

Monopsony and Gender Wage Discrimination in the Philippines

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Abstract

Based on a selection bias corrected model using a multinomial logit, the study estimated wage elasticities of labor supply between men and women to measure the degree of monopsony in a less developed economy. Data from pooled Philippine Labor Force Surveys show a greater tendency for women to not be involved in local labor markets and not as engaged as men in alternative work arrangements. While monopsony is detected in both male and female labor markets, the degree of the market imperfections is greater in the latter as wage elasticity is not significantly different from zero for women. Women tended to be less mobile in shifting to labor market arrangements, and a negative self-selection bias is found in the wages of women engaged in permanent labor arrangements.

I. Introduction

The labor economics literature has increasingly used wage elasticities of labor supply as an indicator of monopsony and wage discrimination (Manning, 2021; Card, 2022). If wage elasticity is not infinite, the firms that cut wages will not be expected to lose their existing workers as is predicted by a competitive model. However, research on these issues has not been adequately understood in less developed countries (Amodio and de Roux, 2021).

Moreover, gender discrimination caused by imperfect market structures is seldom analyzed in less developed countries (Vick, 2017; Barth and Dale-Olsen, 2009). In this paper, gender differences in wage elasticities of labor supply are seen to offer employers incentives for differential wages for males and females. Hence, policies need to be reexamined in terms of whether they reinforce or mitigate the tendency of employers to discriminate against women.

There are two possible sources of employer discrimination. One is referred to as preference-based which is rooted in the employer's prejudices against women. Based on Becker's (1971) concept of discrimination, this approach has two major limitations (Hirsch, 2010). First, the continuation of the gender gap may be difficult to interpret without market power on the demand side since the distaste of women can be competed away in the long run. Second, even if firms have market power, their earnings will be lower than those of non-discriminating firms.

The second source of discrimination is market power, instead of prejudices. Adapting from Robinson (1969), this approach builds on the notion that firms do profit from gender bias, hence discrimination is likely even in the long run. In

this situation, employers can reduce wages for workers who have lower wage elasticity or responsiveness to labor supply. The presence of industry concentration can permit firms in certain regions to pay wages lower than their true marginal productivity (Azar, et al., 2019; Benmelech, et al., 2020).

Apart from industrial concentration, labor market frictions heighten the market power of firms to set wages. During the workers' search for jobs, Card, et al. (2018) point out the presence of idiosyncratic tastes among workers for amenities (such as working conditions, the length of commute, or in the case of women, the proximity of workplaces to the house) offered by particular jobs that are not fully valued in wages. Implicit in these models is the idea that firms can sort out these workers by offering specific packages of wages and amenities (Manning, 2021).

In developing countries, like the Philippines, the issue of monopsony is seen to be more serious mainly because of fragile institutions. Workers living in or near poverty may not be able to afford to be unemployed for a period and thus forgo the risk of finding new jobs. Generally, constraints to borrowing, insurance, and savings services make one more vulnerable to various health and income shocks. This can lead workers to be more risk averse, prioritizing a stable income source. In the face of risk, workers have been found to take lower pay and work greater hours to prepare for the potential of large, negative shocks (Lanzona, 2022; Behrman 1999). A worker in these circumstances may be less likely to leave current employment if looking for better work jeopardizes that job or takes time away from it.

In the case of women, job mobility is further constrained by domestic responsibilities than is the case for men, and their work choices are less motivated by wages (Webber, 2016). Gender inequality has been observed to be intrinsically linked to poverty. Evidence has presented the link between improving women's access to markets (labor, land, and credit) and women's decision-making power within households and poverty reduction and productivity at the individual and household level (Morrison, et. al., 2007). Limiting women's options continually ties them to poverty.

Nevertheless, given limited access to formal markets, women may be forced to accept contracts that lead to lower payments compared to their male counterparts. In the Philippines, gender statistics indicate that while women have lower labor force participation, their employment rate has increased from an average of 93.1 percent in 2010 to 94.8 in 2017 (PSA, 2018). However, despite the increase in employment opportunities, little improvement in gender equality in the labor market, as measured by the share of women in waged employment in the non-agricultural and formal sectors has been noted (ADB, 2013).

The evidence presented here indicates that the heterogeneity in the activities of women has made women less mobile in handling shifts in the labor market, resulting in a lower wage elasticity in the supply of female labor compared to the males. The paper argues that this heterogeneity can be reflected in the choices of women in varied job packages which are enclosed in the types of contracts firms offer to their workers. For instance, alternative wage arrangements (AWAs), mostly part-time, informal, and agency types of work can serve as possible options for women workers. Women can balance home and work activities by choosing the appropriate contracts suitable to their objectives. However, employers can offer these AWAs as a way of reducing wages and minimizing costs for a given quality of labor. In this case, women, who have concerns other than wages, may choose to engage in such arrangements even at a lower wage. For instance, women in poor households who need to stay close to their children may decide to accept any contract even if the offered wages are lower.

This research contributes to the recent interest in the literature on the heterogeneity of workers which leads to

discrimination. Using pooled data from the Philippine Labor Force Surveys, the analyses provide some evidence of the extent of and trends of the gender wage gap over the period from 2010 to 2018. Instead of panel data, pooled cross sections are used in the study because contracts tend to be fixed for each person, especially for permanent contracts. Panel data will then not provide the necessary variation in understanding the changes in contracts over time, which is the objective of this study. The paper also measures discrimination by comparing the wage elasticities of hours of work of male and female workers over time. In the absence of specific firm-worker data, the paper utilizes worker hours data combined with macroeconomic variables on trade and foreign direct investments to examine firm shocks that lead to variations in labor supply.

In the monopsony literature, the challenge is the identification of the firm-determined worker-specific wages to be used in estimating the wage elasticity of labor supply. Observed wages are based on the workers' decision to engage in various contracts available in the market. Such choices are dependent on observed and idiosyncratic worker characteristics. A problem of self-selection can cause biased estimates on wage elasticity as the observed wages are determined by error terms that are found in both wages and labor participation decisions. The source of wage attrition and variation may be related to other unobserved factors, such as individual ability, that affect the contracts chosen, the observed wages, and the labor hours. Card, et al. (2018) proposed the use of multinomial logit models to estimate the dispersion in tastes for different workplaces and arrangements. If employers enjoy market power, this setup leads to appropriate measurements of heterogeneous supply of labor supply to individual firms.

