Wage Premium via Education &Gender Difference through Labor Disputes on OFDI in Taiwan ROC

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We studied specific labor market outcomes to ascertain and compare the effects of labor laws (contemplating the cases of labor disputes) and the effect of education of labor on wage in Taiwan. The rising cases of labor disputes have also made certain amount of positive impact on the wages of educated workers in the outward FDI intensive industries in Taiwan. The country has time and again resisted stern enforcement of labor regulations as it believed that stringent conditions would bring in additional wage premium via educational difference, thus compelling the domestic firms to move outside Taiwan. It also created a narrow difference between gender on wage premium because of educational qualification where wages of women workers had increased more than men's wages.

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Introduction

The impact of outflow of foreign direct investment (or outward FDI) on employment in the domestic market may be a well-researched area. The empirical evidence suggests that outward FDI reduces the demand for low skilled labor and highly skilled employees in Italy.[1] But the studies have suggested that if there is likely a reduction in the domestic demand for labor in the short run, it is likely to increase the company's competitiveness in the longer term. The changes in domestic employment imply systematic and flexible adjustments in the labor market. In particular, there shall be a greater supply of higher vocational profiles and the consequent need for additional investment in human capital.[2]

[1] Although it would be necessary to take into account all the complex relationships between foreign production, domestic employment and production, foreign trade and the variations in the investing firms' competitive advantages, nonetheless it is possible to draw some considerations on the issue.

[2] The lack of such structural adjustment processes would cause other fatal consequences for the competitiveness of the country, and the stability and growth of the domestic employment.

Scholars have argued for and against the notion that a highly regulated labor market creates a positive effect that helps to deter outward FDI (OFDI). According to some, the regulated labor market increases labor productivity because of the improved state of industrial relations and it declines the outflows of FDI (Parcon, 2008). However, scholars from the other camp consider that the regulated labor market deters outflows of foreign capital because it imposes an additional cost. Though a vast literature exists on the effects of labor market regulations and high labor standards on OFDI in home countries (Kokko, 2006), the existing scholarship has a blind spot toward the relationship between the home country's state of industrial relations and the patterns of outflow of foreign investment, a gap that tends to get tilled in this study.

We treated the rate at which the numbers of cases of labor disputes were raised as the indicator of the state of industrial relations. The number of cases of the labor dispute is negatively correlated to a healthy state of industrial relations. We further presumed that labor disputes signify the effects of the changes in regulatory conditions. For instance, there will be a significant improvement in compliance rate after the enactment of strict legislation. Consequently, the improved regulatory conditions will benefit the state of industrial relations and reduce the numbers of cases of labor disputes in due course, or otherwise. Secondly, strict regulation will improve the firms' compliance rate and the quality of manpower. As a result, foreign investors will get attracted to firms that have quality manpower. However, the deteriorating state of industrial relations echoed in the form of an increased number of cases of disputes may compel the domestic firms to invest in a foreign land, thereby increasing the OFDI. Average wage differences between foreign and domestic firms merely reflect differences in the composition of the workforce, wages in foreign-owned firms are 12% higher for production workers and 20% for non-production workers.[3]

At times a relatively higher labor cost in the host country does not discourage the foreign firms from investing.

Globalization has resulted in blurred international boundaries. Subsequently, there is a growing inclination among multinationals to invest in markets with greater opportunities. The host country makes use of different policies to attract foreign investors. These policies are meant to generate flexible labor market conditions. According to Carstensen and Toubal (2003), the increase in the inflow of FDI is largely attributed to the host countries' market potential and regulatory environment. These factors are so critical that at times a relatively higher labor cost in the host country does not

[3] For example, Lipsey and Sjö holm (2004) use a plant-level dataset for Indonesia with detailed information on the composition of workers across educational categories. They find that, while differences in average labor quality account for a significant part of the raw foreign wage premium, it remains large.

discourage the foreign firms from investing, provided the domestic market maintains high labor standards. However, strong labor standards call for improved labor quality. So, the important question is whether the change in the state of industrial relations and improvement in the quality of labor will have any effect on wages, especially for industries with a high outward stock of FDI.

We believe that the studies that have examined the effect of labor quality and cases of labor disputes on foreign investors have not adequately explained the function of these labor market characteristics in influencing the industries with a high outward stock of FDI. So, we are questioning whether the domestic labor market conditions would matter to the domestic investors while they decide to invest outside the country. Building on the extant literature on the effects of labor market conditions such as predicted wage, quality of labor, and state of industrial relations on the outward flow of FDI, in this study, we measure the effect of changes in the state of industrial relations and quality of manpower on wages for industries with a high outward stock of FDI in Taiwan.

Literature Review & Hypotheses Building

One of our foremost assumptions is that the rise or fall in the cases of labor disputes (our measure of the state of industrial relations) is largely attributed to stringent enforcement of labor regulations. Although the enforcement of labor laws is not our key variable while building the hypotheses we relied on the literary evidence on strict enforcement of labor laws and its direct and indirect relationship with industrial disputes, quality of labor, and the outward stock of FDI in industries.

