Asian
Growth Research
Institute

調査報告書 14－04

Ownership-related Wage Differentials, Worker Education, and Worker Occupation in Vietnam's Manufacturing Firms

平成 27（2015）年 3 月

公益財団法人　アジア成長研究所

Ownership-related Wage Differentials, Worker Education, and Worker Occupation in Vietnam's Manufacturing Firms[1]

Introduction and Summary

This report is the second from a multi-year project examining how multinational enterprises (MNEs) affect wages and human resource development in Asia's large developing economies. This report focuses on Vietnamese enterprises (firms), utilizing detailed information on the paid employment and wages by occupation, and on the educational background of workers to compare wages in two groups of MNEs, wholly foreign firms (WFs) and joint ventures (JVs).[2] State-owned enterprises (SOEs) also play prominent roles in some Vietnamese industries. Correspondingly, the papers focus on evaluating the scope of WF-private, JV-private, and SOE-private wage differentials, and on comparing how these differentials vary among industries and worker occupations.

Chapter 1 examines wage differentials among medium-large (20 or more employees) WFs, JVs, SOEs, and domestic private firms in Vietnamese manufacturing. The analysis focuses on 2009 because it is possible to examine wage differentials after accounting for the influences of two measures of worker quality, educational background and occupation. Simple comparisons in large samples of 11 industries combined indicate that averages wages in JVs were about 92 percent higher than in private firms in 2009, SOEs and WFs paid 57 and 54 percent more than private firms, respectively. Corresponding, conditional differentials that

[1] This paper is one output of the research project "Multinationals, Wages, and Human Resources in Asia's Large Developing Economies", which was funded by the Asian Growth Research Institute (formerly the International Centre for the Study of East Asian Development) in fiscal 2014 (ending March 2015). We thank AGI and the University of Danang, School of Economics for financial and logistic assistance. Valuable comments were also received at an AGI Seminar on 25 February 2015. Responsibility for all opinions expressed and any remaining errors or omissions are the authors' alone.

[2] I understand educational information is also available for Vietnamese firms in some recent years and the Thai census of manufacturing plants contains some information on skills of production workers. I am presently working with collaborators to perform similar analysis of these countries. I had also hoped to do similar analysis of Chinese firms, but there is little information on worker quality in the available data.

control for the influences of worker education and occupation, as well as capital intensity, size, and shares of female workers, were substantially smaller, but positive and significant in large samples. Wage levels and differentials varied substantially among industries. Conditional differentials were positive and significant for WFs and JFs in most of the 11 industries examined, but estimates of SOE-private differentials were insignificant in most industries. Robustness checks using 2007 data could not account for worker occupation, but revealed results similar to those for 2009.

Chapter 2 examines wage differentials for four types of workers employed by medium-large WFs, JVs, SOEs, and domestic private firms in Vietnamese manufacturing in 2009. When all sample firms were combined, unconditional JV-private and WF-private wage differentials were 106-124 percent for managers, 78-87 percent for professionals and technicians, 56-68 percent for clerical and support workers, and 22-48 percent for production workers. Corresponding, conditional wage differentials which account for the influences of worker education and sex, in addition to firm capital intensity and size, were positive and usually significant, but smaller, 72-78 percent for managers, 32-36 percent for professionals and technicians, 23-28 percent for clerical and support workers and 15-16 percent for production workers. SOE-private differentials were all much smaller. When estimated at the industry-level, conditional WF-private differentials were positive and significant for most occupations and industries. JV-private differentials were also positive and significant in most industries for highly paid managers or professionals and technicians, but not for lowly paid clerical and support workers or production workers. Most SOE-private differentials were also insignificant when estimated at the industry level. In short, there was a strong tendency for MNE-private differentials to be larger for managers than for professionals and technicians, and a somewhat weaker tendency for differentials to be larger for professionals and technicians than for clerical and support workers.

Contents

Chapter 2: Ownership-related Wage Differentials by Occupation in Vietnamese Manufacturing

Corresponding, co-author: Kien Trung Nguyen
The University of Danang, School of Economics, Vietnam

Chapter 1
Wage Differentials among Ownership Groups and Worker Quality in Vietnamese Manufacturing

Kien Trung Nguyen, The University of Danang, School of Economics
and
Eric D. Ramstetter, Asian Growth Research Institute and Kyushu University

1.1. Introduction

There is a growing literature indicating that foreign-owned multinational enterprises (MNEs) normally pay higher wages than domestic firms in host, developing economies. The most sophisticated studies to date have analysed manufacturing plants in Indonesia and Malaysia, and accounted for the fact that multinational enterprises tend to hire relatively well-educated workers and be relatively large and capital or input intensive compared to local plants (Lipsey and Sjöholm 2004; Ramstetter 2014; Ramstetter and Narjoko 2013). These studies often found positive and significant wage differentials between foreign MNEs and local plants, even after controlling the influences of worker education and sex, as well as plant size and capital intensity. However, aside from limited evidence in Ramstetter and Phan (2007), Tran (2007), and Fukase (2014a, 2014b), there is very little evidence regarding wage differentials among firm ownership groups in Vietnam, which accounts for the influence of worker quality. This paper partially fills the gap in the literature by using data on worker quality that were unavailable in previous years to analyse determinants of wages in manufacturing firms in Vietnam's in 2007 and 2009,.

The relatively large role played by MNEs in Vietnam and Vietnam's intensified emphasis on outward-oriented economic liberalization since the early 2000s has generated interest how MNEs affect the local economy and local workers. State-owned enterprises (SOEs) have traditionally been designated to control key capital-intensive industries. However, the

promulgation of the Enterprise Law in 2000, the negotiation of the Bilateral Trade Agreement with the United States in 2001, the implementation of many commitments made under the ASEAN (Association of Southeast Asian Nations) Free Trade Area (AFTA) by 2005 or shortly thereafter, and the implementation of further revisions to the Enterprise Law and related Investment Laws that eventually led to WTO (World Trade Organization) accession in 2006 were all substantive policy changes that reduced ownership-related policy biases in Vietnamese manufacturing. Correspondingly, the economic environment during 2007-09, was substantially more open and competitive than even five years previous, and many firms were still in the process of adjusting to the large policy changes. During this period, firms were also affected by the world financial crisis, which was partially responsible for the decline of Vietnam's economic growth rate to 5.4-6.4 percent in 2008-13 from the 6.8-7.8 percent that were experienced in 2000-07 (Asian Development Bank 2014).

In this paper, we first review the literature on MNE-local wage differentials (Section 2) and describe the enterprise data that are used for the analysis, focusing on unconditional differentials in wages and worker skills between MNEs and private firms (Section 3). Then we test if wage differentials are statistically significant after accounting for firm size, capital intensity, worker sex, and worker education in both 2007and 2009 (Section 4). For 2009, it is also possible to control for the influence of worker occupation. The focus is on analysis of 2009 data because they allow better control for worker quality, but the estimates for 2007 provide an important robustness check. Finally, Section 5 offers some conclusions and suggestions for future research.

1.2. Literature Review and Methodology

There is a compelling theoretical rationale suggesting that MNEs will often pay higher wages than corresponding domestic enterprises in host developing economies. On the demand

side, MNEs are often argued to possess large amounts of knowledge-based, generally intangible assets such as production technology, marketing networks and management systems. Possession of these firm-specific assets suggests that MNEs will be likely to be more efficient than non-MNEs, which is reflected by larger firm size, higher factor productivity, and/or correspondingly higher factor rewards.

Many MNEs also require their employees, even relatively unskilled staff, to have engineering, marketing, and foreign language skills required to work with particular machinery and clients. In addition, many of these employees need to learn modern work disciplines, such as punctuality, tidiness and promptness, which may not be valued as highly in local firms, for example. Firms operating in developing economies like Vietnam often face shortages of skilled workers who have both engineering, foreign language, and modern management skills. Thus, MNEs relative unfamiliarity with local labor markets may make it more difficult for them to hire new skilled workers, or retain current skilled workers than domestic firms. This may motivate MNEs to pay relatively high wages as an incentive to increase the attractiveness of their firms to skilled workers or to reduce turnover.

On the supply side, workers may prefer to work for locally owned firms because they are more familiar with local management practices. In Vietnam, for example, it is clear that labor market practices often vary greatly between MNEs and local firms. Nonetheless, our impression is that most Vietnamese workers are not very opposed to working for MNEs and many might actually prefer MNE employment to the alternatives. This is supported by studies which suggest that internal migrants in Vietnam often prefer to work for MNEs over local firms (Fukase 2014b).

Some of the most comprehensive analyses of wage differentials to date have examined Indonesian manufacturing plants in 1996 and 2006 (Lipsey and Sjöholm 2004; Ramstetter and Narjoko 2013). For 1996, estimates of Mincer-type wage equations at the plant level found

strong evidence that MNEs paid higher wages than domestic firms after controlling for size, input intensity, the share of female workers, and worker education. For 2006, estimates in large samples of all manufacturing plants combined and a few individual industries also reveal positive and significant wage differentials, but many of the industry-level regressions indicate that conditional wage differentials were not significant in the latter year.[1] In addition, analyses of Malaysian plants in 2000-2004 also suggest that conditional wage differentials accounting for both worker education and occupation were positive and significant in most of the individual industries examined and when all sample industries were combined (Ramstetter 2014). Although they do not control for the effects of worker education or occupation, other studies of Malaysia (Lim 1977) and Thailand (Matsuoka-Movshuk and Movshuk 2006; Ramstetter 2004) also found positive and significant wage differentials after controlling for plant-level differences in capital intensity and size, for example.

Similar studies of Vietnam are sparse. Most of previous studies of wage differentials primarily focused on gender wage gaps, finding that women tend to earn significantly less than men (Liu 2001, 2004; McCarty 1999; Pham and Reilly 2007). Similar to this study, Ramstetter and Phan (2007) and Tran (2007), examined conditional wage differentials between MNEs and local firms in Vietnamese manufacturing during 2000-2005. Both studies found positive and significant wage differentials, but their measures worker quality (the shares of science and technical workers) were not as comprehensive as in the Indonesian or Malaysian data. More recently, the 2007 and 2009 enterprise surveys included more detailed questions on worker education, and the 2009 survey also has information on worker occupation. This study thus focuses on analyzing these years. A recent study by Fukase (2014a) used household data to compare the wages paid to workers in MNEs and domestic

[1] In the combined sample of all manufacturing plants, intercept dummies are used to capture industry-specific effects. The industry-level regressions are more general in that they allow intercepts and all slope coefficients to differ among industries

firms, also finding that MNEs and SOEs tended to pay higher wages than private firms and another study (Fukase 2014b) found that internal migrants were attracted by job opportunities in MNEs and SOEs.

In Vietnam, ownership-related wage differentials are also related to government regulations, which require MNEs to pay higher minimum wages than private companies (Nguyen 2014). For example, in 2006-2007 minimum wages in WFs and JVs were 58-93 percent higher than in domestic firms (private firms and SOEs combined), depending on the region. In 2009, these differentials declined to 38-50 percent. Foreign-domestic differentials in minimum wages were largest in Hanoi and Ho Chi Minh City and smallest in rural areas. On the other hand, it is important to note that minimum wage requirements only affect base salaries, and domestic firms often pay much higher bonuses than multinationals.[2] As explained by Ramstetter and Phan (2007), SOEs were also required to pay relatively high minimum wages in previous years, though we have no new information on this point.

1.3. The Data, Wage Differentials and Worker Quality

This study analyzes medium-large firms (20 or more employees) included in Vietnam's Annual Enterprise Surveys for 2007 and 2009 (General Statistical Office 2011, 2013). To date, only these two surveys have collected comprehensive information on employee education and wages. The 2009 data also have information on worker occupation but this indicator is not available for the 2007. All values are expressed in 2000 prices using appropriate deflators.[3] Wages are defined to include regular salaries and other compensation such as bonuses,

[2] See Appendix Table See Asian Development Bank Institute newsletter of 23 October 2013; received by email on that date.

[3] Output is converted using a manufacturing output deflator at the two-digit level of Vietnam's Standard Industrial Classification. Capital is converted using the deflator is for fixed-capital formation from the national accounts (General Statistics Office various years a, various years b).

subsidies, social security, health insurance, and pension insurance. Real wages are calculated using the consumer price index (CPI).

Most MNEs, including both WFs and JVs, and SOEs are medium- or large-sized firms, which differ in many respects from smaller firms, which are predominantly private. Therefore, it is more meaningful to compare wages among medium-large manufacturing firms with a workforce of at least 20 employees. In addition to making the comparison more consistent and meaningful, excluding small firms also allows us to remove most outliers and most firms reporting implausible data.[4] The analysis also excludes five industries with very few MNEs and/or SOEs (tobacco; publishing and printing; petroleum and gas; miscellaneous manufacturing; and recycling).

After eliminating firms that were small, had implausible data, or were in one of the five excluded industries, 10,221 sample firms remained in 2007 and 10,698 in 2009. These sample firms employed 2.79 million paid workers in 2007 and 3.12 million in 2009 (Table 1). These totals were 74 and 76 percent, respectively, of total employment reported for manufacturing firms in enterprise survey publications (General Statistics Office (2011, 2013) but only 48-49 percent of all manufacturing employees reported by the labor force surveys. In other words, although firms excluded from the samples were relatively small employers, there were a large number of manufacturing workers in units not surveyed by the enterprise surveys. Most were probably employed by household firms, which are excluded from the enterprise surveys.

As mentioned above, the Enterprise Law was promulgated in 2000 and revised as part of the WTO accession process in 2005-2006, along with SOE and foreign investment laws. Thus, by 2007-2009, there was a consistent legal framework and common investment climate for all types of firms. However, Vietnam's foreign investment law has been relatively open since it's

[4] In addition, only limited information is collected from very small local firms with 10 or fewer employees (Jammal et al., 2006).

promulgation in 1987 and Vietnam's policy implementation still favors both MNEs and SOEs over private firms in many cases. Partially as a result of this legacy, MNEs and SOEs accounted for relatively large shares of paid employment in manufacturing firms (Table 1).

However, reflecting efforts to privatize and equitize many SOEs, SOE shares declined markedly after 2000, while MNE shares increased. Table 1 indicates these trends continued in 2007-09, with SOE shares of paid workers in the 11 sample industries declining from 13 to 10 percent while the total MNE (JV+WF) share rose from 43 to 47 percent. WFs accounted for the vast majority of MNE employment, their share rising from 37 to 42 percent while the JV share fell slightly from 5.3 to 4.6 percent. WFs are concentrated in labor-intensive industries such as wood and furniture, apparel, leather, and footwear; and electronics. WF employment shares also exceeded one quarter in three relatively capital-intensive industries: transportation machinery, textiles, and basic metals and metal products.

Of the 11 sample industries, paid employment was largest in apparel leather, and footwear, with 1.08 million paid workers in 2007 and 1.21 million in 2009, followed by food and beverages with 0.35 and 0.40 million, respectively, and wood and furniture, with 0.30 and 0.31 million, respectively. 54 and 60 percent, respectively of the paid workers in the apparel group worked in WFs WFs were also large in the smaller electronic machinery industry, accounting for 72 and 80 percent, respectively, and the paid workers in this industry. These two industries accounted for two-thirds of the paid workers in WFs. At the other end of the scale, WF shares were relatively small in food and beverages (13 percent) and non-metallic mineral products (6.1-6.4 percent). JV shares were almost one-fifth in transportation machinery, but much smaller (6.4 percent or less) in the 10 other sample industries. In 2007, SOE shares were one fifth or more in textiles, chemicals, rubber, and plastics, non-metallic mineral products, and transportation machinery, but in 2009 this was only true in transportation machinery.

