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Article

Recording A Working Life: Length-of-Service, Labour-Market Informality, and the Pension Coverage Gap in Uzbekistan

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Abstract: *Pension entitlements in contribution-based old-age insurance systems are earned, not granted: benefits are a direct function of a documented labour-market career, or stazh. Where large shares of employment go undocumented, length-of-service accounting itself becomes a channel through which labour informality is converted into old-age poverty. This paper examines that channel in Uzbekistan, whose pay-as-you-go pension system covers only 38 per cent of the working-age population. Combining an institutional analysis of Uzbekistan's pension formula, an original micro-simulation of benefits under alternative service-record scenarios, and a cross-sectional regression on a 47-country dataset, the paper asks how much of the coverage gap reflects labour informality versus the design of the record-keeping mechanism itself. Uzbekistan's measured informal-employment rate is significantly lower than its income and demographic profile predict ($p < 0.05$), yet only 30 per cent of registered self-employed citizens contribute voluntarily, and a seven-year service interruption cuts a representative worker's pension by nearly a third. The paper closes with policy recommendations and directions for future research.*

Keywords: *pension coverage; length of service; informal employment; social insurance; Uzbekistan; Central Asia; pension reform*

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1. Introduction

Every contribution-based pension system rests on an administrative act: someone must record that a person worked, for how long, and on what earnings. That record — length of service, or *stazh* — is the currency in which old-age entitlements are paid. Where the record is complete, the pension promise functions as intended; where it is not, the shortfall is a lived reduction in old-age security, and, in aggregate, a measure of how much of a labour market escapes the reach of its own social contract.

Uzbekistan offers a clear setting in which to study this mechanism. The country operates a single-pillar, pay-as-you-go pension scheme in which a citizen's benefit is calculated as a percentage of an assessed average wage, rising with documented years of work: roughly 55 per cent at a 25-year male baseline, scaled proportionally down to a 7-year minimum eligibility floor [1]. This formula is not unusual internationally, but its interaction with Uzbekistan's labour market has

produced a striking outcome: as of July 2024, only 38 per cent of the working-age population was covered by the pension system, and among 2.8 million citizens registered as self-employed, only around 30 per cent voluntarily contribute. As of 2018, 55 per cent of newly assigned pensions were paid on an incomplete work record [2].

This paper asks how much of Uzbekistan's coverage gap reflects an unusually informal labour market, and how much reflects the length-of-service accounting mechanism itself — the vesting threshold, self-employed compliance incentives, tax privileges, and cross-border totalisation. The distinction matters for policy: if informality itself were the binding constraint, the priority would be broad labour-market formalisation; if the country's measured informality is unremarkable for its income level and the gap instead stems from contribution-collection design, the appropriate remedy is considerably more tractable[3].

To answer this, the paper combines three approaches. First, it reconstructs Uzbekistan's pension formula from primary sources and simulates the monetary cost of a documented service gap. Second, it assembles a 47-country cross-sectional dataset to test whether Uzbekistan's informal-employment rate is unusual for its income and demographic profile. Third, it situates both exercises within Uzbekistan's ongoing reform process, which has involved sustained IMF and World Bank engagement since 2024[4].

The paper proceeds as follows. Section 2 reviews the literature on pension coverage, informality, and length-of-service design. Section 3 details Uzbekistan's institutional mechanism. Section 4 describes the data, and Section 5 the methodology for the simulation and regression. Section 6 presents results, Section 7 discusses their implications, and Section 8 concludes with policy recommendations and future research.

Pension coverage tracks economic development closely. An early World Bank synthesis found coverage below ten per cent of workers in South Asia and Sub-Saharan Africa, 30–40 per cent across middle-income Latin America and East Asia, and around 60 per cent in post-Soviet transition economies, with income per capita the strongest predictor of coverage and scheme architecture showing only marginal independent effect. Subsequent research sharpened the causal story: coverage is low principally because a large share of employment never generates the wage record on which contributions depend[4].

