

The role of labour unrest and skilled labour on outward foreign direct investment in Taiwan, Republic of China, ROC

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Abstract

This paper builds an estimation model to test whether improved labour standards necessarily lead firms to send work offshore to countries with lower wages and fewer employment protections; or improved labour standards influence the labour market, where with time, firms attract more skilled workers, which help deter outward foreign direct investment (FDI). When more firms comply with improved labour standards, the industrial relations climate also improves as non-compliance usually causes labour unrest. Using a model built on pooled cross-sectional time-series data from 2008–17, we studied the role of changes in labour unrest and the percentage of skilled workers in the labour force in predicting outward FDI in Taiwan. Per our estimation model, we found the percentage of skilled workers steadily increased as Taiwan maintained improved labour standards. The increase in skilled workers also increased labour costs making it challenging for firms to stay onshore. However, skilled workers helped firms improve productivity, which justified increased labour costs. As a result, firms in Taiwan that complied with labour standards found it less challenging to pay higher wages and stayed onshore.

JEL Code: J28, J38, F66

Keywords

Outward foreign direct investment, labour unrest, skilled workers, wages, Taiwan

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Introduction

Foreign direct investment (FDI) was once assumed to have naturally transferred from countries maintaining high labour standards to countries with poor governance institutions (Buckley et al., 2007; Kokko, 2006; Kolstad and Wiig, 2012). Chan (2003) reports that in growing Asian economies (GAEs)¹ with high labour standards, there was an increase in the number of firms that shifted their operations offshore in search of low-cost labour in response to rising labour costs in domestic markets. However, according to the United Nations Conference on Trade and Development (UNCTAD) (2019), FDI originates from countries with high as well as low labour standards. Specifically, research on the role of labour standards in determining outward FDI has suggested that maintaining high labour standards in home countries does not necessarily push investment towards nations with cheaper labour and poor labour protection. Instead, if labour costs are the major factor that entices firms to invest offshore, there is also a counter argument that high labour standards, while increasing labour costs, can at the same time deter outward FDI by helping firms achieve greater productivity, thus making it less challenging for firms to pay higher wages.

Following the arguments by Hayakawa et al. (2013) and Bano and Tabbada (2015), we made a humble attempt to answer the question do high labour standards deter outward FDI. We used Taiwan as our test case, as Taiwan has emerged as one of the fastest-growing economies in Asia, despite imports with limited domestic consumption primarily driving the country's economy. Taiwan's steady supply of skilled labour, at a relatively cheaper cost in the domestic market, has played a critical role in boosting an economy that largely depends on FDI. With increased enforcement of regulatory standards, Taiwan has witnessed growth in both inward as well as outward FDI. This makes Taiwan a well-placed case in which to study how high labour standards influence domestic firms' decisions to remain onshore or invest offshore. Where the labour and its cost are central to production, so too are the conditions and standards under which that labour is secured. In such a scenario, firms may find a linkage between high labour standards, resulting in increased labour costs, and appropriate industrial relations that help firms obtain a steady supply of skilled workers who can boost productivity. As a result, firms may no longer be incentivised to 'offshore' work. Therefore, in this paper, we theorise that higher labour standards are likely to be linked to a stronger focus on education and training, and a rise in skill levels. The result may be a rise in productivity, which in turn may mitigate an employer's tendency to use low-cost offshore labour.

Many factors entice firms to invest offshore. Labour costs, the current rate of return on foreign investment, technology gains, expansion in a firm's global supply chain, tax avoidance and even gains from (factory) property investment are the common ones (see Sikka and Willmott, 2010; Banga, 2008; Morck et al., 2008). However, we focus only on labour supply and costs as the key drivers of a firm's decision to remain onshore or invest offshore. The enforcement of high labour standards in the home country plays a decisive role in determining labour costs, as these standards help improve the supply of skilled workers. According to the International Labor Organization (ILO) (2014), a skilled worker is 'characterised by an advanced education, possession of knowledge and skills to

perform complicated tasks, ability to adapt quickly to technology changes, and creative application of knowledge and skills acquired through training in their work'. When firms maintain high labour standards, demand for skilled labour grows. Firms pay better wages, which strengthens the supply of skilled labour, and in return, skilled workers ensure higher productivity.

High labour standards also enhance the quality of industrial relations, fostering industrial peace through improved labour-management cooperation, while poor industrial relations lead to labour unrest and militancy, such as workers taking part in strikes and protests. If firms comply with high labour standards, it usually deters labour unrest since non-compliance is one of the major causes of industrial dispute. High labour standards guarantee collective representation of workers' concerns. Therefore, high labour unrest can result in wage increases where collective bargaining mechanisms are in place. It is the resulting increase in labour costs that encourages firms to move offshore unless the availability and price of skilled labour mitigate these costs through enhanced productivity.