Table 2 presents unconditional wage differentials between WFs, JVs, and SOEs on the one hand, and domestic private firms on the other, for 2007 and 2009. On average, JVs paid the highest wages; the mean JV-private wage differential was 175 percent in 2007 and 92 percent in 2009 when firms in all 11 industries were combined. For WFs and SOEs, mean differentials were 68 and 72 percent, respectively, in 2007, and 54 and 57 percent, respectively, in 2009. In other words, on average, JVs paid the highest mean wages in the 11 sample industries, followed distantly by SOEs, and WFs, but all groups paid substantially higher wages than private firms. JVs also paid the highest wages in all 11 industries in 2007 and in eight industries in 2009. In 2009, WFs paid the highest wages in the apparel group and WFs and SOEs both paid the most in paper and general machinery. Although WF-private differentials in were the smallest in samples of all 11 industries combined, WF-private differentials were the smallest in five industries in 2007 and three in 2009. On the other hand, SOE-private differentials were the smallest in six industries in both 2007 and 2009.

Previous, plant-level evidence for Indonesia (Ramstetter and Narjoko 2013, Table 2) suggests a similar tendency for MNEs with large ownership shares (90 percent or larger) to have relatively small unconditional wage differentials compared to other MNEs. MNE-related wage differentials in Table 1 are also of similar as those for Indonesian production workers in 2006, though they are considerably smaller than differentials for 1996 and for non-production workers in 2006. This pattern makes sense because most of the paid workers in the Vietnamese samples are production workers or non-production workers in relatively low-wage occupations.

The size of MNE-local wage differentials may also be related to the size of the technology gap between MNEs and private plants, which is likely to be smaller at higher levels of wages and incomes. There is also a similar, though less consistent tendency for WFs or MNEs with relatively large ownership shares to have relatively small labor productivity differentials

relative to local plants among ownership groups in Indonesia, Thailand, and Vietnam (Ramstetter 2004; Ramstetter and Phan 2013; Takii 2004; Takii and Ramstetter 2005). Another factor leading to wage differentials is the previously noted tendency Vietnam's minimum, base wages to be highest in MNEs, though this difference is often offset by higher payments of other compensation in domestic firms and minimum wage requirements are probably not binding for many MNEs.

When the 11 sample industries are combined, shares of paid workers who completed tertiary education were also higher in SOEs and JVs than in WFs and private firms in both years (Table 3). In JVs this share increased from 16 percent in 2007 to 17 percent in 2009, in SOEs the share increased from 13 to 17 percent, respectively. Corresponding shares in WFs and private firms also increased but were much smaller (5.9-7.3 percent). Although it is reasonable to expect tertiary shares to rise during this period, the large increase for SOEs suggests substantial differences in the SOE sample between the two years, perhaps reflecting the influence of privatization.

There is also large variation in tertiary shares among industries (Table 3). For example, all ownership groups had relatively high tertiary shares in the chemicals group and electronic machinery, but relatively low shares in the apparel group. On the other hand, WFs and SOEs had relatively high tertiary shares in food and beverages, as did JVs in 2009, but tertiary shares were relatively low in private firms in both years. At the industry level, there are a number of other large changes in tertiary shares between 2007 and 2009 which suggest substantial differences in underlying sample firms in some industry-owner combinations.[5]

[5] For example, tertiary shares increased or decreased by more than 6 percentage points for SOEs and JVs in the metals group, general machinery, and electronic machinery, JVs only in wood and furniture, and SOEs only in transportation machinery. Although these large changes are not impossible and there were large economic changes in 2007-09, variables like shares of workers by educational background don't usually change much in a short period of time.

Mean shares of moderately educated workers (those who completed secondary education (e.g., high school or vocational training college, but not tertiary education) in all sample firms were larger than corresponding tertiary shares all ownership groups in 2007 and for private firms and WFs, but not for SOEs or JVs in 2009 (Tables 3, 4). Moreover, differences between secondary shares and tertiary shares tended to be relatively small, six percentage points or less in absolute value. This pattern contrasts sharply with Indonesia in 2006, for example, where secondary shares tended to be substantially larger (e.g., 10-20 percentage points or even more) than tertiary shares. The contrast partially reflects the relatively heavy emphasis Vietnam has placed on higher education at relatively low levels of per capita income.

In addition to data on worker education, the 2009 survey also provides data on four types of worker occupations, two of which are highly paid, managerial employees, and professional, technical and supervisory employees. To further account for worker quality in this year, shares of these highly paid workers are also calculated (Table 5). In all 11 sample industries combined, SOEs and JVs also had the highest shares of high quality workers by this measure 24 and 22 percent, respectively, but in WFs and private firms, these shares were only 16 percent. Similar to tertiary shares, shares of highly paid workers were relatively large for all groups in the chemicals group and electronic machinery, in addition to the metals group, general machinery, and transportation machinery..

1.4. Econometric Estimates of Conditional Wage Differentials

As emphasized in the literature, ownership-related wage differentials in the manufacturing sector are likely to be related to workforce characteristics such as education attainment and occupation. The literature also suggests that firm characteristics such as size, capital intensity, and the share of females in paid employees may also influence the extent of wage differentials. Therefore, in this section we continue with an econometric analysis to examine the extent to

which ownership-related wage differentials persist after controlling for the influences of worker education, occupation, and sex, as well as firm capital intensity and size. Similar to previous studies, we estimate the following model:

$$\ln(RW_{ij}) = a_0 + a_1 \ln(KI_{ij}) + a_2 \ln(RO_{ij}) + a_3 SH_{ij} + a_4 SM_{ij} + a_5 SP_{ij}$$
$$+a_6 SF_{ij} + a_7 DW_{ij} + a_8 DJ_{ij} + a_9 DS_{ij} + \varepsilon_{ij} \qquad (1)$$

where

RW_{ij}= Average real wage of firm *i* of industry *j*.

RO_{ij}= Real output of firm *i* of industry *j*.

KI_{ij}= Capital intensity of firm *i* of industry *j*, measured as the ratio of fixed capital stock over employment after deflating capital stock at a constant value.

SH_{ij}= A share of highly educated employees in total employment of firm *i* of industry *j* (per cent).

SM_{ij}= A share of moderately educated employees in total employment of firm *i* of industry *j* (per cent).

SP_{ij}= A share of employees in highly paid occupation in total employment of firm *i* of industry *j* (per cent).

SF_{ij}= A share of female employees in total employment of firm *i* of industry *j* (per cent).

DW_{ij}= A dummy for wholly-owned, foreign-invested enterprises (wholly foreign firms – WF), taking a value of one if a firm is wholly owned FIE and zero otherwise.

DJ_{ij}= A dummy for joint venture enterprises (JV), taking a value of one if a firm is FIE joint venture and zero otherwise.

DS_{ij}= A dummy for state-owned enterprises (SOE), taking a value of one if a firm is state-owned and zero otherwise.

ε_{ij}= A stochastic error term.

All estimates also include vectors of dummy variables identifying seven regions and as many as 28 industries, usually defined at the two- or three-digit level of Vietnam's Standard Industrial Classification (VSIC) to account for region-specific and industry-specific influences on the constant which are not captured by the firm-level variables.[6] Industry-

[6] The regions are Hanoi, the Red River Delta, the North Mountainous Area, the Central Coast and Central Highland Area, the South East Area, Ho Chi Minh City, and the Mekong Delta (used as the base dummy).

specific effects on constants and slopes are also accounted for in more detail by estimating equations for each of the 11 sample industries separately, as well as all 11 industries combined.

Coefficients on capital intensity (a_1) and real output (a_2) are expected to be positive because capital-intensive and large firms generally pay higher wages than labor-intensive or small firms. Coefficients on the shares of highly or moderately educated workers (a_3, a_4) and shares of highly paid workers occupations (a_5) should also be positive because they suggest higher worker quality in firms with relatively high shares. In contrast, the coefficient on the share of female workers (a_6) is likely to be negative because firms with a higher proportion of female workers tend to have lower average wages.[7] Finally, if wage differentials between WFs JVs, and SOEs, on the one hand, and private firms, on the other, persist after controlling for worker education, occupation, and sex, as well as firm size and capital intensity, the signs of the coefficients on DW, DJ, and DS (a_7, a_8, a_9) will be positive.

Because data on worker occupation are only available for 2009, we focus on estimates for this year, but also provide estimates for 2007 without this variable as a robustness check. Estimates are performed in cross sections, which mean that the coefficients on DW, DJ, and DS (a_7, a_8, a_9) can be interpreted as conditional wage differentials similar to the unconditional differentials in Table 2. However, it is also possible that wages could influence firm's capital intensity and size, creating potential simultaneity between the dependent and independent variables. To check for the robustness of the results to simultaneity concerns, estimates of both contemporaneous and lagged specifications, where capital intensity and output are lagged one year, are compared. All estimates use robust standard errors to account for

---

Industries are defined at the 3-digit level for industries having at least 2 firms of each ownership type in them; 3-digit categories are combined or 2-digit categories used in industries with fewer firms.

[7] Females tend to earn less than males because they tend to be less educated and have less experience in high paying jobs, and because they are discriminated against in the workplace and when educational resources are allocated.

heteroskedasiticity that can be expected when firm-level, scale variables (e.g., output, capital intensity) are used.

In large samples of firms in all 11 industries combined, estimated coefficients were always consistent with expectations for 2007 and generally consistent for 2009 (Table 6). In both years, coefficients on firm size, shares of highly educated workers, and female shares had the expected sign and were highly significant at the 1 percent level or better. Similarly, coefficients on capital intensity and the share of moderately educated workers were positive and highly significant for 2007. For 2009, the coefficient on the share of highly paid workers was also positive and highly significant, and the coefficient on the share of moderately educated workers was also significant at the standard 5 percent level. However, the coefficient on capital intensity was insignificant in 2009. Nonetheless, the goodness of fit measure (R^2) was about 0.48 for 2009 estimates and 0.42 for 2007, suggesting that the model explained the variation in the dependent variable rather well, given the cross sectional context. Moreover, the differences between the size of most coefficients, notable the coefficients on the ownership dummies, were similar in the contemporaneous and lagged specifications, suggesting that any simultaneity bias is likely to be small.

Most importantly, the estimates suggest that MNEs and SOEs paid significantly higher wages than local firms, even after controlling for the influences of capital intensity, firm size as well as worker education, sex, and occupation. However, conditional wage differentials were all substantially smaller than corresponding unconditional differentials in Table 2. For example, conditional WF-private wage differentials were about 28-29 percent in 2009 and 23-25 percent in 2007, JV-private differentials were 28-30 percent and 29-31 percent, respectively, and SOE-private differentials were 9-10 percent and 13-15 percent, respectively,

and that all of these wage differentials were highly significant statistically.[8] These results are consistent with the patterns observed in Table 2 because they imply JVs pay the highest wages, followed by WFs, SOEs and lastly private firms. On the other hand, the conditional differentials were much closer in magnitude than unconditional differentials for WFs and JVs; in other words, the controls in equation (1) apparently explain a much larger portion of JV-private wage differentials than of WF-private differentials. Nonetheless, Wald tests suggest it is statistically meaningful to distinguish JVs and WFs when estimating equation (1).

Given substantial differences in the cross sections used, the lack of worker occupation data for 2007, and that fact that the capital intensity variable was insignificant for 2009, it is difficult to compare differentials between 2007 and 2009 meaningfully. Comparisons between the two years are further confounded by large differences in the macroeconomic environment in these two years. For example, the growth rate of real manufacturing GDP plummeted from over 12.4 percent in 2007 to 9.8 percent in 2008 and only 2.8 percent in 2009, while the growth of the manufacturing deflator skyrocketed from 4.5 percent in 2007 to 13.2 percent in 2008 and 7.3 percent in 2009.[9] On the other hand, the finding of significant, ownership-related wage differentials in both years suggests they were an important feature of Vietnamese manufacturing which were robust to substantial macroeconomic change.

Estimates of equation (1) also performed relatively well when estimates separately in the 11 sample industries. For example, the goodness of fit measure always exceeded 0.4 in six of the 11 industries and was below 0.3 in only one industry (the apparel group) in 2007. Coefficients on real output, the share of highly educated workers were positive and significant at standard levels in almost all estimates. Coefficients on the share of female workers were negative and significant in 19 of the 22 estimates for 2009, but only 14 for 2007. The coefficient on the

[8] Because dependent and independent variables are in natural logs, conditional differentials are calculated as the exponential value of the relevant coefficients (a_7, a_8, a_9) from estimates of equation (1).

[9] Data downloaded from www.gso.gov.vn on 22 January 2014.

share of highly paid workers was also significant in 14 of the 22 cases for 2009. On the other hand, coefficients on capital intensity and the share of moderately educated workers were almost never significant at the industry level.

As with unconditional wage differentials, conditional wage differentials between WFs, JVs, and SOEs, on the one hand, and domestic private firms on the other, varied greatly among industries (Table 7).[10] WF-private differentials were positive and significant in all 11 industries in 2009 and 10 of 11 industries (all except non-metallic mineral products) in 2007. WF-private differentials tended to be largest in general machinery (55-59 percent in 2009 and 40-42 percent in 2007), the metals group (34 and 31-32 percent, respectively), transportation machinery (32-35 and 62-65 percent, respectively), the chemicals group (35 and 36-38 percent, respectively), and textiles (38-40 and 28-29 percent, respectively). On the other hand, WF-private differentials were consistently small in the apparel group (21 and 10-11 percent, respectively).

Conditional, JV-private wage differentials were also positive in 10 of the 11 industry groups (all except paper) in 2009 (Table 7). However, in 2007 differentials were insignificant at standard levels in four industries: the apparel group, wood and furniture, paper, and general machinery. The JV-private differential was also rather small in the apparel group in 2009, though it was positive and highly significant. JV-private differentials were significant and tended to be largest in both years in the chemicals group, electronic machinery, and the metals group in both years. Estimated differentials were also relatively large in textiles in 2009, but smaller in 2007, while the reverse was true in transportation machinery. Wald tests again indicate that it is usually meaningful to distinguish JVs and WFs when estimates of equation (1) are performed at the industry level.

[10] See Appendix Table 1 for all slope coefficients and equation information provided for the 11 industry sample in Table 6. To conserve space, Table 7 only provides wage differential coefficients and results of testing the null hypothesis that JV-private and WF-private differentials were equal.

Although most WF-private and JV-private differentials were significant when estimated at the industry level, most SOE-private wage differentials were insignificant. There were three notable exceptions: food and beverages, the chemicals group, and electronic machinery. There was also some indication of positive and significant SOE-private differentials in transportation machinery in 2007 and in the apparel group in 2009 (lagged specification only). In other words, most of the unconditional, SOE-private differentials are apparently explained by differences in worker education, occupation, and sex, as well as firm-level capital intensity and size.

1.5. Conclusions and Future Research

This paper has examined the extent of wage differentials among medium-large MNEs, SOEs, and domestic private firms in Vietnamese manufacturing in 2007 and 2009, following the numerous policy reforms that removed ownership-related biases and lowered protection from imports. When all sample firms were combined, simple comparisons suggest that average wages were 92-175 percent higher in joint venture MNEs than in private firms, while average wages in SOEs and wholly foreign MNEs were 54-72 percent higher than in private firms. Wage levels and unconditional wage differentials between JVs, WFs, and SOEs on the one hand, and private firms on the other, varied substantially among the 11 sample industries studied.

Conditional wage differentials which account the influences of worker education, occupation, and sex, in addition to firm capital intensity and size on wage determination at the firm level were positive and significant for WFs, JVs, and SOEs when estimated in large samples of including all 11 industries. However, conditional wage differentials were much smaller than corresponding, unconditional differentials, 28-31 percent for JVs, 23-29 percent for WFs, and 9-16 percent for SOEs. Moreover, when conditional differentials were estimated

at the industry level, they were insignificant for SOEs in most industries. On the other hand, conditional differentials were significant in 10 of 11 industries for WFs in both years and for JVs in 2009, and in seven industries in 2007. The consistency of these results is important because 2007 and 2009 were two very different years and suggests findings of positive and significant JV-private and WF-private wage differentials is rather robust.