Latin America has produced the most extensive case literature. Rofman, Lucchetti and Ourens established that contributory coverage remained below 50 per cent of the economically active population across most of the region despite two decades of structural reform. Bosch, Melguizo and Pagés reframed the coverage problem as a labour-market problem rather than a pension-design problem: shifting to individually funded accounts did little to raise active contribution rates, because the underlying constraint — irregular, undocumented employment — was untouched by scheme redesign. Holzmann, Robalino and Takayama generalised the resulting policy response into the now-standard agenda of non-contributory social pensions layered beneath contributory schemes. Jung and Tran, in a dynamic general-equilibrium framework, show that extending pensions to informal workers can generate net welfare gains, though the result depends materially on financing and pre-existing private transfers. Using Argentine data, Arza documents systematic distributional gaps in pension access across income and education groups, while Geri, de Santis and Moscoso show that access inequity from 1994 to 2017 was tied closely to years of formal contribution— the same mechanism examined for Uzbekistan below[5-6].

A distinct concern is the design of length-of-service thresholds themselves. The ILO's Convention No. 102 anchors a full old-age benefit to a 30-year qualifying period and a reduced benefit to 15 years. Uzbekistan's seven-year minimum is markedly below this benchmark and below the ten-, twelve-, and seventeen-year

thresholds reported for Russia, Azerbaijan, and Belarus respectively — more generous at the coverage margin, though this generosity does not by itself guarantee an adequate benefit, as Section 6 quantifies.

Post-socialist reform experience is instructive on implementation. Sweden's shift to notional defined contribution (NDC) accounts became a template subsequently adapted by Latvia, Poland, Mongolia, and the Kyrgyz Republic. The broader multi-pillar paradigm established in the World Bank's *Averting the Old Age Crisis* and refined by Holzmann and Hinz [18] treats length-of-service-based entitlement as characteristic specifically of a scheme's redistributive first pillar; Uzbekistan, remaining almost entirely a first-pillar system, is one where this accounting mechanism carries disproportionate weight[7].

Uzbekistan-specific quantitative research remains thin. Domestic scholarship has documented the historical evolution of the state pension system and, most comprehensively, the institutional mechanisms by which work experience is recorded and verified, including self-employment treatment and cross-border migration. None of this literature has yet quantified the monetary magnitude of the length-of-service penalty, nor benchmarked Uzbekistan's informality against a systematic cross-country frame — the contribution this paper attempts[8].

3. Institutional Background

Uzbekistan's pension system rests on the 1993 Law "On State Pension Provision for Citizens" (No. 938-XII). For a general old-age pension, benefit level is a percentage of assessed average wage — the *stazh* coefficient — anchored to a 25-year (men) or 20-year (women) base norm. Reconstructing the formula from reported coefficient values (55 per cent at 25 years, rising to 76 per cent at 40 years) implies an increment of approximately 1.4 percentage points per additional year beyond the norm. Below the norm but above the 7-year eligibility floor, the benefit scales proportionally to the ratio of actual to required service [21]; below seven years, no state pension is payable[9].

Two indicators anchor the coverage discussion. First, the Agency for Strategic Reforms' July 2024 estimate that only 38 per cent of the working-age population is covered by the pension system at all — driven, in the agency's assessment, by informal employment and by social-tax privileges extended to more than 65,000 enterprises, worth 3.2 trillion soʻm in forgone contributions in 2025 alone. Second, compliance among the formally registered: of 2.8 million citizens registered as self-employed, only around 800,000 (30 per cent) voluntarily remit contributions, leaving roughly two million with no service credit despite having taken the formal step of registration. As of 1 April 2018, 55 per cent of newly assigned pensions were awarded on an incomplete work record[10].

Adequacy is a further concern. The guaranteed minimum for an incomplete-record pension rose from 535,000 soʻm per month in 2023 to 745,000 soʻm by September 2024 and 820,000 soʻm by July 2025. Over the same period the statutory subsistence minimum (MIH) rose from 621,000 to 648,000 soʻm within 2024 alone; the September 2024 minimum pension exceeded the April 2024 MIH by only around 15 per cent — a narrow margin against renewed inflation.

