.e. the rate at which non-contributory pension benefits are gradually reduced as contributory pension benefits increase.

Mandatory, contributory pension schemes should continue to constitute the cornerstone of pension systems. **Pillar 1** should aim to guarantee decent livelihoods by replacing a substantial portion of lifetime pre-retirement income. Pillar 1 can integrate inter- and intra-generational solidarity mechanisms, especially when structured as DB plans. **Pillar 2** should be designed as a complementary and mandatory contributory scheme that smooths consumption during old age. Ideally, Pillars 1 and 2 should combine DB and DC schemes to diversify the risks associated with these pension plans. For instance, if Pillar 1 is structured as a DB or NDC scheme, Pillar 2 should be structured as a DC scheme.

Beyond these three main pillars, other resources can also help support and preserve levels of consumption among the elderly. These include, for instance, additional voluntary pension plans that could allow workers with sufficient contributory capacity to build larger reserves. Importantly, these other forms of old-age income support should complement strong and coherent mandatory pillars, and should not be used as a reason to delay the development of systems that are available to all workers.

Overall, policymakers must ensure citizens' trust in pension systems and guarantee long-term financial sustainability. For both DB and DC schemes, policymakers should establish and enforce clear rules to adjust the main parameters of the system: level of benefits, contribution requirements and statutory age of retirement. Credible and sustainable DC schemes also require transparent investment governance as well as capital market regulations (OECD, 2022^[23]; OECD, 2016^[65]).

Adapt pensions systems to the realities of the informal economy

Expanding the coverage of contributory pensions schemes to informal workers requires approaches that leverage and combine multiple policy tools. This includes: i) offering subsidies and matching contributions

for low-paid workers to make participation more attractive; ii) authorising flexible and irregular contributions with a monthly or annual minimum; iii) integrating schemes to avoid fragmentation and inefficiency; and iv) engaging aggregators and networks (e.g. cooperatives, online work platforms, mobile money operators, or local post offices) to facilitate enrolment, information dissemination and contribution collection. Additionally, bundling pension products with complementary benefits (such as short-term insurance or credit) can enhance their appeal. Policymakers should also assess the impact of and remove regulatory barriers that prevent individuals from working beyond the statutory retirement age – which allows people to continue building pension density – or while receiving retirement benefits (partial retirement). Finally, it is important to revise or eliminate rules that exclude workers with incomplete contribution histories, ensuring they have the option to retire with a partial or reduced pension.

Overall, the selection and combination of policy tools should be guided by each country's specific context. Factors such as the extent of informality and the profile of non-contributing workers – notably their contributory capacity – are crucial to identify the most effective policy mix.

Ensure the adequacy of benefits – including over time

Ensuring that non-contributory pension benefits remain adequate over time is crucial for these schemes to fulfil their anti-poverty purpose. Policymakers should incorporate automatic and predictable adjustment mechanisms – such as indexing benefits to price inflation, wage growth or a combination of both – into the design of non-contributory pension systems. These adjustments help maintain the real value of benefits and protect recipients from the effects of rising costs of living.

Contributory pension schemes, especially those structured as DB plans, can also face benefit erosion over time. In these cases, policymakers should implement comparable indexation mechanisms to ensure that benefit levels are preserved in the long term.

The eligibility age for non-contributory pensions often has limited relevance for informal workers, who typically continue working well beyond this age to support themselves in the absence of contributory benefits. For a given level of fiscal resources allocated to non-contributory schemes, setting a low eligibility age can result in a large proportion of the population being covered, including informal workers in employment, but with benefits too modest to adequately support informal workers once they are no longer able to work. To address this, policymakers should consider adjusting the eligibility age based on objective indicators such as life expectancy. Aligning the eligibility age closer to the point at which informal workers are likely to exit the labour force would reduce the number of beneficiaries but also provide higher benefit amounts to those most in need. For contributory schemes, policymakers should ensure that the statutory age of retirement aligns with the internal financial sustainability of schemes.

Guarantee the financial and fiscal sustainability of the pension system via parametric reforms and domestic resource mobilisation

To finance the expansion of universal non-contributory pension schemes (Pillar 0), policymakers need to mobilise additional domestic resources and maximise spending efficiency. Several fiscal reforms can support these dual goals, including: eliminating deductions on personal income tax and lowering excessively high exemption thresholds; reassess corporate tax incentives to ensure they effectively promote investment and formal employment; introducing new excise taxes (e.g. health taxes on tobacco, alcohol and sugar-sweetened beverages); reducing fossil fuel subsidies; and introducing a personalised VAT¹⁴ to further broaden the revenue base.

For contributory pension schemes, promoting the formalisation of workers and businesses should remain the primary objective – especially for self-employed workers, who are often excluded by design. However, acknowledging that no single solution will achieve full formalisation, policymakers should also consider alternative and innovative methods to increase contribution collection. One promising approach is the

implementation of PTRs (or monotax systems), which consolidate multiple tax obligations – including social security contributions – into a single payment. To be effective, PTRs must be carefully designed, with eligibility criteria and tax structures calibrated to balance incentives for formalisation, maintain the integrity of the standard tax regime and ensure equity among taxpayers. Additionally, policymakers can leverage the growing digitalisation of payments to create voluntary micro-contribution channels at points of sale – the so-called consumption-based pensions. These innovative mechanisms are particularly important as the gig economy expands.

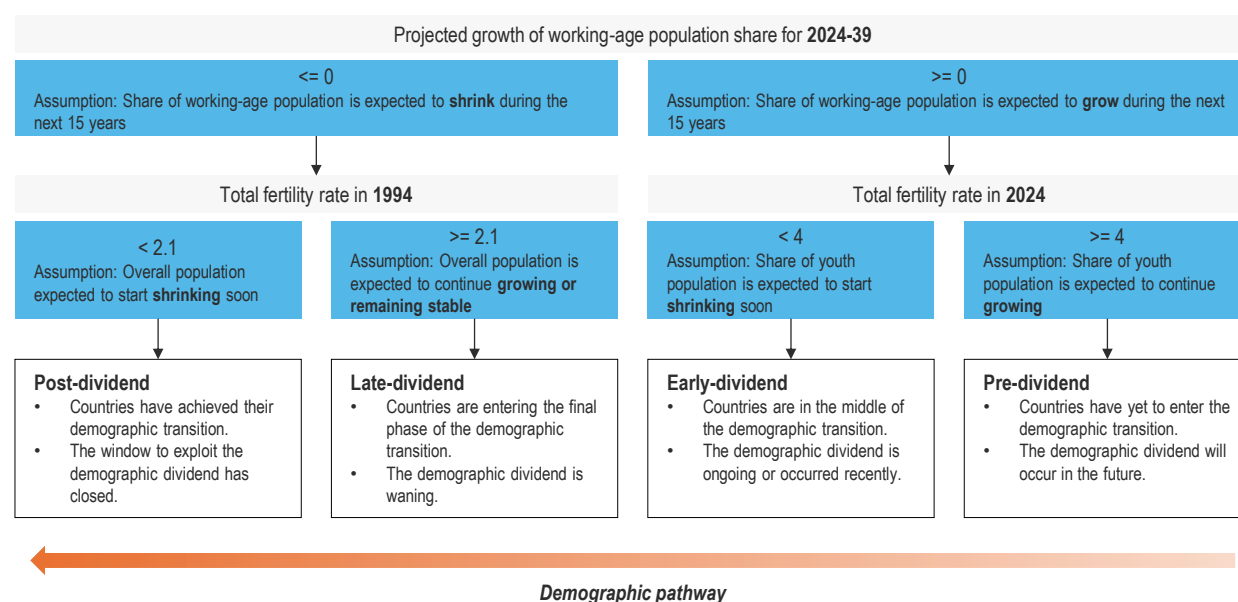
Annex 3.A. Demographic typology

The demographic typology used in the chapter is adapted from the global typology developed in Ahmed et al. (2016^[3]). It classifies countries into four categories based on demographic characteristics and future development potential. Two main parameters are used to classify countries:

- The projected growth of the share of the working-age population over the period 2024-39. In the original typology of Ahmed et al. (2016^[3]), the period of reference is 2015-30.
- The total fertility rate in 1994 (i.e. 30 years¹⁵ before the reference year of 2024, reflecting the approximate length of time that defines a “generation”) and in 2024. In the original typology of Ahmed et al. (2016^[3]), these reference years are 1985 and 2015, respectively.

Annex Figure 3.A.1 describes the use of these two parameters to classify countries into the four demographic groups labelled pre-dividend, early-dividend, late-dividend and post-dividend countries.

Annex Figure 3.A.1. Parameters and methodology used to build the demographic typology of countries



Source: Adapted from Ahmed et al. (2016^[3]).

Based on this updated typology, KIIbIH countries were classified into four groups. This classification can help identify policy priorities and opportunities for countries at different stages of the demographic transition and its associated dividend.

- **Pre-dividend countries:** In a first group of countries, all located in Africa, the potential window for the first demographic dividend¹⁶ – i.e. the automatic increase in the share of working-age individuals relative to the share of dependents induced by the decline of fertility rates – will occur in the future (Annex Table 3.A.1). In these pre-dividend countries, the proportion of the working-age population is expected to grow until 2039. However, current fertility rates – at four or more births per woman – indicate that these countries are still in the midst of the demographic transition

and have not yet experienced the decline in child dependency that typically accompanies the first demographic dividend.

- **Early-dividend countries:** In a second group of countries, spanning Africa, Asia and Latin America and the Caribbean, the potential window for the first demographic dividend is ongoing or occurred recently. In early-dividend countries, working-age population shares are expected to grow between 2024 and 2039. However, current fertility rates – below four births per woman – imply that these countries have been progressing through the demographic transition model and will experience rapid reductions in the population share of its youth.
- **Late-dividend countries:** In a third group of countries, potential for the first demographic dividend is currently passing. In these late-dividend countries, working-age population shares are expected to contract between 2024 and 2039. With fertility rates from 1994 (or 30 years ago, reflecting the approximate length of time that defines a “generation”) being at or above replacement levels (2.1 births per woman), it implies that these countries are entering the final phase of the demographic transition and are still able to reap the first demographic dividend.
- **Post-dividend countries:** In the fourth group of countries, potential for the first demographic dividend has already faded. In these post-dividend countries, working-age population shares are expected to contract between 2024 and 2039. Fertility rates in 1994 were already below replacement levels, indicating that these countries are furthest along in their demographic transition and the window to exploit the first demographic dividend has closed. Most of these countries are already or close to becoming superaged societies, with those aged above 65 years accounting for at least 21% of the population.

Annex Table 3.A.1. Demographic typology of KIIbIH countries and main characteristics

ISO	Country	Demographic group	Region	Income level	Growth of working-age over 2024-39 (% points)	Total fertility rate in 1994	Total fertility rate in 2024
ALB	Albania	Late-dividend	Europe	Upper-middle	-3.6	2.8	1.3
ARG	Argentina	Early-dividend	Americas	Upper-middle	2.1	2.9	1.5
ARM	Armenia	Post-dividend	Asia	Upper-middle	-2.1	2.1	1.7
BEN	Benin	Pre-dividend	Africa	Lower-middle	4.6	6.4	4.5
BFA	Burkina Faso	Pre-dividend	Africa	Low	7.0	6.8	4.1
BGR	Bulgaria	Post-dividend	Europe	High	-2.7	1.4	1.7
BHS	Bahamas	Late-dividend	Americas	High	-3.7	2.5	1.4
BOL	Bolivia	Early-dividend	Americas	Lower-middle	2.3	4.5	2.5
BRA	Brazil	Late-dividend	Americas	Upper-middle	-2.5	2.6	1.6
BRB	Barbados	Post-dividend	Americas	High	-4.5	1.7	1.7
CHL	Chile	Late-dividend	Americas	High	-2.6	2.4	1.1
CHN	China (People's Republic of)	Post-dividend	Asia	Upper-middle	-4.7	1.6	1.0
CMR	Cameroon	Pre-dividend	Africa	Lower-middle	4.5	6.0	4.3
COL	Colombia	Late-dividend	Americas	Upper-middle	-2.7	2.9	1.6
CRI	Costa Rica	Late-dividend	Americas	Upper-middle	-2.2	2.9	1.3
CYP	Cyprus	Late-dividend	Asia	High	-2.8	2.2	1.4
DOM	Dominican Republic	Early-dividend	Americas	Upper-middle	0.8	3.2	2.2
ETH	Ethiopia	Early-dividend	Africa	Low	3.9	7.1	3.9
GHA	Ghana	Early-dividend	Africa	Lower-middle	3.2	5.3	3.3
GMB	Gambia	Early-dividend	Africa	Low	6.3	6.0	3.9
GTM	Guatemala	Early-dividend	Americas	Upper-middle	4.8	5.2	2.3
HND	Honduras	Early-dividend	Americas	Lower-middle	2.7	4.9	2.5

ISO	Country	Demographic group	Region	Income level	Growth of working-age over 2024-39 (% points)	Total fertility rate in 1994	Total fertility rate in 2024
HRV	Croatia	Post-dividend	Europe	High	-3.2	1.5	1.5
IDN	Indonesia	Late-dividend	Asia	Lower-middle	-0.6	2.9	2.1
IND	India	Early-dividend	Asia	Lower-middle	0.7	3.7	2.0
JAM	Jamaica	Late-dividend	Americas	Upper-middle	-1.7	2.9	1.4
KEN	Kenya	Early-dividend	Africa	Lower-middle	3.6	5.4	3.2
KHM	Cambodia	Early-dividend	Asia	Lower-middle	2.3	5.3	2.5
LAO	Lao People's Democratic Republic	Early-dividend	Asia	Lower-middle	3.3	5.6	2.4
LBR	Liberia	Early-dividend	Africa	Low	5.0	6.2	3.9
MDG	Madagascar	Early-dividend	Africa	Low	3.6	6.0	3.9
MDV	Maldives	Early-dividend	Asia	Upper-middle	0.3	4.7	1.6
MEX	Mexico	Late-dividend	Americas	Upper-middle	0.0	3.1	1.9
MLI	Mali	Pre-dividend	Africa	Low	4.8	7.1	5.5
MLT	Malta	Post-dividend	Europe	High	-1.6	1.8	1.1
MMR	Myanmar	Early-dividend	Asia	Lower-middle	0.0	3.2	2.1
MNG	Mongolia	Early-dividend	Asia	Lower-middle	4.8	2.8	2.6
MWI	Malawi	Early-dividend	Africa	Low	5.5	6.5	3.6
NAM	Namibia	Early-dividend	Africa	Upper-middle	5.4	4.7	3.2
NER	Niger	Pre-dividend	Africa	Low	5.9	7.8	5.9
NGA	Nigeria	Pre-dividend	Africa	Lower-middle	5.6	6.3	4.4
NIC	Nicaragua	Early-dividend	Americas	Lower-middle	2.2	3.9	2.2
PER	Peru	Late-dividend	Americas	Upper-middle	-0.2	3.4	2.0
PRY	Paraguay	Early-dividend	Americas	Upper-middle	1.8	4.2	2.4
ROU	Romania	Post-dividend	Europe	High	-3.0	1.4	1.7
RWA	Rwanda	Early-dividend	Africa	Low	4.3	6.4	3.6
SEN	Senegal	Early-dividend	Africa	Lower-middle	3.8	5.9	3.8
SLE	Sierra Leone	Early-dividend	Africa	Low	5.1	6.6	3.7
SLV	El Salvador	Early-dividend	Americas	Upper-middle	1.6	3.6	1.8
SUR	Suriname	Late-dividend	Americas	Upper-middle	-1.1	2.9	2.2
TGO	Togo	Pre-dividend	Africa	Low	3.3	5.7	4.1
THA	Thailand	Post-dividend	Asia	Upper-middle	-6.8	1.9	1.2
TZA	Tanzania	Pre-dividend	Africa	Lower-middle	4.0	5.9	4.5
UGA	Uganda	Pre-dividend	Africa	Low	6.4	6.9	4.2
URY	Uruguay	Late-dividend	Americas	High	-0.1	2.4	1.4
VNM	Viet Nam	Late-dividend	Asia	Lower-middle	-0.8	2.9	1.9
ZAF	South Africa	Early-dividend	Africa	Upper-middle	0.6	3.3	2.2
ZMB	Zambia	Pre-dividend	Africa	Lower-middle	4.4	6.3	4.0

Note: Income levels refer to the income classification developed by the World Bank. Regional classification of countries follows the geographical grouping of the United Nations' M49 standard.

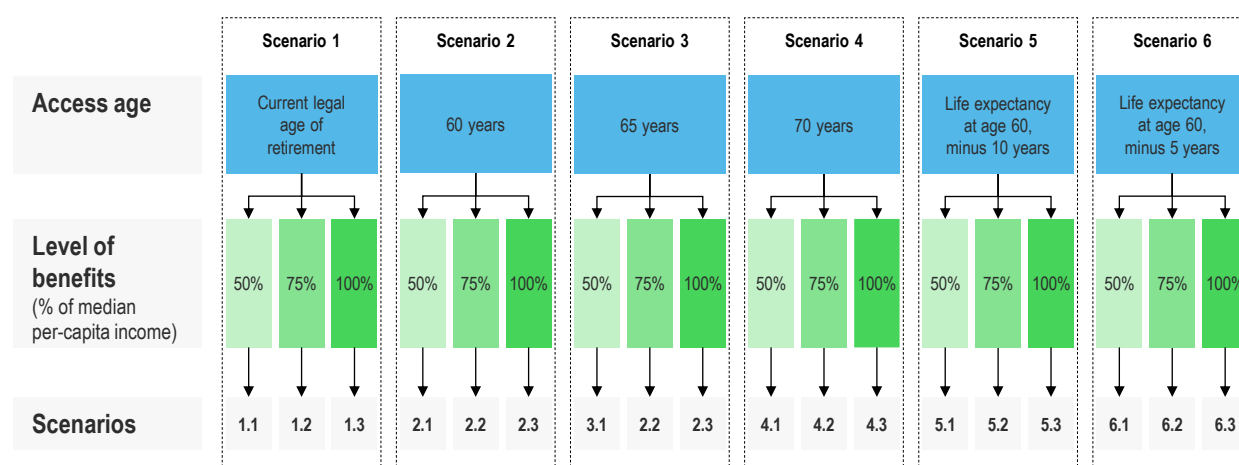
Source: Adapted from Ahmed et al. (2016^[3]).

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Annex 3.B. Estimating the cost of non-contributory pensions

Estimates of the fiscal cost of an age-based universal benefit, or universal non-contributory pension, without any means-test nor pensions-test, rely on two main parameters: the access age (i.e. the age at which an individual becomes eligible to receive non-contributory benefits) and the level of benefits.

Annex Figure 3.B.1. Scenarios and parameters to estimate the cost of universal non-contributory pensions



Source: Authors' own elaboration.

Estimates were produced for six different access age scenarios (Annex Figure 3.B.1).

- In **Scenario 1** (or the baseline scenario), the access age is set at the current legal age of retirement. Depending on the country, this age can differ for men and women.
- In **Scenarios 2, 3 and 4**, the access age is defined as an absolute age limit.
- In **Scenarios 5 and 6**, the access age is defined relative to life expectancy at age 60. Some studies argue in favour of using alternative measures such as healthy life expectancy. However, these measures can be complex to compute and often rely on a set of underlying indicators the quality of which can be questioned, notably in countries with limited statistical capacities. In this regard, OECD (2023^[47]) notes that “available indicators of healthy life expectancy are not suited to determine how retirement ages should evolve. [...] Using the WHO measure for automatic links in pension policies would thus entail a complex procedure requiring more data and entailing a higher risk of errors than using remaining life expectancy, for little gain.” For this reason, the simulation exercise favours the use of life expectancy over healthy life expectancy.

For each access age scenario, the level of benefit was simulated at 50%, 75% and 100% of the median per-capita income, computed as the household total income divided by the number of household members. For countries in which welfare data stem from consumption or expenditure data, these were used as proxy for income and computed as the household total consumption or expenditure divided by the number of household members.

The combination of age and benefit cases results in a total of 18 distinct scenarios (Annex Figure 3.B.1).

Cost estimates, in monetary values, were then expressed as a share of GDP, using GDP data from the IMF's 2025 World Economic Outlook (IMF, 2025^[58]). Annex Table 3.B.1 presents the country-level cost estimates expressed as a share of GDP obtained for the different scenarios.

Annex Table 3.B.1. Country-level cost estimates of universal non-contributory pensions

Share of GDP (%)

Access age		Current legal age of retirement			60 years			65 years			70 years			Life expectancy at age 60, minus 10 years			Life expectancy at age 60, minus 5 years		
Level of benefits (% of median per-capita income)		50%	75%	100%	50%	75%	100%	50%	75%	100%	50%	75%	100%	50%	75%	100%	50%	75%	100%
ISO	Country	1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3	5.1	5.2	5.3	6.1	6.2	6.3
ALB	Albania	1.5	2.3	3.1	1.8	2.7	3.7	1.3	1.9	2.5	0.8	1.3	1.7	0.7	1.1	1.5	0.4	0.6	0.8
ARG	Argentina	0.9	1.3	1.8	1.0	1.5	2.1	0.8	1.1	1.5	0.5	0.8	1.0	0.5	0.8	1.0	0.3	0.5	0.6
ARM	Armenia	2.2	3.3	4.4	2.7	4.0	5.4	1.9	2.8	3.8	1.2	1.8	2.3	1.4	2.1	2.8	0.8	1.3	1.7
BEN	Benin	1.1	1.7	2.3	1.1	1.7	2.3	0.7	1.0	1.4	0.4	0.7	0.9	0.6	0.9	1.1	0.3	0.5	0.7
BFA	Burkina Faso	1.6	2.4	3.1	1.6	2.4	3.1	1.0	1.5	2.1	0.7	1.0	1.4	0.9	1.4	1.9	0.6	0.9	1.2
BGR	Bulgaria	2.1	3.2	4.2	2.4	3.6	4.8	1.9	2.8	3.7	1.3	1.9	2.6	1.6	2.4	3.3	1.1	1.6	2.2
BHS	Bahamas	1.2	1.9	2.5	1.8	2.7	3.6	1.2	1.9	2.5	0.8	1.2	1.6	0.9	1.3	1.8	0.5	0.8	1.1
BOL	Bolivia	3.5	5.3	7.0	3.1	4.7	6.2	2.1	3.2	4.2	1.4	2.0	2.7	2.3	3.4	4.6	1.5	2.2	3.0
BRA	Brazil	1.7	2.5	3.4	2.1	3.2	4.3	1.5	2.2	3.0	1.0	1.5	1.9	1.0	1.5	1.9	0.6	0.9	1.2
BRB	Barbados	1.6	2.3	3.1	2.3	3.5	4.7	1.7	2.6	3.4	1.1	1.7	2.2	0.9	1.4	1.9	0.6	0.9	1.2
CHL	Chile	2.7	4.1	5.5	3.2	4.7	6.3	2.3	3.4	4.5	1.5	2.2	3.0	1.1	1.7	2.2	0.7	1.0	1.3
CHN	China	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CMR	Cameroon	1.3	1.9	2.6	1.3	1.9	2.6	0.9	1.3	1.7	0.6	0.8	1.1	0.7	1.1	1.5	0.4	0.6	0.8
COL	Colombia	1.7	2.6	3.4	1.6	2.4	3.3	1.1	1.7	2.3	0.7	1.1	1.5	0.7	1.1	1.5	0.4	0.7	0.9
CRI	Costa Rica	3.1	4.6	6.1	3.2	4.9	6.5	2.2	3.4	4.5	1.5	2.2	2.9	1.0	1.5	1.9	0.5	0.8	1.1
CYP	Cyprus	2.9	4.3	5.7	3.9	5.8	7.8	2.9	4.3	5.7	2.0	3.0	4.0	1.5	2.3	3.1	0.8	1.2	1.6
DOM	Dominican Republic	1.4	2.1	2.7	1.4	2.1	2.7	0.9	1.4	1.9	0.6	1.0	1.3	0.6	1.0	1.3	0.4	0.6	0.9
ETH	Ethiopia	1.0	1.5	2.0	1.0	1.5	2.0	0.6	1.0	1.3	0.4	0.6	0.9	0.5	0.7	1.0	0.3	0.4	0.5
GHA	Ghana	1.2	1.8	2.4	1.2	1.8	2.4	0.8	1.2	1.7	0.6	0.9	1.2	0.7	1.0	1.4	0.5	0.7	0.9
GMB	Gambia	1.4	2.2	2.9	1.4	2.2	2.9	0.9	1.4	1.9	0.6	0.8	1.1	0.7	1.0	1.4	0.4	0.6	0.8
GTM	Guatemala	1.4	2.0	2.7	1.4	2.0	2.7	0.9	1.4	1.9	0.6	0.9	1.2	0.8	1.2	1.6	0.5	0.8	1.0
HND	Honduras	2.0	3.0	4.0	2.0	3.0	4.0	1.4	2.1	2.7	0.9	1.4	1.8	1.2	1.7	2.3	0.8	1.1	1.5
HRV	Croatia	3.6	5.3	7.1	4.4	6.7	8.9	3.3	5.0	6.7	2.3	3.4	4.5	2.0	3.1	4.1	1.2	1.8	2.5
IDN	Indonesia	0.4	0.6	0.8	0.3	0.5	0.6	0.2	0.3	0.4	0.1	0.2	0.2	0.2	0.3	0.3	0.1	0.2	0.2
IND	India	1.2	1.8	2.4	1.1	1.7	2.2	0.7	1.1	1.5	0.4	0.7	0.9	0.6	0.9	1.2	0.3	0.5	0.7
JAM	Jamaica	2.2	3.2	4.3	3.1	4.6	6.2	2.2	3.2	4.3	1.5	2.3	3.1	1.9	2.8	3.8	1.3	1.9	2.6
KEN	Kenya	0.8	1.2	1.6	0.8	1.2	1.6	0.6	0.8	1.1	0.4	0.5	0.7	0.6	0.8	1.1	0.4	0.5	0.7
KHM	Cambodia	2.6	3.9	5.2	2.6	3.9	5.2	1.7	2.6	3.4	1.0	1.5	2.1	1.1	1.7	2.3	0.6	1.0	1.3
LAO	Lao PDR	2.2	3.4	4.5	1.8	2.7	3.6	1.2	1.8	2.3	0.8	1.1	1.5	1.0	1.5	2.0	0.6	0.9	1.2
MDG	Madagascar	0.5	0.7	1.0	0.5	0.7	1.0	0.3	0.4	0.6	0.2	0.3	0.4	0.2	0.3	0.5	0.1	0.2	0.3
MDV	Maldives	0.8	1.2	1.5	1.2	1.8	2.4	0.8	1.2	1.5	0.5	0.7	0.9	0.4	0.6	0.8	0.3	0.4	0.5
MEX	Mexico	1.1	1.7	2.2	1.6	2.4	3.2	1.1	1.7	2.2	0.7	1.1	1.4	0.8	1.3	1.7	0.5	0.8	1.1
MLI	Mali	2.0	3.0	4.0	2.0	3.0	4.0	1.3	2.0	2.6	0.8	1.2	1.6	1.2	1.8	2.4	0.7	1.1	1.4
MLT	Malta	2.4	3.7	4.9	3.4	5.1	6.8	2.4	3.7	4.9	1.5	2.3	3.1	0.7	1.1	1.4	0.0	0.0	0.0
MMR	Myanmar	2.1	3.1	4.1	2.1	3.1	4.1	1.3	2.0	2.7	0.9	1.3	1.8	1.1	1.7	2.2	0.7	1.1	1.4
MNG	Mongolia	1.5	2.3	3.1	1.2	1.8	2.4	0.7	1.1	1.4	0.4	0.6	0.8	0.6	0.8	1.1	0.3	0.5	0.7

Access age		Current legal age of retirement			60 years			65 years			70 years			Life expectancy at age 60, minus 10 years			Life expectancy at age 60, minus 5 years		
Level of benefits (% of median per-capita income)		50%	75%	100%	50%	75%	100%	50%	75%	100%	50%	75%	100%	50%	75%	100%	50%	75%	100%
ISO	Country	1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3	5.1	5.2	5.3	6.1	6.2	6.3
MWI	Malawi	1.9	2.8	3.7	1.0	1.6	2.1	0.8	1.2	1.6	0.5	0.8	1.1	0.7	1.0	1.4	0.4	0.6	0.8
NAM	Namibia	0.6	1.0	1.3	0.6	1.0	1.3	0.5	0.7	0.9	0.3	0.5	0.6	0.5	0.7	0.9	0.3	0.5	0.6
NER	Niger	1.4	2.1	2.8	1.4	2.1	2.8	0.9	1.3	1.7	0.5	0.8	1.1	0.7	1.1	1.4	0.4	0.6	0.8
NGA	Nigeria	0.3	0.5	0.7	0.3	0.5	0.7	0.2	0.3	0.5	0.1	0.2	0.3	0.2	0.3	0.4	0.1	0.2	0.2
NIC	Nicaragua	2.0	3.0	4.0	2.0	3.0	4.0	1.4	2.1	2.8	1.0	1.5	1.9	1.1	1.7	2.3	0.7	1.1	1.4
PER	Peru	1.2	1.8	2.3	1.7	2.6	3.4	1.2	1.8	2.3	0.7	1.1	1.5	0.8	1.2	1.6	0.5	0.7	1.0
PRY	Paraguay	2.0	3.0	3.9	2.0	3.0	3.9	1.3	2.0	2.7	0.8	1.3	1.7	1.2	1.8	2.4	0.8	1.1	1.5
ROU	Romania	2.6	3.9	5.2	3.1	4.6	6.1	2.4	3.6	4.8	1.6	2.5	3.3	1.9	2.9	3.9	1.2	1.8	2.4
RWA	Rwanda	1.0	1.5	2.0	1.0	1.5	2.0	0.7	1.0	1.3	0.4	0.6	0.8	0.5	0.8	1.1	0.3	0.5	0.7
SEN	Senegal	1.9	2.8	3.7	1.9	2.8	3.7	1.2	1.8	2.4	0.8	1.1	1.5	1.0	1.5	2.0	0.6	0.9	1.1
SLE	Sierra Leone	1.3	2.0	2.6	1.3	2.0	2.6	0.9	1.3	1.8	0.6	0.9	1.1	0.8	1.1	1.5	0.5	0.7	0.9
SLV	El Salvador	3.4	5.0	6.7	2.8	4.3	5.7	2.0	3.1	4.1	1.4	2.1	2.9	1.5	2.3	3.0	1.0	1.5	2.0
SUR	Suriname	2.1	3.2	4.2	2.1	3.2	4.2	1.3	1.9	2.6	0.8	1.2	1.6	1.1	1.6	2.1	0.6	1.0	1.3
TGO	Togo	1.9	2.8	3.8	1.9	2.8	3.8	1.2	1.8	2.4	0.8	1.2	1.6	1.1	1.6	2.1	0.7	1.0	1.4
THA	Thailand	2.5	3.7	4.9	2.5	3.7	4.9	1.7	2.5	3.3	1.0	1.6	2.1	0.7	1.1	1.4	0.4	0.6	0.7
TZA	Tanzania	0.6	0.9	1.1	0.6	0.9	1.1	0.4	0.6	0.8	0.3	0.4	0.5	0.3	0.5	0.7	0.2	0.3	0.4
UGA	Uganda	0.6	0.9	1.2	0.6	0.9	1.2	0.4	0.6	0.8	0.2	0.4	0.5	0.3	0.4	0.5	0.2	0.3	0.3
URY	Uruguay	4.2	6.3	8.3	4.2	6.3	8.3	3.1	4.6	6.1	2.1	3.2	4.2	2.0	2.9	3.9	1.2	1.8	2.4
VNM	Viet Nam	4.0	6.0	8.0	3.2	4.8	6.4	2.1	3.2	4.3	1.4	2.1	2.9	1.2	1.8	2.5	0.8	1.2	1.6
ZAF	South Africa	0.6	0.9	1.2	0.6	0.9	1.2	0.4	0.6	0.8	0.2	0.4	0.5	0.4	0.6	0.8	0.2	0.4	0.5
ZMB	Zambia	0.5	0.7	1.0	0.3	0.5	0.7	0.2	0.4	0.5	0.1	0.2	0.3	0.2	0.4	0.5	0.1	0.2	0.3

Source: Authors' simulations based on OECD (2026^[4]), IMF (2025^[58]) and United Nations (2021^[43]).

StatLink  <https://stat.link/kxqef2>

Notes

¹ “Ageing society” refers to countries in which the share of individuals aged above 65 years accounts for 7% to 14% of the total population. “Aged society” refers to countries in which this group accounts for 15% to 20% of the total population. “Superaged society” refers to countries in which this group accounts for more than 21% of the total population (OECD/WHO, 2022^[66]).

² Argentina, the Bahamas, Bolivia, Brazil, Chile, Mexico and Suriname.

³ For both overall and contributory pension coverage gaps, the same patterns are found when using deciles of household welfare instead of quintiles. Larger overall pension coverage and contributory pension coverage are found among elderly people who belong to the richest deciles of the household welfare distribution.

⁴ KILBIH data rely on the harmonisation of data collected by national statistical offices through household surveys. Data and rates may differ from other official sources such as the ILO, which usually rely on

administrative records (e.g. the Social Security Inquiry questionnaire to monitor SDG Target 1.3, i.e. the proportion of persons effectively covered by a social protection system, including social protection floors). See also Box 3.1.

⁵ In China, the share of current contributors is computed by aggregating contributions to various pension schemes of diverse natures. While most are purely contributory schemes, some important schemes in terms of size and coverage (e.g. the New Rural Pension Insurance scheme) consist of a membership fee that opens eligibility rights for a basic social pension funded via general revenue. Despite having an element akin to a contribution (fee), this is not a traditional contributory scheme whereby benefits are tied to employment as well as the level and density of contributions. Rather it consists of the acquisition of future rights to benefit from a non-contributory pension.

⁶ Bulgaria, China, Costa Rica, Croatia, Cyprus, Malta, Mongolia and Peru.

⁷ For China, the large share of informal workers contributing to pension schemes stems from the fact that the country integrates informal workers who contribute to schemes whereby the worker pays a membership fee that opens eligibility rights for a basic social pension, funded via general revenue. This is not a traditional contributory scheme; rather, it consists of the acquisition of future rights to benefit from a non-contributory pension.

⁸ Earnings categories classify workers based on their labour earnings into three categories, defined relative to median earnings: low wage quality groups individuals ranging from the bottom of the earnings distribution to 50% of median earnings; medium wage quality groups individuals ranging from 50% to 150% of median earnings; and high wage quality groups individuals above 150% of median earnings.

⁹ Notionally defined contribution (NDC) schemes are “pay-as-you-go” schemes with individual accounts that apply a notional rate of return to contributions made (mimicking DC plans). The accounts are “notional” in that the balances exist only on the books of the managing institution. At retirement, the accumulated notional capital is converted into a monthly pension using a formula based on life expectancy and other actuarial factors (OECD, 2019^[67]).

¹⁰ Annuity markets are financial vehicles that convert accumulated retirement savings into an income stream appropriate to protect against these risks. For instance, it can consist in annuities that are purchased at retirement, converting a lump sum into a lifetime income stream (Rusconi, 2008^[26]).

¹¹ Vesting rules are the conditions that determine when pension rights become permanent for a contributor and can no longer be forfeited. They specify how long an individual must participate in the scheme before becoming entitled to employer-financed pension benefits. Two common types of vesting are: cliff vesting, where full entitlement is acquired at a specific point in time, or gradual (graded) vesting, where entitlement builds up progressively over several years of participation.

¹² Depending on data availability, median per-capita consumption was used to proxy income in certain countries.

¹³ Burkina Faso, Cambodia, Cameroon, Ghana, Guatemala, Kenya, Lao PDR, Madagascar, Malawi, Mali, Namibia, Niger, Nigeria, Paraguay, Rwanda, Senegal, Sierra Leone, Togo, Uganda and Zambia.

¹⁴ A personalised VAT is a proposed mechanism designed to address the so called “impossible trinity of consumption taxes”. It includes a broad base, a single rate and targeted relief for those most in need. In

practice, this approach combines three elements: i) universal application, implying a general tax base; ii) a single VAT rate achieved by eliminating exemptions and reduced rates for specific goods; and iii) targeted transfers to the poorest population deciles, in the form of self-financed tax refunds, to offset the resulting increase in tax burden. See Barreix et al. (2022^[70]) for further details.

¹⁵ Thirty years describes the approximate length of time that defines a “generation” – from the birth of a parent to the birth of their child – although the exact span may vary by country and across time.

¹⁶ The first demographic dividend refers to the dividend mechanically induced by a decline in fertility that leads to a substantial and sustained, but ultimately transitory, increase in the share of working-age individuals relative to dependents, and a growth of output per capita. Although more complex to estimate, the second demographic dividend refers to the potential increase in saving rates and accumulation of human and physical capital as the population ages and life expectancy increases, which can further stimulate output per capita on a permanent or self-sustaining basis (Lee and Mason, 2006^[68]; Mason, 2005^[69]).

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4 Automation and the employment prospects of informal workers

Technological change both modifies the world of work and impacts the lives of billions of workers throughout the world. Growing evidence from developed countries suggests that the advance of automation technologies, both traditional and those related to artificial intelligence (AI), will cause many jobs to become automated and disappear. Other jobs will be modified in their task composition, while new jobs and occupations will emerge. It remains to be seen how such trends will affect workers, particularly in developing countries in which informal work is the norm. Drawing on microdata from the *Key Indicators of Informality based on Individuals and their Household* (KIIBIH) and estimates from the literature, this chapter assesses the potential impacts of traditional and AI automation on informal employment across a large sample of developing countries. The chapter starts by exploring the impacts of technological change on the world of work from a global perspective. It then examines the risk of automation for jobs held by informal and formal workers in developing countries and identifies the socio-economic groups that face higher risks. The chapter concludes by proposing policy options to mitigate the adverse effects of automation on workers and their families while strengthening some of its benefits.

In brief

Automation and informal workers employment prospects: Evidence and policies

- Automation is shaping the future of work by disrupting and changing job tasks, labour productivity, employment patterns, job availability and the skill sets required for workers in developing countries.
- Robots are displacing industrial workers in routine manual task occupations (e.g. assembly line operators) while new technologies, such as generative AI, are increasingly transforming jobs in non-routine cognitive tasks (e.g. interpreters). AI-empowered robots could also impact workers in non-routine manual occupations.
- The opportunities and challenges for workers to adapt to technological change, use both industrial robots and AI, and update their skill sets for new forms of production differ significantly in formal and informal economies.
- Informal workers, compared with formal workers, typically hold jobs that are much more exposed to high risks of replaceability by traditional automation, as they are extensively engaged in jobs with manual routine and non-routine tasks. Informal, young and older workers living in rural areas, with low or middle earnings, are the most vulnerable.
- Formal workers face higher risks of AI automation as generative AI tends to automate information processing and codifiable cognitive tasks that are more prevalent within the content of formal jobs.
- Due to sector-specific technologies and production processes, the occupational structure of economies shapes the task content of jobs. This is the main channel for automation risks that affect formal and informal workers according to their respective positions in diverse industries. In fact, automation risks vary due to the different occupations demanded by firms.

Tackling diverse technological and economic shocks requires differentiated and targeted policies

- Policies should support skill development plans that enable workers to complement the tasks taken over by new technologies, coupled with measures that facilitate mobility across sectors and occupations. Foundational skills, such as literacy and numeracy as well as digital skills, problem-solving and interpersonal skills are critical for lifelong learning. As such, they should be at the heart of skills development strategies
- In anticipation of significant shocks linked to traditional automation and, to a lesser extent, AI automation, social protection systems must integrate broad, scalable social protection floors. Such programmes need to be easily and quickly activated to protect all workers at risk, especially informal workers. Modalities for delivering social protection also need to acknowledge the limit of targeting mechanisms in contexts of high informality, in which means testing and other methods can produce substantial inclusion and exclusion errors.
- Several labour-intensive activities remain at relatively low risk of traditional and AI automation. Governments should aim to expand employment in those labour-intensive sectors while raising productivity through better skills, management and digital tools that augment¹ workers – rather than replacing them. Policies promoting innovation, entrepreneurship and job creation in such sectors can offset or mitigate the impacts of job losses in automated industries.

Introduction

Automation technologies such as industrial robots, machine learning and artificial intelligence (AI) are transforming the global economy at an unprecedented pace. Automation generally refers to the use of tools or technologies to perform tasks with minimal human intervention; usually, it aims to increase productivity, consistency and speed while reducing costs. As such, it is shaping the future of work by altering job tasks, labour productivity, employment patterns, job availability and the skill sets required for the workforce of tomorrow. As automation technologies continue to advance, several traditionally human-performed tasks may disappear while new tasks will certainly emerge. This could lead to job losses in certain sectors while simultaneously creating new job opportunities in others.

Understanding the impacts of automation on workers and jobs is essential for countries to navigate the changing labour landscape. Unless countries proactively respond and adapt to the unprecedented acceleration in technological advancement and implementation, opportunities may be lost. In turn, many workers may find themselves unprepared for the consequences. This is particularly true for emerging market and developing economies (EMDEs), where informal employment dominates.

Research increasingly shows that automation technologies affect employment in many complex ways. Technological change brings risks and opportunities for workers, many of which vary across different types of automation technologies, skill levels and time horizons. Often left out of the discussion, however, is how automation impacts the vast majority of workers who operate in the informal economy. To date, assessing the implications of automation technologies for informal workers in developing countries has proven challenging, particularly because harmonised employment and occupation data for informal workers across countries are lacking and research on informal workers remains scarce. This gap is important for at least two reasons. First, the penetration of automation technologies is expected to grow rapidly over the next decades, especially in developing countries in which economic structures and labour markets often depend on low-skill and routine work. Second, the opportunities and challenges for workers to adapt to technological change, use industrial robots and AI, and update their skill sets for new forms of production differ significantly in the formal and informal economies.

This chapter aims to fill this knowledge gap by exploring the impacts of automation technologies on informal economy workers in developing countries. Using the OECD Development Centre's *Key Indicators of Informality based on Individuals and their Household* (KIbIH) database, the chapter probes the following key questions: How may technological change affect informal work in developing countries? What are the employment prospects for formal and informal workers? How exposed and at risk are their jobs? Which population groups and economic sectors are most affected? How can policies mitigate the adverse effects of automation and maximise some of its benefits?

To investigate these questions, the chapter is structured as follows. The first section examines the impacts of automation technologies from a global perspective. The second section assesses the impacts of automation technologies on jobs, based on the risks of occupations to be technically replaceable, with a special focus on informal economy workers. It also identifies the groups of workers more exposed to traditional and AI automation and investigates the welfare implications for households, performing sensitivity analysis to test the robustness of the findings. Finally, the chapter concludes by summarising the main findings and discussing policy implications.

A global perspective on automation technologies and their impacts on employment

In recent decades, the world has been transformed by a rapid expansion of automation technologies. Since 2000, robot adoption has been rapid. In parallel, the share of mobile phone and internet users globally has

increased tremendously. More recently, the spread of AI has been impressive, especially in the most advanced countries. These technologies are affecting both labour markets and the nature of work by making certain occupations obsolete, creating new ones, and changing the task composition of jobs and their skills requirements. Automation technologies also lead to new forms of work and employment, as evidenced by the emergence of platform work.

In practice, automation involves replacing human labour with technology for specific tasks, ranging from mechanised equipment in factories to software that performs office processes (Acemoglu, 2021^[1]). In recent years, the employment impacts of these technologies have been widely analysed, especially in the context of advanced countries. Research findings suggest that the links between automation and employment are complex and largely depend on how such impacts are measured, the type of automation technologies being assessed, and the context in which these technologies operate (Filippi, Bannò and Trento, 2023^[2]; Acemoglu and Restrepo, 2020^[3]).