Because the industry-level results indicate substantial differences in slope coefficients among industries, industry-level estimates of wage differentials are probably more accurate than results from large samples of all 11 industries combined. These results also suggest that industry-level differentials were more persuasive in Vietnam in 2007 and 2009 than MNE-private differentials in Indonesia in 1996 and 2006 and MNE-local differentials in Malaysia in 2000-2004. They are also consistent with results from studies of Vietnamese household data which suggest MNEs tend to pay relatively high wages and attract immigrants.

In short, these results provide important support for previous studies indicating that MNEs often pay significantly higher wages than local firms or plants in Southeast Asia, even after accounting important aspects of worker quality and other firm- or plant-level characteristics affecting wage determination. These results suggest there are important benefits accruing to workers in MNEs and conversely provide important evidence that MNEs do not exploit their workers unfairly. On the other hand, they should not be construed as evidence that workers would be better off if the government were to promote MNEs at the expense of other ownership groups, because MNE-local wage differentials are related to firm characteristics that distinguish MNEs from non-MNEs.

Although these results are important, further research in this area should seek to address a number of related issues. For example, how do changes in ownership affect wages and employment? Further investigation of this issue is particularly relevant in Vietnam because it can help illustrate the effects of privatizing SOEs. Another important question is how does

MNE presence affect wage levels in domestic firms or are there wage spillovers from MNE presence? Analysis of issues raised these questions requires the use of panel data, the creation of which is not straightforward in the Vietnamese case.

References

Asian Development Bank 2014, *Key Indicators for Asia and the Pacific 2014*, 45th Edition. Manila: Asian Development Bank.

Fukase, E 2014a, 'Foreign Wage Premium, Gender and Education: Insights from Vietnam Household Surveys,' *The World Economy*, vol. 37, no. 6, pp. 834-55.

Fukase, E 2014b, 'Job Opportunities in Foreign Firms and Internal Migration in Vietnam', *Asian Economic Journal*, vol. 28, no. 3, pp. 279-99.

General Statistics Office 2011, *Business Results of All Enterprises in Vietnam in 2009*, Vol. 1 & 2, Hanoi: Statistical Publishing House and underlying firm-level data for 2007-2009 supplied by the General Statistics Office.

General Statistics Office 2013, *Development of Vietnam Enterprises in the Period of 2006-2011*, Hanoi: Statistical Publishing House and underlying firm-level data for 2006-2009 supplied by the General Statistics Office.

General Statistics Office various years a, *Statistical Yearbook*, 2000-2004 issues, Hanoi: Statistical Publishing House.

General Statistics Office various years b, *Statistical Yearbook of Vietnam*, 2005-2013 issues, Hanoi: Statistical Publishing House.

Jammal, Y, Thang, DT and Thuy, PD 2006, *"Vietnam Annual Enterprise Survey" Report of GSO/UNDP/DFID Project 00040722 "Support to Socio-Economic Development Monitoring"*, General Statistics Office, Hanoi.

Lim, D 1977, 'Do foreign companies pay higher wages than their local counterparts in Malaysian manufacturing?', *Journal of Development Economics*, vol. 4, no. 1, pp. 55-66.

Lipsey, RE and Sjöholm, F 2004, 'Foreign direct investment, education and wages in Indonesian manufacturing', *Journal of Development Economics*, vol. 73, no. 1, pp. 415-22.

Liu, AY 2001, 'Markets, inequality and poverty in Vietnam', *Asian Economic Journal*, vol. 15, no. 2, pp. 217-35.

Liu, AY 2004, 'Gender wage gap in Vietnam: 1993 to 1998', *Journal of Comparative Economics*, vol. 32, no. 3, pp. 586-96.

Matsuoka-Movshuk, A and Movshuk, O 2006, 'Multinational Corporations and Wages in Thai Manufacturing', in ED Ramstetter and F Sjöholm (eds), *Multinational corporations in Indonesia and Thailand : wages, productivity and exports*, Palgrave Macmillan, New York, pp. 54-81.

McCarty, A 1999, 'Vietnam's Labour Market in Transition', in Law and Labour Market Regulation in Asian: *proceedings of the Law and Labour Market Regulation in Asian* University of the Philippines.

Nguyen, KT 2014, 'Economic reforms, manufacturing employment and wages in Vietnam', PhD Dissertation thesis, Australian National University, Canberra.

Pham, T-H and Reilly, B 2007, 'The gender pay gap in Vietnam, 1993–2002: A quantile regression approach', *Journal of Asian Economics*, vol. 18, no. 5, pp. 775-808.

Ramstetter, ED 2004, 'Labor productivity, wages, nationality, and foreign ownership shares in Thai manufacturing, 1996-2000', *Journal of Asian Economics*, vol. 14, no. 6, pp. 861-84.

Ramstetter, ED 2014, 'Wage Differentials between Multinationals and Local Plants and Worker Quality in Malaysian manufacturing', *Asian Development Review*, vol. 31, no. 2, pp. 55-76.

Ramstetter, ED and Narjoko, D 2013, 'Wage Differentials between Foreign Multinationals and Local Plants and Worker Education in Indonesian Manufacturing', Working Paper 2013-23, Kitakyushu: International Centre for the Study of Development.

Ramstetter, ED and Phan, MN 2007, 'Employee Compensation, Ownership, and Producer Concentration in Vietnam's Manufacturing Industries', ICSEAD Working Paper 2007-07, Kitakyushu: International Centre for the Study of East Asian Development.

Ramstetter, ED and Phan, MN 2013, 'Productivity, ownership, and producer concentration in transition: Further evidence from Vietnamese manufacturing', *Journal of Asian Economics*, vol. 25, pp. 28-42.

Takii, S 2004, 'Productivity differentials between local and foreign plants in Indonesian manufacturing, 1995', *World Development*, vol. 32, no. 11, pp. 1957-69.

Takii, S and Ramstetter, ED 2005, 'Multinational presence and labour productivity differentials in Indonesian manufacturing, 1975–2001', *Bulletin of Indonesian Economic Studies*, vol. 41, no. 2, pp. 221-42.

Tran, TQ 2007, 'Foreign direct investment in industrial transition : a case study of Vietnam ', The Australian National University, Canberra, Australia.

Table 1: Total paid employees in sample firms (number) and shares of SOEs, WFs, and JVs shares (% of industry subtotals)

Industry	2007				2009			
	All firms, number	SOE shares	WF shares	JV shares	All firms, number	SOE shares	WF shares	JV shares
11 sample industries	2,793,123	12.80	37.50	5.33	3,121,007	9.93	42.30	4.59
Food & beverages	354,508	14.06	12.77	5.89	403,724	9.64	13.05	6.39
Textiles	152,230	22.47	32.53	4.55	142,013	14.67	38.87	2.25
Apparel, leather, & footwear	1,081,636	7.25	53.97	4.85	1,205,799	4.89	60.22	3.71
Wood products & furniture	300,553	6.79	32.46	2.70	313,291	4.09	37.24	2.37
Paper	57,452	15.73	19.99	0.81	62,779	12.73	24.16	0.68
Chemicals, rubber, & plastics	186,057	20.81	29.99	4.96	212,183	15.47	36.62	3.40
Non-metallic mineral products	197,056	22.65	6.17	5.50	215,953	19.11	6.41	4.41
Basic metals & metal products	147,612	18.24	25.33	4.30	172,630	17.62	30.85	3.71
General machinery	39,392	18.52	23.63	1.56	43,748	18.03	25.86	1.65
Electronic machinery	155,360	7.48	71.74	6.31	193,414	5.09	79.65	4.78
Transportation machinery	121,270	30.14	27.78	19.15	155,475	31.06	28.42	18.39
Excluded industries and firms	490,934	22.13	36.94	0.98	523,856	12.37	36.00	1.28

Note: Samples include firms with 20 or more paid workers and positive sales, worker compensation, and fixed assets; excluded industries are tobacco, publishing and printing, petroleum products, miscellaneous manufacturing, and recycling.
Source: Author's compilations from General Statistics Office (2011, 2013).

Table 2: Mean compensation per worker in private firms (million dong) and unconditional ownership-related wage differentials (percentage differentials) for paid workers in sample firms

Industry	2007				2009			
	Private firms	SOE-private	WF-private	JV-private	Private firms	SOE-private	WF-private	JV-private
11 sample industries	12.85	72	68	175	14.49	57	54	92
Food & beverages	11.63	92	59	167	14.90	54	83	88
Textiles	11.28	36	62	77	11.71	40	62	84
Apparel, leather, & footwear	12.12	4	24	24	12.53	15	39	30
Wood products & furniture	11.54	28	40	67	11.72	18	53	67
Paper	12.55	58	46	131	14.42	61	61	-5
Chemicals, rubber, & plastics	14.68	123	134	230	17.13	82	66	86
Non-metallic mineral products	12.03	71	42	231	14.10	78	67	107
Basic metals & metal products	14.66	54	62	155	16.53	36	45	92
General machinery	16.31	33	-1	79	18.30	32	31	28
Electronic machinery	16.09	88	176	188	20.11	50	11	117
Transportation machinery	14.63	73	5	168	17.63	18	24	72

Note: See Table 1 for a precise definition of sample firms; compensation refer to all payments to workers, including employer contributions to social insurance.

Source: Author's compilations from General Statistics Office (2011, 2013).

Table 3: Shares of paid workers with tertiary education in sample firms (percent)

	2007				2009			
Industry	Private	SOEs	WFs	JVs	Private	SOEs	WFs	JVs
11 sample industries	5.93	12.57	6.80	15.55	6.71	17.49	7.30	16.90
Food & beverages	5.71	11.73	14.40	6.50	6.60	14.25	14.87	18.49
Textiles	4.34	9.29	3.68	2.01	4.19	10.15	3.61	7.43
Apparel, leather, & footwear	3.22	3.32	2.08	7.98	3.51	5.87	2.33	2.64
Wood products & furniture	3.63	10.93	2.52	17.19	3.95	12.30	3.22	8.54
Paper	5.63	9.88	6.65	18.49	6.20	9.65	6.24	16.84
Chemicals, rubber, & plastics	9.85	17.03	11.47	15.34	10.24	22.59	11.72	17.02
Non-metallic mineral products	4.01	11.01	7.97	19.13	5.01	15.69	10.51	17.57
Basic metals & metal products	7.67	13.77	8.69	17.63	9.52	19.95	8.24	25.64
General machinery	10.53	16.39	7.46	28.04	15.27	32.31	12.69	15.52
Electronic machinery	13.21	21.00	9.11	13.83	17.13	31.07	9.31	32.80
Transportation machinery	6.74	16.79	4.83	14.52	10.33	24.16	7.32	18.20

Note: See Table 1 for a precise definition of sample firms; workers with tertiary education are those who successfully completed college, university, or graduate school.
Source: Author's compilations from General Statistics Office (2011, 2013).

Table 4: Shares of paid workers with secondary education in sample firms (percent)

	2007				2009			
Industry	Private	SOEs	WFs	JVs	Private	SOEs	WFs	JVs
11 sample industries	12.11	12.77	11.21	16.19	11.54	15.08	10.77	15.98
Food & beverages	9.94	15.64	16.03	15.10	9.73	18.37	14.70	17.61
Textiles	7.06	8.03	9.03	7.59	7.89	9.98	9.50	6.32
Apparel, leather, & footwear	7.15	5.40	4.72	7.19	6.39	6.26	5.24	4.81
Wood products & furniture	8.22	10.03	5.02	10.64	7.78	9.46	4.32	12.68
Paper	12.00	10.86	11.06	21.21	10.65	11.22	9.93	27.78
Chemicals, rubber, & plastics	14.97	14.64	14.62	19.37	14.53	14.90	12.98	17.60
Non-metallic mineral products	8.78	11.77	10.15	17.93	9.74	11.84	15.47	21.42
Basic metals & metal products	19.04	14.00	17.53	20.61	18.35	19.39	15.49	18.33
General machinery	25.53	15.81	17.46	27.21	26.91	28.92	19.14	32.17
Electronic machinery	26.09	16.40	15.01	20.43	23.33	17.49	13.04	18.70
Transportation machinery	17.47	13.57	12.35	21.63	20.94	16.98	13.99	16.57

Note: See Table 1 for a precise definition of sample firms; workers with moderate education are those who successfully completed secondary school (12 years), but not tertiary education.
Source: Author's compilations from General Statistics Office (2011, 2013).

Table 5: Shares of workers in highly paid occupation in sample firms in 2009 (percent)

Industry	Private	SOEs	WFs	JVs
11 sample industries	16.30	23.78	16.04	22.13
Food & beverages	16.26	22.45	24.06	22.12
Textiles	12.84	15.57	12.55	18.00
Apparel, leather, & footwear	10.99	11.54	9.05	9.16
Wood products & furniture	12.93	17.98	10.40	15.37
Paper	16.83	15.88	16.02	31.62
Chemicals, rubber, & plastics	21.52	27.32	21.52	24.87
Non-metallic mineral products	14.30	22.31	18.83	22.23
Basic metals & metal products	20.70	25.34	18.65	29.73
General machinery	25.95	43.86	21.76	26.57
Electronic machinery	25.50	33.06	16.95	27.23
Transportation machinery	20.39	30.51	18.91	27.20

Note: See Table 1 for a precise definition of sample firms; highly paid occupations are defined as (1) managers and (2) professional, technical and supervisory employees.
Source: Author's compilations from General Statistics Office (2011, 2013).

Table 6: OLS Estimates of slope ownership-related wage differentials and other slope coefficients from estimates of equation (1); all p-values based on robust standard errors; 11 sample industries combined

	2009		2007	
Independent variable, indicator	Lagged	Contem-poraneous	Lagged	Contem-poraneous
KI	0.0106	0.0034	0.0374 a	0.0114 a
RO	0.1817 a	0.1378 a	0.1955 a	0.1378 a
SH	0.0091 a	0.0089 a	0.0144 a	0.0143 a
SM	0.0008 b	0.0008 b	0.0014 a	0.0014 a
SF	-0.0036 a	-0.0036 a	-0.0036 a	-0.0035 a
SP	0.0035 a	0.0035 a	not available	
DW	0.2553 a	0.2502 a	0.2202 a	0.2071 a
DJ	0.2605 a	0.2492 a	0.2718 a	0.2543 a
DS	0.0974 a	0.0864 a	0.1456 a	0.1289 a
Test DW=DJ	247.56 a	239.95 a	111.57 a	99.54 a
Observations	10,698	10,698	10,221	10,221
R^2	0.482	0.480	0.423	0.419
#industry dummies	28	28	28	28

Notes: a=signficant at the 1% level, b=significant at the 5% level, c=significant at the 10% level; all estimates include 5 regional dummies and 53 industry dummies (see the text for definitions); theTestDFs rows show Wald tests of the hypothesis that coefficients on DW and DJ are equal and associated p-values; full results including the constant and all dummy coefficients are available from the authors.