Fiscally, off-budget Pension Fund expenditure rose from 64.0 trillion soʻm (4.2 per cent of GDP) in 2024 to a forecast 86.1 trillion soʻm (4.1 per cent of GDP) in 2026, against projected revenue of only 64.7 trillion, requiring continued budget transfers . Uzbekistan nonetheless retains a young population structure — an old-age dependency ratio of just 9.3 per cent in 2024, the lowest in the Central Asian/Caucasus comparator set assembled for this paper — implying a roughly ten-to-fifteen-year window during which reform can be undertaken before ageing pressure intensifies . Since 2024, sustained IMF and World Bank engagement has recommended phasing out preferential contribution rates, calculating benefits

from lifetime rather than terminal earnings, and introducing automatic indexation, while a 2026 mission cautioned that comprehensive reform awaits a completed actuarial assessment[11].

Two datasets underpin the analysis. The first is Uzbekistan's own pension formula, reconstructed from coefficient values and thresholds reported in primary legal and institutional sources, used to simulate benefit levels under alternative service-record scenarios (Section 5.1).

The second is an original cross-sectional dataset of 47 countries, selected to span the full income and informality range while ensuring representation of the Commonwealth of Independent States and Central Asia (eight economies: Armenia, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, and Uzbekistan), against a comparison set of 39 additional countries drawn from Sub-Saharan Africa, South and Southeast Asia, Latin America, the Middle East, and high-income Europe, North Asia, and the OECD. The dependent variable is each country's most recent informal-employment rate from the ILO's harmonised ILOSTAT series, with Uzbekistan's 2019 estimate drawn from regional press coverage of ILO data, a limitation given the reference-year gap. Independent variables are GDP per capita (IMF World Economic Outlook, most recent available year, predominantly 2023–2024) and the old-age dependency ratio (World Bank World Development Indicators, 2024 or latest available). A subset of country-year figures — Uzbekistan, Kazakhstan, Armenia, Germany, Chile, Brazil, Argentina, Egypt — were individually verified against primary sources; the remainder reflect standard published estimates for the period[12-15].

2. Materials and Methods

The **Micro-simulation of the length-of-service formula**

Using the coefficient values in Section 3, the paper reconstructs a continuous replacement-coefficient function:

$$R(y) = 55 + 1.4 \times (y - 25), \text{ for } y \geq 25 \quad R(y) = 55 \times (y / 25), \text{ for } 7 \leq y < 25 \quad R(y) = 0, \text{ for } y < 7$$

where y is documented years of service and $R(y)$ is the resulting pension as a percentage of assessed average wage. The function is evaluated across the 0–40-year range (Table 1; Figure 2) and at seven representative service durations against three illustrative wage levels (Table 2), and used to compare a full 25-year record against an otherwise identical 18-year record — a seven-year gap, chosen because it equals the width of the statutory eligibility floor. The resulting monthly shortfall is annuitised over an illustrative 180-month post-retirement horizon to produce an indicative lifetime income loss; this is a simplifying assumption rather than an actuarial calculation, given the unavailability of Uzbekistan-specific period life-table data, and should be read as indicative of order of magnitude only.

Cross-country regression

To test whether Uzbekistan's informal-employment rate is unusual for its income and demographic profile, the paper estimates, by ordinary least squares with heteroskedasticity-robust (HC3) standard errors:

$$\text{Informal}_i = \beta 0 + \beta 1 \log(\text{GDPpc}_i) + \beta 2 \, \text{OldAgeDependency}_i + \beta 3 \, \text{CIS}_i + \varepsilon_i$$

where CIS is a binary indicator equal to one for the eight CIS/Central Asian economies in the sample. The model is estimated with and without the CIS term to assess its independent explanatory contribution, and variance inflation factors are reported to rule out problematic collinearity. Residuals from the income-and-demography-only specification are then examined for each CIS/Central Asian country individually, to identify which economies are more or less informal than their income level and age structure alone would predict (Table 4; Figure 1).

This design is descriptive and diagnostic rather than causal: cross-sectional country data cannot identify *why* any one country's informality diverges from its income-implied benchmark. Its purpose is to establish, as precisely as available public data allow, *whether* Uzbekistan's informal-employment rate is unusual — a necessary empirical input for evaluating whether the country's low pension coverage is better explained by labour-market informality or by the design of its length-of-service accounting mechanism.