Different ways to measure the impacts of automation technologies on employment

To measure the impacts of automation technologies on employment, different approaches are usually adopted, with four complementary strands of the literature that build on one another. First are studies that develop measures of technical exposure at the occupation or task level, thereby identifying which tasks or occupations are potentially affected by automation. Second are studies that use these exposure measures to classify occupations into exposure categories and link them to labour force, household or administrative data. These findings can be used to estimate which workers, sectors, demographic groups and countries are most exposed. Third are studies that examine the actual adoption and use of automation technologies in workplaces, documenting how they are implemented across firms as well as which industries and occupations are impacted. Finally, an emerging body of research seeks to estimate the economy-wide effects of automation by analysing how exposure translates into realised outcomes via five interlinked channels: technology adoption, organisational change, productivity effects, labour reallocation and general equilibrium adjustments.

Occupations and tasks that are most exposed are used as the basis to derive a probability that a job is likely to be automated

When assessing the probability of automation, two approaches can be applied. The occupation-based approach identifies entire occupations that can be automated. The task-based approach investigates which specific tasks within an occupation can be automated. The risk of automation is then obtained by measuring a job's probability of being automated based on the specific content of its tasks or occupation. Compared with the occupation-based approach, task-based measures offer finer granularity and recognise that workers in the same occupation may perform very different mixes of tasks. This helps provide a more detailed picture of which jobs – and which aspects of those jobs – are most exposed to technological change.

Analysis of automation risk began with a landmark study by Frey and Osborne (2017^[4]) that considers a sample of occupations. Using expert evaluations on a sample of jobs in the United States (US), the authors classified occupations based on their likelihood of being automated “by means of computer-controlled equipment”. They then extended the expert judgments to the overall distribution of US occupations. Their headline finding was striking: 47% of US jobs were at high risk of automation (defined as a probability above 70%) over an unspecified timeframe, possibly one to two decades. This estimate triggered widespread concern and inspired similar studies across other countries, often reporting comparably high figures.

Subsequent research refined this approach by emphasising that job automation risk depends not only on occupations but on the specific tasks workers perform. For example, a retail salesperson carries out many

tasks (e.g. operating a cash register or restocking inventory) that might be automated, while other tasks (e.g. engaging with customers) may not be. The task-level approach makes it possible to distinguish occupations that can be fully automated from those more likely to experience partial automation of certain activities. Such research has significantly advanced the understanding of how technological change affects employment and wages (Quintini, 2024^[5]).

This task-level approach, first introduced by Autor, Levy and Murnane (2003^[6]), assesses the task-content of occupations across two dimensions: routine vs. non-routine and cognitive vs non-cognitive. In recent decades, literature on how automation affects employment has focused on the task-content of occupations, characterising tasks carried out in occupations according to whether or not they are automatable. Arntz, Gregory and Zierahn (2016^[7]) combined Frey and Osborne's expert assessments with data from the OECD's Survey of Adult Skills (PIAAC), which provides detailed information on tasks carried out at work. Their findings – that only 9% of jobs in the United States were deemed at high risk of automation – were far less alarming than Frey and Osborne (2017^[4]). Nedelkoska and Quintini (2018^[8]) extended this task-based approach to 32 OECD countries, estimating that 14% of jobs faced high risk, while 32% were likely to undergo significant changes in task composition. These results underscore the importance of accounting for task variation within occupations, which can dramatically alter risk estimates compared with occupation-level analyses.

Other studies explore alternative ways to measure automation potential. Mihaylov and Tijdens (2019^[9]) examined 3 264 occupation-specific tasks to assess “routine task intensity” across 427 occupations listed in the International Standard Classification of Occupations 2008 (ISCO-08). They concluded that 16% of occupations were highly automatable, as most of their tasks were routine in nature. This task-based perspective highlights that automation risk is not uniform across jobs and depends heavily on the nature of work performed.

Beyond the impacts of past technology adoption on the probability of automation, another main concern is the potential impacts of current and future technological developments. Rapid advances in AI, robotics and digital technologies have renewed concerns that an increasing range of tasks may now be automated. These developments have motivated efforts to identify and apply indicators that capture occupational tasks' exposure to automation as a means to measure the extent of possible labour-market disruption.

High exposure can lead to automation; but it can also foster human-machine complementarity and productivity gains. Webb (2019^[10]) proposed a method to estimate exposure by comparing terms in AI patent titles with occupational task descriptions, using the degree of overlap to create an exposure score. Felten, Raj and Seamans (2021^[11]) adopted a different approach, mapping AI capabilities to job-related skills using expert input and O*NET data to assess how critical those skills are to each occupation. An OECD study by Lassébie and Quintini (2022^[12]) surveyed experts on the automatability of around 100 skills across technologies such as robotics and AI. Their findings suggest that while high-skilled jobs are often more exposed to AI, they are less likely to be fully automated. Similarly, low-skilled jobs rarely disappear entirely, although specific tasks within them may change substantially.

Recent developments in generative AI and large language models (LLMs) are expanding the technological frontier of automation. While previous technologies automated primarily routine tasks and did not lead to significant losses in labour demand, generative AI is substantively different (OECD, 2019^[13]). It is a machine-based system that can, for a given set of human-defined objectives, generate media objects, codes, make predictions, recommendations or decisions influencing real or virtual environments (OECD, 2019^[14]). The current technological frontier of generative AI is multimodal, tool-using and increasingly using agentic foundation models. Agentic models are advanced AI systems trained or fine-tuned to act autonomously, undertake multi-step plans, use external tools and execute complex workflows. Unlike traditional models that only respond to prompts, these agentic models reason, adapt to feedback and interact dynamically with software environments. Current systems can understand and generate text, code, images, audio and video. They can also operate over longer contexts and now show rapid performance

gains on advanced reasoning, programming and media-generation benchmarks (OECD, 2023^[15]; Maslej et al., 2025^[16]).

In practice, these models are used to draft, summarise, search and translate information. They power chatbots and virtual assistants, and can write and debug code. In turn, they are able to support customer operations, marketing and sales, and software engineering. They can efficiently carry out some elements of both research and development (R&D) and administrative work. The economic activities most exposed to related impacts are therefore knowledge- and information-intensive sectors, notably banking/finance, high-tech and information and communication technologies (ICTs), life sciences, retail and other business-service activities. OECD evidence also shows that, because generative AI performs many cognitive, non-routine tasks, exposure is especially high in urban, high-skilled regional economies (OECD, 2024^[17]). Previously, it was widely believed that humans had a comparative advantage over machines in these sorts of complex tasks. Generative AI may reverse this paradigm and render these tasks more prone to automation (Agrawal, Gans and Goldfarb, 2019^[18]). Nordhaus (2021^[19]) even suggests that AI may potentially “increase [its] productivity and breadth to the extent that human labour and intelligence will become superfluous.”

Recent contributions from international organisations have further refined understanding of AI-related labour market exposure. The International Labour Organization (ILO) introduced a granular, task-level index to measure exposure to generative AI across countries (Gmyrek et al., 2025^[20]). It finds that roughly one-quarter of global employment is in occupations with some degree of exposure, but only a small fraction – around 3% – falls into the highest exposure category in which most tasks could, theoretically, be automated. The ILO emphasises transformation, rather than displacement, as the dominant trend.

Similarly, the International Monetary Fund (IMF) examined exposure patterns in advanced and emerging economies using worker-level data (Pizzinelli et al., 2023^[21]; Cazzaniga et al., 2024^[22]). Distinguishing between AI acting as a complement versus a substitute for labour can significantly affect displacement risk. Advanced economies show higher exposure overall, largely due to their concentration of professional and managerial roles. At the same time, these roles often exhibit strong complementarity with AI, reducing the likelihood of job loss. The IMF also finds that women and highly educated workers tend to face greater exposure, but notes that exposure does not equate to unemployment risk. Rather, it signals potential for task transformation and productivity gains.

Net impacts of automation on employment are measured as the combination of displacement, productivity and reinstatement effects

Acemoglu and Restrepo (2018^[23]) suggest that the impacts of technology on employment can be organised in three effects: displacement, productivity and reinstatement. Automation may displace workers from performing certain tasks (displacement effect). Productivity gains resulting from new technologies may increase economic output and incomes, leading to more consumption and potentially for more demand for labour in non-automated tasks (productivity effect). Automation may also spur the development of new industries and new tasks (or more complex versions of existing tasks) in which labour has a comparative advantage (reinstatement effect).

As tasks are automated, workers can shift to more human-centred tasks. Typically, robots can do basic assembly while humans move into monitoring, co-ordination, creative design or complex problem-solving roles. This task extension can improve job quality, as workers spend more time on the higher-skilled and interpersonal or creative aspects of work that machines cannot do. This work can be more fulfilling and command higher wages. This transformation underlines that the opportunity of automation lies in human-machine collaboration – i.e. letting machines do what they do best (repetition, computation at scale, etc.) while humans focus on areas in which their strengths are complementary (creativity, empathy, complex judgement, etc.).

Technological change has profound and complex effects on employment

Historically, technological change has had profound and complex effects on employment. While it has consistently raised productivity and enabled long-term economic growth, it has also disrupted labour markets, displaced certain types of jobs, and reshaped the demand for skills. The nature of this impact has evolved over time and has varied significantly across countries, sectors and type of technology.

Automation may increase overall employment in the long run but causes disruption in the short term

Automation can dramatically increase productivity, thereby boosting economic output and improving employment outcomes. By taking over repetitive, time-consuming tasks, automation allows workers (and firms) to do more with less. Today, as many advanced countries face ageing populations and labour shortages in certain sectors, automation offers a way to maintain output and improve services even as labour force growth slows down (BIAC, 2025^[24]). Estimates suggest that widespread adoption of existing automation technologies could increase global labour productivity growth by around 0.8 to 1.4 percentage points per year (Manyika et al., 2017^[25]).

Estimates may, however, overstate the likely economic impacts as they often rely on simplified assumptions regarding technology adoption and productivity gains. According to Acemoglu (2025^[26]), combining the occupational exposure measures developed by Eloundou et al. (2024^[27]) with realistic assessments of task-level cost savings and the economic feasibility of AI implementation, as in Svanberg et al. (2024^[28]), yields considerably more modest projections. Under these assumptions, the diffusion of AI technologies is estimated to increase total factor productivity (TFP) by only about 0.71% over a ten-year period. When accounting for tasks that remain difficult to automate or augment, the expected gain falls to approximately 0.55% of TFP, translating into additional GDP growth of roughly 0.92% over the same time horizon (Acemoglu, 2025^[26]). In a more optimistic scenario, the OECD estimates that AI could add 0.4 to 1.3 percentage points annually to labour productivity growth in relatively exposed and adoption-ready economies such as the United States and United Kingdom. In other G7 countries, estimated gains are up to 50% lower because of their different sectoral structures and slower assumed adoption (Filippucci et al., 2025^[29]).

Acemoglu (2025^[26]) also emphasises that the long-term productivity effects of AI hinge on the nature of the new tasks and activities created alongside technological adoption. Not all emerging tasks are necessarily associated with substantial economic value creation; some may contribute little to productive capacity while others could generate socially undesirable outcomes or “public bads”. Consequently, measures of economic growth that capture only the monetary value of these activities may overestimate the extent to which AI contributes to genuine welfare improvements and sustainable productivity growth.

Arguably, automation has often served as an engine of economic growth (Acemoglu, 2021^[1]). Major technological transformations – such as the mechanisation of agriculture, the rise of industrial manufacturing and, more recently, the spread of digital technologies – have led to structural changes in employment (Apicella, 2025^[30]). While automation has eliminated some jobs, others have emerged in new sectors, often requiring different skills.

Fears of technological unemployment (i.e. that displaced workers cannot transition to new jobs) have been one of the most prominent anxieties related to technological progress (Mokyr, Vickers and Ziebarth, 2015^[31]). Evidence from past technological changes suggests that automation has not produced long-term unemployment overall, although it has caused short-term disruptions in the labour market as workers adapted (Autor, 2015^[32]). However, the economic literature has documented that labour-market adjustments in advanced economies have been shaped not only by automation but also by increased import competition. For example, using regional variation in exposure to Chinese imports, Acemoglu et al. (2016^[33]) show that import penetration from the People’s Republic of China (hereafter “China”) accounted

for a substantial share of US manufacturing employment losses during the 2000s and generated persistent negative effects on earnings and labour-force participation. Their findings complement the evidence of Acemoglu and Restrepo (2020^[3]), showing that industrial robots exert an independent negative effect on employment and wages, even after controlling for trade exposure. These findings suggest that globalisation and automation have jointly contributed to labour-market restructuring.

Overall, declining employment in some economic sectors concurred with employment expansion in others and, in the long run, wages increased along with productivity. While past automation eventually led to new industries and job creation, short-run disruptions can be considerable for displaced workers. Regions that are heavily dependent on the economic sectors likely to become automated may see local employment decline.

Automation technologies are advancing rapidly. The development of AI and robotics has expanded the scope of potentially automatable tasks, raising concerns about broader labour market disruption. As machines and algorithms increasingly replicate tasks that are predictable and rules-based, occupations that rely heavily on such tasks face higher risks of substitution. Industrial robots can now carry out complex, repetitive operations with precision. Similarly, software algorithms can perform some cognitive and decision-making tasks that were previously thought to be the exclusive domain of humans (Filippi, Bannò and Trento, 2023^[2]).

Caution is needed as some recent findings suggest that generative AI may primarily function as an augmentation technology rather than a pure replacement technology. AI appears particularly valuable in occupations in which codifiable knowledge can be transferred from experts to less-skilled workers. This contrasts with more pessimistic narratives of widespread automation and supports the view that the economic impact of AI depends heavily on organisational adoption and task design (Brynjolfsson, Li and Raymond, 2025^[34]).

Box 4.1. Perceptions and technological anxiety

Surveys on the expected effects of technology on the world of work have analysed perceptions and even produced forecasts. These exercises incorporate not only technical potential, but also business sentiments and planned investments. They use qualitative economic indicators to capture the optimism or pessimism of business leaders and executives regarding the current and future state of the economy, underpinning their decisions on hiring, investment and expansion.

One recent survey of employers suggests that between 2025 and 2030, 170 million jobs (equivalent to 14% of current employment) will be created worldwide in new task areas such as AI development, engineering and care services. In parallel, 92 million jobs (around 8% of current employment) will be destroyed (WEF, 2025^[35]).

Another survey finds that 81% of business leaders believe that AI and other technologies will force organisations to radically rethink skills and human resources (WEC, 2024^[36]).

In 2022, the OECD conducted parallel surveys targeting workers and firms in seven countries (Austria, Canada, France, Germany, Ireland, the United Kingdom and the United States) on the impacts of AI on the labour market (Lane, Williams and Broecke, 2023^[37]). The results suggest that while both workers and their employers are generally very positive about the impacts of AI on performance and working conditions, workers have concerns about the impacts of AI on job stability.

Automation can contribute to job polarisation and the hollowing out of the middle class

While technology can create jobs, it can also lead to job displacement and exacerbate inequality for certain groups of workers. Automation and digitalisation may replace certain types of work, leading to unemployment and income loss (Carbonero, Ernst and Weber, 2018^[38]). Automation can be applied to both routine manual tasks (such as assembly line work or data entry) and, increasingly, to non-routine tasks that require adaptive or cognitive skills (Arntz, Gregory and Zierahn, 2016^[7]; Frey and Osborne, 2017^[4]). An overarching challenge is that the benefits of technology are often unevenly distributed, with those lacking digital literacy or access to technology being left behind (OECD, 2025^[39]). The digital divide remains a significant challenge, particularly in developing countries where high costs, lack of infrastructure and low digital literacy are key factors. This is crucial as limited access to technology and the internet can prevent vulnerable workers from fully benefiting from technological advancements (World Bank, 2016^[40]; Gmyrek, Viollaz and Winkler, 2026^[41]; Gmyrek, Winkler and Garganta, 2024^[42]).

Empirical research in developed countries suggests that automation accounted for a significant share of the decline in demand for routine manual and routine cognitive jobs in recent decades. In the United States, between 50% and 70% of the change in the wage structure since 1980 – particularly the erosion of jobs in occupations based on skilled in routine tasks – can be attributed to the adoption of automation technologies (Acemoglu and Restrepo, 2022^[43]). Similarly, in Europe, increased use of industrial robots from 2006 to 2018 has been linked to lower wages and employment in regions with many automatable jobs (Doorley et al., 2023^[44]).

These findings reflect a pattern of job polarisation observed in many advanced economies. Automation has hollowed out mid-skill, routine occupations, while employment has grown at the high-skill and low-skill ends of the spectrum (Autor, 2015^[32]). High-skill professionals and low-paid service workers have increased in share, but middle-skill factory, office and administrative roles have declined. Ultimately, these trends have contributed to wage inequality and a “squeeze” on the middle class (OECD, 2019^[45]).

The rise in digital platforms and so-called “click workers” are other by-products of technological advances

Digital platforms (also referred to as online platforms) are a by-product of technological innovation that has been growing rapidly in recent years (OECD, 2023^[46]). These online entities cover a broad range of activities that use digital technologies to connect the demand and supply of particular services and products (OECD, 2023^[46]; ILO, 2022^[47]). While the rise of digital platforms has produced numerous opportunities and benefits for workers around the world, it has also raised important concerns about job creation, working conditions and social protection.

One important aspect is the extent to which digital platforms create new jobs or mainly reorganise existing forms of work. Often, digital platforms use technology to mediate work and help outsource services, rather than to create new jobs. Many jobs that existed before the emergence of these platforms have changed in nature (Schwellnus et al., 2019^[48]; Graham, Hjorth and Lehdonvirta, 2017^[49]). This is especially true for location-based platforms, which have reorganised work that already existed in particular sectors (ILO, 2022^[47]), as well as some online web-based platforms serving local markets.

These changes raise major questions about the legal classification of digital platform workers, their working conditions and the protection of their rights (Box 4.2). Platform work can widen access to income-generating opportunities, particularly for young people, women and workers outside major urban centres. The World Bank estimates that online gig work may account for up to 12% of the global labour force and that low- and middle-income countries generate around 40% of traffic to gig-work platforms. However, this rise of digital platforms is introducing new dimensions to informal employment. Many platform workers face uncertain earnings, limited career progression, low remuneration, unpaid time spent searching for tasks, exposure to rejection or non-payment, and limited channels to contest platform decisions. Since they are

often classified as self-employed, they may also be excluded from employment-based social protections, including health insurance, retirement benefits and unemployment insurance. These gaps can increase vulnerability and poverty (Berg, 2015^[50]; Rosenblat and Stark, 2016^[51]; Datta et al., 2023^[52]). Digital platforms can also create power imbalances between workers and employers, leading to potential exploitation. They can also complicate taxation and regulation, as tax authorities often struggle with enforcement in the absence of well-established mechanisms to track platform-generated income.

The expansion of artificial intelligence and digital platforms in advanced economies also has implications for workers in EMDEs. Many services that appear automated rely on geographically dispersed workers, often referred to as “click workers”, who label and classify data, transcribe audio, moderate content, verify outputs and complete other microtasks needed to train or operate digital systems. This “hidden” human contribution to automation, described by Casilli (2025^[53]), places workers in EMDEs within global AI production chains even where domestic AI adoption remains limited.

Although this chapter does not examine these cross-border labour arrangements in detail, they reinforce the case for policy co-operation on platform governance. Relevant priorities include transparency in algorithmic management, fair remuneration, effective dispute-resolution mechanisms, data protection and portable social protection, regardless of where workers are located (Berg et al., 2018^[54]).

Box 4.2. ILO’s 2026 Decent Work in the Platform Economy Convention

In June 2026, the 114th Session of the International Labour Conference adopted the Decent Work in the Platform Economy Convention (Convention No. 193), marking the first binding international labour standard specifically designed to regulate digital platform work (ILO, 2026^[55]). The Convention emerged in response to the rapid expansion of the platform economy – including ride-hailing, food delivery, crowd work and other app-mediated services. It also addressed growing concerns that existing labour regulations were insufficient to protect workers operating outside of traditional employment relationships.

Convention No. 193 establishes a broad framework of rights and protections applicable to platform workers, regardless of their formal employment status. Among its key provisions are requirements for fair remuneration, occupational safety and health, social protection, and protection against violence and harassment. It also covers transparency of algorithmic management systems, data protection and privacy rights, human review of automated decisions, safeguards against unjustified account suspension or deactivation, and access to dispute resolution mechanisms. Importantly, Convention No. 193 adopts a fact-based approach to employment classification, emphasising that workers’ rights should not depend solely on the contractual labels used by platforms.

Diverse factors influence the likelihood that highly automatable jobs become automated

As automation technologies continue to advance, an increasing number of work activities could, *a priori*, be handled by automated systems. The extent to which this occurs will depend on more than just the technology itself. What is technically feasible is not always economically profitable, and the speed and scope of automation adoption also depends on factors such as cost-effectiveness, legal permissibility, and stakeholder responses – including those of trade unions, political actors and consumers (Schlogl and Sumner, 2020^[56]). The automation of tasks is also shaped by economic, political, social and cultural considerations. For instance, a task may be 95% automatable in theory, but if the required machinery is too expensive compared with local real wages, firms might not adopt it for a long time. These broader factors are often underexplored, yet they play crucial roles in determining not only if automation takes place, but how it unfolds in relation to local institutions and labour markets.

This is especially true in developing countries, in which the expected impact of generative AI is strongly moderated by historically slow rate of adoption of digital technology. Exposure measures based solely on occupational tasks tend to overstate the near-term effects of generative AI because they overlook a critical prerequisite: the levels of workers' actual access to and use of digital technologies in the workplace. Using indicators of computer use at work, Gmyrek, Winkler and Garganta (2024^[42]) adjust occupational exposure estimates and find that the existing digital divide substantially constrains AI diffusion. More precisely, almost half of the jobs that could potentially benefit from AI-driven augmentation are unlikely to realise these gains because workers lack adequate access to digital technologies, with the constraint being particularly severe in lower-income countries. Consequently, while a significant share of occupations in developing countries have technical characteristics that could be replaced by AI applications, the actual pace of adoption is expected to be considerably slower than in advanced economies. This anticipated lag implies more gradual productivity and labour-market effects.

Workers need a minimum level of foundational technical skills to fully reap the benefits of automation technologies (Autor, 2024^[57]), which are generally lacking in developing countries (OECD, 2024^[58]). Statistical evidence from experimental studies with generative AI tend to focus on very specialised groups of workers who are engaged in sets of very complex tasks. Although empirical evidence suggests that AI may reduce skills inequality within these groups, it should not be directly linked to the whole set of workers, especially in developing economies (Brynjolfsson, Li and Raymond, 2025^[34]; Dell'Acqua et al., 2026^[59]; Noy and Zhang, 2023^[60]).

Finally, increased productivity may bring employment and wage gains in sectors facing a rapidly growing consumer demand (Autor, 2024^[57]). For sectors facing more stable consumer demand, these demand-side effects are likely to differ across countries. In developing economies with a large informal sector, and in which technology adoption and private sector investment are typically concentrated among a small share of formal firms (Cirera, Comin and Cruz, 2022^[61]), formal workers displaced from jobs may face more challenges finding high quality jobs than their counterparts in high-income countries.

Assessing the impacts of automation technologies on informal economy workers

Automation risks refer to a wide range of technological change, including traditional and AI-related automation (see Annex 4.B for more details on automation measurement).

Growing evidence, mostly from advanced countries, suggests that automation technologies affect employment in complex ways. The impacts of automation technologies vary across countries and depend on the type of technology involved. Within countries, the impacts on workers are uneven.

What remains unclear is how automation will affect the vast majority of workers that operate in the informal economy in developing countries. While technological change brings risks and opportunities for informal workers and labour formalisation, there has been only limited assessment of the implications of automation technologies for informal workers in developing countries (Gmyrek, Winkler and Garganta, 2024^[42]).

Box 4.3. Measuring the risk of exposure of jobs to traditional and AI automation

Methodology

The risk of job automation can be assessed using a wide range of methodologies. The chapter analyses two types of technical exposure (or susceptibility): traditional automation and AI automation (Acemoglu and Restrepo, 2019^[62]; OECD, 2023^[46]).

- **Traditional automation** refers to the extent that specific tasks required to perform a job are technically fully substitutable by the waves of automation that occurred up to the early 2020s. It generally includes industrial robot innovations and early AI digital technologies based on data computations, predictions and technical assistance in decision making.
- **AI automation** focuses on the frontier of generative AI technologies and explicitly considers the expanding capabilities of these systems beyond text and LLMs, including voice, image and video generation. These capabilities increase the potential exposure of some occupations, especially in media- and web-related work.

To measure the traditional automation risk, this chapter follows the methodology of Lassébie and Quintini (2022^[12]), which was replicated in the *OECD Employment Outlook* (2023^[46]). The O*NET database, produced by the National Center for O*NET Development, is used to extract occupation-specific information on the skills and abilities required for each job. This information is then combined with expert assessments of the automatability of around 100 skills and abilities and ranked across different scores (O*NET Resource Center, 2026^[63]). The O*NET-based information makes it possible to compute, for each occupation, the share of skills and abilities that are highly automatable and the share that remain bottlenecks to automation, focusing exclusively on skills and abilities deemed essentials to the occupation. The resulting occupation-level indicators are then used to assess which jobs are most exposed to automation and which groups of workers are most at risk, with the latter being those having a job for which at least 25% of tasks can be technically automated (based on the technical judgments of experts in technological innovation).

To measure the AI automation risk, the chapter follows the statistical approach of Gmyrek et al. (2025^[20]). The risk of AI displacement is measured at the task level within each occupation code, combining task-level information for nearly 30 000 tasks (using detailed ISCO-08 job descriptions). In parallel, human expert input and AI-based predictions estimate the extent to which generative AI can perform the tasks that make up each occupation. Each occupation is then classified into four exposure gradients based on its overall average task exposure and the degree of exposure variability across the task bundle. The last gradient includes occupations at high risk of AI technical displacement (i.e. occupations with both high average task exposure, similar to Lassébie and Quintini (2022^[12]), and low exposure variability across tasks, meaning that exposure is high across most tasks performed in the occupation).

Both methods use a granular task-based approach, reflecting the idea that task automation does not automatically translate into full job displacement. Importantly, some important tasks may remain non-automatable or require substantial human involvement.

Data used for the estimates

The last update of the KILBIH is used to analyse the actual potential risk of displacement (OECD, 2026^[64]). These surveys are harmonised consistently across countries, making it possible to construct standardised indicators of demographic, labour market and socio-economic conditions of individuals and their families (see Chapter 2 for more details on the KILBIH).

Information on the risk of automation is matched with data on occupations of workers in the KILBIH database, using the ISCO-08 international standard either at three-digit (for the risk of traditional automation) or four-digit level (for the risk of AI automation) (ILO, 2012^[65]). The variables on occupations have been standardised across countries using either official correspondence tables to reclassify national occupations into ISCO-08 equivalents, or an AI-based classification procedure that matches national and international occupational codes based on detailed job descriptions (see Annex 4.B for more details).

Regarding the definition of informality, the KILBIH follows ILO guidelines and statistical concepts defined by the 20th International Conference of Labour Statisticians (ILO, 2018^[66]) (see Annex 2.B in Chapter 2 for more details). Analysis in this chapter focuses primarily on the employment classification of informality (i.e. the formal or informal status of the job or work activity itself), rather than sector classification, which focuses on the type of economic unit in which production takes place.

In developing countries, informal labour markets dominate and often depend on manual and low-skilled work

In developing countries, in which informality dominates and economic structures and labour markets often depend on manual and low-skilled work (especially in the agricultural sector), the disruptive potential of traditional automation on employment may be particularly pronounced.

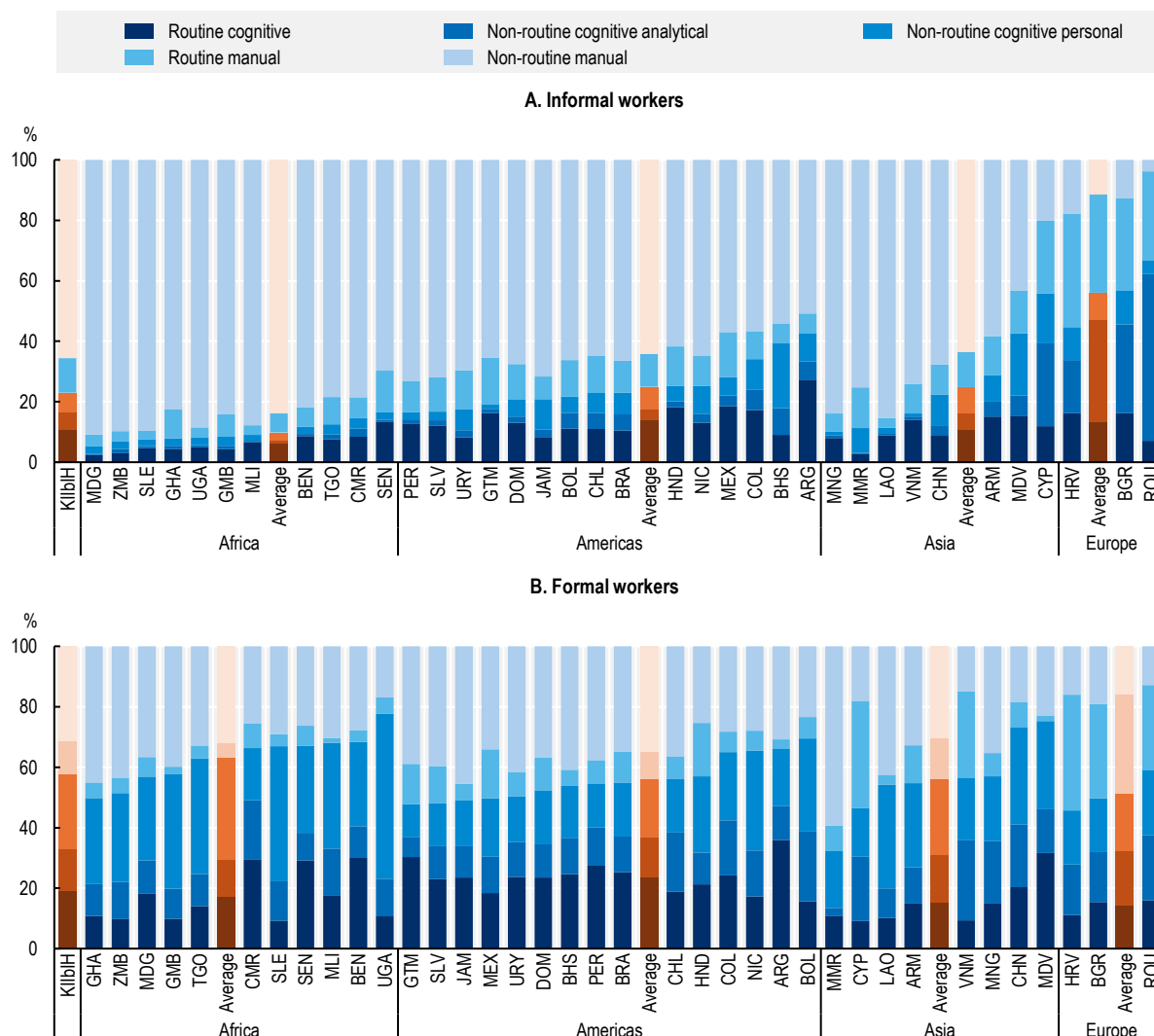
In fact, tasks performed in a particular job are the principal driver of exposure to the risks of traditional or AI automation (Acemoglu and Restrepo, 2020^[67]; Acemoglu and Restrepo, 2019^[62]). These tasks can be broadly categorised along two main axes: manual versus cognitive tasks, and routine versus non-routine tasks. Research findings suggest that manual routine and non-routine tasks are much more exposed to traditional automation. In contrast, cognitive tasks, which include routine tasks such as prediction, classification, retrieval and summarisation (Agrawal, Gans and Goldfarb, 2019^[18]; Eoundou et al., 2024^[27]), and non-routine tasks, such as content generation and editing, code generation, knowledge management and process orchestration may be more exposed to AI automation (Noy and Zhang, 2023^[60]; Almorsi, Ahmed and Gomaa, 2025^[68]; OpenAI, 2025^[69]; Cao, Ma and Zhai, 2024^[70]).

In developing countries, among workers in general and informal workers in particular, manual tasks – whether routine or non-routine – are the most common. On average, across the sample of KILBIH countries for which data are available, 77% of informal workers perform routine or non-routine manual tasks in their job, compared with 42% for formal workers (Figure 4.1). In contrast, the share of workers performing cognitive tasks is as low as 23% among informal workers and as high as 58% for formal workers.

Large country disparities exist in the relative importance of manual versus cognitive tasks performed by informal workers. The proportion of informal workers holding jobs that involve non-routine or routine manual tasks is the highest in the sample of African countries (90% on average), followed by countries from Latin America and the Caribbean and Asia (75% for both), and Europe (44%).

Figure 4.1. Informal workers mostly perform routine or non-routine manual tasks in their jobs

Distribution of informal and formal workers aged above 15 years by occupational task group, latest year available



Note: Routine cognitive refers to jobs requiring codifiable and repetitive information-processing tasks. Non-routine cognitive analytical refers to jobs requiring creative, problem-solving tasks. Non-routine cognitive personal refers to jobs requiring interpersonal tasks requiring judgement. Routine manual refers to jobs with repetitive physical tasks in structured, machine-paced environments. Non-routine manual refers to jobs requiring physical tasks in changing environments requiring dexterity, adaptation or spatial judgement. KILBIH and regional averages are calculated as simple unweighted averages of countries for which data are available.

Source: Estimates based on OECD (2026^[64]) and Lewandowski et al. (2020^[71]).

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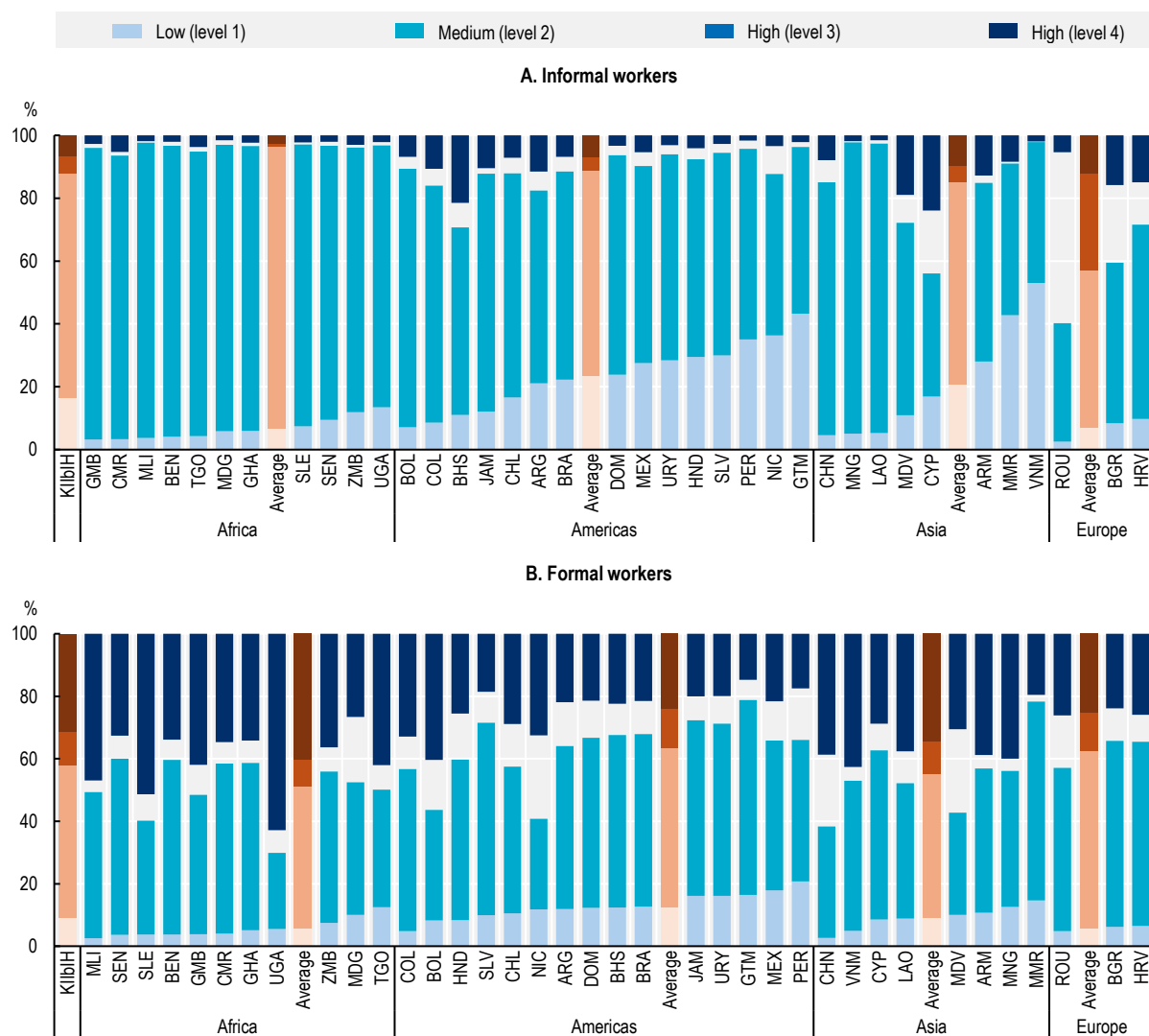
The level of skills required for the job is also an important predictor of the risk of automation. Using the occupational structure of the labour market and based on the ISCO-08 classification that associates a skill level to each occupation, it is possible to estimate the skill content of each job (ILO, 2023^[72]; ILO, 2012^[65]).

Across KILBIH countries, informal workers are disproportionately holding low- and medium-skilled jobs: 17% of informal workers perform a low-skilled job and 71% hold a medium-skilled job, compared with, respectively, 9% and 49% for formal workers (Figure 4.2, Panels A and B). The shares of informal workers

in low- and medium-skilled jobs are remarkably high across all regions, notably across African countries for which data are available (7% of them are low- and 90% are medium-skilled).

Figure 4.2. Most informal workers are in lower-skilled occupations – considerably more than workers in formal employment

Distribution of informal and formal workers aged above 15 years by occupational skill level, latest year available



Note: Skill levels are based on ISCO-08 major groups: “Low skill (level 1)” refers to workers employed in elementary occupations (Group 9 of ISCO-08). “Medium skill (level 2)” refers to: clerical workers; sales and services workers; skilled agricultural, craft and trades workers, and plant and machine operators and assemblers (Groups 4, 5, 6, 7, 8). “High skill (level 3)” refers to technicians and associate professionals (Group 3) as well as managers (Group 1) from sub-major group 14. “High skill (level 4)” refers to professionals (Group 2) as well as managers (Group 1) not otherwise classified in sub-major group 14. Armed forces (Group 0) are classified using 2-digit ISCO-08 codes: sub-major group 03 is assigned to “Low skill (level 1)”, sub-major group 02 to “Medium skill (level 2)”, and sub-major group 01 to “High skill (level 4)”. KILBIH and regional averages are calculated as simple unweighted averages of countries for which data are available.

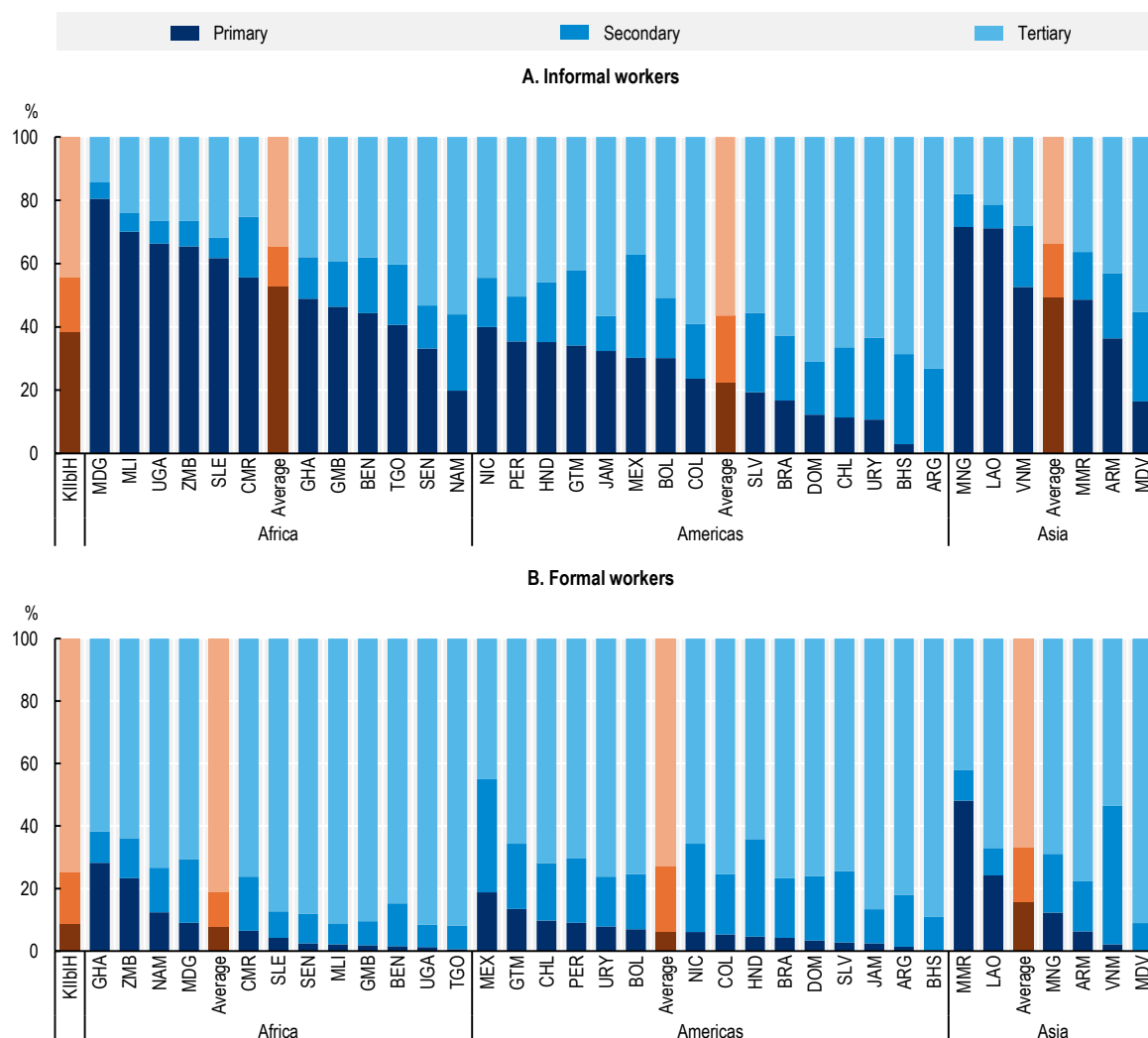
Source: (OECD, 2026^[64]), “Key Indicators of Informality based on Individuals and their Households (KILBIH)”, <https://data-explorer.oecd.org>.

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Understanding the distribution of workers across industries is also important to examine automation risks. Different industries require indeed distinct bundles of tasks and skills, which influences their susceptibility to automation (Acemoglu and Restrepo, 2020^[67]; Acemoglu and Restrepo, 2019^[62]). On average across the KIIbIH, informal workers disproportionately (38%) work in the primary sector² compared with formal workers (9%) (Figure 4.3, Panels A and B). The prevalence of informal workers in the primary sector is particularly strong in several countries in Africa and Asia, but less so in countries from Latin America and the Caribbean. A large share of informal workers (44%) is also engaged in the tertiary sector, in which formal workers are also heavily engaged (75%). In contrast, relatively few informal workers (17%) work in the secondary sector, a share equal to that for formal workers.

Figure 4.3. Informal workers are over-represented in agriculture and under-represented in services

Distribution of informal and formal workers aged above 15 years by broad sector, latest year available



Note: Broad sectors are defined based on ISIC Rev. 4 sectors. Primary activities refer to the direct extraction or use of natural resources, such as agriculture, forestry, fishing, mining and quarrying. It includes ISIC Rev. 4 sectors A and B. Secondary activities refer to the transformation of raw materials and the production of goods, including manufacturing, utilities and construction. It includes ISIC Rev. 4 sectors C to F. Tertiary activities refer to services, including trade, transport, accommodation, finance, public administration, education, health and other service activities. It includes ISIC Rev. 4 sectors G to U.