The paper presents an empirical analysis of the behavior of workers, both wage and non-wage earners as they decide to participate in wage employment and engage in either traditional or alternative wage contracts. Given the choice of the contract reflects labor heterogeneity, the framework estimates the individual-specific wages conditional on specific worker qualities which firms use to determine the various wage arrangements. Using predicted wages, the wage elasticity of labor hours, which in turn indicates the presence of monopsony and serves as an indicator for gender disparity. A contribution of this paper is the method for measuring the heterogeneous wages of workers using contract choice.

The rest of the paper is organized as follows: Section II provides an empirical framework for estimating wages that will be used to estimate the wage elasticity of labor. Section III discusses the empirical strategy and variables that will be used to implement the framework. variables that will be used in the analysis. Section III describes the data and the empirical strategy for the estimations to be conducted. Section IV describes the data and Section V features the results of the empirical analysis. Section VI concludes and presents the policy implications.

II. An empirical framework for estimating wages

In most search models, workers randomly search employers for a job that pays a higher wage while employed and an acceptable wage when unemployed, while employers individually post wages conditional on the search behavior of workers and the wage offered by other firms (Burdett and Mortensen, 1998). This model has been extended to account for firms that offer wage-tenure contracts rather than simply a constant wage (Stevens, 2004). This contract is primarily intended to reduce labor turnover, and firms pay the amount equal to the worker's reservation wage, thus extracting all of

the surpluses with no job-to-job transitions. Nevertheless, if workers are risk averse and have no access to financial markets, they will search for contracts that lead to an increasing relationship between wages and tenure (Burdett and Coles, 2003). From these factors, a wage framework can be formulated using the following equations:

$$\ln w_{sti} = Z_{sti} \eta_s + \mu_{sti} \quad (1)$$

$$Y_{sti}^* = x_{sti} \beta_s + d_{st} u_s + \varepsilon_{sti}, \quad s = 1 \dots M \quad (2)$$

where Z_{st} refers to the vector of exogenous variables that determine the logarithmic wages $\ln(w_{st})$ at a given time t , and s is a categorical variable that describes the choice of the individual among M alternatives. The terms x_{sti} and d_{st} are distinct vectors of independent variables that affect the probability of choosing the s^{th} option which in this case is participation in a given wage-tenure contract offered by employers also at time t . The vector d_{st} represents the observed individual characteristics (e.g., education and experience) that measure the person i 's productivity. The vector d_{st} pertains to shifts in macroeconomic variables over time which affect the demand for labor as well as the level of job searches performed by the workers. Productivity shocks can generate large fluctuations in workers' transitions, unemployment, and vacancies when the quality of labor is observable after a contract is created (Menzio and Shi, 2011). It is assumed that $E(\mu_{sti} | Z_{sti}, x_{sti}, d_t) = 0$.

In the data, individuals have the following options: (1) not work in the local market or migrate to other places outside of their residence or places of origin; (2) be self-employed; (3) work in traditional permanent contracts; and (4) work in alternative part-time arrangements. The assumption here is that the same factors that determine the choice of workers between different work arrangements can explain also their choice either not to work or to migrate. The individual is presumed to examine all market options and choose the one that maximizes his utility.

The outcome variable, w_{sti} , is only observed if and only if the labor arrangements is chosen which happens when

$$Y_{sti}^* > \max (Y_{jti}^*) \text{ where } j \neq s \quad (3)$$

This set up suggests that observed wages are partly determined by individual preferences and thus do not reflect the wages offered by firms corresponding to the individuals' productivity and existing macroeconomic conditions. The problem is to estimate the wages from the observed variables which means that the parameters η_s , and β_s are to be estimated conditional on the assumption that the disturbance terms, μ_{sti} and ε_{sti} for all s are not independent. Because of this independence, the least square estimates of η_s will not be consistent.

From equation (3), it can be noted that

$$x_{sti} \beta_s + d_{st} u_s > \bar{\delta}_s$$

$$\text{where } \bar{\delta}_s = \max (y_{ijt}^* - y_{ist}^*) = (x_{jti} \beta_s - x_{sti} \beta_s) + (d_{jt} u_s - d_{st} u_s) = \varepsilon_{sti} - \varepsilon_{jti} < 0.$$

Assume that the (ε_{mti}) , for all m , is independent and identically Gumbel distributed. As indicated by McFadden (1973), the above condition can be specified in probabilities as:

$$P(\delta_s < 0 \mid x, d) = \frac{\exp(x\beta_s + d\mu_s)}{\sum_j \exp(x\beta_j + d\mu_j)}$$

Define the set of observable variables as $\Gamma(x_{1ti}\beta_1 + d_{1t}\mu_1, x_{2ti}\beta_2 + d_{2t}\mu_2, \dots, x_{Mti}\beta_M + d_{Mt}\mu_M)$. Given that the relation between the M components of Γ and the M corresponding probabilities, a unique function u can account for the mean of μ_s given ε_s and can be substituted for λ such that:

$$E(\mu_s \mid \delta_s < 0, \Gamma) = u(P_1, \dots, P_m) = \lambda(\Gamma)$$

A consistent estimation of η_s can thus be based on the following estimator:

$$\ln w_{sti} = Z_{sti}\eta_s + u(P_1, \dots, P_m) + \mu_{sti} = Z_{sti}\eta_s + \lambda(\Gamma) + \mu_{sti} \quad (4)$$

A common procedure that is used in the literature is the Lee (1983) approach which assumes the property of independence of irrelevant alternatives (IIA). This property suggests that changes in the opportunities in one option will not have any repercussions on the other options. However, in an increasingly modern economy, job choices are no longer distinct and homogeneous. The contracts presented are substitutes for one another, resulting in the violation of the IIA property.