An abundance of quality human resources in the host country helps in attracting foreign investors.

We reviewed the relationship between demand and supply of quality human resources and strict enforcement of labor laws, and its consequences such as rising or declining number of cases of labor disputes. We presumed that strict enforcement of labor laws would help the foreign firms to attract more educated workers, which would bring about an increase in the supply of quality manpower. Lai and Sarkar (2017) claimed that foreign firms in Taiwan have complied with labor laws more often than their domestic counterparts. As a result, there was an increase in the supply of labor in the domestic market. At the same time, considering all other conditions around to be constant, strict enforcement of labor laws could bring in a reduction in the supply of labor if the growing number of cases of disputes because of strict enforcement of labor laws discourages and prevents quality workforce to participate in the labor market. So, stringent enforcement can increase as well as decrease the supply of quality manpower. We focus here on the supply of quality labor since an abundance of quality human resources in the host country helps in attracting foreign investors.

Concerning the demand for labor, Huang et al (2016), Gao (2005), and Noorbakhsh et al (2001) have observed that the demand for quality manpower in foreign firms increases at a normal pace. Concerning the role of the quality of labor in attracting FDI, the empirical evidence indicates that there is a very high demand for educated skilled manpower among foreign firms. For example, Gao (2005) and Noorbakhsh, Paloni, and Youssef (2001) have noticed a positive role played by the quality of domestic labor in attracting FDI. Gao (2005) found the education level of local Chinese workers to have played a critical role in attracting investment from overseas to China. Labor quality characterized by human capital accumulation was found by Hanushek and Kimko (2000) to have resulted in the host country's economic growth. The quality of the host country's human resources helps in rapid technology transfer from the home country. Sarkar and Lai (2009) have found that the output of domestic firms has got positively influenced by foreign ownership through productivity spillover in India. Rhee and Belot (1990) indicated that multinationals act as a natural channel for the flow of knowledge of the overseas market to domestic firms.

Further, Kan & Lin (2011) and Lai and Sarkar (2016) indicated that the enforcement of labor laws is more effective in large firms in Taiwan and it leads to a reduction in job turnover and an increase in employment stability in these firms. So, we assume that the industry comprising large firms will witness stronger enforcement of the beneficial legislation in comparison to the industries with small and medium-sized firms. Consequently, our hypotheses concerning the effects of changes in demand and supply of quality workforce on their wages will vary between industries depending on the size of the firms in those industries.

With regard to the relationship between the state of industrial relations (number of cases of labor disputes) and inflow or outflow of foreign investment, when cases of labor disputes increase during the peak year(s) of enforcement of stringent labor laws, non–wage cost will rise. However, the rise in cases of labor disputes will improve the wages of educated manpower. Cramton and Tracy (1994), Tcha (1998), and Cramton et al (2008) have suggested that firm-level wage initially escalates when there is a labor dispute and this happens because of the collective agreement between labor and management after workers raise disputes against their employer. Therefore, strong enforcement of labor laws, which may get reflected in the rise of cases of labor disputes, will overall increase the cost (wage plus non–wage) of hiring an educated workforce, making it more than what the foreign firms usually pay for educated labor. Consequently, it will result in a reduction in the hiring of educated labor and a subsequent drop in FDI too. Hence, the effect of regulation on the labor market for an educated workforce, especially in the MNC, depends on the changes in demand and supply of an educated workforce.

Therefore, based on the above discussion, we built the following three hypotheses:

H1: Educated young workers are more likely to get hired by the MNC, though the same is contingent upon the number of cases of labor disputes since it has been found to have caused both output and substitution effect, leading to a change in supply or demand for educated young workforce and the subsequent impact on their wages. In contrast, the old workers may get impacted as their wages will reduce.

H2: Based on hypotheses one, the OFDI will lead to wage premium via education difference.

H3: The wage premium via education difference will differ between women and men and will thus create a gender difference.

Data

We used both industry and firm-level data. For the industry data, we included information on the inflow and outflow of FDI. Data on inflow and outflow was obtained from the annual statistics on 'approved inward and outward investment by industries. Both are published by the Ministry of Economic Affairs, Government of Taiwan. We did not have the data on real investment. So, we adopted the data on the approved outflow of foreign investment as a proxy for the outflow of FDI, since approved investments are normally close to the physical investments.

Data on the total number of workers working in the industry was taken from the statistics reported in the annual yearbook of earnings published by the Directorate General of Budget, Accounting, and Statistics, Executive Yuan, Taiwan. Manpower Utilization Survey[4] (MUS) was used as the main source for the micro-level data. Data for an individual across time representing a specific demographic group was used. Our sample was restricted to private firms and individual workers in the age group of 15–60 years, excluding the workers from self–employed and employers[5]. The sample used for testing our model, which was selected from the year 1999 to 2017, comprises137,520 female and 180,935 male workers for testing the effect on wage[6].