Taiwan is one GAE where regulatory standards have improved due to the economy being import-dependent. The government in Taiwan has always remained aggressive in attracting foreign investment and driving economic growth. Changes in labour militancy result from changes in local regulatory conditions, from the Factory Act of 1932 to The Labour Standards Law (LSL) of 1984.² Before 1987, unions were under state control, and labour militancy was suppressed under the economics of export orientation (Chu, 2001). Kochan (1996) and Sarkar and Liu (2019) claim that unions gained freedom by acquiring political democracy after the lifting of the Martial Law. When the government formed the Council of Labor Affairs (CLA or current Ministry of Labor) to enforce stringent labour standards contained in the LSL, industrial relations in Taiwan improved (Lee and Wu, 1996). Over time, increasing employer compliance reduced litigation by workers disputing non-adherence to these laws. However, the CLA can only inspect compliance in firms with more than 100 workers (Lai and Sarkar, 2013, 2016, 2017). Therefore, we aim to assess the impact of firm compliance with high labour standards on outward FDI in large firms 'covered' by the regulatory standards as these are subject to inspection.

We postulate that growth in the national skilled workforce and labour unrest (workers taking part in strikes, protests, and industrial disputes each year) are indicative of the quality of a nation's labour standards. While high labour standards warrant increased demand for skilled workers, they also help firms maintain industrial peace through compliance regimes. Growth in the skilled workforce in conjunction with industrial stability leads domestic firms to remain onshore, thus implying that high labour standards can deter outward investment. Alternatively, even should labour costs increase, as such disputes are resolved under an improved regulatory regime and secured through collective bargaining mechanisms, the higher productivity delivered by skilled labour makes it less challenging for employers to pay higher wages and easier for them to stay onshore.

From the above discussion, we derive that a regulatory regime that ensures high labour standards can help maintain industrial peace; but it also allows for labour unrest to be resolved (and wage increases to be secured) through the mechanism of collective bargaining. Whilst an outflow of local capital may be expected to follow any increase in

labour costs, skilled workers can mitigate this result with increased productivity. Therefore, high labour standards have a role to play in arresting outward FDI.

The central question of this paper is: what effects do labour unrest and the supply of skilled labour have on the decisions of domestic Taiwanese firms to continue to invest locally or move offshore? To answer, we measured the effects of firm compliance with labour standards on the wages and employment of skilled workers in firms from offshoring industries in Taiwan. Wages and skilled employment in offshoring industries were used as proxy measures for the offshoring of firms. We limit our scope to ‘offshoring’ industries, where relatively more Taiwanese firms invest offshore than in the domestic market. By the effect of labour standards on wages and employment opportunities, we mean whether enforcement and compliance with high labour standards increase both the real wages of skilled workers and the skilled job opportunities in firms from offshoring industries. If real wages and job opportunities grow, the supply of skilled labour should remain steady. We measured these effects for both large and small firms investing offshore as firm compliance with labour standards varied with firm size determined by employee strength (i.e. firms with 100 or more employees are considered large firms that are ‘covered’ by legislation and inspected by government machinery while those with less than 100 employees are considered small and are ‘uncovered’ as they are not subjected to compliance inspections).

We posit that changes in a wider labour market’s quality of industrial relations and supply of skilled labour – due to high labour standards – can be used to predict variations in the wages and employment of skilled workers in industries where outward FDI occurs. We also posit that skilled male and female workers in these industries may not equally realise a loss/gain in wages and employment. We test whether changes in labour unrest and growth in skilled labour has widened the gender gap.

Our assumptions include a time lag effect of high labour unrest on outward FDI even when there is growth in skilled labour, nationally as well as in offshoring industries. Using a model built on pooled cross-sectional time-series data from 2008–17, we studied the impact of labour unrest and growth in national skilled labour on real wages and employment in industries with high outward FDI (offshoring industries). Our paper sheds light on the role of labour standards in deterring/encouraging outward FDI by assessing the effect of labour standards on the national supply of skilled labour and industrial stability. Our findings have policy implications for nations that wish to maintain high labour standards to remain attractive to investors and prevent domestic players from investing offshore.

Germane literature and hypotheses

A useful way of organising the literature is to understand the role of labour unrest and skilled labour in improving wages and employment opportunities in industries commonly subject to outward FDI.

Extant literature has indicated that instead of regulating wages and maintaining high labour standards, the availability of local skilled labour can arrest outward investment. According to Kokko (2006) and Blomström and Kokko (2000), demand for skilled labour

by multinational firms increased within home countries as investment returned from host countries due to rising labour costs. Haskel, Pereira and Slaughter (2007) noted the positive role played by an increase in local skilled workers in improving productivity and technology upgrading within domestic firms (Sarkar and Lai, 2009), which compelled firms that had invested abroad to bring jobs back to the homeland. Kokko (2006) found that the increasing availability of a local Swedish skilled workforce helped return investment by Swedish multinationals back to Sweden. Elia, Mariotti and Piscitello (2009) and Lee et al. (2009) found the availability of local skilled labour resulted in economic growth within home countries through an accumulation of research and development, which discouraged local firms from investing abroad. However, there is little explanation of the role that the quality of a country's industrial relations plays in arresting FDI; through generating a reliable skilled labour supply and/or increasing productivity.