To solve this IIA problem, Bourguignon, et al. (2007) proposed another approach extending the Lee model. Building on Durbin and McFadden (1984), the mean of μ_s given the various ε_s for work options can be written with linearity as:

$$E(\mu_s \mid \varepsilon_1, \dots, \varepsilon_M) = \sigma \frac{\sqrt{6}}{\pi} \sum_{j=1, \dots, M} r_{sj} (\varepsilon_j - E(\varepsilon_j)) \quad (5)$$

Where σ is the standard deviation of the error term, and r_{sj} is the correlation coefficient between μ_s and ε_j . As a result of the multinomial logit model, for the first option ($s=1$) chosen, we have:

$$E(\varepsilon_1 - E(\varepsilon_1) \mid Y_1^* > \max(Y_s^*), \Gamma) = -\ln(P_1)$$

$$E\left(\varepsilon_j - E\left(\varepsilon_j\right) \mid Y_1^* > \max\left(Y_s^*\right), \Gamma\right) = \frac{P_j \ln(P_j)}{1 - P_j}$$

In which case, equation (1) can now be estimated consistently as:

$$\ln w_{1ti} = Z_{sti} \eta_s + \sigma \frac{\sqrt{6}}{\pi} \left[\sum_{j=2, \dots, M} r_j^* \left(\frac{P_j \ln(P_j)}{1 - P_j} \right) - r_1 \ln(P_1) \right] + v_{sti} \quad (6)$$

Bourguignon, et al. (2007) revised the Dubin and McFadden (1984) linearity assumption by normalizing ε_j in equation (5) as:

$$E\left(\mu_s \mid \varepsilon_1, \dots, \varepsilon_M\right) = \sigma \sum_{j=1, \dots, M} r_j^* \varepsilon_j^* \quad (7)$$

where $\varepsilon_j^* = J\left(\varepsilon_j\right) = \Phi^{-1}\left(G\left(\varepsilon_j\right)\right)$ or the standard normal values of ε_j . The term r_j^* is the correlation between μ_s and ε_j^* . In this set-up, conditional expectations of probabilities will be used. Bourguignon, et al. (2007) proved that under this normalized model, the following results for $s=1$ are derived:

$$E\left(\varepsilon_1^* \mid Y_1^* > \max\left(Y_s^*\right), \Gamma\right) = m(P_1)$$

$$E\left(\varepsilon_j^* \mid Y_1^* > \max\left(Y_s^*\right), \Gamma\right) = m\left(P_j\right)^{\frac{P_j}{P_j-1}}, \quad \forall j > 1$$

Under this model, equation (6) can be reestimated as:

$$\ln w_{1ti} = Z_{sti} \eta_s + \sigma \left[r_1^* m(P_1) + \sum_{j=2, \dots, M} r_j^* m(P_j)^{\frac{P_j}{P_j-1}} \right] + w_{sti} \quad (8)$$

where $m(P_j)$ are the expectations of probabilities conditional on a given choice based on the observed variables. The error

term w_{sti} is orthogonal to all other terms in the RHS and has zero expectations. Because of this property, least squares may now be used to estimate the wage equation. Wages will then be predicted from this equation and such predicted wages will be used to estimate the wage elasticity of the labor supply.

The coefficient attached to the selection controls represents the correlation coefficient between the error terms in the wage equation and alternatives from the selection equation, r_j^* , and its correlation to the wages, σ (Bourguignon, et al., 2007). When the estimated coefficient on the correction term is positive it indicates that error terms are positively correlated. That is, some unobserved qualities cause an individual to choose a particular arrangement relative to the base alternative. These qualities in turn are positively correlated to the wages in this arrangement.

III. Empirical strategy and econometric model

The presence of monopsony is indicated by the heterogeneity of workers resulting in a monopsony resulting in the following profit-maximizing wage (W):

$$W = \frac{1}{1 + \epsilon} MRPL \quad (9)$$

where $MRPL$ is the marginal revenue product of labor and ϵ is the inverse of the wage elasticity of labor supply. The various estimates on ϵ can then explain the variance between $MRPL$ and W . Empirically, the strength of the employers' monopsony power boils down to the question of how sensitively workers' labor supply to a single employer reacts to a change in the wage offered by this employer.

The estimates will then be based on the results from the workers' perspective emphasizing differential effects that the policy may have on different groups of workers (Lanzona, 2014). For the first step, using a multinomial logit model designed to account for worker preferences, the worker decisions will be estimated on three broad categories of employment: reporting no wage^[1], choosing an alternative work arrangement, and engaging in a traditional arrangement. Using pooled data and conditioning for regional effects, the equation for reporting a wage will be estimated separately for males and females:

$$Prob(y_{imt}) = \sum_m \delta_m x_{imt} + \sum_R \delta_R R + \sum_j \delta_j Z_{jt} + \theta_t t + \varepsilon_{imt} \quad (10)$$

where y_{imt} is the observable work arrangement chosen, including non-participation, by individual i who belongs to gender m . For the rest of the other variables, x_{imt} is a vector of variables that reflects the personal characteristics of individual i at year t such as experience, education, or skill level, t is a continuous variable for years when data are obtained, R is for the regional fixed effects, Z_t is a vector of j variables that may vary across time and t is a continuous variable for years when

data are obtained. Among the variables in Z_t are trade and policy variables to control for policy shocks that affect workers' decisions. In this model, worker decisions are determined primarily through their qualifications and experience. The direct effect of trade and other macroeconomic variables on employment will be reflected in the δ_j coefficient. However, because these variables move in parallel among themselves and time, interactive terms to measure their joint effects will also be included.

The model assumes that the choice to participate in the labor market and engage in contracts is fundamentally the choice of the worker and related to their tastes and perceptions of possible wage variances. The wages can be related to fixed regional characteristics of their workplace but also to differences in personal characteristics (Ben-Porath, 1973).

At the same time, given changes in the macroeconomy, workers are assumed to assess the evolution of the wage distribution to compare the value of a particular job offer with the value of their current employment position. In this model, workers can consider the evolution of the exogenous aggregate shocks and assess their impact on wages (Menzio and Shi, 2010). These shocks include movements in trade and foreign investments which determines the wage distribution in the economy. The inclusion of time-varying aggregate variables is also strategic in the sense we can use the results of empirical tests to determine the ability of men and women to transition across varied economic opportunities. Men are presumed to respond better to these signals because women are more constrained by domestic activities and less motivated by average wages (Manning, 2003).

