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Research Article

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A population perspective reveals contrasting patterns of informal employment in later working life

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Abstract

Assessing longer working lives requires distinguishing workforce composition from the extent and growth of employment across older populations. A population accounting framework is developed to examine two related questions: how often a higher informal share among older workers accompanies a lower informal population share, and how formal and informal population shares change when employment participation rises. Matched data from the International Labour Organization's ILOSTAT database are used to compare ages 55–59 and 60–64 across 112 economies, alongside younger adjacent-age comparisons. The temporal analysis covers 148 periods in 45 economies with rising employment-to-population ratios at both ages. Economies are weighted equally. In 73.2% of profiles, the older group had a higher informal share among workers but lower formal and informal population shares. This reversal was 30.4 percentage points more frequent than in the 55–59 versus 50–54 comparison (95% paired economy-bootstrap confidence interval 17.9–42.9). During expansion, informal population-share gains exceeded formal changes more often in the older group, with a frequency difference of 18.6 percentage points (8.7–29.3); the age contrast in the mean change gap was less precise. The accounting analysis further shows how an initial informal majority can allow larger informal gains despite a declining informal share among workers. Joint reporting of participation, workforce composition and population shares therefore distinguishes a more informal workforce from more widespread informal employment and identifies the balance of formal and informal employment growth.

Keywords: informal employment; older workers; population ageing; employment participation; labour-market monitoring; comparative social policy

1 Introduction

Population ageing has placed longer working lives at the centre of debates on labour supply and economic security [1, 2, 3]. Assessing employment at older ages requires attention to both the proportion of people in work and the forms of work they undertake. These dimensions are closely connected where earnings from informal work coexist with uneven access to pensions and social protection. Their joint interpretation is therefore relevant both to differences between age groups and to the forms of employment that accompany rising participation over time.

Informal employment refers to work that lacks relevant formal recognition or protection in law or practice [4, 5]. It can provide earnings when other opportunities are limited, but the security these earnings offer depends on employment rights, household resources and social protection [6, 7, 8]. Research in Zimbabwe and Tanzania, for example, documents gaps in income support and social protection among informal workers [9, 10]. Studies of sustainable employability also emphasise the ability to remain in suitable work [11, 12]. Longer working lives therefore raise questions about both access to employment and the resources and protection available to those who remain in work.

Assessing informal employment at older ages requires distinguishing workforce composition from employment across the age-group population. The informal share of employment describes the mix of work among those employed and underlies Sustainable Development Goal (SDG) indicator 8.3.1 [13]. Formal and informal population shares instead express each form of work as a proportion of the entire age group. Because these shares also depend on employment participation, an older group can have a more informal workforce but a smaller proportion of people in informal work. Changes over time raise a further question about how formal and informal employment contribute to rising participation. A declining informal share among workers does not by itself establish which population share gains more.

Research has examined health, healthcare use and spending among older informal workers [14, 15, 16], employment over the life course [17], retirement transitions [18] and the persistence of informal employment [19]. Evidence from Turkey illustrates why participation and composition should be considered together: early retirement incentives reduced men's labour-force participation while increasing movement into informal work [18]. Other approaches extend the analysis beyond workers alone. Population-health research has measured informal employment relative to the total population [20], while household

indicators describe resources available to informal workers and their families [21]. Policy decompositions distinguish employment status from protection and registration [22]. Building on these approaches, the present study examines how often worker and population measures give opposing age patterns, whether this contrast is concentrated at older ages, and how the balance of formal and informal employment expansion differs between older age groups.

In this study, a population accounting framework is developed to examine these questions using matched observations from the International Labour Organization's ILOSTAT database. The age-profile analysis compares employment composition and population shares between ages 55–59 and 60–64 across 112 latest-available economy profiles. Younger adjacent-age comparisons on the same profiles establish whether this contrast is more common at the older end of the age range. The temporal analysis then examines how the two population shares change within each age group during 148 periods of rising participation at both ages in 45 economies. It compares the frequency and size of informal gains relative to formal changes and assesses the additional pattern of larger informal gains alongside declining workforce informality. Exact decompositions provide the accounting conditions for interpreting these comparisons.

The contribution is comparative evidence on the frequency and age concentration of opposing age patterns and on the balance of employment expansion. The age profiles show that a more informal workforce often accompanies lower formal and informal population shares, while the temporal comparisons show that informal gains exceed formal changes more often in the older group. The accounting analysis identifies the conditions under which a declining informal share among workers can coexist with larger informal population-share gains. Together, these findings distinguish changes in the mix of work from changes in the extent and balance of employment across older populations.

2 Data and methods

2.1 Data and study populations

Aggregate repeated cross-sectional data were obtained from the ILOSTAT bulk archive [23]. Annual employment-to-population ratios and informal employment rates by sex and age were drawn from series based on the employment definitions of the 13th International Conference of Labour Statisticians [24]. Observations were matched by economy, survey source, sex, year and five-year age group, retaining sources designated as best available for both series.

The primary analyses used data for both sexes combined. Published informal employment rates were checked against the corresponding informal and total employment counts.

Ages 55–59 and 60–64 were selected as the oldest adjacent five-year groups with broad coverage in the matched data. This age range supports comparisons of later-life employment across different retirement systems [25, 26]. Ages 45–49 and 50–54 provided earlier comparisons; the open-ended group aged 65 or older was excluded. After removing observations flagged as unreliable, the latest complete four-age profile was retained for each economy, yielding 112 profiles with reporting years from 2009 to 2026.

