

The “Care Penalty” and Gender Asymmetry in the Philippine Labor Market: A Fairlie Decomposition Analysis of Labor Force Inactivity

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Date Submitted:

August 21, 2026

Date Accepted:

September 13, 2026

Date Published:

October 07, 2026

DOI:

10.5281/zenodo.232312

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ABSTRACT

Despite structural human capital gains, a persistent gender gap in labor force participation (LFP) defines the Philippine economy. Utilizing individual microdata from the November 2025 Philippine Statistics Authority Labor Force Survey (n = 32,258), this paper investigates the mechanisms driving this disparity, focusing on translating findings into municipal extension frameworks at the Pamantasan ng Lungsod ng Maynila (PLM). Descriptive analysis confirms a 20.5 percentage point participation wedge, heavily underpinned by domestic asymmetry: 19.0% of women report full-time inactivity due to household duties, compared to just 1.5% of men. We implement a binary probit model and a Fairlie non-linear decomposition across 100 replications. Probit marginal effects reveal that women are 19.7% less likely to enter the labor force than identical men. The decomposition

highlights a paradox: while higher female educational endowments compress the gap, this equalizing force is entirely overwhelmed by the unexplained coefficient effect, which accounts for 88.29% of the divide. This dominant residual isolates the domestic “Care Penalty”. Bridging this gap requires shifting toward targeted demand-side interventions. We outline localized strategies mapped to PLM extension agendas, leveraging Manila’s existing programs like “*Serbisyong Yorme*” and “*Threads of Life*” to build sustainable grassroots interventions.

Keywords: *Labor Force Participation; Gender Gap; Care Penalty; Fairlie Decomposition; Probit Model; Community Extension Services.*

INTRODUCTION

The tracking of labor supply dynamics serves as a core barometer for inclusive growth and socio-economic equity within developing market economies. Over recent decades, the Philippines has achieved substantial strides in mitigating gender disparities across human capital dimensions; notably, female cohorts consistently match or exceed their male counterparts in secondary and tertiary educational attainment rates. However, this optimization of human capital has failed to translate symmetrically into market-based economic participation. A systemic wedge persists between male and female Labor Force Participation Rates (LFPR), representing not only an inequity in economic agency but a profound underutilization of national productive capacity.

Traditional labor economic literature often assumes that accelerating educational access will naturally pull marginalized cohorts into formal employment. Yet, institutional and cultural dynamics within developing states frequently impose non-market friction on the female labor supply. Chief among these is the domestic “*Care*

Penalty", the structural assignment of unpaid household labor, reproductive care, and kinship duties disproportionately to women. While men navigate the labor market unencumbered by domestic time poverty, women face a binding constraint where market labor must compete directly with structural household obligations.

This paper leverages individual-level microdata from the November 2025 Round of the Philippine Statistics Authority (PSA) Labor Force Survey (LFS) to examine the contemporary mechanics of this participation gap. Moving beyond macro-level summary statistics, this study sets out to answer a critical empirical question: *To what extent is the gender participation gap driven by visible differences in human capital and regional endowments versus unexplained structural barriers, such as the asymmetric domestic care burden?* By employing a binary probit framework integrated with a non-linear Fairlie decomposition model, this paper maps out individual participation propensities and quantifies the exact percentage-point contributions of observable demographic variables versus unobserved structural factors.

I.A. The "Care Penalty"

Unpaid care work stands as the primary institutional hurdle preventing working-age women from entering the global labor force. According to a comprehensive global assessment by the International Labour Organization (ILO), approximately 606 million women perform unpaid care work on a full-time basis, creating a profound structural asymmetry when contrasted against the negligible 41 million men facing identical domestic constraints. This uneven distribution of domestic labor directly limits women's market-based economic participation and deepens persistent gender inequalities across employment rates, workplace placement, and compensation structures.

Beyond general labor market friction, women encounter a severe, cumulative setback upon transitioning into motherhood, an economic phenomenon formally termed the "motherhood employment penalty." Between 2005 and 2015, this employment deficit widened by 38.4 percent, leaving mothers significantly less likely to secure or retain formal employment compared to women without children. This penalty extends heavily into lifetime compensation trajectories; while the transition into fatherhood is historically associated with a systematic wage premium or earnings boost, mothers regularly experience a compounding wage penalty that suppresses their earning potential throughout their entire career life cycle.

