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The Diploma Paradox: Highly Educated, Wrongly Employed — The Reality of Women in Azerbaijan

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ABSTRACT

Azerbaijan presents a macroeconomic puzzle that this paper terms the diploma paradox: between 2006 and 2024, female gross tertiary enrolment more than doubled — from 20.2% to 46.9% — overtaking male enrolment by roughly ten percentage points, yet female labor force participation stagnated near 61%, the gender gap in wage employment persisted at roughly nine percentage points, and nearly 39% of employed women remained concentrated in agriculture, the economy's lowest-productivity, lowest-skill sector. Drawing on World Bank, ILO, and national statistical data for 2000–2025, the study applies descriptive decomposition, a synthetic education–employment mismatch index, and an extended Mincerian interpretive framework to quantify the divergence between women's educational attainment and their labor market absorption. The results indicate that the private returns to female education in Azerbaijan are systematically discounted through three channels: horizontal and vertical overeducation, sectoral segregation into low-wage care and agrarian employment, and a wage penalty of approximately 35–46% documented by national and World Bank estimates. The paper contributes a country-level operationalization of the diploma paradox concept and derives policy implications for skills signaling, childcare infrastructure, and the reform of occupational licensing. Limitations include the absence of micro-level panel data on individual mismatch; future research directions are proposed.

Keywords *Azerbaijan, gender wage gap, overeducation, human capital, post-Soviet labor markets*

1. Introduction

The canonical prediction of human capital theory is elegantly simple: investments in education raise productivity, and productivity raises wages and employment quality (Becker, 1993; Mincer, 1974). Cross-country evidence overwhelmingly confirms positive private returns to schooling, with tertiary education yielding the highest premia (Montenegro & Patrinos, 2014; Psacharopoulos & Patrinos, 2018). Yet a growing body of evidence from transition and emerging economies documents systematic deviations from this prediction, particularly for women (Kupets, 2015; Sloane & Mavromaras, 2020). When educational expansion outpaces the economy's capacity to generate skill-appropriate jobs, the result is overeducation—a persistent mismatch between workers' qualifications and job requirements—which carries measurable wage penalties and discouragement effects (Didier, 2024; Passaretta, 2023).

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Azerbaijan constitutes an unusually sharp case of this phenomenon. As an upper-middle-income, oil-dependent post-Soviet economy with a GDP per capita of approximately USD 7,411 in 2025 (World Bank, 2026a), the country has experienced a dramatic expansion of female higher education over the past two decades. Female gross tertiary enrolment rose from 20.2% in 2006 to 46.9% in 2024, exceeding the male rate (36.6%) by more than ten percentage points (World Bank, 2026a). By conventional human capital logic, this cohort of highly educated women should be transforming the structure of the Azerbaijani labor market.

The empirical record shows the opposite. Female labor force participation, which stood at 72.2% in 2000, fell to approximately 61% by 2025, and the participation gap relative to men remained stuck at roughly five to six percentage points (World Bank, 2026a). Female unemployment exceeded male unemployment in every observed year, and the gender wage gap — estimated at 35–46% depending on methodology — is among the widest in the Europe and Central Asia region (Ismayilov et al., 2022; Pastore et al., 2016; World Bank, 2022). Most strikingly, 38.7% of employed women in 2025 worked in agriculture, a sector characterized by informality, low productivity, and minimal skill requirements — this at a time when nearly half of the female student-age cohort was enrolled in tertiary education.

1.1 Problem Statement

The coexistence of rapidly rising female educational attainment with stagnant female labor market outcomes constitutes what this paper calls the diploma paradox: women in Azerbaijan are highly educated but wrongly employed — channelled into sectors and occupations that neither utilize nor reward their qualifications. The paradox is not merely a matter of individual welfare. Underutilized female human capital represents a measurable macroeconomic loss: the World Bank (2022) estimates that closing gender employment gaps in Azerbaijan could raise long-run GDP per capita by double-digit percentages, a magnitude consistent with global estimates of the output cost of gender misallocation (Cuberes & Teignier, 2016; Hsieh et al., 2019).