Source: (OECD, 2026^[64]), "Key Indicators of Informality based on Individuals and their Households (KIIbIH)", <https://data-explorer.oecd.org>.

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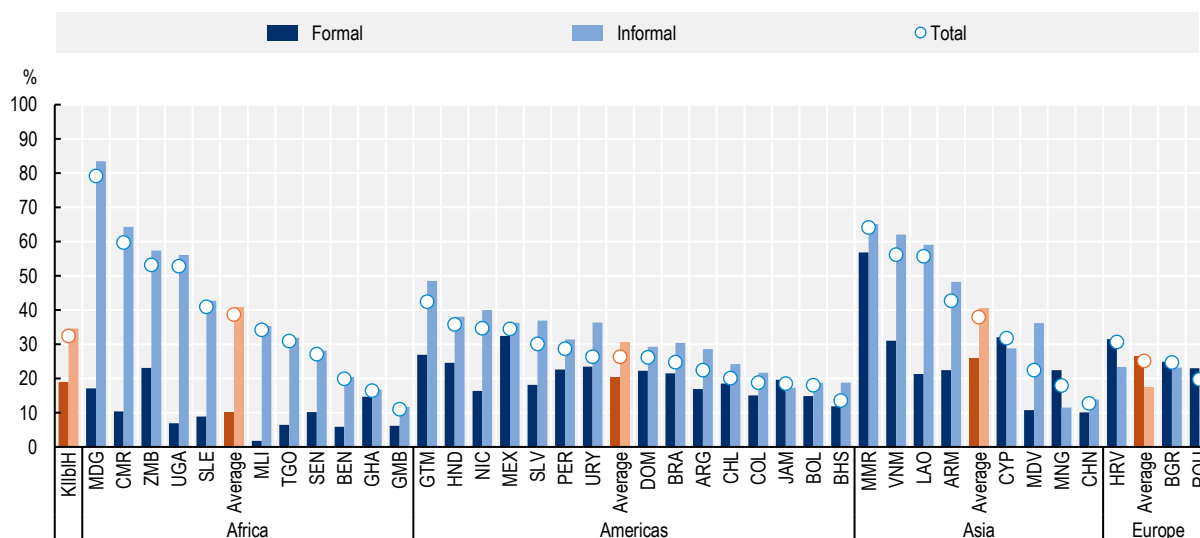
Informal workers face considerable risks of traditional automation; AI automation is more of a risk for formal workers in more advanced countries

Data from the KIIbIH show that, overall, one-third of workers hold a job with considerable traditional automation risks (Figure 4.4). This is slightly more than the OECD average of about one-quarter (OECD, 2023^[46]). Informal workers (35%) are almost twice as likely to be at risk of automation as formal workers (19%). The risk of traditional automation varies across regions. Informal workers in African and Asian countries are the most exposed (41%), followed by those from Latin American and Caribbean (30%). Among European countries, the exposure of informal workers is the lowest (17%), but is the highest across all regions for formal workers.

By and large, the greater exposure to traditional automation risks for jobs held by informal workers from developing countries mirrors the differences in occupations between economies at different stages of development. Since less advanced economies employ more people in occupations involving routine, manual tasks – and fewer people in cognitive tasks – they are more vulnerable than advanced countries to job displacement by industrial robots.

Figure 4.4. The risk of traditional automation is higher for informal jobs

Share of informal and formal workers aged above 15 years in jobs at high risk of traditional automation, latest year available



Note: Jobs are considered to be at high risk of traditional automation if they have a significant share of important skills and abilities (more than 25%) that are highly automatable, following Lassébie and Quintini (2022^[12]).

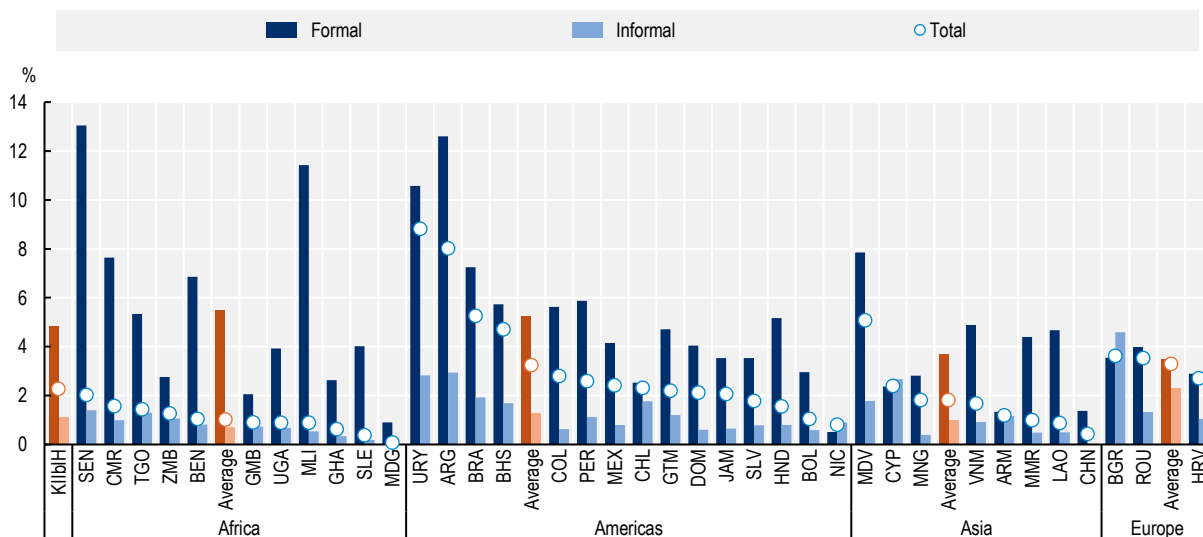
Source: Estimates based on OECD (2026^[64]) and Lassébie and Quintini (2022^[12]).

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By contrast, very few workers (2%) in the sample of KIIbIH countries hold a job exposed to the risks of AI automation (Figure 4.5). Such risks are even smaller for jobs of informal workers (1%) than of formal workers (5%). The risks are more concentrated among workers in Latin America and the Caribbean and Europe, reflecting the differences in the distribution of high skill and cognitive tasks across workers with different formal status and place of residence.

Figure 4.5. Formal workers in more advanced countries face higher risks of AI automation

Share of informal and formal workers aged above 15 years in jobs at high risk of AI automation, latest year available



Note: Jobs are considered to be at high risk of AI automation if they fall into the highest of four exposure gradients, following Gmyrek et al. (2025^[20]). This gradient includes occupations with both high average task exposure and low exposure variability across tasks, meaning that exposure is high across most tasks performed in the occupation. Axis scale is adapted for clarity and ranges from 0% to 14%.

Source: Estimates based on OECD (2026^[64]) and Gmyrek et al. (2025^[20]).

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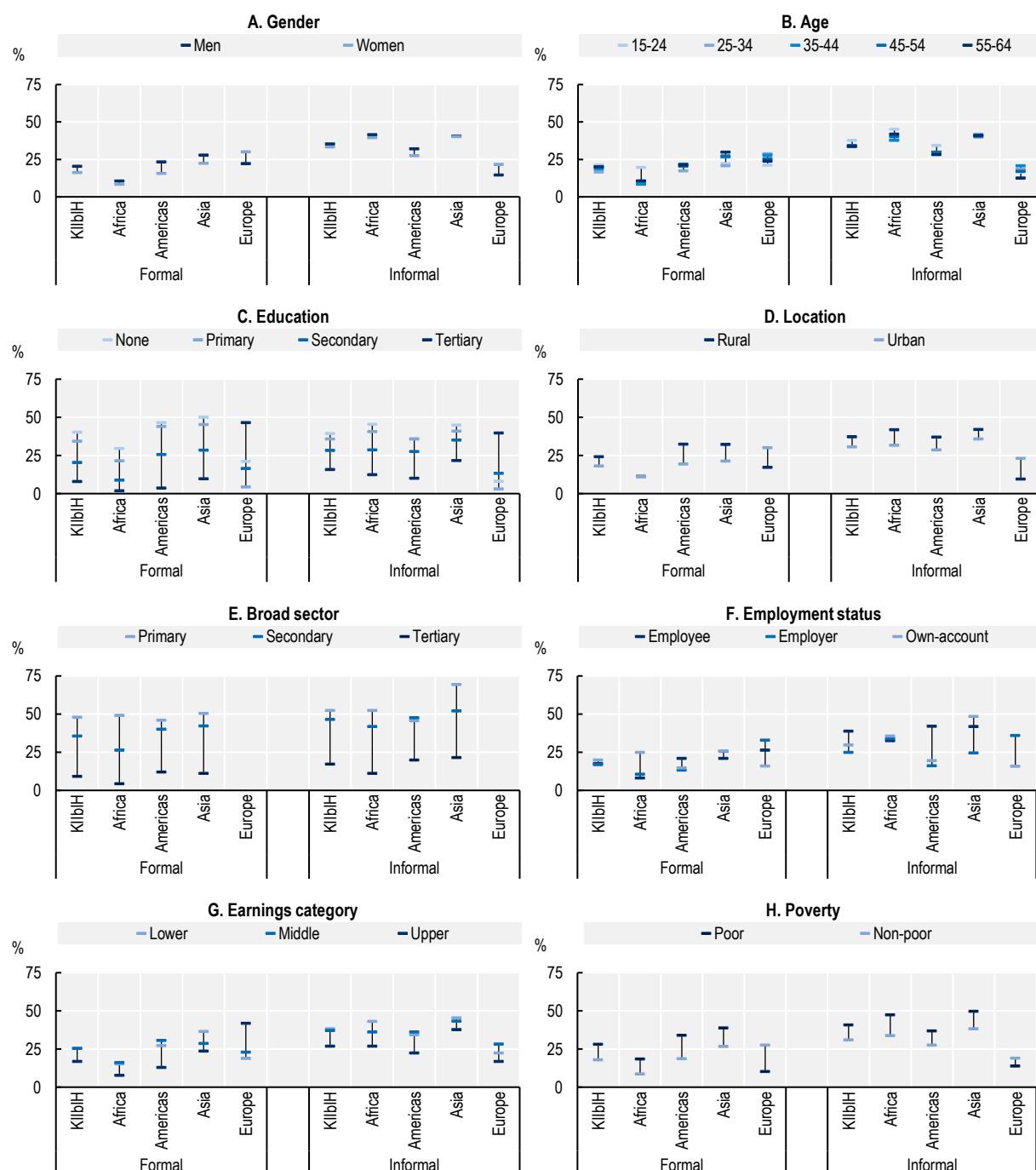
Of particular concern is the magnitude of the possible negative disruption effects of traditional automation on informal workers, who usually have fewer means to adjust to labour market shocks and protect their livelihoods. Indeed, as compared with workers in formal jobs, informal workers have higher odds of being undereducated and/or unskilled, are more likely to live in poor or near-poor households, and have a low probability of transitioning into a formal job (OECD, 2024^[73]; Aleksynska, La and Manfredi, 2023^[74]; OECD, 2023^[75]; Aleksynska and Kolev, 2021^[76]; OECD/ILO, 2019^[77]).

The risk of traditional automation is spread unequally across informal workers and disproportionately affects those in the lower tier of the informal economy

Tackling the negative job displacement effects that traditional automation may have on workers in general – and on workers in the informal economy in particular – requires in-depth understanding of which worker characteristics are linked to high automation risk. Figure 4.6 presents the share of workers aged 15 or more holding a job at high risk of traditional automation, by informality status and selected socio-demographic characteristics. Despite being based on univariate correlates, most of these results tend to be relatively robust to multivariate analysis and confirm the greater vulnerability to job displacement of informal workers in the middle and lower tier of the informal economy.

Figure 4.6. For both formal and informal workers, traditional automation risk is higher for male, rural, poor, young and older workers as well as workers in agriculture and with low skills

Share of informal and formal workers aged above 15 years in jobs at high risk of traditional automation by selected socio-demographic characteristics



Note: Jobs are considered to be at high risk of traditional automation if they have a significant share of important skills and abilities (more than 25%) that are highly automatable, following Lassébie and Quintini (2022^[12]). Axis scale is adapted for clarity and ranges from 0% to 75%.

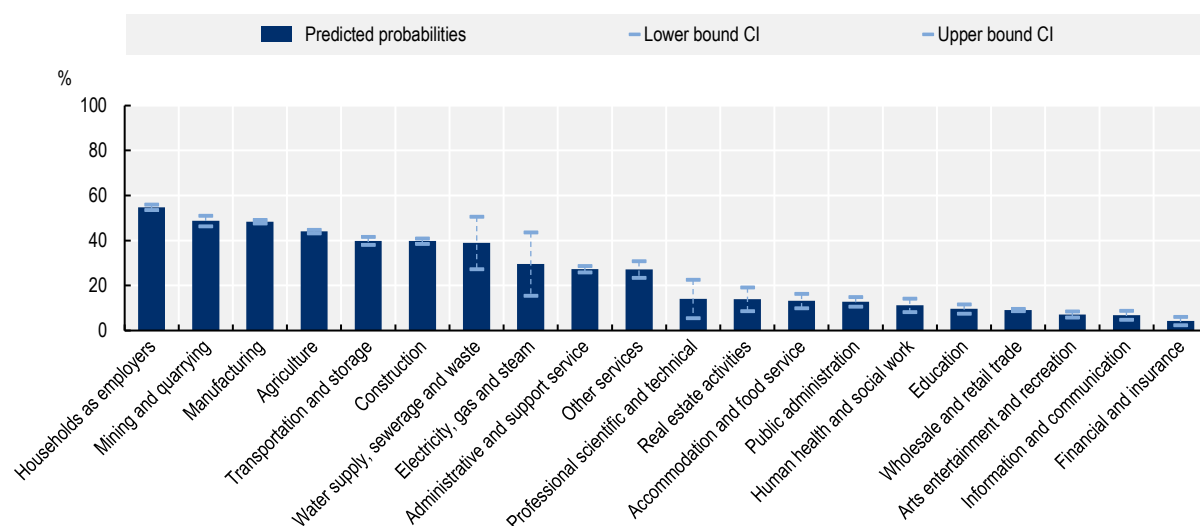
Source: Estimates based on OECD (2026^[64]) and Lassébie and Quintini (2022^[12]).

Across KIIbIH countries, the traditional automation risk is similar for jobs of informal male workers (36%) and female workers (37%) (Figure 4.6, Panel A), although patterns differ across regions, with Asian and European female workers more exposed than males. Such gender differences stem largely from the fact that informal male workers are more frequently employed in agriculture and in jobs requiring manual and routine tasks that score higher on the risks of technical replaceability. As shown in Figure 4.6, among informal workers, the risk of automation is also disproportionately higher for jobs held by younger and older workers (Panel B), workers with no or little education (Panel C), rural workers (Panel D), and workers in the primary sector (Panel E). Also affected are employees and unpaid family workers (Panel F), low- and middle-paid workers (Panel G) and workers living in poor households (Panel H).

Multivariate analysis confirms that, compared with formal workers, informal workers are at a significant disadvantage and shows that, “all else equal”, gender, age, education, earnings category and place of residence are important correlates of holding a job at high risk of automation (Annex Table 4.A.1). Similarly, informal workers with low levels of skills and middle- and upper-paid jobs are more exposed to traditional automation risk than formal counterparts with similar characteristics (Annex Table 4.A.2).

Figure 4.7. The risks of traditional job automation vary substantially across sectors

Probability of workers aged above 15 years of holding a job at high risk of traditional automation by sector of employment



Note: The chart shows estimates of the predicted probabilities of being employed in a job at high risk of traditional automation in each sector. Estimates are based on logit regressions for which the dependent variable is a dummy identifying if the worker is in a job at high risk of traditional automation. 95% confidence intervals (CI) are shown with point estimates. Controls include age and age squared, gender, educational attainment, marital status, location, formality status of workers, sector of employment (using the one-digit ISIC Rev. 4), earnings quality and status in employment. To account for differences in sample and population size across countries, probability survey weights are normalised so that each country equally contributes to the estimates. Regressions are run for the sample of countries with available data: Bolivia, Cameroon, Chile, China, the Dominican Republic, El Salvador, Honduras, Mexico, Nicaragua, Nigeria, Peru, Tanzania and Uruguay.

Source: Estimates based on OECD (2026^[64]) and Lassébie and Quintini (2022^[12]).

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Regression results highlight the critical role of industry as a significant mediator of automation exposure in KIIbIH countries (Figure 4.7). This is consistent with the fact that sector-specific technologies and production processes shape the task content of jobs demanded by firms. Predicted exposure is particularly

high in primary and secondary sectors, such as activities of households with very low level of productivity (55%), mining (49%), manufacturing (48%) and agriculture (44%). It remains elevated in service activities such as transport (40%), administrative and support service and other services (27%), water and waste management (42%) and utilities (37%). Exposure is substantially lower in health (11%), education (10%), ICT services (7%) and financial services (4%).

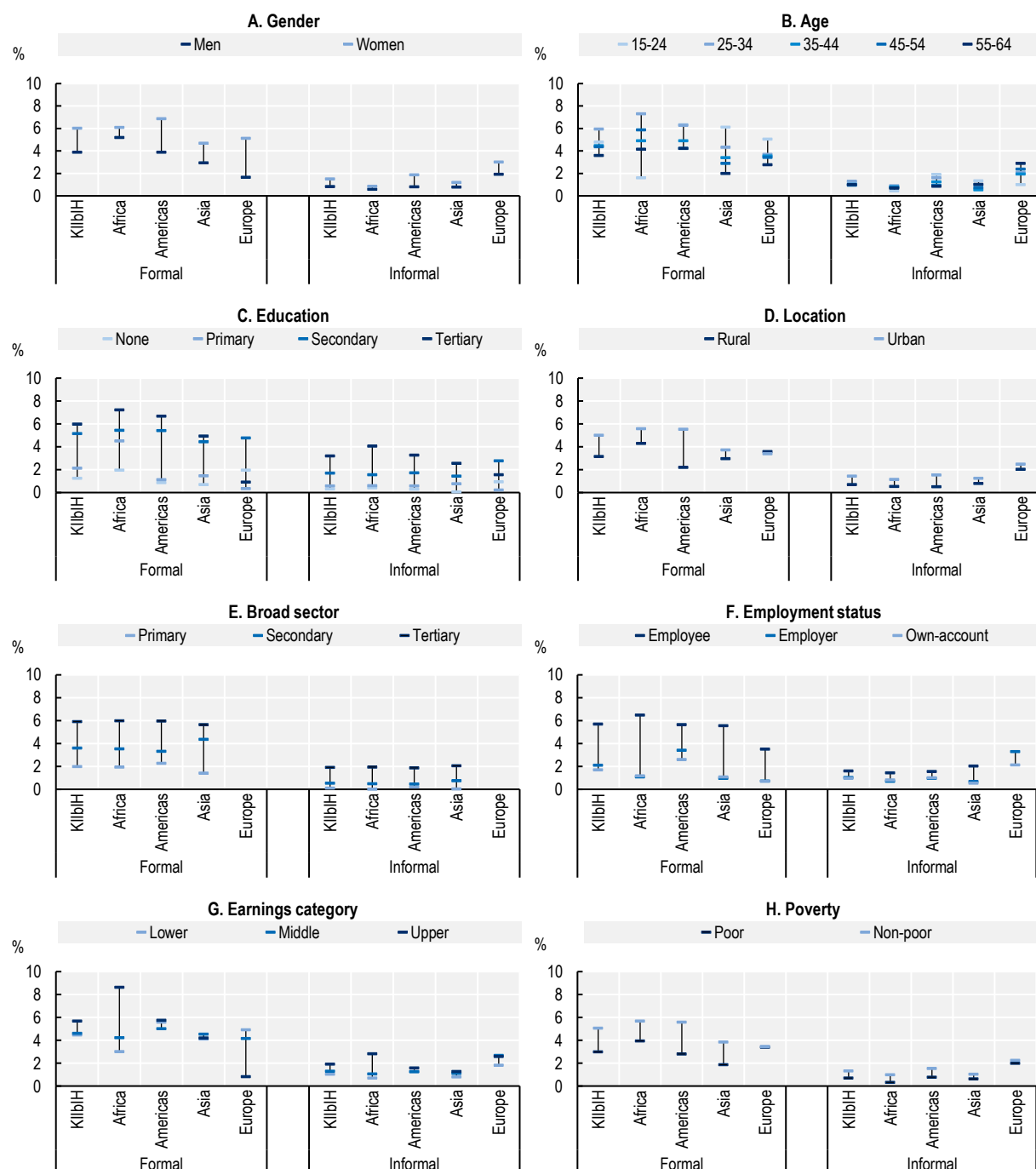
While AI automation may impact few informal workers, those with jobs at high risk are disproportionately female, young, urban and highly educated workers

Across KILBIH countries, AI automation risks are disproportionately higher for jobs held by formal workers (5%) than by informal ones (1%) (Figure 4.5). This aligns with the fact that AI (especially generative applications) targets information-processing and codifiable cognitive tasks that are more prevalent in the context of formal job structures. If those formal workers were to lose their job through the dissemination of AI technologies, they could end up in the informal economy and contribute to further enlarging informal employment.

KILBIH data also show that the few informal workers holding a job at risk of AI automation have specific characteristics. As shown in Figure 4.8, the share of informal workers at risk of AI automation is usually higher for female (Panel A), younger (Panel B) and urban workers (Panel D). It rises markedly with the level of education (Panel C) and for workers in the secondary and tertiary sector (Panel E). It is also higher for employees (Panel F), better-paid workers (Panel G), and workers who live in non-poor households (Panel H).

Figure 4.8. The risk of AI automation is highest among female, young, highly educated and urban formal workers

Share of informal and formal workers aged above 15 years in jobs at high risk of AI automation by selected socio-demographic characteristics



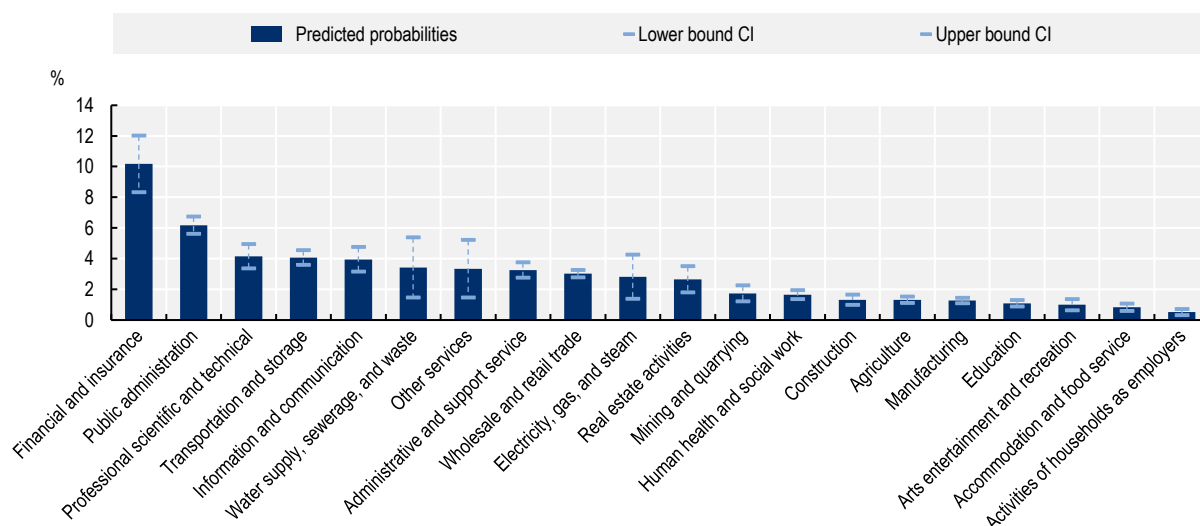
Note: Jobs are considered to be at high risk of AI automation if they fall into the highest of four exposure gradients, following Gmyrek et al. (2025_[20]). This gradient includes occupations with both high average task exposure and low exposure variability across tasks, meaning that exposure is high across most tasks performed in the occupation. Axis scale is adapted for clarity and ranges from 0% to 10%.

Source: OECD (2026_[64]) and Gmyrek et al. (2025_[20]).

Based on multivariate analysis, the formal employment status of workers remains positively and significantly correlated with AI automation risks when controlling for other factors. However, a large part of this apparent formality effect tends to be mediated by differences between formal and informal workers in terms of skills, status in employment and sector-specific tasks. The sector of employment, in particular, seems to be an important factor shaping the likelihood of jobs being at high risk of AI automation (Figure 4.9). Even holding worker characteristics constant, the predicted probabilities of being at risk of AI automation vary widely across sectors, with significantly higher risks for workers who operate in the financial sector (10%), public administration (6%), and professional scientific and technical roles (4%).

Figure 4.9. Working in financial and business services exposes to higher risks of AI automation

Probability of workers aged above 15 years of holding a job at high risk of AI automation by sector of employment



Note: The chart shows estimates of the predicted probabilities of being employed in a job at high risk of AI automation in each sector. Estimates are based on logit regressions for which the dependent variable is a dummy identifying if the worker is in a job at high risk of AI automation. 95% confidence intervals (CI) are shown with point estimates. Controls include age and age squared, gender, educational attainment, marital status, location, formality status of workers, sector of employment (using the one-digit ISIC Rev. 4), earnings quality and status in employment. To account for differences in sample and population size across countries, probability survey weights are normalised so that each country equally contributes to the estimates. Regressions are run for the sample of countries with available data: Chile, China, the Dominican Republic, El Salvador, Honduras, Liberia, Maldives, Peru, and Tanzania. Axis scale is adapted for clarity and ranges from 0% to 14%.

Source: OECD (2026^[64]) and Gmyrek et al. (2025^[20]).

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Automation risks are amplified at the household level, especially for individuals who live in informal households

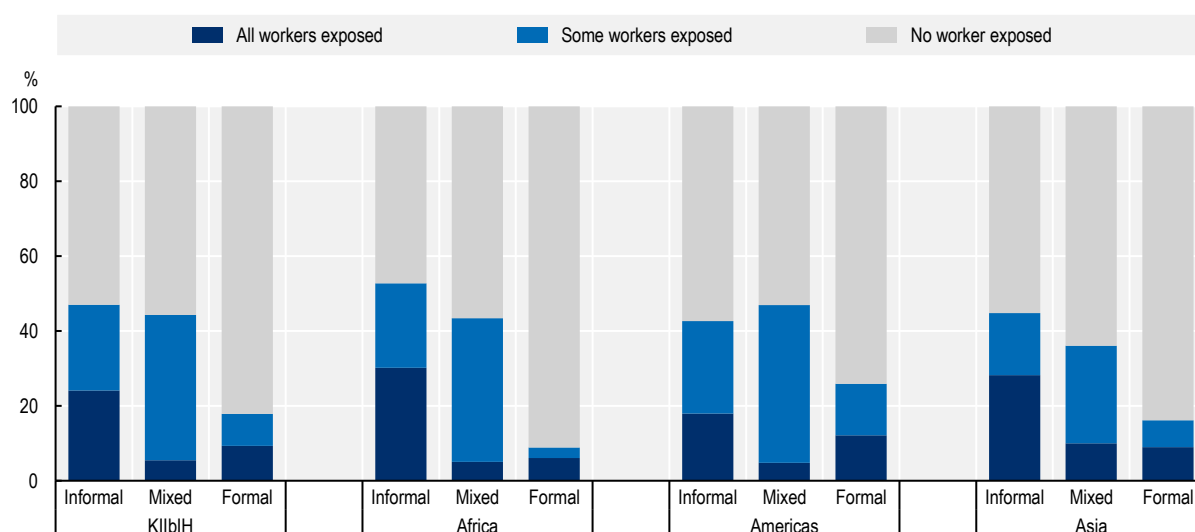
Automation risks can affect livelihoods through job displacement and earnings disruption, at both the individual and household level. Factors such as a household's incidence of informality and whether some or all workers of a household hold jobs exposed to automation risks will ultimately determine the overall level of vulnerability of workers and their families to income shocks. This makes it essential to assess, separately, the overall level of exposure to automation risks for formal, mixed and informal households.

As regards traditional automation, KIIbIH data point to substantial heterogeneity across households while showing that such risks are high and disproportionately concentrated among informal households

(Figure 4.10). Among households in which all workers are informal, 47% of members live in a household in which at least one worker is employed in a job exposed to traditional automation. More precisely, 23% live in a household where some working members are exposed and others are not, while 24% live in a household where all are exposed. By contrast, in mixed households (where formal and informal workers co-habit), 44% of members live with at least one exposed worker (39% with a mix of exposed and non-exposed workers, and 5% with all workers exposed). In formal households, exposure is less common overall: 18% of members live in a household in which at least one working member is exposed (9% with a mix of exposed and non-exposed workers, and 9% with all workers exposed). Across regions, Africa (30%) and Asia (28%) exhibit the largest share of people who live in informal households in which all working members are exposed to traditional automation risks.

Figure 4.10. Exposure to traditional automation risk is concentrated in informal households

Distribution of the population by level of household informality and number of household members exposed to traditional automation risk



Note: Jobs are considered to be at high risk of traditional automation if they have a significant share of important skills and abilities (more than 25%) that are highly automatable, following Lassébie and Quintini (2022^[12]). The population of reference are people living in households with at least one worker (household with no workers are excluded). “Informal” refers to a household where all workers are informal workers; “mixed” refers to a household where at least one worker is an informal worker and one worker is a formal worker; and “formal” refers to a household where all workers are formal workers. KIIbIH and regional averages are calculated as simple unweighted averages of countries for which data are available: the Bahamas, Benin, Bolivia, Brazil, Cameroon, Chile, China, Colombia, the Dominican Republic, El Salvador, Gambia, Ghana, Honduras, Jamaica, Lao PDR, Madagascar, Maldives, Mali, Mexico, Nicaragua, Peru, Senegal, Sierra Leone, Togo, Uganda, Uruguay and Zambia.

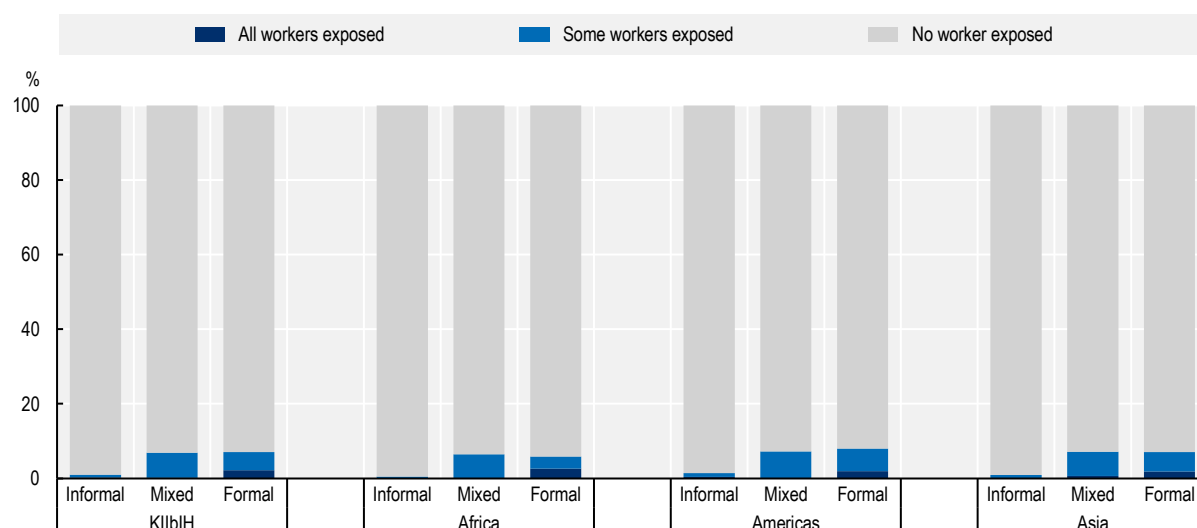
Source: OECD (2026^[64]) and Lassébie and Quintini (2022^[12]).

StatLink  <https://stat.link/bcqq40>

For AI automation, KIIbIH data show an overall low level of household exposure, especially in less advanced regions, and that most of the exposed workers live in formal and mixed households (Figure 4.11). Among formal households, 7% of people live in households with some (5%) or all (2%) working members exposed, compared to 7% in mixed households and 1% in informal households.

Figure 4.11. AI automation exposure is rare and concentrated in mixed/formal households

Distribution of the population by level of household informality and number of household members exposed to AI automation risk



Note: Jobs are considered to be at high risk of AI automation if they fall into the highest of four exposure gradients, following Gmyrek et al. (2025^[20]). This gradient includes occupations with both high average task exposure and low exposure variability across tasks, meaning that exposure is high across most tasks performed in the occupation. The population of reference are people living in households with at least one worker (household with no workers are excluded). “Informal” refers to a household where all workers are informal workers; “mixed” refers to a household where at least one worker is an informal worker and one worker is a formal worker; and “formal” refers to a household where all workers are formal workers. KILBIH and regional averages are calculated as simple unweighted averages of countries for which data are available: the Bahamas, Benin, Bolivia, Brazil, Cameroon, Chile, China, Colombia, the Dominican Republic, El Salvador, Gambia, Ghana, Jamaica, Honduras, Lao PDR, Madagascar, Maldives, Mali, Mexico, Nicaragua, Peru, Senegal, Sierra Leone, Togo, Uganda, Uruguay and Zambia.

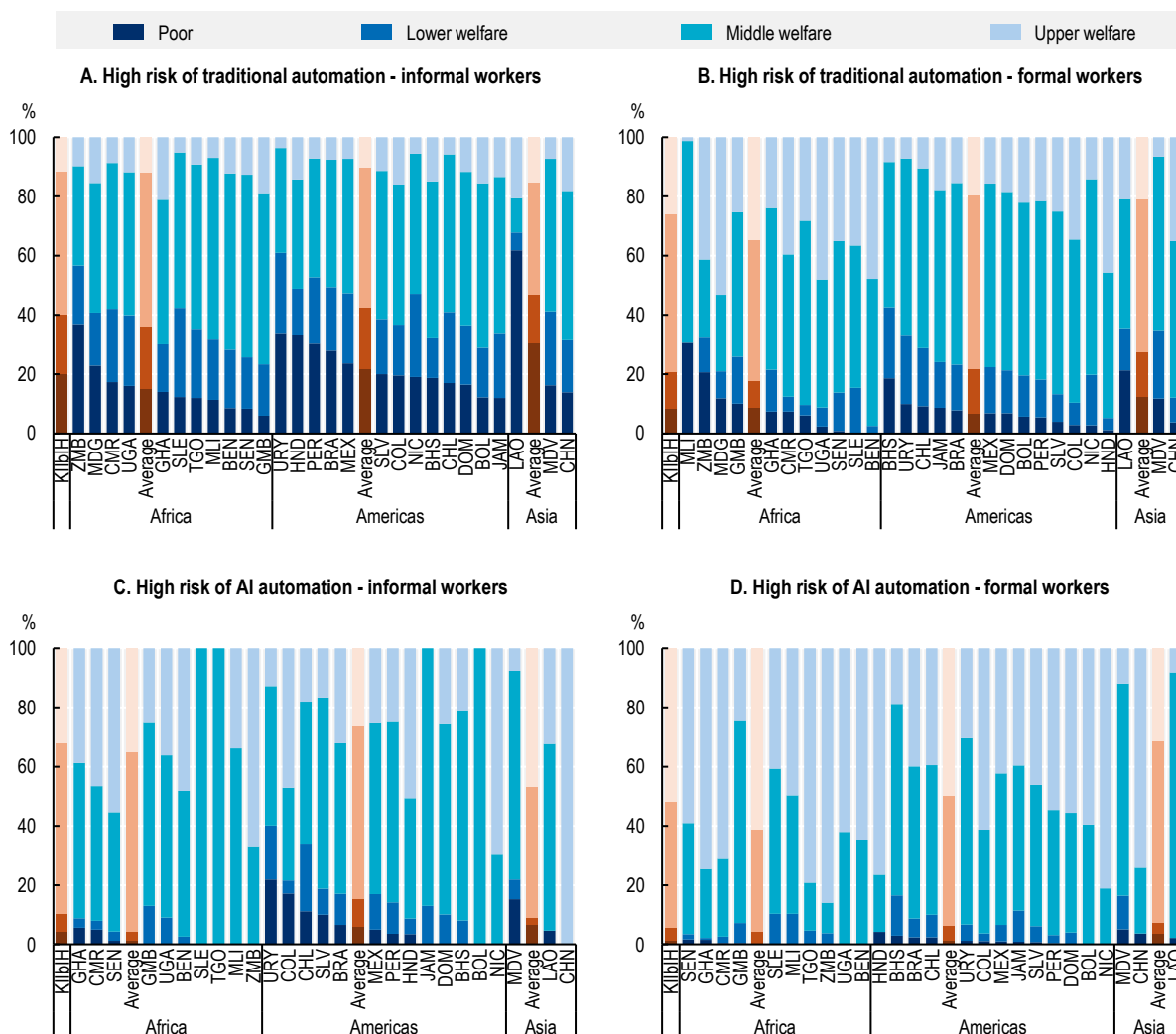
Source: OECD (2026^[64]) and Gmyrek et al. (2025^[20]).

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Among informal workers exposed to high risk of traditional automation, substantial shares live in poor- (20% of the total) or lower-welfare households (20%). This exposes their material welfare to income shocks in case of a technology-related dismissal or worsening labour market conditions (Figure 4.12, Panel A). Most (48%) live in middle-welfare households, while relatively few (12%) live in upper-welfare households. This fact especially holds for Asian countries and those in Latin America and the Caribbean. In contrast, formal workers facing high risks of traditional automation are more likely to live in middle- (53%) and upper-welfare (26%) households (Figure 4.12, Panel B). If workers were displaced by technology, the resulting loss of income could weaken their families’ material welfare and push some middle-welfare households towards lower-income or poorer conditions. This would mirror the hollowing out of the middle class already observed in many OECD economies (OECD, 2023^[46]; OECD, 2019^[45]). This risk appears substantial in Latin America and the Caribbean, where most formal workers exposed to traditional automation are part of the middle-welfare category (60% of the total).

Figure 4.12. Informal workers are more exposed to income shocks linked to risks of traditional automation, as most formal workers in the middle-welfare group risk being hollowed out

Distribution of informal and formal workers aged above 15 years at high risk of traditional (Panels A and B) and AI (Panels C and D) automation by welfare group, latest year available



Note: The population of reference are people living in households with at least one worker (household with no workers are excluded). Jobs are considered to be at high risk of traditional automation if they have a significant share of important skills and abilities (more than 25%) that are highly automatable, following Lassébie and Quintini (2022^[12]). Jobs are considered to be at high risk of AI automation if they fall into the highest of four exposure gradients, following Gmyrek et al. (2025^[20]). This gradient includes occupations with both high average task exposure and low exposure variability across tasks, meaning that exposure is high across most tasks performed in the occupation. Welfare classes are defined relative to the household median welfare (income or consumption, depending on the country and survey) observed in each country, using the categories and underlying concepts developed by OECD (2019^[45]). Poor: below 50% of median welfare; lower welfare (or “vulnerable”): between 50% and 75% of median welfare; middle welfare (or “middle class”): 75% and 200% of median welfare; upper welfare (or “affluent”): above 200% of median welfare. KilbIH and regional averages are calculated as simple unweighted averages of countries for which data are available. Source: Estimates based on OECD (2026^[64]), Lassébie and Quintini (2022^[12]) and Gmyrek et al. (2025^[20]).

StatLink  <https://stat.link/zyqud8>

The risk of material welfare loss due to AI automation is concentrated among more affluent workers than for traditional automation. Formal workers highly exposed to AI automation mostly live in middle- (42%) or upper-welfare (52%) households. The figures are similar for at-risk informal workers (57% and 32% respectively) (Figure 4.12, Panels C and D). In reality, given the low shares of workers highly exposed to AI automation risks, the expected overall effects on income levels and distribution is likely to be small, at least in the short term. If technological innovation accelerates and new AI applications (such as agentic models) become able to automate more complex bundles of tasks than is currently possible, many workers who now appear relatively protected could face skills obsolescence (OECD, 2025^[39]; Maslej et al., 2025^[16]; OECD, 2023^[46]). This could weaken their position in formal labour markets and reduce their chances of accessing better-quality jobs.

Conclusion and policy discussion

Throughout the world, technological change has always entailed risks and opportunities for workers. Traditional and AI automation technologies are no exceptions. What makes a significant difference in impacts is the environment in which these technological transitions are taking place. In contrast to developed OECD countries, governments in developing countries often face the dual challenge of high informality and limited fiscal space, which heightens the level of vulnerability of the workforce and restricts the scope for policy response. At the same time, the pace of technology adoption in developing countries may be slower and more conducive to gradual tasks restructuring rather than immediate, large job losses. This is particularly true for generative AI, for which infrastructure and organisational bottlenecks can slow deployment. Ultimately, policymakers have a responsibility to manage the spread of automation technologies. To a large extent, policy action will determine whether the opportunities brought by technological change could outweigh its challenges.

The evidence presented in this chapter shows that traditional automation, if investment and capital deepening were to happen abruptly, could become a mass risk for informal workers, who disproportionately hold low-skill jobs. For AI automation, the magnitude of the risk is more limited and largely contained among few formal and highly educated workers with more adaptive capacities. In this context, a strategy to manage the technological transition could be articulated around the following five pillars: i) invest in education and reskilling; ii) strengthen social protection systems; iii) encourage decent job creation in emerging sectors; iv) regulate automation; and v) address equity issues and profit sharing.

Investing in education and reskilling

As automation technologies create uncertainty and change skills demands, governments and firms must develop skill strategies that prioritise lifelong learning, vocational training and digital literacy to equip workers for new roles. Technical and vocational education and training (TVET) systems are particularly well-placed to respond to shifting task demands, given their direct connections to employers and their capacity to update curricula in response to emerging skill needs (OECD, 2023^[78]). Skills and occupations are central channels shaping exposure to technological replacement, with sectoral composition being one of the characteristics shaping the distribution of risks. For traditional automation risk, exposure is broader and more concentrated in routine-intensive sectors. Predicted automation probabilities across broad sectors show very high risk in manufacturing relative to many services. For AI automation, secondary and tertiary educational attainment significantly increases the probability of being in a high-risk AI automation occupation – even after controlling for the industry composition (the main source of variation in risk).

These results support the need for skill development plans that are task-focused and enable workers to complement the tasks performed by new technologies, coupled with measures that facilitate mobility across sectors and occupations. Specific attention is also needed on foundational skills such as literacy and numeracy, as well as digital skills, problem-solving and interpersonal skills. All of the preceding are

critical for lifelong learning. The high risk of traditional automation faced by workers in the informal economy also requires specific measures to bridge the skills gap for informal workers and facilitate their access to skills development and lifelong learning programmes. Informal workers are less likely to participate in adult education and training, which impedes skills formation and makes the jobs held by informal workers more prone to automation. Such measures could include: recognition of prior learning and the extension of formal TVET programmes to informal economy workers. Community-based and other non-formal training initiatives also represent a critical source of skills for informal workers, as does offering training incentives as part of broader formalisation policies. Apprenticeship programmes, which help build task-relevant skills by embedding structured learning in the workplace, help strengthen employer engagement and improve system responsiveness to shifting skill demands (OECD, 2018^[79]).

Lifelong learning is becoming more and more relevant, amid the changes in skill needs induced by AI technologies. While versatile and transferable skills foster adaptability, the returns to these competencies vary. Digital roles may allow more employment prospects for workers, especially informal ones, but the scale of these gains differs by occupation, educational attainment and country contexts. Skills are critical for professional resilience, inclusion and opportunity, but they must be developed, recognised, valued and used in ways that reflect evolving labour markets and societal needs – across worker's entire life cycle. Lifelong learning must be at the centre of transition strategies to tackle informality and ensure that no one is left behind. Expanding comprehensive, inclusive and forward-looking skills offers is vital for a fast-changing world of work (ILO, 2026^[80]).

Strengthening social protection systems

The analysis of automation risks undertaken in this chapter highlights the importance of strengthening social protection programmes in parallel with the technological transition. The findings show that traditional automation risks disproportionately impact informal economy workers and a meaningful share of households in which all workers are exposed, implying the potential for large welfare loss if displacement occurs. By contrast, individual and household exposure to AI automation risk is much lower and affects disproportionately formal workers from middle/upper classes. This suggests that immediate welfare impacts stemming from AI automation may be smaller, though job transformation remains important.