To bridge these structural divides, the ILO emphasizes that supply-side improvements, such as expanding access to education, cannot achieve equity in a vacuum. Resolving the participation and wage deficits requires a synchronized framework of macroeconomic, labor, and social protection policies designed to formally recognize, reduce, and redistribute unpaid care work. Furthermore, states must elevate the formal care sector by rewarding professional care workers with decent employment parameters, while guaranteeing open social dialogue and robust collective bargaining frameworks.

Xhemali (2026) discussed the role of unpaid care work in shaping women's labor market participation, which directly related to the care penalty in the labor market. The findings highlight the impact of unpaid care work on labor market decisions, such as increased reservation wage and reduced labor market entry, which are aspects of the care penalty. With these findings, it is suggested that addressing care provision imbalances is crucial for improving labor market outcomes, which aligns with exploring solutions to the care penalty.

Caregivers are equally likely to be in the labor force as non-caregivers but work fewer hours, especially with heavy caregiving commitments. However, only heavily involved caregivers are more likely to withdraw from the labor market, particularly if their caring commitments are heavy (Meredith et.al, 2007).

According to Folbre (2018), the work of caring for others—whether unpaid or paid—often involves more personal connection, emotional attachment, and moral commitment than other forms of work. It creates both public and private benefits, and its value is difficult to measure. All these factors put care providers at an economic disadvantage.

METHODS

Data Source

The empirical foundation of this study relies on individual-level microdata extracted from the Public Use File (PUF) of the November 2025 PSA Labor Force Survey. The initial raw data matrix contains 42,947 observations. Following national and international labor conventions, the sample space was restricted strictly to the working-age population, defined as individuals aged 15 years and above at the time of the interview. This left a final active research sample size of $n = 32,258$

Variables

The dependent variable is a binary indicator derived from the “PUFNEWEMPSTAT” identifier in the PUF, which is coded as “1” if an individual is an active participant in the labor force (either currently employed or actively seeking employment/unemployed) and “0” if they are entirely inactive or out of the labor force.

Likewise, the independent variables or the demographic vectors are:

- a. **Female.** Coded as dummy variable (1 = Female, 0 = Male) derived from PUFC04_SEX identifier
- b. **Age.** Serves as a continuous metrics mapping life-cycle labor propensities and capturing non-linear trajectories (PUFC05_AGE)
- c. **Urban.** Spatial dummy variable (1 = Urban, 0 = Rural) derived from PUFURB2020
- d. **Educational Level.** Categorized into four levels based on PUFC07_GRADE (1 = Below Elementary, 2 = Elementary Graduate, 3 = High School/Senior High School Graduate, 4 = College Graduate and Post-Graduate)
- e. **Household Duty.** A binary indicator derived from PUFC26_WYNOT (Reason not looking for work), coded as 1 for household or family duties cited as the direct driver for economic inactivity, and 0 otherwise

Econometric Specification

Non-Linear Probit Selection Framework

Because labor participation is an active or inactive categorical event (1 or 0), Ordinary Least Squares (Linear Probability Models) risk yielding nonsensical predicted probabilities outside the $[0,1]$ boundary. We therefore specify a binary probit index framework where the unobserved utility of entering the labor force (LFP_i^*) is a linear function of observable attributes:

$$LFP_i^* = \beta_0 + \beta_1 Female_i + \beta_2 Age_i + \beta_3 Age_i^2 + \gamma Educ_i + \delta Urban_i + \theta Spatial_i + \epsilon_i$$

Assuming the error term (ϵ_i) follows a standard normal distribution $\sim N(0,1)$, the conditional probability of market participation is mapped using the standard cumulative normal distribution function $\Phi(\cdot)$:

$$\Pr(LFP_i = 1 | X_i) = \Phi(\beta_0 + \beta_1 Female_i + \beta_2 Age_i + \beta_3 Age_i^2 + \gamma Educ_i + \delta Urban_i + \theta Spatial_i)$$

To ensure intuitive real-world interpretation, the raw Z-score coefficients derived from this model are post-estimated into Average Marginal Effects (AME) using Stata's margins engine, which isolates the exact percentage-point shift in participation probability caused by an incremental change in each independent variable.