The temporal analysis asks how formal and informal population shares change when participation rises within each age group. Consecutive available observations from the same source were linked into periods one to five years apart, retaining only unflagged endpoints. Periods including or spanning 2020 or 2021 were excluded because of pandemic-related disruption. Employment expansion required the employment-to-population ratio to rise by at least 0.50 percentage points per year at both focal ages. The common expansion requirement focuses the age comparison on how growth is distributed between formal and informal work. Table 1 summarises the samples.

Table 1 Study samples

Sample	Selection rule	Sample size
Latest age profiles	Latest complete four-age profile	112 economies
Higher workforce informality	Higher I/E in both final and preceding age comparisons	70 economies
Eligible periods	Same source; 1–5 years; no period includes or spans 2020–2021	438 / 55
Expansion at focal ages	E/P growth ≥ 0.50 pp/year at both ages	148 / 45
Declining I/E at both ages	Expansion and declining I/E at both ages	44 / 24
Initial informal majority	Expansion with initial I/E > 50% at both ages	89 / 30
Expansion at all four ages	E/P growth ≥ 0.50 pp/year at every age	88 / 38
Sex-specific expansion	Both focal ages expand in combined, male and female series	68 / 34

Note: Temporal sample sizes are periods/economies.

2.2 Workforce and population perspectives

2.2.1 Employment measures

Employment participation links workforce composition to formal and informal employment shares in the age-group population. Let P denote the age-group population and E, I and F the numbers in total, informal and formal employment. Since $F = E - I$, their population shares satisfy:

$$e = E/P; \quad q = I/E; \quad i = I/P = eq; \quad f = F/P = e(1-q). \tag{1}$$

Here, e is the employment-to-population ratio, termed employment participation; q is the informal share of employment; and i and f are the informal and formal population shares. The non-employed share is $1 - e$. Employment categories follow the source definitions, including main-job classification in SDG informality statistics [13]. Equations use proportions, while differences and annual changes are reported in percentage points (pp) and pp per year, respectively.

Figure 1 illustrates the two uses of these population accounts. In Brazil in 2025, ages 60–64 had a higher informal share among workers than ages 55–59, but lower population shares in both formal and informal work (Figure 1(a)). In Mauritius during 2018–2019, participation at ages 60–64 increased and I/E declined, yet the informal population-share gain exceeded the formal gain (Figure 1(b)). The first example compares employment between age groups; the second compares changes within one age group. Together, they motivate examining the extent of employment and the balance of its expansion alongside workforce composition.

2.2.2 Age pattern comparisons

Age differences were defined as $D_{\mathrm{a}}x = x_{60-64} - x_{55-59}$, with the same older-minus-younger convention applied to earlier age pairs. An age-pattern reversal was defined by:

$$R = \mathbf{1}[D_a q > 0 \text{ and } D_a i < 0]. \tag{2}$$

R equals one when the older group has a higher informal share of employment but a lower informal population share, and zero otherwise. Reversal therefore also entails lower employment participation and a lower formal population share (Equation (1)). It describes a more informal workforce within a smaller employed proportion of the age group.

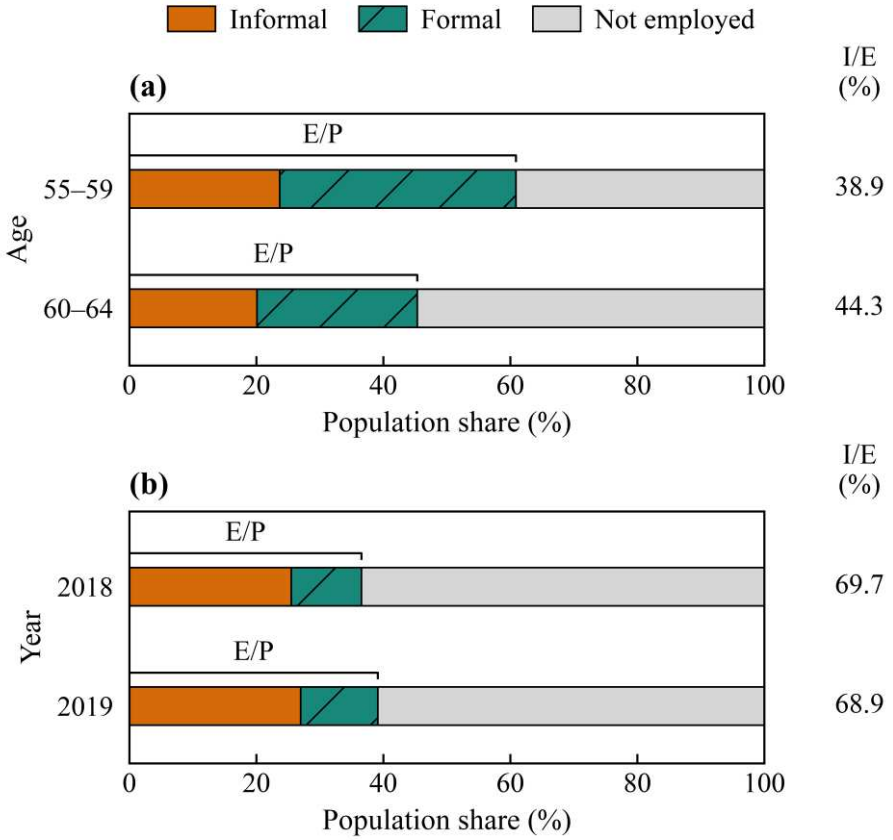


Fig. 1 Workforce and population perspectives in (a) Brazil in 2025 and (b) Mauritius at ages 60–64 in 2018–2019