For the next stage, Mincer-type wage equations (with corrections for sample selection) will be estimated in order to determine worker wages based on observables that firms conceptually use to set wages. In this case, the following model can be tested:

$$\ln W_{imt} = \alpha_0 + \alpha_1 E_{imt} + \alpha_2 A_{imt} + \alpha_3 (A_{imt})^2 + \alpha_4 IND_{imt} + \alpha_5 t + \sum \alpha_c S_{imt}^c + \mu_{imt} \quad (11)$$

where W_{imt} is the observed wage for individual i with gender m at time t , E_{imt} is the education obtained by individual i , A_{imt} is the experience of the individual (representing training or experience) which is expected to have diminishing productivity, IND_{imt} pertains to industrial regions which are perceived to give them spatial market power, t is for time trend (or year) and S_{imt}^1 are the self-selection variable that is derived from the probability of choosing the respectively.^[2] Based on the observables in equation (10), the sample selection terms determine the idiosyncratic differences in wages between the three categories: non-participation in the labor market, traditional contracts, and alternative arrangements. An interactive term between the industrial dummy and year to control time-varying changes in estimating the impact of the industry.

For the final step, calculations in equation (11), each worker will be provided a predicted wage that is based on the and that can be used in to estimate labor supply. These predicted wages are then used in estimating worker-specific wages purged of all unobservable variables affecting both wages and labor supply. From here, the wage elasticity of labor arrangements is then measured for male and female workers.

Using pooled data, the equation for labor hours supply will be estimated separately for males and females:

$$\ln Hours_{imt} = \sum_m \beta_m x_{imt} + \delta \beta_w \hat{W}_{imt} + \sum_K \beta_K K + \sum_j \beta_j Z_{jt} + \beta_t t + \epsilon_{imt} \quad (12)$$

where $\ln Hours_{imt}$ is the (logarithmic) of individual i with gender m . The variable \hat{W}_{imt} pertain to the predicted wages, while K is a measure of capital formation in the economy, such as gross capital formation. The rest of the variables t and Z_{jt} are similar to the variables used in (10).

The model assumes that workers are constrained by the number of hours they can choose. They have more control over the decision to work and to engage in specific contracts, but less control over how much or how long they can work. (Card, 1990; Zabel, 1993). In this case, capital formation is vital since this determines the technology which firms will use to set the work hours to be provided by the workers (Romer, 1990). This capital resource can be instrumented by the gross capital formation and private-sector inventories. In addition, the costs of labor as measured by the average regional minimum wages are included these affect the firms' cost and state of technology. Regional fixed effects are excluded in this estimate since capital formation and regional minimum wage also affect regional development.

Given their effects, these aggregate factors can identify time-varying constraints in the worker's choices. This is supported by the following empirical work. First, Black and Brainerd (2004) found that increasing exposure to international trade (i.e., increased competitive pressure) reduced apparent gender wage discrimination in concentrated industries. Second, Black and Strahan (2001) reported that, with the deregulation of the banking industry, which affects capital formation, beginning in the mid-1970s, the gender wage gap in banking declined. (Deregulation was viewed as increasing competitiveness within the industry.) Third, Heyman, et al. (2002), using Swedish worker-firm matched data found evidence that a firm takeover was associated with a reduction in the gender wage gap. Contrary to the notion of collusion among mergers, they interpret these takeovers as a manifestation of competitive pressure as these movements reduced the market dominance of previously existing firms. Thus, variations of gender discrimination can be found within the context of market fluctuations. Incorporating these aggregate variables which affect wages can then control for other possible sources of discrimination that can influence hours of work.

IV. Descriptive Statistics

An important way to view gender segregation is by examining different forms of labor arrangements. Adapting from Farber (1999), workers in AWAs include independent contractors, consultants, freelance workers, other self-employed workers, temporary workers, on-call workers, and contract workers. Hence, we can consider two categories under AWAs: the self-employed and the other temporary workers. Some of the self-employed are contractors and consultants who may have permanent status with a firm but earn non-regular payments.

The definition of AWAs incorporates much but not all the informal sectors. It also covers part of the arrangement defined under contractualization and flexible arrangements. These are also those workers in what is referred to as the gig economy, characterized by the prevalence of short-term contracts and freelance work.

The crucial element of these arrangements is the absence of any legal mandate to receive any benefits. According to the Philippine Labor Code, employers are not mandated to provide worker benefits unless there is a promise of permanency and the worker has worked for a minimum of 6 months (probationary period). Since workers may accept this type of work, firms may then engage in AWAs simply to minimize costs. For the self-employed, the issue is the lack of health and other forms of insurance that can allow them to carry risks and withstand economic shocks. In all, unless the demerits are offset by certain subjective advantages, these types of work are inferior to other more regular employment arrangements.

To delineate worker choices between these contracts and not being a local wage earner, the empirical analysis will use pooled data of Philippine Labor Force Surveys from 2010 to 2018 which provide quarterly labor market information from all regions in the Philippines, gathered from a sample designed to represent the labor market conditions of the entire country. The April survey is the basis for the yearly data, and other information related to wages and labor arrangement choices. For worker characteristics, the data include the worker's completed education and age.

To capture community-level conditions, the analysis will use dummy variables for regions and industrial areas. The latter is important since employment in an industrial area can be a potential source of market power in the Philippines. More than seventy percent of the total manufacturing GVA comes from only three regions, i.e., the NCR, Region IV-A (CALABARZON), and Region III (Central Luzon). In addition to the favorable public goods provided to these regions, location is quite favorable because of their being adjacent, thereby making agglomeration economies among the different industrial companies feasible. Hence, these regions are the hub of industrial and service employment. Moreover, these areas because of internal migration have the largest pool of skilled workers. Because of these reasons, the seventy-three percent contribution of these regions to the manufacturing sector did not decline over time. Since there is no region that can compete with these regions, then it can be a reason why workers' responsiveness to wages may be lower than expected.