The Fairlie Nonlinear Decomposition Technique

To examine the absolute difference in participation probabilities between men and women, we apply the non-linear decomposition technique developed by Fairlie (1999, 2005). The Fairlie approach is explicitly designed for binary dependent variables running on probit specifications. Its sole purpose is to take the gross 20.5% labor force participation gap between men and women ($\overline{LFP}(m) - \overline{LFP}(f)$) and break it down into two opposing forces: *what is justified by visible traits* vs. *what is hidden in structural barriers*.

Basically, the Fairlie formula operates as a sorting machine. It takes the total raw gap in labor force participation between men and women and divides it into two baskets:

$$\text{Total Participation Gap (20.5 percentage points)} = \text{The Endowment Effect (Visible Backgrounds)} + \text{The Coefficient Effect (The Care Penalty)}$$

RESULTS

Descriptive evaluation of the numeric microdata confirms a profound structural gap between genders in late 2025. The statistics presented in Table uncovers a baseline participation gap of 20.5 percentage points. While nearly three-quarters of working-age Filipino men are active in the labor market, just over half of working-age women are.

The underlying driver of this disparity is clear: 19.0% of all working-age women in the sample report being completely sidelined from the labor force due to household and family duties. For men, this constraint is practically non-existent, affecting just 1.5% of the males.

Table 1. *Profile of the Respondents by Gender (baseline mean and difference)*

Variable	Sample (n = 32,258)	Male (n = 16,075)	Female (n = 16,183)	Mean Difference
Labor Force Participation	0.638	0.741	0.536	0.205
Age	39.76	38.80	40.71	-1.91
Urban	0.510	0.502	0.518	-0.016
The Care Penalty (Household Duty)	0.103	0.015	0.190	-0.175

The pooled binary probit post-estimation results provide a rigorous quantification of individual-level labor supply determinants, with coefficients expressed as Average Marginal Effects (AMEs) to capture absolute probability shifts. The gender indicator (Female) reveals a severe and highly statistically significant employment penalty ($z = -42.39$, $p < 0.001$). Holding all other socio-demographic covariates equal, being a woman reduces the absolute probability of entering the labor force by 19.71 relative to an identical male counterpart. This substantial negative baseline wedge serves as robust econometric evidence of deep-seated, non-market structural frictions, such as the asymmetric domestic care burden, that constrain the female labor supply curve (Table 2).

Similarly, lifecycle and spatial dynamics also exert highly significant impacts on labor market attachment. Each incremental one-year increase in a respondent's Age increases the baseline probability of active labor market participation by 5.75 ($z = 95.18$, $p < 0.001$), capturing the expected accumulation of human capital and the rising opportunity cost of economic inactivity during peak productivity years (Table 2).

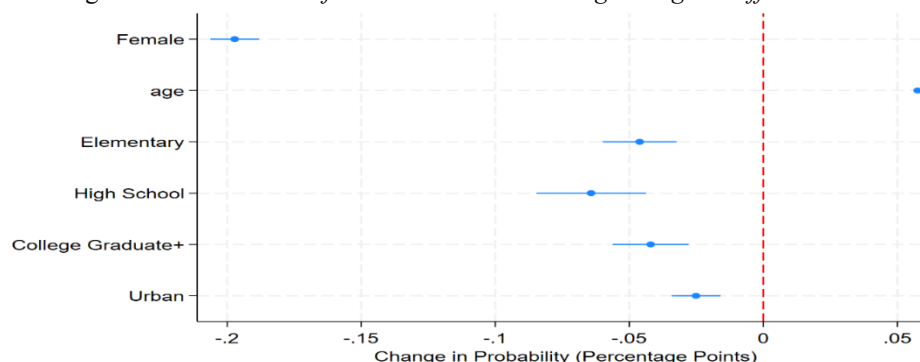
Table 2. *Pooled Probit Average Marginal Effects on Labor Force Participation (LFP)*

