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Childhood Vows, Career Costs: The Impacts of Early Marriage and Childbirth on Women's Employment in Egypt - Evidence from ELMPS 2023

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Abstract

Egypt's female labor force participation remains among the world's lowest, at 16 percent in 2023. Results indicate that 13.8 percent of women aged 16-64 who got married before the age of 18 work 1.2 percentage points less than their peers who did not marry early. Additionally, 16.3 percent of these women had a first birth before 20, working 1.7 percentage points less than those who delayed childbirth. However, after controlling for age, schooling, maternal background, and region, survey-weighted logit average marginal effects for early marriage and early childbirth are statistically indistinguishable from zero ($p > 0.10$), suggesting that lower employment reflects differences in human capital rather than transition timing. Interaction terms show that the employment premium associated with secondary or higher schooling is erased by early marriage (AME = –0.051, $p < 0.10$) and further reduced by early childbirth (AME = –0.094, $p < 0.01$), while AMEs for women with basic education remain small and insignificant. The non-linear Fairlie decomposition finds that age and education differences fully account for the observed employment gaps, leaving virtually no unexplained remainder. This highlights the importance of delaying early transitions and bolstering girls' education—especially in rural areas—to reduce Egypt's gender employment disparity.

Keywords: Early marriage, Early childbirth, Women's employment, Labor force participation, Education, Human capital, Egypt, Fairlie decomposition, Oaxaca–Blinder decomposition.

JEL classification: J13, J16, C25, C31

ملخص

لا تزال مشاركة المرأة في القوى العاملة في مصر من بين أدنى المعدلات عالميًا، حيث ستبلغ 16% في عام 2023. وتشير النتائج إلى أن 13.8% من النساء اللواتي تتراوح أعمارهن بين 16 و64 عامًا، واللواتي تزوجن قبل سن الثامنة عشرة، يعملن بمعدل أقل بمقدار 1.2 نقطة مئوية من أقرانهن اللواتي لم يتزوجن مبكرًا. بالإضافة إلى ذلك، أنجبت 16.3% من هؤلاء النساء أول مولود قبل سن العشرين، أي بمعدل أقل بمقدار 1.7 نقطة مئوية من اللواتي أخرن الإنجاب. ومع ذلك، وبعد ضبط عوامل السن والتعليم وخلفية الأم والمنطقة، فإن متوسط التأثيرات الهامشية لـ "لوجيت" المرجح بالمسح للزواج المبكر والولادة المبكرة لا يمكن تمييزه إحصائيًا عن الصفر ($p > 0.10$)، مما يشير إلى أن انخفاض التوظيف يعكس اختلافات في رأس المال البشري وليس توقيت الانتقال. تُظهر مصطلحات التفاعل أن علاوة التوظيف المرتبطة بالتعليم الثانوي أو العالي تتلاشى بسبب الزواج المبكر (AME = -0.051، $p < 0.10$) وتنخفض أكثر بسبب الولادة المبكرة (AME = -0.094، $p < 0.01$)، بينما تظل هذه العلاوة للنساء الحاصلات على تعليم أساسي صغيرة وغير ذات دلالة إحصائية. ويخلص تحليل فيرلي غير الخطي إلى أن فروق السن والتعليم تُفسر تمامًا فجوات التوظيف الملحوظة، مما يكاد لا يترك أي أثر غير مُفسَّر. وهذا يُبرز أهمية تأخير الانتقال المبكر وتعزيز تعليم الفتيات - وخاصة في المناطق الريفية - للحد من التفاوت في التوظيف بين الجنسين في مصر.

1. Introduction

Early marriage—commonly defined as entering wedlock before turning 18 years old—remains widespread in Egypt, with roughly 17 percent of women aged 20-24 marrying as minors (UNICEF, 2023). Adolescent motherhood is less prevalent but still significant; about 6.6 percent of Egyptian women aged 18-22 had their first birth before turning 18 (Population Reference Bureau, 2009). Both child marriage and early childbearing truncate girls' educational trajectories, expose them to greater health risks, and undermine their long-term economic empowerment.

Women who marry before the age of 18 face markedly poorer life chances; they are far less likely to complete primary schooling, more prone to adverse reproductive health outcomes, and substantially less likely to participate in the labor market or earn an income as adults (UNICEF, 2023). Recognizing these long-term harms, the international development community has made ending child marriage a priority under Sustainable Development Goal 5—achieving gender equality and empowering all women and girls—which explicitly targets the elimination of child marriage to improve women's education, health, and economic prospects (United Nations, 2015; UNICEF, 2011).

Egypt's female labor force participation (FLFP) is among the lowest in the world. According to the World Bank, only 18 percent of Egyptian women aged 15-64 were employed in 2012, a share that fell to 14.6 percent by 2020 before edging up to 16.4 percent in 2023—well below the global average of roughly 50 percent (World Bank, 2023). This mirrors a regional pattern, since the Middle East and North Africa report an average FLFP of about 20 percent, the lowest in the world (Moghadam, 2020). The stark gap between women's rising educational attainment and their persistently low employment rates has been dubbed the "MENA paradox" (Assaad and Krafft, 2015; Moghadam, 2020).

Sociocultural norms in Egypt strongly channel women into domestic roles, especially after marriage, and impose substantial barriers to sustained labor market engagement. Ethnographic studies in Cairo highlight that marriage confers adult social status on women but also instantly expands their household responsibilities, prompting many to exit paid work in order to prioritize childbearing and homemaking (Hoodfar, 2023). These deeply ingrained gender expectations make early marriage and adolescent childbirth particularly harmful to women's economic agency, a pattern echoed across the broader MENA region (Hoodfar, 2023; UNICEF, 2023).

This study enriches the Egyptian literature on women's economic inclusion by weaving together four analytical advances. First, it offers a detailed descriptive overview—Figures 1-5—that provides a nationally representative picture of how early marriage and early motherhood relate to women's employment, geography, and education. Second, survey-weighted logit models are used to isolate the independent association between the timing of early transitions and employment while accounting for core endowments. Third, the analysis then introduces a moderation framework, interacting early-transition indicators with educational attainment to probe whether schooling conditions those associations. Finally, a non-linear Fairlie decomposition partitions the

observed employment gap into components attributable to differences in endowments versus differences in returns, providing a rigorous accounting of the mechanisms that underlie any disparities. Together, these contributions provide a nuanced, methodologically integrated perspective on when, how, and for whom early life-course events influence Egyptian women's labor market opportunities, addressing significant empirical and conceptual gaps in the existing research. Three questions guide the inquiry:

(1) How are early marriage (before the age of 18) and early childbirth (before the age of 20) related to women's likelihood of employment?
(2) Does educational attainment moderate the association between early marriage/childbirth and women's likelihood of employment?
(3) What share of the employment gap between women who experienced early marriage or childbirth and those who did not is explained by differences in observable endowments (age, education, maternal background, region) versus differences in the returns to those endowments?