1.2 Gap Analysis

Three gaps in the literature motivate this study. First, the extensive literature on overeducation is dominated by OECD and EU cases (Didier, 2024; Passaretta, 2023; Sloane & Mavromaras, 2020); evidence from the South Caucasus remains fragmentary (Khitarishvili, 2019; Kupets, 2015). Second, existing Azerbaijan-focused studies examine either the wage gap (Ismayilov et al., 2022; Pastore et al., 2016) or employment barriers (World Bank, 2022) but do not integrate the education-expansion dimension into a unified analytical framework. Third, no study to date has constructed a time-series, indicator-based quantification of the divergence between female educational supply and labor market absorption in Azerbaijan. This paper fills these gaps by (i) assembling a consistent 2000–2025 macro-panel from World Bank and ILO sources, (ii) proposing and computing an Education–Employment Divergence Index (EEDI), and (iii) situating the Azerbaijani case within the comparative literature on gendered skill mismatch.

1.3 Research Questions and Hypotheses

> **RQ1.** To what extent has the expansion of female tertiary education in Azerbaijan (2006–2024) been matched by commensurate improvements in female labor force participation, employment quality, and sectoral allocation?
>
> **RQ2.** Through which observable mechanisms — sectoral segregation, agricultural concentration, unemployment differentials — is female human capital discounted in the Azerbaijani labor market?
>
> **RQ3.** What is the magnitude and trend of the education–employment divergence, and what policy levers does the evidence prioritize?

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> **H1 (Diploma Paradox Hypothesis):** Female educational attainment in Azerbaijan has grown substantially faster than female labor market absorption, producing a widening education–employment divergence.
>
> **H2 (Segregation Channel Hypothesis):** The divergence operates primarily through horizontal segregation into low-return sectors (agriculture, education, health) rather than through outright exclusion from employment.
>
> **H3 (Wage Discount Hypothesis):** The returns to female education are significantly lower than the returns to male education, consistent with demand-side discrimination and statistical signaling failures.

2. Literature Review

2.1 Human Capital Theory and Its Gendered Fractures

The human capital framework (Becker, 1993; Mincer, 1974) treats education as an investment whose returns materialize in earnings. Global meta-analyses confirm average private returns of roughly 9–10% per additional year of schooling, with higher returns for women in many samples (Psacharopoulos & Patrinos, 2018; Montenegro & Patrinos, 2014). However, this literature also acknowledges that realized returns depend on labor market institutions, demand conditions, and discrimination (Card, 1999; Patrinos et al., 2021). The feminist economics literature has long argued that human capital models understate the role of occupational crowding (Bergmann, 1974) and statistical discrimination (Arrow, 1973) in depressing female returns — arguments that have regained empirical traction in recent decomposition studies (Blau & Kahn, 2017; Ñopo et al., 2012).

2.2 Overeducation and Skill Mismatch

Overeducation — employment in jobs requiring less education than the worker possesses — is estimated to affect 20–35% of tertiary graduates across advanced economies, with wage penalties of 10–15% (Sloane & Mavromaras, 2020). Recent work distinguishes vertical mismatch (overqualification) from horizontal mismatch (field-of-study misalignment) and finds both to be gendered: women are more likely to be horizontally mismatched and to experience compounding penalties when mismatch interacts with motherhood or care responsibilities (Didier, 2024; Passaretta, 2023). Cross-country evidence links mismatch to incomplete labor markets and discrimination: where employers can discriminate cheaply, women's qualifications are more readily discounted (Birgier, 2025; Didier, 2024). For transition economies, Kupets (2015, 2016) documents that rapid higher-education expansion without concomitant job restructuring produces persistent graduate overeducation, and that the incidence of overeducation rises with age among women — a pattern she attributes to interrupted careers and occupational downgrading after family-related exits.

2.3 Gender Gaps in Post-Soviet Labor Markets

The post-Soviet literature establishes a distinctive regional pattern: high female educational attainment inherited from the Soviet system, combined with rising gender wage gaps and re-traditionalization of gender roles after 1991 (Ishkanian, 2003; Khitarishvili, 2019). Khitarishvili's (2019) review of gender pay gaps across the former Soviet Union finds that gaps widened most where market reforms were combined with weak anti-discrimination enforcement and where female employment re-concentrated in low-wage public services. Studies of the South Caucasus confirm strong occupational gender segregation in Azerbaijan, Georgia, and Armenia, with women dominating education, health, and social services while being nearly absent from high-productivity industrial and extractive sectors (Gebel et al., 2021; Saifnazarov & Saifnazarova, 2023).