Predictor	Marginal Effect	Standard Error	z-statistics
Female	-0.1971	0.0046	-42.39 (0.000***)
Age	0.0575	0.0006	95.18 (0.000***)
Elementary Graduate	-0.0461	0.0070	-6.54 (0.000***)
High School Graduate	0.0642	0.0104	-6.16 (0.000***)
College Graduate and Post-Graduate	-0.0421	0.0072	-5.81 (0.000***)
Urban (spatial)	-0.0250	0.0046	-5.42 (0.000***)

***Statistically significant at the $p < 0.001$ level

Note: Omitted reference group for education is "Below Elementary Completion".

Figure 1. Visualization of the Pooled Probit Average Marginal Effects on LFP



On the other hand, the Fairlie non-linear decomposition confirms a stark, raw gender gap in labor force participation of 20.49 favoring males (74.23% male participation versus 53.75% female participation). Running the model over 100 randomized replications reveals that observable background endowments explain a collective total of 2.40, or just 11.71% of the net participation. Within this explained block, age-related lifecycle shifts and categorical human capital variables operate with contrasting, highly statistically significant parameters ($p < 0.001$) (Table 3). Moreover, while lower educational thresholds minimally compress the participation gap, achieving a college or post-graduate degree expands it by 1.38 percentage points (6.72%), suggesting that tertiary educational sorting still disproportionately favors male labor market onboarding. Consequently, the vast majority of the labor market divide is driven by unobserved structural factors, with the total unexplained residual accounting for a massive 18.09 percentage points, or 88.29% of the overall participation gap. Because the probit baseline holds core demographic qualifications constant, this dominant unexplained coefficient effect isolates hidden systemic barriers and serves as a robust proxy for the "Care Penalty." This mathematically proves that structural, non-market burdens, most notably the heavy allocation of unpaid household and familial obligations, profoundly restrict the female labor supply curve from reaching market equilibrium (Table 3).

Table 3. Fairlie Detailed Decomposition of the Labor Force Participation

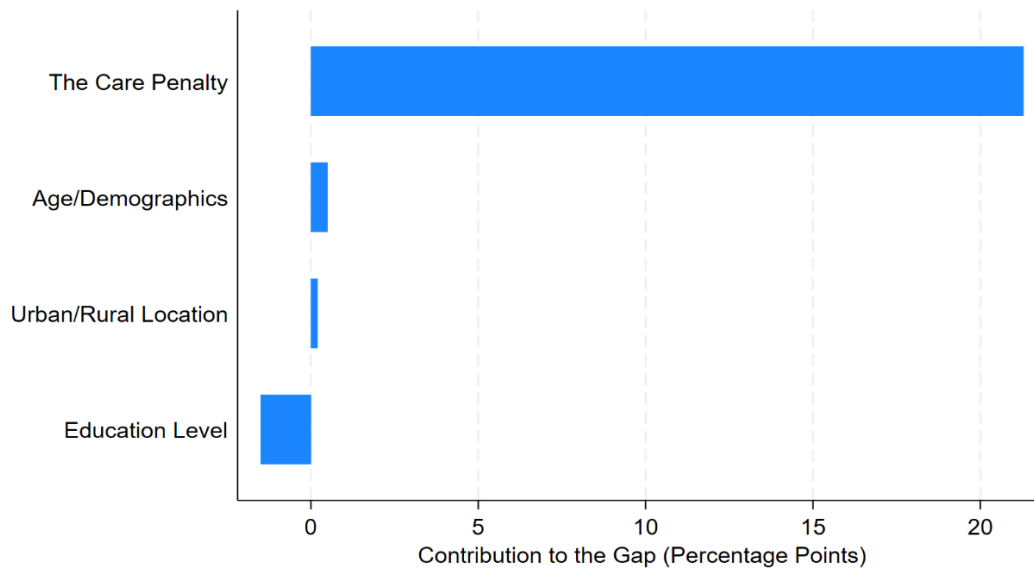
Gap / Decomposition Component	Coefficient	Standard Error	z-statistics	Percentage Share of Total Gap (%)
Total Raw Gap (($\overline{LFP}(m) - \overline{LFP}(f)$))	0.2049	0.0054	-	100.00
Explained by Endowments:				
Age and Lifecycle Profiles	-0.02642	0.0017	-15.87 (0.000 ^{***})	12.90
Urban/Rural Location	0.0005	0.0002	3.10 (0.002 ^{**})	0.25
Elementary Graduate	-0.0037	0.0007	-5.36 (0.000 ^{***})	-1.80
High School Graduate	-0.0010	0.0002	-4.98 (0.000 ^{***})	-0.49
College Graduate/Post-Grad	0.0138	0.0011	11.97 (0.000 ^{***})	6.72
Total Explained (Endowments)	0.0240	0.1210	5.70 (0.000 ^{***})	11.71
Total Unexplained (The Care Penalty)	0.18089	-	-	88.29