Table 1 carries the definitions of variables and descriptive statistics. We adopted the real wage ($Wage_{ijt}$) of employee *i* working in industry *j* at time *t* using 2011 as the base year. For the workers who work for lesser hours, their wages, working hours, occupation, tenure, and the type of industries in which they were employed are the key variables included in our study. Besides, we included the variable of deflated $OFDI_{jt}$ for

[4] It is an annual survey that collects data on earnings and elicits employment data from 1978 onward in Taiwan.

[5] Farm labor public firm's workers and self-employed and employers will be less affected by the labor legislation than labor in other sectors.

[6] We did the robust test for different sample periods. Result obtained from the years 1999-2012 was better than other time periods. Neither shorter nor longer control years have produced better results.

an individual employee *i* working in industry *j* at time *t,* which indicates the net/outward stock of FDI in US dollar calculated by dividing the real GDP in the industry *j*. This was used in equation 4 (Noorbakhsh et al, 2001). We adopted the net/outward stock of FDI. Based on capital formation, the outflow of FDI is expected to crowd-out the domestic investment. Therefore, the net/outward stock of FDI was used as it will precisely reflect the capital formation of domestic investment.

The coefficient of $\Delta OFDI_{jt-1}$ represents the lag changes in OFDI (viz., the difference between $OFDI_{jt}$ in period *t* and $OFDI_{jt-1}$ in period *t–1*) to GDP ratio (Noorbakhsh et al 2001). The independent variables in our model include the cases of labor disputes (LDS_t), which is the proxy for the state of industrial relations. We expected that LDS_t should be able to capture the effects of industrial relations on wages (Cramton & Tracy 1994; Tcha, 1998; Cramton et al, 2008; Busse et al, 2011).

The variable of MS_{ijt} represents the market size, which is a lag of log GDP in an industry *j* at year *t* (Asiedu, 2006). The involved rate of labor intensity for an industry (viz., LDN_{jt}) to check if the foreign investment has flown mostly to the labor-intensive industries in Taiwan. To measure the labor intensity, we included the employment figure by industry in a specific year and divided the figure by the amount of capital in the industry in that year. Since low exchange rates (EXR_t) for Taiwanese currency might have helped in attracting FDI but at the same time might affect wages as well, thus we adjusted the exchange–rate fluctuations by adopting an average exchange rate for one US dollar against the New Taiwanese dollar.

The control variables in our model include monthly working hours ($Hour_{ijt}$), educational years (Edu_{ijt}), experience (Exp_{ijt}), working tenure (Ten_{ijt}), income from other family members (FI_{jt}), and the marital status ($Marital_{ijt}$) of workers. In the wage equation (equation 4), the control variables also include the number of years spent on education, we included the higher education dummy variable viz., HED_{ijt} (workers educated college degree or higher for each demographic group ex, young workers aged 15-29 and older worker aged 30-60 years) or lower education dummy variable LED_{ijt} (workers educated high school degree or lower for each demographic group, young workers aged 15-29 and older workers aged 30-60). After controlling the years spent on education, the dummy variable of higher education viz., HED_{ijt} (LED_{ijt}) measures the additional effect of highly (lower) educated workers on wages. However, the most important variable viz., HED_{ijt} (LED_{ijt}) which is the variable of high (low) educated workers, is included as a dummy variable in our model (Gao, 2005). Time trend (Td_t) variable that ranged from 1 to 19 represented every year from 1999 to 2017. It measured the time fixed effect, especially the effect of macroeconomic conditions over a fairly long time. Since our sample comprises industry data, we controlled the industry type to attain greater explana-

tory power. Based on the classification of industries, the industry dummy variables were included.[7]

Estimating the Effects on Stock of Outward Foreign Direct Investment

At first, we examined the differences in the effects of labor quality and labor disputes on the wages of workers employed in large and small firms.

In the existing literature, where repeated cross-sectional data (such as the one from the MUS) was used to test the effects of laws on labor market outcomes, researchers have normally applied DDD estimation method (Lai & Sarkar, 2013; 2017). We too adopted the underlying principles of DDD estimation method in our model of firm or industry choice. It was done to control the changes in productivity characteristics across workers employed in firms of different sizes who have faced high and low enforcement of labor laws. It was also done to remove any sample–selection bias. Policy placement is correlated with some unobservable firm– or industry-specific factors. Large firms in Taiwan normally face strong labor law enforcement by the Council of Labor Affair (CLA),