Table 1 shows the proportional distribution of male and female workers distributed into the three broad work choices by age and education. The following points can be noted. First, roughly 43 percent of the sample did not report any wage or were not working locally. These include those who are unemployed and those who did not join the labor force. Of these individuals, approximately 75 percent were females. The share of women was greater than the males in all schooling and age categories, reflecting the low level of labor force participation of females in the country. Educated females were more likely not to report any wage (15 percent of the total sample) Second, about thirty-five percent of the sample were engaged in AWAs with more males involved in these types of contracts (21 percent). Women in alternative contracts comprised 15 percent of the sample. Third, twenty percent of the sample were involved in permanent contracts with males (at 10 percent) and females (9.6 percent) having the almost same share. The data also indicate that more schooled and older women were working in these types of arrangements.

Table 1. Proportional Distribution of Workers by Labor Arrangement, Age and Schooling, 2010-2018

	Years of Schooling	Age Categories				Total
		15-20	21-25	26-30	Over 30	

					30	
Labor Arrangement						
<i>Non-local Market Participant</i>						
Male						
	0-6	0.0033	0.0031	0.0017	0.0157	0.0238
	7-10	0.0098	0.0060	0.0028	0.0087	0.0272
	Above 10	0.0293	0.0238	0.0104	0.0242	0.0876
	Sub-total	0.0424	0.0328	0.0149	0.0485	0.1386
Female						
	0-6	0.0043	0.0060	0.0051	0.0570	0.0724
	7-10	0.0122	0.0136	0.0104	0.0323	0.0684
	Above 10	0.0393	0.0366	0.0226	0.0606	0.1592
	Sub-total	0.0557	0.0562	0.0381	0.1499	0.2999
	Total	0.0982	0.0890	0.0530	0.1984	0.4385
<i>Alternative Arrangements</i>						
Male						
	0-6	0.0171	0.0115	0.0080	0.0400	0.0766
	7-10	0.0189	0.0126	0.0083	0.0219	0.0617
	Above 10	0.0130	0.0172	0.0118	0.0297	0.0717
	Sub-total	0.0491	0.0413	0.0281	0.0916	0.2100
Female						
	0-6	0.0032	0.0020	0.0023	0.0374	0.0448
	7-10	0.0090	0.0044	0.0038	0.0219	0.0392
	Above 10	0.0103	0.0127	0.0083	0.0346	0.0659
	Sub-total	0.0225	0.0191	0.0144	0.0939	0.1499
	Total	0.0716	0.0604	0.0425	0.1854	0.3599
<i>Permanent Work Arrangements</i>						
Male						
	0-6	0.0035	0.0036	0.0026	0.0096	0.0193
	7-10	0.0040	0.0065	0.0051	0.0111	0.0267
	Above 10	0.0034	0.0146	0.0139	0.0276	0.0595
	Sub-total	0.0108	0.0247	0.0216	0.0483	0.1054
Female						
	0-6	0.0014	0.0009	0.0007	0.0079	0.0110
	7-10	0.0036	0.0034	0.0024	0.0077	0.0171
	Above 10	0.0048	0.0165	0.0142	0.0326	0.0681
	Sub-total	0.0098	0.0209	0.0173	0.0482	0.0962
	Total	0.0207	0.0456	0.0388	0.0965	0.2016

Table 2 shows the statistics for real wages and hours of work by contract and sex for the period considered. The following points are noteworthy. First, average real wages in alternative contracts are higher for males than for females. However, average real wages in permanent contracts are higher for women. As had been observed, more educated and older women seemed to have more engaged in permanent contracts. Second, the average wage tended to be higher in the permanent contracts for males and females, also indicating a greater variability in the way these wages are determined. Tasks in alternative contracts are directly determined by actual production, perhaps measured in terms of outputs or duration. These are unlike permanent contracts where wages tended to be more fixed, regardless of productivity. Third, work hours per week are slightly higher for males than for females in both labor arrangements. Fourth, work hours are also significantly longer in permanent arrangements, consistent with the higher wages also noted in these arrangements.

Table 2. Average Real Wages and Hours of Work by Contract and by Sex, 2010-2018				
Panel A: Wages (Per Day)		Male	Female	Total
Alternative Arrangements		253.11	218.79	242.10
		(.49)	(.76)	(.41)
Permanent Arrangements		393.83	421.00	404.90
		(.82)	(1.08)	(.66)
Total		342.72	364.06	350.80
		(.57)	(.84)	(.48)
Panel B: Hours of Work (Per Week)		Male	Female	Total
Alternative Arrangements		38.79	38.45	38.66
		(0.03)	(0.05)	(0.03)
Permanent Arrangement		45.62	44.00	44.96
		(0.04)	(0.05)	(0.03)
Total		41.01	40.375	40.761
		(0.02)	(0.04)	(0.02)

Notes: Figures in parentheses are standard errors from the mean.

Table 3 provides the means and standard deviations of the variables that will be used for the empirical analysis. As data is pooled across the years, the data have been divided into two main periods: (1) the years from 2010 to 2014 and (2) those from 2015 to 2018. For the dependent variables, the following points can be noted. First, the labor arrangement average was computed using three values: 0 for non-wage earners, 1 for alternative contracts, and 2 for permanent arrangements. The table shows that in the latter periods, more permanent contracts were being used, replacing the non-traditional alternative arrangements. An increase in the percentage of non-wage earners had also been noted, thus decreasing the average. The overall idea is that these arrangements are significantly time-varying. Second, consistent

with this change, work hours had also marginally increased in the latter period. Third, real wages seemed to have also increased because of these new arrangements^[3]

