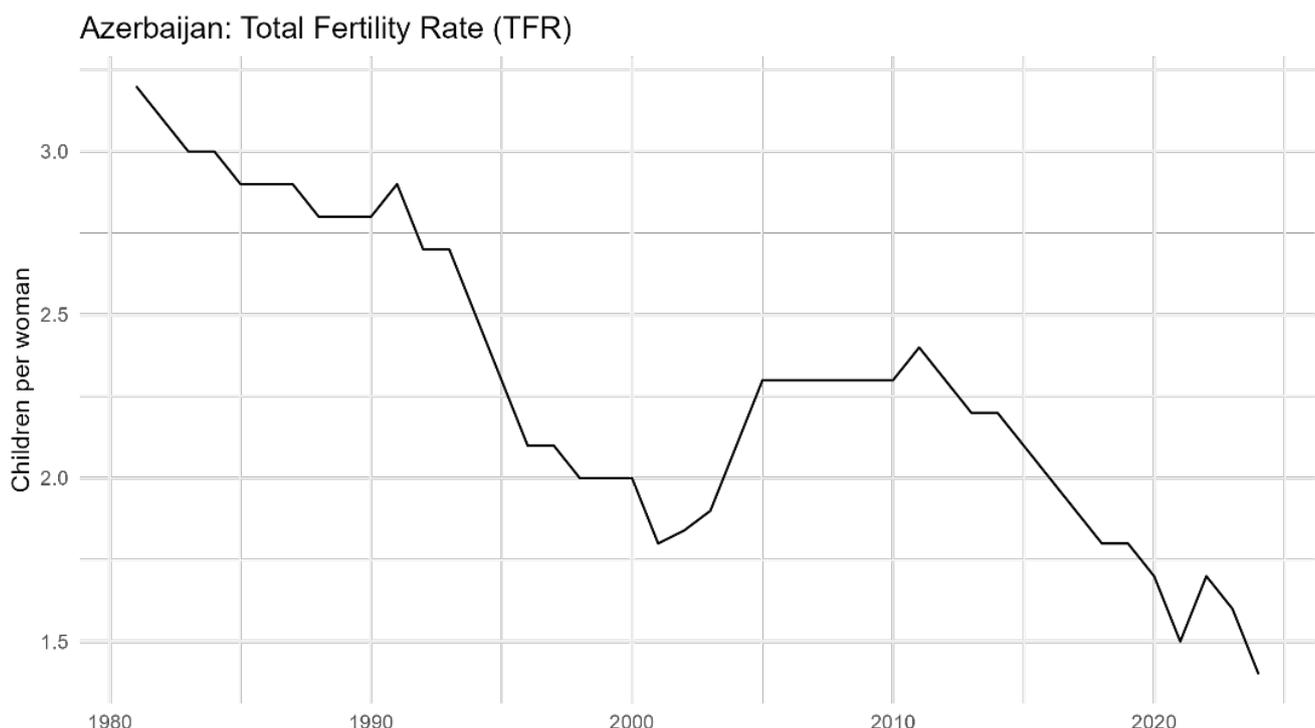


# Female Employment, Household Norms, and Declining Fertility in Azerbaijan

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Azerbaijan has seen two major trends of interest for this piece in the last forty years: a steady drop in fertility and a slow rise in women joining the workforce. I use official demographic statistics and ILO labor-market indicators. My focus is on the years 1981 to 2024, when both data sets are available yearly. Over this window, Azerbaijan's total fertility rate (TFR) experiences a significant decline, while the female labor force participation rate (FLFP) shows a steady increase. These patterns raise an important question: How should we understand the ongoing decline in fertility? This happens as women work more, but social and institutional changes might not keep up.

**Figure 1: TFR over time (1981–2024)**



I use Claudia Goldin's (2021) framework to interpret these

patterns. It shows that fertility dynamics depend on women's labor supply, expectations, household norms, and the institutional environment. These factors all influence work-family trade-offs. Goldin explains that fertility can stay low when women's market opportunities increase faster than the shift of unpaid work within families and the growth of care-supporting institutions. This view is important in situations where traditional gender roles and weak childcare options increase the cost of having children, especially as women work more in the market.

Azerbaijan is a revealing case for applying this lens. As a post-socialist society, it faces both new market chances and enduring social norms due to the transition period's economic changes. Patriarchal household structures still shape gender roles in domestic work. This affects how families balance jobs and having kids (UNFPA 2023). These features hint that a Goldin-style "incomplete adjustment" view makes sense. However, we cannot directly measure household labor allocation or childcare limits with the data currently available.