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which inspects firms with more than 100 workers (Lai & Sarkar, 2013). Besides, these large firms are more prepared to comply with labor laws as they want to attract a quality workforce (Kan & Lin, 2011; Lai & Sarkar, 2016).[8] Therefore, in our study, we have treated industries comprising large firms as the covered industries, and others as uncovered industries. Consequently, the estimated coefficients on the policy variable (viz., $Covered_{ijt}$) became subject to a host of endogeneity biases[9]. However, our estimation strategy could correct for endogenous policy placement through the firm with more than 100 workers or FDI intensive industry fixed effects term, viz., $Covered_{ijt}$ (Rosenzweig & Wolpin, 1986). Besides, the primary condition for applying DDD estimation method is that the key trends in wages should be similar for both workers in large and small firms in Taiwan because if the trends were

[7] We divided industry dummy variables into three sub-industries/sectors, which include Industry-1 comprising food, textile, garment, lumber, paper, leather, plastic, rubber, and chemical; Industry-2 comprising non-metallic, metals, machinery, electronic, transportation machinery, precision; Industry-3 comprising water, electrically and gas power, construction, retailers and wholesalers, international trade, transportation, warehouses, communication.

[8] Some argue that the industries with firms hiring more than 100 workers may be host to numerous small firms undetected by the CLA. It may cause the cover variable malfunction. However, we check the industries (Textile, Apparel and Leather) having largest ratio of small size firms, the ratio of covered firms (workers>100) is 26%, and uncovered firms (workers<100) is 74% during 1999-2012. Therefore, the cover variable can perform the measurement of legislation enforcement.

[9] The endogeneity problem occurs when more large-sized firms and more productive firms attract full-timer workers with higheducation and low labor disputes.

different, then the DDD estimates would include heterogeneity bias[10]. We found the trends to be similar.

In equation 1, we included a vector of variables viz., Y_{ijt}. It is a matrix of input factors hypothesized to influence labor supply for individual worker *i* in industry *j* at the year *t* as shown in Table 1. Input factors include the experience (linear and quadratic), job tenure (linear and quadratic), years of education, and marital status of workers. We also added macro variables to Y_{ijt} such as industry variables, lag change in OFDI, market size, exchange rate, the labor intensity of an industry, and the time trend[11]. Besides, the family income from other household members (FI_{ijt}) was added to Y_{ijt} in equation 1.

To measure the difference in chances of wage among quality workforce employed in industries with high net/outward stock of FDI between the conditions where cases of labor disputes are high and cases of labor disputes are few, we calculated the $Q_{ijt} \times LDS_{ijt}$ with the interaction between large and small firms ($Covered_{ijt}$), in which case the DDD coefficient became $Covered_{ijt} \times Q_{ijt} \times LDS_t$. The value of higher education dummy (viz., $HED_{ijt,}$ or LED_{ijt}) in the given condition varies from zero to one, and the labor disputes ratio is represented by LDS_t. We treated the independent variable measuring the number of cases of labor dispute (LDS_t) as an exogenous variable, though it includes certain endogeneity bias. Besley and Case (2000) claimed that the DDD estimation can eliminate the endogenous problem for the policy variable depending on the control group that is chosen. By the $Covered_{ijt}$ in our equation 1, 3, and 4 together with the labor quality dummies and labor dispute variable we could provide the DD ($Covered_{ijt} \times Q_{ijt}$ and $Covered_{ijt} \times LDS_t$) and DDD ($Covered_{ijt} \times Q_{ijt} \times LDS_t$) estimators. However, the firms that have high or low enforcement of labor laws ($Covered_{ijt}$) multiplied by the higher education dummy and more cases of labor disputes and their intersection (viz., $Covered_{ijt} \times Q_{ijt} \times LDS_t$.) may include the effects of other factors over and above the laws. Hence, we multiplied $Covered_{ijt}$ by the control variables (Y_{ijt}), which is $Covered_{ijt} \times Y_{ijt}$ in equation 1. We believe that the latter two intersections will be able to test the varying effects of wages between firms of different sizes with high and low enforcement of labor laws. Therefore, to measure the large and small firms' differential effects on account of the quality workforce employed in industries with a high outward stock of FDI who are working in conditions where cases of labor disputes are high, the DDD estimate (viz., $Covered_{ijt} \times Q_{ijt} \times LDS_t$ in our

[10] We noticed a similarity between the key trends in large-sized and small-sized firms. Therefore, we could summarily dismiss the possibility of any heterogeneity bias.

[11] There are 16 control variables will include monthly working hours (Hourijt), educational years (Eduijt), experience (Expijt) linear and quadratic, working tenure (Tenijt) linear and quadratic, and the marital status (Maritalijt). Four industries (Ind1-4ijt), and other control variables include the lag changes in OFDI (ΔOFDIjt-1), market size (MSjt), labor intensity for an industry (LDNjt), exchange rate (EXRt) and Time trend (Tdt).

equation 1 were worked out from the differences in values of $Q_{ijt} \times LDS_t$ between workers in large firms and workers in small firms in our equation 1. To estimate the effect on wage through DDD, we formed equation 1.