These concerns call for the strengthening of social protection programmes with a view to establish broad, scalable social protection floors in anticipation of significant shocks linked to traditional automation and, to a lesser extent, AI automation. Such programmes need to be easily and quickly activated to protect all at-risk workers, especially informal workers. Social protection delivery modalities also need to acknowledge the limit of targeting mechanisms in high-informality contexts, where proxy-means testing and other methods can produce substantial inclusion/exclusion errors. As delivery-system quality is often as important as the targeting rule itself (Hanna and Olken, 2018^[81]), three action streams appear critical: i) investing in integrated delivery systems (registries, digital ID where feasible, grievance redress, payment infrastructure, etc.); ii) progressively moving towards universal or quasi-universal floors as capacity and fiscal space allow (Sabates-Wheeler, Hurrell and Devereux, 2015^[82]); and iii) using adaptive targeting (categorical elements plus community validation) to reduce inclusion and exclusion errors and improve legitimacy.

Encouraging decent job creation in emerging sectors

Policies promoting innovation, entrepreneurship and job creation in sectors with low exposure to automation risks can offset or mitigate the impacts of job losses in automated industries. As shown in this chapter, several labour-intensive activities remain at relatively low risk of both traditional and AI automation. This includes jobs in health and social work, accommodation and food, public administration, and professional services. In this context, expanding employment in those labour-intensive sectors – while boosting productivity through better skills, management and digital tools that augment rather than replace

workers – is particularly important and should be integral to any job-rich growth strategy (Nayyar, Vorisek and Yu, 2023^[83]; Rodrik and Sandhu, 2024^[84]; Nayyar, Hallward-Driemeier and Davies, 2021^[85]; African Development Bank, 2025^[86]; García Zaballos, Iglesias Rodríguez and Puig Gabarró, 2020^[87]). In parallel, promoting innovation and effective eco-systems for the clusters of high-productivity firms in AI-intense sectors remains essential to reap the benefits of innovation and support new and highly productive jobs.

Regulating automation

Automation technologies, including generative AI, can bring many benefits to workers and societies. They also present new risks that require thoughtful responses from governments, businesses and individuals. There is a strong rationale for regulating the pace and scope of automation in order to influence technology adoption speed and pervasiveness, protect vulnerable workers, and minimise potential misuse. Often, the challenge is to balance innovation incentives and the need to address potential risks. Diverse approaches have proven effective. Importantly, in a time of rapid technological change, any regulatory efforts may need to frequently evolve and incorporate mechanisms for periodic review and flexibility.

One approach is to enhance existing governance frameworks and develop new regulatory mechanisms to address emerging risks. For instance, to promote safety and avert risks to people, the EU AI Act classifies AI systems into risk categories with different degrees of requirements and obligations embedded.

Another approach is to focus on voluntary commitments from AI firms themselves and to promote co-regulation rather than purely state regulation. Industry actors are expected to develop internal governance systems, conduct risk assessments, implement safety frameworks, disclose incidents, and participate in voluntary standards and codes of conduct (OECD, 2024^[88]). The implication is that the effective frontier of AI capabilities is partially determined by firms' own governance choices. Without credible self-regulation, governments may impose stronger ex-ante restrictions. Industry self-regulation serves both as a safety function, reducing harms and incidents, but also as a legitimate function, preserving public acceptance of AI deployment (OECD, 2025^[89]). From a labour-market perspective, legitimacy may be as important as capability. Occupations are substituted only when society accepts delegation of tasks to AI systems. In this regard, many professional occupations remain protected not by technical bottlenecks alone, but rather by social expectations regarding responsibility, liability, and trust.

Addressing equity issues and profit sharing

If productivity gains are widely shared and workers are provided help to retrain for new tasks, automation can support inclusive growth. Conversely, if gains accrue mainly to owners of capital and a narrow group of innovators, with weak support for displaced workers, automation can widen and deepen inequality. In the absence of policy guidance, automation technologies may amplify inequality and reduce worker bargaining power. Policies that redirect technology, strengthen education and labour-market institutions, and extend social protection can tilt outcomes towards broad societal benefits (Acemoglu (2024^[90]). While social dialogue can play an important role to address equity issues, union coverage and collective bargaining are often weaker in countries with pervasive informality (ILO, 2026^[91]), reducing workers' capacity to negotiate how technology is introduced (task redesign, redeployment, training commitments, and safeguards against abusive monitoring). Evidence from international social dialogue research emphasises that effective bargaining institutions can improve fairness in transitions (including digital transitions) (ILO, 2024^[92]). The interventions may include strengthening or incentivising legal and practical freedoms of association, investing in dispute resolution and sectoral dialogue, and enabling representation models for informal and self-employed workers (through co-operatives, associations or hybrid social-partner structures). Such interventions help to ensure that adoption decisions incorporate job-quality safeguards and training pathways.

Equity is also an issue for many workers and their families. Traditional automation risks are higher for male, low-skilled informal workers living in rural areas. In contrast, women in formal jobs with a high level of skills and living in urban settings are more likely to hold jobs at high risk of AI automation. These findings confirm that certain risks may be concentrated in particular clusters of labour markets. For most occupations, the impacts are more likely to be felt through changes in tasks, skills and working conditions rather than widespread job losses. Strengthening social dialogue, addressing occupational segregation and ensuring women's representation in AI-related roles will be critical to ensuring that technological change supports decent work and advances gender equality (ILO, 2026^[93]).

Annex 4.A. Sensitivity analysis

Traditional automation

Annex Table 4.A.1. Determinants of the risk of traditional automation

Percentage points change in the likelihood of being employed in a job at high risk of traditional automation

	(1)		(2)		(3)		(4)	
	Marginal effect	Robust SE	Marginal effect	Robust SE	Marginal effect	Robust SE	Marginal effect	SE
Age	-0.002***	(0.000)	-0.003***	(0.000)	-0.000**	(0.000)	-0.000***	(0.000)
Female (ref. Male)	-0.067***	(0.004)	-0.051***	(0.004)	-0.061***	(0.004)	-0.031***	(0.004)
Civil status (ref. Single)								
Married	0.001	(0.006)	-0.021***	(0.006)	0.008	(0.006)	0.005	(0.005)
Living together	0.039***	(0.005)	-0.006	(0.005)	0.018***	(0.005)	0.012***	(0.004)
Separated/Divorced	0.055***	(0.006)	0.015**	(0.006)	0.030***	(0.006)	0.022***	(0.006)
Widowed	0.065***	(0.010)	0.015	(0.010)	0.049***	(0.010)	0.040***	(0.009)
Urban (ref. Rural)	-0.127***	(0.005)	-0.071***	(0.004)	-0.075***	(0.005)	-0.026***	(0.004)
Education (ref. No schooling)								
Primary			-0.046***	(0.007)	-0.046***	(0.007)	-0.016***	(0.006)
Secondary			-0.148***	(0.007)	-0.135***	(0.007)	-0.062***	(0.006)
Tertiary			-0.388***	(0.006)	-0.358***	(0.006)	-0.262***	(0.006)
Employment status (ref. Employee)								
Employer					-0.257***	(0.004)	-0.239***	(0.004)
Own-account worker					-0.183***	(0.005)	-0.164***	(0.004)
Contributing family worker					0.104***	(0.008)	0.092***	(0.007)
Earnings categories (ref. Lower tier)								
Middle tier	0.040***	(0.004)	0.036***	(0.003)	0.040***	(0.004)	0.036***	(0.003)
Upper tier	-0.058***	(0.004)	-0.053***	(0.004)	-0.058***	(0.004)	-0.053***	(0.004)
Informal employment (ref. Formal)	0.051***	(0.004)	-0.030***	(0.004)	0.037***	(0.005)	0.017***	(0.004)
Country fixed effects	Yes		Yes		Yes		Yes	
Sector dummies	No		No		No		Yes	
Observations	411 744		411 744		411 744		411 744	

Note: The table reports the marginal effects from logit regressions. The dependent variable is a dummy variable identifying workers employed in jobs at high risk of traditional automation. Robust standard errors (SE) of the estimates are shown in parentheses. Stars (*) indicate the level of statistical significance (* p<0.10; ** p<0.05; *** p<0.01). To account for differences in sample and population size across countries, probability survey weights have been normalised so that each country equally contributes to the estimates. Multiple regressions are run with distinct specifications. Specification (1) controls only for socio-demographic variables, formality status and earnings category; (2) controls also for the educational attainment (based on ISCED classification); (3) further controls for the status in employment; (4) adds sector controls, using one-digit ISIC Rev. 4 and agricultural workers as the reference group. All specifications control for country fixed effects. Regressions cover all countries with available data: Bolivia, Cameroon, Chile, China, the Dominican Republic, El Salvador, Honduras, Mexico, Nicaragua, Nigeria, Peru, Tanzania and Uruguay.

Source: Estimates based on OECD (2026^[64]) and Lassébie and Quintini (2022^[12]).

StatLink  <https://stat.link/k76mcq>

Annex Table 4.A.2. Determinants of the risk of traditional automation for formal and informal workers

Percentage points change in the likelihood of being employed in a job at high risk of traditional automation

	Formal		Informal		Difference	
	Marginal effect	Robust SE	Marginal effect	Robust SE	Significance	Robust SE
Age	-0.000	(0.000)	-0.000*	(0.000)	***	(0.000)
Female (ref. Male)	-0.046***	(0.004)	-0.012*	(0.006)	***	(0.005)
Civil status (ref. Single)						
Married	0.013*	(0.005)	0.007	(0.008)		(0.008)
Living together	0.027***	(0.005)	0.008	(0.007)		(0.006)
Separated/Divorced	0.021***	(0.006)	0.021*	(0.009)	*	(0.009)
Widowed	0.020	(0.016)	0.022*	(0.011)	***	(0.012)
Urban (ref. Rural)	-0.044***	(0.005)	-0.014*	(0.006)	***	(0.005)
Education (ref. No schooling)						
Primary	-0.018*	(0.008)	-0.010	(0.006)	***	(0.007)
Secondary	-0.096***	(0.007)	-0.034***	(0.007)	***	(0.007)
Tertiary	-0.336***	(0.008)	-0.164***	(0.009)	***	(0.008)
Employment status (ref. Employee)						
Employer	-0.148***	(0.011)	-0.272***	(0.006)	***	(0.005)
Own-account worker	-0.091***	(0.008)	-0.172***	(0.005)	***	(0.005)
Contributing family worker	.		0.084***	(0.007)	***	(0.008)
Earnings categories (ref. Lower tier)						
Middle tier	-0.025***	(0.005)	0.042***	(0.004)	***	(0.004)
Upper tier	-0.115***	(0.006)	-0.018***	(0.006)	*	(0.006)
Country fixed effects	Yes		Yes			
Sector dummies	Yes		Yes			
Observations	225 163		186 581			

Note: The table reports the marginal effects from logit regressions. The dependent variable is a dummy variable identifying workers employed in jobs at high risk of traditional automation. Robust standard errors (SE) of the estimates are shown in parentheses. Stars (*) indicate the level of statistical significance (* p<0.10; ** p<0.05; *** p<0.01). To account for differences in sample and population size across countries, probability survey weights have been normalised so that each country equally contributes to the estimates. Regressions are run separately for formal and informal workers. To test whether the estimated marginal effects differ between the two groups, an additional pooled specification is estimated in which each regressor is interacted with informality status (results are not presented in the table). This allows the marginal effect of each variable to vary between formal and informal workers. The “Difference” columns report the statistical significance of the difference between these two marginal effects, based on a t-test of the corresponding interaction term, with robust standard errors shown in parentheses. All specifications include the same set of regressors: age and age squared (the table reports the compounded effect), gender, marital status, location, educational attainment, employment status, earnings quality and sector controls (using one-digit ISIC Rev. 4 and agricultural workers as the reference group). They also control for country fixed effects and cover all countries with available data: Bolivia, Cameroon, Chile, China, the Dominican Republic, El Salvador, Honduras, Mexico, Nicaragua, Nigeria, Peru, Tanzania and Uruguay.

Source: Estimates based on OECD (2026_[64]) and Lassébie and Quintini (2022_[12]).

StatLink  <https://stat.link/ystlnk>

AI automation

Annex Table 4.A.3. Determinants of the risk of AI automation

Percentage points change in the probability of being employed in a job at high risk of AI automation

	(1)		(2)		(3)		(4)	
	Marginal effect	Robust SE	Marginal effect	Robust SE	Marginal effect	Robust SE	Marginal effect	Robust SE
Age	-0.000***	(0.000)	-0.000	(0.000)	-0.000	(0.000)	-0.000	(0.000)
Female (ref. Male)	0.019***	(0.001)	0.017***	(0.001)	0.017***	(0.001)	0.019***	(0.001)
Civil status (ref. Single)								
Married	-0.008***	(0.001)	-0.007***	(0.001)	-0.006***	(0.001)	-0.006***	(0.001)
Living together	-0.013***	(0.001)	-0.008***	(0.001)	-0.008***	(0.001)	-0.007***	(0.001)
Separated/Divorced	-0.012***	(0.002)	-0.008***	(0.002)	-0.008***	(0.002)	-0.007***	(0.002)
Widowed	-0.019***	(0.002)	-0.014***	(0.002)	-0.014***	(0.002)	-0.013***	(0.002)
Urban (ref. Rural)	0.016***	(0.001)	0.012***	(0.001)	0.012***	(0.001)	0.009***	(0.002)
Education (ref. No schooling)								
Primary			0.001	(0.001)	0.001	(0.001)	0.001	(0.002)
Secondary			0.016***	(0.001)	0.016***	(0.001)	0.015***	(0.002)
Tertiary			0.034***	(0.002)	0.033***	(0.002)	0.028***	(0.002)
Employment status (ref. Employee)								
Employer					-0.015***	(0.001)	-0.015***	(0.001)
Own-account worker					-0.005***	(0.001)	-0.008***	(0.001)
Contributing family worker					-0.012***	(0.002)	-0.012***	(0.003)
Earnings categories (ref. Lower tier)								
Middle tier					0.005***	(0.001)	0.004***	(0.001)
Upper tier					0.007***	(0.001)	0.004***	(0.001)
Informal employment (ref. Formal)	-0.029***	(0.001)	-0.020***	(0.001)	-0.015***	(0.001)	-0.012***	(0.001)
Country fixed effects	Yes		Yes		Yes		Yes	
Sector dummies	No		No		No		Yes	
Observations	390 424		390 424		390 424		390 424	

Note: The table reports the marginal effects from logit regressions. The dependent variable is a dummy variable identifying workers employed in jobs at high risk of AI automation. Robust standard errors (SE) of the estimates are shown in parentheses. Stars (*) indicate the level of statistical significance (* p<0.10; ** p<0.05; *** p<0.01). To account for differences in sample and population size across countries, probability survey weights have been normalised so that each country equally contributes to the estimates. Multiple regressions are run with distinct specifications. Specification (1) controls only for socio-demographic variables and formality status; (2) controls also for the educational attainment (based on ISCED classification); (3) further controls for the status in employment and earnings category; (4) adds sector controls, using one-digit ISIC Rev. 4 and agricultural workers as the reference group. All specifications control for country fixed effects. Regressions cover all countries with available data: Bolivia, Chile, China, the Dominican Republic, El Salvador, Honduras, Mexico, Nicaragua, Peru, Tanzania and Uruguay.

Source: Estimates based on OECD (2026^[64]) and Gmyrek et al. (2025^[20]).

StatLink  <https://stat.link/etgv4i>

Annex Table 4.A.4. Determinants of the risk of AI automation for formal and informal workers

Percentage points change in the probability of being employed in a job at high risk of AI automation

	Formal		Informal		Difference	
	Marginal effect	Robust SE	Marginal effect	Robust SE	Significance	Robust SE
Age	0.000	(0.000)	-0.000	(0.000)		(0.000)
Female (ref. Male)	0.028***	(0.002)	0.009***	(0.002)	***	(0.003)
Civil status (ref. Single)						
Married	-0.012***	(0.003)	-0.002	(0.002)		(0.003)
Living together	-0.012***	(0.003)	-0.005***	(0.002)	***	(0.002)
Separated/Divorced	-0.014***	(0.004)	-0.004	(0.004)		(0.004)
Widowed	-0.046***	(0.009)	-0.001	(0.005)		(0.007)
Urban (ref. Rural)	0.014*	(0.006)	0.004	(0.003)		(0.003)
Education (ref. No schooling)						
Primary	0.024*	(0.014)	-0.001	(0.003)		(0.002)
Secondary	0.057***	(0.007)	0.011***	(0.003)	***	(0.002)
Tertiary	0.072***	(0.008)	0.022***	(0.003)	***	(0.003)
Employment status (ref. Employee)						
Employer	-0.042***	(0.007)	-0.012***	(0.003)	***	(0.002)
Own-account worker	-0.031***	(0.006)	-0.007***	(0.001)	***	(0.002)
Contributing family worker	.		-0.013***	(0.003)	***	(0.002)
Earnings categories (ref. Lower tier)						
Middle tier	0.020***	(0.004)	-0.002	(0.001)		(0.002)
Upper tier	0.022***	(0.004)	-0.001	(0.002)		(0.003)
Country fixed effects	Yes		Yes			
Sector dummies	Yes		Yes			
Observations	206 168		184 256			

Note: The table reports the marginal effects from logit regressions. The dependent variable is a dummy variable identifying workers employed in jobs at high risk of AI automation. Robust standard errors (SE) of the estimates are shown in parentheses. Stars (*) indicate the level of statistical significance (* p<0.10; ** p<0.05; *** p<0.01). To account for differences in sample and population size across countries, probability survey weights have been normalised so that each country equally contributes to the estimates. Regressions are run separately for formal and informal workers. To test whether the estimated marginal effects differ between the two groups, an additional pooled specification is estimated in which each regressor is interacted with informality status (results are not presented in the table). This allows the marginal effect of each variable to vary between formal and informal workers. The “Difference” columns report the statistical significance of the difference between these two marginal effects, based on a t-test of the corresponding interaction term, with robust standard errors shown in parentheses. All specifications include the same set of regressors: age and age squared (the table reports the compounded effect), gender, marital status, location, educational attainment, employment status, earnings quality and sector controls (using one-digit ISIC Rev. 4 and agricultural workers as the reference group). They also control for country fixed effects and cover all countries with available data: Bolivia, Chile, China, the Dominican Republic, El Salvador, Honduras, Mexico, Nicaragua, Peru, Tanzania and Uruguay.

Source: Estimates based on OECD (2026_[64]) and Gmyrek et al. (2025_[20]).

StatLink  <https://stat.link/o10rs7>

Annex 4.B. Methodology and data

This chapter measures technical exposure (or susceptibility) to automation, rather than predicting realised job losses. Technical exposure captures the extent to which existing or frontier technologies could, in principle, perform a significant share of the tasks required in a job. Actual labour market outcomes depend on additional factors such as technology adoption costs, regulatory frameworks, firm-level capabilities, and the creation of new tasks and occupations. The analysis therefore follows a task-based approach, in which occupations are understood as “bundles of tasks” that may be differentially affected by technology (OECD, 2023^[46]; Acemoglu and Restrepo, 2019^[62]).

Two complementary dimensions of technical exposure are considered – traditional and AI automation exposure. Both rely on a task-based approach, reflecting the concept that occupations are bundles of tasks, many of which can be automated by technologies. As the extent of the technical replaceability differs from task to task, occupations may be transformed in terms of numbers, contents and the degree of automation of the tasks.

- **Traditional automation exposure** reflects the substitutability of tasks by earlier waves of digital technologies and robotics (up to the early 2020s).
- **AI automation exposure** captures the expanding capabilities of recent generative AI systems, including multi-modal models capable of processing text, voice, images and video.

This dual approach makes it possible to analyse how different technological waves have effects on occupations through distinct channels. It also accounts for the fact that estimates of exposure are sensitive to methodological choices and technological scope. A key strength of this dual approach is that it captures different technological frontiers, allowing comparison between mature automation technologies and emerging AI-driven risks. It also reflects the reality that technological change is cumulative rather than discrete.

A limitation is that both measures remain “technical” rather than behavioural or economic: they do not capture firms’ adoption decisions, institutional constraints or demand-side adjustments. As a result, the estimates should be interpreted as upper-bound exposure indicators rather than forecasts of employment outcomes.

Measuring exposure to traditional automation

The measurement of traditional automation risk follows the approach developed by Lassébie and Quintini (2022^[12]) and subsequently applied in the *OECD Employment Outlook* (OECD, 2023^[46]).

The methodology combines two main inputs:

- **Occupational requirements (O*NET database):** The O*NET database provides detailed information on the skills, abilities and knowledge required for each occupation in the US labour market. Each descriptor is rated according to its importance, using a scale from 1 (“not important”) to 5 (“extremely important”).
- **Expert assessments of automatability:** Expert surveys are used to classify approximately 100 skills and abilities according to their degree of automatability, distinguishing between highly automatable items and bottlenecks to automation (items that remain difficult to automate).

Computing occupation-level exposure indicators and defining high-risk occupations

For each occupation, the analysis computes two indicators:

- the share of important skills and abilities that are highly automatable, and
- the share of important skills and abilities that are bottlenecks to automation.

Occupations are decomposed by skills and abilities necessary to perform them. Each skill and ability is assigned a score ranging from 1 to 5 depending on its importance to perform the related occupation, with 1 indicating “not important” and 5 indicating “extremely important”. The calculation of the share of skills and abilities that are automatable is then done by only retaining those skills and abilities deemed as essentials (importance score of 4 = “very important” or 5 = “extremely important”). Thus, the analysis focuses on core job tasks, avoiding overestimation driven by marginal activities. The decomposition into automatable and bottleneck skills also provides a nuanced view of exposure. A drawback is that the choice of the importance threshold is somewhat arbitrary, and alternative thresholds could yield different exposure estimates. Importance scores are derived from US-based data (O*NET), which may not fully reflect task structures in developing economies.

An occupation is classified as at high risk of traditional automation when at least 25% of its important skills and abilities are highly automatable. This threshold identifies occupations in which a significant share of core tasks is technically substitutable, while recognising that most occupations retain some non-automatable components. Indeed, existing evidence shows that even highly exposed occupations typically have only a minority of fully automatable tasks, implying that job transformation is more likely than complete job disappearance. Because O*NET data are based on US occupations, exposure scores are mapped to international occupational classifications (ISCO) and, using occupational codes, subsequently assigned to workers in the KILBIH microdata. This mapping enables consistent cross-country analysis while acknowledging that task content within occupations may vary across contexts.

A major strength of this approach is that it goes deeper than occupation-level classifications. Working at the level of skills and abilities allows a granular assessment of which components of work are automatable. The approach explicitly states that occupations contain both automatable and non-automatable elements. A potential shortcoming is that the methodology relies on expert judgements, which may become outdated as technologies evolve or reflect subjective biases. In addition, the approach captures primarily pre-generative AI technologies, potentially underestimating exposure in some high-skilled or cognitive jobs affected by recent AI advances.

Measuring exposure to AI automation

AI automation exposure follows Gmyrek et al. (2025^[20]) and is based on:

- **Task-level scoring for nearly 30 000 tasks.** The paper uses a comprehensive global task library, derived from occupational classifications, namely the technical documentation of ISCO-08. This tool breaks each occupation down into hundreds of detailed tasks, similarly to Lassébie and Quintini (2022^[12]). Each task is scored for its potential automation by generative AI.
- **A combination of human expert input and AI-assisted predictions.** The approach directly assesses a subset of tasks (around 2 800 to 3 000) using worker surveys (perceived AI automation potential), expert panels and iterative validation. This labelled subset is then used to train and calibrate an AI system, which predicts automation scores for the full task universe.

Compared to earlier approaches (such as O*NET skills/abilities), this task dataset has much finer granularity, facilitating the capture of specific activities rather than broad skills. It is closer to real work processes, in which tasks are the actual units of production. The dataset is partly built from one national

classification (from Poland, compatible with ISCO-08) and extended globally. This may bias the measurements in other labour markets.

Computing occupation-level exposure indicators and defining high-risk occupations

Each task in the dataset is assigned an automation score between 0 and 1. In turn, these task-level scores are aggregated to the occupational level, producing a mean exposure score across tasks as well as a measure of task variability (dispersion of exposure across tasks). Combining these two dimensions, occupations are then classified into four exposure gradients: i) low exposure (low mean exposure, high variability); ii) moderate exposure; iii) significant exposure; and iv) high exposure (high mean exposure and relatively low variability across tasks). This framework reflects the idea that automation of some tasks does not necessarily imply job displacement as other tasks may still require human input.

In this chapter, occupations are considered at high risk of AI automation when they fall into the highest exposure gradient, i.e. those with both:

- high average exposure to AI across tasks, and
- low exposure variability across the task bundle (i.e. exposure is high across most tasks performed in the occupation).

This definition is conceptually consistent with the threshold-based approach used for traditional automation. It enables meaningful comparison across different technologies while leveraging richer task-level information. This framework is particularly strong in capturing the idea that task heterogeneity matters: even highly exposed occupations may retain non-automatable tasks. The inclusion of variability is an important improvement over simpler averages. The approach may, however, be less intuitive than threshold-based methods. Additionally, the interpretation of gradients can be less straightforward for policy implications.

Data and sources

All empirical results are based on the OECD Key Indicators of Informality based on Individuals and their Households (KIIbIH) database, which harmonises nationally representative household survey data across a large number of developing and emerging economies (OECD, 2026^[64]).

The KIIbIH database provides, among others, detailed information on three major areas:

- **Individual labour market characteristics**, including employment status, industry, occupation, earnings, education, demographic characteristics and location.
- **The formality status of workers**, harmonised across countries based on survey information (e.g. social protection coverage for employees, registration/accounting practices for own-account workers) and following ILO recommendations (ILO, 2018^[66]; ILO, 2013^[94]).
- **Household composition and welfare**, which enables analysis of labour market risks in a household context rather than solely at the individual level.

Because O*NET data are based on US occupations, exposure scores are first mapped to the International Standard Classification of Occupations (ISCO-08) and then assigned to workers in the KIIbIH microdata using their occupational codes. For traditional automation, the chapter uses data from Lassébie and Quintini (2022^[12]), which translates O*NET-based scores into 3-digit ISCO-08 occupational groups. For countries where KIIbIH occupational data are only available at the 2-digit level, estimates are computed by applying the 3-digit distribution of high-risk occupations within each broader 2-digit group. In practice, workers in a 2-digit group are assigned the share of its 3-digit sub-occupations classified as being at high risk of traditional automation. For AI automation, the chapter uses 4-digit ISCO-08 data from Gmyrek et al.

(2025^[20]), mapped to KIIbIH data. When country-level occupational data are only available at the 2- or 3-digit level, the same approach is applied: workers are assigned the average AI automation risk of the corresponding 4-digit occupations within their broader occupational group. Thus, if a 3-digit occupation contains three 4-digit occupations and only one is classified as being at high risk of AI automation, one-third of workers in that 3-digit occupation are counted as being at high risk.

The mapping is done at the level of detail of the occupational variable of the KIIbIH database. As this varies from among countries, it has been standardised with the methodology presented in OECD (forthcoming^[95]). This enables consistent cross-country analysis while acknowledging that task content within occupations may vary across contexts.

A key advantage of KIIbIH is that it allows linking labour outcomes to household-level vulnerability, including the distinction between household socio-economic typologies and their welfare status. This framework enables the analysis of how exposure to automation may translate into welfare risks depending on the degree of income diversification within households.

Notes

¹ Augmentation refers to the use of technology, including AI, to enhance the capabilities of workers rather than replace them (automation). Whereas automation implies that machines take over a human task, augmentation means that humans collaborate closely with machines to perform a task (Raisch and Krakowski, 2021^[97]; Raj, Srivastava and Behera, 2026^[96]).

² Primary activities refer to the direct extraction or use of natural resources, such as agriculture, forestry, fishing, mining and quarrying. It includes ISIC Rev. 4 sectors A and B. Secondary activities refer to the transformation of raw materials and the production of goods, including manufacturing, utilities and construction. It includes ISIC Rev. 4 sectors C to F. Tertiary activities refer to services, including trade, transport, accommodation, finance, public administration, education, health and other service activities. It includes ISIC Rev. 4 sectors G to U.

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5

Informal workers and emerging risks in the era of environmental degradation and climate change

Environmental degradation and climate hazards – such as droughts, floods and extreme heat – pose urgent and growing threats to economic activity and work worldwide. These hazards are particularly pronounced in developing countries, with acute consequences for workers in the informal economy. Drawing on data from the *Key Indicators of Informality based on Individuals and their Households* (KIbIH), this chapter starts by documenting the strong dependence of informal economy workers on the natural environment for their livelihoods. It then assesses the level of risk faced by informal workers in relation to droughts, floods and heat stress based on three dimensions: exposure, sensitivity and adaptive capacity. By highlighting the structural factors that underpin these risks and vulnerabilities, the chapter provides a range of short- and long-term evidence-based policy options to strengthen the resilience of informal economy workers to environmental degradation and climate shocks.

In brief

Environmental degradation threatens the livelihoods of informal economy workers

Informal workers' livelihoods strongly depend on the natural environment

- Across KIIbIH countries, 36% of all workers are employed in sectors that rely directly or indirectly on natural and environmental resources. Informal workers (41%) are far more likely than formal ones (12%) to operate in these sectors, reflecting their involvement in agriculture.
- Environmentally linked jobs are associated with lower earnings, higher poverty rates and higher household informality. On average, the poverty rate of workers operating in environmentally linked sectors (36%) is double that of those in sectors with no environmental link (18%).
- Reliance on the environment is compounded in rural areas, among low-educated workers, and among own-account and contributing family workers.

Droughts and floods disproportionately affect informal workers

- More than 40% of informal workers face medium to high levels of risk from droughts and floods, compared with less than 2% of formal workers. This asymmetry stems from the limited adaptive capacity of informal workers and their large sectoral sensitivity to environmental hazards.
- Should exposure to weather events intensify, the level of risk faced by many informal workers could rapidly increase, putting their livelihoods under greater strain.
- People living in fully informal households are far more vulnerable to droughts and floods. In cases of shocks during which all members may be affected simultaneously, these households have a much lower ability to offset income losses through alternative sources of income, with potentially large negative consequences on the well-being of all household members.

Heat stress is increasingly responsible for large productivity losses among informal workers

- Informal workers are overrepresented in physically demanding jobs, the activities in which productivity losses due to heat stress are largest.
- In 2025, excessive heat reduced working hours by 2.2% across KIIbIH countries, corresponding to a GDP loss of USD 510 billion in purchasing power parity (PPP) terms. This is equivalent to about 60 billion hours of work lost or about 28.8 million full-time jobs. Heat-related productivity losses in 2025 were substantially larger for informal workers (2.4%) than for formal ones (1.4%).
- Under current labour-market structures, productivity losses are projected to increase to 2.8% by 2055, equivalent to an additional 8 million full-time jobs lost.

Securing the livelihoods of informal workers calls for policy responses that combine preparedness, mitigation and adaptation to environmental shocks

- To secure informal workers' livelihoods in the face of environmental degradation and climate risks, governments should focus on five policy objectives: i) consolidate access to traditional and new social protection tools; ii) invest in skills, training and human capital; iii) strengthen occupational safety and health policies and early warning systems; iv) establish comprehensive agricultural and rural development policies to build rural resilience; and v) invest in resilient and quality urban infrastructure.

Introduction

Technological innovation has helped reduce some of the environmental damage associated with industrialisation. Still, the combined effects of multiple factors throughout the 20th and into the 21st centuries – in particular accelerated industrialisation, natural resource depletion, urban sprawl and mass consumption – have placed growing pressure on the natural environment. Emerging environment-related risks have turned into multi-dimensional threats to societies worldwide, and to workers in particular.

Environmental degradation is a complex and multifaceted concept. Broadly, it refers to the deterioration of the environment caused by human or natural causes, including resource depletion, ecosystem and habitat destruction, species extinction and rising pollution. According to Yeganeh (2020^[1]), degradation can be categorised into two types – pollution and deterioration – across five dimensions: atmosphere, hydrosphere, lithosphere, biosphere and food. For example, global warming results from atmospheric deterioration, intensifying climate-related events such as heat waves, droughts and floods. Similarly, land degradation – primarily driven by human activity – falls under lithosphere deterioration and encompasses phenomena such as deforestation and desertification.

Individuals and households face varying levels of risk from adverse events triggered by environmental degradation and climate change, including droughts, floods and extreme temperatures. From a livelihood perspective, these risks arise across three dimensions: exposure, sensitivity and adaptive capacity. Exposure to shocks refers to the presence, frequency and severity of environmental threats. Sensitivity reflects the extent to which individuals and households are likely to be harmed by such threats. Adaptation relates to the capacity of individuals, households and communities to cope with and recover from environmental impacts. Together, the notions of sensitivity and adaptive capacity form the intermediary concept of vulnerability towards environmental degradation and climate change, whose formal definition has evolved over time. Vulnerability can take many forms and span multiple dimensions of individuals' lives – including non-economic ones (Canpolat et al., 2025^[2]). This chapter looks specifically at environment-related vulnerability through the lens of the potential impacts that environmental degradation and climate hazards can have on workers' incomes. (Annex 5.A provides more details on the concepts of risk and vulnerability and the approach adopted in the analysis).

Within this perspective, the situation of workers in the informal economy requires specific attention. The argument developed in this chapter can be summarised as follows. By and large, environmental degradation and resource depletion disproportionately affect some of the world's poorest countries (*exposure*), in which work is often mostly informal. Workers in the informal economy contribute in many ways to environment sustainability through the nature of their tasks and often have a smaller carbon footprint than formal workers. However, they tend to be concentrated in activities that are directly linked to the natural environment, which makes them particularly sensitive to environmental degradation and climate change (*sensitivity*). Finally, informal workers and their households typically lack access to social protection systems, which severely limits their ability to cope with and recover from the socio-economic consequences of environmental degradation (*adaptation*). This limited adaptive capacity is often even more constrained for women, who may face additional barriers linked to unequal access to resources, unpaid care responsibilities and discriminatory social norms.

Importantly, this chapter analyses informal workers' links to the environment insofar as these links can heighten their sensitivity to environmental degradation. Yet, these same links also position informal economy workers as key agents of the green growth agenda and of efforts to mitigate environmental degradation (World Bank, 2024^[3]; Tucker and Anantharaman, 2020^[4]; Longondjo Etambakonga and Roloff, 2019^[5]). In urban areas, for example, the informal economy generates substantial social and environmental value. Activities such as waste picking, recycling and street vending are crucial components of local economies. They can help reduce cities' carbon footprints while providing valuable services at a cost that remains accessible to most residents.

This chapter aims to document the links between the informal economy and the natural environment and assess the level of risk faced by workers in the informal economy as a result of environmental degradation. It then reflects on possible solutions to support their livelihoods and those of their households at a time when more and more countries are pursuing green transition strategies. Drawing on KILBIH data, the first section examines the relative importance of the natural environment for the livelihoods of informal workers. The second and third sections investigate the levels of risk faced by workers in the informal economy in relation to two specific environmental hazards: extreme weather events and heat stress. The chapter concludes by identifying short- and long-term policy options to help reduce and mitigate the vulnerabilities of informal economy workers to environmental degradation.

Workers of the informal economy rely heavily on the natural environment for their livelihoods

To measure the links of workers to the environment, jobs are classified into three categories based on their codes in the fourth revision of the International Standard Industrial Classification of All Economic Activities (ISIC-04). Sectors with a *direct* environmental link either rely directly on natural resources or play a key role in environmental management. Sectors with an *indirect* environmental link are those in which most activities depend on the environment without directly exploiting natural resources (Figure 5.1). All remaining sectors are classified as having no environmental link. Together, sectors with direct and indirect links are referred to as *environmentally linked* sectors.

Figure 5.1. Sectoral linkages to environment

	ISIC level 1	ISIC level 2	ISIC level 3	ISIC level 4
Direct link Sectors using natural resources directly or supporting better environmental management	A = Agriculture, forestry and fishing	All level-2, level-3 and level-4 codes		
	B = Mining and quarrying	All level-2, level-3 and level-4 codes		
Indirect link Sectors in which most of the activity is related to the environment, without directly exploiting natural resources	C = Manufacturing	C-10 = Manufacture of food products C-11 = Manufacture of beverages C-16 = Manufacture of wood and of products of wood and cork, except furniture, manufacture of articles of straw and plaiting materials C-17 = Manufacture of paper and paper products	All level-3 and level-4 codes	
	G = Wholesale and retail trade; repair of motor vehicles and motorcycles		G-462 = Wholesale of agricultural raw materials and live animals G-463 = Wholesale of food, beverages and tobacco	All level-4 codes
	I = Accommodation and food service activities		I-552 = Camping grounds, recreational vehicle parks and trailer parks	All level-4 codes
	N = Administrative and support service activities		N-791 = Travel agency and tour operator activities	All level-4 codes
	R = Arts, entertainment and recreation			R-9103 = Botanical and zoological gardens and nature reserves activities
No link Rest of the economy	All other ISIC-04 sectors			

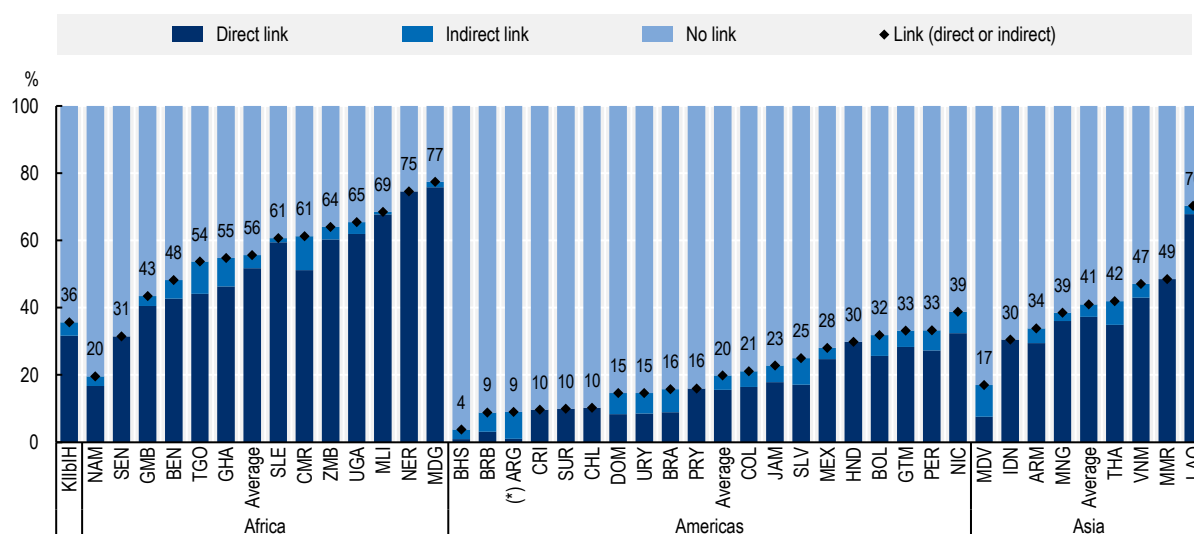
Source: Authors' own elaboration.

Many workers depend on the natural environment for their livelihoods, especially informal workers

Across the KILBIH countries for which sectoral data are available, about one-third of workers rely on the environment for their jobs and livelihoods. On average, 32% of workers' primary jobs have a strong, direct link to the environment, while an additional 4% are indirectly linked (Figure 5.2). Reliance on the environment varies widely across countries but is particularly elevated in Africa and, to a lesser extent, in Asia. In Mali, Lao PDR, Madagascar and Niger, more than two-thirds of the labour force work in sectors that are directly or indirectly linked to the environment, reflecting the central role these activities play in national labour markets.

Figure 5.2. About one-third of workers rely on the environment for their livelihoods

Share of workers aged above 15 years by sectoral link to the environment, latest year available



Note: KILBIH and regional averages are calculated as simple unweighted averages of countries for which data are available. Countries identified by (*) reflect surveys that cover only urban areas. Regional classification of countries follows the geographical grouping of the United Nations' M49 standard.

Source: (OECD, 2026^[6]), "Key Indicators of Informality based on Individuals and their Households (KILBIH)", <https://data-explorer.oecd.org>.

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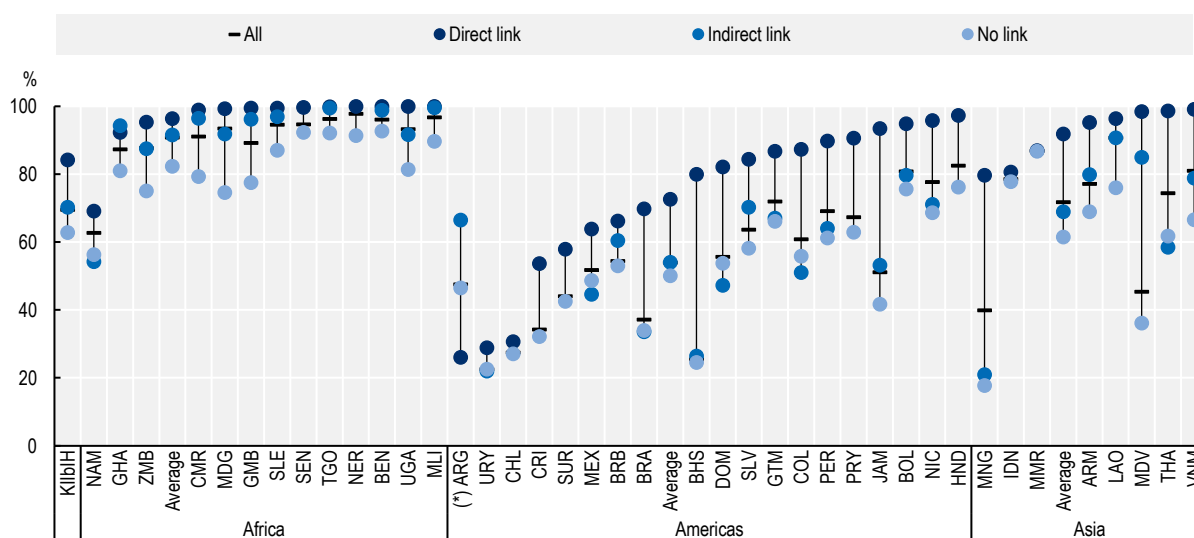
Most environmentally linked jobs are concentrated in agriculture, but not exclusively so. In low- and middle-income countries characterised by a high overall dependence of the labour market on the environment, this reliance primarily stems from the size of the agricultural sector (which is naturally classified as directly linked to the environment). However, dependence on the environment extends beyond agriculture. In Burkina Faso, Liberia, Mali, Mongolia, Togo and South Africa, more than 4% of jobs directly linked to the environment are outside agriculture, often reflecting the importance of the extractive sector in these countries. Many jobs are also concentrated in sectors that indirectly rely on the environment or are located downstream in agricultural value chains. Despite the important role of these jobs, notably for food systems, they often face bias from national and local policymakers and lack adequate public-sponsored support during adverse events such as the COVID-19 pandemic or climate-induced disruptions (OECD/UN-Habitat, 2022^[7]). Overall, across KILBIH countries, up to 4% of jobs are in sectors that depend indirectly on natural resources, ranging from waste management to food processing, wholesale of food

and beverages, ecotourism, and so forth. In Cameroon, Ghana, the Maldives and Togo, KIIbIH data show that these indirect sectors account for more than 8% of total employment.

Workers who operate in an environmentally linked sector are more likely to be in informal employment, and this likelihood increases as the sectoral link to the environment tightens. Across KIIbIH countries, the informal employment rate stands at 84% among sectors with a strong and direct environmental link. The rate drops to 70% among sectors with an indirect link and to 63% for sectors with no link to the environment (Figure 5.3). This cross-sectoral pattern holds true across nearly all KIIbIH countries, notably when the profile of the labour market is more diverse. By contrast, in Africa, where informality is widespread across the economy, differences across sectors are more limited.