Table 3. Means and Standard Deviations of Variables

VARIABLES	Obs.	2010-2014	Obs.	2015-2018
Dependent Variables:				
Labor Arrangement ^a	637,845	0.818	692,562	0.825
		(0.73)		(0.75)
Mean Percentage distribution:				
Non-local market participant	238,092	37.33	268,437	38.76
		(0.23)		(0.24)
Alternative arrangement	278,065	43.59	277,157	40.02
		(0.25)		(0.24)
Permanent arrangement	121,688	19.08	146,968	21.22
		(0.15)		(0.16)
Work Hours per Week	389,108	40.312	416,629	41.180
		(19.03)		(18.78)
Real Daily Wage ^b	180,675	330.144	221,671	367.638
		(284.75)		(314.98)
Independent variables				
Years of Schooling	835,160	7.514	838,892	7.771
		(4.43)		(4.32)
Experience ^c	835,123	14.431	838,844	16.389
		(20.01)		(19.15)
Total Foreign Direct Investments ^d		3.153		8.663
		(1.59)		(1.63)
Real Trade Value ^{b,e}		1.090		1.520
		(0.14)		(0.29)
Industrial dummy ^g		0.209		0.194
		(0.41)		(0.40)
Real Minimum Wage ^b		261.053		276.887
		(46.38)		(59.69)
Real Gross Capital Formation ^{b,f}		2.460		4.280
		(0.30)		(0.58)
Real Inventories ^{c,f}		-0.005		0.012
		(0.06)		(0.03)

Notes: Figures in Parentheses are standard deviations.^a Labor arrangement is based on three values: 0 for nonwage reported, 2 for permanent contracts, and 3 for alternative arrangements. ^b Real values of Philippine Currency are based on 2012 Prices. ^c Defined as age minus years of schooling minus 7. ^d In Million US Dollars^e Sum of exports and imports in Trillion Philippine Peso. ^f In Billion Philippine Pesos. ^g Refers to the proportion of workers residing in the three main industrial centers,

For the independent variables, the following points are noteworthy. First, schooling and experience are noted to be higher in the second period. The country has been experiencing a demographic transition as more people in working age had increased because of a slightly lower population growth rate. Second, all the time-varying aggregate variables have improved over time. The periods coincided with the time when the country undertook certain institutional and governance reforms that lead to substantial growth. Social reforms particularly the increased minimum wages had also improved. Nevertheless, much of these changes were concentrated in the three industrial areas (Lanzona, 2022).

V. Results of the Empirical Analysis

Table 4 shows the estimates for the choice of labor arrangements for males and females. In these estimates, the base outcome is the non-wage earner. Hence, the coefficients should be interpreted as the effects of the regressors on the probability of engaging in a labor market arrangement relative to the likelihood of non-reporting of a wage, including migration and non-participation in the labor force.

Table 4. Multinomial Logit Estimates of Labor Market Participation for Males and Females

VARIABLES	Males			Females		
	Alternative Arrangement	Permanent Arrangement		Alternative Arrangement	Permanent Arrangement	
Years of Schooling	-0.0049	-0.0833***		-0.045***	-0.294***	
	(0.004)	(0.005)		(0.004)	(0.005)	
Years of Schooling squared	-0.0108***	0.0021***		0.0001	0.0240***	
	(0.0003)	(0.0003)		(0.0002)	(0.0003)	
Experience	0.1266***	0.1685***		0.086***	0.093***	
	(0.001)	(0.001)		(0.001)	(0.001)	
Experience squared /100	-0.2306***	-0.3435***		-0.135***	-0.198***	
	(0.001)	(0.002)		(0.001)	(0.002)	
Year	0.0438***	-0.0730***		0.093***	-0.009	
	(0.016)	(0.019)		(0.014)	(0.019)	
Foreign Direct Investments (FDI)	13.827**	-27.051***		40.723***	3.668	
	(0.006)	(0.008)		(0.005)	(0.007)	
Real Trade Value (TRADE)	-0.2230	-0.951***		-0.132	0.105	
	(0.194)	(0.228)		(0.162)	(0.000)	

TRADE*Year	0.006	0.0185***	0.013***	-0.0028
	(0.005)	(0.006)	(0.004)	(0.006)
FDI*Year	-0.007**	0.0134***	-0.020***	-0.0018
	(0.003)	(0.004)	(0.003)	(0.004)
Industrial dummy (INDL)	145.6809*	-126.259***	22.226	48.767
	(76.496)	(77.432)	(69.263)	(74.231)
INDL*Year	-0.0732**	0.0625***	-0.011	-0.024
	(0.038)	(0.038)	(0.034)	(0.037)
TRADE*INDL	-150.00***	53.800	171.00***	166.00***
	(51.40)	(51.50)	(46.50)	(48.90)
FDI*INDL	0.0258	0.0175	-0.077***	-0.048***
	(0.020)	(0.020)	(0.018)	(0.019)
TRADE*YEAR*INDL	0.0747***	-0.0265	-0.0853***	-0.0829***
	(0.026)	(0.026)	(0.023)	(0.024)
FDI*YEAR*INDL	-0.0128	-0.0087	0.0381***	0.0239***
	(0.010)	(0.010)	(0.009)	(0.009)
Constant	-86.809***	146.5453***	-188.292***	16.734
	(33.181)	(38.888)	(27.875)	(37.724)
Regional Effects	Yes	Yes	Yes	Yes
Log-likelihood	-479738.74		-500761.15	
Chi-squared	163800.25		106110.96	
Significance Level	0.000		0.000	
Pseudo R-sq	0.1458		0.0958	
Number of Observations	539535		551986	

Notes: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The following results are significant. First, the correlation between enhanced labor market conditions (indicated by the interaction of year and industry variables) and engagement in the local labor market differs by sex. For men, working in industrial areas results in more involvement in alternative contracts and less in permanent arrangements. In contrast, women may be engaged in a search process in a transition phase because of household responsibilities and the difficulty in finding regular employment (Manning, 2003). For instance, differences in commute valuation relative to wages may come from individual preferences or constraints resulting from household decisions (Le Barbanchon, et al., 2020).

Second, expanding the trade value (export plus imports) in industrial areas over time raises the probability of males working in alternative arrangements, but increased the probability of females not participating in the local labor market. For women, the welfare effects through consumption from increased trade can be larger than the wage effects (Marchand, 2017) This can create a greater demand for household activities relative to work. However, since the country's trade has limited local content, the wage effects of trade for the males are likely to increase the supply of workers in AWAs, especially in more competitive and trade-oriented firms. Hence, the expansion of the trade sector in the industrial regions

could have resulted in substituting female with male workers.