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2.4 Azerbaijan-Specific Evidence

Azerbaijan-specific scholarship, though limited in volume, is remarkably consistent in its findings. Pastore et al. (2016), using household survey data, show that the gender wage gap in Azerbaijan emerges abruptly around age 20–22 — coinciding with family formation — and reaches roughly 20 percentage points within two years, suggesting a child-penalty mechanism rather than pre-market human capital differences. Ismayilov et al. (2022) estimate Mincerian returns to education in Azerbaijan and find that while returns are positive overall, women receive systematically lower returns to educational attainment than men, with the differential concentrated at the tertiary level. The World Bank's (2022) Breaking Barriers to Women's Employment in Azerbaijan report documents that men earn on average 46% more than women, identifies legal restrictions on female employment (674 job restrictions, subsequently reformed with Women, Business and the Law support) as a binding constraint, and shows that women's employment is concentrated in low-productivity agriculture and low-wage public services (World Bank, 2022, 2026b). Alasgarova (2025) documents that girls outperform boys throughout general and higher education in Azerbaijan, reinforcing the paradox: superior educational performance does not translate into superior labor market outcomes. Complementary institutional analysis shows that women constitute roughly 75% of employees in education and 76% in health and social services — sectors with compressed wage structures (Economic Policy Research Center [EPRC], 2021).

2.5 Macroeconomic Costs of Gender Misallocation

The macro-development literature quantifies the aggregate cost of gendered misallocation of talent. Hsieh et al. (2019) estimate that removing occupational misallocation explains a substantial share of U.S. productivity growth; Cuberes and Teignier (2016) compute that closing gender gaps in employment and entrepreneurship would raise GDP by 5–15% in typical developing economies; and the World Bank (2023) estimates that gender employment gaps cost economies roughly 20% of GDP per capita on average globally. For Azerbaijan specifically, the World Bank (2022) argues that the combination of low female participation and sectoral misallocation constitutes one of the country's largest unexploited growth reserves — a claim this paper's divergence analysis directly supports.

2.6 Synthesis and Positioning

Taken together, the literature establishes three building blocks: (i) overeducation is gendered and costly (Didier, 2024; Passaretta, 2023); (ii) post-Soviet institutions amplify the discounting of female credentials (Khitarishvili, 2019; Kupets, 2015); and (iii) Azerbaijan exhibits extreme values on the relevant margins — educational expansion, agricultural concentration of female labor, and wage gaps (Ismayilov et al., 2022; World Bank, 2022). What is missing is an integrated, time-series quantification of the paradox. That is the contribution of the present study.

3. Methodology

3.1 Research Design

The study employs a quantitative, descriptive-econometric research design combining (i) secondary macro-data analysis of a 2000–2025 time series for Azerbaijan, (ii) construction of a composite divergence index, and (iii) an interpretive decomposition framed by an extended Mincerian model. The design is appropriate for the research questions because harmonized micro-data on individual-level mismatch (e.g., a national labor force survey with occupation-by-education cross-tabulations) are not publicly available for Azerbaijan; macro-indicator triangulation is the standard alternative in the transition-economy literature (Khitarishvili, 2019; Kupets, 2015).

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3.2 Data Sources

All quantitative data are drawn from primary international statistical sources. First, the World Bank World Development Indicators (WDI) and the World Bank Gender Data Portal supplied 15 indicator series for Azerbaijan covering 2000–2025, retrieved programmatically via the World Bank API v2 in September 2026. Second, ILO modeled estimates embedded in WDI labor indicators provide labor force participation, unemployment, and sectoral employment by sex. Third, the World Bank (2022) country report supplies the national wage-gap estimate (46%) and employment-barrier diagnostics. Fourth, figures from the State Statistical Committee of the Republic of Azerbaijan are used as reported in Ismayilov et al. (2022) and in secondary compilations. Fifth, the World Bank Women, Business and the Law database supplies legal-framework indicators, including the reform eliminating 674 occupational restrictions on women (World Bank, 2026b).

3.3 Analytical Tools

Descriptive trend analysis. Gender gaps are computed as male-minus-female differences and female-to-male ratios for each year; pre-2010 and post-2015 sub-periods are compared to test the temporal structure of H1.