The rest of the paper is organized as follows. Section 2 reviews the literature, and section 3 describes the analytical framework and variables. Section 4 presents the data, while section 5 presents the main findings. Finally, section 6 concludes, providing policy implications and suggestions for future research.

2. Literature review

2.1. Conceptual linkages

Early marriage and early childbearing in Egypt—where marriage almost always precedes motherhood—are widely thought to curtail women's educational attainment and labor market participation. Because these transitions typically occur in families with conservative norms or limited resources, isolating their direct effects from underlying socioeconomic disadvantage is challenging. Yet, theoretical models predict that entering marriage and parenthood at younger ages reduces the time for skill acquisition and job experience, thereby lowering employment probabilities later in life.

Empirical studies using quasi-experimental and longitudinal methods support this causal link. Assaad, Krafft, and Selwaness (2017) utilize instrumental variables in Egyptian panel data to show that marrying before the age of 18 significantly lowers women's likelihood of working, while Yount et al., (2016) find that each year's delay in marriage raises labor force participation. Levine (2014) underscores that teenage childbearing both reflects and amplifies socioeconomic disadvantage, further hindering employment prospects. Together, this body of research demonstrates that early marriage and motherhood independently undermine women's economic empowerment in Egypt—over and above their roles as indicators of preexisting disadvantages—by truncating education and work experience at critical ages.

2.2. Early marriage and women's employment

Early marriage disrupts girls' education and skill development, entrenching long-term economic disadvantages. In Egypt, women who marry before the age of 18 are roughly 18-19 percentage points less likely to complete even primary school compared to those who marry later (UNICEF, 2023). This schooling deficit translates directly into poorer labor market outcomes; a UNICEF study spanning Egypt, Jordan, and Tunisia finds that child marriage sharply reduces women's workforce participation and pushes those who do work into low-paying or informal jobs (UNICEF, 2023).

Empirical analyses reinforce these patterns. Assaad, Krafft, and Selwaness (2017) use national labor force surveys to show that marrying by the median age of 22 causally lowers a woman's probability of employment by about 16 percent in Egypt, with most losses concentrated in private-sector wage jobs. This reflects a broader MENA trend in which marriage often prompts women to exit formal employment, especially outside the public sector (Assaad and Krafft, 2015; Hendy, 2015).

Conversely, delaying marriage bolsters economic engagement. Using longitudinal Egyptian data, Yount, Crandall, and Cheong (2018) demonstrate that women who marry at 18 or older enjoy significantly higher odds of market-work participation later in life—even after accounting for prior employment and fertility—underscoring a likely causal link between postponing marriage and improved long-term employment and agency.

2.3. Early childbearing and women's employment

Early childbearing—often occurring alongside early marriage—poses a significant barrier to women's socioeconomic advancement by curtailing education and imposing immediate caregiving demands. Internationally, adolescent mothers are far less likely to complete secondary schooling; barely half of US teen mothers hold a high school diploma by age 22, compared to nearly 90 percent of their peers (Levine, 2014). Globally, teenage childbearing correlates with lower earnings and higher poverty, even after accounting for preexisting disadvantages (World Bank, 2022; UNICEF, 2024).

In Egypt, roughly six to seven percent of women in their early twenties gave birth before the age of 18 (Population Reference Bureau, 2009). While these young mothers disproportionately come from low-income and conservative families, research finds that early childbirth itself independently disrupts educational attainment and future earnings. Immediate childcare responsibilities force many into the labor market out of necessity, but the positions available—unpaid family work or jobs paid in kind—offer little security, low wages, and no clear path for advancement (Barsoum, Ramadan, and Mostafa, 2014). Taken together, the evidence indicates that early childbearing, like early marriage, undercuts women's labor-market opportunities by interrupting skill accumulation and saddling them with caregiving duties at a pivotal stage of life.

3. Analytical approach

3.1. Methodology

The analysis opens with descriptive statistics drawn from a nationally representative sample of women aged 16-64—an age range that captures exposure to early marriage or childbirth while remaining within working age. The sample retains both ever-married and never-married women across all regions of Egypt.

Survey-weighted logit models then link early marriage (< 18) and early childbirth (< 20) to employment.[2] The main specification includes both indicators simultaneously to estimate their independent associations with the binary outcome.[3] Two auxiliary models enter each transition separately to check robustness and limit multicollinearity, recognizing that childbirth in Egypt typically follows marriage. Later models add interaction terms between each early transition and educational attainment, testing whether secondary or higher schooling attenuates these employment penalties.[4]

A non-linear decomposition is then implemented based on a logit model, following the method of Fairlie (2005). All models apply individual-level sampling weights to produce nationally representative estimates.

3.2. Non-linear fairlie decomposition

A non-linear Fairlie decomposition (Fairlie, 2005) is applied using a weighted logistic model of employment on age, age², education, maternal education, region, and spouse blood relation. The Fairlie decomposition quantifies the contribution of observed covariates to differences in binary outcome probabilities between two groups (e.g., early-transition vs. non-early).

First, a pooled logistic regression for the binary employment outcome Y_i is estimated. Equation (1) is:

$$Pr(Y_i = 1|x_i) = f(x_i\beta) = exp(x_i\beta)/\big(1 + exp(x_i\beta)\big) \quad (1)$$

where

$x_i = (x_{i1}, x_{i2,}x_{i3}, \ldots . x_{ik})$ is the k vector of covariates for individual i, Using the estimated coefficients β, group-specific averages are computed. Equation (2):

$$\bar{p_A} = (1/n_A)\Sigma_{i\in A}\big[exp(x_i\beta)/\big(1 + exp(x_i\beta)\big)\big] \quad (2)$$

$$\bar{p_B} = (1/n_B)\Sigma_{j\in B}\left[exp\big(x_j\beta\big)/\left(1 + exp\big(x_j\beta\big)\right)\right],$$

[2] Models were estimated on the logit scale to ensure compatibility with the Fairlie decomposition procedure.

[3] The early-marriage and early-childbirth dummies correlate at ρ = 0.60, yielding VIF ≈ 1.6—well below the usual threshold (VIF > 5).