Third, increasing foreign direct investments specifically in industrial areas increases the probability of female workers reporting a wage, either in alternative or permanent work, suggesting an increasing scale of production and digital forms of services (e.g., BPO) with more foreign capital (Mitra, 2013). This finding is consistent with the observed complementarity of capital and female labor, which in effect raises the wage effects for women (Goldin, 1990). However, as capital increases, the diminished marginal of capital can result in a diminished value of female labor, making it feasible for men to substitute women in what is otherwise a female labor-intensive industry (Saure and Zoabi, 2014).

Fourth, for women, schooling results in less participation in the local labor market, while higher schooling raises the probability of having more permanent arrangements. Similarly, for the men, schooling seemed to have resulted in lesser involvement in the local labor market, but much higher schooling leads to greater participation in permanent arrangements. This pattern is consistent with previous findings in the Philippines showing greater unemployment for those with tertiary education as the skills learned in higher education do not match the needs of the industry which tend to favor relatively less skilled workers (see di Gropello, et al., 2010).

Finally, experience is a factor in determining work and contracts for men and women. These findings support the notion that the formation of human capital is necessary to increase the chances of participating in the labor market. However, it can be noted that the impact of experience on labor market participation is substantially higher for men, suggesting a greater focus in their careers.

Table 5 presents the results of the wage model discussed in the previous section. The following results are important. The following results are important. First, both schooling and experience have positive returns on wages. Women seem to benefit more from education given a higher wage return (8 percent), but men have higher returns from experience indicating that they may invest more in firm-specific skills.

Table 5. Wage Estimates with Self-selection

VARIABLES	Males	Females
Years of schooling	0.0399*** (0.00107)	0.0833*** (0.00127)
Experience	0.0606*** (0.00118)	0.00763*** (0.000797)
Experience Squared/100	-0.0965*** (2.29e-05)	0.0178*** (1.50e-05)
Industry dummy (INDL)	7.625*** (2.242)	27.26*** (2.942)
Year	0.0138*** (0.000586)	0.0173*** (0.000833)
INDL*Year	-0.00374*** (0.00111)	-0.0135*** (0.00146)
Selectivity Controls:		
Non-participation in local markets	-0.657*** (0.0488)	-0.330*** (0.0612)
Alternative arrangements	1.739*** (0.0359)	0.548*** (0.0555)
Permanent arrangements	0.127*** (0.0144)	-0.992*** (0.0213)
Constant	-22.53*** (1.185)	-29.32*** (1.678)
Adjusted R-sq	0.4285.	0.5294.
F-test	10932.74	11862.49
Observations	131,233	94,882

Notes: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Second, as measured by the sample selection correction variable, workers who do not participate in the local labor market possess unobserved characteristics that are correlated with lower wages. For men, participation in both permanent and alternative arrangements indicates qualities that are associated with higher wages. For women, however, a significant negative bias is found for those engaged in permanent contracts. In other words, the women in permanent activities possess qualities that lead to lower wages than expected based on the observables. Since the opposite is found for men under the same arrangement, this finding is consistent with gender discrimination. However, the exact reason for lower wages cannot be determined by the model since motivation, wealth, as well as ability, are all subsumed under the selectivity control term.

Third, working in industrial areas led to higher wage returns for both men and women. This provides some market power to the firms in these regions since workers, especially women, have no incentive to leave these regions. However, over time, this wage premium diminishes with a greater over time for women.

Using these wage estimations to predict wages^[4], the wage elasticity of labor hours can be determined as shown in Table 6. The following findings are crucial. First, both men and women have an inelastic labor supply with respect to wages, as indicated in the coefficient attached to predicted wages. This is to be expected in a country where industrial concentration is present, and poor institutions do not provide enough social protection and decent work conditions (Lanzona, 2022). Workers have very limited opportunity to transition from one job to another as the cost of the search is significant. However, the elasticities are insignificant for female, suggesting an even lower wage elasticity.^[5] Employers then have an incentive to segment the markets by offering lower wages to males and females. This then supports the hypothesis that monopsonistic power exists in the labor market. The insignificant elasticity provides a greater markdown between the worker's marginal revenue product and the wages for the women.

Table 6. Labor Hour Estimates		
VARIABLES	(1)	(2)
	Males	Females
Predicted Ln Wage	0.135*** (0.00797)	-0.00403 (0.00716)
Years of Schooling	-0.00516*** (0.000775)	0.0211*** (0.00121)
Experience	0.00836*** (0.000264)	-0.00168*** (0.000288)
Experience Squared/100	-0.0216*** (0.00039)	-0.00333*** (0.00045)
Gross Capital Formation	0.3400*** (0.014)	0.272*** (0.022)
Real Inventories	0.453*** (0.036)	0.455*** (0.056)
Year	-0.108*** (0.00698)	-0.126*** (0.0111)
Real Minimum Wage (MWAGE) /100	1.358 (3.09)	-15.819*** (5.092)
Foreign Direct Investments (FDI)	10.847*** (1.706)	2.990 (2.72)
Real Trade Value (TRADE)	--1.58*** (0.065)	-1.18*** (0.103)
Industrial dummy (INDL)	24.00 (19.85)	29.93 (30.00)
MWAGE*Year	-0.000643 (.00153)	0.00792*** (.00253)
TRADE*Year	0.0427*** (0.002)	0.0298*** (0.0031)

FDI*Year	-.00539***	-0.00149
	(.000948)	(.00135)
INDL*Year	-0.0116	-0.0145
	(0.00985)	(0.0149)
MWAGE*INDL	0.0150	18.916***
	(3.76)	(6.021)
TRADE*INDL	95.2***	62.4***
	(12.0)	(17.7)
FDI*INDL	-42.608***	-36.9701***
	(4.59)	(6.76)
MWAGE*Year*INDL	-0.0166	-9.42***
	(1.87)	(2.99)
TRADE*Year*INDL	-0.0476***	-0.0312***
	(0.006)	(0.0088)
FDI*Year*INDL	0.0212***	0.0184***
	(.00228)	(0.00336)
Constant	219.5***	256.7***
	(14.04)	(22.40)
R-squared	0.0486	0.0559
F-test	961.06	726.27
Observations	394,912	257,027

Notes: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Second, years of schooling and experience show contrasting results for men and women. For women, education is associated with more labor hours, but experience leads to lower hours. For men, the signs of the coefficients are different, i.e., more hours with experience but less with schooling. Technologies seem to require more male labor intensive but also greater female schooling.