My contribution is intentionally modest and descriptive. I present evidence for Azerbaijan from 1981 to 2024. I connect fertility outcomes to female labor-market indicators, using both levels and first differences. I also check age-specific fertility patterns for consistency. I do not make causal claims. I check if the patterns match Goldin's predictions in a non-Western, post-socialist setting. I also highlight measurement gaps, especially the lack of consistent time-use and care data. These gaps limit stronger conclusions.

## **Conceptual Framework**

I explore the link between fertility and female employment in Azerbaijan. I use Goldin's ideas about "baby busts" and "baby booms." Fertility changes based on women's job opportunities and household norms. The starting point is a basic idea about opportunity cost: As women's potential earnings and job

chances increase, the time needed for childbearing and raising children stands out more. This makes fertility more affected by the challenges of balancing work and family life. Goldin's main point is that fertility changes depend on how families and societies adapt to women's roles. This includes shifts in gender expectations at home and support from institutions like childcare, flexible work, and family policies (Goldin 2021).

In Goldin's framework, fertility tends to fall most sharply when women's labor market engagement expands faster than the reallocation of unpaid labor at home. If society assigns domestic work and childcare mostly to women, having another child becomes harder. This is true as women's job opportunities increase. This norm-institution mismatch can lead to a steady drop in fertility. This happens even if family size preferences don't change much. Households struggle to coordinate. Women can enter the workforce quickly. However, changing household roles and creating support systems takes time. In this context, fertility drops may happen when women are making important schooling-to-work transitions. Early career pressures can lead to delays or missed births. This suggests that constraints, not just personal choices, drive these changes.

Azerbaijan is plausibly a case where this "incomplete adjustment" mechanism is relevant. Evidence shows that gender norms and household power structures stay traditional. Women often take on most domestic tasks, while men hold more decision-making power in families. Azerbaijan is described as a patriarchal society. Men are seen as the main breadwinners, while women manage household tasks. Women's economic power is limited by unequal bargaining (UNFPA 2023). These features connect to Goldin's focus on slow-changing household norms. Even if more women join the workforce, fertility might keep falling. This could happen if domestic responsibilities stay unevenly shared and if there are few ways to balance work and family life (Goldin, 2021).

Importantly, I treat these arguments as a theory-guided interpretive framework, not a causal claim. My analysis examines if Azerbaijan's long-term fertility trends and age shifts align with Goldin's mechanism during gradual changes in norms and institutions.

## **Data and Empirical Strategy**

I use annual fertility indicators published by the **State Statistical Committee of the Republic of Azerbaijan (AzStat)**. The main dependent variable is the **total fertility rate (TFR)**, measured at the national level. I look at age-specific fertility rates (ASFR) for ages 15–19, 20–24, and 25–29. This helps me see if declines happen mainly when people move from school to work or start their careers. I restrict the analysis window to **1981–2024** to align fertility series with labor-market coverage.

Labor-market indicators come from **ILOSTAT**. To ensure comparability over time, I use only “LFS – Labour Force Survey” data. I focus on the “female, total (15+)” definition for my core female labor series. The key explanatory variable is the **female labor force participation rate (FLFP)**. I also include the female unemployment rate and the female time-related underemployment rate. This helps show labor market conditions and underutilization. I view female average monthly earnings as extra information. I interpret this data carefully because long-term earnings often have breaks and measurement changes.

After aligning sources and restricting years, my main dataset is an **annual national time series (1981–2024)**. The small sample size of the time series shapes my careful, descriptive interpretation. It also leads me to use Newey-West HAC standard errors in regression analysis.

I estimate time-series OLS models to show the long-run link between fertility and women's work in the labor market. My baseline specification links the national total fertility rate

(TFR) to female labor force participation and other labor-market factors:

$$TFR_t = \alpha + \beta_1 FLPF_t + \beta_2 Earnings_t + \beta_3 Unemployment_t + \beta_4 Underemployment_t + \varepsilon_t$$

Here, ( $FLPF_t$ ) stands for the female labor force participation rate (ages 15+), based on LFS. ( $Earnings_t$ ) refers to average monthly earnings for females. ( $Unemployment_t$ ) is the female unemployment rate. ( $Underemployment_t$ ) shows the female time-related underemployment rate.

I build the results table sequentially: first ( $TFR_t$ ) on ( $FLPF_t$ ), then add earnings, then unemployment, and finally underemployment. This staged approach tests if the link between fertility and participation remains strong. I do this by adding labor-market conditions and imperfect proxies for the opportunity cost of time. I interpret ( $\beta_1$ ) as a descriptive long-run correlation, not a causal effect. The goal is to see if the sign and stability of the relationship match Goldin's norm-adjustment mechanism. This mechanism suggests that as women's market work increases, fertility may decline faster than households and institutions can adapt (Goldin, 2021).