To assess whether reversal was concentrated at older ages, its prevalence was estimated across the same 112 profiles for ages 50–54 versus 45–49, 55–59 versus 50–54, and 60–64 versus 55–59. Age concentration was measured as prevalence in the final comparison minus prevalence in the preceding one. Two restricted samples were then examined: profiles with higher I/E in the older group in both comparisons, and profiles meeting this condition in all three comparisons. These restrictions assess whether age concentration persists when workforce-composition differences have a common direction.

The participation and workforce-composition contributions to these age patterns were estimated using a symmetric rate decomposition [27, 28]:

$$D_a i = \frac{[e_{60–64} - e_{55–59}][q_{60–64} + q_{55–59}]}{2} + \frac{[q_{60–64} - q_{55–59}][e_{60–64} + e_{55–59}]}{2}. \quad (3)$$

The participation contribution evaluates the E/P difference at the two groups' mean I/E; the composition contribution evaluates the I/E difference at their mean E/P. Their sum equals $D_{\mathrm{a}} i$. Replacing q with $1 - q$ gives the formal population-share decomposition. Under

reversal, the negative participation contribution outweighs the positive composition contribution. Mean contributions were calculated across all profiles.

2.3 The balance of employment expansion

Changes in formal and informal population shares show how employment expansion is distributed between the two forms of work. Average annual changes over a period of h years were defined as $\Delta_t x = (x_1 - x_0)/h$. These changes satisfy:

$$\Delta_t e = \Delta_t f + \Delta_t i. \tag{4}$$

The balance of expansion is measured by $A = \Delta_t i - \Delta_t f$, the annual informal population-share change minus the formal change, in pp per year. During expansion, $A > 0$ means that the informal population share rises, while the formal share may rise, remain unchanged or fall. These patterns were distinguished by the sign of $\Delta_t f$, using identical periods and weights at both ages.

A further comparison examined whether larger informal gains coincided with a declining informal share among workers. This combination, C, requires declining I/E together with $A > 0$ during expansion. Both population shares then rise: expansion with declining I/E implies a rise in the formal share, while $A > 0$ entails a larger informal gain. An exact decomposition separates A into contributions from expansion at the initial employment mix and changes in workforce composition:

$$A = \frac{e_1(2q_1 - 1) - e_0(2q_0 - 1)}{h} = \Delta_t e(2q_0 - 1) + 2e_1\Delta_t q = B + Q. \tag{5}$$

Here, B is the contribution of employment growth evaluated at the initial mix, and Q is the contribution of changing workforce composition evaluated at endpoint participation. During expansion, B is positive when informal workers initially form a majority, whereas Q is negative when I/E declines. An initial informal majority is therefore necessary, but not sufficient, for C. A larger formal population-share gain, $A < 0$, requires:

$$\Delta_t q < \frac{\Delta_t e(1 - 2q_0)}{2e_1}. \tag{6}$$

With an initial informal majority, I/E must therefore decline enough to offset expansion at the initial mix for the formal population-share gain to exceed the informal gain. With an initial formal majority, however, formal gains can remain larger even if I/E increases modestly.

Appendix A presents the age-difference decomposition and alternative allocations of the interaction term. These allocations preserve total A and therefore the classification of expansion patterns.

Two observed cases illustrate how declining workforce informality can accompany different balances of employment growth. Cases were drawn from the shared expansion sample. At ages 60–64, both population shares had to increase, and both the I/E decline and absolute A had to exceed 0.25 pp per year. One case for each sign of A was selected using the latest eligible end year, followed by the latest start year.

2.4 Statistical analysis

The frequency and magnitude of expansion patterns were assessed separately. The frequency of $A > 0$ measures how often informal gains exceed formal changes, whereas mean A gives the average difference between those changes. C was assessed in the full expansion sample and in matched subsets with declining I/E or an initial informal majority at both ages. Periods with expansion at all four ages were used to compare the final age contrast with the preceding one.

Each economy received equal weight. In the temporal analysis, outcomes were first averaged over eligible periods within each economy and then across economies. Temporal percentages therefore represent averages of economy-specific frequencies, giving each economy equal representation despite differences in population size and observation schedules. Paired age comparisons and additive decompositions used identical periods and weights.

For the primary estimates, 95% percentile bootstrap confidence intervals (CIs) were calculated from 20,000 resamples of whole economies. Resampling preserved matched ages and periods, with common draws for related estimates and decomposition components. Figure error bars show 95% bootstrap CIs. Age differences are 60–64 minus 55–59 unless stated otherwise.

Sensitivity analyses examined event definitions, sample selection and period comparability. Reversal was assessed using stricter margins for both defining conditions, while C required $\Delta_t q \leq -m$ and $A > m$, with m set to 0.25 or 0.50 pp per year. Further analyses varied expansion thresholds at both ages, reporting windows, weighting and period inclusion. Period bands were defined by interval midpoints and compared within matched economies. Sex-

specific analyses used common periods with expansion at both focal ages in the combined, male and female series.