Figure 5.3. Informal employment is more common among environmentally linked sectors

Share of workers aged above 15 years in informal employment by sectoral link to the environment, latest year available



Note: KIIbIH and regional averages are calculated as simple unweighted averages of countries for which data are available. Countries identified by (*) reflect surveys that cover only urban areas.

Source: (OECD, 2026^[6]), "Key Indicators of Informality based on Individuals and their Households (KIIbIH)", <https://data-explorer.oecd.org>.

StatLink  <https://stat.link/o6nt0q>

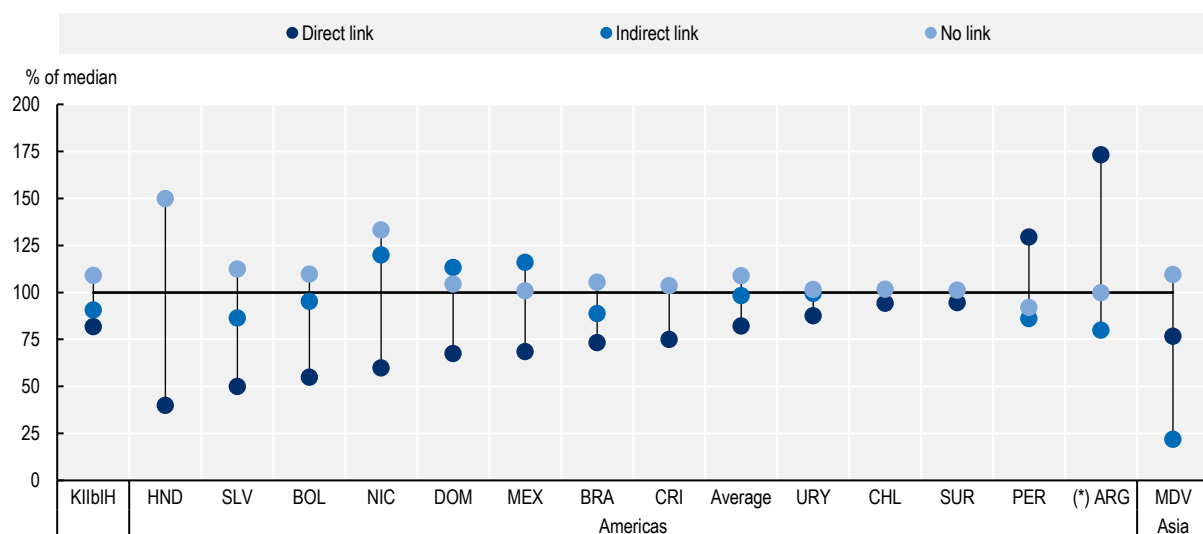
Overall, these informal employment rates translate into informal workers being more concentrated than formal ones in jobs that depend on the natural environment. Across KIIbIH countries, on average, 41% of informal workers (44% for men and 37% for women) hold a job that has a direct or indirect link to the environment, including 37% in jobs with a direct link. In comparison, only 12% of formal workers (15% for men and 9% for women) work in a sector that has a direct or indirect link to the environment, including 9% with a direct link. This asymmetry primarily stems from the larger shares of informal workers who operate in the agricultural sector (36%) compared with formal ones (7%).

Environmentally linked jobs tend to pay less, which disproportionately affects informal workers

In general, KILBIH data show that workers who operate in sectors linked to the environment earn less than the rest of the labour force, which puts informal workers at a greater risk of low-pay jobs. On average, across the 14 countries for which sectoral and income data are available (most of which are located in Latin America and the Caribbean), workers who operate in sectors with a direct environmental link earn 82% of the median labour income compared with 91% of the median labour income for workers in sectors with an indirect environmental link, and 109% of the median labour income for workers in other economic sectors (Figure 5.4).

Figure 5.4. Workers operating in environmentally linked jobs earn less than the rest of the labour force

Labour income of workers aged above 15 years by sectoral link to the environment as a share of national median labour income, latest year available



Note: KILBIH and regional averages are calculated as simple unweighted averages of countries for which data are available. Countries identified by (*) reflect surveys that cover only urban areas.

Source: (OECD, 2026^[6]), "Key Indicators of Informality based on Individuals and their Households (KILBIH)", <https://data-explorer.oecd.org>.

StatLink  <https://stat.link/ng8doi>

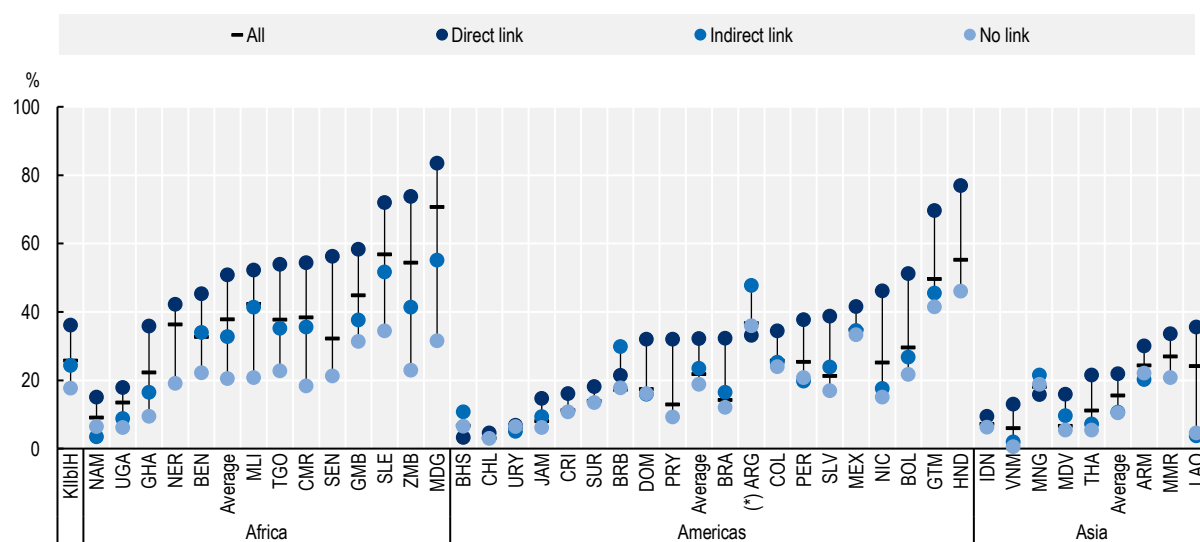
These differences in labour income across sectors conceal large discrepancies between informal and formal workers. The earning disadvantage in environmentally linked sectors seems to be mostly observed among informal workers. Across these same 14 countries, formal workers, including those who operate in environmentally linked sectors, earn far more than the national median labour income. Conversely, informal workers, regardless of whether or not they belong to an environmentally linked sector, tend to earn systematically less than the national median labour income. Moreover, the informal economy tends to be characterised by a much clearer labour income penalty associated with operating in an environmentally linked sector. In Nicaragua, informal workers who have a job with a direct link to the environment earn, on average, 50% of the national median labour income, whereas informal workers in a sector indirectly linked earn 93%, and informal workers in sectors with no link earn 100%. By contrast, formal workers, regardless of which sector in which they operate, earn on average more than 150% of the

national median labour income. A similar gradient is found in Bolivia, where informal workers respectively earn 51% (direct link), 82% (indirect link) and 96% (no link) of the national median labour income, compared with 137% (direct link), 150% (indirect link) and 167% (no link) for formal workers.

Working poverty is also more common in environmentally linked sectors. Across KILBIH countries, the average poverty rate among workers whose main job is directly tied to the environment stands at 36%, compared with 24% for workers whose main job is only indirectly linked, and 18% for workers in sectors with no clear link (Figure 5.5). This pattern is consistent across all KILBIH countries for which data are available. In many African countries (such as Cameroon, Madagascar, Mali, Senegal, Sierra Leone, Togo and Zambia), the gap between workers in direct link and no link sectors is larger than 30 percentage points. In 22¹ of 40 countries with available data, the poverty rate of workers in environmentally linked sectors is at least twice that of no link workers.

Figure 5.5. Workers operating in environmentally linked jobs are more likely to be poor

Poverty rates at national poverty line among workers aged above 15 years by sectoral link to the environment, latest year available



Note: KILBIH and regional averages are calculated as simple unweighted averages of countries for which data are available. Countries identified by (*) reflect surveys that cover only urban areas.

Source: (OECD, 2026^[6]), "Key Indicators of Informality based on Individuals and their Households (KILBIH)", <https://data-explorer.oecd.org>.

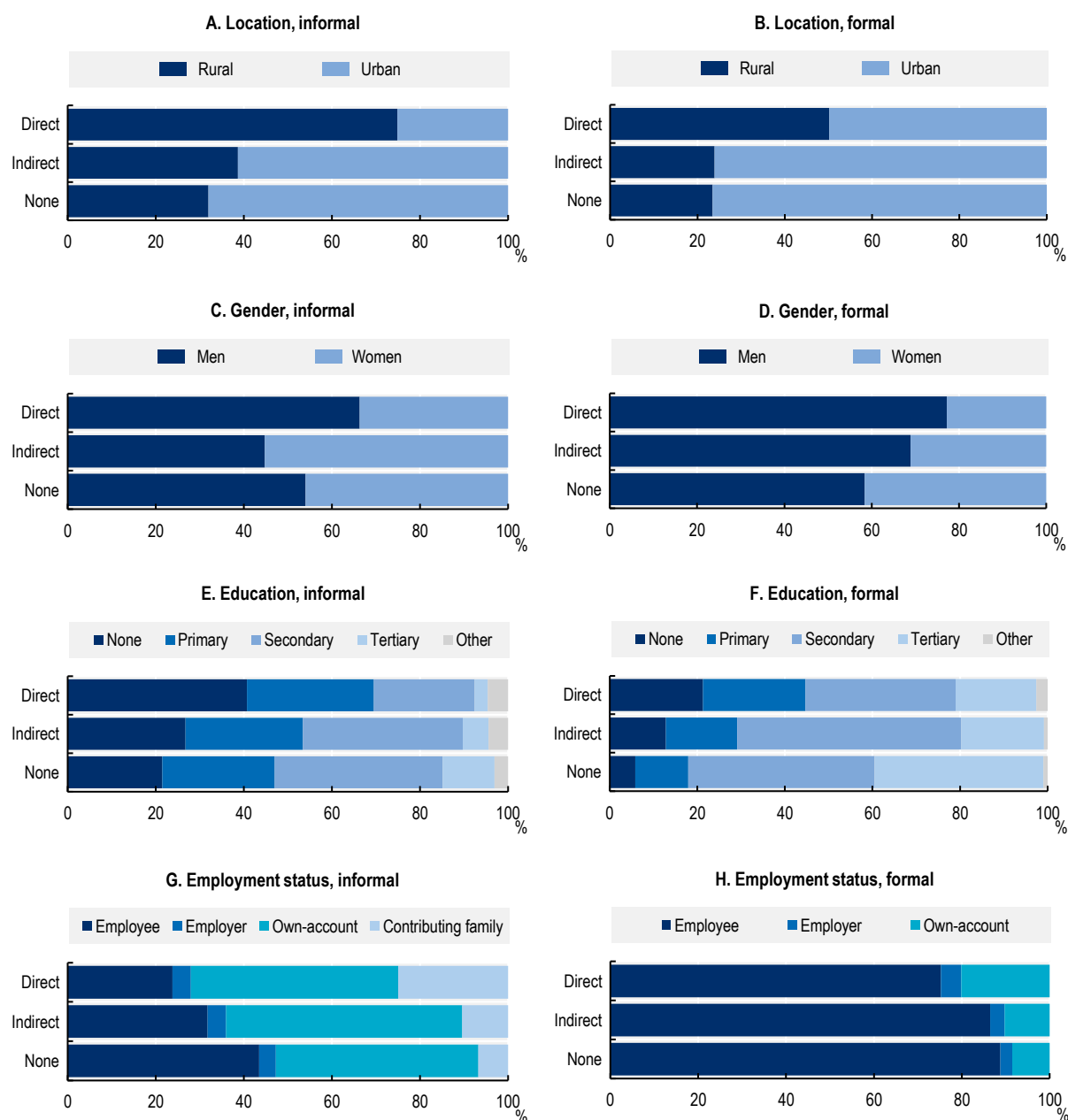
StatLink  <https://stat.link/tnuf4g>

For both formal and informal workers, environmentally linked jobs are concentrated among rural men with low educational attainment

Across KILBIH countries, rural workers are overrepresented in jobs that are directly linked to the environment. In fact, 72% of workers in these jobs live in rural areas, including 75% of informal workers and 50% of formal workers (Figure 5.6). This pattern largely reflects the central role of agriculture (and more generally of the entire primary sector), which is classified as directly linked to the environment and remains concentrated in rural areas. Evidence from KILBIH also shows that rural workers are more likely to be informally employed and to face greater gaps in access to education and training (see Chapter 2).

Figure 5.6. Rural men with low levels of education and employed as own-account workers are more likely to have jobs with a direct link to the natural environment

Distribution of informal (Panels A, C, E and G) and formal (Panels B, D, F and H) workers aged above 15 years according to the environmental link of their job and their location, gender, educational attainment and employment status



Note: KIbIH averages are calculated as simple unweighted averages of countries for which data are available. KIbIH average covers 36 countries in Panels A and B, 39 countries in Panels C, D, E, F, G and H.

Source: (OECD, 2026^[6]), "Key Indicators of Informality based on Individuals and their Households (KIbIH)", <https://data-explorer.oecd.org>.

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Men are more likely than women to work in sectors that directly rely on the environment. On average, men account for about two-thirds (66%) of workers whose job has a direct environmental link. The share rises to 77% among formal workers but remains similar among informal workers (66%) (Figure 5.6). This overrepresentation mainly reflects men's greater involvement in agriculture and, above all, their disproportionate presence in mining and quarrying activities. The gender pattern differs slightly regarding jobs with an indirect link, notably among informal workers, where women account for 55% of employment. This largely reflects women's stronger participation in activities related to the wholesale of agricultural products, food, beverages and tobacco.

These KILBIH findings are mostly in line with other sources. Taking a different lens and focusing on the agrifood system, the Food and Agriculture Organization (FAO) estimates that men account for 58% of employment in agrifood systems (FAO, 2026^[8]). However, because of more limited employment options outside of agrifood systems, women's employment tends to be disproportionately concentrated in such activities, notably in countries where agricultural production remains dominant. Women's informal employment is also particularly pronounced in non-agricultural agri-food systems.

Workers' educational profiles vary markedly in relation to how strongly their jobs are linked to the environment. For both informal and formal workers, educational attainment rises as the environmental link of jobs weakens (Figure 5.6). In effect, jobs directly linked to the environment are disproportionately held by workers with low levels of education. Across KILBIH countries, about two-thirds of workers (66%) in directly linked sectors have no education or only primary education, while only a small minority (6%) have completed tertiary education. This pattern is particularly pronounced for informal workers in directly linked sectors, among whom around 41% have no formal education and fewer than 3% have a tertiary degree (Figure 5.6). Formal workers in direct sectors are better educated than their informal counterparts, but still less so than workers operating in other parts of the economy, where secondary and tertiary education account for a much larger share of employment. Overall, this results in workers with low levels of education being far more likely to be employed in sectors that are directly linked to the environment. Across KILBIH countries, nearly half of workers with no education and more than one-third of those with only primary education work in directly linked sectors, while this share declines sharply with education and reaches very low levels among workers with tertiary education.

Likewise, workers' employment status varies strongly with how closely their jobs are linked to the environment. Jobs directly linked to the environment are disproportionately held by own-account workers and contributing family workers (i.e. helping a family or household member run a business, farm or job, without regular payment), while employees are much more prevalent in sectors with no environmental link. Across the KILBIH, more than two-thirds of workers in directly linked sectors are either own-account workers (43%) or contributing family workers (23%), compared with around one-third in sectors with no environmental link (Figure 5.6). In the informal economy, own-account and contributing family workers account, respectively, for nearly half of employment in directly linked sectors and one-quarter of it. By contrast, among formal workers, employment in directly linked sectors is dominated by employees, reflecting the limited presence of non-standard employment statuses outside informality. Here again, it translates into own-account workers and contributing family workers being far more likely than employees to be concentrated in environmentally linked sectors. Across KILBIH countries, 35% of own-account workers and 59% of contributing family workers operate in jobs directly linked to the environment, whereas most employees (84%) work in sectors with no environmental link. This pattern is especially strong in the informal economy, where non-wage workers are heavily concentrated in environmentally dependent activities.

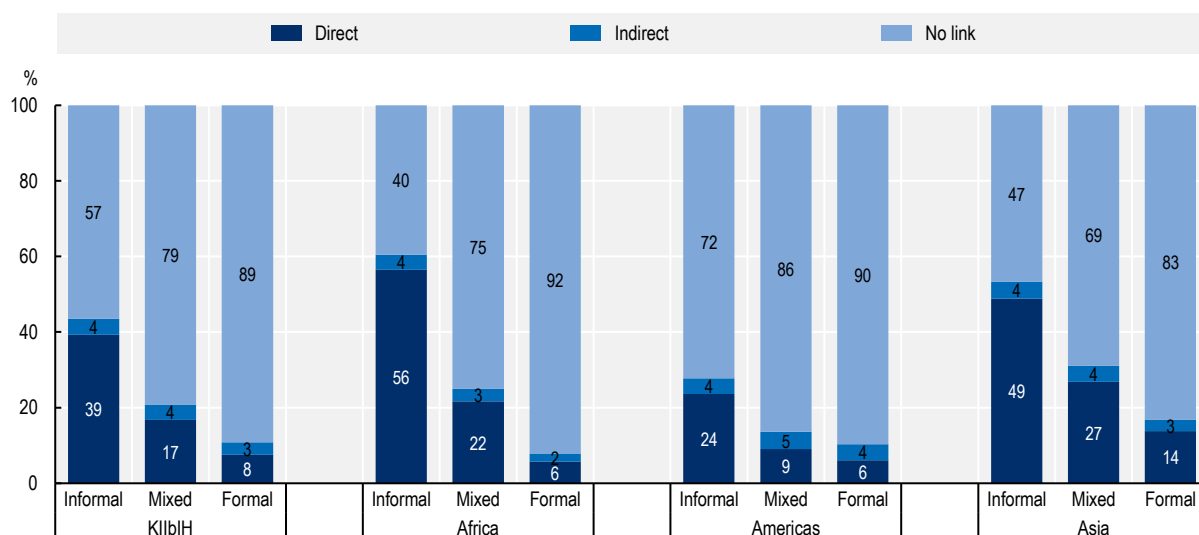
Informal workers' reliance on the natural environment is compounded by the household dimension

Access to resources, livelihoods, labour diversification and coping capacities are largely influenced by the composition of household and living arrangements. This is why workers' reliance on the environment depends not only on the sector in which they operate, but also on whether they live with other household members who also rely on the environment for their livelihoods and may be affected by shocks simultaneously.

Evidence from KIlbIH data points to a strong overlap between environmental dependence at the job level and informality at the household level, with informal households being more likely to depend on the environment for their livelihoods. On average, 39% of workers who live in informal households – in which all working members of the household are in informal employment – operate in jobs with a direct environmental link, compared with 17% in mixed households – in which some working members are in informal employment and others are in formal employment. The share drops to only 8% in formal households (Figure 5.7). Conversely, workers living in formal households are overwhelmingly concentrated in sectors with no environmental link, which account for 90% of their employment.

Figure 5.7. Informal households depend more on the environment than other types of households

Share of workers aged above 15 years by sectoral link to the environment and the informality status of the household in which they live, latest year available



Note: KIlbIH and regional averages are calculated as simple unweighted averages of countries for which data are available. KIlbIH average covers 40 countries; regional averages cover 13 countries in Africa, 19 in the Americas, and 8 in Asia.

Source: (OECD, 2026^[6]), "Key Indicators of Informality based on Individuals and their Households (KIlbIH)", <https://data-explorer.oecd.org>.

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This overlap between environmental dependence and household informality holds across regions, although its intensity varies. In Africa and Asia, around half of workers who live in informal households are employed in sectors directly linked to the environment (56% and 49%, respectively). In the Americas, the share remains substantial at 24%. Across all regions, workers in mixed households occupy an intermediate position, with a higher likelihood of working in environmentally linked sectors (21%) than those in formal

households (11%), but substantially less than those in fully informal households (43%). As potential environmental shocks are more likely to simultaneously affect both labour income and household resources, this concentration of workers with environmentally linked jobs in informal households reinforces their vulnerability. Conversely, formal households tend to benefit from greater labour diversification and insulation from such risks.

Informal workers face high risks from droughts and floods

Climate change is already affecting every region across the globe. Evidence from historical observed climate data shows an increase in frequency of intensity of droughts and heavy precipitation events, which can lead to inland floods (IPCC, 2023^[9]). Human influence has also raised the likelihood of compound extreme events, including the frequency of concurrent heatwaves and droughts and compound flooding in some locations (IPCC, 2023^[9]).

The effects of extreme weather events are not uniform across households. Beyond the direct destruction of assets and infrastructure, such events trigger impacts on labour demand and supply, on-the-job productivity, income and vulnerability among the self-employed, and labour reallocation (Feriga, Lozano Gracia and Serneels, 2024^[10]). The incidence of these labour-market and income shocks largely depends on where people live, the sectors and jobs they rely on, and the resources and institutions they can draw on to cope. Recognising this heterogeneity is central for policymakers and to design adequate adaptation policies: when the most exposed groups are also those with the least capacity to smooth consumption and recover, climate shocks can translate into persistent welfare losses and widen existing socio-economic divides.

A growing body of evidence shows that extreme weather events can have sizeable effects on incomes and inequality, often hitting those with fewer resources the hardest. While labour earnings may be partly stabilised through transfers or substitution across activities – and capital income may, in some contexts, be more exposed to disaster-related losses – the distributional impacts vary markedly depending on the type of disaster and the local context. Studying flash floods in Brazil, Wagner (2025^[11]) shows that income losses are concentrated at the bottom of the income distribution, largely because widespread labour informality leaves lower-income workers – especially those in the informal sector – less protected from disruptions. Heightened income losses are associated with inadequate housing, lack of access to compensation schemes from public and private institutions, and exclusion from formal disaster responses. In the United States, Pleninger (2022^[12]) shows that natural disasters primarily affect middle income households, which may help explain why aggregate inequality measures sometimes show little change following a disaster. Importantly, effects differ widely across sectors, and some workers may even experience short-term cyclical gains. The construction sector, for instance, where informal employment is often prevalent, frequently sees a surge in labour demand in the aftermath of disasters (Wagner, 2025^[11]; Groen, Kutzbach and Polivka, 2020^[13]). Following Türkiye's 2023 earthquakes, Akarsu et al. (2026^[14]) find that women, younger and less-experienced workers, as well as those earning lower wages, were hit hardest, facing both higher job losses and steeper wage declines. By contrast, construction workers experienced relative gains. Beyond income effects, Higa (2025^[15]) highlights that in Peru, high temperatures reduce hours worked but the effect is primarily concentrated among informal jobs rather than among weather-exposed industries. The findings suggest that informal workers are more affected (i.e. working fewer hours) irrespective of the sector in which they work. This points towards multiple impact channels: demand shocks, infrastructure gaps (notably at home) and care burdens intensified by heat.

Exposure to extreme weather events and their frequency shape the overall risk faced by workers as well as their resilience (or lack thereof). Multiple and severe disasters tend to generate larger income losses (Pleninger, 2022^[12]). If countries are unable to restore a fair distribution of income and resources, notably where inequality is already high, as well as broader access to social protection and health services,

increasingly recurrent shocks can crowd out adaptation efforts and further undermine resilience (Cappelli, Costantini and Consoli, 2021^[16]). Yet, prior experience can also help attenuate impacts, as areas that have experienced natural disaster in the past are often better prepared than locations where a “surprise” effect can have dramatic human and economic consequences (Pleninger, 2022^[12]).

Against this backdrop, this section examines the risks from droughts and floods faced by workers, notably those in informal employment, using a three-dimension framework of exposure, sensitivity and adaptive capacity tailored to weather events (Box 5.1).

Box 5.1. Measuring drought and flood risks: Concepts and methodological approach

The methodology to measure the levels of risk from weather events builds on a theoretical framework combining three core dimensions: exposure, sensitivity and adaptation. Together, the dimensions of sensitivity and adaptive capacity form the sub-concept of vulnerability. This framework is then adapted and operationalised in the context of droughts and floods. Annex 5.A provides more details on the risk framework adopted and the approach implemented to measure risk levels from droughts and floods.

- **Exposure** is measured using data from the Emergency Events Database (EM-DAT)¹ for the period 2000-23. For each KIIbIH country, data on droughts and floods are aggregated at the sub-national administrative level, using the Global Administrative Unit Layers (GAUL) level 1 classification developed by the FAO. These data are then linked to population data using the same GAUL framework. For both drought and floods, exposure is measured by normalising the total annual duration of events over the reference period and classifying the resulting indicator into three exposure levels: low (0-1 month per year); medium (1-2 months per year); and high (more than 2 months per year).
- **Sensitivity** is measured through the sectoral link of jobs to droughts and floods – i.e. the degree to which a sector could be negatively affected by these hazards. Jobs are classified into three categories – direct, indirect and no/weak sensitivity – based on their ISIC-04 codes. This sensitivity classification is tailored specifically and separately for droughts and floods, and slightly differs from the environmental link classification outlined in the first section of the chapter. Annex 5.A provides more details on the sensitivity classification of sectors for both droughts and floods.
- **Adaptive capacity** is measured using the formality or informality status of workers aged 15 years and above as a proxy. As informal workers are usually excluded from employment-based social insurance, their adaptive capacity to job loss and income shocks is considered lower than that of formal workers.

All three dimensions are combined to build three levels of risks from weather events – low, medium and high (Figure 5.8).

Figure 5.8. Definition of levels of risks from weather events

Formal employment					Informal employment				
		Sectoral sensitivity					Sectoral sensitivity		
		None	Indirect	Direct			None	Indirect	Direct
Exposure	Low [0-1 month/year]	Low	Low	Low	Exposure	Low [0-1 month/year]	Low	Low	Medium
	Medium [1-2 months/year]	Low	Low	Medium		Medium [1-2 months/year]	Low	Medium	High
	High [>2 months/year]	Low	Medium	High		High [>2 months/year]	Medium	High	High

Source: Authors' own elaboration.

Note:

1. EM-DAT is an international disaster database produced by the Centre for Research on the Epidemiology of Disasters. EM-DAT contains data on the occurrence and impacts of over 27 000 mass disasters worldwide from 1990 to present, including droughts and floods. The database is compiled from various sources, including UN agencies, non-governmental organisations, reinsurance companies, research institutes and press agencies.

Exposure to droughts and floods varies widely across countries in both frequency and intensity

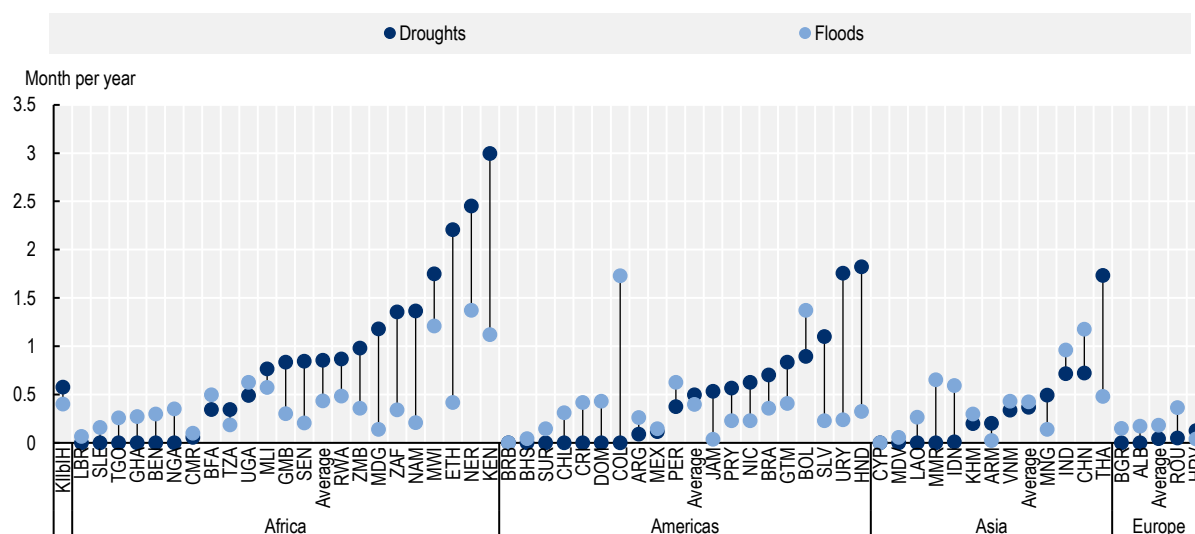
Countries differ widely in their **exposure** to these shocks, both in frequency (how often they occur) and intensity (how severe they are). EM-DAT data for 2000-23 show clear contrasts between the two hazards. Droughts are relatively rare but long-lasting.² Over this period, KIIbIH countries experienced (on average) about one drought, with a mean duration of under six months. Floods, by contrast, were more frequent, with an average of seven events per country, but of much shorter duration, with a mean duration of only one month. On average, KIIbIH countries experienced 0.5 months per year of droughts and 0.4 months of floods, with extremely large variations across countries (Figure 5.9).

Data also suggest that regions face different types of challenges. Among KIIbIH countries, African countries are the most affected by droughts. Between 2000 and 2023, 7³ of the 22 African countries included in the analysis experienced average yearly drought durations exceeding one month. On average, the African region faced a yearly drought duration of 0.9 months, compared with 0.5 months in the Americas, 0.4 months in Asia and less than 0.1 months in Europe. In several African countries, including Ethiopia, Kenya, Malawi and Niger, droughts are both recurrent and long-lasting, reflecting their slow-onset character and the sustained pressure they place on livelihoods that depend on rain-fed agriculture and natural resources. By contrast, flood exposure is more unevenly distributed across regions and driven by a smaller number of highly affected countries such as Bolivia, the People's Republic of China (hereafter "China"), Colombia, Kenya, Malawi and Niger, in which the average yearly flood duration exceeds one month. This diversity of countries reflects the frequency of localised flood events occurring across different parts of large and climatically diverse territories. While individual flood events are typically short-lived, their recurrence throughout the year can result in high cumulative exposure, increasing the likelihood of repeated disruptions to work and income. Overall, the coexistence of slow-onset and rapid-onset hazards

implies that workers may face different types of climate-related risks over time, often through distinct transmission channels.

Figure 5.9. Exposure to droughts and floods varies substantially across countries

Normalised yearly duration of droughts and floods over the period 2000-23



Note: For each country, the average yearly duration of droughts and floods is calculated as the unweighted average of the mean yearly duration of events in each administrative area (using the FAO GAUL level 1 typology) over the period 2000 to 2023.

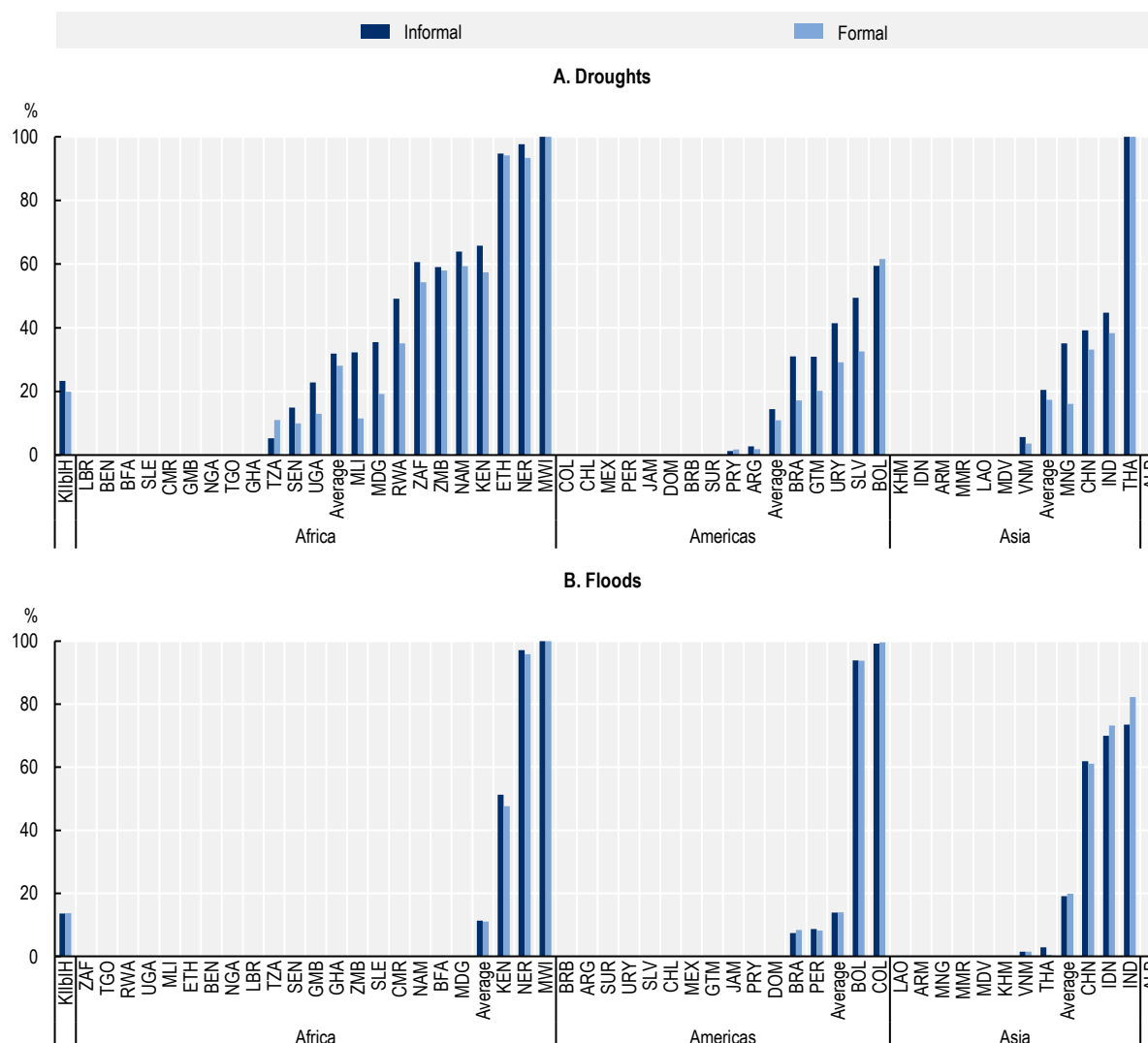
Source: (UCLouvain / CRED, 2025^[17]), Emergency Events Database (EM-DAT), <https://www.emdat.be>.

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Together, these patterns highlight that risks from weather events are shaped not only by whether countries are exposed to droughts or floods, but also by the nature of that exposure. Droughts tend to generate prolonged and widespread stress, particularly in low-income and agriculture-dependent settings, while floods create repeated, localised shocks that can disrupt livelihoods multiple times within a year. Examination of population exposure shows no major differences between formal and informal workers. On average, across the KILBIH, the shares of formal and informal workers who live in areas where the average yearly duration of droughts and floods was larger than one month per year are nearly identical (Figure 5.10). In other words, in most countries the informality status cuts across geographical locations, exposing all workers to the same risks. Yet, for informal workers, who often lack savings, insurance and adequate housing conditions, as well as access to social protection and infrastructure, both types of exposure can translate into heightened income volatility and limited capacity to recover between shocks.

Figure 5.10. Exposure of informal and formal workers to droughts and floods is similar

Share of informal and formal workers aged above 15 years who, on average over the period 2000-23, have been exposed to more than one month per year of droughts (Panel A) and floods (Panel B)



Source: (UCLouvain / CRED, 2025^[17]), Emergency Events Database (EM-DAT), <https://www.emdat.be>; and (OECD, 2026^[6]), "Key Indicators of Informality based on Individuals and their Households (KilbIH)", <https://data-explorer.oecd.org>.

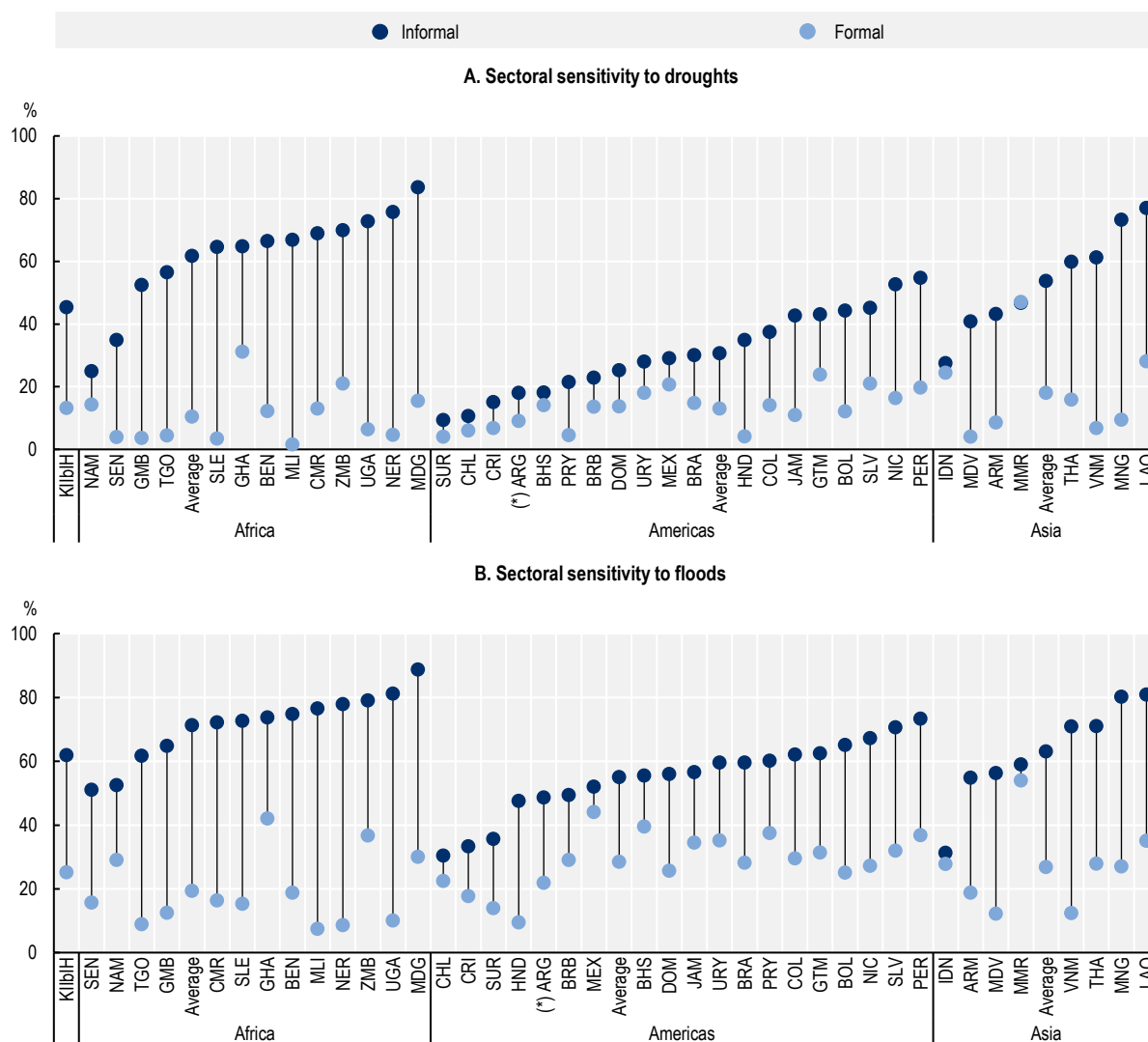
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Informal workers are particularly sensitive to weather events

Although exposure captures how often and intensely countries are affected by droughts and floods, it does not necessarily indicate which workers are most likely to be affected. The effects of weather events also depend on workers' **sensitivity**, that is, the extent to which their jobs are concentrated in sectors that can be directly or indirectly affected by these hazards (see Annex 5.A for more details on the classification of drought- and flood-sensitive sectors). The dimension of sensitivity is independent of that of exposure. For example, a worker may be employed in a drought-sensitive sector without living in a drought-prone area. Conversely, even in areas facing similar levels of exposure, workers may experience very different risks, depending on their sector of employment and their employment status.

Figure 5.11. Informal workers are disproportionately employed in sectors exposed to droughts and floods

Share of informal and formal workers aged above 15 years employed in sectors that have a direct or indirect link to droughts (Panel A) and floods (Panel B), latest year available



Note: KilbIH and regional averages are calculated as simple unweighted averages of countries for which data are available. Countries identified by (*) reflect surveys that cover only urban areas.

Source: (OECD, 2026^[6]), "Key Indicators of Informality based on Individuals and their Households (KilbIH)", <https://data-explorer.oecd.org>.

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Data show that sensitivity to weather events varies markedly between informal and formal workers. For both types of events and across all regions, informal workers are consistently more likely than formal workers to be employed in sectors that can be directly or indirectly affected by these hazards. This sensitivity largely reflects the disproportionate employment of informal workers in agricultural activities. For droughts, on average, 45% of informal workers operate in drought-sensitive sectors compared to 13% of formal workers (Figure 5.11, Panel A). The gaps between informal and formal workers attain

51 percentage points in Africa and 36 in Asia. Overall, in 17⁴ of 40 countries for which sectoral data are available, more than half of informal workers are employed in drought-sensitive sectors, while the share of formal workers operating in these sectors rarely exceeds 20%. For floods, a similar pattern exists although the sensitivity of both informal and formal workers is larger, reflecting the wider set of sectors that could be potentially affected by floods. On average across KIbIH countries, 62% of informal workers operate in flood-sensitive sectors compared with 25% of formal workers (Figure 5.11, Panel B). In nearly all countries, more than half of the informal labour force operates in such sectors.

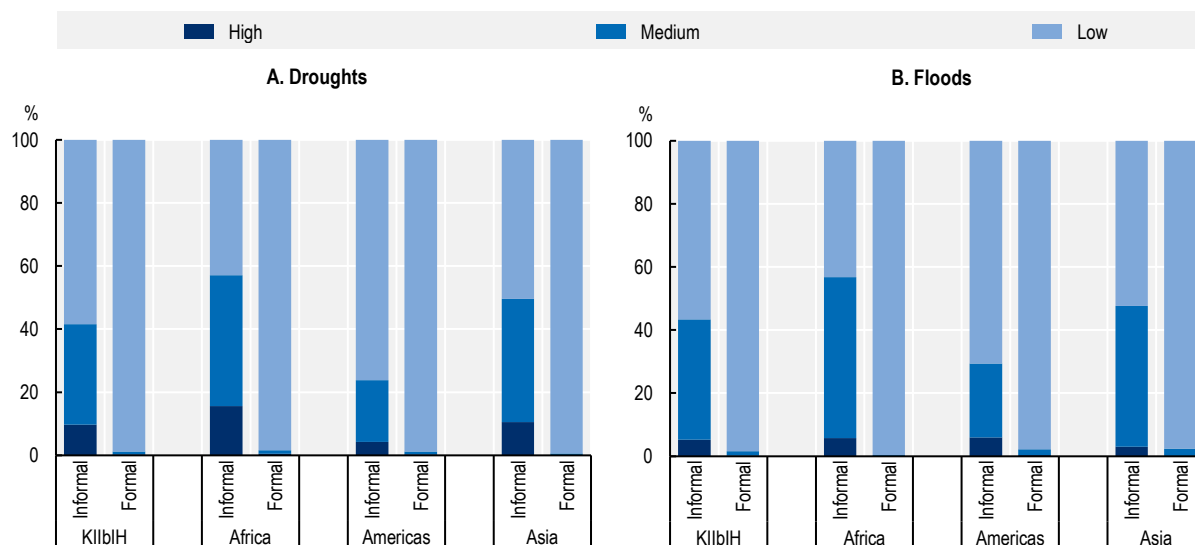
A higher sensitivity to droughts and floods, combined with reduced adaptive capacity, places informal workers at greater risk

Measuring risk as the combination of exposure, sensitivity and adaptive capacity shows that around one in three workers across KIbIH countries face medium to high levels of risk from droughts and floods.