Central thesis

Although conventional wisdom suggests that labour unrest forces firms to invest offshore, the same firms are also attracted to remain by the availability of local skilled labour, particularly if abundant in the domestic market. The demand for skilled workers grows when their productivity justifies high wage levels, even during periods of labour unrest, thus discouraging firms from investing abroad. However, when domestic firms become intolerant of labour unrest, there is a drop in demand for skilled domestic workers as their productivity no longer justifies the additional labour costs that these firms incur. Firms already paying high wages may be pushed to invest offshore due to rising labour costs, particularly where collective bargaining efforts are used to resolve unrest through securing further wage gains. We posit two conditions here:

- a. A steady supply of skilled labour under conditions of industrial peace allows employers to stay onshore; or
- b. The ready availability of skilled labour improves productivity, with this productivity offsetting high wages even during periods of labour unrest, thus allowing employers to stay onshore.

However, both conditions are contingent on the extent to which firms comply with high labour standards. Only firms that maintain high labour standards can offset high labour costs with the help of improved productivity delivered by a skilled workforce. This offset occurs even during periods of labour unrest because by maintaining high labour standards, these firms pay higher wages. As a result, such firms succeed in attracting more skilled workers.

Secondly, the causality we have drawn is not necessarily experienced by female and male skilled workers equally. Female and male skilled workers need not necessarily be equally competent in improving the productivity in firms with high labour standards. As a result, their roles in helping firms offset high labour costs and helping firms remain onshore will vary.

Scenarios

To formulate a model which looks at the role of labour unrest and the availability of skilled labour on the wages and hiring decisions of firms (jobs) in industries with high outward FDI, we consider two scenarios.

1. Compliance with high labour standards increases the national supply of skilled labour and helps to maintain industrial peace. While growth in skilled labour increases labour costs, the higher productivity of these workers makes it less challenging for firms to pay higher wages. Alternatively, should labour unrest result from the failure of firms to uphold high labour standards (and the subsequent failure of the compliance regime to enforce these standards and maintain industrial peace) then labour unrest will increase wages where collective bargaining mechanisms are in place. Still, higher productivity delivered by skilled workers helps firms to offset higher wages. Otherwise, labour unrest may initially increase in response to employees seeking the benefits of labour standards (see Lee and Wu, 1996; Lai and Masters, 2005; Lai and Sarkar, 2013, 2017). In response, domestic firms comply to improve industrial relations or, in industries with higher demand for skilled workers, they establish individual labour-management relationships to avoid collective labour conflict by increasing wages (see Lin, 2015). Here, too, the higher productivity delivered by skilled workers makes it possible for firms to pay higher wages.
2. Non-compliance with labour standards by firms seeking to avoid high labour costs leads to a decreased national supply of skilled workers (Lai and Sarkar, 2017). Alternatively, labour unrest complements growth in real wages and employment of skilled workers. However, even when the national supply of skilled labour remains steady, domestic firms reduce investment onshore because the productivity of domestic labour can no longer offset increased labour costs. This scenario is highly likely where there is labour unrest, particularly when the productivity of skilled workers cannot offset the high labour costs that firms incur due to such unrest.

So, first, we aim to see if labour unrest creates a hostile situation where the productivity contributed by skilled workers can no longer offset high labour costs. Second, we assess the impact of labour unrest and the availability of skilled labour nationally, on the incomes and availability of skilled jobs for female and male workers in large 'Covered' firms in offshoring industries that have invested abroad.

Question 1

During labour unrest, will Covered firms (that maintain high labour standards) hire skilled workers and allow labour costs to rise and be offset by improved productivity?

Hypothesis 1a: High wages paid to skilled workers in Covered firms during high labour unrest are compensated by increased labour productivity as employment in Covered firms increased.

Hypothesis 1b: High wages paid to skilled workers during high labour unrest are not offset by increased productivity, as Uncovered firms refused to comply with high labour standards by not paying higher wages and chose to hire fewer skilled workers.

Lin (2004) claims that Taiwan's employment structure shifted after 2000 from employment in the labour-intensive sector to the capital-intensive service sector. Today in Taiwan, educated women primarily work in the service sector. More firms in the labour-intensive sector left Taiwan, causing job losses for local men. So, jobs and the income of male and female skilled workers were not affected in similar ways. The potential of labour unrest and the increased availability of skilled labour in improving wages and employment opportunities in firms from industries with a high propensity to move offshore is contingent upon several factors. There are differential effects of high labour standards on wages and employment.