Additional checks assessed source comparability. Age-profile checks excluded observations marked as breaks in series, while temporal checks excluded periods with changed source-note codes. Periods crossing the 2023 revision of international informal-economy standards were also excluded [5]. This check used the calendar boundary because national implementation dates were unavailable. A final check excluded the 2026-labelled Mexican profile, whose metadata did not establish a complete calendar-year reference period.

3 Results

3.1 Workforce and population patterns

Opposing worker and population age patterns were common across the observed economies. In 73.2% of profiles, ages 60–64 had a higher informal share among workers but lower formal and informal population shares than ages 55–59 (95% CI 64.3–81.3; Figure 2(a)). Mean differences across all profiles showed the same pattern (Table 2). The decomposition relates these differences to lower employment participation: its negative contribution outweighed the positive contribution of workforce composition for informal employment (Figure 2(b)), while both contributions were negative for formal employment (Figure 2(c)).

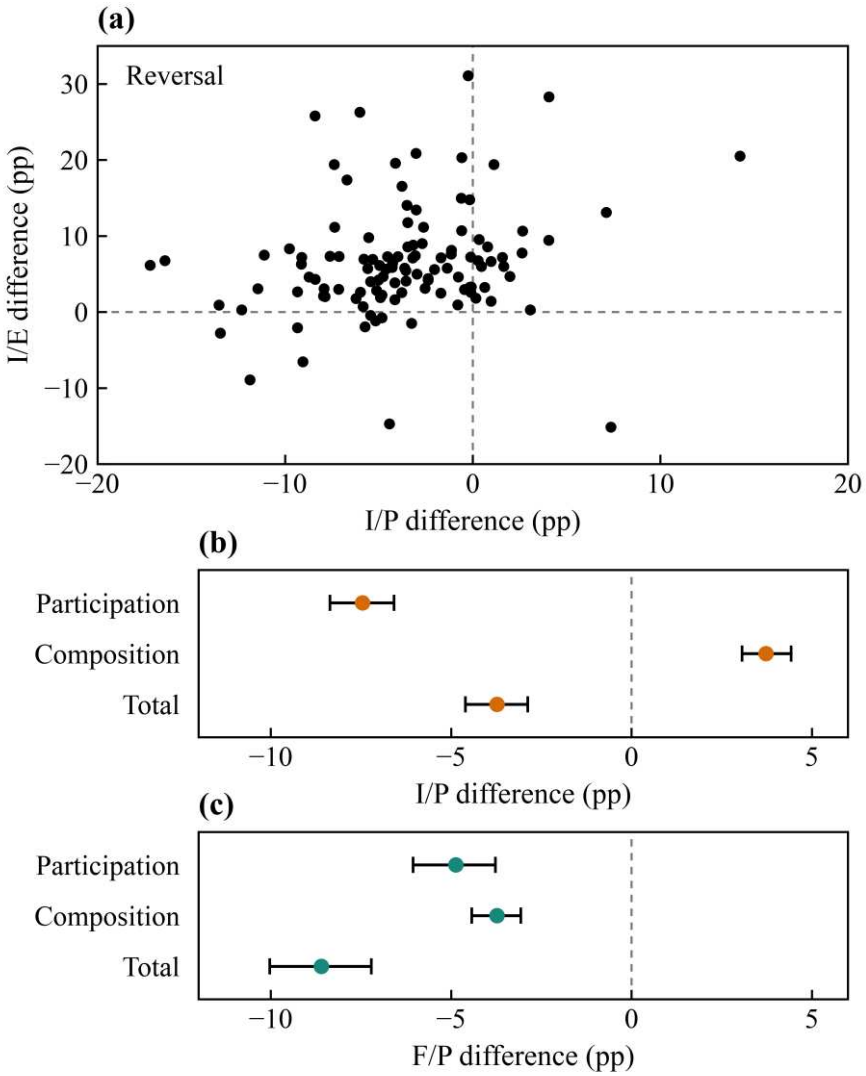


Fig. 2 Age differences in workforce and population measures. (a) Economy profiles. (b,c) Participation and composition contributions to informal and formal population-share differences

3.2 Age concentration of reversal

Reversal was more frequent in the oldest age comparison. Within the same profiles, its prevalence was 30.4 pp higher for ages 60–64 versus 55–59 than for ages 55–59 versus 50–54 (95% CI 17.9–42.9; Figure 3). Requiring larger differences in both the informal share among workers and the informal population share gave a similar contrast (Table 2).

This age contrast persisted when the informal share among workers was higher in the older group in both comparisons. When the sample was further restricted to profiles with increasing I/E across all three comparisons, the contrast was smaller and less precise, with a CI that included zero (Table 2).