These risks are more pronounced for informal workers, who typically lack access to employment protection, insurance mechanisms or adaptive technologies, and are also more exposed to disruptions caused by droughts or floods. Large variations exist across regions, with informal workers from African and Asian countries facing the highest levels of risk (Figure 5.12). Across 36 countries with available data, 10% of informal workers face high levels of risk from droughts and 32% face medium levels, compared with about 1% of formal workers who face either medium or high levels (Figure 5.12, Panel A). Similarly, 5% of informal workers face high levels of risk from floods and 38% face medium levels, compared with less than 2% of formal workers (Figure 5.12, Panel B). Of 36 countries analysed, more than half of informal workers face medium to high levels of risk from droughts in 11⁵ countries and from floods in 14⁶ countries.

Figure 5.12. Informal workers face greater risks from droughts and floods than formal ones

Share of informal and formal workers aged above 15 years by the level of risk they face from droughts (Panel A) and floods (Panel B)



Note: KIbIH and regional averages are calculated as simple unweighted averages of countries for which data are available for three dimensions: exposure (weather event); sensitivity (sectors); and adaptive capacity (informal status). KIbIH average covers 36 countries; regional averages cover 13 countries in Africa, 15 in the Americas, and 8 in Asia.

Source: (UCLouvain / CRED, 2025^[17]), Emergency Events Database (EM-DAT), <https://www.emdat.be>; and (OECD, 2026^[6]), "Key Indicators of Informality based on Individuals and their Households (KIbIH)", <https://data-explorer.oecd.org>.

The decomposition by risk dimensions highlights that medium-to-high risks are primarily driven by the combination of workers' informal status (low adaptive capacity) and their sectoral link to the hazard (high sensitivity), rather than by exposure alone. For both droughts and floods, most workers facing medium risk levels are informal workers who operate in sectors that can be directly affected by these hazards, but who live in areas with low exposure. Workers who face high risk levels tend to have a similar profile (informal with direct sectoral link) but live in areas that are more prone to droughts and floods. Conversely, risks rarely exceed low levels among workers with only a weak sectoral link to either hazard, regardless of where they live.

These insights suggest that should weather events intensify, the level of risk faced by many workers could rapidly increase. This is notably the case for informal workers who work in a drought- or flood-sensitive sector and already face medium risk levels at current exposure levels. For both hazards, these workers account for about one-quarter of the labour force across KIIbIH countries. A worsening in hazard frequency, duration or intensity would shift their exposure component upward, tipping a sizeable share of the workforce into high risk levels – even without changes in the sectoral or informal composition of the labour market. Importantly, under such a scenario, formalisation alone would not necessarily eliminate risks. If exposure becomes medium to high in hazard-prone areas, workers whose livelihoods depend on hazard-sensitive sectors would still face elevated risks of income and employment disruption, even if they formalise.

If the aggravation of events were very large, a second, more structural dynamic could emerge. Informal workers currently with low exposure and no (or weak) sectoral sensitivity, but low adaptive capacity, could progressively “move” along the risk continuum and face, over time, medium levels of risk as exposure expands geographically and temporally. In other words, workers currently shielded by their location could become more regularly affected, increasing their level of risk. In this regard, adaptation strategies should target not only workers at high risk today but also anticipate future transitions by prioritising: i) informal workers in hazard-sensitive sectors who already sit close to the medium/high threshold; and ii) informal workers with a weak sectoral link but who live in areas in which exposure is likely to rise.

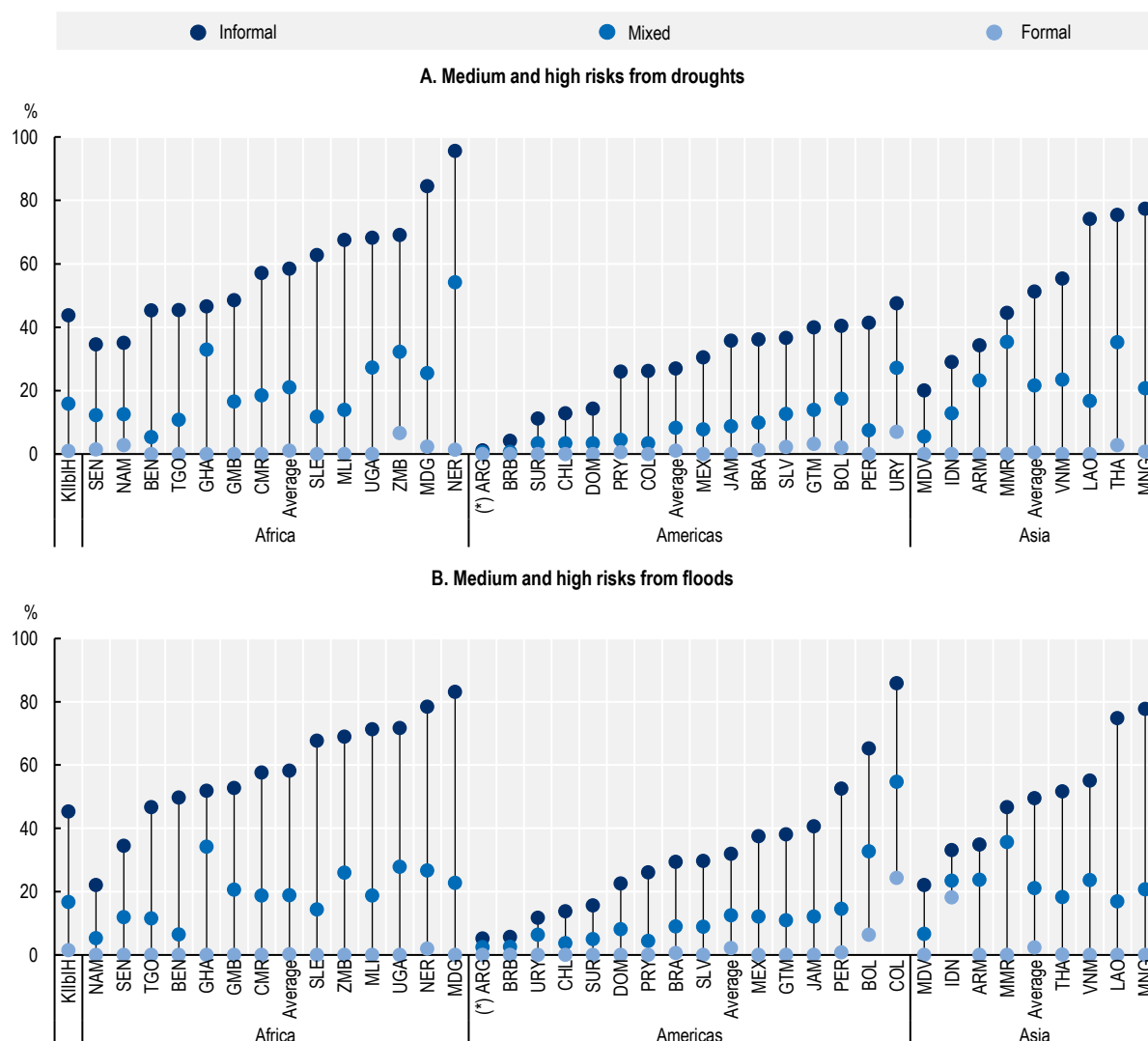
Overall, these dynamics are likely to be non-linear and path dependent. Repeated or overlapping shocks can erode coping capacity (e.g. savings, assets, health and debt position), which can progressively reduce adaptive capacity – including among workers who are currently formal. As a result, future increases in exposure may translate into larger-than-proportional increases in medium to high risk, especially for groups already concentrated near the risk thresholds.

Informal workers' risks from droughts and floods are amplified at the household level

A disproportionate concentration in households in which all members are informally employed exacerbates the risks of informal workers from droughts and floods. Across KIIbIH countries, 44% of workers who live in fully informal households face medium to high risks from droughts, compared with 16% of those in mixed households and less than 1% of those in fully formal households (Figure 5.13, Panel A). The pattern is identical regarding floods, with workers who belong to fully informal households facing far greater risks than the working members of other households (Figure 5.13, Panel B).

Figure 5.13. Fully informal households face greater risks from droughts and floods

Share of informal and formal workers aged above 15 years who face medium and high levels of risk from droughts (Panel A) and floods (Panel B) by the informality status of the household in which they live, latest year available



Note: "Informal" means that all working members of the household are in informal employment. "Mixed" means that some working members are in informal employment and others are in formal employment. "Formal" means that all working members of the household are in formal employment. KilbIH and regional averages are calculated as simple unweighted averages of countries for which data are available. Countries identified by (*) reflect surveys that cover only urban areas.

Source: (UCLouvain / CRED, 2025^[17]), Emergency Events Database (EM-DAT), <https://www.emdat.be>; and (OECD, 2026^[6]), "Key Indicators of Informality based on Individuals and their Households (KilbIH)", <https://data-explorer.oecd.org>.

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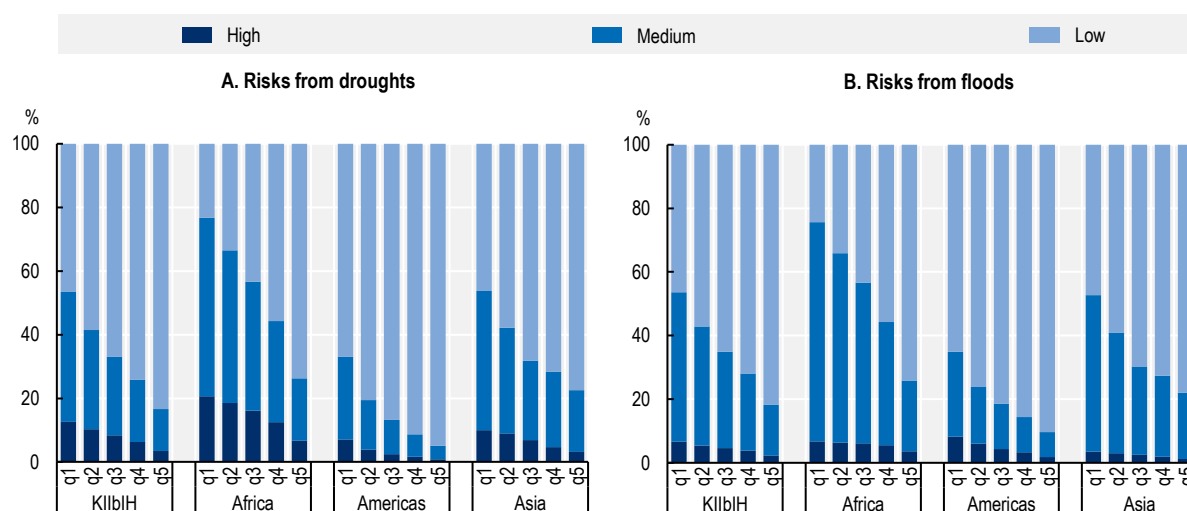
Poverty is also a key dimension of workers' vulnerability to weather events, especially for those in informal employment – with large overlaps across these two realities. On average across KilbIH countries, more than half of workers living in households belonging to the poorest welfare quintile (Q1) face medium to high levels of risks from droughts and floods (Figure 5.14, Panels A and B), and nearly all of them are informally employed. As household welfare rises, the share of workers facing medium to high risks declines. In the richest quintile (Q5), fewer than 20% of workers face medium to high risks from either

hazard. The gradient is particularly steep in Africa, where the share of workers facing medium to high risks from droughts falls by around 50 percentage points – from over 75% in the poorest quintile to about 25% in the richest. This highlights the combined effects of widespread informality, the central role of agriculture within the poorest segments of the population, and the continent’s relatively high exposure to droughts and floods.

Poverty rates are much higher among workers who face greater environmental risks, especially among at-risk informal workers. On average across KIIbIH countries, poverty affects 39% of informal workers who face medium to high risks from droughts (37% for floods), compared with 22% of informal workers who face low risks (23% for floods). By contrast, 28% of formal workers who face medium to high risks from droughts are poor (7% for floods).

Figure 5.14. Poorer households face greater risks from droughts and floods

Share of workers aged above 15 years by the level of risk they face from droughts (Panel A) and floods (Panel B), across household welfare quintiles



Note: KIIbIH and regional averages are calculated as simple unweighted averages of countries for which data are available for exposure (weather event), sensitivity (sectors) and adaptive capacity (informal status), as well as welfare. Depending on the survey, welfare quintiles are computed based on household consumption, expenditure or income. KIIbIH average covers 36 countries; regional averages cover 13 countries in Africa, 15 in the Americas, and 8 in Asia.

Source: (UCLouvain / CRED, 2025^[17]), Emergency Events Database (EM-DAT), <https://www.emdat.be>; and (OECD, 2026^[6]), “Key Indicators of Informality based on Individuals and their Households (KIIbIH)”, <https://data-explorer.oecd.org>.

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Heat stress disproportionately affects the productivity and income of informal economy workers

One major consequence of climate change is global warming, which increases both the frequency and intensity of extreme heat events, including heatwaves (IPCC, 2023^[9]). As these events multiply, the risk of heat stress rises because workers are exposed to high temperatures for longer periods, and potentially at levels that exceed what the human body can safely tolerate. Heat stress is a health hazard that occurs when the heat received by the body exceeds its capacity to dissipate excess heat through physiological mechanisms such as sweating and cardiovascular regulation, without causing impairment (Kjellstrom

et al., 2016^[18]). As extreme heat events become more frequent, more intense and last longer, periods during which ambient temperatures, humidity and solar radiation exceed these physiological thresholds become more common.

Such excessive heat can have severe short- and long-term health consequences. It notably impairs the body's ability to maintain a stable internal temperature, leading to physical strain. In severe cases, it can cause adverse health outcomes ranging from mild conditions such as heat rash, heat cramps and heat exhaustion to potentially fatal heatstroke (NIOSH, 2026^[19]). Beyond acute health outcomes, growing evidence also underlines a range of longer-term and chronic health consequences of repeated heat exposure, such as developing serious and debilitating chronic diseases, impacting the cardiovascular and respiratory systems, and negatively affecting kidney function (Flouris et al., 2024^[20]). For pregnant women, heat stress can lead to a wide range of adverse health effects, including preterm birth, low birth weight, congenital anomalies and still birth (Lakhoo et al., 2025^[21]).

Heat stress can also severely degrade labour productivity. Excessive body temperature and dehydration not only increase the risk of heat exhaustion and heat stroke, but may also slow work, raise the likelihood of errors while working, and increase the risk of occupational injuries (Kjellstrom et al., 2017^[22]). The productivity loss due to workers slowing down already results in billions of potential hours of work lost. In turn, this can be expressed in millions of full-time equivalent job losses or in terms of monetary economic loss. Based on this chain of causality, the International Labour Organization (ILO) estimated that global economic losses linked to heat stress could rise from USD 280 billion in 1995 to USD 2.4 trillion by 2030 (ILO, 2019^[23]). Similarly, the Lancet Countdown estimated that reduced labour capacity due to heat exposure resulted in global potential income losses of around USD 1 trillion in 2024, equivalent to 0.97% of global gross domestic product (GDP) – with the largest relative losses occurring in less advanced economies (Romanello et al., 2025^[24]). In aggregate, these economic impacts of heat may be even larger and extend well beyond individual effects on labour productivity (Callahan and Mankin, 2022^[25]; Miller et al., 2021^[26]; Diffenbaugh and Burke, 2019^[27]). For instance, excess heat that leads to school closures or reduced working hours in certain sectors may aggravate economic losses.

The impacts of heat on labour productivity depend strongly on the nature of the job and the conditions under which it is performed. Productivity losses are particularly severe in activities that involve heavy physical effort (such as agriculture, construction and mining), which tend to employ more men, and other labour-intensive occupations, notably indoor manufacturing activities without cooling (such as textile factories, notably in Southeast Asia), where women are often overrepresented. In these jobs, tasks often require sustained physical exertion in environments in which exposure to high temperatures cannot easily be avoided or mitigated. In these contexts, heat stress can rapidly translate into sharp productivity losses, shorter working hours or work stoppages, with direct consequences for earnings, especially where income is closely tied to daily output or hours worked. Other factors may amplify these effects. Working outdoors without shade or indoors with poor ventilation, and the need to wear heavy or protective equipment, can all intensify heat stress by limiting the body's ability to dissipate heat. Importantly, high temperatures can also impair productivity in less physically demanding jobs. In situations of inadequate indoor cooling or ventilation, excessive heat can make it difficult to perform even basic office and desk-based tasks due to mental fatigue, reduced concentration and discomfort.

Building on the approach developed by Kjellstrom et al. (2017^[22]) and ILO (2019^[23]), which examined heat-related productivity losses across all workers regardless of informality status or location, this section applies a similar framework to estimate productivity losses associated with historical and projected heat exposure, with a specific focus on informal workers (Box 5.2).

Box 5.2. Measuring heat-related productivity losses: Concepts and methodological approach

The methodology to estimate productivity losses associated with heat exposure builds on the approach developed by Kjellstrom et al. (2017^[22]) and ILO (2019^[23]). In these studies, temperatures and associated productivity losses are computed at a fine spatial resolution using climate grid cells. Population data are then overlaid at the grid-cell level using Columbia University's *Gridded Population of the World* dataset. To estimate productivity losses across sectors, national employment-to-population ratios are applied uniformly across all grid cells for agriculture, construction, industry and services, constituting a strong and potentially biased assumption.

While the methodology developed in this chapter follows a similar overall approach to compute temperature levels and associated productivity losses, it produces these estimates at the level of countries' administrative areas. In parallel and at the same spatial scale, the approach relies on KIIbIH geolocated household microdata to generate population and sector-specific labour estimates. Arguably, this major update makes it possible to more precisely link climate data with population information, and to analyse the productivity impacts of heat exposure across a broader range of social, demographic and economic dimensions, including workers' household environments.

The method developed in this chapter follows three main steps:

- **Computation of heat exposure:** Hourly wet bulb globe temperatures (WBGT) are computed using historical climate data and bias-adjusted future climate projections for the period 2010 to 2069, providing a consistent measure of heat stress over time and across locations. WBGTs are calculated for each small-resolution climate grid cell and for a daily theoretical 12-hour working period. This step provides a consistent measure of heat stress over time and across locations.
- **Estimation of productivity losses:** Heat exposure is translated into daily productivity losses using workload-specific response curves derived from epidemiological studies that distinguish three types of workers depending on the level of physical intensity their job involves: light = 200 watts (W); moderate = 300 W; and heavy = 400 W. For each grid cell, heat-related productivity losses are computed separately for each type of worker. To capture long-term climate trend, productivity losses for all three levels are then aggregated into two 30-year period averages. Within this chapter, the period 2010-39 is referred to as 2025, and the period 2040-69 as 2055.
- **Matching climate and labour data to a common spatial classification:** Finally, climate grid cells are matched to sub-national administrative areas, using the GAUL level 1 classification developed by the FAO as a spatial reference. In parallel, KIIbIH data are geolocated and matched to the same list of sub-national administrative areas. For each sub-national administrative area, this spatial correspondence makes it possible to obtain two estimates: i) heat-induced productivity losses by level of sectoral physical intensity (200 W, 300 W and 400 W); and ii) the sectoral composition of the labour force. By combining these two measures, it is possible to derive estimates of total productivity loss for each sub-national administrative area, as well as at the country level.

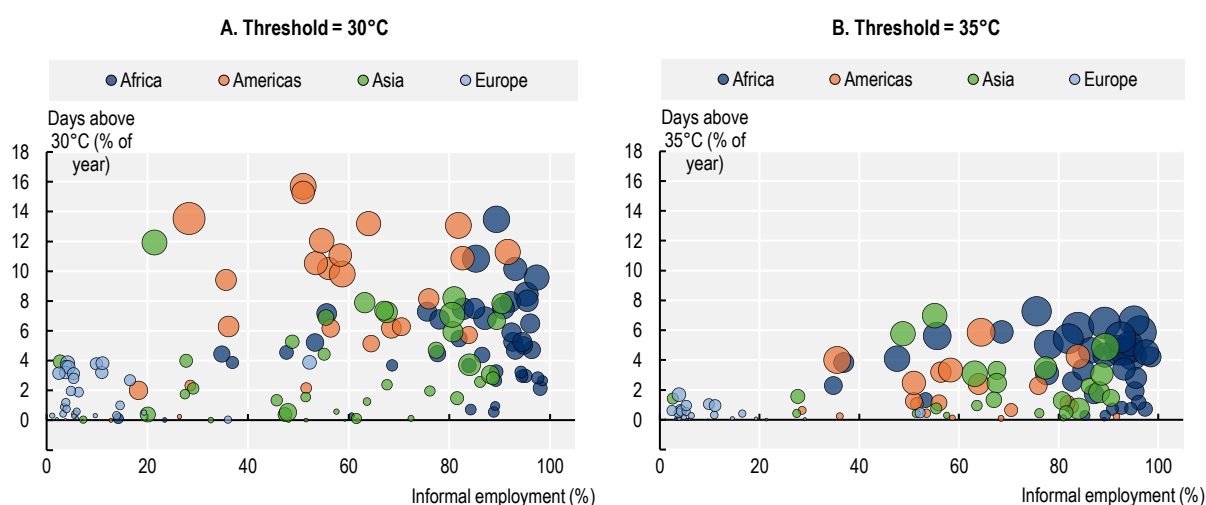
Annex 5.B presents the methodology in more detail, including data sources and assumptions.

Extreme temperature predominantly affects countries and areas with a large informal economy

Under the intermediate-emissions scenario (SSP2-4.5),⁷ global projections indicate that temperatures will exceed 30°C during an average of 11.9 days in 2030 (3.3% of the year) and 35°C during 5.4 days (1.5% of the year), with considerable variations across regions and income-groups (OECD, 2026^[28]). Low- and lower-middle income countries are notably projected to experience more additional hot days compared with upper-middle and high-income countries (Maes et al., 2025^[29]). Likewise, the SSP2-4.5 scenario projects that Africa will experience 19.5 days above 30°C and 13.2 days above 35°C in 2030, whereas Europe will experience, respectively, only 3.1 and 0.6 days on average. In general, many economies with large informal sectors are located in tropical and subtropical regions, where baseline temperatures are high and heat extremes occur more frequently. As a result, the projected share of days in 2030 with temperatures above 30°C and 35°C is considerably higher in countries with high rates of informal employment (Figure 5.15).

Figure 5.15. Countries in which the informal economy dominates are also more exposed to hot days

Correlation between the informal employment rate and the share of days in 2030 with median temperatures above 30°C (Panel A) and 35°C (Panel B), and the projected change in the number of days above these thresholds between 2030 and 2050 (bubble size)



Note: The figure shows the correlation between the informal employment rate, as measured by the ILO for the latest year available, and the projected share of days in 2030 during which temperatures exceed 30°C and 35°C. Data cover 144 countries. Bubble size reflects the projected change in the yearly share of days above these thresholds between 2030 and 2050, with larger bubbles indicating larger percentage-point increases. The number of days in 2030 refers to the median projected yearly number of days for 2020-39; the number of days in 2050 refers to the median projected yearly number of days for 2040-59. Climate projections follow the intermediate-emissions scenario (SSP2-4.5) of the CMIP6. Further methodological details are provided in Maes et al. (2025^[29]).

Source: (ILO, 2026^[30]), ILOSTAT, <https://ilostat ilo.org/topics/informality>; and (OECD, 2026^[28]), *Projected exposure to extreme temperature*, <https://data-viewer.oecd.org?chartId=98d2d4d0-357d-4e38-b7ef-60819a695936>.

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Climate projections suggest that countries with current high informality will experience the steepest increases in extremely hot days in the coming decades. Between 2030 and 2050, the yearly share of days above 30°C and 35°C is expected to rise more sharply in these economies than in those with lower informality levels. For both temperature thresholds, Figure 5.15 shows that the largest bubbles

– representing the biggest percentage-point increases in the annual number of days above these thresholds – correspond to countries that either have a very large informal economy or already experience many hot days, or both.

Informal workers are concentrated in jobs that are physically demanding

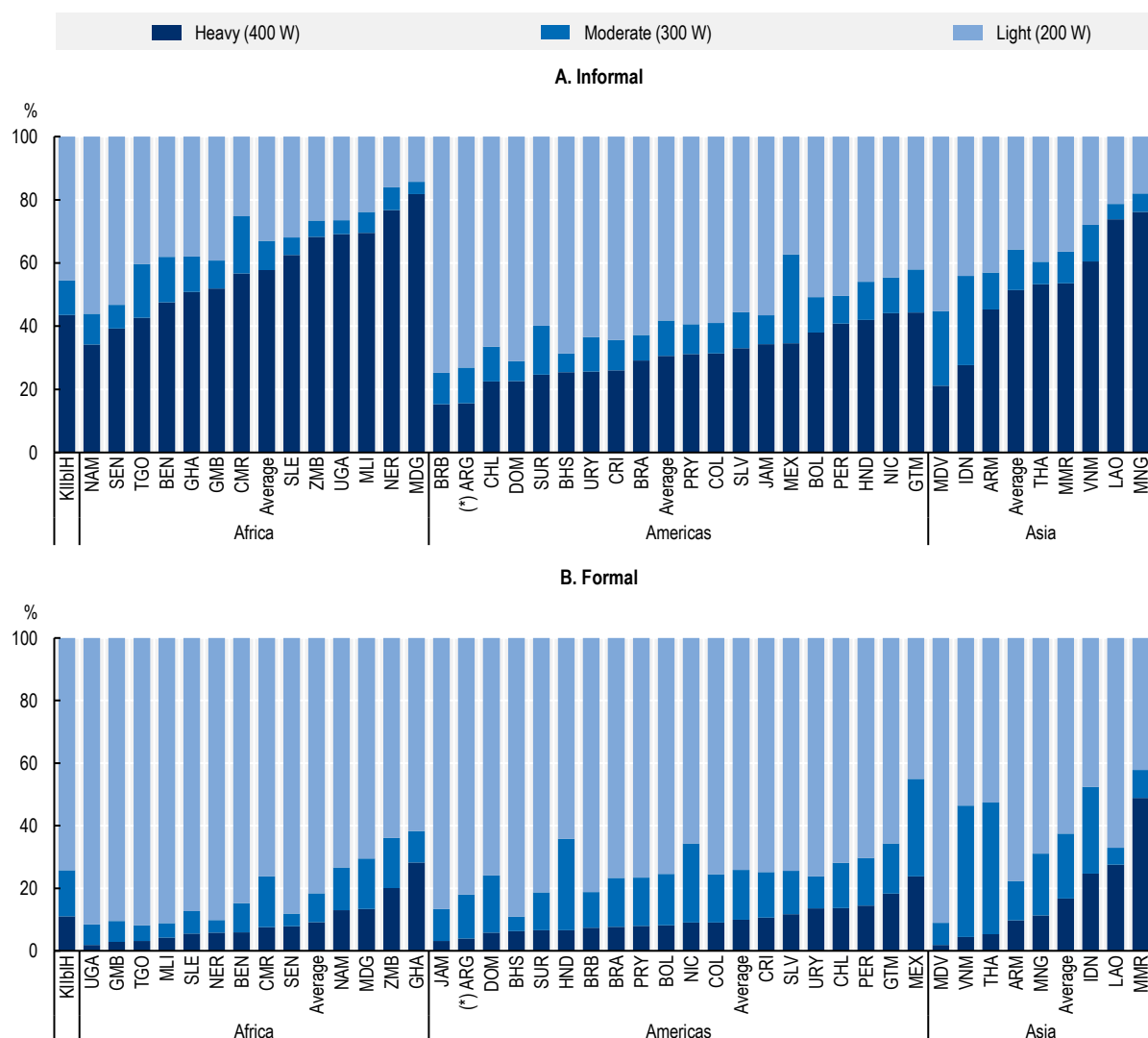
Not only are countries with a large informality footprint more exposed to extreme heat, but informal workers are concentrated in economic sectors in which excessive heat can severely hinder work. Following the approach of Kjellstrom et al. (2017^[22]) and ILO (2019^[23]), this analysis divides sectors of the economy into three categories according to the level of physical effort necessary to perform a job: light, moderate and heavy (see Box 5.2 and Annex 5.B for more details).

Across KIIbIH countries, on average, 36% of workers aged above 15 are employed in sectors involving heavy physical effort, such as agriculture and construction. A further 12% work in sectors characterised by moderate physical effort, including mining and quarrying; manufacturing; electricity, gas, steam and air-conditioning supply; and water, sewage, waste and remediation activities. These shares vary widely across regions and countries, reflecting differences in economic structure and the size of the rural sector. In many Africa and Asian countries, more than half of all workers are employed in jobs involving heavy physical effort. By contrast, in most Latin American and Caribbean countries, this share falls below 30% and is less than 20% in half of them.

Informal workers predominantly hold jobs involving moderate and heavy physical effort (Figure 5.16). On average, 55% of informal workers are employed in sectors that require either heavy or moderate physical intensity, including 44% in heavy-intensity sectors and 11% in moderate-intensity sectors. Among formal workers, by contrast, only 26% are employed in sectors with moderate or heavy physical intensity (11% in heavy-intensity and 15% in moderate-intensity sectors). This uneven sectoral distribution of informal and formal workers translates into higher informality rates in more physically demanding activities. Across the KIIbIH, 86% of workers in the high-intensity sectors of agriculture and construction are informally employed, compared with 64% in moderate-intensity sectors and 62% in light-intensity sectors. In reality, these averages conceal substantial cross-country variation. In most African countries, the gap in informality rates between heavy- and light-intensity sectors remains relatively small, underlining the widespread nature of informality across these economies. Conversely, gaps exceed 30 percentage points in countries such as Argentina, the Bahamas, Brazil, Jamaica, the Maldives, Mongolia and Suriname.

Figure 5.16. Informal workers are more likely to hold jobs that involve heavy physical effort

Share of informal (Panel A) and formal (Panel B) workers aged above 15 by the level of physical intensity of their jobs, latest year available



Note: Heavy physical work refers to activities requiring a metabolic rate of 400 watts (W); moderate physical work requires 300 W; light physical work requires 200 W. KILBIH and regional averages are calculated as simple unweighted averages of countries for which data are available. Countries identified by (*) reflect surveys that cover only urban areas.

Source: (OECD, 2026^[6]), "Key Indicators of Informality based on Individuals and their Households (KILBIH)", <https://data-explorer.oecd.org>.

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Productivity losses associated with heat are disproportionately larger for informal workers

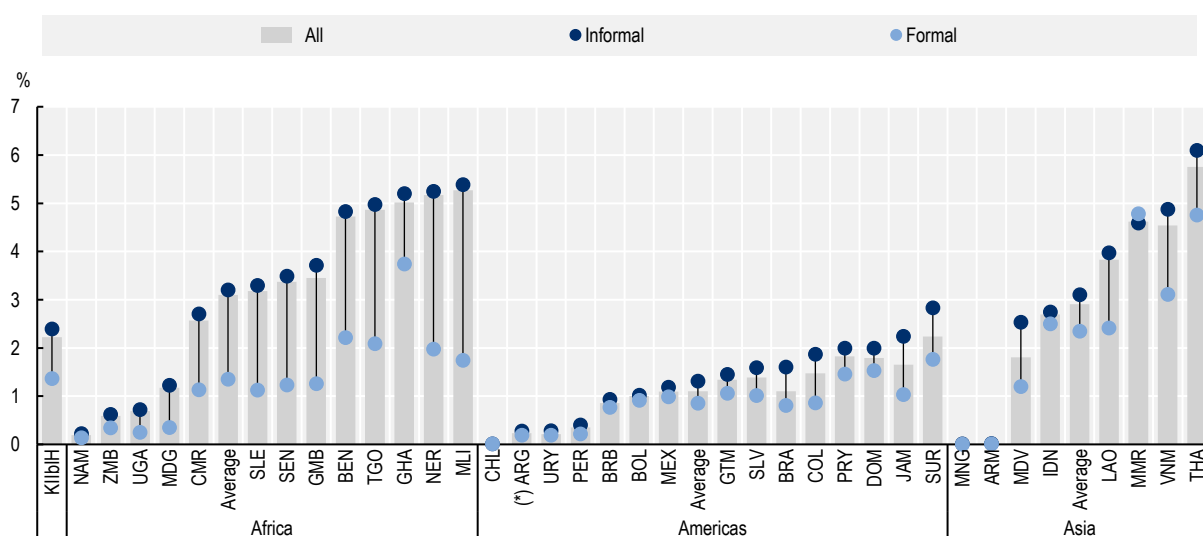
For any given job, the impact of heat on labour productivity depends heavily on the level of physical effort required. According to the International Organization for Standardization, heat stress hinges on three key parameters: i) the characteristics of the environment; ii) the heat generated inside the body through physical activity (often referred as the metabolic rate); and iii) the clothing worn, which affects the body's

ability to exchange heat with the environment (ISO, 2017^[31]). In this section, the environmental heat level is measured using the wet bulb globe temperature (WBGT), one of the most widely used heat-stress indices in occupational health (see Box 5.2 and Annex 5.B for more details). The metabolic rate is assessed following the approach of Kjellstrom et al. (2017^[22]) and ILO (2019^[23]), which applies risk functions that translate heat exposure into productivity losses – i.e. the reduction in work capacity. These risk functions derive from epidemiological studies and are estimated for the three levels of physical intensity described in the previous sub-section: light (200 W), moderate (300 W) and heavy (400 W) (see Box 5.2 and Annex 5.B for more details). The third parameter, clothing insulation, is assumed to be constant and standard across workers.

On average across KIIbIH countries, excessive heat reduced total working hours by 2.2% in 2025 (Figure 5.17), amounting to about 60 billion hours of work lost and equivalent to about 28.8 million full-time jobs. Assuming that reductions in labour input translate proportionally into output losses, the associated combined GDP losses are estimated at about USD 500 billion in PPP terms, out of a combined total GDP of USD 24 000 billion (PPP) for KIIbIH countries.

Figure 5.17. Productivity losses due to excessive heat are substantially larger for informal workers

Heat-related productivity losses of informal, formal and all workers aged above 15, 2025



Note: Productivity losses for 2025 refer to average heat-related productivity losses computed over the period 2010-39. KIIbIH and regional averages are calculated as simple unweighted averages of countries for which data are available. Countries identified by (*) reflect surveys that cover only urban areas.

Source: Authors' own estimates based on (OECD, 2026^[6]), (Copernicus Climate Change Service CDS, 2026^[32]) and (Copernicus Climate Change Service CDS, 2026^[33]).

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These losses vary widely across countries, reflecting both differences in heat exposure and the structure of national labour markets. On average in 2025, productivity losses reached 1.1% across American countries covered by the KIIbIH, 2.9% across Asian ones, and 3.1% across African ones. In Brazil, Ghana, Indonesia, Mexico Myanmar, Thailand and Viet Nam, the size of the labour market and the level of losses translate into more than one million jobs lost. Because of differences in economic size, the largest monetary losses in 2025 occur in Asian KIIbIH countries, with productivity losses corresponding to an estimated GDP

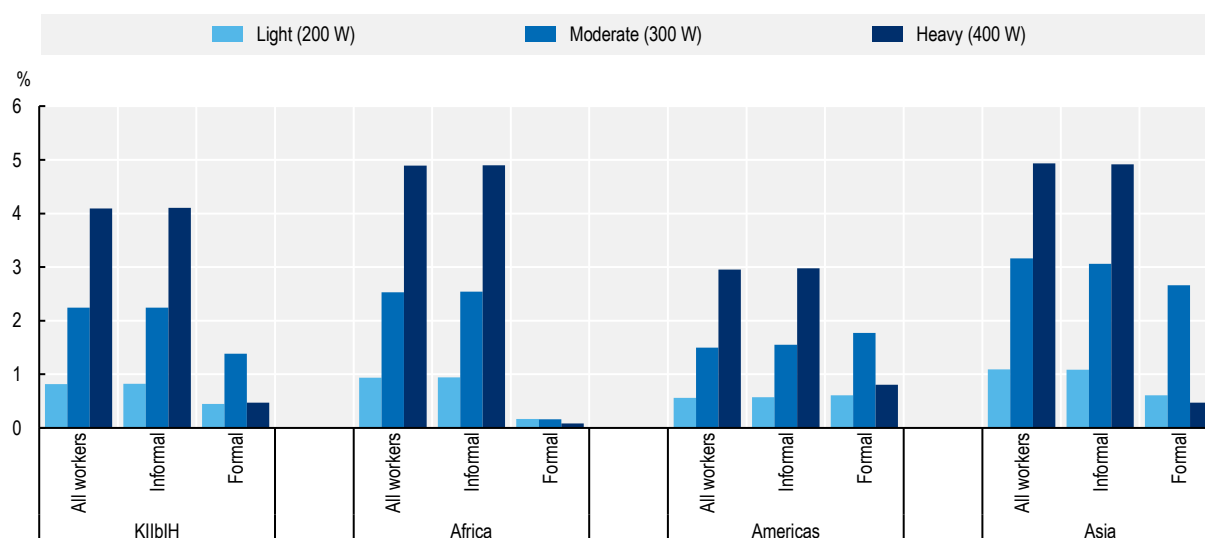
shortfall of about USD 340 billion (PPP) under the assumption that output is proportional to labour input (out of a combined total GDP of around USD 9 200 billion in PPP). In Indonesia, Thailand and Viet Nam, these losses each exceed USD 80 billion in PPP. By comparison, GDP losses are estimated at around USD 130 billion (PPP) in the Americas and USD 40 billion (PPP) in Africa.

Heat-related productivity losses are substantially larger for informal workers than for formal ones. On average across the KIIbIH countries, informal workers lost 2.4% of their working hours in 2025, compared with 1.4% among formal workers (Figure 5.17). This pattern holds true in every KIIbIH country, with the gap between informal and formal workers exceeding 3 percentage points in countries such as Mali and Niger.

The impacts of heat on labour productivity are particularly strong for jobs that involve heavy physical effort. On average across KIIbIH countries, current climatic conditions are estimated to lead to productivity losses of more than 4% for these jobs (Figure 5.18), exceeding 7% in countries such as Benin, Gambia, Ghana, Thailand and Togo. The impacts are particularly pronounced in countries facing particularly severe heat conditions.

Figure 5.18. Informal workers in physically demanding jobs suffer from the largest heat-related productivity losses

Heat-related productivity losses of informal, formal and all workers aged above 15 by the level of physical intensity of their jobs, 2025



Note: Productivity losses for 2025 refer to average heat-related productivity losses computed over the period 2010-39. Heavy physical work (400 W) includes activities in agriculture, forestry and fishing (Sector A) and construction (Sector F). Moderate physical work (300 W) includes activities in mining and quarrying (Sector B), manufacturing (Sector C), electricity, gas and air conditioning supply (Sector D), and water supply and waste management (Sector E). Light physical work (200 W) includes all remaining activities. KIIbIH and regional averages are calculated as simple unweighted averages of countries for which data are available and for which individual-level data can be geo-located. KIIbIH average covers 38 countries; regional averages cover 13 countries in Africa, 15 in the Americas, 9 in Asia, and 1 in Europe.

Source: Authors' own estimates based on (OECD, 2026^[6]), (Copernicus Climate Change Service CDS, 2026^[32]) and (Copernicus Climate Change Service CDS, 2026^[33]).

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Heat-related productivity losses are not homogeneous across formal and informal workers

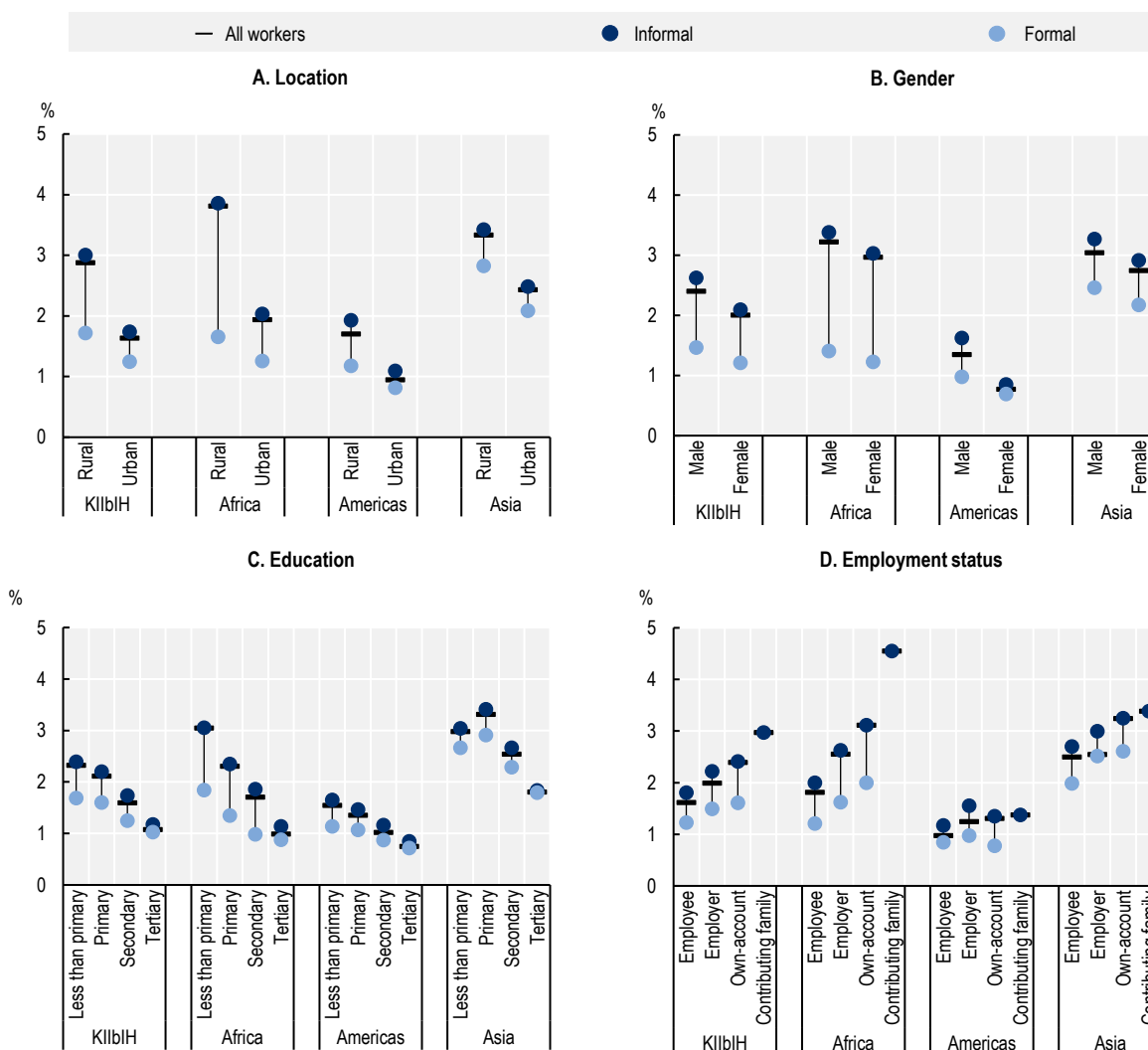
Because of the strong linkages between rural employment and agriculture, productivity losses due to heat are substantially larger for rural workers than for urban ones. On average across KIIbIH countries, rural workers lost 2.9% of their working hours in 2025, compared with 1.6% among urban workers (Figure 5.19, Panel A). Losses among informal rural workers are particularly pronounced in countries that combine high exposure to extreme temperatures with a rural labour market that is poorly diversified and dominated by agricultural activities. In Ghana, Thailand and Togo, productivity losses among informal rural workers exceeded 6%.

Heat-related productivity losses also vary sharply by educational attainment. For both informal and formal workers, losses rise as education levels fall (Figure 5.19, Panel C). This pattern is especially marked among informal workers: across the KIIbIH, informal workers with less than primary education experienced productivity losses of 2.3% in 2025, compared with 2.1% for those with primary education, 1.6% for those with secondary education, and 1% for those with tertiary education. These differences largely reflect the concentration of low-educated informal workers in manual and physically demanding activities that require a low level of qualifications but are highly sensitive to elevated temperatures.