At first, we eliminated the sample selection bias by adopting the Heckman two-stage method. Since the wage data was available only for those who were employed, wage estimates for all observations were derived based on our wage equation (equation 1) that was capable of controlling the sample selection bias caused by employment. λ^x is a sample selection term in equation 1. σ is the coefficient of λ^x and u_i is the error term. Wage equation estimation was done with the subsample of employed people only. Here, λ^x was derived from a reduced–form estimation of workforce employment for all observations that were made in connection with the employed and non–employed individuals (Lee, 1983).[12]

$$Wage_{ijt}=a_0+a_1OFDI_{jt}+a_2Covered_{ijt}+b_1Q_{ijt}+b_2LDS_t+b_3Q_{ijt}\times LDS_t+\sum_{(i=1)}^{16} c_iY_{ijt}+d_1Covered_{ijt}\times Q_{ijt}+d_2Covered_{ijt}\times LDS_t+d_3Covered_{ijt}\times Q_{ijt}\times LDSt+\sum_{(i=1)}^{16} e_iCovered_{ijt}\times Y_{ijt}+f_1OFDI_{ijt}\times Q_{ijt}+f_2OFDI_{jt}\times LDS_t+f_3OFDI_{jt}Q_{ijt}\times LDS_t+\sum_{(i=1)}^{16} g_iOFDI_{jt}\times Y_{ijt}+h_1OFDI_{jt}\times Covered_{ijt}\times Q_{ijt}+h_2OFDI_{jt}\times Covered_{ijt}\times LDS_t+h_3OFDI_{jt}\times Covered_{ijt}\times Q_{ijt}\times LDS_t+\sum_{(i=1)}^{16} k_iOFDI_{jt}\times Covered_{ijt}\times Y_{ijt}+\delta\lambda^x+u_i \quad \ldots\ldots(1)$$

$$Q_{ijt}=HED_{ijt} \text{ or } LED_{ijt} \quad \ldots\ldots(2)$$

Real monthly wage ($Wage_{ijt}$) was included as the dependent variable in equation 1. $Wage_{ijt}$ is the individual worker *i*'s monthly wage obtained from MUS and adjusted by the prices in 2011. Likewise λ^x was included as a white noise term in equation 1.

To measure the differential effects on account of labor quality and labor disputes on wage, we presumed that the intersection of $OFDI_{jt}$, $Covered_{ijt,}$ and $Q_{ijt}\times LDS_t$ (viz. $OFDI_{jt}\times Covered_{ijt}\times Q_{ijt}\times LDS_t$ will measure the main effects in equation 4. Here, h_j is the coefficient of the four-way interaction (viz. $OFDI_{jt}\times Covered_{ijt}\times HED_{ijt}\times LDS_t$ or $OFDI_{jt}\times Covered_{ijt}\times LED_{ijt}\times LDS_t$). The DDD estimator for the interaction viz., $OFDI_{jt}\times Covered_{ijt}\times Q_{ijt}\times LDS_t$ is expected to measure the main effects of OFDI on wage.

As a result of the combined effect of labor disputes and labor quality, the workers' wages are likely to increase, and outward FDI in the industry in which they are employed is likely to reduce. Therefore, the effects of OFDI, labor quality,

[12]The reduced form omits wage and includes, in addition to the explanatory variables in the labor force equation, age, education, and other variables related to the labor participation. By using the predicted probability from the equation 1, we constructed a set of sample selection terms as given below.

$$\lambda^x = f(F^{-1}[P(X=x)])/P(X=x)$$

Here, f(X=x) and P(X=x) represent the cumulative distribution and probability density function for standard normal distribution, respectively. These terms are analogous to the inverse Mills' ratio in Heckman selection model.

and labor disputes on wages depend on whether the effect of laws would tower over every other factor. Besides, the industries with outflow or net stock of OFDI are likely to realize greater protection effects of the laws compared to smaller firms with a low outward stock of FDI. Whether the firms have outward stock of FDI will have an effect on workers' wages too. To correct for heteroskedasticity, we made estimations applying LDS_t weighted least squares regression in equation 3.

Wage Premium via Education in Equation 3 is $OFDI_{jt} \times Covered_{ijt} \times HED_{ijt} \times LDS_t$ minus $OFDI_{jt} \times Covered_{ijt} \times LED_{ijt} \times LDS_t$. It can measure the effect of legislation on highly educated workers (or low educated workers) in outward FDI intensive industries during the period of high labor disputes. To measure the gender difference of wage premium via education, as seen in Equation 4, wage Premium via Education & Gender $[OFDI_{jt} \times Covered_{ijt} \times WG_{ijt} \times LDS_t]_{Women}$ minus $OFDI_{jt} \times Covered_{ijt} \times WG_{ijt} \times LDS_t]_{Men}$ can measure the gender difference for the effect of legislation on highly educated workers (or low educated workers) in outward FDI intensive industries during the period of high labor disputes.