***Statistically significant at the $p < 0.001$ level

**Statistically significant at the $p < 0.01$ level

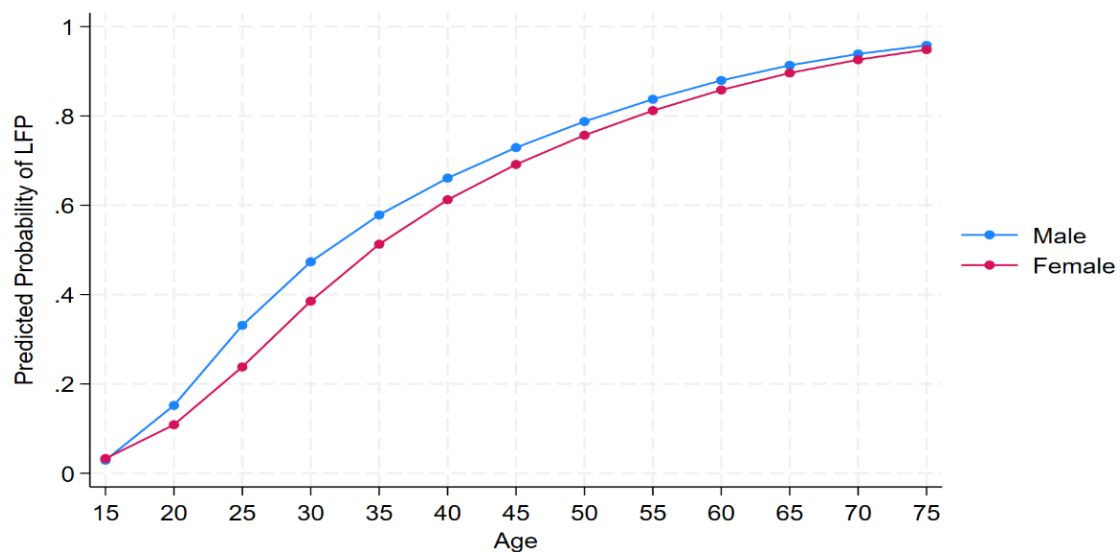
Note: Omitted reference group for education is "Below Elementary Completion".

Figure 2. *Visualization of the Fairlie Nonlinear Decomposition of the LFP Gender Gap*



Finally, for both genders, the probability of labor force participation rises sharply during early adulthood as individuals complete formal education and enter their prime working years, peaking between the ages of 35 and 45. However, the vertical distance between the two trajectories exposes severe inequality: the female labor supply curve (represented in red) is systematically depressed across all age cohorts, remaining roughly 20 percentage points below the male baseline. Crucially, this participation deficit is widest during peak reproductive and career-building ages (25 to 45), providing strong empirical evidence of the domestic "Care Penalty." Rather than converging as human capital accumulates, the lines run parallel until a symmetrical lifecycle contraction begins around age 50, showing that non-market household burdens permanently anchor the female labor supply significantly below market equilibrium throughout the entire life cycle (Figure 3).

Figure 3. *Predicted Probability of Labor Force Participation by Age*



DISCUSSIONS

The empirical results establish a clear baseline paradox within the contemporary Philippine labor market: the optimization of female human capital is structurally bottlenecked by the asymmetric distribution of unpaid domestic labor. The Fairlie decomposition proves that the participation gap is not a consequence of lagging female education or geographic sorting. Instead, it is entirely driven by the structural coefficient effect, the unobserved barriers that penalize women even when they hold identical qualifications to men.