The data further show that own-account and contributing family workers face substantially higher productivity losses than other workers. Across the KIIbIH, their respective heat-related productivity losses are estimated at 2.4% and 3%, compared with 1.6% among employees (Figure 5.19, Panel D). This mainly reflects that agricultural jobs are disproportionately held by own-account and contributing family workers, most of whom are informal, while employees are more prevalent in sectors with no environmental link (see Figure 5.6) and in clerical tasks that require only light physical effort. Incidentally, own-account and contributing family workers, notably when informally employed, tend to be the least protected by occupational safety and health policies. The 2006 Thai Occupational Standard, for example, orders work interruptions and workplace adjustments according to specific WBGT thresholds, and mandates employers to deploy personal protective equipment, post warning notices and arrange health check-ups for employees. However, it does not mention self-employed workers. Likewise, India's approach to occupational health and safety is outlined in both the 2020 Occupational Safety, Health Working Conditions Code and the 2009 National Policy on Occupational Safety, Health and Environment at Workplace. In principle, these policies recognise unorganised workers; in practice, they are designed for establishments with 10 or more workers, typically excluding home-based workers (Sinha et al., 2026^[34]).

Figure 5.19. Informal and rural workers with low levels of education and in vulnerable forms of employment experience larger heat-related productivity losses

Heat-related productivity losses of informal, formal and all workers aged above 15 by socio-demographic characteristics, 2025



Note: Productivity losses for 2025 refer to average heat-related productivity losses computed over the period 2010-39. KIIbIH and regional averages are calculated as simple unweighted averages of countries for which data are available and for which individual-level data can be geo-located. In Panel A, KIIbIH average covers 34 countries and regional averages cover 13 countries in Africa, 14 in Americas and 7 in Asia. In Panel B, KIIbIH average covers 36 countries and regional averages cover 13 countries in Africa, 15 in Americas and 8 in Asia. In Panel C, KIIbIH average covers 33 countries and regional averages cover 10 countries in Africa, 15 in Americas and 8 in Asia. In Panel D, KIIbIH average covers 36 countries and regional averages cover 13 countries in Africa, 15 in Americas and 8 in Asia.

Source: Authors' own estimates based on (OECD, 2026^[6]), (Copernicus Climate Change Service CDS, 2026^[32]) and (Copernicus Climate Change Service CDS, 2026^[33]).

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The limitations of the model applied may lead to an underestimation of the losses faced by many own-account and contributing family workers, particularly in urban settings. The current level of spatial and sectoral detail – in both climate and labour data – does not allow to capture the specific heat exposure of certain urban occupations (e.g. home-based workers, street vendors and market traders). Yet evidence

from Bangkok (Thailand) and Delhi (India) shows that these workers are among the most exposed to heat (Box 5.3). Moreover, their vulnerability is often compounded by overlapping disadvantages, including limited access to shade, ventilation and basic services, poor housing conditions, and restricted access to health care.

Box 5.3. The vulnerability of urban informal workers to heat stress: A granular perspective from WIEGO

Cities are hotspots of climate risk, and a growing body of evidence shows that informality shapes such risk across housing, industry, livelihoods, infrastructure and ecological systems (Satterthwaite et al., 2018). While increasing attention has been paid to informal settlements as sites of both vulnerability and innovation (IPCC, 2022^[35]), far less is known about how informal livelihoods shape risk, experience climate impacts and contribute to adaptation. Recent research by Women in Informal Employment: Globalizing and Organizing (WIEGO) with street vendors and home-based workers in Bangkok and Delhi identifies three interconnected channels through which heat shapes productivity for urban workers in the informal economy: infrastructure deficits, demand disruptions and intensified care burdens (WIEGO, 2026^[36]).¹ Standard productivity measures, which narrowly focus on labour inputs, tend to overlook these constraining factors (Chen et al., 2025^[37]).

Across both cities, infrastructure deficits were a key factor affecting heat-related shifts in productivity. For home-based workers, housing conditions directly shape heat exposure. In Delhi – where most research subjects lived in high-density settlements with limited or irregular access to basic services – only one-third reported access to clean water during the heat period. Six in ten respondents spent more than two hours per day collecting water, nearly double the share in milder conditions. Home-based workers who reported increased time collecting water were more likely to report reductions in work hours. Street vendors depend on public space and access to shade, water and toilets. In Delhi, over 70% of surveyed vendors lacked access to these basic services, with women facing systematically lower access. The largest gender gap was in access to shade, at nearly 20 percentage points. Vendors without shade were also more likely to report reduced working hours during the heat period.

A second channel operates through demand. In Bangkok and Delhi, 80% and 96% of vendors, respectively, reported a decline in customers, with similar patterns observed across genders. Among home-based workers in Delhi, 74% reported reduced work orders during the heat period, almost double the proportion observed during milder periods. While fluctuating demand and irregular access to raw materials are common features of this work, these findings suggest that heat amplifies these challenges. Evidence from previous crises, such as the COVID-19 pandemic, suggests that heat may affect supply-side factors by disrupting the mobility of workers and intermediaries, delaying the delivery of inputs and exacerbating unequal value-chain dynamics, such that unfulfilled orders can lead to future cancellations.

Finally, heat-related illness increases care responsibilities and can reduce labour availability, particularly for women. In Bangkok, 64% of female street vendors and 77% of female home-based workers reported increased direct care responsibilities (e.g. taking care of elders, children or the sick) during extreme heat. Workers reporting increased care responsibilities were also more likely to reduce their working hours. In Delhi, home-based workers in larger households (more than six members) were more likely to miss work due to illness. While this pattern may reflect the direct health impacts of heat exposure, it also suggests that household composition mediates impacts and the ability to cope.

Together, this evidence shows that heat-related productivity losses are shaped by the interaction of gender and informality, operating through unequal access to infrastructure, demand disruptions and unpaid care responsibilities. These findings are consistent with emerging evidence from other contexts,

including econometric analyses from Peru (Higa, 2025^[15]) and survey-based research on home-based workers (HomeNet South Asia, 2022^[38]) and street vendors (Ghosh, 2024^[39]) in South Asia. More research is needed to understand how productivity impacts vary across different groups of workers in the informal economy and through the multiple channels identified here.

Note:

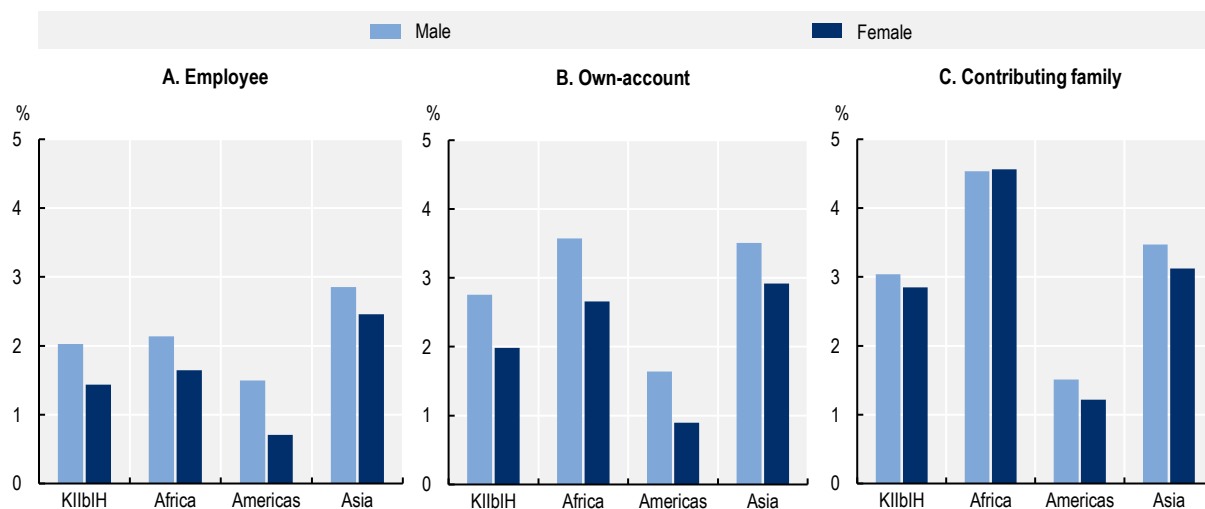
1. The evidence is based on two survey findings. In Bangkok, 496 street vendors (70% women) and 530 home-based workers (84% women) were surveyed in May 2025 and asked to recall their experiences during April, the city's hottest month. In Delhi, approximately 500 street vendors (36-41% women) and 300 home-based workers (all women) were surveyed before and after the summer heat in the same markets and neighbourhood clusters. This allowed a cohort analysis of aggregate changes between milder and extreme heat conditions.

In aggregate, male workers tend to experience larger productivity losses than women, largely because they are overrepresented in sectors such as agriculture and construction. On average across KIIH countries, male workers lost 2.4% of their working hours in 2025, compared with 2% for female workers (Figure 5.19, Panel B). In the Americas, although overall productivity losses are lower than in Africa and Asia, the shortfall for informal male workers is twice as large as that for informal female workers. This gender gap is closely linked to gender-based occupational segregation, where men and women tend to be concentrated in different sectors and types of work (OECD, 2023^[40]; OECD, 2024^[41]). Often, men are overrepresented in jobs traditionally associated with physically demanding activities. Worldwide, in 2023, men accounted for 92% of total employment in the construction sector and 86% in mining (OECD, 2023^[40]). Such concentration exposes these workers to higher potential productivity losses under extreme heat.

However, the aggregate gender gap conceals very different realities across employment statuses. When disaggregating data by type of employment, the gender gap in productivity losses persists for employees and own-account workers but tends to disappear – and in some cases reverse – among contributing family workers (Figure 5.20). This is notably the case across several African and Asian countries included in the analysis, such as Cameroon, Gambia, Indonesia and Thailand, where female contributing family workers (i.e. helping a family or household member run a business, farm or job, without regular payment) experienced larger heat-related productivity losses than their male counterparts in 2025. This is not trivial, as women are far more likely to be engaged in this form of work. In 2023, for example, only 7% of employed Southeast Asian men worked as contributing family workers, compared with 20% of women (OECD, 2024^[41]).

Figure 5.20. Gender-based differences in heat-related productivity losses largely depend on the employment status

Heat-related productivity losses of informal workers aged above 15 by gender and employment status, 2025



Note: Productivity losses for 2025 refer to average heat-related productivity losses computed over the period 2010-39. KilbIH and regional averages are calculated as simple unweighted averages of countries for which data are available and for which individual-level data can be geo-located. KilbIH average covers 36 countries; regional averages cover 13 countries in Africa, 15 in Americas, and 8 in Asia.

Source: Authors' own estimates based on (OECD, 2026^[6]), (Copernicus Climate Change Service CDS, 2026^[32]) and (Copernicus Climate Change Service CDS, 2026^[33]).

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Importantly, the gender gap in productivity losses fails to consider the significant heat-related vulnerabilities women face through their unpaid domestic work. Globally, women spend 2.6 times more hours on unpaid care and domestic tasks than men (OECD, 2023^[40]). This work has long been excluded from GDP and remains largely invisible in monetary terms (van de Ven, Zwijnenburg and De Queljoe, 2018^[42]). Across the OECD, unpaid housework has been valued at between 15% and 27% of GDP in 2021 (OECD, 2021^[43]) but, overall, data remain scarce and limited to few countries with reliable information. As a result, current measures likely underestimate the full productivity losses women experience, including in unpaid labour. A 2023 study covering India, Nigeria and the United States found that 75% of women's heat-related productivity losses stem from their unpaid work, revealing how much of the burden remains unmeasured (Adrienne Arsht-Rockefeller Foundation Resilience Center, 2023^[44]). The study suggested that accounting for unpaid work would raise women's estimated heat-related productivity losses by 260%, compared with a 76% increase for men.

Heat stress not only has direct and largely unaccounted effects on women's productivity, it may also indirectly amplify their caregiving burden. Evidence on these indirect effects remains scarce, primarily because of the difficulty of measuring and monitoring time devoted to unpaid care and domestic activities.⁸ However, growing evidence suggests that, as children, elderly and working-age adults face greater risks of heat exhaustion, heat-related illnesses and co-morbidities, the resulting additional care needs are likely to fall disproportionately on women's shoulders, increasing the already unequal share of unpaid care and domestic work they undertake (OECD, 2023^[40]; HomeNet South Asia, 2022^[38]). Heat-related disruptions, such as school closures, may further exacerbate the demand for care and force women to reduce or forgo income-generating work.

These unaccounted impacts are often most severe in low-income and informal households, particularly those living in urban slums or informal settlements built with heat-retaining materials and lacking proper ventilation or cooling. For women who remain at home to perform unpaid care and domestic tasks, this translates into heightened vulnerability to heat. For other workers who spend long hours in physically demanding jobs under extreme heat and then return to dwellings that stay hot well into the night, the result is a cycle of continuous exposure and insufficient recovery (Meade et al., 2025^[45]). For workers in the informal economy – especially those living in informal settlements – climate exposure accumulates across both workplace and home, reducing productivity, increasing health risks, and eroding long-term earning potential.

Effective policy responses must therefore integrate all dimensions of vulnerability, including the household environment, living conditions, access to basic services, the distribution of unpaid care and domestic work, and workplaces outside formal regulations. Importantly, these policies should systematically apply a gender lens since women and men may experience these vulnerabilities through different channels, some of which may remain hidden or overlooked due to limited data. Without this broader perspective, interventions risk overlooking the conditions in which informal workers live and the cumulative exposure that shapes their overall capacity to cope with extreme heat.

Climate projections suggest that the impacts of heat stress on informal workers may aggravate by 2055

Across KIIbIH countries included in the analysis, rising temperatures already increased the share of total working hours lost from 1.7% in 1995 to 2.2% in 2025. Under the intermediate-emissions scenario (SSP2-4.5), the “middle-of-the-road” development pathway – in which social, economic and technological trends continue broadly in line with historical patterns – rising temperatures are expected to raise the share of total working hours lost to 2.8% in 2055 (Figure 5.21, Panel A). Under current labour market structures, this amounts to about 17 billion additional hours of work lost because of extreme heat, rising from 60 billion hours in 2025 to 77 billion in 2055. This is equivalent to more than 8 million additional full-time jobs lost.

Losses will be far more severe in several countries, particularly in Africa and Asia. In Benin, Ghana, Mali, Myanmar, Thailand, Togo and Viet Nam, productivity losses are projected to exceed 5%, while estimates for Niger reach more than 7% (Figure 5.21, Panel A). Because economies differ in size and population, the distribution of lost hours and jobs is uneven. Most jobs losses will occur in large economies experiencing rapid temperature increases. By 2055, Brazil, Indonesia, Mexico, Thailand and Viet Nam are each expected to lose more than 500 000 additional full-time jobs.

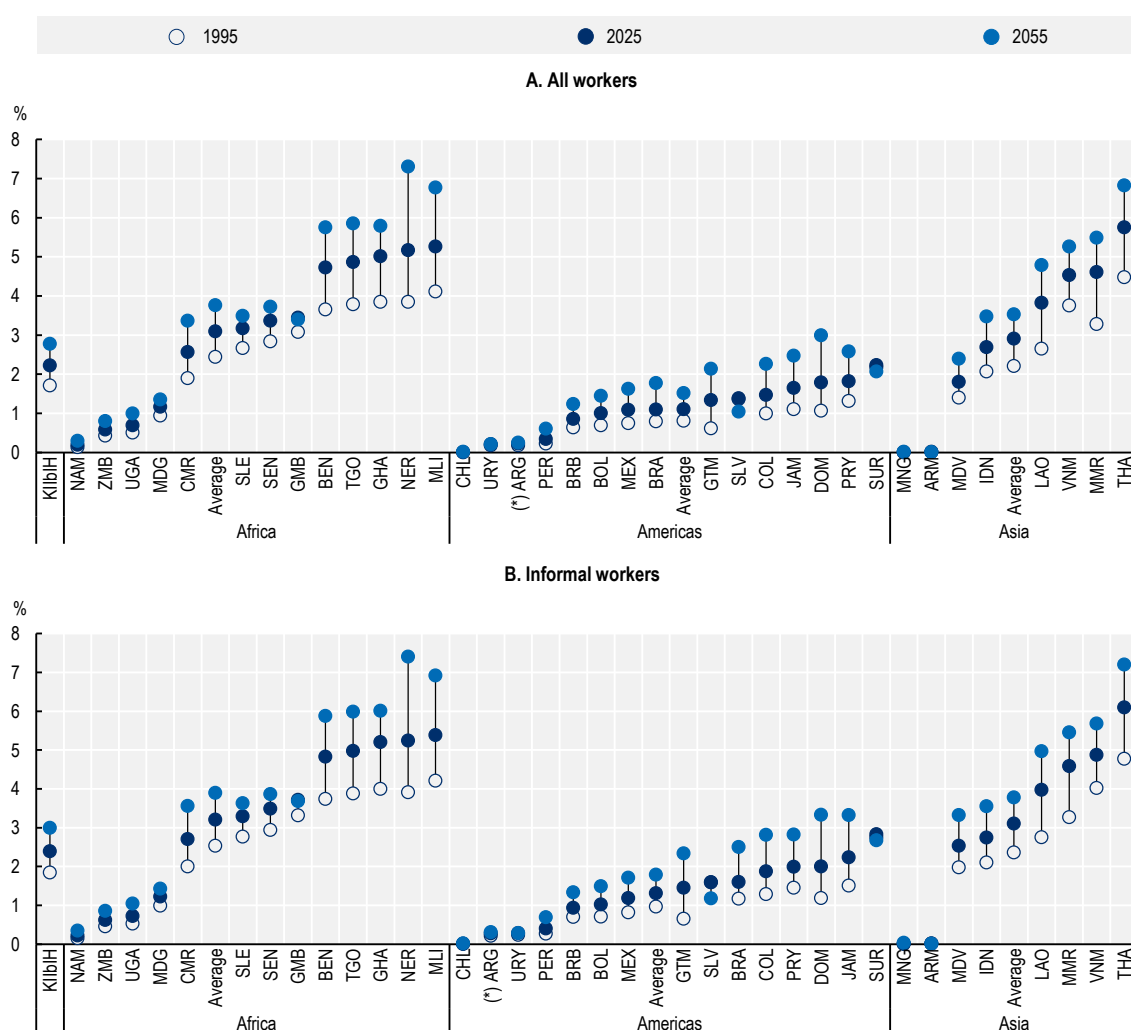
Although all workers will be affected, informal workers will face the steepest increases under current labour-market structures. On average across KIIbIH countries, their productivity losses are projected to rise by 0.6 percentage points, compared with an increase of 0.4 percentage points for formal workers (Figure 5.21, Panel B). In Niger, the increase for informal workers exceeds two percentage points.

Several structural factors may amplify these losses by 2055. First, these projections are based on an intermediate-emissions scenario (SSP2-4.5) consistent with a global temperature increase of around 2.7°C by 2100 relative to 1850-1900 (Chen et al., 2023^[46]). Under a different and more intense pathway, global temperatures could rise by more than 4°C, substantially increasing productivity losses. Second, the impacts of rising temperatures are uneven across regions and countries. Less-developed economies are more exposed to extreme heat and often face deep-seated socio-economic vulnerabilities, intensifying the consequences of heat stress. Projections in this chapter assume constant population and labour-market structures, but demographic dynamics may substantially compound and modify these patterns. For example, many African countries face the largest projected increases in heat stress while experiencing rapid population growth, which could result in a disproportionate increase of heat-related productivity losses. By contrast, in rapidly ageing regions projected to experience more frequent and intense heat events – e.g. Southeast Asia – a shrinking labour force may reduce heat-related productivity losses but amplify and aggravate the health effects of heat exposure as older people have more difficulties in adapting

to high heat levels (Cheng et al., 2018^[47]). Third, and closely related to the limitations of assuming constant population and labour-market structures, future economic growth – or lack thereof – may profoundly alter the structure of the economy and employment. As a result, estimated productivity losses could differ markedly under alternative growth and structural change scenarios. Finally, poor housing and lack of urban planning may aggravate the effects of heat in the future. Informal settlements often rely on materials that trap heat, have poor ventilation, and offer limited access to basic services such as electricity or cooling. Dense urban layouts, combined with limited green spaces and extensive paved surfaces, amplify local temperatures through the urban heat island effect. Together, if left unaddressed, these factors may increase continuous exposure to heat at home and at work, reducing workers' ability to rest, recover and maintain productivity (Meade et al., 2025^[45]).

Figure 5.21. Productivity losses due to heat are projected to increase by 25% by 2055

Heat-related productivity losses of all (Panel A) and informal (Panel B) workers aged above 15, 1995, 2025 and 2055



Note: Productivity losses refer to average heat-related productivity losses computed over the following periods: 1995 = 1980-2009; 2025 = 2010-39; and 2055 = 2040-69. KiliBH and regional averages are calculated as simple unweighted averages of countries for which data are available and for which individual-level data can be geo-located. Countries identified by (*) reflect surveys that cover only urban areas.

Source: Authors' own estimates based on (OECD, 2026^[6]), (Copernicus Climate Change Service CDS, 2026^[32]) and (Copernicus Climate Change Service CDS, 2026^[33]).

Conclusion and policy discussion

Environmental degradation and climate events such as droughts, floods and extreme heat pose urgent and growing threats to human lives, economic activity and work worldwide. These threats are particularly pronounced in developing and emerging economies, with particularly acute consequences for workers in the informal economy. New evidence from the KIIbIH shows that informal workers depend heavily on the natural environment for their livelihoods and face far greater exposure to environmental risks than formal workers. Their vulnerability is characterised by structural and often overlapping disadvantages, including limited social protection coverage, lower levels of education, discriminatory social norms, concentration in fully informal households, lack of access to quality infrastructure and poor housing conditions.

The scale and distribution of risks across informal workers vary considerably depending on the type of event considered and the characteristics of workers. Informal agricultural workers are among the most vulnerable to all types of events, with direct and potentially dramatic consequences of hazards on their income and livelihoods. The concentration of informal workers in agriculture makes agricultural and rural development policies central pillars of any resilience strategy. These risks also differ by gender, with men more often concentrated in outdoor agricultural activities and women more exposed through downstream agri-food activities, such as processing and sales, as well as informal service and vending activities, especially in urban areas. Many informal urban workers (e.g. home-based workers, street vendors and market traders) are among the most exposed to heat stress. Their vulnerability is often compounded by limited access to shade, ventilation and basic services (e.g. drinkable water), poor housing conditions, and restricted access to health care. Low-paid and poor informal workers are also disproportionately concentrated in environmentally linked sectors as well as drought- and flood-sensitive sectors, exacerbating their vulnerability to climate hazards.

In this context, securing the livelihoods of informal economy workers against environmental risks requires both a holistic approach that addresses the core dimensions of resilience – adaptation and mitigation – and tailored solutions that tackle the specific risks faced by diverse groups within the informal economy. Both approaches should be locally led and systematically informed by a gender lens, to ensure that policies reflect local realities and account for the different ways in which women and men experience, anticipate and cope with environmental risks. Against this backdrop, a strategy could be articulated around five major policy areas: i) consolidate access to traditional and new social protection tools; ii) invest in skills, training and human capital; iii) strengthen occupational safety and health policies and early warning systems; iv) establish comprehensive agricultural and rural development policies to build resilience; and v) invest in resilient urban infrastructure.

Consolidate access to traditional and new social protection tools

Traditional social protection instruments, such as unemployment benefits, cash transfers, food assistance and public works programmes, must remain the cornerstone of resilience towards environmental degradation. Ultimately, there is no better preparation than ensuring that existing social protection systems cover as many people as possible.

Recent policy development has framed adaptive social protection – i.e. systems that scale up automatically in response to climate shocks – as a core climate strategy rather than a residual safety net (ILO, 2024^[48]). Adaptive social protection rests on two central principles. First, it should entail a wide range of programmes, from productive inclusion to active labour market programmes and insurance schemes. Second, investment in those delivery systems should occur in advance (OECD, 2024^[49]). In this regard, the role of social protection should be understood as a continuum, with the right mix of interventions before and after a risk materialises. Notable examples include Ethiopia's Productive Safety Net Programme and India's Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), which provide income support while building productive assets that can reduce future vulnerability (IPCC, 2022^[35]). In Kenya, the Hunger

Safety Net Programme (HSNP) functions as a traditional cash-transfer programme but integrates a drought-related scale-up mechanism that extends coverage to additional beneficiaries depending on the drought's severity – assessed through remote sensing data monitoring of vegetation conditions (OECD, 2024^[49]).

Beyond traditional social protection instruments, new approaches such as parametric (or index-based) insurance⁹ may be well suited to protect informal workers from extreme weather events, particularly heat. These products may be offered by private insurers, public schemes or public-private partnerships. Unlike conventional indemnity insurance, parametric products automatically pay out a fixed amount when a pre-defined physical threshold or index value is reached – such as daytime and/or nighttime temperatures, humidity level, rainfall deficit or flood gauge reading – without requiring individual loss assessment (McLeod and Goering, 2025^[50]; OECD, 2025^[51]). This makes them potentially far better suited for workers of the informal economy, although little evidence on their impact exists at present. Several experiments have incorporated women's unique exposure patterns and needs into the trigger mechanisms and payout structures, suggesting that parametric insurance may be particularly effective in addressing the gender dimension of extreme weather events (Suzumu and Chanel, 2024^[52]).

Recently, several such programmes have been launched in India. In 2023, the Self-Employed Women's Association (SEWA), in partnership with the Climate Resilience Center and the insurer Blue Marble, piloted the Extreme Heat Income Insurance in Ahmedabad and the state of Gujarat (Climate Resilience Center, 2026^[53]; Dabrowski, 2023^[54]). The scheme covers 21 000 female workers, including waste recyclers, street vendors, salt pan miners, construction workers and home-based workers. It provides income compensation when temperatures exceed a pre-defined threshold. Rather than preventing work outright, the payout is designed to offset lost earnings and cover additional costs – e.g. medical care, higher electricity bills, extra water – that extreme heat imposes on low-income households. The approach also incorporates heat early warning systems and practical equipment such as heat-resistant tools. One of the notable innovations of the Extreme Heat Income Insurance programme is that Blue Marble developed a forecast-based heat stress product that enables pay-outs to be made *ex-ante* rather than *ex-post* (Raithatha, 2023^[55]). In Ahmedabad, the Mahila Housing Trust developed a comparable product, the Climate Risk Insurance solution (Raithatha, 2024^[56]).

To be effective, parametric heat insurance products should incorporate several key design features, including premium subsidies, alignment with heat action plans and product bundling. Premium subsidies provided by a government, donor or sponsor are often critical, particularly during the product's inception phase and for individuals with low levels of financial literacy (Garcia Ocampo and Lopez Moreira, 2024^[57]). To improve understanding of payout triggers and encourage appropriate protective behaviour, product designers should also align insurance parameters with early warning systems and heat action plans. Finally, parametric products are often most effective when bundled with other social protection and/or financial instruments, as well as livelihood-support measures such as credit or maternity benefits. Bundling allows innovative products to leverage existing, trusted delivery channels, such as health and life insurance schemes or cash transfer programmes. This “portfolio effect” can work in both directions: traditional social protection gains a channel for reaching informal workers who might not otherwise access it while the parametric product benefits from the credibility and delivery infrastructure of established programmes.

Scaling parametric insurance for heat and other natural hazards may require updates to regulatory frameworks. In many countries, bringing these products to market would require amending insurance legislation to allow payouts based on pre-defined index triggers without the need to assess actual losses or damages (Garcia Ocampo and Lopez Moreira, 2024^[57]). Official supervisory capacities may be limited, notably regarding index selection as well as the accuracy and reliability of payout triggers. At present, regulatory approaches vary substantially across jurisdictions: some countries have enacted specific laws and regulations, while others regulate these new products under broader insurance laws or through legal opinions and pilot projects (Garcia Ocampo and Lopez Moreira, 2024^[57]).

The long-term financial sustainability of these new products remains largely uncertain. Most are recent and rely heavily on subsidies, either through lower premiums for insured individuals or through top-up mechanisms that increase payouts beyond what collected premiums would normally cover. While subsidies and support from governments, donors or sponsors can improve affordability and encourage uptake, reliance on such support raises questions about whether these programmes can remain financially viable over time.

Invest in skills, training and human capital

Over the long term, skills development can reduce informal workers' structural vulnerability to environmental degradation and climate risks. Many informal workers with low levels of education are concentrated in sectors that depend heavily on natural resources or are highly exposed to droughts, floods and extreme heat. Training can help lower this sensitivity in two ways: by improving workers' ability to adapt within their current livelihoods and by expanding their access to less climate-sensitive jobs over time.

For workers who are likely to remain in agriculture, skills policies should focus on practical, climate-adaptive practices. These include soil conservation, improved water management, efficient irrigation, agroecological techniques, crop diversification, and the use of drought-resistant or heat-tolerant varieties (see below section on "Establish comprehensive agricultural and rural development policies to build resilience"). Such training can help protect productivity and incomes without requiring a full sectoral move, which may be unrealistic for many rural informal workers in the short term. Extension services, farmer field schools and co-operatives can play key roles in delivering this support, especially when they combine technical advice with access to inputs and market information.

At the same time, skills development should support gradual livelihood diversification. Informal workers need access to training that improves their prospects in sectors with lower climate sensitivity and stronger productivity potential. This can include technical and vocational education and training in food processing, repair and maintenance services, care services, construction adapted to climate-resilient infrastructure, renewable energy, waste management and other green or local service activities (AUC/OECD, 2024^[58]). Priority should be given to transferable skills such as literacy, numeracy, digital skills, financial literacy and business management. These skills can help informal workers adapt to changing labour demand, shift activities when needed and strengthen their ability to manage shocks.

Skills policies should also account for gender-specific barriers to training and labour-market transitions. Gender divides remain a major constraint to skills development, including in foundational skills, participation in technical and vocational education and training (TVET), and access to more productive activities (AUC/OECD, 2024^[58]). To address the typical barriers faced by informal female workers – lower literacy levels, limited mobility, care responsibilities, and weaker access to information, finance and employer networks – training programmes should include targeted outreach to women, flexible schedules, childcare support and links to women's organisations, co-operatives and local employers. They should also promote women's participation in climate-resilient and higher-productivity activities, such as agri-food processing, repair services, renewable energy, waste management and local care services. However, training alone may not be sufficient where informal laws, customary practices or social norms restrict women's mobility, control over income, or ability to work outside the household. Skills policies should therefore be paired with community engagement, support from local women's organisations, and measures that address discriminatory norms and practices.

Overall, skills policies need to recognise the realities of informal work, which means that training programmes should be short, modular, locally delivered and compatible with workers' schedules. They should also reduce participation costs through stipends, transport support, or links with cash-transfer and public employment programmes. For workers with low literacy, training should rely on practical demonstrations, peer learning and local languages rather than classroom-based instruction alone.

Finally, skills policies should be closely linked to formalisation and certification. Recognition of prior learning can help informal workers document skills acquired on the job and improve their access to better-paid work, contracts or public support programmes. Stronger linkages with the private sector as well as co-operatives and worker organisations can strengthen the credibility of training and help align skill supply with the labour-market demand (AUC/OECD, 2024^[58]).

Strengthen occupational safety and health policies and early warning systems

Occupational safety and health

Legislation on occupational safety and health (OSH) is a cornerstone of effective policy responses to environmental degradation and climate-related hazards. OSH policies define acceptable working conditions and set benchmarks for employers and workers, with the aim of preventing accident, injury and illness in the workplace by reducing exposure to potential hazards (ILO, 1981^[59]). Most existing OSH frameworks, however, are not designed for climate-driven risks. Heat stress, for instance, is rarely covered by dedicated standards in low- and middle-income countries, despite its already significant productivity costs. In addition, even in countries in which policymakers have integrated specific climate risks into OSH and environmental legislation, risks and hazards may evolve and intensify, making it necessary to re-evaluate guidelines or create new regulations (ILO, 2024^[60]; ILO, 2026^[61]). OSH frameworks also rarely account for the gender-specific nature of climate-related occupational risks, even though women and men often work in different occupations, face different workplace exposures, and experience different constraints related to working time, unpaid care responsibilities, workplace design and access to protective equipment (ILO, 2014^[62]).

In practice, implementing robust OSH frameworks often involves one or a combination of the following: establishing specific temperature thresholds with mandatory rest, shade and hydration provisions for both indoor and outdoor work; setting protocols for suspending work during extreme weather events, including flood warnings; and designing requirements for employers to assess and communicate climate-related exposure risks. In this regard, ILO Conventions No. 155, No. 184 and No. 187 form the basis of strong and resilient OSH policies and management systems (ILO, 2006^[63]; ILO, 2001^[64]; ILO, 1981^[59]). Although employer-based protections (including OSH guidelines) are weak or absent for most informal workers, promoting these legal requirements can have a powerful “lighthouse effect.” In effect, establishing a standard for the formal economy signals a socially acceptable standard to the informal economy.

To effectively reach informal workers, OSH policies and programmes must be adapted to their unique characteristics. Informal jobs are heterogeneous, often mobile and conducted in public spaces. In turn, informal workers usually face information barriers, limited bargaining power and low trust in public institutions. It is therefore crucial to simplify requirements, prioritise high-risk hazards, and embed OSH messages within existing contact points and community structures, including primary health care services and social protection programmes. Evidence from Bangkok and Delhi, for instance, shows that information shared through community networks and market associations reaches informal workers more reliably than top-down government communication (Valdivia et al., 2025^[65]; Sinha et al., 2026^[66]).

Workers' organisations and collective action can play crucial roles in shaping effective OSH policies and in negotiating agreements and devising strategies that go beyond OSH policies while effectively protecting informal workers from the consequences of climate-related hazards. Collective organisations, such as trade unions, cooperatives and informal worker associations, are essential to: negotiate better working conditions (including adapted work schedules and regular breaks); access shared services (such as cooling infrastructure); benefit from hydration and sanitation strategies; and organise mutual support systems (Valdivia et al., 2025^[65]; Sinha et al., 2026^[66]).

Early warning systems

In the context of extreme weather events, multi-hazard early warning systems are an essential complement to OSH standards. Location- and occupation-specific alerts – when tied to temperature thresholds with clear, actionable guidance on rest, hydration and task adjustment – can reduce health impacts and productivity losses. For heat, most occupational injuries occur before the official authority declares a heatwave (Flouris et al., 2024^[20]). It is therefore crucial to trigger alerts and undertake preventive measures during hot periods and not only during heatwaves (when crisis response plans are usually activated). For droughts and floods, warnings that cover seasonal outlooks and their expected effects on agricultural calendars can help farmers adjust planting decisions, activate insurance cover, or access support in advance of shocks, shifting from reactive response to anticipatory risk management (FAO and WMO, 2025^[67]).

The design of warning systems should account for the fact that many informal workers have limited digital skills or low literacy, which can prevent critical information from reaching them. Effective systems should utilise multiple channels, including community radio, SMS alerts in local languages, market associations and extension services. Critically, they should deliver messages that are simple, actionable and tailored to specific occupations (Valdivia et al., 2025^[65]). Integrating OSH guidance (e.g. recommendations on rest, hydration and/or flood evacuation) into early warning messages could further increase the practical value of each alert.

Establish comprehensive agricultural and rural development policies to build resilience

Agricultural practices and climate risks are closely intertwined. Globally, the growth of the agri-food industry and the substantial productivity gains achieved during the last 50 years have largely come at the cost of the degradation of ecosystems (Davis et al., 2025^[68]). Current intensive and unsustainable practices – e.g. poor soil management, absence of crop rotation, and misuse or overuse of chemical fertilisers and pesticides – have notably worsened the quality of soil, water and air. In combination, these factors have increased the vulnerability of the agricultural sector to extreme weather events and climate risks (OECD, 2026^[69]). In return, the intensification of climate-related and extreme weather events now threatens agriculture productivity and farmers' livelihoods.

Agricultural practices

New and different environment-friendly approaches are needed, typically entailing practices such as organic farming, agroecology and regenerative agriculture (OECD, 2026^[69]). In general, these techniques require more labour inputs than in conventional practices, which would provide more on-farm jobs and wage work. They also tend to require different types of inputs (e.g. fertilisers and pesticides) and techniques (e.g. crop diversification and cross-crop cultivation) that are less harmful for the environment than those used in conventional farming. Socially, these approaches tend to produce a large range of positive outcomes, from better gender inclusion to the promotion of local and indigenous agricultural knowledge and the development of local agri-food value chains.

The potential economic risks associated with shifting towards more sustainable approaches should be clearly understood and carefully managed. Changing farming practices represents a substantial risk for farmers in terms of agricultural knowledge, yield and income. For example, many business models of organic farming depend on a price premium; if that premium declines over time or fails to materialise, the returns to organic farming may fall below those of conventional farming. For informal workers with limited resources and little financial cushion, this risk may simply be too high to absorb. Overall, two complementary elements are vital to success. First, farmers must clearly understand the trade-offs of different sustainable agriculture practices. In parallel, public policy should help reduce transition risks by supporting farmers during the adjustment period and providing incentives to adopt new practices.

Agri-food value chains

Transitioning successfully to sustainable agricultural practices would require boosting the market demand for sustainable food products. Reliable certification and labelling systems can help inform customers on the use of sustainable agricultural practices. Strengthening local supply chains through better linkages among actors (e.g. farmers, processors, distributors and retailers) could improve the quality of products, minimise losses and improve farmers' direct access to markets. Internationally, trade agreements that prioritise sustainable agriculture could support such practices by shifting the priority from quantity to quality.

The development of local value chains rests on investments in agricultural infrastructure. At the macro level, sustainable agricultural livelihoods largely depend on access to a broad and diverse set of infrastructures, including roads, water supplies, irrigation canals and market linkages. Often, these investments directly enhance agricultural productivity and resilience while also strengthening the institutional and social fabric of rural communities. Conversely, underdeveloped infrastructure, inadequate distribution systems, low production technology and insufficient institutional capacity can constitute major threats to food security (JICA, 2026^[70]).

Irrigation and water management

Access to reliable water management infrastructure is particularly critical. It constitutes a powerful structural determinant of agricultural resilience, notably in locations prone to heat stress and droughts. The Intergovernmental Panel on Climate Change (IPCC) identifies the shift from rainfed to irrigated systems as one of the most widely adopted adaptation responses in agriculture (IPCC, 2022^[35]). Yet in much of sub-Saharan Africa and parts of South and Southeast Asia, the majority of smallholder farmers remain entirely dependent on rainfall, making their livelihoods inherently fragile in the face of climate variability (FAO, 2023^[71]).

Although conventional irrigation is often unaffordable for most informal smallholders, innovative and sustainable solutions exist. For example, the community-based smallholder irrigation (COBSI) approach, developed by the Japan International Cooperation Agency (JICA), represents a fundamental departure from the assumption that irrigation requires large-scale, externally financed, and technically complex infrastructure (JICA, 2017^[72]; JICA, 2024^[73]). First piloted in Malawi in 2002 and subsequently in Zambia in 2009, COBSI enables farmers to construct functional diversion weirs using locally available materials such as wood, stone, clay and grass – at near-zero cost. These simple weirs serve as an entry point to irrigated agriculture, allowing communities to gain experience with water management and irrigated cropping. The model then operates gradually: where conditions and resources permit, these simple structures are upgraded to more permanent weirs with more complex designs. In Zambia, by the end of the initial COBSI project period (2009-11), 568 irrigation sites had been developed or rehabilitated using this method, with most households shifting from rainfed, slash-and-burn cultivation to irrigated agriculture within a few years. As a comprehensive approach COBSI also strengthens community group dynamics by bringing people together to construct, manage and maintain shared water infrastructure. This builds social capital, itself a critical component of climate resilience. The approach has also been linked to the Smallholder Horticulture Empowerment and Promotion (SHEP) methodology, transitioning farmers from subsistence to market-oriented horticulture, with nutritional awareness components additionally integrated.

Drought-resistant and heat-tolerant crops

The increased use of drought-resistant and heat-tolerant seeds is a key practice that could help reduce agricultural sensitivity to climate shocks. Drought-resistant and heat-tolerant crop varieties allow farmers to maintain meaningful production under conditions that would otherwise cause near-total crop failure. Across the world, several initiatives are underway to develop and disseminate climate-resilient crop varieties. In Africa, for instance, the Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA)

project has focused on validating and disseminating climate-smart technologies across Ethiopia, Ghana, Kenya, Mali, Senegal and Zambia (World Bank, 2024^[74]). Likewise, the FAO's Global Framework on Water Scarcity in Agriculture (WASAG) programme has launched trials of indigenous drought-resilient crops – e.g. sorghum and cowpeas – targeting women and youth farmers, recognising that traditional crop knowledge is itself a resilience asset (FAO, 2026^[75]).

However, the gap between the development of drought-resistant varieties in research institutions and their practical availability to smallholder farmers remains substantial. In most low- and middle-income countries, improved varieties rarely reach informal smallholder farmers due to weak national seed regulatory systems, inadequate seed multiplication, limited distribution infrastructure, high commercial seed prices and limited agricultural extension capacity (Sutton, Lotsch and Prasann, 2024^[76]). The IPCC also underlines that cultural and economic factors – including farmers' risk aversion, lack of extension support and weak input supply chains – could constitute crucial barriers to the adoption of such varieties (Sutton, Lotsch and Prasann, 2024^[76]). Collective organisations, such as farmers' cooperatives, can play a key role by aggregating demand for seeds and irrigation at a scale individual smallholders cannot reach alone.

Rural development and rural-urban linkages

Beyond agriculture, building the resilience of informal workers requires broader territorial approaches to rural development. While climate-smart agriculture, irrigation and resilient crops can strengthen farm livelihoods, they are unlikely to be sufficient on their own. Many rural households already depend on a combination of farming and non-farm activities, including trade, transport, agro-processing, construction, tourism and personal services. Supporting the development of these activities can reduce dependence on climate-sensitive agriculture, diversify income sources and create new opportunities for productive employment. In this regard, rural development policies should not focus solely on increasing agricultural productivity, but also on fostering local entrepreneurship, skills development, access to finance and the growth of rural non-farm economies (OECD, 2019^[77]).

Such territorial approaches acknowledge that rural and urban areas are deeply interconnected. Intermediary cities, in particular, are at the heart of food systems, acting as interfaces at which rural areas source their agricultural inputs and farmers access local markets (OECD/UN-Habitat, 2022^[71]). These areas also play a particularly important role as hubs for food processing, logistics, education, health care and business services (OECD, 2019^[77]). Strengthening rural-urban linkages through investments in transport, digital connectivity, market infrastructure and local value chains can help connect rural producers and workers to larger markets, services and employment opportunities, thereby transforming agricultural growth into broader local economic development.

These linkages highlight that resilience cannot be built in rural areas alone. The territorial perspective underscores the need to integrate climate adaptation, economic development and spatial planning across rural and urban areas rather than treating them as separate policy domains. As workers, goods and services move between territories, the quality of urban infrastructure increasingly shapes the ability of households, including rural ones, to cope with environmental risks. Investments in resilient transport systems, housing, public services and urban infrastructure are therefore a critical complement to rural development policies, particularly in intermediary and rapidly growing cities that connect rural and urban economies (OECD/UN-Habitat, 2025^[78]; OECD/UN-Habitat, 2022^[71]).

Invest in resilient and quality urban infrastructure

The quality of infrastructure and buildings in which informal workers live and work is a crucial dimension of their vulnerability to extreme weather events. Urban informal workers often face a double exposure, both at work – whether they operate in a fixed place of work or in the public space – and at home. Workplace-focused measures are therefore essential but are not sufficient on their own because heat

exposure and its consequences extend well beyond the job site. For example, dwellings built with heat-retaining materials, minimal insulation and inadequate ventilation can reach intolerable temperatures during heatwaves, often exceeding outdoor ambient temperatures (Valdivia et al., 2025^[65]; Sinha et al., 2026^[66]). In dense, low-income urban neighbourhoods, the urban heat island effect can substantially raise temperatures. Meanwhile, for workers in flood-prone areas, poorly sited and structurally inadequate housing means that flooding simultaneously destroys assets and disrupts livelihoods. Informal workers often face compounding exposure as they tend to be concentrated in the most hazardous parts of cities – e.g. floodplains, steep slopes and poorly drained lowlands – without access to basic infrastructure such as water drainage or electricity (IPCC, 2022^[35]).