3. Result

Türkiye **The length-of-service penalty**

Table 1 and Figure 2 show the reconstructed schedule. Because the coefficient is proportional to years of service below the 25-year norm, each additional year between the 7-year floor and 25-year ceiling raises the coefficient by a constant 2.2 percentage points, compared with 1.4 points per year beyond the norm — the marginal value of documenting one more year of work is highest precisely for workers with the least complete records. The floor is also a genuine cliff: a citizen with 6.9 years receives nothing, while one with 7.0 years receives 15.4 per cent of assessed average wage[16].

Table 1. Reconstructed pension coefficient schedule (illustrative, men)

Years of documented service	Pension coefficient (% of assessed average wage)	Regime
< 7	0	Below eligibility floor
7	15.4	Proportional zone (floor)
12	26.4	Proportional zone
18	39.6	Proportional zone
25	55.0	Base norm
30	62.0	Above norm (+1.4 pp/year)
35	69.0	Above norm
40	76.0	Above norm

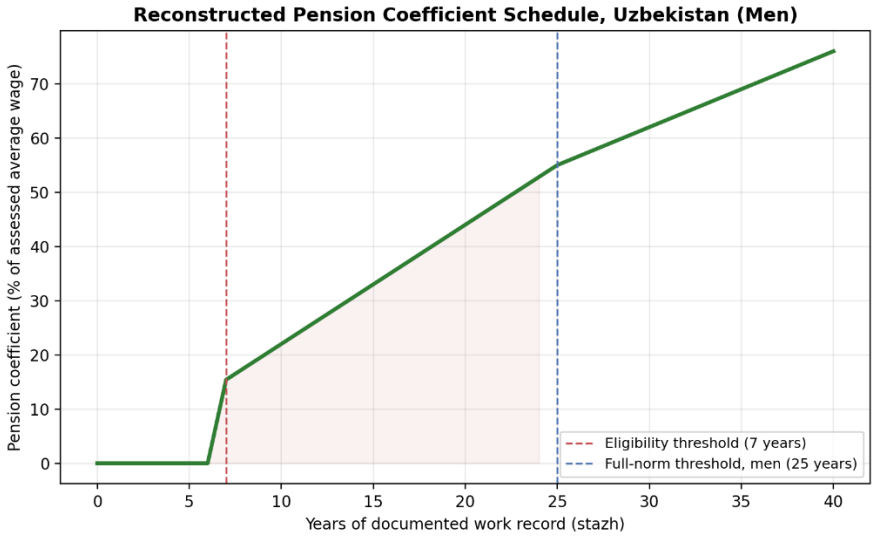

Figure 2. Reconstructed pension coefficient schedule, Uzbekistan (men)

Table 2 translates this into monthly pension amounts. At the illustrative average wage of 3,000,000 so'm, a worker retiring with the 7-year minimum receives 462,000 so'm — below the 2024 subsistence minimum — while a worker with the full 25-year record receives 1,650,000 so'm, more than two and a half times as much from an identical wage history.

Table 2. Simulated monthly pension by years of service and wage level (so'm)

Years of service	0.5× average wage (1,500,000)	1.0× average wage (3,000,000)	2.0× average wage (6,000,000)
7	231,000	462,000	924,000
12	396,000	792,000	1,584,000
18	594,000	1,188,000	2,376,000
25	825,000	1,650,000	3,300,000
30	930,000	1,860,000	3,720,000
35	1,035,000	2,070,000	4,140,000
40	1,140,000	2,280,000	4,560,000

Applying the schedule to a seven-year documentation gap (comparing 18 years against 25 years, both at the average wage), the monthly shortfall is 462,000 so‘m. Annuitised over an illustrative 180-month horizon, the cumulative lifetime shortfall is approximately 83.2 million so‘m — roughly US$6,550 at the 2024 average exchange rate, and more than ten years’ worth of the monthly subsistence minimum. A single seven-year interruption — a plausible outcome of one spell of undocumented work — is not a marginal loss[17].

Fiscal and adequacy context

Figure 3 shows Pension Fund expenditure rising from 64.0 to a forecast 86.1 trillion so‘m (2024–2026), against a widening revenue shortfall. Figure 4 plots the guaranteed minimum incomplete-record pension against the subsistence minimum: the minimum pension overtook the MIH only during 2024 and has since maintained a narrow margin. Figure 5 illustrates the self-employed compliance gap: of 2.8 million registered self-employed citizens, only 30 per cent (≈800,000) voluntarily contribute.