Table 7: Industry-level OLS estimates of ownership-related wage differentials from estimates of equation (1) ; all p-values based on robust standard errors

Differential, industry	2009		2007	
	Lagged	Contem-poraneous	Lagged	Contem-poraneous
WF-private, 11 industries	0.2553 a	0.2502 a	0.2202 a	0.2071 a
Food & beverages	0.2413 a	0.2447 a	0.2102 a	0.1858 a
Textiles	0.3358 a	0.3237 a	0.2553 a	0.2461 a
Apparel, leather, & footwear	0.1916 a	0.1872 a	0.1080 a	0.0962 b
Wood products & furniture	0.2214 a	0.1923 a	0.1450 a	0.1207 a
Paper	0.2029 a	0.1874 a	0.2896 a	0.2764 a
Chemicals, rubber, & plastics	0.2995 a	0.3013 a	0.3206 a	0.3074 a
Non-metallic mineral products	0.2177 a	0.2075 a	0.0972	0.0927
Basic metals & metal products	0.3425 a	0.3357 a	0.3155 a	0.3076 a
General machinery	0.4390 a	0.4620 a	0.3476 a	0.3353 a
Electronic machinery	0.2170 a	0.2230 a	0.2340 b	0.2418 b
Transportation machinery	0.2988 a	0.2758 a	0.4979 a	0.4808 a
JV-private, 11 industries	0.2605 a	0.2492 a	0.2718 a	0.2543 a
Food & beverages	0.1672 a	0.1687 a	0.2039 a	0.1768 a
Textiles	0.3599 b	0.3311 b	0.2260 b	0.2250 b
Apparel, leather, & footwear	0.1350 a	0.1229 b	0.0999	0.0942
Wood products & furniture	0.2462 a	0.2232 a	0.1422 c	0.1113
Paper	-0.8096	-0.8791	0.0799	0.0476
Chemicals, rubber, & plastics	0.3352 a	0.3371 a	0.4785 a	0.4688 a
Non-metallic mineral products	0.2561 a	0.2485 a	0.2354 b	0.2281 b
Basic metals & metal products	0.3285 a	0.3162 a	0.4695 a	0.4485 a
General machinery	0.3144 a	0.3184 a	0.1608	0.1416
Electronic machinery	0.5908 a	0.5812 a	0.3721 b	0.3715 b
Transportation machinery	0.3101 a	0.2760 a	0.4089 a	0.3556 b
Test WF-priv=JV-priv, 11 indus.	247.56 a	239.95 a	111.57 a	99.54 a
Food & beverages	18.26 a	19.09 a	8.34 a	6.36 a
Textiles	32.04 a	30.99 a	12.58 a	11.75 a
Apparel, leather, & footwear	27.70 a	27.00 a	4.04 b	3.49
Wood products & furniture	29.92 a	22.65 a	9.06 a	6.48 a
Paper	8.22 a	6.57 a	8.09 a	7.32 a
Chemicals, rubber, & plastics	56.08 a	56.75 a	50.44 a	49.04 a
Non-metallic mineral products	15.04 a	13.59 a	3.35 b	3.23 b
Basic metals & metal products	52.71 a	49.35 a	38.90 a	36.54 a
General machinery	17.52 a	19.25 a	10.72 a	10.20 a
Electronic machinery	19.68 a	19.53 a	4.97 a	5.50 a
Transportation machinery	14.45 a	12.57 a	18.44 a	17.42 a

Table 7 (continued)

Differential, industry	2009		2007	
	Lagged	Contem-	Lagged	Contem-
SOE-private, 11 industries	0.0974 a	0.0864 a	0.1456 a	0.1289 a
Food & beverages	0.2021 a	0.1989 a	0.2111 a	0.1869 a
Textiles	0.0022	-0.0061	-0.0877	-0.1119
Apparel, leather, & footwear	0.0837 b	0.0621	0.0785	0.0534
Wood products & furniture	-0.0536	-0.0948	-0.0747	-0.0912
Paper	0.1722	0.1624	-0.0051	-0.0675
Chemicals, rubber, & plastics	0.2129 a	0.2129 a	0.4090 a	0.3941 a
Non-metallic mineral products	-0.0138	-0.0292	-0.0086	-0.0183
Basic metals & metal products	0.0755	0.0652	0.2322 a	0.2088 a
General machinery	0.1126	0.1188	0.0612	0.0680
Electronic machinery	0.2410 a	0.2337 a	0.3393 b	0.3509 b
Transportation machinery	0.0278	0.0234	0.2353 a	0.2195 a

Notes: a=signficant at the 1% level, b=significant at the 5% level, c=significant at the 10% level; ; see Appendix Table 3 for other slope coefficients and indicators; full results including all coefficients and equation details are available from the authors.

Appendix Table 1: Paid employees in sample firms by ownership and industry (number)

Industry	2007				2009			
	Private firms	SOEs	WFs	JVs	Private firms	SOEs	WFs	JVs
11 sample industries	1,239,236	357,645	1,047,385	148,857	1,347,540	310,052	1,320,188	143,227
Food & beverages	238,522	49,858	45,254	20,875	286,290	38,925	52,697	25,812
Textiles	61,577	34,213	49,520	6,921	62,786	20,829	55,204	3,195
Apparel, leather, & footwear	367,003	78,407	583,782	52,445	376,043	58,959	726,102	44,695
Wood products & furniture	174,483	20,401	97,545	8,125	176,407	12,812	116,657	7,416
Paper	36,468	9,037	11,483	465	39,193	7,994	15,167	425
Chemicals, rubber, & plastics	82,318	38,724	55,795	9,220	94,447	32,824	77,708	7,205
Non-metallic mineral products	129,437	44,624	12,166	10,829	151,327	41,263	13,836	9,528
Basic metals & metal products	76,947	26,924	37,397	6,345	82,546	30,426	53,257	6,401
General machinery	22,173	7,297	9,309	614	23,824	7,888	11,314	722
Electronic machinery	22,494	11,614	111,449	9,803	20,272	9,841	154,058	9,244
Transportation machinery	27,818	36,548	33,686	23,218	34,408	48,293	44,189	28,586
Excluded industries and firms	196,129	108,658	181,356	4,792	263,814	64,775	188,568	6,699

Note: Firms with viable data are those with positive paid workers, output, worker compensation, and fixed assets; samples exclude firms with less than 20 employees; excluded industries are tobacco, publishing and printing, petroleum products, and recycling.

Source: Author's compilations from General Statistics Office (2011, 2013).

Appendix Table 2: Mean compensation per worker in sample firms by ownership and industry (million dong)

Industry	2007				2009			
	Private firms	SOEs	WFs	JVs	Private firms	SOEs	WFs	JVs
11 sample industries	12.852	22.096	21.625	35.323	14.490	22.705	22.309	27.873
Food & beverages	11.631	22.294	18.500	31.050	14.898	22.974	27.304	27.992
Textiles	11.281	15.297	18.235	19.924	11.705	16.377	19.000	21.540
Apparel, leather, & footwear	12.124	12.648	15.031	15.044	12.533	14.438	17.482	16.281
Wood products & furniture	11.280	14.555	17.286	16.778	11.535	13.678	17.927	19.888
Paper	12.554	19.794	18.364	28.949	14.420	23.242	23.230	13.718
Chemicals, rubber, & plastics	14.676	32.765	34.277	48.460	17.133	31.105	28.456	31.868
Non-metallic mineral products	12.032	20.593	17.082	39.813	14.097	25.062	23.540	29.115
Basic metals & metal products	14.663	22.575	23.767	37.454	16.526	22.531	24.029	31.796
General machinery	16.310	21.632	16.069	29.205	18.297	24.136	24.046	23.407
Electronic machinery	16.087	30.318	44.431	46.397	20.106	30.078	22.396	43.588
Transportation machinery	14.631	25.306	15.395	39.145	17.631	20.885	21.883	30.320

Note: Firms with viable data are those with positive paid workers, output, worker compensation, and fixed assets; samples exclude firms with less than 20 employees; excluded industries are tobacco, publishing and printing, petroleum products, and recycling.

Source: Author's compilations from General Statistics Office (2011, 2013).

Appendix Table 3: Sales of sample firms by ownership and industry (trillion dong)

Industry	2007				2009			
	Private firms	SOEs	WFs	JVs	Private firms	SOEs	WFs	JVs
11 sample industries	228,883	98,974	198,516	108,795	279,493	87,859	274,504	117,349
Food & beverages	86,418	24,034	37,709	20,737	98,369	16,143	55,790	28,673
Textiles	7,946	4,679	14,326	1,283	8,952	2,986	16,566	859
Apparel, leather, & footwear	16,110	6,496	37,311	4,768	17,271	4,395	49,026	3,626
Wood products & furniture	16,251	2,623	12,006	1,621	20,633	1,693	15,527	1,730
Paper	6,992	2,798	3,987	157	10,162	2,481	6,171	210
Chemicals, rubber, & plastics	25,909	17,336	21,527	12,373	31,122	17,201	35,188	6,019
Non-metallic mineral products	15,814	15,287	3,409	9,115	18,567	13,129	3,456	7,933
Basic metals & metal products	29,087	6,218	13,518	8,460	43,090	10,697	16,876	9,593
General machinery	3,746	1,149	3,500	188	4,801	1,425	4,503	337
Electronic machinery	11,286	7,362	35,923	12,071	12,274	6,685	51,263	11,396
Transportation machinery	9,321	10,992	15,302	38,022	14,253	11,025	20,137	46,973
Excluded industries	45,181	28,857	26,111	3,727	101,516	28,289	41,354	5,662

Note: Firms with viable data are those with positive paid workers, output, worker compensation, and fixed assets; samples exclude firms with less than 20 employees; excluded industries are tobacco, publishing and printing, petroleum products, and recycling.

Appendix Table 4: Number of sample firms by ownership and industry

Industry	2007				2009			
	Private firms	SOEs	WFs	JVs	Private firms	SOEs	WFs	JVs
11 sample industries	7,665	531	1,699	326	7,611	517	2,249	322
Food & beverages	1,353	115	145	55	1,337	104	164	59
Textiles	366	31	153	17	416	28	191	11
Apparel, leather, & footwear	878	46	363	41	871	45	489	40
Wood products & furniture	1,145	36	168	29	1,245	28	224	32
Paper	470	17	62	2	445	17	76	2
Chemicals, rubber, & plastics	850	59	287	51	764	54	406	44
Non-metallic mineral products	921	81	39	29	1,062	78	59	30
Basic metals & metal products	1,010	44	187	43	880	55	267	46
General machinery	242	19	51	6	196	19	63	7
Electronic machinery	196	28	123	26	169	29	159	25
Transportation machinery	234	55	121	27	226	60	151	26
Excluded industries	1,767	278	545	43	3,400	177	717	50

exclude firms with less than 20 employees; excluded industries are tobacco, publishing and printing, petroleum products, and recycling.

Source: Author's compilations from General Statistics Office (2011, 2013).

Appendix Table 5: OLS Estimates of Ownership-Related Wage Differentials and Other Slope Coefficients; all p-values based on robust standard errors

	2009				2007			
	Lagged		Contem-poraneous		Lagged		Contem-poraneous	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
Food and beverages								
KI	0.0109	0.604	0.0296	0.027	0.0878	0.000	0.0322	0.009
RO	0.1808	0.000	0.1541	0.000	0.2064	0.000	0.1445	0.000
SH	0.0123	0.000	0.0124	0.000	0.0181	0.000	0.0181	0.000
SM	0.0002	0.872	0.0002	0.870	-0.0022	0.228	-0.0021	0.241
SF	-0.0019	0.011	-0.0020	0.006	-0.0031	0.000	-0.0030	0.000
SP	0.0039	0.001	0.0039	0.001	not available			
DW	0.2413	0.000	0.2447	0.000	0.2102	0.002	0.1858	0.005
DJ	0.1672	0.009	0.1687	0.008	0.2039	0.002	0.1768	0.009
DS	0.2021	0.000	0.1989	0.000	0.2111	0.000	0.1869	0.001
Test DW=DJ	18.26	0.000	18.21	0.000	8.34	0.001	6.36	0.003
Obs./R^2	1,664	0.499	1,664	0.497	1,668	0.433	1,668	0.426
No. *DI* s	3		3		3		3	
Textiles								
KI	0.0465	0.130	0.0249	0.105	0.0461	0.103	0.0324	0.072
RO	0.1636	0.000	0.1244	0.000	0.2006	0.000	0.1128	0.000
SH	0.0152	0.001	0.0145	0.001	0.0254	0.000	0.0255	0.000
SM	-0.0007	0.633	-0.0008	0.605	0.0023	0.373	0.0025	0.336
SF	-0.0022	0.064	-0.0023	0.051	-0.0020	0.082	-0.0020	0.079
SP	0.0044	0.026	0.0045	0.025	not available			
DW	0.3358	0.000	0.3237	0.000	0.2553	0.000	0.2461	0.000
DJ	0.3599	0.013	0.3311	0.019	0.2260	0.020	0.2250	0.016
DS	0.0022	0.976	-0.0061	0.932	-0.0877	0.366	-0.1119	0.243
Test DW=DJ	32.04	0.000	18.21	0.000	12.58	0.000	11.75	0.000
Obs./R^2	646	0.483	646	0.480	567	0.468	567	0.460
No. *DI* s	0		0		0		0	
Apparel and leather products								
KI	0.0050	0.734	-0.0070	0.458	0.0368	0.063	-0.0006	0.963
RO	0.1729	0.000	0.1179	0.000	0.1811	0.000	0.1175	0.000
SH	0.0041	0.130	0.0042	0.118	0.0123	0.002	0.0126	0.002
SM	-0.0020	0.206	-0.0019	0.218	-0.0015	0.317	-0.0012	0.408
SF	-0.0032	0.001	-0.0031	0.001	-0.0012	0.322	-0.0012	0.329
SP	0.0039	0.019	0.0037	0.028	not available			
DW	0.1916	0.000	0.1872	0.000	0.1080	0.004	0.0962	0.011
DJ	0.1350	0.010	0.1229	0.019	0.0999	0.162	0.0942	0.19
DS	0.0837	0.044	0.0621	0.133	0.0785	0.132	0.0534	0.3
Test DW=DJ	27.70	0.000	18.21	0.000	4.04	0.049	3.49	0.104
Obs./R^2	1,445	0.391	1,445	0.386	1,328	0.281	1,328	0.2726
No. *DI* s	1		1		1		0	

Appendix Table 5 (continued)

	2009				2007			
	Lagged		Contem-		Lagged		Contem-	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
Wood products and furniture								
KI	0.0550	0.001	0.0192	0.091	0.0535	0.002	0.0193	0.086
RO	0.2611	0.000	0.1561	0.000	0.1916	0.000	0.1496	0.000
SH	0.0092	0.003	0.0081	0.010	0.0121	0.000	0.0119	0.000
SM	0.0003	0.854	0.0003	0.827	0.0030	0.027	0.0030	0.024
SF	-0.0053	0.000	-0.0053	0.000	-0.0052	0.000	-0.0051	0.000
SP	0.0084	0.000	0.0089	0.000	not available			
DW	0.2214	0.000	0.1923	0.000	0.1450	0.000	0.1207	0.000
DJ	0.2462	0.000	0.2232	0.000	0.1422	0.057	0.1113	0.130
DS	-0.0536	0.378	-0.0948	0.127	-0.0747	0.399	-0.0912	0.297
Test DW=DJ	29.92	0.000	18.21	0.000	9.06	0.000	6.48	0.000
Obs./R^2	1,529	0.477	1,529	0.460	1,378	0.385	1,378	0.379
No. *DI* s	1		1		1		1	
Paper products								
KI	0.0757	0.031	0.0094	0.642	0.0516	0.117	0.0123	0.501
RO	0.1201	0.000	0.1513	0.000	0.2713	0.000	0.1739	0.000
SH	0.0080	0.003	0.0089	0.001	0.0124	0.000	0.0133	0.000
SM	-0.0001	0.977	0.0004	0.850	0.0019	0.299	0.0016	0.339
SF	0.0002	0.888	0.0004	0.756	-0.0015	0.193	-0.0013	0.257
SP	0.0030	0.109	0.0029	0.116	not available			
DW	0.2029	0.000	0.1874	0.001	0.2896	0.000	0.2764	0.000
DJ	-0.8096	0.195	-0.8791	0.202	0.0799	0.413	0.0476	0.656
DS	0.1722	0.160	0.1624	0.191	-0.0051	0.977	-0.0675	0.721
Test DW=DJ	8.22	0.000	18.21	0.000	8.09	0.000	7.32	0.001
Obs./R^2	540	0.417	540	0.404	551	0.415	551	0.401
No. *DI* s	0		0		0		0	
Chemical, Rubber and Plastics								
KI	-0.0085	0.617	0.0005	0.964	0.0355	0.096	0.0081	0.469
RO	0.1302	0.000	0.1275	0.000	0.2266	0.000	0.1362	0.000
SH	0.0101	0.000	0.0101	0.000	0.0150	0.000	0.0145	0.000
SM	0.0017	0.101	0.0017	0.095	0.0019	0.066	0.0019	0.060
SF	-0.0015	0.013	-0.0015	0.013	-0.0008	0.239	-0.0008	0.279
SP	0.0040	0.000	0.0040	0.000	not available			
DW	0.2995	0.000	0.3013	0.000	0.3206	0.000	0.3074	0.000
DJ	0.3352	0.000	0.3371	0.000	0.4785	0.000	0.4688	0.000
DS	0.2129	0.001	0.2129	0.001	0.4090	0.000	0.3941	0.000
Test DW=DJ	56.08	0.000	18.21	0.000	50.44	0.000	49.04	0.000
Obs./R^2	1,268	0.528	1,268	0.528	1,247	0.513	1,247	0.506
No. *DI* s	3		3		3		3	