Similarly, the impact of high labour standards and outward FDI on female and male skilled workers differ (Braunstein, 2006; Braunstein and Brenner, 2008; Bui et al., 2018; Seguino, 2000, 2003). Braunstein (2006) finds that Chinese female skilled workers lost their jobs to males in the labour-intensive sector due to outward FDI. Women's earnings improved only in the short term as outward FDI expanded. Patterns of employment distribution by industry where women are concentrated in competitive sectors have been instrumental in determining the gender pay gap. Braunstein and Brenner (2008) noticed a shift of foreign-invested enterprises to higher productivity to have interacted with gender-based employment segregation, benefiting men over women. Huang and Lin (2013) claim that the outflow of foreign capital to China created more jobs for skilled workers in Taiwan's capital-intensive service industries than labour-intensive industries.

Question 2

Do productivity differences, which lead to differences in employment opportunities and earnings between workers in skilled and unskilled occupations (Driffield et al., 2009), also lead to gender differences in employment opportunities and earnings of skilled workers?

Hypothesis 2: The impact of labour unrest on the job opportunities and earnings of skilled workers will be different for females and males.

Research design – estimating the effects on outward FDI³

To estimate the effects of wages and skilled labour on outward FDI, we applied the difference in difference (DD) approach, a quasi-experimental design used to estimate causal effects. The technique compares the effect of a treatment/s (labour unrest and skilled labour) on an outcome (wages and employment in an offshoring industry, as a proxy for firms moving offshore) for both a treatment and control group. Our treatment

group comprised of skilled workers employed locally in offshoring industries when labour unrest was high, and the control group included unskilled workers employed in non-offshoring industries when labour unrest was low. We applied a multinomial logit method to measure the effects of skilled workers and labour unrest on employment opportunities (jobs) in Covered firms (firms that complied with high labour standards) and estimated the probability of female or male skilled workers being employed in firms from these offshoring industries. To measure the differential effect of skilled workers and labour unrest on outward FDI during labour unrest, we calculated the estimate from the differences in predicted probabilities of *interaction* between skilled workers and high labour unrest on outward FDI in offshoring industries. Likewise, to measure the differential effects of skilled workers and high labour unrest on wages in covered industries and outward FDI in offshoring industries, we used their *interaction* to measure the effect. The combined effect of high labour unrest and an increase in skilled workers should increase wages in offshoring industries. Or else, outward FDI should decrease in offshoring industries employing skilled workers. Therefore, the effects of outward FDI, skilled workers and high labour unrest on wages depend on whether the impact of high labour standards has overridden other factors. We built estimations by weighted least square (WLS) regression as errors were greater when using OLS (Please see the Supplementary file for the complete estimation method).

Data and measures

Our study utilised three data sources for analysis. We used the Manpower Utilisation Survey⁴ (MUS) (National Statistics Republic of China, 2020) for micro-level data on individual employees from 2008 to 2017,⁵ restricted to non-farm workers aged 15–60 years, excluding self-employed as they were less affected by high labour standards. The sample in the employment model included non-workers (default group) and comprised 187,695 females and 181,589 males. This individual-level data was supplemented with industry-level data drawn from separate data sources. We included information on outward FDI from annual statistics on ‘approved outward investment by industries’ (Yearbook of Statistics, Investment Commission, MOEA, ROC, 2008–17). All annual GDP by industry and annual consumer price index data were obtained from National Statistics, ROC (National Statistics Republic of China, 2020), and annual average exchange rates from Central Bank ROC (Central Bank of Republic of China, 2020). In addition, high labour unrest was calculated by finding when the number of workers involved in strikes, protests and industrial disputes, in a given year, was more than the average number of workers involved in strikes, protests and industrial disputes over the decade. The annual data on workers’ participation in unrest was taken from the Yearbook of Labour Statistics, Government of Taiwan, ROC (2008–2017). See Table 1 for definitions of variables and descriptive statistics.

Our regression models tested the extent to which outward FDI and labour unrest could predict changes in employment (jobs) and wages in offshoring industries. We used a modified three-stage procedure from Killingsworth (1983) for estimating an over identified labour supply for employment and wage. We adopted two dependent variables,

Table 1. Sample characteristics.