Education–Employment Divergence Index (EEDI). The paper's principal constructed measure is defined as

$$\mathrm{EEDI}(t) = \frac{\mathrm{TER}_F(t)}{\mathrm{TER}_F(t_0)} - \frac{\mathrm{LFPR}_F(t)}{\mathrm{LFPR}_F(t_0)}, \qquad t_0 = 2006.$$

where TER_F is female tertiary enrolment and LFPR_F is female labor force participation, each normalized to its base-year value. EEDI > 0 indicates that educational supply is growing faster than labor market absorption; the index's slope is interpreted as the annual pace of divergence. This construction parallels normalization approaches in mismatch measurement (Kupets, 2016) while remaining transparent and reproducible.

Extended Mincerian interpretive framework. Following Ismayilov et al. (2022) and Montenegro and Patrinos (2014), observed gender differentials in the returns to education are interpreted through the identity $\ln(\text{wage}) = \beta_0 + \beta_1\text{Educ} + \beta_2\text{Exp} + \beta_3\text{Exp}^2 + \beta_4(\text{Female} \times \text{Educ}) + \varepsilon$, where H3 predicts $\beta_4 < 0$. Because micro-data for re-estimation are unavailable, the paper triangulates published β_4 estimates (Ismayilov et al., 2022; Pastore et al., 2016) with macro-level wage-gap figures (World Bank, 2022).

Robustness and limitations. ILO modeled estimates embed smoothing; thus year-to-year changes are interpreted cautiously, and emphasis is placed on multi-year trends. Sensitivity is assessed by comparing base years 2006 and 2010 for the EEDI and by cross-checking WDI figures against national statistics where reported (Ismayilov et al., 2022).

4. Results

4.1 The Educational Expansion

Table 1 documents the expansion of tertiary enrolment by sex. Female enrolment more than doubled between 2006 (20.2%) and 2024 (46.9%), while male enrolment grew from 19.3% to 36.6%. The female-to-male enrolment ratio crossed parity around 2009 and reached 1.28 by 2024 — women are now enrolled at a rate 28% above men.

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Table 1. Gross Tertiary Enrolment Ratio by Sex, Azerbaijan, Selected Years (2006–2024)

Year	Female (%)	Male (%)	F/M ratio
2006	20.2	19.3	1.05
2010	19.2	19.4	0.99
2014	24.8	21.7	1.14
2018	31.2	27.0	1.16
2020	39.2	33.8	1.16
2022	44.9	37.6	1.19
2024	46.9	36.6	1.28

Note. Values are gross enrolment ratios (%).
Source: World Bank WDI, indicators SE.TER.ENRR.FE and SE.TER.ENRR.MA, retrieved September 2026. F/M = female-to-male ratio.

The trajectory in Table 1 is the supply side of the diploma paradox. Between 2019 and 2024 alone, female enrolment rose by 11.1 percentage points — an acceleration consistent with cohort effects, rising household demand for female credentials, and expanded university capacity documented by Alasgarova (2025). Under H1, this surge should mechanically raise the skill intensity of female employment within five to ten years, as educated cohorts enter working age. The fact that the F/M enrolment ratio reached 1.28 — a level associated in OECD economies with female dominance of professional and managerial occupations — sets a benchmark against which Azerbaijan's absorption performance can be judged. The divergence between this educational trajectory and the labor market outcomes documented in Tables 2 and 3 constitutes the paper's central empirical finding and directly supports the Diploma Paradox Hypothesis.

4.2 Stagnant Participation, Persistent Unemployment Penalty

Table 2. Female Versus Male Labor Market Outcomes, Azerbaijan, Selected Years (2000–2025)

Year	LFPR F (%)	LFPR M (%)	Unemp. F (%)	Unemp. M (%)	Youth unemp. F (%)
2000	72.2	82.2	12.7	10.9	25.3
2005	63.0	70.7	7.3	7.2	16.3
2010	59.8	62.1	6.8	4.3	14.8
2015	61.1	66.3	5.8	4.1	15.6
2020	64.4	70.3	8.4	6.1	17.6
2023	61.7	67.2	6.5	4.8	15.3
2025	60.8	66.0	6.3	4.7	14.7

Note. LFPR = labor force participation rate (%, ILO modeled estimate, ages 15+); Unemp. = unemployment rate (% of labor force); Youth unemp. F = female unemployment, ages 15–24.
Source: World Bank WDI / ILO modeled estimates (SL.TLF.CACT.FE.ZS, SL.TLF.CACT.MA.ZS, SL.UEM.TOTL.FE.ZS, SL.UEM.TOTL.MA.ZS, SL.UEM.1524.FE.ZS).