I estimate first-difference models to check short-run co-movement. This helps reduce worries that results come only from shared long-run trends.

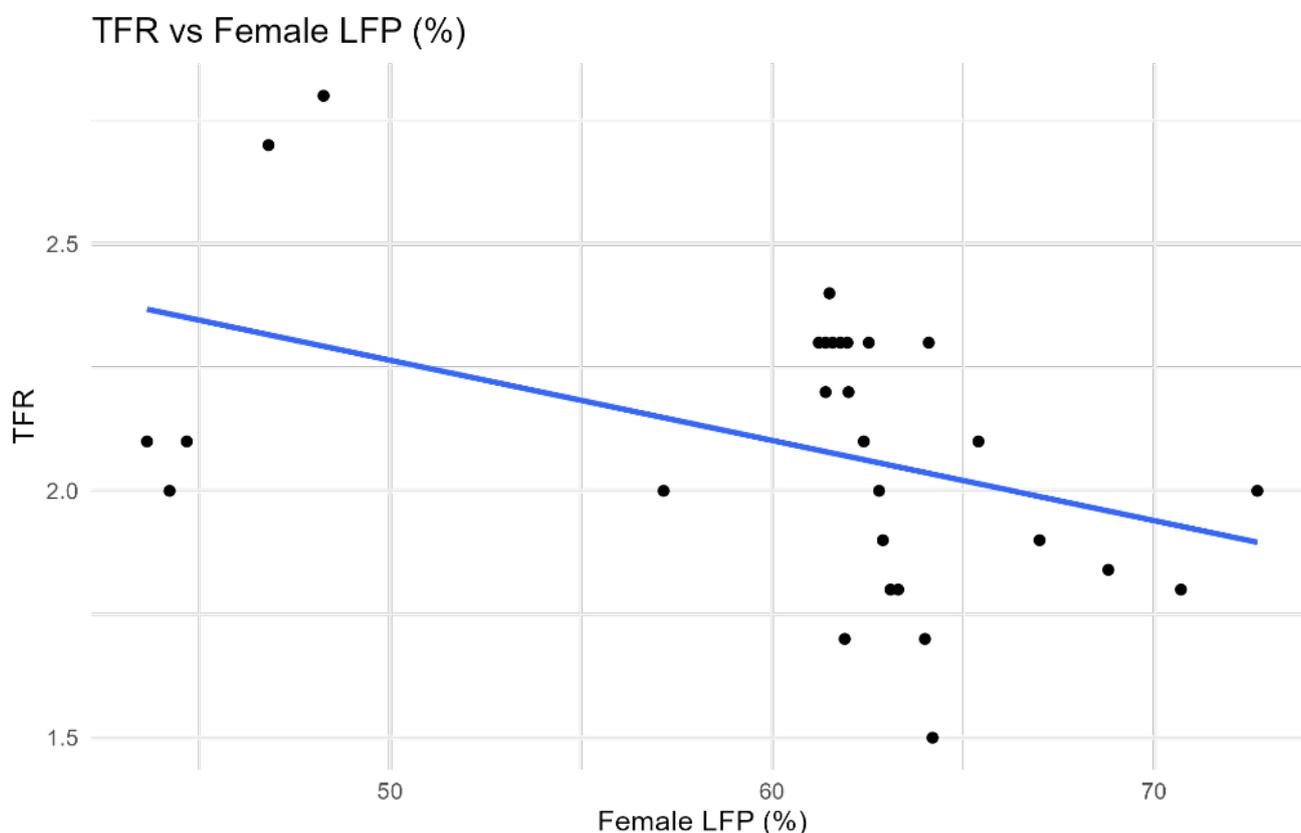
$$\Delta TFR_t = \gamma_0 + \gamma_1 \Delta FLPF_t + \gamma_2 \Delta Earnings_t + \gamma_3 \Delta Unemployment_t + \gamma_4 \Delta Underemployment_t$$

where ( $\Delta X_t = X_t - X_{t-1}$ ). I see these models as helpful. Differencing reduces the sample size and highlights year-to-year changes instead of levels. So, coefficients show current relationships, not dynamic cause-and-effect responses.

All models are estimated by OLS with Newey–West HAC standard errors to account for serial correlation and heteroskedasticity in annual time series. I set the HAC lag length using a standard rule-of-thumb based on the effective sample size,  $[4(T/100)^{2/9}]$ , with a minimum lag of one. I drop any specification with fewer than a small minimum number of complete observations to avoid unstable estimates. This step ensures that tables remain interpretable and comparable across models.