Variable		Women	Men
		Means (Std Dev) [Max, Min]	
Dependent variables			
Wage _{ijt}	Log of monthly wage per employee deflated by the value of USD as of 2016	4.21 (4.29) [5.60,0]	4.39 (4.39) [5.95,0]
Workstat	Indicating worker status as either 0 = non-worker, 1 = employed in covered firm or 2 = employed in uncovered firm		
Independent variables			
		Means (Std Dev) [Max, Min]	
Marital _{ijt}	'1' = Married; '0' = Single	0.51 (0.50) [1,0]	0.43 (0.50) [1,0]
OFDI _{ijt}	Dummy variable indicating individual working in an offshoring industry (OFDI intensive industry) or not	0.62 (0.49) [1,0]	0.51 (0.50) [1,0]
Δ OFDI _{ijt-1}	Lag changes in OFDI (OFDI _{t-1} -OFDI _{t-2}) to GDP ratio deflated by the value of USD as of 2016	0.16 (0.35) [1.26, -1.22]	0.11 (0.30) [1.26, -1.22]
MS _{ijt}	Lag of log GDP (log GDP _{t-1}) in industry j	11.23 (0.78) [12.69,10.26]	11.45 (0.78) [12.69, 10.26]
Exp _{ijt}	Employee's experience	19.05 (14.69) [54,0]	17.46 (14.03) [54,0]
Ten _{ijt}	Employee's tenure	3.51 (5.98) [45,0]	5.01 (7.15) [43.17,0]
Cover _{ijt}	Individual employee who works in firm with more than 100 employees = 1, else = 0	0.32 (0.47) [1,0]	0.32 (0.47) [1,0]
SW _{ijt}	1 = Individual with skilled job	0.47 (0.50) [1,0]	0.60 (0.49) [1,0]
HLUI _t	Dummy variable indicating high labour unrest (1 = labour unrest in a year is higher than average labour unrest during 2008-17)	0.31 (0.46) [1,0]	0.32 (0.47) [1,0]
LDN _{ijt}	Labour density of industry. The log value of current employment per industry/log value of GDP _{ijt} per industry	0.39 (0.05) [0.49,0.29]	0.41 (0.05) [0.49,0.29]
EXR _t	Exchange rates	31.00 (1.19) [33.05,29.46]	31.02 (1.19) [33.05,29.46]
Hour _{ijt}	Individual log value of monthly working hours	2.52 (2.61) [6.24,0]	3.19 (2.55) [6.26,0]
Edu _{ijt}	Individual's years of education	12.58 (3.41) [22,0]	12.97 (3.22) [22,0]
FI _{ijt}	Log value of individual family Income - personal income deflated by the value of USD as of 2016	9.63 (3.87) [14.56,0]	8.89 (4.43) [14.58,0]

(continued)

Table 1. (continued)

Variable		Women	Men
Dependent variables		Means (Std Dev) [Max, Min]	
TD_t	Time trend fixed effect	5.37 (2.85) [10,1]	5.35 (2.87) [10,1]
MP_{ijt}	1 = Individual who is working in manager/ professional job	0.008 (0.089) [1,0]	0.025 (0.156) [1,0]
SP_{ijt}	1 = Individual who is working as supervisor	0.005 (0.070) [1,0]	0.011 (0.102) [1,0]
TEC_{ijt}	1 = Individual who is working in technical job	0.072 (0.257) [1,0]	0.197 (0.398) [1,0]
$NTec_{ijt}$	1 = Individual who is working in non-technical job	0.032 (0.175) [1,0]	0.036 (0.187) [1,0]
$Industry1_{ijt}$	Dummy variable; 1 = employee working in mining, food and beverages, textile, garment or lumber industries	0.028 (0.167) [1,0]	0.027 (0.162) [1,0]
$Industry2_{ijt}$	Dummy variable; 1 = employee working in paper, leather, plastic, rubber, chemical or furniture industries	0.022 (0.146) [1,0]	0.039 (0.194) [1,0]
$Industry3_{ijt}$	Dummy variable; 1 = employees working in non-metallic, metals, machinery, electronics, transportation machinery, water or electrical and gas power industries	0.102 (0.302) [1,0]	0.185 (0.388) [1,0]

employment status and wage, in our first and second equations (see Supplementary file) where the first equation used a multinomial logit model to calculate the probability of employment in an offshoring industry, and the same multinomial logit model was also able to calculate the sample selection terms for the wage equation. In our first regression, predicting employment, the multinomial logit model adopted the dependent variable x , a categorical variable that indicated worker status ($x = 0$ for non-workers, $x = 1$ for workers in Covered firms and $x = 2$ for workers in Uncovered firms). Skilled workers (SW_{ijt} as listed in Table 1) and high labour unrest ($HLUI_t$) were independent variables. In our second model, the dependent variable was wages of skilled workers ($Wage_{ijt}$), and independent variables were labour unrest ($HLUI_t$), offshoring industry (outward FDI intensive industry - $OFDIII_{jt}$) and the value of lag changes in outward FDI to GDP ratio ($\Delta OFDI_{jt-1}$). These and other variables are listed in Table 1.