Table 2 Employment differences and age concentration of reversal

Measure or comparison	Estimate (95% CI)
Age differences (pp; 112 economies)	
Employment participation	−12.3 (−13.9 to −10.8)
Informal share among workers	6.5 (5.2 to 7.9)
Informal population share	−3.7 (−4.6 to −2.9)
Formal population share	−8.6 (−10.0 to −7.2)
Age concentration of reversal (pp)	
All profiles (n = 112)	30.4 (17.9 to 42.9)
0.50-pp reversal margins (n = 112)	29.5 (17.0 to 42.0)
Higher I/E in both comparisons (n = 70)	20.0 (5.7 to 34.3)
Higher I/E in all three comparisons (n = 43)	11.6 (−4.7 to 27.9)

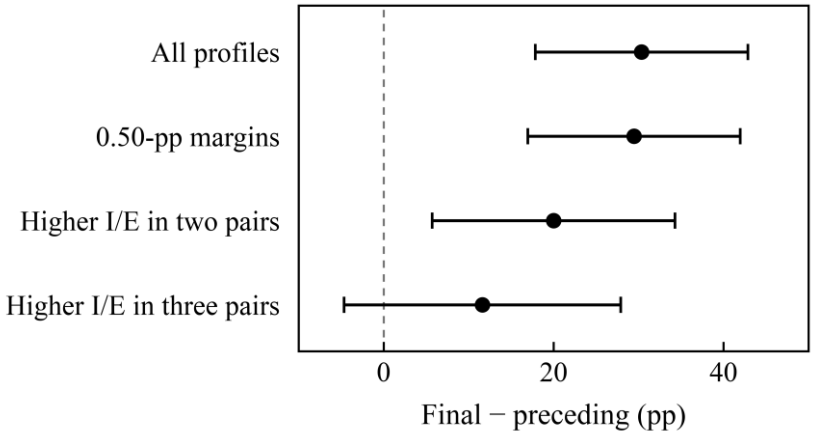


Fig. 3 Difference in reversal prevalence between the final and preceding age comparisons

3.3 The balance of employment expansion

3.3.1 Frequency and magnitude of expansion patterns

During employment expansion, informal population-share gains exceeded formal changes more often at ages 60–64 than at ages 55–59 (Figure 4(a)). Across 148 periods in 45 economies with expansion at both ages, the difference in economy-averaged frequency was 18.6 pp (95% CI 8.7–29.3; Figure 4(b)). In the subset with expansion at all four ages, the age contrast in $A > 0$ frequency was also greater for the final than for the preceding age comparison (Table 3).

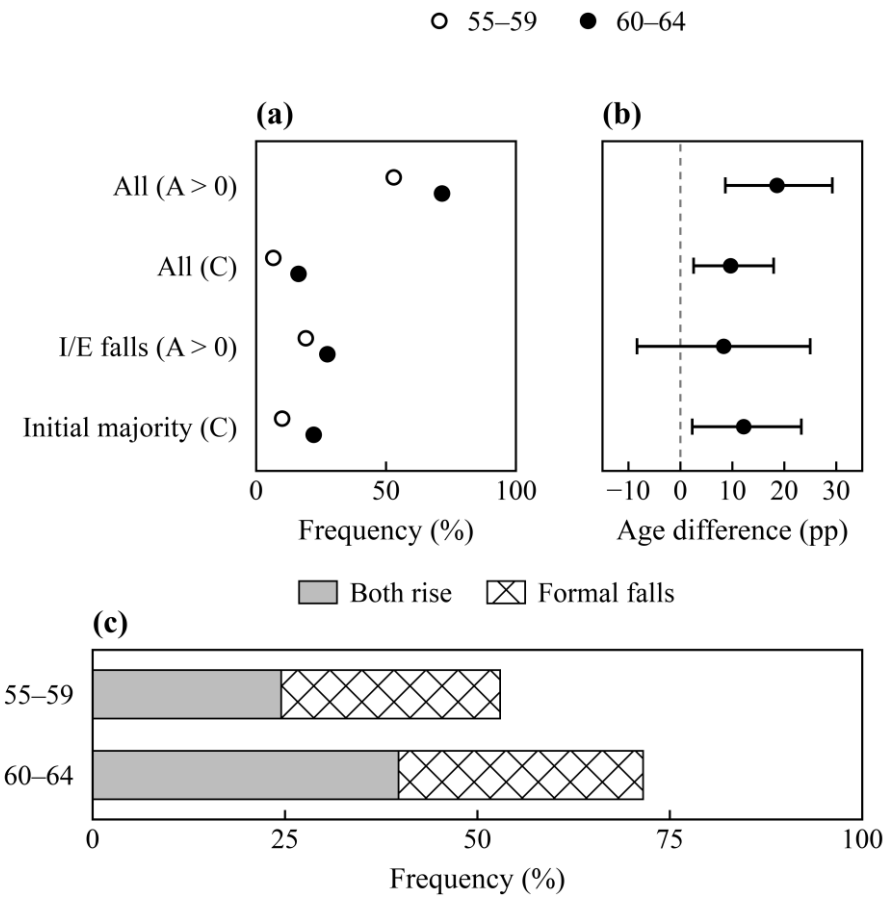


Fig. 4 Employment expansion patterns. (a) Frequencies and (b) age differences. A > 0 means informal gains exceed formal changes; C also requires declining I/E. Initial majority means I/E > 50%; restrictions apply at both ages. (c) A > 0 by formal population-share change

The $A > 0$ pattern occurred both when the two population shares increased and when an informal increase accompanied a formal decline (Figure 4(c)). Periods with both shares increasing made the larger estimated contribution to the age difference. However, the CI for the difference between these two contributions included zero (Table 3).