Wage Premium via Education

$$OFDI_{jt} \times Covered_{ijt} \times WG_{ijt} \times LDS_t = OFDI_{jt} \times Covered_{ijt} \times HED_{ijt} \times LDS_t - OFDI_{jt} \times_{ijt} \times LED_{ijt} \times LDS_t \quad \text{.....(3)}$$

Wage Premium via Education & Gender

$$Gender \times OFDI_{jt} \times Covered_{ijt} \times WG_{ijt} \times LDS_t = [OFDI_{jt} \times Covered_{ijt} \times WG_{ijt} \times LDS_t]_{Women} [OFDI_{jt} \times Covered_{ijt} \times WG_{ijt} \times LDS_t]_{Men} \quad \text{.....(4)}$$

Empirical Results

The DDD results presented in column (1A) and (3A) of Table 2 for $OFDI_{jt} \times Covered_{ijt} \times HED_{ijt} \times LDS_t$ show that the net OFDI intensive industries have seen an increase in earnings of the female and male young high educated workers (0.010 and 0.007), but a decrease of old men (-0.006) in column (4A) of Table 2. On the other hand, the column (2B) and (3A) of Table 2 for $OFDI_{jt} \times Covered_{ijt} \times LED_{ijt} \times LDS_t$ show that the net OFDI intensive industries have seen a decrease in earnings of the female older high educated workers (0.010).

Wage has a significant negative effect on educated young females employed in large firms in outflow FDI intensive industries during the period of industrial turbulence and strife.

However, the coefficient of $OFDI_{jt} \times Covered_{ijt} \times HED_{ijt} \times LDS_t$ in column (1A) of Table 3 shows that wage has a significant negative effect (-0.008) on educated young females employed in large firms in outflow FDI intensive industries during the period of industrial turbulence and strife. But the coefficient

Table 1 The Sample Characteristics

Variable	Women	Men
Dependent Variable:		
$Wage_{ijt}$: Log value of monthly wage per employee.	10.49(0.44)	10.48(0.43)
Independent Variables		
$Marital_{ijt}$= '1': Married = '0': Single	0.52(0.50)	0.59(0.50)
$\Delta OFDI_{jt-1}$: lag changes in the net outward FDI to GDP ratio	-0.0005(0.03)	-0.0002(0.04)
MS_{ijt}: lag of log GDP in an industry j	10.68(3.05)	10.56(3.13)
Exp_{ijt}: The employee' experience	17.08(11.76)	19.41(11.35)
Ten_{ijt}: The employee's tenure	5.51(6.24)	6.64(7.28)
HED_{ijt}: College education level	0.19(0.40)	0.10(0.31)
LED_{ijt}: Lower education level	0.15(0.36)	0.15(0.36)
LDS_t: The involved rates of labor disputes	0.43(0.10)	0.44(0.07)
LDN_{jt}: The labor density of the industry	8.18(3.66)	8.18(3.66)
EXR_t: The exchange rates	32.32(1.51)	32.32(1.51)
$Hour_{ijt}$: Individual log value of monthly working hours	4.96(1.23)	4.94(1.29)
Edu_{ijt}: Individual education years	12.46(3.17)	12.20(3.17)
FI_{ijt}: Family IncomeTD_t: The time trend fixed effect	9.06(3.95)	8.61(4.00)
	7.74(6.68)	8.41(4.02)
$Ind1_{ijt}$: food, textile, garment, lumber, paper, leather, plastic, rubber, and chemical.	0.30(0.46)	0.37(0.48)
$Ind2_{ijt}$: non–metallic, metals, machinery, electronic, transportation machinery, precision.	0.03(0.18)	0.18(0.38)
$Ind3_{ijt}$: water, electrically and gas power, construction retailers and whole sales, international trade, transportation, warehouses, communication	0.26(0.43)	0.21(0.41)

Note: Inside the parenthesis are standard deviation

of $OFDI_{jt} \times Covered_{ijt} \times LED_{ijt} \times LDS_t$ in column (2B) of Table 3 shows increased wage (0.009) of low educated old women in the outflow intensive industry. So, during the period when labor disputes were at their peak in Taiwan, the high outward stock of FDI in industries has made a positive impact on the earnings of young educated women and men.

As seen in (1A), (1B) and (1C) of Table 4, wage premium via high education will have a positive effect on young women, young men, and old women in large firms in net outflow FDI intensive industries during the period of industrial turbulence and strife (0.012, 0.014, 0.017). As seen in (1A) and (1C) of Table 4, wage premium via high education has a positive effect on young women and old women in large firms in outflow FDI intensive industries during the period of industrial turbulence and strife (0.010, 0.012). However, as seen in (1B) of Table 4, the wage premium via high education has a positive effect on young men in large firms in outflow FDI intensive industries during the period of industrial turbulence and strife (-0.015). As seen in (2A) and (2B) of Table 4, wage premium via high education and gender will have a positive effect on young workers in large firms in outflow and net outflow FDI intensive industries during the