Appendix Table 5 (continued)

	2009				2007			
	Lagged		Contem-		Lagged		Contem-	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
Non-metallic mineral products								
KI	-0.0356	0.014	-0.0247	0.013	-0.0122	0.592	-0.0111	0.408
RO	0.2591	0.000	0.1956	0.000	0.2441	0.000	0.1966	0.000
SH	0.0090	0.000	0.0086	0.000	0.0114	0.053	0.0113	0.056
SM	-0.0027	0.001	-0.0026	0.002	0.0017	0.247	0.0017	0.267
SF	-0.0027	0.000	-0.0026	0.000	-0.0037	0.000	-0.0037	0.000
SP	0.0054	0.000	0.0058	0.000	not available			
DW	0.2177	0.000	0.2075	0.000	0.0972	0.263	0.0927	0.294
DJ	0.2561	0.000	0.2485	0.000	0.2354	0.013	0.2281	0.014
DS	-0.0138	0.785	-0.0292	0.570	-0.0086	0.868	-0.0183	0.726
Test DW=DJ	15.04	0.000	18.21	0.000	3.35	0.036	3.23	0.040
Obs./R^2	1,229	0.503	1,229	0.496	1,070	0.504	1,070	0.501
No. *DI* s	1		1		1		1	
Basic metals & metal products								
KI	0.0240	0.261	0.0105	0.409	0.0183	0.283	0.0106	0.343
RO	0.1481	0.000	0.1154	0.000	0.1898	0.000	0.1277	0.000
SH	0.0083	0.000	0.0081	0.000	0.0077	0.003	0.0077	0.003
SM	0.0003	0.682	0.0003	0.600	0.0012	0.203	0.0012	0.199
SF	-0.0047	0.000	-0.0047	0.000	-0.0047	0.000	-0.0047	0.000
SP	0.0010	0.345	0.0010	0.339	not available			
DW	0.3425	0.000	0.3357	0.000	0.3155	0.000	0.3076	0.000
DJ	0.3285	0.000	0.3162	0.000	0.4695	0.000	0.4485	0.000
DS	0.0755	0.140	0.0652	0.201	0.2322	0.000	0.2088	0.001
Test DW=DJ	52.71	0.000	18.21	0.000	38.90	0.000	36.54	0.000
Obs./R^2	1,248	0.386	1,248	0.384	1,284	0.336	1,284	0.331
No. *DI* s	3		3		3		3	
General machinery								
KI	-0.0645	0.303	-0.0442	0.022	0.0535	0.077	0.0132	0.512
RO	0.0434	0.390	0.1012	0.000	0.1500	0.002	0.1491	0.000
SH	0.0057	0.002	0.0059	0.001	0.0134	0.000	0.0133	0.001
SM	0.0028	0.010	0.0028	0.011	0.0017	0.138	0.0018	0.122
SF	-0.0073	0.000	-0.0075	0.000	-0.0054	0.000	-0.0054	0.000
SP	0.0031	0.043	0.0031	0.040	not available			
DW	0.4390	0.000	0.4620	0.000	0.3476	0.000	0.3353	0.000
DJ	0.3144	0.010	0.3184	0.008	0.1608	0.446	0.1416	0.496
DS	0.1126	0.164	0.1188	0.140	0.0612	0.573	0.0680	0.533
Test DW=DJ	17.52	0.000	18.21	0.000	10.72	0.000	10.20	0.000
Obs./R^2	285	0.447	285	0.441	318	0.442	318	0.438
No. *DI* s	0		0		0		0	

Appendix Table 5 (continued)

	2009				2007			
	Lagged		Contem-		Lagged		Contem-	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
Electronic machinery								
KI	-0.0011	0.980	0.0052	0.799	0.0570	0.397	0.0441	0.190
RO	0.1213	0.000	0.0820	0.000	0.0351	0.385	0.0632	0.016
SH	0.0083	0.000	0.0081	0.000	0.0175	0.000	0.0176	0.000
SM	0.0005	0.752	0.0005	0.745	0.0046	0.002	0.0045	0.003
SF	-0.0042	0.001	-0.0043	0.000	-0.0030	0.009	-0.0030	0.010
SP	0.0036	0.097	0.0037	0.090	not available			
DW	0.2170	0.000	0.2230	0.000	0.2340	0.018	0.2418	0.020
DJ	0.5908	0.000	0.5812	0.000	0.3721	0.019	0.3715	0.014
DS	0.2410	0.005	0.2337	0.006	0.3393	0.016	0.3509	0.013
Test DW=DJ	19.7	0.000	18.2	0.000	5.0	0.008	5.5	0.004
Obs./R^2	382	0.437	382	0.435	373	0.347	373	0.346
No. *DI* s	4		4		4		4	
Transportation machinery								
KI	-0.0143	0.608	-0.0586	0.000	0.0108	0.811	-0.0412	0.146
RO	0.1471	0.000	0.1089	0.000	0.1885	0.000	0.1193	0.000
SH	0.0050	0.017	0.0046	0.029	0.0114	0.004	0.0118	0.004
SM	0.0019	0.087	0.0020	0.075	0.0006	0.741	0.0006	0.755
SF	-0.0031	0.008	-0.0030	0.009	-0.0053	0.002	-0.0055	0.001
SP	0.0013	0.327	0.0016	0.221	not available			
DW	0.2988	0.000	0.2758	0.000	0.4979	0.000	0.4808	0.000
DJ	0.3101	0.000	0.2760	0.001	0.4089	0.005	0.3556	0.012
DS	0.0278	0.619	0.0234	0.677	0.2353	0.004	0.2195	0.008
Test DW=DJ	14.5	0.000	18.2	0.000	18.4	0.000	17.4	0.000
Obs./R^2	462	0.431	462	0.424	437	0.376	437	0.368
No. *DI* s	1		1		1		1	

Note: in the Obs./R2 rows, the coefficient column contains the number of observations and the P-value column contains the R-squared; all estimates include 5 regional dummies; see the text for definitions or region and industry dummies; the Test DFs rows show Wald tests of the hypothesis that coefficients on DW and DJ are equal and associated p-values; and full results including the constant and all dummy coefficients are available from the authors.

Appendix Table 6: VSIC Categories included in each industry group

Industry name	VSIC Categories included
Manufacturing	Sum or Mean of 11 sample industries and excluded industries below
11 sample industries	Sum or Mean of 11 sample industries below
Food & beverages	VSIC 15
Textiles	VSIC 17
Apparel, leather, & footwear	VSIC 18 & 19
Wood products & furniture	VSIC 20 & 361
Paper, printing, & publishing	VSIC 21
Chemicals, rubber, & plastics	VSIC 24 & 25
Non-metallic mineral products	VSIC 26
Basic metals & metal products	VSIC 27 & 28
General machinery	VSIC 29
Electronic machinery	VSIC 30,31,32 &33
Transportation machinery	VSIC 34 & 35
Excluded industries	VSIC 16, 22, 23, 369 & 37

Applendix Table 7: Nominal minimum wages per month in Vietnam, 2000-2010 (thousand dong)

Year	2000-01	2002	2003-04	2005	2006-07	2008	2009	2010
Domestic firms								
Region 1	180	210	290	350	450	620	800	980
Region 2						580	740	880
Region 3						540	690	810
Region 4						540	650	730
MNEs	2000-2005				2006-07	2008	2009	2010
Region 1	626				870	1000	1200	1,340
Region 2	556				790	900	1080	1,190
Region 3	487				710	800	950	1,040
Region 4	487				710	800	920	1,000

Notes:

(1) Minimum wage rates were uniform for all domestic firms regardless of firm location in 2000-07.

(2) Region-specipfic, minimum wage rates did not change for MNEs in 2000-05.

(3) Regions are defined as follows:

Region 1 : Hanoi and Ho Chi Minh City.

Region 2 : Hai Phong, Dong Nai, Binh Duong, Ba Ria Vung Tau, Quang Ninh, Da Nang, and Can

Region 3 : Other provinces.

Region 4 : Bac Kan, Binh Phuoc, Dak Nong, Lai Chau, and Tay Ninh.

Sources: Vietnamese government degrees compiled by Nguyen (2014, p. 52).

Chapter 2

Ownership-related Wage Differentials by Occupation in Vietnamese Manufacturing

Kien Trung Nguyen*, The University of Danang, School of Economics
and
Eric D. Ramstetter, Asian Growth Research Institute and Kyushu University

2.1. Introduction

Casual observation and descriptive statistics indicate that foreign multinational enterprises (MNEs) often pay higher average wages than domestic firms or plants in manufacturing industries of host, developing economies. Rigorous statistical analyses of plant-level data for Indonesia (Lipsey and Sjöholm 2004; Ramstetter and Narjoko 2013) and Malaysia (Ramstetter 2014), as well as firm-level data for Vietnam (Nguyen and Ramstetter 2015; Phan and Ramstetter 2007) also suggest that positive wage differentials often remain statistically significant after accounting for the influences of worker education and/or occupation, and plant or firm capital- or input-intensity and size.[1] Studies of households and internal migrants in Vietnam (Fukase 2014a, 2014b) also provide evidence that MNEs pay relatively high wages and attract immigrants after accounting for individual characteristics.

Of these studies, only analyses of Indonesia have been able to estimate MNE-local wage differentials for different types of workers. In Indonesia, wage differentials between MNEs and local, private plants (excluding plants belonging to state-owned enterprises, SOEs) tended to be larger for relatively high wage, non-production workers than for production workers. Conditional differentials were also statistically significant when estimated in large samples of manufacturing plants. At the industry level, MNE-private differentials also tended to be larger

[1] Other studies of Malaysia (Lim 1977) and Thailand (Matsuoka-Movshuk and Movshuk 2006; Ramstetter 2004) also found positive and significant wage differentials after controlling for differences in capital intensity and size, for example, but were unable to control for worker education or occupation.

for non-production workers and most conditional differentials were statistically significant in 1996, but many were insignificant in 2006. Results from large samples of Thai manufacturing plants in 1996 also indicate MNE-local plant wage differentials were statistically significant and larger for non-production workers, but do not control for worker education or other measures of labour quality (Matsuoka-Movshuk and Movshuk 2006).

Results from a small, stratified sample of 1,500 manufacturing and non-manufacturing firms in five large Chinese cities (Hale and Long 2011, pp. 417-419) contrast somewhat. These results are consistent in suggesting that firms with relatively large foreign ownership shares paid significantly higher wages to engineers and managers and that this differential was larger than for low-wage, ordinary workers. However, they were inconsistent because they find no significant effect of foreign ownership on wages of ordinary workers.[2] Evidence on how MNE-local wage differentials vary among occupations remains scarce, however.

We help fill this important gap in the literature by analysing data for Vietnamese manufacturing firms in 2009, the only year for which such data on wages and workers can be obtained by occupation. An important advantage of the Vietnamese data is that they allow disaggregation of non-production workers into lowly paid and highly paid occupations, whereas previous studies have usually interpreted non-production workers as white collar or relatively highly paid and skilled workers. The analysis also pays close attention to variation in MNE-private wage differentials among industries, which many of the above-mentioned studies indicate are quite important. Although the study has well-known shortcomings of cross sectional analyses, it is possible to lag key independent variables using 2008 data and partially account for simultaneity issues often thought to affect such estimates. Perhaps more importantly, a previous study (Nguyen and Ramstetter 2015) has demonstrated that

[2] Similar results suggest that MNE-local wage differentials were significant for skilled workers but not unskilled workers in Mexico in 1990 (Aitken et al. 1996, p. 367-368).

ownership-related wage differentials for all workers were qualitatively similar in 2007 and 2009. This consistency is an important robustness check because firm-level data on worker education are only available in these years and because the macroeconomic environment was good in 2007, but poor in 2009.[3]

Vietnam's economy has three important characteristics with important implications for this and related analyses. First, even after *doi moi* (reform) that marked the transition away from a centrally controlled economy from 1986, SOEs have received preferential treatment and traditionally been designated to control capital-intensive industries thought to be key to the country's development. Second, after the promulgation of the first foreign investment law in 1988, MNEs have also been treated more favourably than local private firms. For example, Vietnam's foreign investment laws also contain relatively few formal ownership restrictions. As a result, the vast majority of MNEs are wholly-foreign firms (WFs). On the other hand, many MNE joint ventures (JVs) involve SOE partners, making it important to distinguish JVs and WFs even though JVs are quite small.

Third, Vietnam intensified emphasis on outward-oriented economic liberalization in the early 21st century. Important measures included the promulgation of the Enterprise Law in 2000, the negotiation of the Bilateral Trade Agreement with the United States in 2001, the implementation of many commitments made under the ASEAN (Association of Southeast Asian Nations) Free Trade Area (AFTA) by 2005 or shortly thereafter, and further revisions to the Enterprise Law and related Investment Laws that eventually led to WTO (World Trade Organization) accession in 2006. Correspondingly, by 2009, the economy was substantially more open and competitive than even five years previous.

[3] For example, the growth rate of real manufacturing GDP plummeted from over 12.4 percent in 2007 to 9.8 percent in 2008 and only 2.8 percent in 2009, while the growth of the manufacturing deflator skyrocketed from 4.5 percent in 2007 to 13.2 percent in 2008 and 7.3 percent in 2009 (data downloaded from www.gso.gov.vn on 22 January 2014).

In this paper, we first review the literature on MNE-local wage differentials, focusing on why wage differentials might differ among occupations (Section 2). Subsequently, we describe the enterprise data used for the analysis, focusing on patterns of unconditional differentials in wages and worker skills between MNEs and private firms (Section 3). Then we test if wage differentials are statistically significant after accounting for firm size, capital intensity, worker sex, and worker education in 2009 (Section 4). Finally, Section 5 offers some conclusions and suggestions for future research.

2.2. Literature Review and Methodology[4]

There is a compelling theoretical rationale suggesting that MNEs will often pay higher wages than corresponding domestic enterprises in host developing economies. On the demand side, MNEs are often argued to possess large amounts of knowledge-based, generally intangible assets such as production technology, marketing networks and management systems. Possession of these firm-specific assets suggests that MNEs will be likely to be more efficient than non-MNEs, which is reflected by larger firm size, higher factor productivity and factor returns, and/or higher capital or technology intensity.

Many MNEs also require their employees, even relatively unskilled staff, to have engineering, marketing, and foreign language skills required to work with particular machinery and clients. In addition, many of these employees need to learn modern work disciplines, such as punctuality, tidiness and promptness, which may not be valued as highly in local firms. Firms operating in developing economies like Vietnam often face shortages of skilled workers who have both engineering, foreign language, and modern management skills. MNEs relative unfamiliarity with local labor markets may make it more difficult for them to

[4] Portions of this section draw heavily on Nguyen and Ramstetter (2015, Section 2).

hire new skilled workers, or retain current skilled workers than domestic firms. This may also motivate MNEs to pay relatively high wages as an incentive to increase the attractiveness of their firms to skilled workers or to reduce turnover.

On the supply side, workers may prefer to work for locally owned firms because they are more familiar with local management practices. In Vietnam, for example, it is clear that labor market practices often vary greatly between MNEs and local firms. Nonetheless, our impression is that most Vietnamese workers are not very opposed to working for MNEs and many might actually prefer MNE employment to the alternatives. This is supported by studies which suggest that internal migrants in Vietnam often prefer to work for MNEs over local firms (Fukase 2014b).