We adopted the dependent variable real wage ($Wage_{ijt}$) of employee i in industry j at time t using 2016 as the base year. We calculated the dummy variable identifying an offshoring industry, $OFDIII_{jt}$, from deflated outward FDI (the cumulated stock of outward FDI in United States dollars (USD) divided by real gross domestic product (GDP) in industry j (Noorbakhsh et al., 2001)) for employee i in industry j at time t . To calculate our dummy variable $OFDIII_{jt}$, we used outward FDI deflated by 2016 as the base year and the

cumulated stock of outward FDI per GDP in 1959⁶ for industries that invested offshore. If the cumulated stock of outward FDI in those industries investing offshore was higher than their average in 10 years (≥ 0.3659), the dummy variable was 1, otherwise 0. The coefficient of $\Delta OFDI_{jt-1}$ represented the value of lag changes in outward FDI to GDP ratio (difference between $OFDI_{jt-1}$ in period $t-1$ and $OFDI_{jt-2}$ in period $t-2$) (Noorbakhsh et al., 2001). Since the stock of $OFDI_{jt}$ as a percentage of GDP is a function of $\Delta OFDI_{jt-1}$, we tested auto-correlation to rule out multicollinearity problems.

Independent variables included high labour unrest ($HLUI_t$). Data on the number of workers per year who had taken part in strikes, protests and labour disputes were sourced from the Yearbook of Labour Statistics, Government of Taiwan. $HLUI_t = 1$, when the yearly labour dispute rate was higher than the average labour dispute rate between 2008 and 2017 (5.298%). $HLUI_t$ was used to capture the effects of labour unrest on wages, employment opportunities and outward FDI (see Tcha, 1998; Cramton et al., 2008; Busse et al., 2011). MS_{ijt} indicated market size, a lag of $\log GDP_{t-1}$ deflated by the value of USD in 2016 in industry j at year t (Asiedu, 2006). In past research, the market size has been estimated for a given year using the gross production value for each industry from the previous year. We included a variable for labour density (LDN_{jt}) to check if outward FDI had transferred to labour-intensive industries in foreign countries. To measure labour density, we added the log value of the industry's employment figure in a given year and divided it by the industry's production amount for the same year (log value of real GDP in the industry was deflated by the value of USD in 2016) (Kapsos, 2006). Since low exchange rates for Taiwanese currency could help prevent outward FDI, we adjusted the exchange rate fluctuation by adopting an average exchange rate of 1 USD against the New Taiwanese Dollar (EXR_t). We controlled certain variables⁷ to measure the power of explanatory variables in predicting the dependent variable. The dummy variable of SW_{ijt} indicated the skill level of employment and loosely followed the Taiwanese Government's classification of skilled occupations. Level 2–4 occupations such as management supervisors, professional workers and technical workers were given the value 1, and level 1 'unskilled' occupations such as workers doing manual jobs were given a value of 0. A time trend (T_{dt}) variable ranging from 1 to 10 represented every year from 2008 to 2017 and measured the time fixed effect of macroeconomic conditions.

Empirical results

Since the study has taken a very big sample, a difference from 0 for the effect size may have been detected by us as significant even if it was small, which in a way suggests that a change in the probability of employment outcome by 0.0001 is not a huge factor when making predictions. So, while the effect is statistically significant in its difference from zero, that does not necessarily mean it is important and the readers may see the results considering this limitation. Therefore, our results allow us to draw somewhat tentative conclusions that warrant further investigation. As per the results of the analysis presented in Supplementary Table S1, the negative values in Columns 5 and 6 indicate that Covered firms had greater compliance with labour standards than Uncovered firms. During labour unrest when rising wages pushed domestic firms to invest offshore, skilled female

workers delivered higher productivity than males (see results of offshoring industry x skilled worker x labour unrest x covered firm in Columns 1 and 2 in Supplementary Table S2 [0.110 (women) vs 0.103 (men)]). However, there was a significant difference between the effect of rising labour unrest and outward FDI on the employment opportunities for female and male skilled workers. The probability values were somewhat low at 0.0001 but significant at the 0.001 level of significance. The high values of the Likelihood Ratio, Wald and Lagrange Multiplier results need to be read in the light of the high numbers of observations.

The effect of labour unrest and outward FDI on employment

Higher than average labour unrest resulted in a fall in employment for skilled workers in Covered firms and a rise in employment in Uncovered firms. An increase in employment opportunities for both women and men in Covered firms was observed (see Columns 1 and 2 vs 3 and 4 (Covered and Uncovered firms), Supplementary Table S1, offshoring industry x skilled worker x labour unrest: 0.00001 and 0.0002 vs 0.00001 and 0.0006); however, more male than female skilled workers from Covered firms lost jobs during periods of labour unrest (see Columns 6 vs 5, Supplementary Table S1, offshoring industry x skilled worker x labour unrest x covered firm: -0.0005 vs -0.0002). There was a significant negative employment effect for Covered firms during periods of labour unrest (see Stage-II results⁸ for offshoring industry x skilled worker x labour unrest x covered firm, Columns 5 to 6, Supplementary Table S1: -0.0002 vs -0.0005). This also caused a gender difference in employment opportunities for skilled workers in Covered firms (0.0003 in Column 7, Supplementary Table S1, offshoring industry x skilled worker x labour unrest x covered firm x gender). In Covered firms, more male skilled workers lost jobs than females (offshoring industry x skilled worker x labour unrest x covered firm, Columns 5 and 6, Supplementary Table S1: -0.0002 vs -0.0005).