## Results

**Figure 2: TFR (left axis) and Female LF Participation (right axis)**



I begin by noting a key trend: during the study period, Azerbaijan's total fertility rate (TFR) declines, while female labor force participation (FLFP) increases steadily. Figure 1 shows the main idea of the paper: Fertility rates drop during economic changes and recovery, while women's involvement in the labor market grows. This pattern supports Goldin's idea. Fertility can drop when women work more in the market, and household norms and support systems don't keep up.

**Table 2: TFR and Female Labour Indicators (Levels, Newey–West HAC SE)**

TFR and Female Labour Indicators (Levels, Newey–West HAC SE)

	TFR ~ FLFP	+ earnings	+ unemployment	+ underemployment
(Intercept)	4.216*** (0.967)	14.748*** (2.593)	15.865*** (1.722)	13.579*** (0.967)
flfp_f	-0.034* (0.015)	-0.196** (0.044)	-0.221*** (0.030)	-0.155*** (0.022)
earn_f		-0.001* (0.000)	-0.001* (0.000)	-0.001+ (0.000)
unemp_f			0.095* (0.036)	0.055 (0.047)
underemp_f				-0.077+ (0.037)

In levels, I estimate a sequence of models that relates national TFR to FLFP and then progressively adds additional labor-market indicators. Across specifications, the association between FLFP and TFR is consistently negative. In the simplest bivariate model, higher FLFP is associated with lower fertility. When I include female earnings, the estimated FLFP coefficient stays negative and grows larger. This means the participation–fertility link doesn’t just mirror wage changes. Adding female unemployment and underemployment does not overturn the negative association between FLFP and TFR. The negative coefficient stays strong, even when we add factors like joblessness, labor underutilization, and other signs of labor market stress.

The earnings coefficient is typically negative, but interpretation of it must be more cautious. Earnings series can change due to different definitions, measurement breaks, or currency shifts over time. So, I view the earnings result as suggestive, not definitive. The negative sign supports the

opportunity-cost idea. When the value of women's time goes up, fertility may drop, especially where balancing work and family is hard. The unemployment and underemployment coefficients are mixed in sign and strength across models, which is unsurprising. Labor market insecurity can affect fertility in various ways. It might lead to delays in having children, decrease household resources, or shift focus to home production. So, I see these coefficients as context, not as main drivers.

Overall, the level results are consistent with Goldin's emphasis on incomplete adjustment. If more women join the workforce but household duties and care systems change slowly, it costs more to raise children. This can lead to a lasting drop in fertility. Evidence shows that Azerbaijan holds onto traditional gender roles and unequal power in households. This likely helps explain the long-term associations.

**Table 3: TFR and Female Labour Indicators (First Differences, Newey–West HAC SE)**

TFR and Female Labour Indicators (First Differences, Newey–West HAC SE)

	$\Delta\text{TFR} \sim \Delta\text{FLFP}$	+ $\Delta\text{earnings}$	+ $\Delta\text{unemployment}$	+ $\Delta\text{underemployment}$
(Intercept)	-0.043*	-0.080**	-0.076**	-0.068*
	(0.017)	(0.022)	(0.019)	(0.024)
dflfp	-0.060+	-0.085**	-0.093*	-0.088+
	(0.030)	(0.019)	(0.031)	(0.037)
dearn		0.001*	0.000	0.000
		(0.000)	(0.000)	(0.000)
dunemp			0.015	0.016
			(0.023)	(0.026)
dunder				-0.027
				(0.028)

I estimate first-difference models too. This helps confirm the findings since trending macro series can create false correlations in levels. These regressions relate annual changes in fertility to annual changes in female labor indicators. The differenced specification lessens the impact of long-run drift. It highlights year-to-year co-movement.

The first-difference results support the main pattern: when FLFP rises, TFR usually falls at the same time. The estimated coefficients on  $\Delta$ FLFP are mostly negative. They stay negative even when I include changes in earnings, unemployment, and underemployment. This aligns with the idea that changes in women's work involvement connect to both long-term fertility drops and short-term fertility changes.

At the same time, these models have important limitations that I emphasize explicitly. Differencing cuts the effective sample size. Also, missing data in some labor indicators can lower the number of usable observations even more. The coefficients should therefore be read as suggestive associations, not as dynamic causal responses. I use the differenced models mainly to support the level results. The main interpretation stays descriptive and guided by theory, not causal.