[4] Because the survey lacks information on whether women finished their schooling *before* they married or had their first child, it is not possible to establish the required temporal sequence—early transition **X** (marriage/childbirth) → education **M** → current employment **Y**—nor to meet the sequential ignorability assumption needed for causal mediation analysis. Consequently, the indirect (education-mediated) effects are not estimated.

where n_A and n_B are the sample sizes for groups A and B, respectively. The raw employment gap Δ is defined in Equation (3):

$$\Delta = \bar{p}_B - \bar{p}_A = \sum_{k=1}^{k} c_k \quad (3)$$

where $c_k$is the contribution of covariate k to the gap. In the Fairlie decomposition, a positive covariate contribution indicates that differences in that characteristic serve to widen the employment probability gap between non-early and early-transition women, while a negative contribution indicates that those differences help to narrow the gap.

Each covariate's contribution $c_k$is approximated by:

$$c_k \approx (1/n_A) \sum_{i=1}^{n_A} \left[f\left(x_{i,(-k)}^{A}, x_k^B; \beta\right) - f\left(x_{i,(-k)}^{A}, x_k^A; \beta\right) \right] \quad (4)$$

Where

$x_{i,(-k)}^{A}$ $denote$s the full covariate vector for observation i in group A except for the kth element. x_k^A and x_k^B are the values of the kth covariate in groups A and B, respectively. Groups: A = early-transition; B = Non-early-transition.

Indices:

i = 1…n_A for group A;

j = 1…n_B for group B. 500 bootstrap replications are performed for standard errors.

As a sensitivity check, the Oaxaca–Blinder decomposition (Oaxaca, 1973; Blinder, 1973) is performed via a weighted linear probability model, partitioning the raw employment gap between early-transition and non-early women into explained and unexplained components.[5]

3.3. Key measures

3.3.1. Dependent variable

The dependent variable equals one if a woman performed any paid, self-employed, or informal work in the past three months and zero otherwise—an inclusive measure of recent labor-market activity suitable for logistic regression.

3.3.2. Independent variable

Two binary indicators are created for early life transitions. Early marriage is coded as one if a woman's age at first marriage is under 18 and zero otherwise (including those never married), consistent with the internationally recognized definition of child marriage (UNICEF, 2018). Early childbirth is coded as one if the difference between the year of her first birth and her birth year

[5] Although the LPM can produce fitted values outside [0,1] and impose a strict linear relationship, its decomposition naturally yields percentage-point gaps, making it an ideal sensitivity check to verify that the magnitude and direction of employment differentials align with the main non-linear Fairlie results.

places her age at first birth between 16 and 19, capturing adolescent fertility (WHO, 2024), and zero if she had her first birth at age 20 or older or has never given birth.

3.3.3. Control variables

All models include controls for age and age² to capture life-cycle effects; individual schooling to proxy human capital; region (Greater Cairo, Other Urban, Lower Egypt, Upper Egypt, Frontier) to capture spatial labor-market variation; and maternal education[6] as a stand-in for family background, early-life resources, and parental attitudes toward work, schooling, and early marriage. In the early-childbirth specifications, a kin-marriage indicator is added both to reflect traditional norms around consanguineous unions and as a marker for more conservative or resource-constrained family environments that may facilitate adolescent fertility. This variable is omitted from the early-marriage models because it occurs at the time of marriage—making it a post-treatment mediator—and is only observed for married women, which would otherwise exclude never-married respondents and distort the comparison group.

4. Data and sample

This study draws on the fifth wave of the Egypt Labor Market Panel Survey (ELMPS, 2023; OAMDI, 2024), a nationally representative household panel conducted in late 2023. Covering 17,784 households and 70,636 individuals, it provides detailed information on employment status, marital history, fertility, education, and residence.

5. Results

5.1. Descriptive statistics

Table 1 summarizes key characteristics for women aged 16-64 in the 2023 ELMPS. Roughly 70 percent are currently married, 13.8 percent wed before the age of 18, 16.3 percent had a first birth before age 20, and 10 percent experienced both early transitions. Only 14.8 percent were employed in the past three months, and 17.3 percent have ever worked for pay. While 40.6 percent completed at least secondary schooling, more than three-quarters report mothers with low education. Urban residents constitute 37.2 percent of the sample, and rural Upper Egypt is the single largest regional group (34.2 percent). The mean age is 35.4 years, and the average age at first marriage is about 21 years. These patterns provide a demographic baseline for understanding how early life transitions relate to labor market outcomes among women in Egypt.

[6] "Low maternal education" comprises mothers with no formal schooling or only primary education. "Medium/High maternal education" comprises mothers who completed preparatory schooling, secondary schooling, or any higher education.

Table 1. Summary of demographic characteristics, early transitions, and employment status among women aged 16-64 (ELMPS 2023)

N	20,653
Marital Status: Never Married	4,256 (20.6%)
Marital Status: Contractually Married	35 (0.2%)
Marital Status: Married	14,461 (70.0%)
Marital Status: Divorced	524 (2.5%)
Marital Status: Widowed	1,374 (6.7%)
Age at First Marriage (Mean, SD)	21.1 (4.6)
Education: Basic or Less	6,118 (29.6%)
Education: Some Secondary	6,147 (29.8%)
Education: Secondary or Higher	8,388 (40.6%)
Years of School (Mean, SD)	8.9 (5.5)
Mother's Education: Low	15,301 (77.4%)
Mother's Education: Medium/High	4,461 (22.6%)
Spouse is Blood Relative: No	10,340 (74.4%)
Spouse is Blood Relative: Yes	3,566 (25.6%)
Early Marriage: 18 or Older / Never Married	17,798 (86.2%)
Early Marriage: Married Before 18	2,855 (13.8%)
Early Childbirth: No (20+ or No Child)	17,245 (83.7%)
Early Childbirth: Yes (Before 20)	3,349 (16.3%)
Employed in the Past 3 Months: No	17,504 (85.2%)
Employed in the Past 3 Months: Yes	3,040 (14.8%)
Ever Worked: No	16,999 (82.7%)
Ever Worked: Yes	3,545 (17.3%)
Urban	7,677 (37.2%)
Rural	12,976 (62.8%)
Region: Greater Cairo	1,520 (7.4%)
Region: Alexandria/Suez Canal	1,297 (6.3%)
Region: Urban Lower Egypt	2,127 (10.3%)
Region: Urban Upper Egypt	2,747 (13.3%)
Region: Rural Lower Egypt	5,904 (28.6%)
Region: Rural Upper Egypt	7,058 (34.2%)
Age (Mean, SD)	35.4 (13.1)
Dual Early Transitions	2,057 (10.0%)

5.2. Visual representation of early life transitions and employment

To complement the descriptive statistics, figures are included to illustrate the correlation between early marriage and childbirth and women's employment status, as well as the variation in the prevalence of these transitions by educational attainment and region. All analyses apply individual sampling weights to ensure national representativeness.