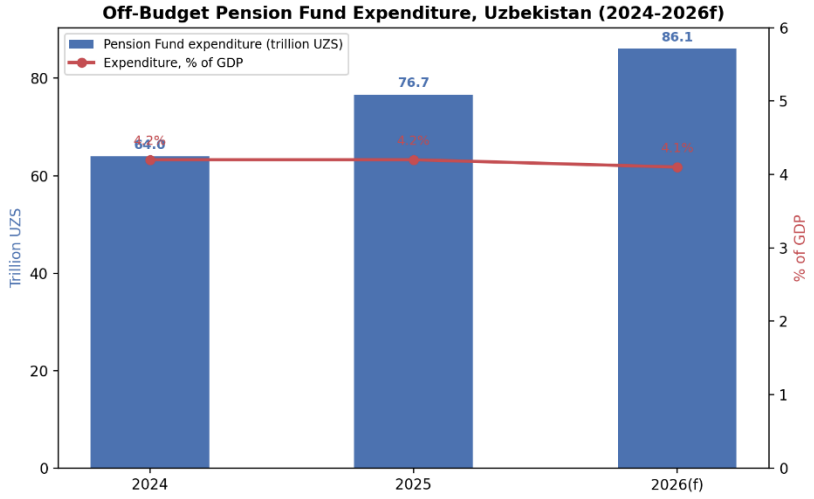

Figure 3. Off-budget Pension Fund expenditure, Uzbekistan (2024–2026f)

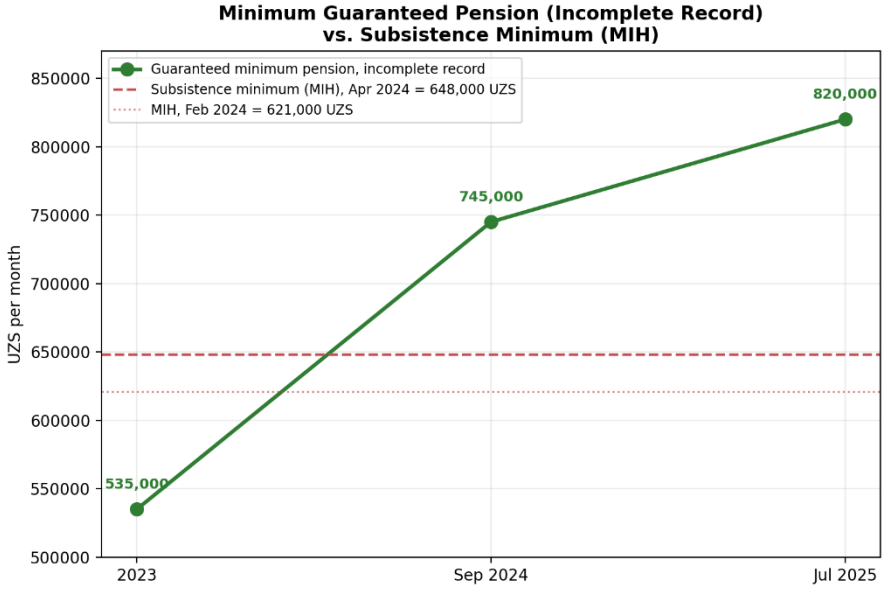

Figure 4. Minimum guaranteed pension (incomplete record) vs. subsistence minimum

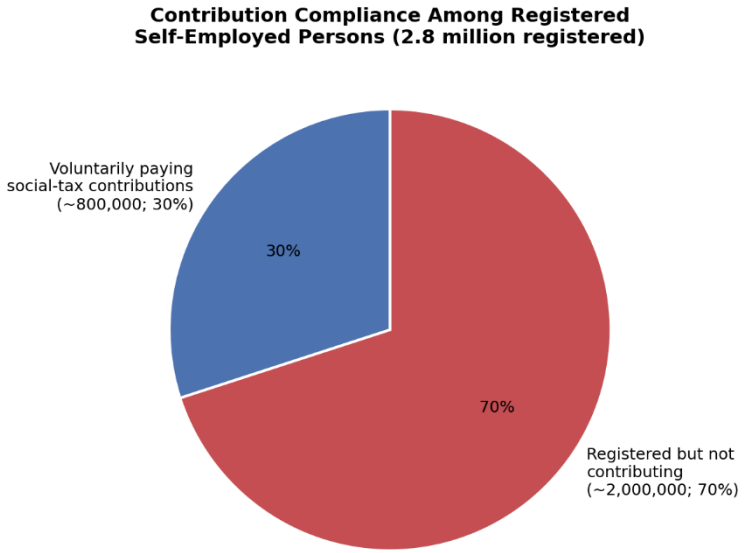

Figure 5. Contribution compliance among registered self-employed persons

Is Uzbekistan's informality unusual?