**Table 4: Age-Specific Fertility and Female Labour Indicators (Newey–West HAC SE)**

Age-Specific Fertility and Female Labour Indicators  
(Newey–West HAC SE)

	ASFR 15–19	ASFR 20–24	ASFR 25–29
(Intercept)	304.954*** (59.846)	1229.932*** (115.595)	1043.204*** (171.800)
flfp_f	-3.853** (1.013)	-16.842*** (2.040)	-14.884*** (2.922)
earn_f	-0.042** (0.011)	-0.118** (0.026)	-0.071* (0.026)
unemp_f	0.771 (1.588)	6.420* (2.632)	5.786* (2.054)

To examine *where* fertility decline is concentrated, I turn to age-specific fertility rates (ASFR) for ages 15–19, 20–24, and 25–29. This “mechanism check” comes from the belief that major fertility changes often happen during schooling-to-work transitions and early career stages. In Goldin’s framework, incomplete adjustment shows up as delayed or missed births. This happens when women see more job opportunities but are held back by household norms and a lack of care support (Goldin, 2021).

The ASFR regressions show a clear negative association between FLFP and fertility for younger working-age groups. The coefficients on FLFP are negative across the three age bands, with particularly strong relationships for the 20–24 and 25–29 groups. This pattern shows a timing channel: fertility declines happen mostly among women at ages when they are entering the job market, searching for work, and starting their careers. The decline in fertility isn’t just about smaller families. It also shows how the timing and ability to have children during working years have changed.

I interpret these ASFR results cautiously. The sample size for age-specific regressions is smaller. Age-specific fertility rates are shown as births per 1.000 women. This impacts the size of the coefficients. For these reasons, I treat the ASFR

regressions as descriptive evidence that complements the aggregate TFR findings. The age pattern and the labor market link support the overall view. Fertility decline is strongest among groups facing work-family trade-offs. This is likely due to slow changes in households and institutions.

### **Data Limitations & Measurement Gaps**

I interpret my results with caution. Many key parts of Goldin's framework are hard to measure. This includes the link between women's market work, unpaid household labor, and care-supporting institutions. The available time series data from Azerbaijan doesn't capture these interactions well (Goldin, 2021). The most important limitation is the absence of consistent **time-use** data that would allow me to observe changes in the gender division of unpaid work. I can't see if more women in the workforce matches changes in household tasks. I need yearly data on unpaid work, childcare hours, or fathers' caregiving roles. This matters because Goldin's argument highlights that fertility can remain low when women's market opportunities grow faster than the changes in household norms. Additionally, the development of institutions that help reduce the domestic burden on women is also crucial.

Relatedly, I lack systematic indicators of **childcare availability, affordability, and quality** over time. In settings where formal childcare is limited or uneven, work-family trade-offs can become more intense. This situation often reinforces the negative link between female employment and fertility rates. Since I can't see these institutional constraints in my data, I view the regressions as descriptive patterns. They don't provide proof of just one channel.

The UNFPA Azerbaijan factsheet shows that the social environment supports these ideas. It describes Azerbaijan as a patriarchal society. Here, gender and social norms play a big role. There are strong expectations about men's authority and women's domestic roles. I only use this material to show that

household norms and unpaid care are important for understanding macro associations. They aren't meant as inputs for estimation.

Two further limitations concern measurement comparability. Long-run earnings series can easily change due to shifts in definitions, coverage, and currency rules. So, I see earnings coefficients as helpful but not central to my argument. I can't track fertility intentions or desired family size over time. This makes it hard to tell if changes are due to shifting preferences or just timing and constraints.

These gaps should be understood as structural measurement limits rather than weaknesses unique to my analysis. They also push for a clear agenda to improve data collection. This includes time-use and care-related statistics. These are needed to evaluate Goldin-style adjustment mechanisms in Azerbaijan more directly.

## **Conclusion**

I document a clear descriptive pattern in Azerbaijan over 1981–2024: Fertility declines over the long run while female labor force participation rises. Higher female labor market engagement means lower total fertility. This trend is especially strong among younger women. Their decline in fertility often coincides with starting their careers. If women's work outside the home grows faster than their household roles, it can increase the cost of having children. This may keep fertility rates low, especially if support systems do not adapt. Azerbaijan shows traditional gender roles and unequal household decision-making. This supports the idea of "incomplete adjustment" as a way to understand these issues.

Azerbaijan faces a key challenge: It lacks consistent data. There's no reliable time-series information on unpaid care work, childcare availability, or related support systems. Better gender-sensitive data collection, especially on time-

use and family policy indicators, would help us evaluate the mechanisms in Goldin's model more directly. My findings show that the employment-fertility link from Goldin's work is also important in post-Soviet areas. Here, changes in the job market can happen faster than shifts in family norms and care systems.

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