Figure 1 establishes the temporal framework for the analysis by plotting the weighted distributions of age at first marriage (Panel A) and age at first birth (Panel B). Marriage clusters tightly between ages 17 and 22 (modal age ≈ 20), while first births follow one to two years later, peaking between 19 and 23.

Figure 1. Distribution of age at first marriage and first birth (weighted)

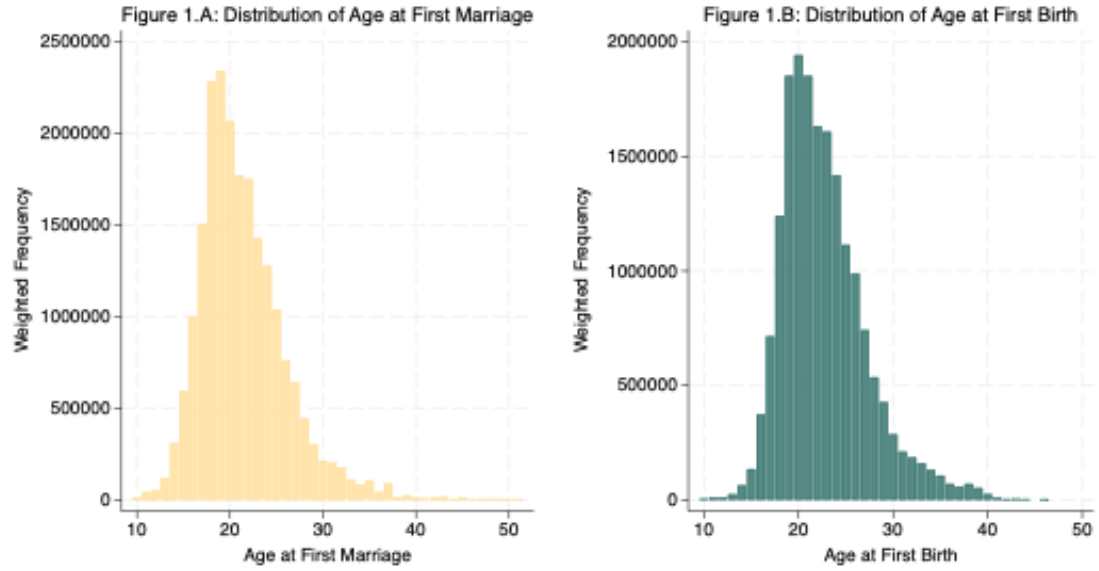


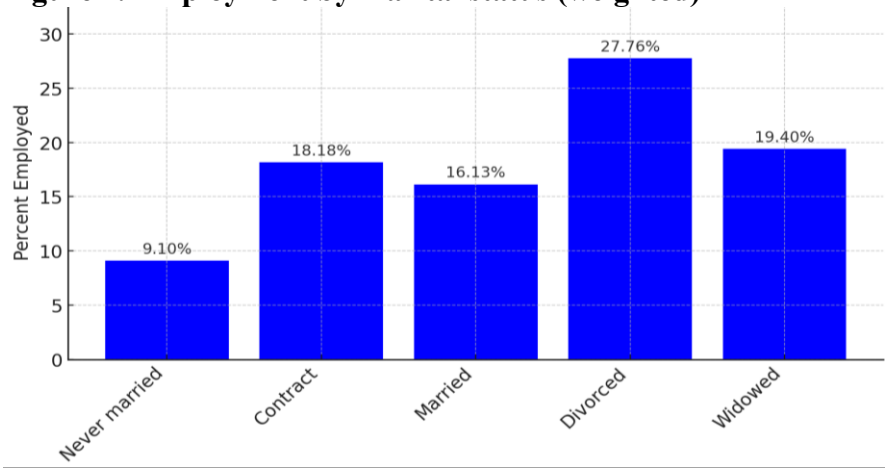
Figure 1.A and 1.B restrict the x-axis to ages 10 to 55 to exclude implausible outliers and ensure meaningful interpretation of early life transitions.

Source: Author's calculations using ELMPS 2023 data.

Notes: Figure 1A and 1B restrict the x-axis to ages 10 to 55 to exclude implausible outliers and ensure meaningful interpretation of early like transitions.

Building on these transition timings, employment in the past three months is lowest among never-married women (9.10 percent), climbs to 16.13 percent for married women and 18.18 percent for those in contract unions, and rises further to 19.40 percent for widows and 27.76 percent for divorcees. The sharp increase after marital dissolution—particularly following divorce—suggests that the end of a union can heighten economic necessity and expand autonomy, prompting greater labor market engagement.

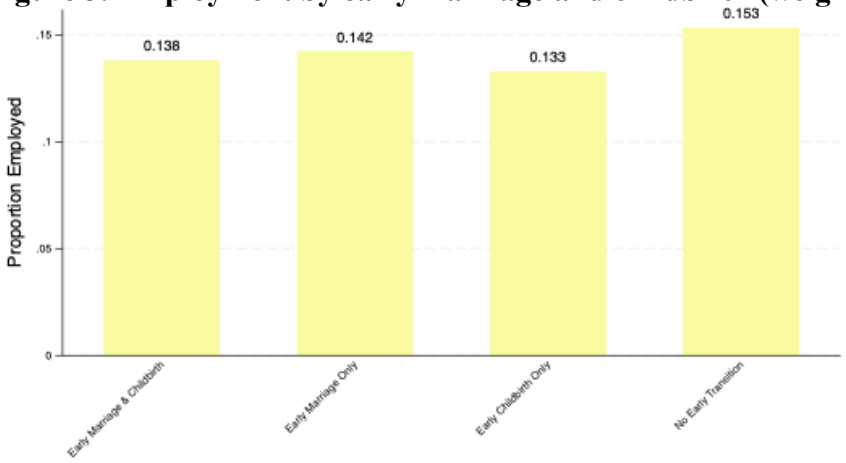
Figure 2. Employment by marital status (weighted)



Source: Author's calculations using ELMPS 2023 data.

Turning to the specific combination of early transitions, Figure 3 breaks down employment rates across four groups defined by early life transitions. Women who experienced neither early marriage nor early childbirth have the highest employment rate (15.3 percent). Those who married early but did not give birth early follow closely at 14.2 percent, while the group experiencing both early marriage and early childbirth is at 13.8 percent. Women with only an early childbirth record the lowest employment rate (13.3 percent), suggesting that early motherhood in isolation is associated with a marginally greater reduction in labor market participation.