Table 2 The Effect of Net OFDI on Wages

	Women				Men			
	(1A)HED	(1B)LED	(2A)HED	(2B)LED	(3A)HED	(3B)LED	(4A)HED	(4B)LED
Intercept	8.154	8.129	8.421	8.459	9.328	9.288	-9.427	9.358
	(0.047)***	(0.047)***	(0.050)***	(0.047)***	(0.035)***	(0.035)***	(0.035)***	(0.035)***
$OFDI_{jt}\times Covered_{ijt}\times\Delta OFDI_{jt-1}$	-0.506	-0.521	-0.511	-0.451	-0.155	-0.141	-0.142	-0.136
	(0.263)*	(0.263)**	(0.263)*	(0.262)*	(0.220)	(0.220)	(0.220)	(0.220)
$OFDI_{jt}\times Covered_{ijt}\times MS_{ijt}$	0.008	0.008	0.009	0.009	0.019	0.019	0.019	0.019
	(0.003)***	(0.003)***	(0.003)***	(0.003)***	(0.002)***	(0.002)***	(0.002)***	(0.002)***
$OFDI_{jt}\times Covered_{ijt}\times LDN_{jt}$	-0.004	-0.002	-0.005	0.002	-0.008	-0.006	-0.005	-0.007
	(0.002)**	(0.002)	(0.002)**	(0.002)	(0.002)***	(0.002)***	(0.002)**	(0.002)***
$OFDI_{jt}\times Covered_{ijt}\times LDS_{t}$	1.457	1.439	1.483	1.474	1.240	1.255	1.217	1.182
	(0.356)***	(0.357)***	(0.356)***	(0.355)***	(0.268)***	(0.269)***	(0.269)***	(0.268)***
$OFDI_{jt}\times Covered_{ijt}\times EXR_{t}$	0.032	0.032	0.033	0.033	0.020	0.0197	0.020	0.020
	(0.006)***	(0.006)***	(0.006)***	(0.006)***	(0.005)***	(0.005)***	(0.005)***	(0.005)***
$OFDI_{jt}\times Covered_{ijt}\times Q_{ijt}$	-0.100	-0.008	0.023	0.010	-0.038	-0.036	0.049	-0.035
	(0.035)***	(0.040)	(0.033)	(0.030)	(0.031)	(0.037)	(0.025)**	(0.026)
$OFDI_{jt}\times Covered_{ijt}\times Q_{ijt}\times LDS_{t}$	0.0010	-0.002	0.006	-0.010	0.007	-0.007	-0.006	0.003
	(0.003)***	(0.005)	(0.004)	(0.003)***	(0.004)**	(0.004)*	(0.003)**	(0.003)
λ^{χ}	9.047	8.958	6.753	5.860	4.334	4.363	3.414	3.148
	(0.278)***	(0.279)***	(0.289)***	(0.288)***	(0.140)***	(0.142)***	(0.144)***	(0.145)***
Adj. R square	0.411	0.411	0.415	0.417	0.424	0.424	0.425	0.426
F value	1178	1178	1196	1209	1611	1613	1620	1629
Number of observations	137520	137520	137520	137520	180935	180935	180935	180935

Source: The Manpower Utilization Survey 1999–2017.

Note:

a. Based on equation 1 (Dependent Variable = Monthly Wage based on 2011 dollar)

b. All standard errors are shown in parentheses. * p < .01 ** p < .005 *** p < .001

c. The columns 1 and 3 are model of Q= (HED or LED) =young workers, and column 2 and 4 are model of Q= (HED or LED) =older workers.