It is often difficult to fully account for worker quality when examining MNE-local wage differentials in samples of plant- or firm-level data. This is because very few plant- or firm-level data sets contain information on key determinants of wages such as experience or human capital investment, which are used as in standard Mincer equations of wage determination. In this study, we proxy human capital investment with measures of workforce educational attainment, but we do not have data on other aspects of human capital formation or worker experience. More importantly, as in other studies of this nature, we are forced to estimate average wages at the firm level, not for individual workers. Thus, we are not modelling how wages vary among workers but how average wages vary among firms and occupations.

Some of the most comprehensive analyses of wage differentials to date have examined Indonesian manufacturing plants in 1996 and 2006 (Lipsey and Sjöholm 2004; Ramstetter and Narjoko 2013). These studies are particularly relevant here because they estimate separate Mincer-type wage equations at the plant level for production workers and non-production workers. Non-production workers include managers, technicians, and other professionals, and generally earn much more than production workers. More importantly, the Indonesian

evidence suggests that the wage gap between non-production and production workers was larger for MNEs than for private plants.[5] Equivalently, as described in the introduction, both unconditional and conditional MNE-private wage differentials were larger for non-production workers than for production workers, and differentials were positive and significant for both types of workers. For a small sample of Chinese firms in five large cities, Hale and Long (2011) also found qualitatively similar results that foreign ownership had a stronger impact on wages of managers and professionals than ordinary workers. However, their results differed from those for Indonesia because foreign ownership had no significant effect on the wages of ordinary workers. Velde and Morrissey (2003) also found a tendency for MNE-local wage differentials to be positive and larger for relatively skilled workers in five African countries.

Why do these studies suggest that foreign ownership has larger effects on the wages of relatively skilled workers earning relatively high wages? Three distinct possibilities seem conspicuous. First, skilled workers are more likely than unskilled workers to be able to utilize the MNEs knowledge-based, generally intangible assets MNEs possess in relatively large amounts compared to non-MNEs. Because they are better able to utilize these assets, skilled workers probably experience larger increases in labor productivity, and thus wages, by moving from private firms to MNEs, for example, than do unskilled workers. The second possibility is mundane and statistical, but probably just as important. Namely, skilled workers are by definition more heterogeneous than unskilled workers and it is thus likely that controls for labor quality such as educational background capture variation in labor quality better for unskilled workers than for skilled ones. A third possibility is that estimates of ownership-

[5] In Ramstetter and Narjoko's (2013, pp. 25-26, 41-42) large samples of medium large plants in Indonesia, for example, ratios of wages earned by non-production workers to those of production workers were 2.11 for private plants and 2.61 for MNEs in 1996 and 1.82 and 1.99, respectively, in 2006. Corresponding unconditional, MNE-private wage differentials were 201 percent for non-production workers and 144 percent for production workers in 1996, and 84 and 69 percent, respectively, in 2006. When estimated in large samples of all plants combined, corresponding conditional differences were 34 and 26 percent, respectively, in 1996 and 15 and 3.5 percent, respectively, in 2006.

related differentials include monopoly rents in markets for highly valued managers and technicians or professionals, for example, because these labor markets may better be characterized as a series of bilateral monopolies rather than perfectly competitive markets. Correspondingly, larger portions of observed, MNE-local differentials for skilled workers can probably be explained by unmeasured aspects of labor quality and labor market imperfections.

In Vietnam, it is also important that MNEs are required to pay higher minimum wages than private companies.[6] Because minimum wages affect unskilled workers more than skilled ones, they reduce the extent to which MNE-private differentials for skilled workers exceed differentials for unskilled workers. On the other hand, minimum wage requirements only affect base salaries, and domestic firms often pay higher bonuses than MNEs.[7]

2.3. The Data, Wage Differentials and Worker Quality

This study analyzes medium-large firms (20 or more employees) included in Vietnam's Annual Enterprise Surveys for 2009 (General Statistics Office 2011, 2013). The 2009 data are the focus because this is the only year for which information on the number of workers and wages by occupation is available.[8] Because lagged variables are used in on specification, values are expressed in 2000 prices.[9] Wages are defined to include regular salaries and other

[6] For example, in 2006-2007 minimum wages in WFs and JVs were 58-93 percent higher than in domestic firms (private firms and SOEs combined), depending on the region. In 2009, these differentials declined to 38-50 percent. Foreign-domestic differentials in minimum wages were largest in Hanoi and Ho Chi Minh City and smallest in rural areas (Nguyen 2014).

[7] See Appendix Table See Asian Development Bank Institute newsletter of 23 October 2013; received by email on that date.

[8] In addition, only 2009 and 2007 surveys have information on employee education.

[9] Output is converted using a manufacturing output deflator at the two-digit level of Vietnam's Standard Industrial Classification. Capital is converted using the deflator is for fixed-capital formation from the national accounts (General Statistics Office various years a, various years b). Real wages are calculated using the consumer price index (CPI).

compensation such as bonuses and subsidies, but exclude employer contributions to social insurance (e.g., social security, health insurance, and pension insurance).

Most MNEs, including both wholly-foreign MNEs (WFs) and JVs, and SOEs are medium- or large-sized firms. These medium-large firms differ in many respects from smaller firms, which are predominantly private. Therefore, it is more meaningful to compare wages among medium-large manufacturing firms with a workforce of at least 20 employees. In addition to making the comparison more consistent and economically meaningful, excluding small firms also allows us to remove most outliers and firms reporting implausible data.[10] The analysis also excludes firms reporting implausible data (non-positive values from sales, worker compensation, and fixed assets, as well as firms in five industries with very few MNEs and/or SOEs (tobacco; publishing and printing; petroleum and gas; miscellaneous manufacturing; and recycling). Finally, because the purpose of this study is to compare MNE-private wage differentials among occupations, it also makes sense to further restrict the samples to firms reporting positive workers and compensation for each occupation.

These constraints reduce the sample to 7,795 firms with 2.70 million paid workers (Table 1). Paid employment in this sample amounted to 66 percent of the 4.09 million employees in manufacturing firms as reported in published compilations of the enterprise survey data (General Statistics Office 2011, 2013).[11] This sample is thus a large cross section and broadly representative of Vietnam's medium-large firms in 2009. On the other hand, comparisons of enterprise and labor force survey data suggest there were about 2.77 million manufacturing employees not covered by the enterprise surveys, most of whom probably worked for household enterprises excluded from the enterprise survey.

[10] In addition, only limited information is collected from very small local firms with 10 or fewer employees (Jammal et al., 2006).

[11] This sample is substantially smaller than the sample of 10,698 firms with 3.12 million paid workers used in Nguyen and Ramstetter (2015) because that study includes firms that had zero paid employees or wages for any one of the four occupation categories, whereas this study excludes such firms.

As mentioned above, there has been a substantial policy bias in favor of SOEs and MNEs in Vietnam. Partially as a result of this legacy, MNEs and SOEs have played relatively large roles in Vietnam's manufacturing industries. Reflecting efforts to privatize many SOEs and stimulate private business, the enterprise data suggest SOE shares declined markedly after 2000 but national accounts data suggest only small reductions in SOE shares after 2000.[12] Partially because there are few ownership restrictions, WFs account for almost all MNE activity in Vietnamese manufacturing.

In 2009, private firms had the largest payrolls in the 11 sample industries (1.14 million paid workers), followed closely by WFs (1.13 million), and distantly by SOEs and JVs (0.29 million and 0.13 million, respectively; Table 1). WF employment was concentrated in labor-intensive industries such as apparel, leather, and footwear, electronic machinery, and wood and furniture. JV employment was also heavily concentrated in a few industries, namely the apparel group, transportation machinery, and food and beverages. In contrast, private firm employment was more evenly disbursed across a range of industries, led by the apparel group, food and beverages, wood and furniture, and non-metallic mineral products. SOEs also employment was also evenly spread among a number of industries led by the apparel group, transportation machinery, non-metallic mineral products, food and beverages, the chemicals group, and the metals group.

As might be expected in a sample of manufacturing firms, production workers was by far the largest category, accounting for an average of just over 80 percent of all paid workers in SOEs, 82 percent in JVs, 84 percent in private firms, and 87 percent in WFs (Table 1). Shares of all lowly paid workers, defined as production workers plus clerical and support workers, varied in a narrower range, from 85 percent in SOEs and 86 percent in JVs to 88 percent in private firms and 90 percent in WFs. Lowly paid worker shares were 89 percent or higher in

[12] See Ramstetter and Phan (2013, pp. 31-32) for more details.

textiles (private firms, SOEs, WFs), the apparel group (private firms, SOEs, WFs), the wood group (private firms, WFs, JVs), electronic machinery (WFs), and transportation machinery (JVs). In other words, a very large portion of paid employment in Vietnam's manufacturing is generated by firms that depend heavily on relatively lowly paid workers.

Professionals and technicians was the second largest category which accounted for an average of 11 percent of paid workers in SOEs, 8.5 percent in JVs, 8.2 percent in private firms, and 6.5 percent in WFs (Table 1). Shares of this group were 10 percent or more for at least one category in eight of the 11 industry categories, the exceptions being three industries heavily dependent on low wage labor (textiles, the apparel group, wood and furniture). The smallest occupation was managers, and the largest mean share was in JVs (5.2 percent), followed rather distantly by SOEs (4.2 percent), private firms (3.9 percent), and WFs (3.7 percent). Relatively high manager shares (6 percent or more) were observed for JVs in three industries (apparel, chemicals, and non-metallic mineral products), for private firms in two (the metals group and general machinery, and in one for SOEs (electronic machinery).

In a large sample of the 11 industries combined, mean compensation was almost identical for production workers and clerical and support workers in private firms (13.9 million dong or about US$815 per year; Table 2). For production workers, WFs paid a mean of 22 percent more than private firms, while SOEs paid 38 percent more, and JVs 48 percent more. For clerical and support workers, wage differentials were similar for SOEs, 33 percent, but much larger in WFs and JVs, 56 and 68 percent, respectively. In other words, WFs and JVs paid more for their clerical and support staff relative to production workers than did SOEs or private firms, which paid no premium for clerical and support workers. This suggests that WFs and JVs may require relatively skilled, high wage clerical and support services comparted to SOEs or private firms.

In private firms, professionals and technicians earned an average of 34 percent more than production, clerical, and support workers, while managers earned an average 2.96 times more than lowly paid production or clerical and support workers (Table 2). The SOE-private differential for professionals and technicians was also about one-third, but the corresponding differential for managers was only 5 percent. In contrast, WF- and JV-private differentials were relatively large for professionals and technicians (78 and 87 percent, respectively) and highest for managers (106 and 124 percent, respectively). In other words, as in previous studies, MNE-private wage differentials were larger in highly paid occupations than in lowly paid occupations.

At the industry level, there was substantial variation in these patterns (Table 2). For example, production worker wage differentials were negative (indicating higher wages in private firms) for SOEs and WFs in wood and furniture, JVs in paper, WFs in electronic machinery, and SOE and WFs in transportation machinery. On the other hand, production worker wages were highest in six of the 11 industries for JVs and four industries for SOEs, but only in one for WFs. Thus, at the industry level, there was a tendency for JVs to pay production workers the most, followed by SOEs, WFs, and lastly private firms. Although clerical and support workers were also lowly paid, JVs paid the highest wages in only four industries compared to six for WFs and one for SOEs. For clerical and support workers, there were only two negative wage differentials, for SOEs in the apparel group and JVs in paper.

In the highly paid occupations, negative differentials were also sparse being observed among professionals and technicians in SOEs in the apparel group and in wood and furniture and among managers in all groups in the apparel group, and SOEs in general machinery. JVs paid the highest wages to professionals and technicians in seven of the 11 industries but the highest wages to managers in only four industries. WFs paid the highest wages to professional and technician wages in the remaining four industries and the highest managerial wages in the

other seven industries. For the high wage occupations, wages in SOE exceeded WFs (technical and professional workers in chemicals) or JVs (managerial workers in paper) in only two cases.

One important weakness of the Vietnamese data is that it is not possible to measure educational attainment for each type of worker. Rather, the variable is only collected for all workers combined (Table 3). When the 11 sample industries are combined, shares of paid workers who completed tertiary education were much higher in SOEs and JVs (18 and 17 percent, respectively) than in WFs and private firms (7.8 percent in each). SOEs also had the highest tertiary shares in seven industries while JVs had the highest in the remaining four. Tertiary shares were lowest WFs in seven industries, in private firms in three, and in JVs in one industry. In short, there was a strong tendency for WFs and private firms to hire relatively large shares of lowly paid workers who did not finish tertiary education compared to SOEs and JVs.

2.4. Results of Estimating Earnings Equations by Occupation

The previous literature and the data presented above suggest that the ownership-related wage differentials in the manufacturing sector are related to worker education and occupational differences among ownership groups. The literature also suggests that other firm characteristics such as size, capital intensity, and the share of females in the workforce in paid employees may also influence the extent of wage differentials. Therefore, in this section we continue with an econometric analysis to examine the extent to which ownership-related wage differentials vary among occupations after controlling for the influences of worker education, occupation, and sex, as well as firm capital intensity and size. Similar to previous studies, we estimate the following model:

$$\ln(RW_{ijk}) = a_0 + a_1 \ln(KI_{ij}) + a_2 \ln(RO_{ij}) + a_3 SH_{ij} + a_4 SM_{ij}$$

$$+a_5 SF_{ij} + a_6 DW_{ij} + a_7 DJ_{ij} + a_8 DS_{ij} + \varepsilon_{ij} \qquad (1)$$

where

RW_{ijk}= Average real wage of firm *i* of industry *j* for worker group *k*.

RO_{ij}= Real output of firm *i* of industry *j*.

KI_{ij}= Capital intensity of firm *i* of industry *j*, measured as the ratio of fixed capital stock over employment after deflating capital stock at a constant value.

SH_{ij}= A share of highly educated employees in total employment of firm *i* of industry *j* (per cent).

SM_{ij}= A share of moderately educated employees in total employment of firm *i* of industry *j* (per cent).

SF_{ij}= A share of female employees in total employment of firm *i* of industry *j* (per cent).

DW_{ij}= A dummy for wholly-owned, foreign-invested enterprises (wholly foreign firms – WF), taking a value of one if a firm is wholly owned FIE and zero otherwise.

DJ_{ij}= A dummy for joint venture enterprises (JV), taking a value of one if a firm is FIE joint venture and zero otherwise.

DS_{ij}= A dummy for state-owned enterprises (SOE), taking a value of one if a firm is state-owned and zero otherwise.

ε_{ij}= A stochastic error term.

All estimates also include vectors of dummy variables identifying seven regions and as many as 28 industries, usually defined at the two- or three-digit level of Vietnam's Standard Industrial Classification (VSIC) to account for region-specific and industry-specific influences on the constant which are not captured by the firm-level variables.[13] Industry-specific effects on constants and slopes are also accounted for in more detail by estimating equations for each of the 11 sample industries separately, as well as all 11 industries combined.

[13] The regions are Hanoi, the Red River Delta, the North Mountainous Area, the Central Coast and Central Highland Area, the South East Area, Ho Chi Minh City, and the Mekong Delta (used as the base dummy). Industries are defined at the 3-digit level for industries having at least 2 firms of each ownership type in them; 3-digit categories are combined or 2-digit categories used in industries with fewer firms.

Coefficients on capital intensity (a_1) and real output (a_2) are expected to be positive because capital-intensive and large firms generally pay higher wages than labor-intensive or small firms. Coefficients on the shares of highly or moderately educated workers (a_3, a_4) should also be positive because they suggest higher worker quality in firms with relatively high shares. In contrast, the coefficient on the share of female workers (a_5) is likely to be negative because firms with a higher proportion of female workers tend to have lower average wages in Vietnam and many other economies.[14] Finally, if wage differentials between WFs JVs, and SOEs, on the one hand, and private firms, on the other, persist after controlling for worker education, occupation, and sex, as well as firm size and capital intensity, the signs of the coefficients on DW, DJ, and DS (a_6, a_7, a_8) will be positive.