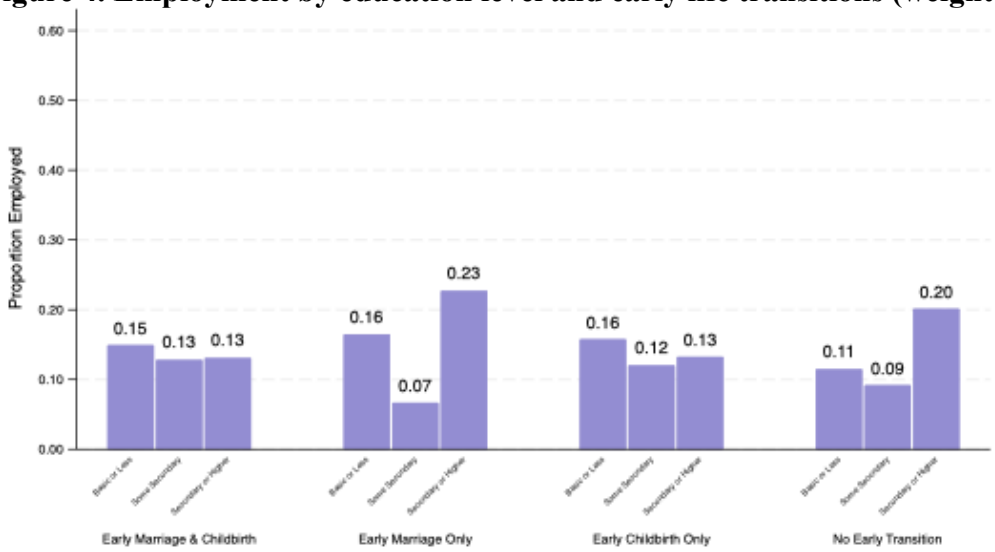
Figure 3. Employment by early marriage and childbirth (weighted)



Source: Author's calculations using ELMPS 2023 data.

To investigate whether education mitigates these penalties, Figure 4 disaggregates employment rates by education level within each profile of early transitions. Women who experienced both early marriage and early childbirth show little variation by schooling—15 percent for basic or less, and 13 percent for both some secondary and secondary or higher. In contrast, among those with early marriage only, employment is just seven percent for women with incomplete secondary schooling but rises to 23 percent for those with secondary or higher (16 percent for basic or less). Women who experienced only early childbirth record 16 percent employment at the basic level, dipping to 12 percent for some secondary schooling and rising slightly to 13 percent for secondary or higher. Finally, in the no-transition group, employment increases from 11 percent (basic or less) and nine percent (some secondary) to 20 percent for secondary-educated women. Overall, these patterns indicate that while secondary education boosts labor market participation across all groups, its protective effect is strongest for women who marry early without early childbirth and weakest when both transitions occur.

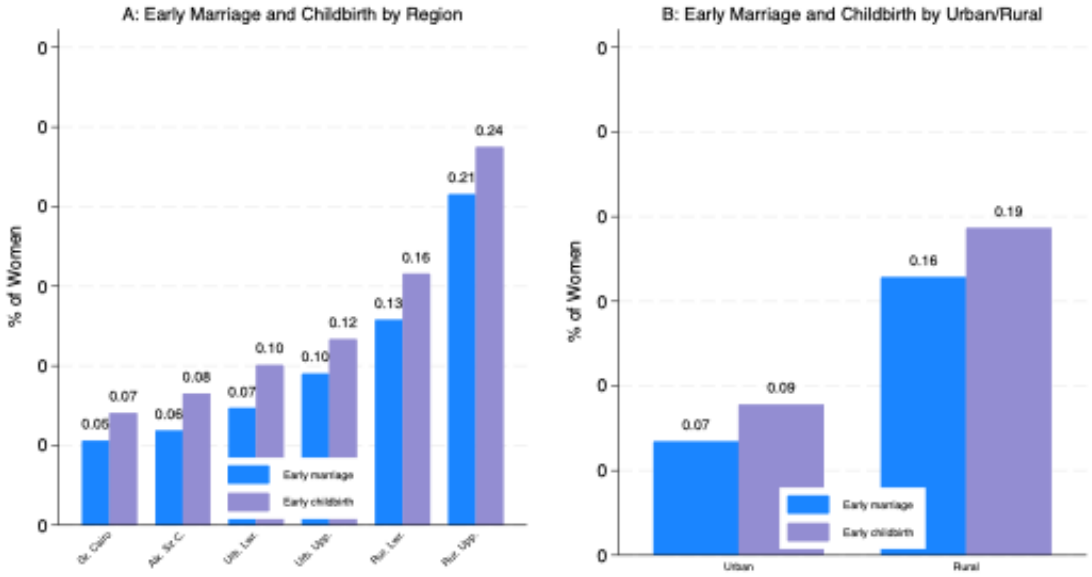
Figure 4. Employment by education level and early life transitions (weighted)



Source: Author's calculations using ELMPS 2023 data.

Finally, Figure 5 locates these dynamics spatially. Panel A ranks governorates by the prevalence of early transitions, revealing that rural Upper Egypt exhibits the highest rates (21 percent early marriage; 24 percent early childbirth), while urban governorates remain below 10 percent. Panel B then aggregates these results into a rural-urban comparison, demonstrating that early marriage and childbirth are more than twice as common in rural areas. Together, these five figures trace a coherent narrative—from the timing of life transitions to their demographic, educational, and geographic contours—and lay the groundwork for the multivariate regression and decomposition analyses.

Figure 5. Early marriage and childbirth by region and urban/rural (weighted)



Source: Author's calculations using ELMPS 2023 data.

Figure A.1 in the Appendix displays women's attitudes toward work and marriage in weighted distributions. Just under one-third of women are confident they can work after marriage, while the majority (over 50 percent) say it "depends." Among those currently employed, slightly more than half expect to continue working post-marriage, and roughly one-third cite spousal or other constraints. Mobility norms remain traditional; over 40 percent deem it inappropriate for a married woman to return home from work after 5 PM. Public sector jobs are viewed most favorably—nearly half believe they improve marriage prospects—while private-sector and self-employment receive moderately positive ratings. Crucially, most working women report that their own employment either has no negative effect on their marriageability or strengthens their position, signaling a growing sense of autonomy despite conservative social norms.