The frequency contrast was clearer than the difference in average changes. The mean informal–formal change gap was estimated to be larger at ages 60–64, although the CI for this age contrast included zero (Table 3). Its decomposition assigned positive estimates to both expansion at the initial employment mix and changes in workforce composition. The initial-mix component mainly reflected higher initial I/E in the older group. These components describe the mean change gap, while the frequency estimates describe how often the gap was positive.

3.3.2 Declining workforce informality and the initial employment mix

Larger informal than formal population-share gains also occurred when the informal share among workers declined. This combination, C, was more frequent in the older group in the full expansion sample and among periods with an initial informal majority at both ages (Figure 4(a) and Figure 4(b)). When declining I/E was required at both ages, however, the age contrast was less precise and its CI included zero. Its sensitivity to periods and event margins is examined in Section 3.4.

Mauritius and Brazil illustrate why the starting employment mix matters for this comparison (Figure 5). In Mauritius, informal workers initially formed a majority, and the decline in I/E was too small for the formal population-share gain to exceed the informal gain. In Brazil, by contrast, an initial formal majority and declining I/E both contributed to the larger formal gain. The same direction of change in workforce composition therefore accompanied different balances of employment growth, consistent with the condition in Equation (6).

Table 3 Age contrasts in employment expansion

Contrast	Estimate (95% CI)
Mean age differences (pp/year; 148 periods, 45 economies)	
Informal–formal change gap	0.83 (−0.14 to 1.87)
Expansion at the initial mix	0.44 (0.27 to 0.62)
Workforce composition change	0.40 (−0.56 to 1.39)
Expansion minus composition components	0.04 (−0.95 to 1.02)
Initial-mix component: starting informality	0.39 (0.30 to 0.49)
Initial-mix component: participation growth	0.04 (−0.11 to 0.19)
Difference in frequency contributions (pp)	
Both shares rising minus formal share falling	11.9 (−8.5 to 32.8)
Age concentration (pp; 88 periods, 38 economies)	
Informal gains exceed formal changes	28.0 (11.6 to 45.4)
Larger informal gains with declining I/E	10.8 (3.5 to 19.8)

Note: Age concentration compares the final and preceding age contrasts.

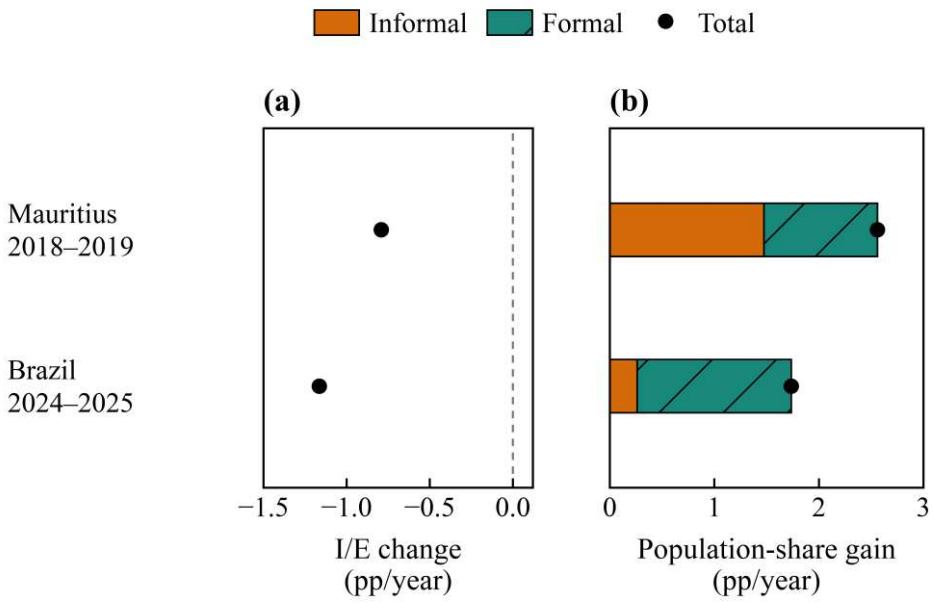


Fig. 5 Changes in workforce composition and population shares at ages 60–64

3.4 Variation across samples and periods

Reversal remained common when the sample was restricted to recent reporting years and when the 2026-labelled record was excluded (Table 4; Figure 6(a)). The pattern was therefore not confined to earlier observations.

The higher frequency of $A > 0$ in the older group persisted across expansion thresholds, with the CIs for these age contrasts above zero (Figure 6(b)). The contrast was also similar after periods with changed source-note codes were excluded (Table 4). Its direction persisted under alternative weighting and period-selection rules, as well as after excluding extreme changes or individual economies. Sex-specific comparisons showed the same direction, with wider intervals in the smaller matched samples.