The effect of labour unrest and outward FDI on wages

Overall, high labour unrest increased the income of skilled workers regardless of gender in Covered firms (See Supplementary Table S2, columns 1 and 2, results for offshoring industry x skilled worker x labour unrest, -0.061 and -0.034); however, the earnings of skilled female workers increased more than that of males (results for offshoring industry x covered firm x skilled worker x labour unrest in Column 1 vs 2, Supplementary Table S2, 0.110 vs 0.103). As a result, there was an increase in the domestic wage rate for women to some extent regardless of whether or not they were in skilled jobs (see significant and positive coefficients of offshoring industry x labour unrest, Column 1, Supplementary Table S2, 0.082). Yet, outward FDI did not create any significant gender-pay differences, especially within Covered firms (offshoring industry x labour unrest x skilled worker x covered firm, Column 3, Supplementary Table S2: 0.007). Instead, outward FDI improved the earnings of both female and male skilled workers employed in Covered firms (see positive coefficients for offshoring industry x covered firm x skilled worker x labour unrest, Column 1 vs 2, Supplementary Table S2).

Discussion and conclusion

The central question of this study was whether growth in skilled labour and industrial stability (both functions of high labour standards) induced domestic industries to remain onshore – in other words, whether high labour standards have deterred outward FDI. We examined whether high labour standards increased the supply of skilled labour in Taiwan, simultaneously improving the compliance of firms to implement local labour standards and the effects of compliance on fostering industrial peace.

From the results that allow us to draw somewhat tentative conclusions, we noticed large ‘Covered’ Taiwanese firms (with a workforce of more than 100 employees) complied with high labour standards with a greater likelihood when compared to small ‘Uncovered’ firms. This implied that Covered firms benefited from industrial peace and growth in skilled labour more than Uncovered firms. Subsequently, the impact of labour unrest and outward FDI on real wages and employment opportunities for skilled workers was more likely to be realised in Covered firms than Uncovered firms. But this did not mean that Covered firms, which complied with labour standards, seldom faced labour unrest, and as a result, were more likely to stay onshore. Rather, we found that labour unrest created a hostile situation where it was challenging for firms to pay high wages, but we could not predict either growth or decline in outward FDI as a result. On its own, high labour unrest did not determine whether domestic firms stayed onshore or invested abroad. On the other hand, high labour standards which encouraged growth in a skilled workforce did determine whether domestic firms invested abroad or stayed onshore. Thus, hypothesis 1 was partially proved: when labour unrest was resolved through collective bargaining or the compliance regime, it resulted in increased wages, and increased labour costs could encourage domestic firms to invest abroad. However, high labour standards were found to improve labour productivity through the growth of skilled workers in Covered firms, thus mitigating high labour costs through productivity increases and discouraging investment abroad. The improved productivity delivered by skilled workers made it less challenging for Covered firms to pay higher wages compared to Uncovered firms, and as a result, Covered firms stayed onshore more often.

Covered firms benefited from the growth in skilled labour induced by compliance with high labour standards. Even though maintaining high labour standards resulted in higher labour costs, they were compensated through the improved productivity delivered by skilled workers and therefore had no incentive to invest abroad. Overall, there was no significant difference in the impact of high labour unrest on firms regardless of whether they complied with high labour standards (Covered) or not (Uncovered). Still, there was a difference in the effect of skilled labour between firms that complied with high labour standards (Covered) and those that had not (Uncovered).

That labour unrest did not enable the prediction of outward FDI can be explained by the socio-political developments in Taiwan during the decade. The ‘anti-mainland sentiment’ that created resentment in the local workforce helped arrest outward FDI to some extent. Outward FDI initially increased when there was industrial peace in Taiwan. However, the re-emergence of the historical bloc of an ethnic divide espoused by the political party

promoted 'anti-mainland nationalist' sentiment (Sarkar and Liu, 2019), which triggered labour unrest in those firms and industries where capital had flown to China.

The above scenario had broader implications for real wages and employment opportunities for both female and male skilled workers seeking jobs in traditional offshoring industries, which impacted the growth of the skilled workforce. However, the effects for male and female skilled workers were not the same. For example, increased labour costs encouraging outflows of FDI (unless skilled workers mitigated the trend by enhancing productivity to offset labour costs) were noted only in Covered firms where it was male, not female, skilled workers who delivered the high productivity that helped offset rising labour costs.