5.3. Baseline logit regressions without interaction terms

Table 2 presents the average marginal effects from three survey-weighted logistic regressions examining how early marriage and early childbearing relate to women's employment in Egypt, controlling for age, education, maternal background, and region. In the full model (Model 1), neither marrying before the age of 18 (AME = 0.009, SE = 0.013) nor having a first birth before age 20 (AME = –0.003, SE = 0.012) exerts a statistically significant direct effect on employment once demographic and human-capital endowments are held constant. Age displays a strong life-cycle pattern: each additional year increases employment probability by about 0.4 percentage points ($p < 0.001$), reflecting rapid labor-market attachment in early adulthood.[7] Women with secondary or higher education enjoy a large premium—approximately +10.7 percentage points ($p < 0.001$)—relative to those with only basic schooling, whereas "some secondary" education confers only a small, non-significant advantage.

Maternal education contributes positively but modestly (AME = 0.024, SE = 0.010, $p < 0.05$), suggesting some intergenerational transmission of work-related resources or norms. Regional disparities are also pronounced: relative to Greater Cairo, women in Alexandria/Suez display a +3.5-percentage-point increase in employment ($p < 0.05$), while those in Lower and Upper Egypt—both urban and rural—see gains ranging from +5.3 to +6.4 percentage points (all $p < 0.01$), likely reflecting heterogeneity in local labor market structures and social norms.

Models 2 and 3 confirm these patterns. Omitting the early-childbirth dummy (Model 2) leaves the early-marriage coefficient effectively unchanged, while substituting in early childbirth (and adding a spouse-relationship control) in Model 3 reproduces the strong education and region effects and, again, shows no independent effect of early childbirth. Overall, observable endowments—especially age and education—drive employment outcomes, whereas the timing of marriage and first birth does not independently predict labor market participation once these factors are accounted for.

[7] The marginal effect for age incorporates both the linear (age) and quadratic (age^2) terms. When accounting only for early marriage, the AME is –1.18 percentage points ($p = 0.23$), non-significant, and for early childbirth alone, –1.69 percentage points ($p = 0.06$), marginally significant; when both are included, AMEs are –0.24 percentage points ($p = 0.85$) for early marriage and –1.57 percentage points ($p = 0.16$) for early childbirth, both non-significant.

Table 2. Average marginal effects from survey-weighted logit models without interaction terms (women 16-64, ELMPS 2023)

Variable	Model 1: Full Model	Model 2: Early Marriage Only	Model 3: Early Childbirth Only (+ Spouse Rel)
Married <18	0.009 (0.013)	0.007 (0.011)	-
First Birth <20	-0.003 (0.012)	-	0.003 (0.012)
Age	0.004*** (0.000)	0.004*** (0.000)	0.005*** (0.000)
Some Secondary	0.005 (0.009)	0.004 (0.009)	0.003 (0.010)
Secondary or Higher	0.107*** (0.009)	0.106*** (0.009)	0.125*** (0.011)
Medium/High Maternal Education	0.024 (0.010)**	0.025 (0.010)**	0.030 (0.013)**
Alex/Suez Canal	0.035* (0.016)	0.035* (0.016)	0.009 (0.018)
Urban Lower Egypt	0.053*** (0.015)	0.054*** (0.015)	0.074*** (0.018)
Urban Upper Egypt	0.061*** (0.014)	0.061*** (0.014)	0.073*** (0.017)
Rural Lower Egypt	0.061*** (0.013)	0.062*** (0.013)	0.082*** (0.016)
Rural Upper Egypt	0.064*** (0.014)	0.065*** (0.014)	0.091*** (0.017)
Blood Relative	-	-	0.001 (0.010)
Observations	19,630	19,689	13,619

Note: Reference groups are: Women who married at age 18 or older (or never married), and those who had their first child at age 20 or older (or no children). Robust standard errors in parentheses.

*Notes: * p<0.10, ** p<0.05, *** p<0.01.*

5.4. Logit models examining education as a moderator

Table 3 illustrates how the impacts of early marriage and early childbirth on employment vary by education level. For women with only basic schooling, early marriage raises employment by 1.9 percentage points (AME = 0.019, SE = 0.013) in Model 1 and by 1.6 percentage points (SE = 0.015) in the full interaction Model 3, though neither estimate reaches conventional significance ($p > 0.10$). Early childbirth exhibits a similar positive effect of 1.9 percentage points in Model 2 (SE = 0.014) and 0.6 percentage points in Model 3 (SE = 0.013), both of which are also non-significant.

Among women with some secondary education, all estimated effects of early marriage and early childbirth cluster very close to zero (ranging from –0.009 to 0.015), and none are statistically significant, indicating no discernible penalty or benefit.

In contrast, women with a secondary or higher education face clear disadvantages from early transitions. Early marriage reduces employment by 5.1 percentage points in Model 1 (AME = –0.051*, SE = 0.028, $p<0.10$) and remains negative (–1.4 percentage points) in Model 3, albeit non-significant. Early childbirth exerts an even stronger deterrent effect: –9.4 percentage points in Model 2 (AME = –0.094***, SE = 0.024, $p<0.01$) and –6.1 percentage points in Model 3 (AME = –0.061*, SE = 0.026, $p<0.10$). Overall, early life transitions appear to modestly boost labor market participation among the least educated, have negligible effects for the mid-educated, and impose significant employment penalties on the most highly educated women.

Table 3. Average marginal effects of early marriage and early childbirth on women's employment, by education level (survey-weighted logit, ELMPS 2023)

Interaction	Model 1: Early Marriage × Edu (No Spouse)	Model 2: Early Childbirth × Edu (+ Spouse)	Model 3: Both Interactions (No Spouse)
Early Marriage × Basic or Less	0.019 (0.013)	–	0.016 (0.015)
Early Marriage × Some Secondary	0.002 (0.015)	–	–0.009 (0.016)
Early Marriage × Secondary or Higher	–0.051* (0.028)	–	–0.014 (0.037)
Early Childbirth × Basic or Less	–	0.019 (0.014)	0.006 (0.013)
Early Childbirth × Some Secondary	–	0.021 (0.017)	0.015 (0.018)
Early Childbirth × Secondary or Higher	–	–0.094*** (0.024)	–0.061* (0.026)
Observations	19,689	13,619	19,630

Note: Reference groups are: Early transitions: Women who married at age 18 or older (or never married), and those who had their first child at age 20 or older (or no children). Robust standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Figure A.2 in the Appendix presents coefficient plots with 95 percent confidence intervals for the six survey-weighted logit models, including both baseline specifications and those with education interactions.