Because data on wages by worker occupation are only available for 2009, we focus on estimates for this year, Because of data constraints, estimates are performed in cross sections, which mean that exponential value of the coefficients on DW, DJ, and DS can be interpreted as conditional wage differentials similar to the unconditional differentials in Table 2. However, it is also possible that wages could influence firm's capital intensity and size, creating potential simultaneity between the dependent and independent variables. To check for the robustness of the results to simultaneity concerns, estimates of both contemporaneous and lagged specifications, where capital intensity and output are lagged one year, are compared. All estimates use robust standard errors to account for heteroskedasiticity that can be expected when firm-level, scale variables (e.g., output, capital intensity) are used.

In large samples of firms in all 11 industries combined, estimated coefficients were generally consistent with expectations, with two notable exceptions (Table 4). First, the coefficient on capital intensity which was insignificant at the standard 5 percent level in all

[14] Females tend to earn less than males because they tend to be less educated and have less experience in high paying jobs, and because they are discriminated against in the workplace and when educational resources are allocated.

three non-production worker categories and in the contemporaneous specification for production workers. Second, the coefficient the share of workers with moderate education was negative and significant (managers and clerical and support workers) or weakly significant at the 10 percent level (professionals and technicians) for the three non-production worker categories, but positive and significant for production workers. In other words, firms with large shares of moderately educated workers tended to pay relatively high wages to production workers but relatively low wages to the three non-production worker categories. Although unexpected, this result is plausible, suggesting that high school education alone leads to lower wages for non-production workers, but to higher wages for production workers. This result is probably related to relatively high levels of educational attainment in Vietnam compared to other economies with similar per capita GDP, for example. On the other hand, larger firms, firms with relatively large tertiary shares, and firms with relatively small female shares all paid significantly higher wages to all worker classes. Goodness of fit measures (R^2) ranged from 0.21 to 0.34 for the four types of labor, which is typical in large cross sections such as these.

Conditional, ownership-related differentials were also positive and usually significant statistically, the sole exception being the SOE-private differential for managers (Table 4). JVs paid the highest wages for all three non-production worker categories, 77-78 percent more than private firms for managers, 36 percent more for professionals and technicians, and 28 percent more for clerical and support workers (Table 4). For WFs, corresponding differentials with private firms were smaller but of similar magnitude, 72, 32, and 23-24 percent, respectively. Although small, differences in JV-private and WF-private differentials were statistically significant, however. Perhaps most importantly, however, there is a tendency for mean wage differentials between MNEs (both WFs and JVs) and private firms to be larger in high-wage occupations than in low-wage occupations.

This pattern is also relatively strong at the industry level for WFs and JVs. All estimates of WF-private conditional differences were positive and significant at 5 percent or better in all 11 industries for managers, in all industries except general machinery for professionals and technicians, and in all but paper, non-metallic mineral products, and transportation machinery for clerical and support workers and production workers (Tables 5-6). These WF-private differentials were consistently at least one tenth larger for managers than for professionals and technicians in all 11 industries and at least one tenth larger for professionals and technicians than for clerical and support workers in seven industries.

JV-private differentials were also positive and significant for high wage occupations, but there were a few industries where differentials were insignificant (the apparel group, paper, and general machinery) for managers or professionals and technicians (Table 5-6). Most JV-private differentials were also largest for highly paid managers, but ordering among other occupations varied at the industry level. Wald tests of the hypothesis that WF-private and JV-private differentials were equal were always rejected at the 5 percent level in large samples of all 11 industries combined and in most industry-occupation samples.

For SOEs, most conditional differences were insignificant at the industry level (Tables 5-6). There were notable exceptions in food and beverages, where SOE-private differentials were positive for all four occupations, and in the chemicals group and electronic machinery, where there were positive and significant differentials for all occupations except managers. But in most industries and for most occupations, SOEs did not pay significantly more than private firms if the influences of worker education and sex and plant size and capital intensity are accounted for.

2.5. Conclusions and Future Research

This paper began with a review of previous evidence that MNE-local wage differentials have often been found to remain positive even after accounting for the fact that MNEs tend to hire relatively high quality labor and to be large and capital intensive compared to local firms. When all sample firms were combined, simple comparisons suggest that average wages were highest in joint venture MNEs followed closely by wholly foreign MNEs. Unconditional JV-private and WF-private wage differentials were 106-124 percent for managers, 78-87 percent for professionals and technicians, 56-68 percent for clerical and support workers, and 22-48 percent for production workers. Corresponding, conditional wage differentials which account for the influences of worker education and sex, in addition to firm capital intensity and size, were positive and usually significant, but smaller, 72-78 percent for managers, 32-36 percent for professionals and technicians, 23-28 percent for clerical and support workers and 15-16 percent for production workers. Conditional, SOE-private differentials were not significant for managers and relatively small (7-11 percent) for the three other occupations.

When estimated at the industry-level, conditional WF-private differentials were positive and significant for most occupations and industries. JV-private differentials were also positive and significant in most industries for highly paid managers or professionals and technicians, but more often insignificant for lowly paid clerical and support workers or production workers. Most SOE-private differentials were also insignificant when estimated at the industry level. On the other hand, even at the industry level, there was a strong tendency for MNE-private differentials to be largest for managers than for professionals and technicians, and a somewhat weaker tendency for differentials to be larger for professionals and technicians than for clerical and support workers.

In this sample of Vietnamese manufacturing firms, there was thus a tendency for MNE-private differentials to be relatively large and/or more often positive and significant for

relatively high-wage occupations than for low-wage occupations. This pattern is consistent with the probability that relatively skilled workers are better able to increase productivity by using access to an MNE's firm-specific assets than unskilled workers. It is also consistent with the possibility that estimated conditional differentials include aspects of worker quality not captured by workforce education or monopoly rents earned by prized managers and technicians or professionals, for example.

Although these results have been obtained from a relatively small sample of 7,795 manufacturers in 2009, it is important to emphasize that two key results are consistent with results from a previous study (Nguyen and Ramstetter 2015) estimating the mean wage differential for all workers combined, and using a much larger samples for two very different years, 2009 (10,698 firms) and 2007 (10,221 firms). First, JVs tend to pay the most, but conditional JV-private and WF-private differentials for all paid workers combined were of similar magnitude (23-31 percent), on average. Second, most SOE-private differentials were insignificant when estimated at the industry level, but most WF-private and JV-private differentials were positive and significant. The similarity of key results from this sample and larger samples in 2007 (a good year in Vietnamese manufacturing) and in 2009 (a very bad year), suggests that both samples are comprehensive enough to generate robust results.

In short, these results provide further support for previous studies indicating that MNEs often pay significantly higher wages than local firms or plants, even after accounting important aspects of worker quality and other firm- or plant-level characteristics affecting wage determination. These results are important because they suggest there are important benefits accruing to workers in MNEs. On the other hand, the results of this and a few other studies suggest that MNE-private differentials are largest for a small number of workers in highly paid occupations and smallest for the large number of production workers. Another important pattern emerging from the data is that clerical and support workers earned

substantially more than production workers in JVs and in WFs (unconditional skill premiums of 14 and 28 percent, respectively), but about the same in private firms and less in SOEs.

Although these results suggest MNE-private wage differentials are much larger for relatively few highly paid workers, we do not think this finding is strange in a capitalist labor market. And although there may be a case in favor of the argument for limiting salaries of top managers if labor market imperfections (e.g., the bilateral monopolies that often characterize markets for highly skilled workers) are judged to result in inefficiency or unfairly high wages, there is probably little rationale for treating top managers of MNEs any differently than top management in other high paying firms.

Unfortunately, the lack of data on wage and paid workers by occupation for other years makes it difficult to extend these analyses in important ways. For example, it would be interesting to investigate how changes in ownership affect wages and employment and how these effects differ among occupations. Another important question is how MNE presence affects wage levels in domestic firms and if these spillovers differ among occupations? Unfortunately, rigorous analysis of issues raised these questions requires the use of panel data which will be impossible until data on wages and employment are collected by occupation for more years.

References

Aitken, B, Harrison, A, and Lipsey, RE 1996, "Wages and foreign ownership: A comparative study of Mexico, Venezuela, and the United States", Journal of International Economics, vol. 40, no. 3-4, pp. 345-371.

Fukase, E 2014a, 'Foreign Wage Premium, Gender and Education: Insights from Vietnam Household Surveys,' *The World Economy*, vol. 37, no. 6, pp. 834-55.

Fukase, E 2014b, 'Job Opportunities in Foreign Firms and Internal Migration in Vietnam', *Asian Economic Journal*, vol. 28, no. 3, pp. 279-99.

General Statistics Office 2011, *Business Results of All Enterprises in Vietnam in 2009*, Vol. 1 & 2, Hanoi: Statistical Publishing House and underlying firm-level data for 2008-2009 supplied by the General Statistics Office.

General Statistics Office 2013, *Development of Vietnam Enterprises in the Period of 2006-2011*, Hanoi: Statistical Publishing House and underlying firm-level data for 2008-2009 supplied by the General Statistics Office.

General Statistics Office various years a, *Statistical Yearbook*, 2000-2004 issues, Hanoi: Statistical Publishing House.

General Statistics Office various years b, *Statistical Yearbook of Vietnam*, 2005-2013 issues, Hanoi: Statistical Publishing House.

Hale, G and Long, C 2011, 'Did Foreign Direct Investment Put an Upward Pressure on Wages in China?', IMF Economic Review, vol. 59, no. 3, pp. 404-430..

Jammal, Y, Thang, DT and Thuy, PD 2006, *"Vietnam Annual Enterprise Survey" Report of GSO/UNDP/DFID Project 00040722 "Support to Socio-Economic Development Monitoring"*, General Statistics Office, Hanoi.

Lim, D 1977, 'Do foreign companies pay higher wages than their local counterparts in Malaysian manufacturing?', *Journal of Development Economics*, vol. 4, no. 1, pp. 55-66.

Lipsey, RE and Sjöholm, F 2004, 'Foreign direct investment, education and wages in Indonesian manufacturing', *Journal of Development Economics*, vol. 73, no. 1, pp. 415-22.

Matsuoka-Movshuk, A and Movshuk, O 2006, 'Multinational Corporations and Wages in Thai Manufacturing', in ED Ramstetter and F Sjöholm (eds), *Multinational corporations in Indonesia and Thailand : wages, productivity and exports*, Palgrave Macmillan, New York, pp. 54-81.

Nguyen, KT 2014, 'Economic reforms, manufacturing employment and wages in Vietnam', PhD Dissertation thesis, Australian National University, Canberra.

Nguyen, KT and Ramstetter ED 2015, 'Wage Differentials among Ownership Groups and Worker Quality in Vietnamese Manufacturing', Working Paper 2015-05, Kitakyushu: Asian Growth Research Institute.

Ramstetter, ED 2014, 'Wage Differentials between Multinationals and Local Plants and Worker Quality in Malaysian manufacturing', *Asian Development Review*, vol. 31, no. 2, pp. 55-76.

Ramstetter, ED and Narjoko, D 2013, 'Wage Differentials between Foreign Multinationals and Local Plants and Worker Education in Indonesian Manufacturing', Working Paper 2013-23, Kitakyushu: International Centre for the Study of Development.

Ramstetter, ED and Phan, MN 2007, 'Employee Compensation, Ownership, and Producer Concentration in Vietnam's Manufacturing Industries', ICSEAD Working Paper 2007-07, Kitakyushu: International Centre for the Study of East Asian Development.

Ramstetter, ED and Phan, MN 2013, 'Productivity, ownership, and producer concentration in transition: Further evidence from Vietnamese manufacturing', *Journal of Asian Economics*, vol. 25, pp. 28-42.

Velde, DW te and Morrissey, O 2003, 'Do Workers in Africa Get a Wage Premium if Employed in Firms Owned by Foreigners?', *Journal of African Economics*, vol 12., no. 1, pp. 41-73.

Table 1: Paid workers (number) and occupational shares of all workers (percent) by owner and industry

Industry	Private firms	SOEs	WFs	JVs
All paid workers, 11 sample industries	1,139,670	294,439	1,128,497	132,998
Food & beverages	230,539	37,361	48,986	20,668
Textiles	50,974	20,195	45,583	2,524
Apparel, leather, & footwear	335,115	52,486	603,139	41,883
Wood products & furniture	140,622	11,568	105,480	6,950
Paper	30,765	7,756	11,631	430
Chemicals, rubber, & plastics	80,726	32,500	66,325	6,866
Non-metallic mineral products	127,660	39,785	10,985	9,542
Basic metals & metal products	73,032	29,127	46,674	6,117
General machinery	20,953	6,447	10,865	715
Electronic machinery	19,293	9,543	137,533	8,689
Transportation machinery	29,991	47,671	41,296	28,614
Excluded industries and firms	481,432	80,317	401,131	18,432
% Managers, 11 sample industries	3.86	4.19	3.72	5.16
Food & beverages	3.78	4.76	4.45	4.43
Textiles	2.92	3.32	3.52	4.60
Apparel, leather, & footwear	2.55	2.50	3.40	7.59
Wood products & furniture	3.72	3.22	3.08	3.60
Paper	5.55	4.85	4.90	5.12
Chemicals, rubber, & plastics	5.72	5.18	5.86	6.15
Non-metallic mineral products	4.28	4.48	4.16	6.63
Basic metals & metal products	6.21	5.26	5.07	5.82
General machinery	6.47	5.23	5.61	4.90
Electronic machinery	5.38	6.79	3.44	3.14
Transportation machinery	4.30	3.86	4.35	2.31
Excluded industries and firms	5.52	5.69	4.08	7.41
Professionals & technicans, 11 sample industri	8.17	10.69	6.51	8.51
Food & beverages	8.55	10.39	15.38	10.04
Textiles	7.07	7.65	5.58	8.40
Apparel, leather, & footwear	5.75	5.64	4.92	5.03
Wood products & furniture	6.08	9.37	5.03	6.22
Paper	9.91	10.08	11.11	23.26
Chemicals, rubber, & plastics	14.19	13.38	11.06	15.90
Non-metallic mineral products	8.26	14.28	9.17	19.30
Basic metals & metal products	12.36	11.01	9.20	14.55
General machinery	11.60	13.17	10.38	9.51
Electronic machinery	13.79	14.78	7.27	12.36
Transportation machinery	9.27	12.03	8.10	4.99
Excluded industries and firms	7.61	13.67	4.77	9.30

Table 1 (continued)

Industry	Private firms	SOEs	WFs	JVs
Clerical & support workers, 11 sample industri	3.97	4.64	3.08	4.27
Food & beverages	4.11	4.94	5.87	5.91
Textiles	3.33	7.81	3.86	16.56
Apparel, leather, & footwear	2.50	1.82	2.55	2.29
Wood products & furniture	3.18	3.84	3.28	2.82
Paper	5.56	3.92	4.42	3.49
Chemicals, rubber, & plastics	6.04	6.93	4.63	5.69
Non-metallic mineral products	4.86	3.99	6.47	4.57
Basic metals & metal products	5.83	5.58	4.43	7.06
General machinery	6.79	4.84	4.09	5.17
Electronic machinery	6.27	7.16	2.14	5.01
Transportation machinery	5.08	4.37	3.59	3.97
Excluded industries and firms	2.71	4.63	3.28	4.96
Production workers, 11 sample industries	84.01	80.48	86.70	82.06
Food & beverages	83.56	79.91	74.30	79.62
Textiles	86.68	81.22	87.04	70.44
Apparel, leather, & footwear	89.20	90.04	89.13	85.09
Wood products & furniture	87.02	83.57	88.61	87.37
Paper	78.99	81.15	79.57	68.14
Chemicals, rubber, & plastics	74.05	74.51	78.45	72.25
Non-metallic mineral products	82.59	77.25	80.20	69.49
Basic metals & metal products	75.60	78.15	81.30	72.57
General machinery	75.14	76.76	79.92	80.42
Electronic machinery	74.57	71.28	87.15	79.49
Transportation machinery	81.35	79.73	83.96	88.72
Excluded industries	84.15	76.01	87.87	78.33

Note: Samples include firms with 20 or more paid workers and positive sales, worker compensation, and fixed assets; excluded industries are tobacco, publishing and printing, petroleum products, and recycling.