A prerequisite is to ensure dwellings and places of work have access to the basic infrastructure on which urban livelihoods depend: piped water, drainage, paved roads, electricity and emergency access (Satterthwaite et al., 2018^[79]). In cases of floods, for example, lack of access to these services can contribute to the spread of disease in the aftermath and delay recovery. Likewise, lack of access to electricity during heatwaves can prevent households and businesses from installing or operating cooling systems.

Informal settlement upgrading – i.e. systematic improvement of housing stock, tenure security, services and public spaces – is one of the most effective vehicles for climate adaptation available to city governments (OECD/UN-Habitat, 2022^[7]). In most places, the urban housing deficit is not in quantity but in quality. In 2018, the Inter-American Development Bank estimated that 94% of the total urban housing deficit in Latin America and the Caribbean was associated with inadequate living conditions in existing informal settlements while 90% of housing solutions involved the construction and delivery of new units instead of retrofitting (Adler et al., 2018^[80]).

Upgrading such informal settlements and providing basic services requires the engagement of multiple layers of governance. Since the adverse impacts of extreme weather events are observed at different scales, urban adaptation that is both pro-poor and pro-informal workers is needed across all stakeholders, from individual and household level to neighbourhood, community and city level. To remain feasible and realistic, these adaptation measures should integrate coping measures, incremental adjustments and transformational changes. This co-ordination among diverse actors and across spatial layers is crucial to ensure infrastructure investment incorporates climate risk from the outset, including through flood risk mapping, heat island analysis and community participation at the planning stage. Failing to do so can inadvertently lock in new vulnerabilities. For example, road investments can accelerate stormwater runoff while drainage improvements in one location can worsen flooding downstream (Satterthwaite et al., 2018^[79]).

In practice, improving housing and workplace buildings can draw upon diverse techniques and methods. In the case of heat, demand for cooling will grow sharply as temperatures rise, but access to effective cooling remains deeply unequal, mainly because of the cost of air conditioners or coolers. Electric fans, the most common fallback in low-income households, are ineffective above 35°C – when cooling is most needed – since they circulate hot air without reducing indoor temperature. Policies should therefore focus not only on providing affordable electricity and access to electricity-powered cooling mechanisms, but should also prioritise passive cooling approaches that do not depend on access to electricity or households' welfare (ADB, 2022^[81]). These passive strategies include thermal insulation, natural ventilation design, shading, cool roofs and reflective surfaces. Importantly, most of these potential gains are locked in at the design stage. The role of building codes and minimum energy performance standards for new construction is crucial to ensure passive solutions are progressively implemented as new dwellings and buildings are built.

In informal settlements, cool roof solutions are particularly interesting as they are relatively inexpensive, fast to deploy and do not require major structural modifications (ADB, 2022^[81]). Evidence from a range of major cities in the Global South shows that cool roof retrofits could reduce up to 91% of annual heat

exposure (Natkiewicz et al., 2022^[82]). For existing housing stock, publicly subsidised retrofit programmes that prioritise ventilation improvements and reflective surfaces offer a practical route to reduce chronic heat exposure for the most vulnerable residents.

At the community or city level, adaptation to heat can be achieved through various levers, including decongestion of public space, use of cool or permeable pavement, provision of shaded and resting spaces (e.g. benches) in public urban spaces, and the installation of vegetation and water areas where possible (ADB, 2022^[81]). Cooling centres – e.g. community spaces with fans, drinking water and basic facilities – can also provide critical relief during heatwaves for outdoor workers and local residents in overheated dwellings who have no private alternative (Engel, Anzilotti and Palmieri, 2025^[83]). Green infrastructure can also deliver a wide range of co-benefits that are particularly relevant to informal workers: it absorbs stormwater during flood events, reduces air pollution, improves mental health outcomes, and provides physical spaces for outdoor work and rest during extreme heat (Hunter et al., 2023^[84]).

Strengthening urban resilience to climate risks also requires rethinking transportation systems and the way public space is organised. In 2025, in the context of intermediary cities of Kenya and Mozambique, the OECD and UN Habitat identified four priority areas of action: i) rethinking how road space and public space are allocated; ii) structuring urban development and infrastructure investment around accessibility rather than distance; iii) expanding and improving sustainable mobility options; and iv) reinforcing governance and institutional alignment (OECD/UN-Habitat, 2025^[78]). These high-leverage goals are strategic system shifts that can unlock broader transformation. While each city and urban area may have its own constraints and specific objectives, these areas of action tend to converge towards similar priorities: reclaiming road space for people, linking housing and transport planning, and improving public and shared mobility.

Annex 5.A. Environmental and climate risks: Concepts and application

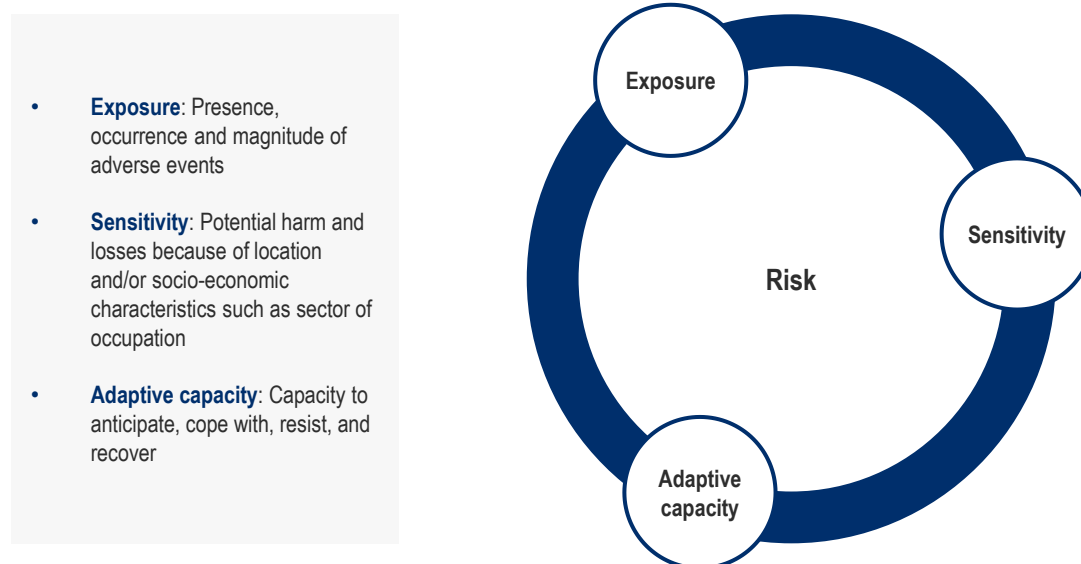
Conceptual approach

The concept of environmental and climate risk has evolved over time. The field of environment uses a wide array of terms – risk, vulnerability, sensitivity, resilience, adaptation and adaptive capacity – for which relationships are not always clear and meanings may vary when used in different contexts or by different authors. In its sixth and latest assessment (2022), the Intergovernmental Panel on Climate Change (IPCC) revisited the definition of risk as a function of hazard, exposure and vulnerability (IPCC, 2022^[35]). This approach establishes vulnerability as both a component of risk and a stand-alone crucial concept. Defined as the propensity or predisposition to be adversely affected, vulnerability itself encompasses a variety of concepts, including sensitivity or susceptibility to harm and lack of capacity to cope and adapt. This definition remains very similar to the description of vulnerability in the IPCC's third assessment (2001), which describes vulnerability as a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity (Brooks, 2003^[85]).

The chapter examines specifically at environment-related risks through the lens of potential impacts that environmental degradation and climate shocks can have on workers' incomes. Although risks and vulnerabilities can take many forms and span multiple dimensions of individuals' lives – including non-economic ones (Canpolat et al., 2025^[2]) – the analysis focuses primarily on the risks faced by the informal economy from environmental degradation and hazards. For this reason, the chapter uses income vulnerability as its main entry point and examines, by extension, individuals' ability to economically sustain their livelihoods and those of their households in the event of adverse shocks.

The chapter adopts a definition of risk broadly in line with the IPCC's definition, relying on three key dimensions: exposure, sensitivity and adaptation (Annex Figure 5.A.1). This is consistent with the frameworks used in the research on environmental risks. For instance, the University of Notre Dame's ND-GAIN index assesses the vulnerability of a country for a large range of indicators and areas across three cross-cutting components: the exposure of the sector to climate-related or climate-exacerbated hazards; the sensitivity of that sector to the impacts of the hazard; and the adaptive capacity of the sector to cope or adapt to these impacts (Chen et al., 2024^[86]). Likewise, the OECD Development Centre (2024^[87]) adopted a definition of risk that relies on three key factors: exposure (the presence, occurrence and magnitude of environmental degradation); sensitivity (the harm caused by a given level of environmental degradation); and adaptation capacity (the ability of individuals or systems to cope with the impacts of environmental degradation).

Annex Figure 5.A.1. Risk as the outcome of three key elements – exposure, sensitivity and adaptive capacity



Source: Authors' own elaboration.

Exposure is defined as the presence, occurrence and magnitude of environmental degradation or hazards. How exposure is measured depends on the type of event considered. To assess exposure to heat stress, the chapter uses the wet bulb globe temperature (WBGT) – a composite indicator capturing the combined effects of air temperature, humidity, wind speed and solar radiation. For droughts and floods, exposure is measured using the normalised total yearly duration of events, which reflects both their frequency and persistence. In addition, the level of exposure to a given hazard can vary substantially across locations, depending on the type of event being analysed. Typically, regions or countries that are severely exposed to droughts are not necessarily exposed to the same extent to floods, extreme temperatures, storms, sea-level rise or other hazards.

Sensitivity is defined as the potential harm caused to individuals' livelihoods by a given level of environmental degradation. From a labour perspective, sensitivity refers to whether jobs and labour income could be potentially impacted by environmental degradation. This dimension is strongly linked to the concept of dependency towards and reliance upon environmental resources. Importantly, the level of sensitivity can vary depending on the type of environmental degradation or climatic shock to which a given individual, household or community is exposed. Typically, based on the economic sector of occupation, a worker may be highly sensitive to a certain type of environmental degradation, such as heat stress, but less sensitive to another type such as floods.

Adaptation is the ability of individuals or systems to cope with the impacts of environmental degradation. This approach is broadly in line with the IPCC, which defines adaptation in human systems as the process of adjustment to actual or expected climate events and associated effects in order to moderate harm or take advantage of beneficial opportunities (IPCC, 2022^[35]). In this chapter, adaptation capacity is assessed from a labour-market perspective and is primarily understood as operating in the informal economy or not. The use of the informality status is a proxy for access – or lack thereof – to social protection, which is a crucial factor for individuals to avoid harm and/or recover from it. At the same time, workers of the informal economy are more likely to experience a wide range of deprivations in other key socio-economic dimensions such as poor living conditions, lower educational attainment, reduced access to public services

and infrastructure, etc. These limitations further hamper informal workers' ability to cope with environmental degradation.

Methodology to measure risk from weather events

To measure risk from weather events, the chapter adopts a definition based on the three core dimensions previously outlined and tailors them to the available data.

Exposure is measured using data from the Emergency Events Database (EM-DAT) for the period 2000-23. Produced by the Centre for Research on the Epidemiology of Disasters (UCLouvain / CRED, 2025^[17]), EM-DAT documents the occurrence and impacts of more than 27 000 mass disasters worldwide since 1990, including droughts and floods. The database draws on multiple sources, such as UN agencies, non-governmental organisations, reinsurance companies, research institutes and press agencies.

Based on harmonisation work undertaken by Teber et al. (2025^[88]), EM-DAT data for droughts and floods are geocoded using the spatial standard of Global Administrative Unit Layers (GAUL) developed by the Food and Agriculture Organization (FAO). These hazards are linked to GAUL level 1 areas, which correspond to the first national administrative level (e.g. provinces, regions). For each KIbIH country, data on floods and droughts are aggregated at the sub-national level. Exposure is measured by normalising the total yearly duration of events over the reference period and classifying the resulting indicator into three exposure levels: low (0-1 month/year), medium (1-2 months/year) and high (more than 2 months/year).

In parallel, population data from the KIbIH are geocoded and harmonised to match GAUL level 1 classification (Annex Table 5.A.1). Weather event data are then linked to the KIbIH population data using the same GAUL framework.

Annex Table 5.A.1. List of KIbIH surveys geo-located to GAUL level 1 classification

ISO-3	Country	Year	Region	Number of GAUL area covered	Share of population geo-located (%)	Share of labour force geo-located (%)
ALB	Albania	2012	Europe	12	100	100
ARG	Argentina	2023	Americas	24	100	100
ARM	Armenia	2023	Asia	11	100	100
BEN	Benin	2021	Africa	12	100	100
BFA	Burkina Faso	2021	Africa	13	100	100
BGR	Bulgaria	2023	Europe	No data geo-located		
BHS	Bahamas	2013	Americas	No data geo-located		
BOL	Bolivia	2022	Americas	9	100	100
BRA	Brazil	2023	Americas	27	100	100
BRB	Barbados	2016	Americas	11	100	100
CHL	Chile	2022	Americas	16	100	100
CHN	China	2020	Asia	21	100	100
CMR	Cameroon	2007	Africa	10	100	100
COL	Colombia	2023	Americas	32	98	100
CRI	Costa Rica	2023	Americas	No data geo-located		
CYP	Cyprus	2023	Asia	No data geo-located		
DOM	Dominican Republic	2018	Americas	10	100	100
ETH	Ethiopia	2018	Africa	11	100	100
GHA	Ghana	2013	Africa	10	100	100
GMB	Gambia	2015	Africa	8	100	100
GTM	Guatemala	2022	Americas	22	100	100
HND	Honduras	2019	Americas	16	24	44

ISO-3	Country	Year	Region	Number of GAUL area covered	Share of population geo-located (%)	Share of labour force geo-located (%)
HRV	Croatia	2023	Europe	<i>No data geo-located</i>		
IDN	Indonesia	2014	Asia	19	94	95
IND	India	2012	Asia	32	100	100
JAM	Jamaica	2019	Americas	14	100	100
KEN	Kenya	2015	Africa	47	100	100
KHM	Cambodia	2019	Asia	24	100	100
LAO	Lao PDR	2012	Asia	17	100	100
LBR	Liberia	2016	Africa	15	100	100
LVA	Latvia	2023	Europe	<i>No data geo-located</i>		
MDG	Madagascar	2012	Africa	6	100	100
MDV	Maldives	2019	Asia	18	100	100
MEX	Mexico	2022	Americas	32	93	100
MLI	Mali	2021	Africa	9	100	100
MMR	Myanmar	2015	Asia	3	100	100
MNG	Mongolia	2021	Asia	21	100	100
MWI	Malawi	2019	Africa	3	100	100
NAM	Namibia	2015	Africa	14	100	100
NER	Niger	2018	Africa	8	100	100
NGA	Nigeria	2015	Africa	35	100	100
NIC	Nicaragua	2014	Americas	<i>No data geo-located</i>		
PER	Peru	2023	Americas	22	100	100
PRY	Paraguay	2024	Americas	16	100	100
ROU	Romania	2023	Europe	<i>No data geo-located</i>		
RWA	Rwanda	2016	Africa	5	100	100
SEN	Senegal	2021	Africa	14	100	100
SLE	Sierra Leone	2018	Africa	4	100	100
SLV	El Salvador	2023	Americas	14	100	100
SUR	Suriname	2022	Americas	10	100	100
TGO	Togo	2021	Africa	5	100	100
THA	Thailand	2017	Asia	77	100	100
TZA	Tanzania	2019	Africa	31	100	100
UGA	Uganda	2019	Africa	4	100	100
URY	Uruguay	2023	Americas	19	100	100
VNM	Viet Nam	2016	Asia	63	100	100
ZAF	South Africa	2016	Africa	7	100	100
ZMB	Zambia	2015	Africa	10	100	100

Adaptive capacity is measured using the formality or informality status of workers aged 15 years and above.

Sensitivity is measured through the sectoral link of jobs to droughts and floods, defined as the extent to which economic activities are likely to be negatively affected by these hazards. Jobs are classified into three categories – direct, indirect, and no or weak sensitivity – based on codes from the fourth revision of the International Standard Industrial Classification of All Economic Activities (ISIC-04). ISIC is a hierarchical classification system that organises economic activities into four levels, ranging from broad categories at level 1 to detailed activities at level 4. The sensitivity classification is developed separately for droughts and floods and is tailored to each hazard.

For droughts, all activities within “agriculture, forestry and fishing” (ISIC-04 Sector A) are classified as having direct sensitivity (Annex Figure 5.A.2). Activities with indirect sensitivity include selected manufacturing and service sectors. In manufacturing (Sector C), five divisions and all of their level-3 and

level-4 subcategories are classified as indirectly sensitive: manufacture of food products (C10); beverages (C11); tobacco products (C12); wood and wood products excluding furniture (C16); and paper and paper products (C17). In services, all food-related activities within accommodation and food services (I56, Sector I), as well as several level-3 and level-4 activities from sectors G, N and R, are also classified as indirectly sensitive to droughts (Annex Figure 5.A.2). The rest of the economy is classified as only weakly sensitive to droughts.

Annex Figure 5.A.2. Sectoral linkages to droughts

	ISIC level 1	ISIC level 2	ISIC level 3	ISIC level 4
Direct sensitivity	A = Agriculture, forestry and fishing	All level-2, level-3 and level-4 codes		
Indirect sensitivity	C = Manufacturing	C-10 = Manufacture of food products C-11 = Manufacture of beverages C-12 = Manufacture of tobacco products C-16 = Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials C-17 = Manufacture of paper and paper products	All level-3 and level-4 codes	
	G = Wholesale and retail trade; repair of motor vehicles and motorcycles		G-462 = Wholesale of agricultural raw materials and live animals G-463 = Wholesale of food, beverages and tobacco G-472 = Retail sale of food, beverages and tobacco in specialized stores	All level-4 codes
	I = Accommodation and food service activities	I-56 = Food and beverage service activities	All level-3 and level-4 codes	
	N = Administrative and support service activities		N-791 = Travel agency and tour operator activities N-813 = Landscape care and maintenance service activities	All level-4 codes
	R = Arts, entertainment and recreation			R-9103 = Botanical and zoological gardens and nature reserves activities
No or weak sensitivity Rest of the economy	All other ISIC-04 sectors			

Source: Authors' own elaboration.

For floods, all activities within “agriculture, forestry and fishing” (Sector A) and “mining and quarrying” (Sector B) are classified as having direct sensitivity (Annex Figure 5.A.3). In addition, two level-3 activity groups related to transportation systems are identified as directly sensitive to floods. Activities with indirect sensitivity include selected manufacturing and service sectors. All activities within “construction” (Sector F), “accommodation and food service activities” (Sector I) and “real estate activities” (Sector L) are classified as indirectly sensitive to floods. The same five manufacturing divisions (Sector C) identified as indirectly sensitive to droughts are classified as indirectly sensitive to floods, along with all water- and sewage-related activities (E36, E37 and E38, Sector E). Several level-2, level-3 and level-4 activities from Sectors G, N, R and T are likewise classified as indirectly sensitive to floods (Annex Figure 5.A.3). All remaining economic activities are classified as having only weak sensitivity to floods.

Annex Figure 5.A.3. Sectoral linkages to floods

	ISIC level 1	ISIC level 2	ISIC level 3	ISIC level 4
Direct sensitivity	A = Agriculture, forestry and fishing	All level-2, level-3 and level-4 codes		
	B = Mining and quarrying	All level-2, level-3 and level-4 codes		
	H = Transportation and storage		H-491 = Transport via railways H-492 = Other land transport	All level-4 codes
Indirect sensitivity	C = Manufacturing	C-10 = Manufacture of food products C-11 = Manufacture of beverages C-12 = Manufacture of tobacco products C-16 = Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials C-17 = Manufacture of paper and paper products	All level-3 and level-4 codes	
	E = Water supply; sewerage, waste management and remediation activities	E-36 = Water collection, treatment and supply E-37 = Sewerage E-38 = Waste collection, treatment and disposal activities; materials recovery	All level-3 and level-4 codes	
	F = Construction	All level-2, level-3 and level-4 codes		
	G = Wholesale and retail trade; repair of motor vehicles and motorcycles		G-462 = Wholesale of agricultural raw materials and live animals G-463 = Wholesale of food, beverages and tobacco G-472 = Retail sale of food, beverages and tobacco in specialised stores	All level-4 codes
				G-4781 = Retail sale via stalls and markets of food, beverages and tobacco products
	I = Accommodation and food service activities	All level-2, level-3 and level-4 codes		
	L = Real estate activities	All level-2, level-3 and level-4 codes		
	N = Administrative and support service activities		N-791 = Travel agency and tour operator activities N-812 = Cleaning activities N-813 = Landscape care and maintenance service activities	All level-4 codes
	R = Arts, entertainment and recreation			R-9103 = Botanical and zoological gardens and nature reserves activities
	T = Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	T-92 = Activities of households as employers of domestic personnel	All level-3 and level-4 codes	
No or weak sensitivity	All other ISIC-04 sectors			
Rest of the economy				

Source: Authors' own elaboration.

Annex 5.B. Methodology to estimate productivity losses associated with heat

This annex presents the methodology used to estimate labour productivity losses associated with heat stress. Productivity losses are defined as reductions in work capacity resulting from exposure to high levels of heat during working hours. The approach builds on the framework developed by Kjellstrom et al. (2017^[22]) and the ILO (2019^[23]), while introducing important methodological adaptations designed to better capture heterogeneity in labour-market exposure to heat.

Conceptual approach and comparison with existing methodologies

Relative to the ILO methodology, the approach adopted in this chapter involves a trade-off between spatial precision in climate exposure and precision in population and labour-market characteristics. On the climate side, heat exposure is aggregated from fine-resolution climate grid cells to sub-national administrative areas using a “contain” approach, whereby only grid cells fully contained within a given Global Administrative Unit Layers (GAUL) area are retained and median values across these cells are used to characterise local heat exposure. This aggregation reduces within-area climate variability compared with a purely grid-based analysis as implemented in Kjellstrom et al. (2017^[22]) and ILO (2019^[23]).

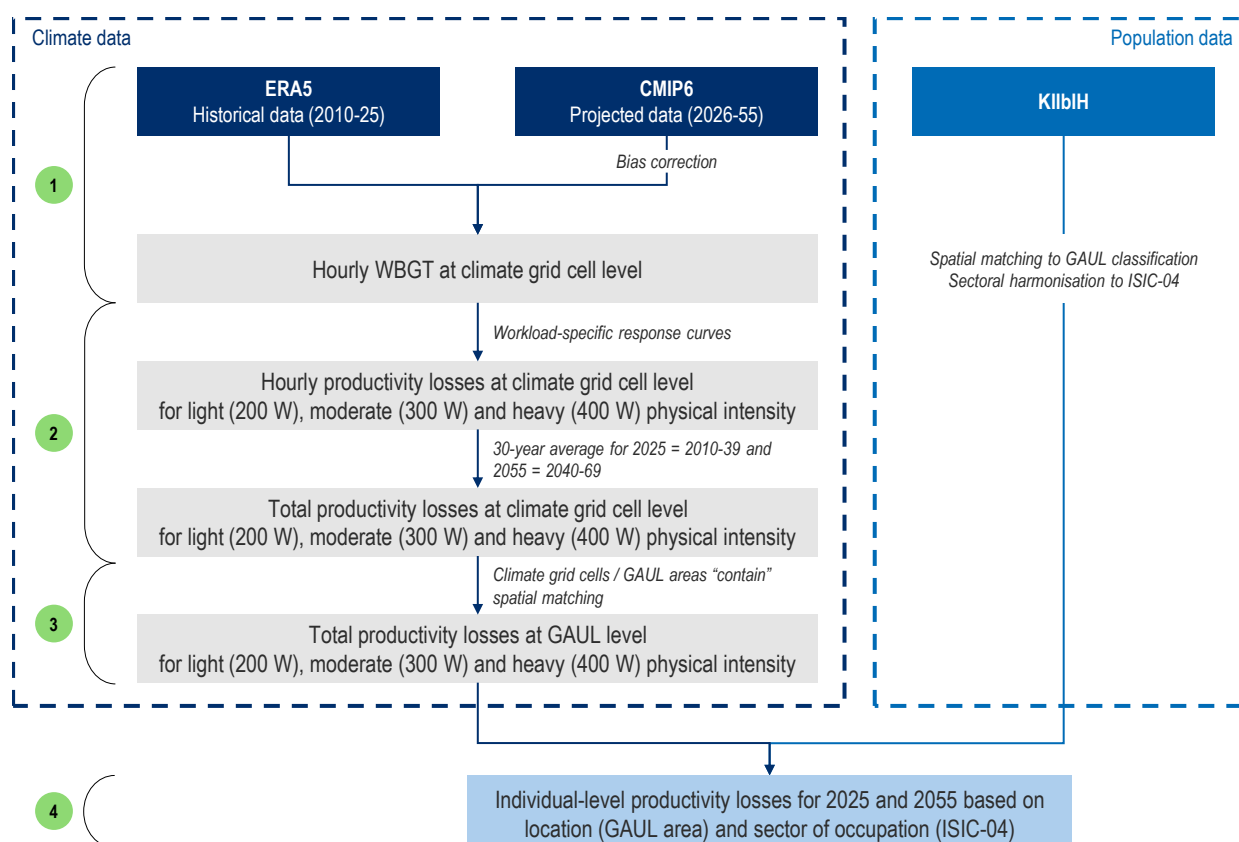
On the population side, the methodology substantially improves the measurement of exposure and impacts across workers. Instead of relying on national employment-to-population ratios applied uniformly across space, as in the ILO approach, the methodology applied here links productivity losses to geolocated individual-level data from the KILBIH household survey. This allows productivity impacts of heat stress to be weighted by the actual spatial and sectoral distribution of workers and to be analysed across specific sub-groups of the labour force, including formal and informal workers, as well as across a broader range of social, demographic and economic characteristics.

The methodology therefore prioritises a more accurate representation of who is exposed to heat and how exposure translates into productivity losses across different segments of the labour force, while maintaining consistency with the core climate-productivity relationships established in the literature.

Methodology to compute productivity losses

The methodology consists of four main steps: i) measurement of heat exposure using WBGT; ii) translation of heat exposure into productivity losses at the climate grid-cell level; iii) spatial aggregation of productivity losses to administrative areas; and iv) linkage of climate-based losses with labour-market microdata (Annex Figure 5.B.1).

Annex Figure 5.B.1. Process to compute productivity losses based on climate and KilbIH data



Note: Green circles refer to the four main steps detailed in the annex. CMIP6 refers to Coupled Model Intercomparison Project Phase 6 and ERA5 refers to European Centre for Medium-Range Weather Forecasts (ECMWF) Reanalysis v5.

Source: Authors' own elaboration.

Measurement of heat exposure

Raw climate data are extracted from the Copernicus Climate Data Store (CDS) for the period 2010-69, using historical data (2010-25) from the European Centre for Medium-Range Weather Forecasts (ECMWF) Reanalysis v5 (ERA5) dataset, and projected data (2026-2069) from the Coupled Model Intercomparison Project Phase 6 (CMIP6) dataset (Copernicus Climate Change Service CDS, 2026^[32]; Copernicus Climate Change Service CDS, 2026^[33]). CMIP6 data are extracted from the MPI-ESM1-2-LR model of the Max Planck Institute for Meteorology for the intermediate-emissions scenario (SSP2-4.5). Annex Table 5.B.1 provides information on the historical and projected raw data extracted from Copernicus CDS.

Annex Table 5.B.1. Raw climate data from ERA5 and CMIP6 used to measure heat exposure

Dataset	Code	Name	Unit	Description
ERA5				
	t2m	2m temperature	Kelvin (K)	The temperature of air at 2 meters above the surface of land, sea or inland waters is calculated by interpolating between the lowest model level and the Earth's surface, taking account of atmospheric conditions.
	d2m	2m dewpoint temperature	Kelvin (K)	The temperature to which the air, at 2 meters above the surface of the Earth, would have to be cooled for saturation to occur is a measure of the humidity of the air. Combined with temperature, it can be used to calculate the relative humidity. 2m dewpoint temperature is calculated by interpolating between the lowest model level and the Earth's surface, taking account of atmospheric conditions.

Dataset	Code	Name	Unit	Description
	u10	10m u-component of wind	Meter per second (m/s)	The eastward component of the 10-meter wind corresponds to the horizontal speed of air moving towards the east, at a height of 10 meters above the surface of the Earth.
	v10	10m v-component of wind	Meter per second (m/s)	The northward component of the 10-meter wind corresponds to the horizontal speed of air moving towards the north, at a height of 10 meters above the surface of the Earth.
CMIP6				
	tas	Near-surface air temperature	Kelvin (K)	The temperature of air at 2 meters above the surface of land, sea or inland waters is calculated by interpolating between the lowest model level and the Earth's surface, taking account of atmospheric conditions.
	tasmax	Daily maximum near-surface air temperature	Kelvin (K)	Daily maximum temperature of air at 2 meters above the surface of land, sea or inland waters.
	huss	Near-surface specific humidity	dimensionless	Amount of moisture in the air near the surface, divided by the amount of air plus moisture at that location.
	psl	Sea level pressure	Pascal (Pa)	Pressure of the atmosphere at the surface of the Earth, adjusted to the height of sea level.
	sfcWind	Near-surface wind speed	Meter per second (m/s)	Magnitude of the two-dimensional horizontal air velocity (u- and v- component) near the surface.

Source: (Copernicus Climate Change Service CDS, 2026^[32]) and (Copernicus Climate Change Service CDS, 2026^[33]).

To ensure that the output of the climate model aligns with historical data, projected data are bias-corrected using quantile delta mapping method. First, ERA5 and CMIP6 historical simulations are re-gridded to a common spatial resolution. Monthly histograms are constructed for each grid cell and variable, using fixed bin widths. These histograms are aggregated over the calibration period and converted into empirical quantiles. Second, quantile delta mapping method is applied to projected CMIP6 data. For each grid cell, projected values are mapped from the CMIP6 historical distribution to the ERA5 reference distribution, while preserving projected changes in quantiles. Relative humidity is bias-corrected indirectly by correcting relative humidity distributions and converting them back to specific humidity. This approach ensures physical consistency between temperature and humidity.

Heat exposure is measured using the wet bulb globe temperature (WBGT), a composite indicator that captures the combined effects of air temperature, humidity, wind speed and solar radiation on human heat stress. WBGT is widely used in occupational health research and forms the basis of the productivity-heat response functions adopted in this analysis.

The standard formula to compute the outdoor WBGT is:

$$WBGT = 0.1 \times T_{db} + 0.7 \times T_{wb} + 0.2 \times T_g$$

Where:

- T_{db} = dry bulb temperature
- T_{wb} = wet bulb temperature
- T_g = globe temperature (radiant heat)

The **dry bulb temperature** (T_{db}) corresponds to the ambient air temperature.

The **wet bulb temperature** (T_{wb}) reflects the lowest temperature that can be reached by evaporative cooling and is influenced by both air temperature and humidity. It can be estimated using the Stull (2011^[89]) approximation, especially in large-scale modelling:

$$T_{wb} \approx T_{db} \times \tan^{-1}(0.151977 \times \sqrt{RH + 8.313659}) + \tan^{-1}(T_{db} + RH) - \tan^{-1}(RH - 1.676331) + 0.00391838 \times RH^{1.5} \times \tan^{-1}(0.023101 \times RH) - 4.686035$$

Where:

- T_{db} = dry bulb temperature
- RH = relative humidity

Based on Parish and Putnam (1977^[90]), relative humidity (RH) is itself calculated as:

$$RH = \frac{e(T_{dp})}{e(T_{db})} \times 100$$

Where:

- $e(T_{dp})$ = actual vapour pressure, i.e. vapor pressure at dewpoint temperature (T_{dp})
- $e(T_{db})$ = saturation vapour pressure, i.e. vapor pressure at dry bulb temperature (T_{db})

Both actual and saturation vapour pressure can be estimated for any temperature level T using the Clausius-Clapeyron formula (Bolton, 1980^[91]):

$$e(T) = 6.112 \times \exp\left(\frac{17.67 \times T}{T + 243.5}\right)$$

For CMIP6 data (for which dewpoint temperature is not available), the computation of $e(T_{dp})$ can be further transformed to instead rely only on near-surface specific humidity (q) and sea level pressure (p):

$$e(T_{dp}) = \frac{q \times \frac{p}{100}}{0.622 + 0.378 \times q}$$

The **globe temperature** (T_g) can be estimated using wind speed:

$$T_g = T_{db} + 1.1 + 0.02 \times WS$$

Where:

- T_{db} = dry bulb temperature
- WS = wind speed

For CMIP6 data, near-surface wind speed is already available. For ERA5 data, it can be computed from the u- and v-component of wind with:

$$WS = \sqrt{u^2 + v^2}$$

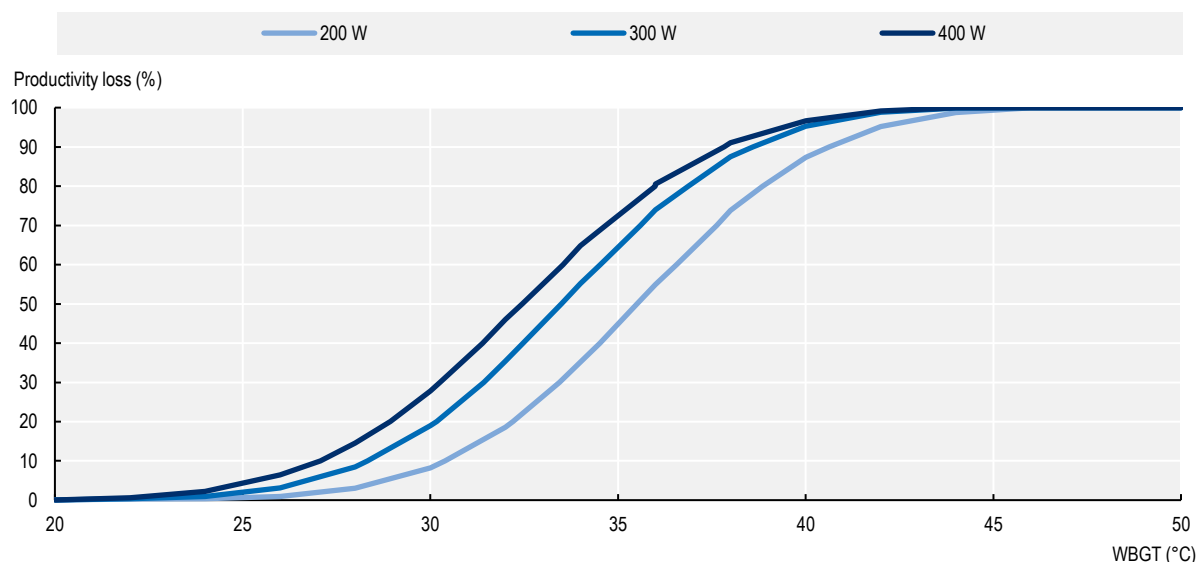
Based on these formulas, WBGT is calculated for a daily theoretical 12-hour working period, following the standard assumptions made in Kjellstrom et al. (2017^[22]) and ILO (2019^[23]). For historical climate data (ERA5), hourly WBGT values are computed for hours spanning 7:00 to 19:00 in local time. For projected climate data (CMIP6), hourly values of the raw data are not available. Instead, the method estimates the typical hourly distribution of heat levels in each grid cell from 7:00 to 19:00 by applying the “4+4+4” method. This method divides the 12-hour daily working period into three 4-hour sub-periods: during 4 hours, WBGTs are assumed to be close to the daily maximum WBGT; during 4 hours, WBGTs are assumed to be close to the daily mean WBGT (early morning and early evening); during the remaining 4 hours WBGTs are assumed to lie halfway between the daily mean WBGT and the daily maximum WBGT. The resulting three temperature datapoints computed are assumed to represent the 12-hour distribution of temperatures.

Translation of heat exposure into productivity losses

Hourly WBGT values are translated into labour productivity losses using workload-specific response curves derived from epidemiological and occupational health studies (Kjellstrom et al., 2017^[22]). These response functions describe the reduction in work capacity – or productivity loss – associated with increasing heat stress and differ according to the physical intensity of work.

Three categories of workers are distinguished based on metabolic workload: light work (200 watts [W]), moderate work (30 W) and heavy work (400 W) (Annex Figure 5.B.2).

Annex Figure 5.B.2. Estimated productivity losses at different level of physical intensity: 200 W, 300 W and 400 W



Source: Kjellstrom, T. et al. (2017^[22]), "Estimating population heat exposure and impacts on working people in conjunction with climate change", <https://doi.org/10.1007/s00484-017-1407-0>.

For each climate grid cell and each day, hourly productivity losses are computed separately for the three workload categories by applying the corresponding response curve to the observed WBGT values. These hourly losses are aggregated to daily and annual productivity losses at the grid-cell level.

To capture long-term climate trends, rather than short-term variability, annual productivity losses are averaged over three 30-year periods. A 30-year period aligns with what the climate science community regards as the minimum time period over which a long-term climate trend, as opposed to weather or extreme events, can be demonstrated (ILO, 2019^[23]). Throughout the chapter, the period 1980-2009 is referred to as 1995, the period 2010-39 as 2025, and the period 2040-69 as 2055.

Spatial aggregation of climate data

Climate grid cells are spatially matched to sub-national administrative areas using the GAUL spatial developed by the FAO. Productivity losses are linked to GAUL level 1 areas, corresponding to the first national administrative level (e.g. provinces, regions).

To reconcile the spatial resolution of climate grid cells with administrative boundaries, a "contain" approach is applied. Only grid cells fully contained within a given GAUL area are retained. For each GAUL area and each period (1995, 2025 and 2055), GAUL-level productivity losses are obtained by computing the average, median, minimum and maximum values across all contained grid cells. The median value is used as the baseline measure in the analysis, as it provides a robust representation of typical exposure while limiting the influence of local extremes.

Linkage with labour-market microdata

The final step links climate-based productivity losses with individual-level labour-market data from KIIBIH household surveys. In total, 50 surveys in the KIIBIH database are spatially harmonised by assigning individuals and households to GAUL level 1 areas based on their place of residence. Annex Table 5.A.1 in Annex 5.A reports the results of this spatial harmonisation process and the share of the population successfully geolocated.

Productivity losses computed at the GAUL level for 1995, 2025 and 2055 are matched to individuals based on their location of residence and sector of activity. Based on codes from the fourth revision of the International Standard Industrial Classification of All Economic Activities (ISIC-04), jobs are mapped to the three workload categories defined above. Activities in agriculture, forestry and fishing (Sector A) and construction (Sector F) are assumed to involve heavy physical work. Activities in mining and quarrying (Sector B), manufacturing (Sector C), electricity, gas and air conditioning supply (Sector D), and water supply and waste management (Sector E) are assumed to involve moderate physical work. All remaining activities are assumed to involve light physical work (Annex Figure 5.B.3).

This linkage allows productivity losses to be weighted by the actual spatial and sectoral distribution of workers and enables analysis of heat-related productivity impacts across specific labour-market sub-groups, including formal and informal workers.

Annex Figure 5.B.3. Level of physical intensity of ISIC-04 sectors

	ISIC level 1	ISIC levels 2, 3 and 4
Heavy physical work 400 W	A = Agriculture, forestry and fishing	All codes
	F = Construction	All codes
Moderate physical work 300 W	B = Mining and quarrying	All codes
	C = Manufacturing	All codes
	D = Electricity, gas, steam and air conditioning supply	All codes
	E = Water supply; sewerage, waste management and remediation activities	All codes
	G = Wholesale and retail trade; repair of motor vehicles and motorcycles	All codes
Light physical work 200 W	H = Transportation and storage	All codes
	I = Accommodation and food service activities	All codes
	J = Information and communication	All codes
	K = Financial and insurance activities	All codes
	L = Real estate activities	All codes
	M = Professional, scientific and technical activities	All codes
	N = Administrative and support service activities	All codes
	O = Public administration and defence; compulsory social security	All codes
	P = Education	All codes
	Q = Human health and social work activities	All codes
	R = Arts, entertainment and recreation	All codes
	S = Other service activities	All codes
	T = Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	All codes
	U = Activities of extraterritorial organisations and bodies	All codes

Source: Authors' own elaboration based on (Kjellstrom et al., 2017^[22]).

Notes

¹ Benin, Bolivia, Brazil, Cameroon, El Salvador, Ghana, Jamaica, Lao PDR, Madagascar, Maldives, Mali, Namibia, Nicaragua, Niger, Paraguay, Senegal, Sierra Leone, Thailand, Togo, Uganda, Viet Nam and Zambia.

² While the distinctive pattern of droughts – relatively rare but long-lasting – likely reflects their slow-onset nature, it may also point to important limitations of EM-DAT. To be included in EM-DAT, an event must meet at least one of the following inclusion criteria: at least ten deaths (including dead and missing); at least 100 people affected (people affected, injured or homeless); and/or a call for international assistance or an emergency declaration. Unlike floods, which are visible events that often immediately lead to impacts and damages, droughts are silent, slow onset events, the consequences of which are much more difficult to track and reveal.

³ Ethiopia, Kenya, Madagascar, Malawi, Namibia, Niger and South Africa.

⁴ Benin, Cameroon, Gambia, Ghana, Lao PDR, Madagascar, Mali, Mongolia, Nicaragua, Niger, Peru, Sierra Leone, Thailand, Togo, Uganda, Viet Nam and Zambia.

⁵ Cameroon, Lao PDR, Madagascar, Mali, Mongolia, Niger, Sierra Leone, Thailand, Uganda, Viet Nam and Zambia.

⁶ Bolivia, Cameroon, Colombia, Gambia, Ghana, Lao PDR, Madagascar, Mali, Mongolia, Niger, Sierra Leone, Uganda, Viet Nam and Zambia.

⁷ The SSP2-4.5 scenario is one of five core scenarios based on Shared Socio-economic Pathways (SSPs) developed by the Intergovernmental Panel on Climate Change (IPCC), using simulations from the Coupled Model Intercomparison Project Phase 6 (CMIP6). The SSP2-4.5 scenario represents a “middle-of-the-road” development path in which social, economic and technological trends continue broadly in line with historical patterns. It assumes moderate challenges to both mitigation and adaptation, with radiative forcing reaching 4.5 W/m² by 2100. In this scenario, global emissions peak around mid-century and then decline, but not fast enough to avoid significant warming beyond 2°C (Chen et al., 2023^[46]; Lee et al., 2023^[92]).

⁸ As of 2021, the United Nations estimated that 82 countries had conducted time-use surveys at national level, corresponding to only 38% of countries worldwide. About half of them (44 countries) had repeated their time-use survey at least once (UN Women, 2021^[94]).

⁹ Parametric insurance as discussed in this chapter refers to insurance schemes that provide payouts directly to individuals. This differs from how parametric insurance is usually understood within adaptive social protection (Bowen et al., 2020^[93]), under which it often serves as a market-based financing mechanism for governments. In the latter framework, payouts triggered by catastrophic or adverse events can be used to finance the vertical or horizontal expansion of social protection programmes, in line with the objectives of adaptive social protection.

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Securing the Livelihoods of Informal Economy Workers in Times of Global Changes

Informality shapes the lives of billions of workers and their families across developing countries. It is often marked by income insecurity, limited social protection and restricted access to job opportunities, especially for the poorest workers. As the world works towards the Sustainable Development Goals (SDGs), improving the livelihoods of informal workers remains a major challenge. Despite important progress in terms of formalisation, the pace of change and its benefits remain insufficient to meet global commitments by 2030.

This report provides a detailed analysis of the informal economy in developing countries. Using data from the OECD Key Indicators of Informality based on Individuals and their Households (KIIbIH), it highlights the diversity of situations within the informal economy. It examines how major global trends, including population ageing, automation and environmental degradation, are reshaping the risks and opportunities faced by informal workers.

The analysis helps inform policy proposals aimed at reducing vulnerabilities and improving livelihoods in the informal economy, with a focus on stronger social contracts, formal job creation, locally led approaches and greater policy coherence.