This finding matches the descriptive reality that 19% of working-age women are completely locked out of the labor force due to household obligations, compared to less than 2% of men. This asymmetry creates a "Care Penalty" that functions as a non-market tax on female productivity. While men can deploy their educational credentials directly into the labor market, women must constantly negotiate their human capital against domestic care demands.

These findings indicate that traditional supply-side solutions, such as simply increasing educational access, have reached their structural limit for closing the participation gap. Bridging this divide requires shifting toward demand-side and institutional interventions that directly alleviate the domestic care burden.

To systematically dismantle the domestic care penalty and foster an equitable labor market, policy interventions must pivot toward structural institutional adjustments that alleviate and redistribute the burden of unpaid work:

1. ***Institutionalizing state-subsidized childcare through a robust network of accessible, community-based day facilities***, especially across low-income urban and rural zones, is essential to free up female labor time from the binding constraints of early childhood care;
2. ***Expanding parental leave frameworks by amending current statutory protections to offer balanced, non-transferable paternity leave*** can actively normalize the redistribution of primary infant care duties within households, shifting cultural expectations away from women as the sole default caregivers; and
3. ***Mandating flexible work standards by incentivizing the formal private sector***, particularly in-demand fields like the Business Process Outsourcing (BPO) and administrative services industries, to institutionalize hybrid models, flextime, and remote arrangements will significantly lower the opportunity cost for women balancing family obligations with professional career trajectories.

Actionable and Localized Initiatives to the Community

Key Result Area No. 1: Community-oriented extension programs

- ***Collaboration with Funding Agencies.*** In order to translate the findings of this study into an implementable grassroot programs to address Care Penalty in the City of Manila, the PLM must establish structured funding collaborations with external development partners. The university should leverage the quantitative rigor of this binary probit and Fairlie decomposition framework to secure grants from national bodies like the Philippine Commission on Women (PCW), the Department of Labor and Employment (DOLE), and international entities such as the International Labour Organization (ILO).
- ***Municipal Extension Programs.*** The finding that 19.0% of working-age women in the sample are completely sidelined from the labor market due to full-time household responsibilities establishes a critical baseline need. By identifying the precise magnitude of this domestic "Care Penalty" within urban poor communities, this paper provides the exact empirical framework needed to design municipal extension programs or further improve existing ones that address real-world socio-economic bottlenecks rather than theoretical assumptions. At present, the City of Manila offers programs that are relevant in addressing Care Penalty such as "Serbisyon Yorme" and "Threads of Life".

Key Result Area No. 2: Community and Industry Engagement

- *Lowering the barriers to female labor market entry.* The lifecycle participation curves illustrate that the negative impact of household obligations remains flat and severe across a woman's entire working life. This structural permanence means that short-term, seasonal outreach initiatives are fundamentally ineffective. PLM must prioritize long-term, community-responsive extension programs that adapt to the shifting needs of local families.
- *Experiential Learning and Student Immersions.* PLM can operationalize its student body as a force for civic action by embedding these research findings directly into experiential learning, community immersions, and on-the-job training opportunities. Simultaneously, students from the College of Business Administration and the College of Engineering can fulfill their practicum requirements by running digital literacy and freelance upskilling workshops for stay-at-home mothers, creating direct pathways to the flexible remote economy.

Key Result Area No. 3: Relevant, Sustainable, and Impactful Extension Programs

- *Research-Driven Solutions for Specific Community Needs.* This study fulfills the university's mandate to generate research-driven solutions for pressing community needs. The Fairlie decomposition proves that traditional supply-side solutions, like general education, are no longer enough to close the labor gap on their own, as the divide is heavily driven by unexplained structural factors. PLM responds directly to this empirical insight by bypassing superficial fixes and engineering structural, research-backed solutions. By designing specific programs to address the time-poverty of marginalized women, the university fulfills its civic duty: *using academic research to dismantle the real-world barriers holding back the community.*

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