5.5. Non-Linear fairlie decomposition of employment gaps

Table 4 decomposes the 1.2-percentage-point raw employment gap for early marriage and the 1.7-percentage-point gap for early childbirth into explained and unexplained portions. The total explained component is 2.1 percentage points for marriage and 2.2 percentage points for childbirth, indicating that differences in measured characteristics more than account for the raw gaps.

Within that explained share, the linear age effect closes the gap by –19.0 percentage points ($p < 0.01$) for marriage and –16.5 percentage points ($p < 0.01$) for childbirth, while the quadratic age term widens it by 15.9 percentage points ($p < 0.01$) and 13.7 percentage points ($p < 0.01$), respectively. The difference in secondary or higher education widens the gap by +5.6 percentage points ($p < 0.01$) for marriage and +5.2 percentage points ($p < 0.01$) for childbirth. The difference in maternal education widens the gap by +0.4 percentage points ($p < 0.05$) for marriage and +0.3 percentage points ($p < 0.05$) for childbirth.

Regional residence contributes differently to the explained early-marriage and early-childbirth employment gaps. For the explained early-marriage gap, residence in Alexandria and Suez Canal widens the gap by +0.1 percentage points ($p < 0.10$), and residence in urban Lower Egypt widens it by +0.1 percentage points ($p < 0.01$). In contrast, Rural Lower Egypt narrows this gap by –0.1 percentage points ($p < 0.05$) and Rural Upper Egypt closes it by –0.7 percentage points ($p < 0.01$).

For the explained early-childbirth gap, the effect in Alexandria and Suez Canal is effectively zero (0.000 percentage points), while both Urban Lower Egypt and Urban Upper Egypt widen the gap by +0.1 percentage points each ($p < 0.01$). Rural Lower Egypt then reduces the gap by –0.1

percentage points ($p < 0.05$), and Rural Upper Egypt closes it by –0.6 percentage points ($p < 0.01$). Additionally, having a blood-relative spouse widens the explained early-childbirth gap by +0.2 percentage points ($p < 0.10$).[8]

The remaining unexplained component captures lower returns to these same characteristics among early-transition women, pointing to structural factors that sustain the negative employment gaps despite endowment advantages. Oaxaca-Blinder robustness checks confirm the Fairlie patterns. For early marriage, the raw employment gap is 3.4 percentage points, of which 5.1 percentage points are explained by covariate differences, leaving a small, statistically insignificant residual (–1.6 percentage points). For early childbirth, the raw gap is 1.7 percentage points, with 1.1 percentage points explained and an equally negligible unexplained remainder (0.6 percentage points).[9]

Table 4. Non-linear fairlie decomposition of employment probability gaps by early transitions (ELMPS 2023)

Variable	Early Marriage	Early Childbirth
Employment Rate (Not Early)	0.152 (0.000)	0.153 (0.000)
Employment Rate (Early)	0.140 (0.000)	0.136 (0.000)
Raw Employment Gap	0.012 (0.000)	0.017 (0.000)
Total Explained	0.021 (0.000)	0.022 (0.000)
Age	-0.190*** (0.006)	-0.165*** (0.006)
Age Squared	0.159*** (0.005)	0.137*** (0.005)
Education: Some Secondary	-0.003 (0.002)	-0.003 (0.003)
Education: Secondary or Higher	0.056*** (0.005)	0.052*** (0.005)
Mother's Education: Medium/High	0.004** (0.002)	0.003** (0.002)
Region: Alex/Suez Canal	0.001* (0.000)	0.000 (0.000)
Region: Urban Lower Egypt	0.001*** (0.000)	0.001*** (0.000)
Region: Urban Upper Egypt	0.000** (0.000)	0.001*** (0.000)
Region: Rural Lower Egypt	-0.001** (0.001)	-0.001** (0.000)
Region: Rural Upper Egypt	-0.007*** (0.001)	-0.006*** (0.001)
Spouse Blood Relative	-	0.002* (0.001)
Number of Obs	19,689	19,630

*Note: Reference groups are basic or less education; low maternal education; Greater Cairo region; and no blood-relative spouse. Panel A: Early Marriage (G = 0: married ≥ 18 or never, N = 16 854; G = 1: married < 18, N = 2 835). Panel B: Early Childbirth (G = 0: first birth ≥ 20, N = 16 293; G = 1: first birth < 20, N = 3 337). *** (p<0.01), ** (p<0.05), * (p<0.10)*

Regression and decomposition results show that early marriage and adolescent childbirth impose no independent penalty on women's current employment once individual and maternal education are controlled. In logit models, the deficits in employment associated with these transitions disappear when schooling and family background are accounted for, indicating that it is foregone human capital—rather than timing per se—that drives lower labor market engagement. The Fairlie decomposition confirms this interpretation: the age and education endowments of early-

[8] In non-linear Fairlie decompositions, the explained component can exceed the raw gap, indicating that some covariates "over-explain" the difference by also capturing variance from unmeasured factors in the unexplained portion. For instance, education level may proxy cognitive ability, school quality, or family wealth; age and age squared can absorb life-cycle shocks such as health events or evolving childcare burdens; and regional dummies may reflect local labor demand fluctuations, infrastructure quality, childcare availability, prevailing gender norms, and employer hiring practices.

[9] Full decomposition tables are available from the author on request.

transition women would, on average, predict equal or higher employment, leaving only a small unexplained gap attributable to differential returns (likely reflecting childcare constraints and conservative gender norms). In short, education "explains it all" as the principal channel linking early life transitions to employment outcomes in Egypt.

6. Conclusion

6.1. Conclusion and discussion

Early marriage and adolescent childbirth remain prevalent in Egypt—especially in rural governorates—but their direct effect on women's employment all but disappears once human capital characteristics are taken into account. Descriptively, and compared to their later-transition peers, women who marry before the age of 18 work 1.2 percentage points less often, and those who have a first birth before the age of 20 work 1.7 percentage points less often. Yet, survey-weighted logit estimates show that, after controlling for age, own schooling, maternal education, and region, the average marginal effects of these transitions are small and statistically indistinguishable from zero.

Non-linear Fairlie decompositions corroborate this finding. Differences in age and education more than explain the raw gaps—by 2.1 percentage points for early marriage and 2.2 percentage points for early childbirth—leaving modest negative unexplained components (–0.9 percentage points and –0.5 percentage points). These residuals point to lower labor market returns to identical credentials, plausibly due to childcare obligations, mobility constraints, conservative gender norms, or employer discrimination, rather than to endowment deficits.