Table 2 establishes that the labor market has not absorbed the expanding supply of educated women. Female LFPR in 2025 (60.8%) remains more than eleven percentage points below its 2000 level and roughly five points below male LFPR, despite female enrolment having more than doubled over the same window. The female unemployment penalty is persistent and structural rather than cyclical: in every year since 2010, female unemployment exceeded male unemployment by 1.6–2.6 percentage points, and youth female unemployment (14.7% in 2025) remains nearly triple the headline male rate — precisely the margin where tertiary-educated entrants should appear. The COVID-19 shock (2020) widened both the participation and unemployment gaps, consistent with global evidence that women absorbed disproportionate labor market damage (International Labour Organization [ILO], 2024, 2025).

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These patterns reject the absorption mechanism required by standard human capital predictions and corroborate H1; the fact that exclusion coexists with segregation (Table 3) refines the mechanism toward H2.

4.3 Sectoral Misallocation: Where Educated Women Actually Work

Table 3. Female Employment Structure and Wage Employment by Sex, Azerbaijan, Selected Years (%)

Year	F in agriculture	F in industry	F in services	Wage empl. F	Wage empl. M
2000	45.9	7.6	46.5	28.8	34.4
2010	44.2	6.4	49.5	27.4	36.9
2015	41.9	6.0	52.1	28.1	36.5
2020	40.6	6.8	52.6	27.6	36.2
2024	39.2	7.1	53.7	28.2	37.4
2025	38.7	7.1	54.1	28.4	37.6

Note. Columns show the sectoral distribution of female employment and the share of wage and salaried employment in total employment, by sex.

Source: World Bank WDI / ILO modeled estimates (SL.AGR.EMPL.FE.ZS, SL.IND.EMPL.FE.ZS, SL.SRV.EMPL.FE.ZS, SL.EMP.WORK.FE.ZS, SL.EMP.WORK.MA.ZS).

Table 3 reveals the structural core of the paradox. Almost four in ten employed Azerbaijani women (38.7% in 2025) work in agriculture — overwhelmingly informal, own-account, and subsistence employment where a tertiary diploma yields negligible returns — while only 7.1% work in industry, the economy's highest-productivity, oil-linked sector. Over a quarter-century, the agricultural share of female employment declined by merely 7.2 percentage points, a glacial pace relative to the 26.6-point surge in tertiary enrolment over a shorter window. The wage-employment gap is equally telling: 28.4% of employed women hold wage jobs versus 37.6% of men, a nine-point gap that has not narrowed since 2000. Services absorb the majority of women, but EPRC (2021) sectoral data show this concentration is skewed toward education (75.2% female) and health (76.2% female) — low-wage, feminized public services. This configuration confirms H2: the discounting of female credentials operates through where women work, not only whether they work.

4.4 The Education–Employment Divergence Index

Figure 1 plots female tertiary enrolment and female labor force participation, each indexed to its 2006 value, together with the shaded EEDI divergence gap between them.

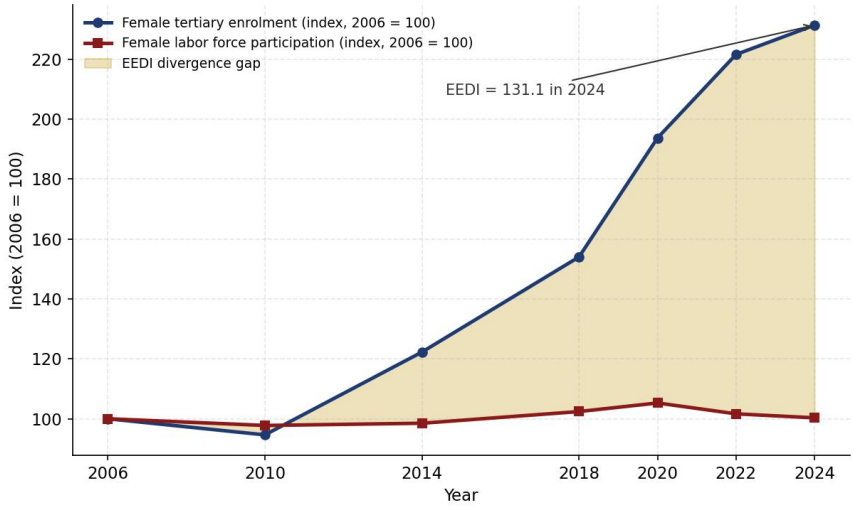


Figure 1. Female Tertiary Enrolment Versus Female Labor Force Participation, Indexed to 2006 = 100