Table 3 reports the regression results. Both models confirm the international income-informality gradient: a one-log-point increase in GDP per capita is associated with a 15–17 percentage-point reduction in informal employment ($p < 0.001$). The CIS/Central Asia coefficient is −12.97 percentage points ($p = 0.031$): holding income and demographic structure constant, the eight CIS/Central Asian economies exhibit informal employment almost thirteen points lower than otherwise-comparable countries. Variance inflation factors range from 1.06 to 3.27, indicating no problematic collinearity[18].

Table 3. OLS regression: determinants of the informal-employment rate (47 countries)

Variable	Model 1 (with CIS)	Model 2 (without CIS)
Constant	215.32*** (21.79)	202.50*** (21.74)
log(GDP per capita)	−16.91*** (3.35)	−15.26*** (3.21)
Old-age dependency ratio	−0.69 (0.54)	−0.95** (0.46)
CIS/Central Asia indicator	−12.97** (6.00)	—

R^2	0.778	0.746
Adjusted R^2	0.762	0.735
N	47	47

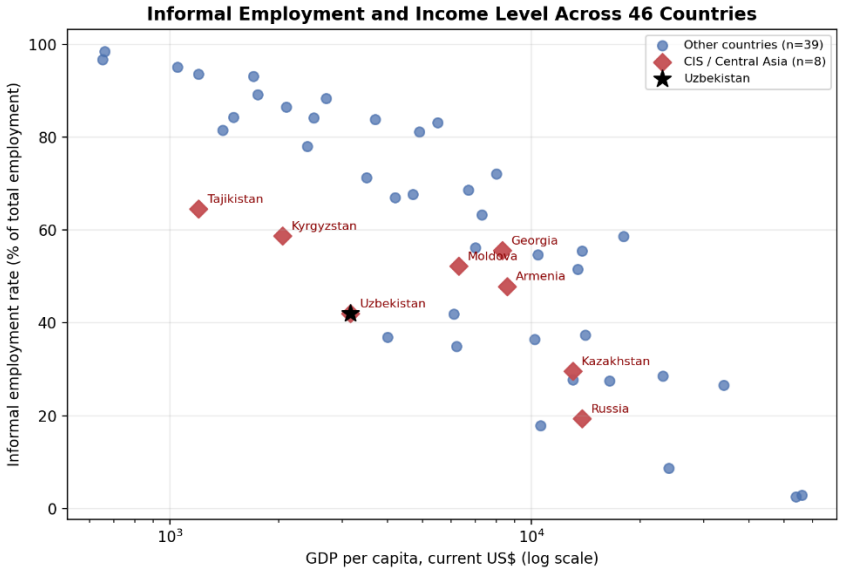

Figure 1. Informal employment and income level across 46 countries

Read alongside the coverage statistics in Section 3, this is the paper's central finding. Uzbekistan is not, by conventional cross-country metrics, an unusually informal economy for its income level — if anything the opposite — yet only 38 per cent of the working-age population is covered by its pension system, and even registered self-employed citizens contribute at only a 30 per cent rate. The coverage gap cannot be adequately explained by exceptional labour informality; it must be explained by what happens after employment is recorded — whether contributions are collected, and whether the record is captured in a form the accounting mechanism recognises. This finding should be read with some caution given that the Uzbekistan informality estimate is drawn from 2019 [20], seven years prior to most other observations; a ten-point upward revision would not, however, overturn the qualitative result.