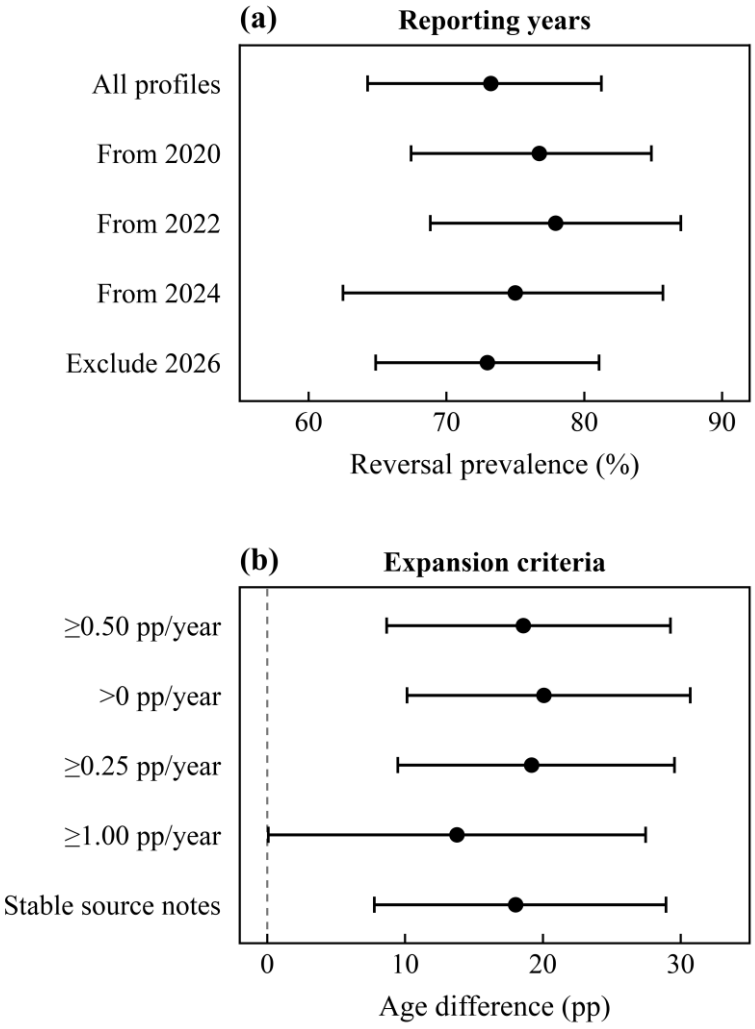


Fig. 6 Sensitivity of (a) reversal prevalence and (b) the age difference in how often informal gains exceed formal changes

The age contrast in C varied more across periods than the broader $A > 0$ contrast. Under the baseline definition, it was positive in the 2010–2019 midpoint band and negative in 2022–2025. Events in the recent band disappeared when both conditions required margins of 0.25 pp per year, indicating that they were close to at least one event boundary. The decline between bands persisted when the same economies were compared. In the full sample, the contrast at a margin of 0.50 pp per year had a CI that included zero. Thus, the age difference in the balance of expansion was more consistent than the pattern that also required declining workforce informality.

Table 4 Sensitivity of reversal and expansion patterns

Specification	Sample size	Estimate (95% CI)
Reversal prevalence (%)		
Reporting year ≥ 2020	86	76.7 (67.4 to 84.9)
Reporting year ≥ 2022	77	77.9 (68.8 to 87.0)
Reporting year ≥ 2024	56	75.0 (62.5 to 85.7)
Exclude 2026-labelled record	111	73.0 (64.9 to 81.1)
Informal gains exceed formal changes: age contrast (pp)		
E/P growth > 0 pp/year	191 / 48	20.1 (10.1 to 30.7)
E/P growth ≥ 0.25 pp/year	167 / 47	19.2 (9.5 to 29.6)
E/P growth ≥ 1.00 pp/year	102 / 42	13.8 (0.1 to 27.5)
Unchanged source-note codes	146 / 45	18.0 (7.8 to 28.9)
Larger informal gains with declining I/E: age contrast (pp)		
Unchanged source-note codes	146 / 45	9.7 (2.5 to 17.9)

Note: Sample sizes are economies or periods/economies.

4 Discussion

4.1 Informality from a population perspective

The age-profile results show that a more informal older workforce can accompany a larger non-employed share of the age group. In the reversal profiles, ages 60–64 had lower employment participation and lower formal and informal population shares than ages 55–59, even though a larger proportion of their workers were informally employed. The higher informal share therefore described the composition of a smaller employed proportion of the age group. The greater frequency of reversal in the oldest comparison makes this distinction particularly relevant at the older end of the age range studied.

This interpretation connects research on health and healthcare among older informal workers [14, 15, 16] with population-health analyses [20] and household indicators of shared resources [21]. Worker-based measures describe the employment arrangements of people in work; population measures place those arrangements alongside non-employment. The matched comparisons establish how often these perspectives yield opposing age patterns and where that contrast is concentrated.

Retirement and movements between formal and informal work offer possible explanations for these age profiles. If formal and informal workers leave employment at different rates, the mix of work among those employed can change alongside participation. Individual employment histories would be needed to examine these pathways, informed by research on self-employment, labour-market flows and family support [29, 30, 31].

4.2 Workforce composition and the balance of employment growth

The temporal analysis extends the population comparison to changes within age groups when employment participation rises. Informal population-share gains exceeded formal changes more often at ages 60–64 than at ages 55–59, although evidence for a larger mean change gap was less precise. The frequency finding includes both growth in the two population shares and informal growth alongside a formal decline. Joint reporting thus shows whether rising participation includes a gain or a loss in the formal population share.