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Note. EEDI = Education–Employment Divergence Index, computed as the difference between the two indexed series.
Source: authors' calculations from World Bank WDI (SE.TER.ENRR.FE; SL.TLF.CACT.FE.ZS

Figure 1 makes the paradox visible: by 2024 the female educational supply index stood at 231 while the absorption index remained essentially flat at 100, yielding an EEDI of 131 points. The divergence is monotonic after 2010 and accelerates after 2018, when enrolment growth steepened while participation stagnated. This pattern is inconsistent with a lag-adjustment story alone: even allowing a five-year cohort-entry lag, the 2015–2019 enrolment cohort (index approximately 135–175) entered a labor market whose female participation fell during 2020–2025. The EEDI therefore captures a genuine structural failure of absorption, not a transitional delay. In comparative terms, Kupets (2015) finds qualitatively similar divergence in Ukraine and Georgia, but Azerbaijan's index magnitude — a 131-point gap in eighteen years — is at the extreme end of documented transition-economy experience, reinforcing the country's status as a limiting case of gendered skill misallocation and strongly supporting H1.

4.5 Wage Discount: The Returns Penalty

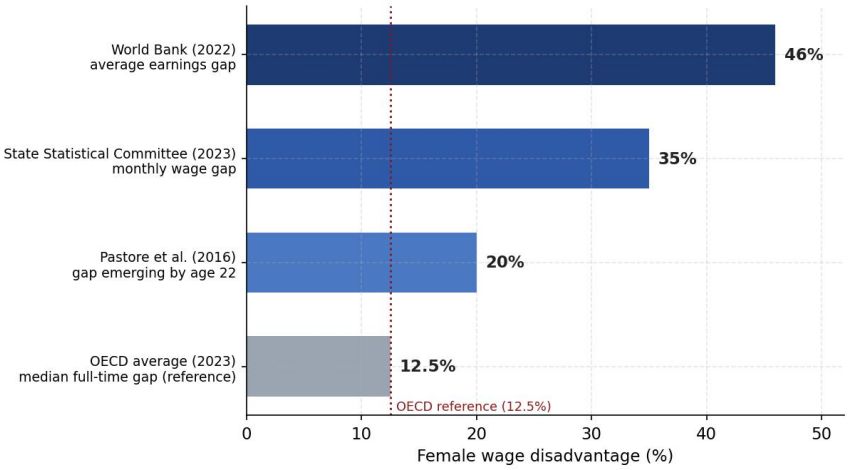


Figure 2. The Gender Wage Penalty in Azerbaijan Across Data Sources, With OECD Reference

Note. Estimates are not strictly commensurable across methodologies and are presented as a triangulation band. *Sources*: World Bank (2022); State Statistical Committee of Azerbaijan as reported in 2023 compilations; Pastore et al. (2016); OECD (2023).

Figure 2 consolidates the demand-side evidence for H3. Three independent estimates converge on an exceptionally wide female wage penalty: the World Bank's (2022) headline estimate of a 46% average male-over-female earnings advantage, the State Statistical Committee's roughly 35% monthly wage gap for 2023, and Pastore et al.'s (2016) finding that an approximately 20-point gap materializes within two years of age 20 — before substantial human capital divergence can occur. Against the OECD median gap of roughly 12–13% (OECD, 2023), Azerbaijan's penalty is three- to four-fold. Critically for the diploma paradox, Ismayilov et al. (2022) show that the Azerbaijani gap is largest at the tertiary level: education narrows the gap less for women than for men, implying a negative Female × Education interaction in the extended Mincerian specification. The wage evidence thus closes the logical loop: educational expansion without return equalization produces exactly the observed outcome — highly educated women crowded into low-wage sectors or informal agricultural work, where credentials cannot be monetized.