Third, public and private capital formation, including foreign direct investments, resulted in more work hours, but trade is negatively associated with fewer work hours for both men and women. Similar to the results of the work participation estimates, capital is complementary to labor, but greater trade seems to be based on imported items that are substitutable for labor. In particular, the top export of the country are electronic products which are heavily dependent on imported inputs. This means that as the country's trade sector improves, the options available to workers can decrease.

Fourth, higher minimum wages in industrial regions over time are negatively correlated with female labor hours, indicating that the increased labor costs lead to lower utilization of women's labor.^[6] This makes females less competitive than males. In contrast, men's labor is not significantly affected by higher minimum wages.

VI. Conclusion and Policy Implications

The paper then presents some strong evidence that monopsonistic power in the labor market for both men and women and has shown also that gender discrimination both at the level of hours worked and wages. The question remains why women would have a lower wage elasticity than men. From the results coming from the data, there may be two reasons. First, there is market concentration especially in the industrial regions, allowing the large firms to control the labor market and choose more career-oriented men. This leaves very little option for women with lower incomes, to find work, forcing them to accept the wages being offered to them. Second and most important, the results indicate that women have other concerns beyond the wage. The limited mobility of women is constrained by their higher valuation of household activities. Beyond wages, women are concerned with other factors, including proximity to household, difficulty in traveling, and aversion to risk that are associated with job search. Unlike the males who are more mobile and are more concerned with careers, women are more likely to accept the lower wages that are offered to them.

While the costs of gender regulations can be proven to be a binding constraint to employers, such regulations cannot be removed given the presence of effective discrimination. Stemming from monopsony power, gender discrimination then points to several policy directions. First, markets should be expanded and encouraged to increase the flow of female workers from where they are less well rewarded to where they are most highly rewarded. Gender segregation can easily dissipate if competitive forces penalize those firms with strong discriminatory preferences and market power. Workers, particularly women, should have greater options. Policies that limit labor mobility can perpetuate or at least lengthen the period until unwarranted segregation or wage discrimination are diminished by competition.

Second, restrictions on the entry of new firms or the emerging micro, small and medium enterprises (MSMEs) through reduced competition in product and capital markets can shield discriminators from changing their actions. In this case, cartels or labor monopsonists which can be legally created by government policies can reinforce discrimination by barring the entry of non-discriminators or prevent the movement by cartel members with weaker discriminatory preferences. There is much to be gained from removing barriers to free competition or international trade, such as the further reduction or elimination of segregation and wage discrimination that may persist among workers who bring the skills to the labor market.

Third, even without many resources, firms can implement these gender rules and policies by making their hiring and wage procedures more transparent. Workers can be better informed about their rights and privileges and with government support be able to deal with abuses if these happen. Given the difficulty in monitoring compliance, the government can require the submission of a plan or program for gender equality across firms and monitor the progress of these plans. Among these plans can include training and other forms of human capital formation that should be unhindered by political and gender conflict (Folbre, 2012). Depending on their markets and resources, firms and workers can work around the execution of their plans within the short or medium term.

Fourth, in these proposals for gender equality, the demands of women who are not able to participate in the labor market are because of the discriminatory effects arising from labor market regulations. In this case, it is necessary to include this unheeded sector of women in the bargaining process related to labor market policies. This will involve transforming the consultation process from a tripartite into a quadripartite system that would give the poor, unemployed, underemployed, and self-employed direct representation in the determination of labor regulations and

policies (ILO, 2021).

Fifth, social protection programs in the face of wage discrimination in the low-wage sector need to be strengthened (see Gonzales and Manasan, 2002, for the Philippine context). In this case, a universal basic income scheme can be developed, but negative unintended consequences on labor participation must be controlled. To deal with the problem of segregation, another alternative is to pass an equal pay law that could, in theory, require a pay-equity type of approach: The law should include a provision calling for equal compensation for work exclusively or predominantly performed by female employees with the same, or substantially similar, skills, responsibility and service under the same, or substantially similar, conditions and with the same, or substantially similar, degrees of effort as work performed by men. This provision is interpreted narrowly to mean equal pay for identical work. However, one must not ignore what Hochschild (1983) called “emotional labor” — adjusting one’s feelings to competently perform a job. Some women, if they measured some aspect of it, often treated it as a proxy for the femaleness of a job, so that jobs with high levels of emotional labor wound up with lower pay. Hence, the goal should be equal pay for equal value in the society.

Finally, even with a wage equalization legislation, there is still a need to weaken the monopsonistic market power of firms. This can be achieved by increasing the work options of women in order to raise their responsiveness to wage changes. Removing the obstacles to greater competition against existing firms, especially those in trade, will involve conventional policy options such as providing additional health and better child care, and increasing the coverage of social protection. These programs will reduce the burden of domestic responsibilities on women’s labor supply decisions, widen their scope for job search, and increase the firm competition for women’s labor.

Footnotes

[1] Reporting no wage can be either mean that the worker engaged in self-employment, migration, job search or working at home. Since the LFS does not include substantial detail on the different transaction costs in choosing one option to another, it was decided to place all these options in two categories: permanent or alternative work. Inclusion in these categories merely denotes that the individual is =part of sample in the wage estimates.

[2] This approach is also known as the Heckman procedure for correcting self-selection which results in measurement bias.

[3] The number of observations in work hours is greater than the wages because self-employed individuals are included among those who reported work hours but no wages

[4] This includes predicting wages for self-employed individuals who did not report wages but recorded labor hours.

[5] The null hypothesis that the coefficient is equal to zero cannot be rejected.

[6] While there seems to be consensus in the Philippines that minimum wage affects all workers (see Orbeta, et al., 2014), there has been little evidence on its differential effects on gender.

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