4. Discussion

The evidence supports a reframing of Uzbekistan's coverage problem. Much of the domestic and international commentary treats the 38 per cent coverage figure as primarily a labour-informality problem, implicitly suggesting that coverage will rise as the economy formalises. The cross-country evidence complicates this: if informality itself were the dominant constraint, Uzbekistan's coverage rate should be closer to the upper end of the distribution implied by its comparatively low informality, not among the lowest in the region[21].

A more consistent explanation is that the *conversion* of formal or semi-formal activity into a recognised pension record is where the system loses its subjects. Three mechanisms stand out. First, the self-employed compliance gap: registration is evidently not the binding constraint — 2.8 million citizens have taken that step — but the subsequent decision to remit contributions is, with fewer than one in three doing so. This is a design and incentive problem, not a labour-informality problem in the conventional sense. Second, social-tax privileges extended to more than 65,000 enterprises mean formally employed workers at those firms accrue reduced service credit, because the wage base from which contributions are calculated is itself reduced. Third, the absence of comprehensive cross-border totalisation means formal employment abroad — in Russia, Kazakhstan, or under South Korea's Employment Permit System — is frequently invisible to

Uzbekistan's own records[22].

Uzbekistan's proportional, low-threshold formula is, in the sense discussed in Section 2, more forgiving than many comparator systems: it avoids the sharpest cliff-edge exclusion documented in the Latin American literature, and its seven-year floor is well below the ILO benchmark and several CIS neighbours' thresholds. The persistence of a large incomplete-record population despite this design is itself informative: a low vesting threshold expands nominal eligibility, but does nothing to address the antecedent problem of whether a contribution-generating record exists at all. The micro-simulation makes the consequence concrete: a worker who clears the eligibility floor with only seven years of service still receives a pension well below the contemporaneous subsistence minimum[23-24].

The reform process under way since 2024 has, to date, concentrated on parameters largely orthogonal to length-of-service design specifically — retirement age, preferential contribution rates, and the earnings basis for calculation. None of the proposals reviewed directly addresses self-employed compliance incentives, the pension-record consequences of tax privileges, or cross-border totalisation, even though this paper's evidence suggests these are where the coverage gap is concentrated[25].

5. Conclusion

Four recommendations follow from this analysis. First, redesign the incentive structure facing registered self-employed citizens, whose 30 per cent voluntary-compliance rate is the largest identifiable component of the coverage gap; because these citizens are already registered with the state, a personal pension-projection tool showing how each contribution translates into future entitlement, combined with simplified mobile payment, could plausibly raise compliance. Second, subject social-tax privileges to a pension-record impact assessment before renewal, given their evident effect of reducing contribution-based service credit for potentially large numbers of formally employed workers. Third, expand bilateral and multilateral totalisation agreements, prioritising Russia, Kazakhstan, and South Korea as the principal destinations for Uzbek labour migrants, so that documented employment abroad translates into recognised domestic length-of-service credit. Fourth, complete the transition to fully electronic, cross-agency length-of-service registries with an explicit audit and error-correction protocol, since record accuracy — not merely formula design — determines much of the practical burden the coverage gap places on individual citizens. None of these four recommendations requires the completed actuarial assessment on which the IMF has conditioned broader reform; each could, in principle, be pursued in parallel with the slower-moving retirement-age and contribution-rate elements of the wider reform agenda.

This paper's reliance on aggregate, published, and simulated rather than individual-level administrative data is its central limitation, and points directly to the most valuable direction for future research: access to anonymised Pension Fund and State Tax Committee microdata, through an appropriate research-data-access agreement, would allow direct estimation of service-gap distributions and their sociodemographic correlates — by sex, region, sector, and migration history — in place of the formula-simulation approach used here, and would support a proper actuarial treatment of the lifetime-cost calculation only approximated in this paper. A second priority is a harmonised, ILOSTAT-consistent informal-employment estimate for Uzbekistan repeated at multiple points since 2019, which would allow the cross-country comparison in Section 6.3 to be repeated on a consistent data vintage and would permit a formal test of whether the low measured informality documented here reflects a genuine administrative legacy specific to the post-Soviet region, rather than a data artefact. Finally, future work

should examine directly the sex-disaggregated distribution of length-of-service completeness, both to quantify the gender dimension raised in Section 2 and to evaluate whether Uzbekistan's differentiated male/female service norms remain well calibrated to contemporary patterns of career interruption.

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