Finally, interaction estimates reveal that the employment premium normally associated with secondary or higher schooling is wiped out when a woman marries before the age of 18 (AME = –0.051, $p < 0.10$) and is reduced even more sharply when she bears her first child before the age of 20 (AME = –0.094, $p < 0.01$). In contrast, among women with basic or only some secondary education, the corresponding coefficients are small and statistically insignificant, indicating that their already low employment probabilities do not vary with the timing of these transitions.

Policy interventions must focus on rural governorates, where early marriage and adolescent childbirth are most prevalent, and target both the accumulation of human capital and the returns to it. Expanding conditional cash transfers, fee waivers, and safe-transport subsidies that are conditional on girls completing secondary school would postpone early transitions while deepening their educational endowments. Establishing subsidized community-based childcare centers and offering fiscal incentives for employers to provide flexible or part-time schedules would lessen care constraints and enable educated mothers to translate their qualifications into formal employment. Finally, the vigorous enforcement of the legal minimum age of marriage, coupled with community-led norm-change campaigns that publicize the economic benefits of delayed marriage and childbearing, would consolidate these gains. Collectively, these measures can neutralize the employment disadvantage linked to early transitions, especially in rural Egypt.

6.2. Limitations and future research

Several caveats temper the study's conclusions. First, even with extensive controls, unobserved factors—household bargaining dynamics, local labor-demand shocks, or women's aspirations—may simultaneously shape both early marriage or childbirth and subsequent employment, leaving residual bias. Second, the dependent variable measures only whether a woman worked for pay in the past three months, which obscures variations in hours, earnings, sector, contract formality, and seasonality that are especially pertinent in rural Egypt. Third, imposing single-year age cut-offs (< 18 for marriage, < 20 for childbirth) masks the continuous risk gradient across late adolescence.

Future research can address these gaps by leveraging the panel structure of the ELMPS to estimate individual fixed-effects models and by employing plausibly exogenous instruments to strengthen causal inference. Harnessing the survey's rich yet untapped modules on hours, wages, contract terms, childcare availability, employer flexibility, gender-norm attitudes, and detailed time use would illuminate whether early transitions depress job quality as well as participation, and identify the mechanisms driving these outcomes. Complementary qualitative work with women, employers, and community leaders—augmented by time-use diaries or mobility tracking—could reveal how social norms, caregiving responsibilities, and discrimination constrain opportunities. Finally, disaggregating the analysis by wealth quintile, urban-rural residence, and governorate would pinpoint the groups that benefit most from delaying early marriage and childbirth, enabling more precisely targeted policy interventions that promote women's economic empowerment.

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Appendix

Figure A.1. Perceptions of women's employment and marriageability: insights from gender role attitude responses

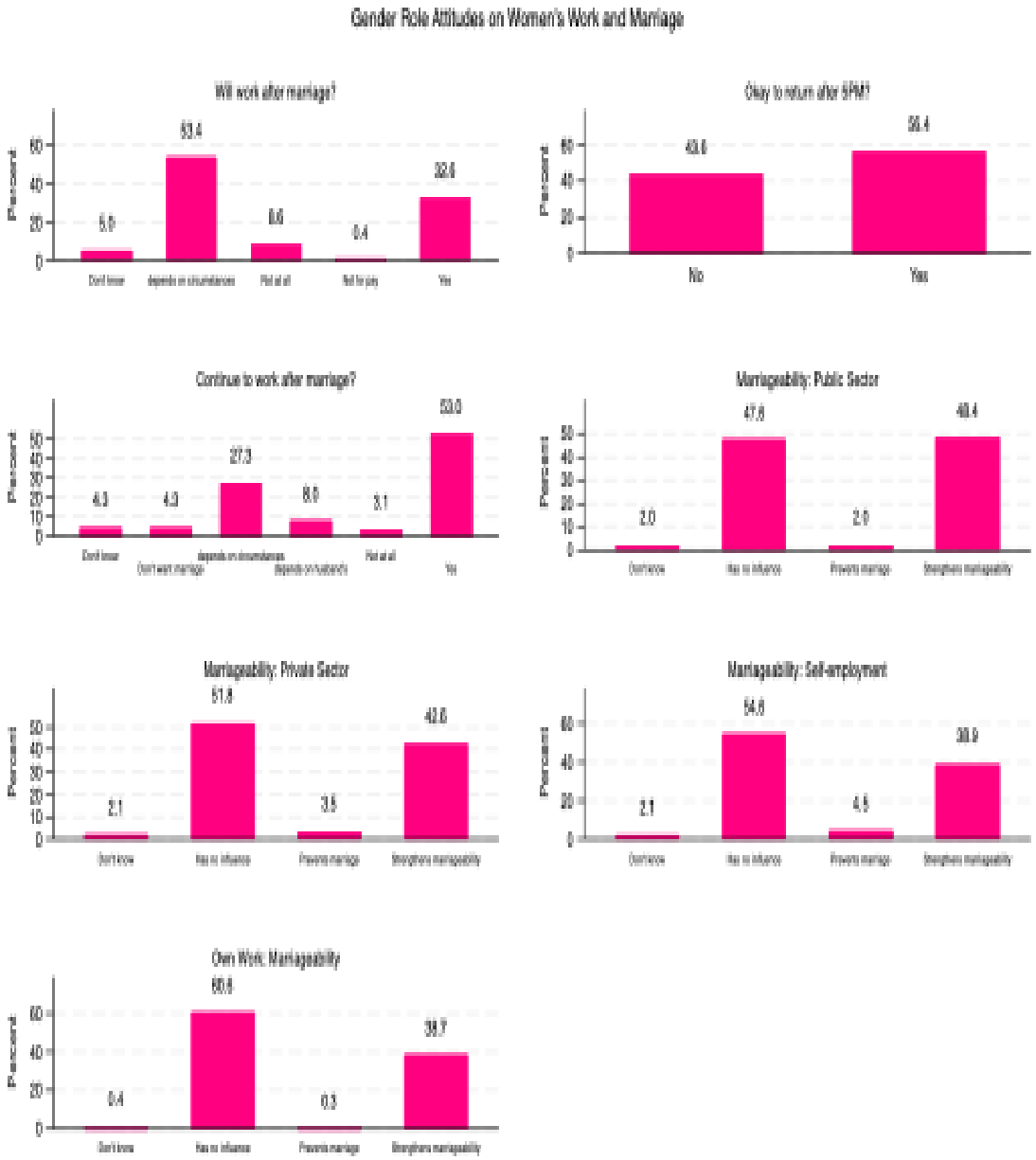

Figure A.2. Coefficient plots from survey-weighted logit models of women's employment: early marriage and early childbirth effects