A declining informal share among workers adds a distinct compositional change to this comparison. During expansion, it implies an increase in the formal population share. However, faster proportional growth of a smaller formal share can coexist with a larger percentage-point gain in the informal share. The starting employment mix therefore matters: with an initial informal majority, the decline in I/E must be large enough to offset expansion at that mix for the formal gain to exceed the informal gain (Equation (6)). This combination of declining I/E and larger informal gains occurred in the data, but its age contrast varied across periods and event margins. A falling informal share among workers and larger formal population-share gains therefore provide distinct assessments of expansion. This distinction complements research on employment status, protection, registration and formalisation [22, 32].

4.3 Implications for longer working lives

The two analyses support a common approach to monitoring longer working lives. Employment participation shows the proportion of an age group in work, the informal share of employment describes the workforce, and formal and informal population shares show how each arrangement extends across the age group. Across ages, these measures distinguish a more informal workforce from a larger proportion of people in informal work. Over time, they show whether the two employment shares rise together or move in opposite directions, and which contributes more to participation growth. The population shares can be calculated from matched employment and informality rates and reported alongside SDG 8.3.1 [13].

Assessing the implications for economic security also requires evidence on pensions, earnings and working conditions. Non-employment may reflect pension-supported retirement or limited opportunities to work. Protection can also extend beyond a worker's own employment status: informal workers may have health insurance through a formally employed household member [21]. Information on pension receipt, contribution histories and household income therefore helps identify the resources available during retirement and continued employment [7, 8, 33]. This context is needed to assess what changes in participation and employment composition mean for older people's livelihoods.

4.4 Scope and future research

The estimates give equal weight to economies whose latest profiles refer to different reporting years. Survey practices and the implementation of statistical standards can also differ despite source matching. Harmonised observations for common years would support comparisons of how the patterns vary with pension systems, sectoral composition and access to formal work.

The temporal findings concern expansion at both focal ages; expansion at only one age and employment contraction require separate study. The repeated cross-sections describe age differences and changes over time without tracing individual employment histories. Linked employment, pension and income records could distinguish retirement, job changes and re-entry into employment and relate these pathways to their institutional context. Survey-design information would also allow uncertainty in national estimates to be incorporated alongside the variation across economies captured by the bootstrap.

5 Conclusion

Population ageing has made employment at older ages central to debates on longer working lives and economic security. However, workforce composition alone cannot establish the extent of formal and informal employment across the older population or their contributions to rising participation. Matched ILOSTAT data were analysed within the population accounting framework developed in this study, linking adjacent-age comparisons with changes during employment expansion.

Across 112 economy profiles, ages 60–64 frequently had a higher informal share among workers but lower formal and informal population shares than ages 55–59. This reversal was more common than in the preceding age comparison. In these profiles, the higher informal

share characterised a smaller employed proportion of the age group, rather than more widespread informal employment among older people. Its frequency and age concentration demonstrate the importance of interpreting workforce composition alongside employment participation. The temporal analysis identified a related distinction in employment growth. During expansion at both ages, informal population-share gains exceeded formal changes more often at ages 60–64 than at ages 55–59. This age contrast was clearer for the frequency of the pattern than for the mean informal–formal change gap. The accounting analysis also clarified the role of the initial employment mix: when informal workers initially form a majority, the informal population share can gain more percentage points than the formal share even as the informal share among workers declines. A more formal workforce and a larger formal contribution to employment growth are therefore distinct outcomes.

Together, the evidence and accounting analysis show how workforce and population measures answer different questions about later-life employment. Joint reporting of participation, workforce composition and formal and informal population shares clarifies both the extent of employment and the balance of its growth. These measures place workers' employment arrangements in the context of the whole age group, providing a clearer basis for assessing longer working lives. Examining these patterns alongside pensions, earnings and working conditions can then clarify what continued employment means for economic security in later life.

Appendix A Additional accounting decompositions

The age difference in A is the sum of the age differences in its components:

$$D_a A = D_a B + D_a Q. \tag{7}$$

A symmetric decomposition divides the interaction between participation and composition equally between the components:

$$A = \Delta_t e(q_0 + q_1 - 1) + (e_0 + e_1)\Delta_t q. \tag{8}$$

An alternative allocation evaluates expansion at q_1 and composition change at e_0. These allocations change the component values but preserve A. To separate the contributions of employment growth and initial composition within B, let $z = 2q_0 - 1$:

$$D_a B = \frac{D_a(\Delta_t e)[z_{60–64} + z_{55–59}]}{2} + \frac{D_a z[\Delta_t e_{60–64} + \Delta_t e_{55–59}]}{2}, \quad z = 2q_0 - 1. \tag{9}$$

The first term evaluates the age difference in employment growth at the two groups' mean z; the second evaluates the difference in initial composition at their mean growth. Their sum is the age difference in B. These decompositions describe A and its age difference; the frequency of $A > 0$ is estimated from the sign of A in each period.

Statements and declarations

Data availability

The data are publicly available from the International Labour Organization's ILOSTAT bulk download facility (https://ilostat.ilo.org/data/bulk/). The principal annual series are EMP_DWAP_SEX_AGE_RT_A for employment-to-population ratios and EMP_NIFL_SEX_AGE_RT_A for informal employment rates, both by sex and age.

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Ethics and consent

Ethics approval and consent to participate

Not applicable. This study analysed publicly available aggregate ILOSTAT statistics. No participants were recruited, and no individual-level or identifiable personal data were accessed or analysed.

Competing interests

The author declares no financial or non-financial competing interests.

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