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4.6 Institutional Context: Legal Reform Without Labor Market Response

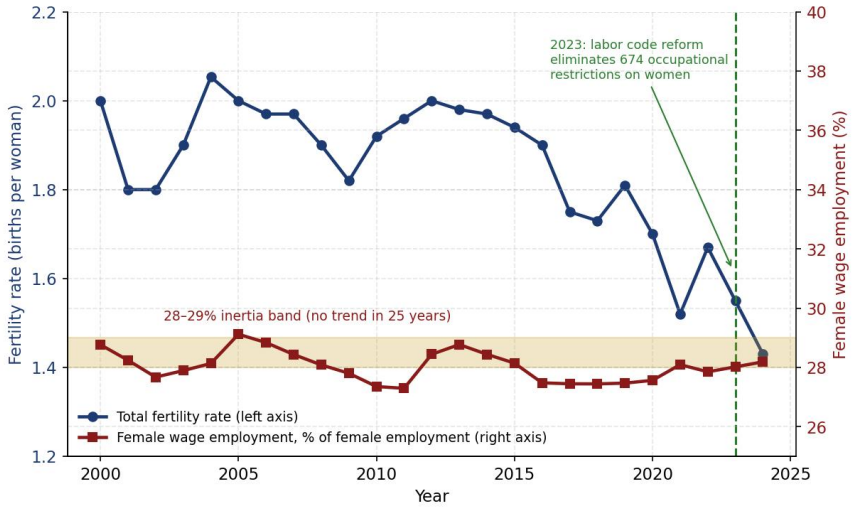


Figure 3. Fertility Decline and Occupational Liberalization Versus the Inertia of Female Wage Employment, Azerbaijan, 2000–2024

Note. Left axis: total fertility rate (births per woman). Right axis: wage and salaried employment as a share of female employment (%). The vertical line marks the 2023 labor code reform that eliminated 674 occupational restrictions on women.
Source: World Bank WDI (SP.DYN.TFRT.IN; SL.EMP.WORK.FE.ZS); World Bank (2026b).

Figure 3 juxtaposes two forces that should, in theory, have raised female employment quality: fertility fell from 2.0 (2000) to 1.43 (2024), reducing the care constraint emphasized by Pastore et al. (2016), and the Women, Business and the Law-supported labor code reform eliminated 674 legal restrictions on women's occupations (World Bank, 2026b) — among the most consequential de-jure liberalizations in the region. Yet female wage employment moved less than one percentage point across the entire quarter-century. This inertia indicates that legal and demographic constraints are no longer the binding margin; the constraint has migrated to demand-side institutions — hiring discrimination, sectoral wage structures, childcare infrastructure deficits, and weak signaling of female credentials to employers (Didier, 2024; World Bank, 2022). The policy implication is direct: further de jure reform will underdeliver unless paired with active labor market instruments targeting the placement and remuneration of tertiary-educated women.

5. Discussion

5.1 Synthesis of Findings

The evidence assembled in the Results section supports all three hypotheses. The diploma paradox is empirically real and quantitatively large: an eighteen-year window in which female tertiary enrolment grew by 131 index points relative to female labor market absorption (Figure 1) has no precedent in the advanced-economy overeducation literature, where mismatch typically manifests as a level problem within employment rather than as a growth divergence between education and participation (Passaretta, 2023; Sloane & Mavromaras, 2020). Azerbaijan thus extends the mismatch literature: in institutional environments where discrimination is cheap and feminized sectors are wage-compressed, overeducation manifests not only as graduates in sub-graduate jobs but as graduates absent from the graduate labor market altogether.

5.2 Comparison With Existing Literature

The findings are consistent with, and sharpen, three literatures. First, they corroborate the post-Soviet pattern documented by Khitarishvili (2019) and Kupets (2015, 2016) — educational advantage

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decoupled from labor market advantage — while showing Azerbaijan to be an extreme realization of that pattern. Second, they align with the micro-evidence of Pastore et al. (2016) and Ismayilov et al. (2022): the abrupt emergence of the wage gap at family-formation age and the negative Female × Education interaction jointly imply that the credential discount is imposed by employers and institutions, not produced by differential pre-market investment — indeed, Alasgarova (2025) shows girls outperform boys educationally at every level. Third, the sectoral findings extend Didier's (2024) mechanism linking mismatch to discrimination: Azerbaijan's combination of 38.7% agricultural female employment with 75–76% feminization of education and health employment (EPRC, 2021) instantiates Bergmann's (1974) crowding model in a contemporary transition economy — women are crowded into a narrow band of sectors whose excess supply of labor depresses the wages of all women, educated or not.