Table 3 The Effect of OFDI on Wages

	Men				Women			
	(1A)HED	(1B)LED	(2A)HED	(2B)LED	(3A)HED	(3B)LED	(4A)HED	(4B)LED
Intercept	8.097	8.071	8.362	8.400	9.296	9.257	9.398	9.328
	(0.047)***	(0.048)***	(0.048)***	(0.048)***	(0.035)***	(0.036)***	(0.035)***	(0.035)***
$OFDI_{jt}\times Covered_{ijt}\times\Delta OFDI_{jt}-1$	0.658	0.686	0.705	0.610	0.207	0.196	0.189	0.171
	(0.289)**	(0.290)**	(0.290)**	(0.288)**	(0.248)	(0.248)	(0.248)	(0.248)
$OFDI_{jt}\times Covered_{ijt}\times MS_{ijt}$	-0.0117	-0.012	-0.012	-0.0112	-0.030	-0.029	-0.028	-0.028
	(0.005)**	(0.005)**	(0.005)**	(0.005)**	(0.003)***	(0.003)***	(0.003)***	(0.003)***
$OFDI_{jt}\times Covered_{ijt}\times LDN_{jt}$	0.003	0.002	0.003	-0.002	0.007	0.005	0.005	0.007
	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)***	(0.002)***	(0.002)***	(0.002)***
$OFDI_{jt}\times Covered_{ijt}\times LDS_{t}$	-1.859	-1.831	-1.827	-1.852	-1.561	-1.559	-1.553	-1.508
	(0.426)***	(0.426)***	(0.425)***	(0.423)***	(0.301)***	(0.301)***	(0.300)***	(0.300)***
$OFDI_{jt}\times Covered_{ijt}\times EXR_{t}$	-0.026	-0.026	-0.027	-0.026	-0.009	-0.009	-0.009	-0.010
	(0.007)***	(0.007)***	(0.007)***	(0.007)***	(0.005)*	(0.005)*	(0.005)*	(0.005)*
$OFDI_{jt}\times Covered_{ijt}\times Q_{ijt}$	0.080	0.046	-0.035	-0.001	0.029	0.036	-0.029	0.023
	(0.041)*	(0.048)	(0.039)	(0.035)	(0.038)	(0.044)	(0.029)	(0.029)
$OFDI_{jt}\times Covered_{ijt}\times Q_{ijt}\times LDS$	-0.008	-0.002	-0.003	0.009	-0.006	0.009	0.003	-0.002
	(0.004)**	(0.005)	(0.004)	(0.004)**	(0.004)	(0.004)*	(0.003)	(0.003)
λ^{χ}	8.972	8.878	6.707	5.834	4.318	4.353	3.403	3.138
	(0.278)***	(0.278)***	(0.289)***	(0.288)***	(0.140)***	(0.142)***	(0.145)***	(0.144)***
Adj. R square	0.413	0.413	0.416	0.418	0.424	0.425	0.425	0.427
F value	1185	1185	1201	1214	1615	1618	1623	1633
Number of observations	137520	137520	137520	137520	180935	180935	180935	180935

Source: The Manpower Utilization Survey 1999–2017.

Note:

a. Based on Equation 1. (Dependent Variable = Monthly Wage based on 2011 dollar)

b. All standard errors are shown in parentheses. * p < .01 ** p < .005 *** p < .001

c. The columns 1 and 3 are model of Q (HED or LED) =young workers, and column 2 and 4 are model of Q (HED or LED) =older workers.

Table 4 The Wage Premium via Education & Their Gender Difference Effect

	(1A)Young Women	(1B) Young Men	(1C) Old Women	(1D) Old Men
OFDI=Net OFDI	0.012(0.006)**	0.014(0.006)***	0.017(0.005)***	0.012(0.006)**
Outflow	0.010 (0.006)*	-0.015(0.006)***	0.012(0.005)***	0.010 (0.006)*
OFDI=Net OFDI	(2A)		(2B)	
Outflow	-0.002		0.025	
	(0.008)		(0.008)***	
	0.012		0.007	
	(0.006)**		(0.006)	

Note:
a. The columns 1A to 1D are based on equation 4, and the columns 2A and 2B are based on equation 4.
b. All standard errors are shown in parentheses. * p < .01 ** p < .005 *** p < .001
c. The columns 1A and 1B are model of Q (HED or LED) = young workers, and column 1C and 1D are model of Q (HED or LED) =older workers.
d. The column 2A is calculated from 1A minus 1B, and column 2B is calculated from 1C and 1D.

period of industrial turbulence and strife (0.012 vs. 0.025).

Discussion & Conclusion

From our results for both net OFDI and OFDI industry, we could, first, confirm one of our hypotheses in which we presumed that the young and old female labor will have certain effects on wages premium during the peak years of strict enforcement of labor laws in Taiwan. But, once again we have noticed a significant difference between the earnings of educated and less educated women rather than men in these industries. So, the high educational attainment has enjoyed more benefits and earned more wages than less-educated workers in Taiwan.

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Furthermore, after we consider the gender wage difference, the young workers in the OFDI intensive industry will have a positive gender wage difference in wage premium as a result of labor disputes and labor legislation effect. On the other hand, old workers in the high net OFDI industry will have a positive gender wage difference (women minus men) in wage premium as a result of labor disputes and labor legislation effect.

Taiwan has time and again resisted stern enforcement of labor regulations as they believed that stringent conditions would bring in additional wage premium via educational difference, thus making it move outside Taiwan. Nevertheless, empirical evidence in support of this apprehension is mixed. Our results have pointed out two key issues. One, it is true that domestic firms have paid more to educated workers in comparison to less-educated workers in Taiwan. One may interpret it as a sign of proximity to the high net and general OFDI with industry

characteristics. Two, the increasing cases of labor disputes during the peak years of strict enforcement of labor laws have not aided much in bringing any significant effect on increasing the earnings of educated young workers rather than of older workers. The higher wages premium of a young educated workforce could cause higher OFDI. The outward FDI also lead to higher gender difference for wage premium via education difference.

Acknowledgments

The author would like to thank the Center for Survey Research, Academia Sinica for providing the data of the Manpower Utilization Survey. Thanks are due to Shih Chien University for providing the author with the grant for doing the research (grant number USC 106-08-01005).

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