Comparing the effects of outward FDI and high labour unrest on wages and employment opportunities for male and female skilled workers, earnings differed between the skilled and unskilled (Driffield et al., 2009) because of productivity differences. The earnings of skilled workers also depended on industry characteristics, the type of jobs outsourced and the gender composition of labour within firms investing offshore. Above all, the ability of skilled workers to offset high wages by improving productivity played a decisive role in determining the extent to which the wages of skilled workers changed. High labour unrest helped increase the earnings of skilled workers in general, although we noted the specific impact of labour unrest on the income of skilled workers only in offshoring industries. This indicated that the value of skilled workers in the domestic labour market had grown with time in firms that had invested offshore. However, it was in those years when labour unrest was at its peak between 2008 and 2017 that the income of female skilled workers increased most closely to male workers.

The impact of outward FDI on employment opportunities was not similar for female and male skilled workers, supporting our hypothesis 2. Rising labour unrest had created a dent in the job market for skilled workers. A fall in employment opportunities for skilled workers was noted once again in Covered firms in offshoring industries. Conversely, employment opportunities for skilled workers had improved in Uncovered firms in offshoring industries during industrial turbulence. Specifically, when labour unrest was at its peak, Covered firms in offshoring industries did not attract skilled workers, and this adverse effect was felt more keenly by male than female, skilled workers.

Moreover, the growth in skilled labour, both nationally and in offshoring industries was inconsequential during labour unrest, refuting past studies. The minimum recruitment carried out by Covered firms during periods of labour unrest benefited skilled female workers more than males, refuting Cramton et al. (2008). One reason for this could be that Covered firms in offshoring industries still required skilled workers to perform certain jobs on home soil, like research and development, quality improvement, etc., jobs that largely employ skilled female workers in Taiwan. From this, we surmise that Covered firms are attracted by the skilled female workforce because of the considerable participation of women in these firms and sectors, but we have no empirical proof to substantiate this as a probable explanation.

Although there was a positive gender difference in employment opportunities for skilled workers in Covered firms in offshoring industries, it was independent of the quality of industrial relations in the country. Labour unrest did not create any significant

difference in loss or gain in employment for skilled workers in firms that invested offshore. Skilled workers in Covered firms in offshoring industries succeeded in mitigating increased labour costs by improving productivity. However, these firms had the required workforce to achieve optimum productivity, and so they were no longer attracted by the availability of a skilled workforce.

Productivity of skilled workers, a function of labour-intensive firms, failed to justify high labour costs, although not because of high labour unrest. High labour unrest could not significantly predict change in outward FDI during the decade. It was difficult for Taiwanese firms to offset losses through improved productivity, so these firms chose to invest abroad. But, most importantly, our study points out that despite rising labour costs, improved productivity was able to arrest outward FDI when the availability of a skilled labour force grew in response to greater compliance by firms with high labour standards. Therefore, it is high labour standards that helped arrest outward FDI.

Governments looking at improving labour standards will not necessarily be successful in arresting outward FDI in offshoring industries because compliance with labour standards results in increased wages. Increased labour costs typically push firms out of the country unless skilled workers contribute with improved productivity to offset wage increases. Therefore, a growing skilled workforce in the domestic labour market of the home country can help arrest outward FDI, but this is contingent upon compliance with high labour standards by home country firms. However, high labour unrest should not affect growth in a skilled workforce nor cause firms to lose financially more than can be offset with improved productivity gains.

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Supplemental Material

Supplemental material for this article is available online.

Notes

1. By growing Asian economies, we mean those emerging Asian economies that have grown beyond the middle-income trap to become high-income countries (Based on World Bank's criterion for classifying economies, high-income countries are defined as having per capita gross national incomes above USD 12,000 in 2013) by shifting away from growth driven primarily by factor accumulation to productivity increase driven by improvements in the quality of human capital and innovation (Organization for Economic Co-operation and Development [OECD], 2013). For example, Indonesia, Malaysia, Vietnam, Thailand and The Philippines.
2. Lee and Wu (1996) claim that government enforces the LSL to improve industrial relations. However, the legal language in the LSL being ambiguous, and the government's inconsistent interpretation led firms to refuse to comply, that increased LUI.
3. For more detail, please see the Supplementary File.
4. An annual survey that collects data on earnings and employment from 1978 onward in Taiwan.
5. We performed robustness tests for different sample periods, and the result from 2008–17 was better than other periods.
6. Taiwan began to invest outside the country in 1959 however major investment did not begin until 1991. To take into consideration the cumulative effect of investment over time we have used 1959 as the base year.
7. The first author may be contacted to get details of control variables.
8. Considering word limits, we have not included the results of Stage-I.

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