5.3 Macroeconomic Interpretation

From a macro-analytical standpoint, the paradox represents a structural misallocation of the economy's fastest-growing asset. With GDP per capita of USD 7,411 (2025) and oil-dependent growth under diversification pressure, Azerbaijan's failure to deploy tertiary-educated women into productive wage employment constitutes a measurable drag on potential output. Applying the conservative lower bound of Cuberes and Teignier's (2016) and the World Bank's (2023) cross-country estimates to Azerbaijan's participation and sectoral gaps suggests a long-run output cost on the order of 10–20% of GDP — consistent with the World Bank's (2022) country-specific assessment. The diploma paradox is therefore not a distributional footnote; it is a first-order macroeconomic inefficiency.

5.4 Alternative Explanations and Limitations

Three rival explanations deserve acknowledgment. First, cohort lag: the enrolment surge is recent, and absorption may materialize in the 2030s. Figure 1's post-2018 acceleration of the EEDI despite the entry of earlier educated cohorts weakens this account, but only future micro-data can fully exclude it. Second, measurement: ILO modeled estimates smooth informal employment; if educated women increasingly occupy unmeasured gig or remote work, the paradox is partly statistical. The wage evidence (Figure 2), which derives from administrative and survey sources independent of the modeled series, argues against a purely statistical artifact. Third, preference-based sorting: women may freely choose agricultural or public-service work. The abrupt, age-20-linked emergence of the wage gap (Pastore et al., 2016) and the documented legal restrictions on female occupations until recently (World Bank, 2026b) are difficult to reconcile with a pure preferences account. The study's principal limitations follow from its macro design: no individual-level mismatch measurement, no causal identification, and reliance on modeled estimates for some series. These are mitigated by triangulation across independent sources but should discipline interpretation.

6. Conclusion

6.1 Summary

This paper has identified, operationalized, and quantified the diploma paradox in Azerbaijan: between 2006 and 2024, female tertiary enrolment rose by a factor of 2.3 while female labor force participation stagnated, female unemployment maintained a structural premium over male unemployment, 38.7% of employed women remained in agriculture, and the female wage-employment share froze in a 28–29% band. The constructed Education–Employment Divergence Index reached 131 points by 2024. The evidence indicates that female credentials are discounted through sectoral crowding and demand-side discrimination rather than through educational deficits — girls and women outperform men educationally at every level of the system.

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6.2 Policy Implications

Four policy priorities follow. First, childcare and care infrastructure: the child-penalty mechanism (Pastore et al., 2016) and the fertility decline without employment response (Figure 3) imply that affordable early-childhood care is the highest-yield activation instrument. Second, active labor market policies for tertiary-educated women, including wage subsidies for first private-sector placements, apprenticeship quotas in industry and ICT, and enforcement follow-through on the post-2023 occupational liberalization (World Bank, 2026b). Third, pay transparency and anti-discrimination enforcement, modeled on OECD pay-transparency instruments (OECD, 2023), to compress the 35–46% wage penalty. Fourth, education-to-employment signaling reform: mandatory career services and labor market information systems linking universities to employers, addressing the signaling failure that Didier (2024) identifies as the channel through which discrimination converts education into mismatch. The World Bank (2022) estimates that measures of this kind rank among the highest-return growth policies available to Azerbaijan.

6.3 Future Research

Three directions are proposed. First, acquisition of unit-record labor force survey data to estimate individual-level overeducation incidence and the extended Mincerian interaction directly, replacing macro triangulation with micro econometrics. Second, comparative EEDI construction across the South Caucasus and Central Asia, testing whether the paradox's magnitude correlates with oil dependence and institutional quality. Third, longitudinal tracking of the post-2023 occupational-liberalization cohort — a natural experiment in whether de-jure reform alone can close the divergence, or whether, as this paper's inertia evidence suggests, demand-side instruments are indispensable.

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