Source: Author's compilations from firm-level data underlying General Statistics Office (2011, 2013).

Table 2: Mean compensation per paid worker, excluding employer contributions to social insurance, in private firms reporting compensation, and unconditional owernship-related wage differentials by occupation, ownership, and industry

Industry	Private firms	SOE-private	WF-private	JV-private
Managers, 11 sample industries	41.16	5	106	124
Food & beverages	31.84	38	264	250
Textiles	27.76	44	212	122
Apparel, leather, & footwear	112.19	-73	-38	-59
Wood products & furniture	28.05	17	187	164
Paper	29.72	77	158	53
Chemicals, rubber, & plastics	37.10	78	129	161
Non-metallic mineral products	29.31	63	283	152
Basic metals & metal products	30.86	21	168	189
General machinery	32.29	-5	124	56
Electronic machinery	39.20	31	165	328
Transportation machinery	29.99	9	187	324
Professionals & technicans, 11 sample industrie	18.63	34	78	87
Food & beverages	20.16	34	57	81
Textiles	16.94	26	77	47
Apparel, leather, & footwear	18.35	-7	81	37
Wood products & furniture	16.93	-9	76	99
Paper	17.64	41	160	107
Chemicals, rubber, & plastics	21.29	60	55	68
Non-metallic mineral products	17.59	46	83	107
Basic metals & metal products	18.23	33	78	44
General machinery	20.60	12	40	81
Electronic machinery	20.39	57	116	119
Transportation machinery	18.32	16	53	86
Clerical & support workers, 11 sample industri	13.90	33	56	68
Food & beverages	13.25	48	77	66
Textiles	12.24	16	51	22
Apparel, leather, & footwear	17.41	-24	13	8
Wood products & furniture	12.06	11	96	40
Paper	12.48	56	85	-18
Chemicals, rubber, & plastics	14.17	85	79	62
Non-metallic mineral products	13.29	32	25	69
Basic metals & metal products	15.14	10	35	106
General machinery	14.64	22	45	1
Electronic machinery	14.70	98	67	99
Transportation machinery	12.99	23	36	136

Table 2 (continued)

Industry	Private firms	SOEs	WFs	JVs
Production workers,11 sample industries	13.88	38	22	48
Food & beverages	13.59	41	45	61
Textiles	11.22	18	28	52
Apparel, leather, & footwear	11.52	9	25	19
Wood products & furniture	14.30	-19	-1	11
Paper	12.72	52	39	-73
Chemicals, rubber, & plastics	14.67	65	41	50
Non-metallic mineral products	13.60	66	38	59
Basic metals & metal products	14.88	23	18	62
General machinery	16.22	22	21	22
Electronic machinery	18.06	44	-9	32
Transportation machinery	17.87	-1	-11	29

Note: Samples include firms with 20 or more paid workers and positive output, worker compensation, and fixed assets; excluded industries are tobacco, publishing and printing, petroleum products, and recycling.

Source: Author's compilations from firm-level data underlying General Statistics Office (2011, 2013).

Table 3: Shares of workers with higher education in firms reporting compensation by occupation, ownership, and industry (percentage per workers)

Industry	Private firms	SOEs	WFs	JVs
Manufacturing, 11 sample industries	7.75	17.79	7.80	16.98
Food & beverages	8.46	14.89	15.44	19.54
Textiles	4.84	9.76	3.42	7.35
Apparel, leather, & footwear	3.49	4.63	2.60	2.57
Wood products & furniture	4.40	12.55	3.13	8.39
Paper	6.28	9.69	6.00	16.84
Chemicals, rubber, & plastics	11.37	22.61	13.00	17.74
Non-metallic mineral products	5.99	15.84	9.66	17.84
Basic metals & metal products	10.39	21.07	8.46	26.33
General machinery	16.98	35.05	14.68	15.52
Electronic machinery	18.88	31.07	10.13	29.25
Transportation machinery	11.37	23.24	7.53	17.19

Note: Samples include firms with 20 or more paid workers and positive sales, worker compensation, and fixed assets; excluded industries are tobacco, publishing and printing, petroleum products, and recycling.

Source: Author's compilations from firm-level data underlying General Statistics Office (2011, 2013).

Table 4: OLS Estimates of slope ownership-related wage differentials and other slope coefficients from estimates of equation (1); all p-values based on robust standard errors; 11 sample industries combined

	Managers		Professionals & technicians	
Independent variable, indicator	Lagged	Contem-poraneous	Lagged	Contem-poraneous
KI	0.0110	0.0067	0.0017	-0.0098 c
RO	0.1357 a	0.1531 a	0.1221 a	0.1234 a
SH	0.0087 a	0.0087 a	0.0058 a	0.0059 a
SM	-0.0018 a	-0.0018 a	-0.0008 c	-0.0009 c
SF	-0.0013 a	-0.0013 a	-0.0015 a	-0.0015 a
DW	0.5435 a	0.5437 a	0.2786 a	0.2793 a
DJ	0.5731 a	0.5755 a	0.3087 a	0.3089 a
DS	0.0311	0.0343	0.0693 a	0.0687 a
Test DW=DJ	237.10 a	240.37 a	117.83 a	116.75 a
Observations	7,995	7,795	7,795	7,795
R^2	0.341	0.341	0.277	0.277
#industry dummies	27	27	27	27
	Production workers		Clerical & support workers	
Independent variable, indicator	Lagged	Contem-poraneous	Lagged	Contem-poraneous
KI	0.0259 a	-0.0081	0.0126	-0.0066
RO	0.1263 a	0.1181 a	0.0985 a	0.1060 a
SH	0.0080 a	0.0079 a	0.0056 a	0.0056 a
SM	0.0011 b	0.0011 a	-0.0010 b	-0.0009 b
SF	-0.0039 a	-0.0038 a	-0.0010 a	-0.0010 a
DW	0.1506 a	0.1421 a	0.2142 a	0.2103 a
DJ	0.1450 a	0.1358 a	0.2468 a	0.2439 a
DS	0.1015 a	0.0955 a	0.1027 a	0.1019 a
Test DW=DJ	47.90 a	42.95 a	61.31 a	59.47 a
Observations	7,795	7,795	7,795	7,795
R^2	0.304	0.305	0.213	0.213
#industry dummies	27	27	27	27

Notes: a=signficant at the 1% level, b=significant at the 5% level, c=significant at the 10% level; all estimates include 5 regional dummies and 53 industry dummies (see the text for definitions); theTestDFs rows show Wald tests of the hypothesis that coefficients on DW and DJ are equal and associated p-values; full results including the constant and all dummy coefficients are available from the authors.

Table 5: Industry-level OLS estimates of ownership-related wage differentials from estimates of equation (1) for managers and professionals/technicians; all p-values based on robust standard errors

Differential or indicator, industry	Managers		Professionals & technicians	
	Lagged	Contem-poraneous	Lagged	Contem-poraneous
WF-private, 11 industries	0.5435 a	0.5437 a	0.2786 a	0.2793 a
Food & beverages	0.6800 a	0.6858 a	0.2557 a	0.2515 a
Textiles	0.6627 a	0.6566 a	0.3141 a	0.3135 a
Apparel, leather, & footwear	0.4834 a	0.4845 a	0.2781 a	0.2795 a
Wood products & furniture	0.5225 a	0.5279 a	0.1950 a	0.1936 a
Paper	0.5225 a	0.5196 a	0.3515 a	0.3550 a
Chemicals, rubber, & plastics	0.4771 a	0.4830 a	0.3088 a	0.2848 a
Non-metallic mineral products	0.5355 a	0.5324 a	0.2798 a	0.2698 a
Basic metals & metal products	0.6169 a	0.6135 a	0.3811 a	0.3781 a
General machinery	0.5727 a	0.6259 a	0.2313	0.2430 c
Electronic machinery	0.4667 a	0.4494 a	0.3344 a	0.3245 a
Transportation machinery	0.4330 a	0.4314 a	0.2407 a	0.2416 a
JV-private, 11 industries	0.5731 a	0.5755 a	0.3087 a	0.3089 a
Food & beverages	0.6238 a	0.6295 a	0.3128 a	0.3070 a
Textiles	0.6584 a	0.6593 a	0.5760 a	0.5741 a
Apparel, leather, & footwear	0.1312	0.1363	0.1806	0.1842
Wood products & furniture	0.7208 a	0.7276 a	0.2314 b	0.2352 b
Paper	0.0161	-0.0092	-0.4104	-0.4551
Chemicals, rubber, & plastics	0.6064 a	0.6122 a	0.2624 a	0.2528 a
Non-metallic mineral products	0.4291 a	0.4225 a	0.3694 a	0.3754 a
Basic metals & metal products	0.4921 a	0.4935 a	0.3732 a	0.3707 a
General machinery	0.4280 b	0.4155 b	0.3164 c	0.3014 c
Electronic machinery	1.1888 a	1.1780 a	0.4337 a	0.4288 a
Transportation machinery	0.6569 a	0.6562 a	0.4521 a	0.4604 a
Test WF-priv=JV-priv, 11 indus.	237.1 a	240.4 a	117.8 a	116.8 a
Food & beverages	41.0 a	42.2 a	12.7 a	12.4 a
Textiles	28.1 a	25.4 a	11.3 a	12.0 a
Apparel, leather, & footwear	23.7 a	24.0 a	17.6 a	17.9 a
Wood products & furniture	34.9 a	36.6 a	7.4 a	7.9 a
Paper	7.0 a	6.7 a	5.7 a	4.3 a
Chemicals, rubber, & plastics	30.8 a	31.1 a	17.0 a	16.0 a
Non-metallic mineral products	11.7 a	11.6	10.4 a	10.2 a
Basic metals & metal products	29.1 a	29.5 a	25.0 a	24.5 a
General machinery	9.6 a	10.7 a	2.2	2.3
Electronic machinery	19.4 a	18.7 a	7.6 a	7.5 a
Transportation machinery	9.2 a	10.0 a	6.4 a	6.7 a

Table 5 (continued)

Differential or indicator, industry	Managers		Professionals & technicians	
	Lagged	Contem-	Lagged	Contem-
SOE-private, 11 industries	0.0311	0.0343	0.0693 a	0.0687 a
Food & beverages	0.1875 a	0.1890 a	0.1896 a	0.1841 a
Textiles	0.0727	0.0727	0.1004	0.0999
Apparel, leather, & footwear	0.0148	0.0223	-0.0645	-0.0563
Wood products & furniture	0.0323	0.0395	-0.2079 c	-0.2090 c
Paper	0.3140 c	0.3149 c	0.1164	0.1269
Chemicals, rubber, & plastics	0.1296	0.1456	0.1722 b	0.1780 b
Non-metallic mineral products	-0.0201	-0.0207	0.0235	0.0312
Basic metals & metal products	-0.0891	-0.0874	0.1012	0.0986
General machinery	-0.0769	-0.0657	0.0871	0.0823
Electronic machinery	0.0913	0.0855	0.2878 b	0.2867 b
Transportation machinery	-0.1967 b	-0.1956 b	-0.0563	-0.0517

Notes: a=signficant at the 1% level, b=significant at the 5% level, c=significant at the 10% level; ; see Appendix Table 5 for other slope coefficients and indicators; full results including all coefficients and equation details are available from the authors.

Table 6: Industry-level OLS estimates of ownership-related wage differentials from estimates of equation (1) for production workers and clerical/support workers; all p-values based on robust standard errors

Differential or indicator, industry	Production workers		Clerical & support workers	
	Lagged	Contem-poraneous	Lagged	Contem-poraneous
WF-private, 11 industries	0.1506 a	0.1421 a	0.2142 a	0.2103 a
Food & beverages	0.1539 a	0.1478 a	0.3102 a	0.3117 a
Textiles	0.2470 a	0.2291 a	0.2198 a	0.2210 a
Apparel, leather, & footwear	0.1325 a	0.1315 a	0.1338 b	0.1350 b
Wood products & furniture	0.1232 a	0.0870 b	0.2019 a	0.1916 a
Paper	0.0241	0.0153	0.1361	0.1081
Chemicals, rubber, & plastics	0.1402 a	0.1400 a	0.2733 a	0.2698 a
Non-metallic mineral products	0.1236 c	0.1175 c	-0.0376	-0.0403
Basic metals & metal products	0.2514 a	0.2333 a	0.2473 a	0.2375 a
General machinery	0.3398 a	0.3511 a	0.3196 b	0.3591 a
Electronic machinery	0.1778 b	0.1725 b	0.2812 a	0.2816 a
Transportation machinery	0.0533	0.0416	0.2033 b	0.1921 c
JV-private, 11 industries	0.1450 a	0.1358 a	0.2468 a	0.2439 a
Food & beverages	0.1481 b	0.1422 b	0.2155 b	0.2156 b
Textiles	0.2778 c	0.2525 c	0.1638	0.1619
Apparel, leather, & footwear	0.0754	0.0726	0.0130	0.0239
Wood products & furniture	0.1127	0.0971	0.1553	0.1600
Paper	-1.5789 a	-1.6830 a	-0.6252	-0.7274
Chemicals, rubber, & plastics	0.2170 a	0.2166 a	0.3098 a	0.3062 a
Non-metallic mineral products	0.1529 b	0.1403 b	0.2453 a	0.2392 a
Basic metals & metal products	0.1960 b	0.1802 c	0.3951 a	0.3896 a
General machinery	0.2769 c	0.2607 c	0.0313	0.0192
Electronic machinery	0.2171	0.2189	0.5022 a	0.5010 a
Transportation machinery	0.0990	0.0841	0.4504 a	0.4276 a
Test WF-priv=JV-priv, 11 indus.	47.9 a	43.0 a	61.3 a	59.5 a
Food & beverages	5.6 a	5.2 a	12.5 a	12.8 a
Textiles	8.6 a	8.5 a	4.6 b	4.7 a
Apparel, leather, & footwear	5.3 a	5.3 a	2.9 c	3.0 c
Wood products & furniture	4.7 a	2.4 c	5.2 a	4.8 a
Paper	15.5 a	9.7 a	2.0	1.5
Chemicals, rubber, & plastics	8.4 a	8.2 a	16.7 a	16.6 a
Non-metallic mineral products	3.6 b	3.2 b	4.1 b	3.8 b
Basic metals & metal products	16.3 a	14.0 a	10.7 a	9.9 a
General machinery	5.5 a	6.3 a	3.4 b	4.4 b
Electronic machinery	2.9 c	2.8 c	9.8 a	10.0 a
Transportation machinery	0.4	0.3	4.7 b	4.4 b

Table 6 (continued)

Differential or indicator, industry	Production workers		Clerical & support workers	
	Lagged	Contem-	Lagged	Contem-
SOE-private, 11 industries	0.1015 a	0.0955 a	0.1027 a	0.1019 a
Food & beverages	0.1687 a	0.1672 a	0.2760 a	0.2729 a
Textiles	0.0181	0.0098	0.0174	0.0168
Apparel, leather, & footwear	0.1000 c	0.0938 c	-0.0166	-0.0064
Wood products & furniture	-0.0611	-0.1056	-0.0996	-0.1109
Paper	0.1222	0.1290	0.3586 a	0.3452 a
Chemicals, rubber, & plastics	0.2017 a	0.2129 a	0.2991 a	0.3004 a
Non-metallic mineral products	0.0284	0.0232	-0.0223	-0.0194
Basic metals & metal products	0.0582	0.0415	0.0136	0.0078
General machinery	0.1588 c	0.1531	0.1423	0.1489
Electronic machinery	0.3464 a	0.3533 a	0.3954 a	0.3930 a
Transportation machinery	-0.0546	-0.0535	-0.0225	-0.0271

Notes: a=signficant at the 1% level, b=significant at the 5% level, c=significant at the 10% level; ; see Appendix Table 6 for other slope coefficients and indicators; full results including all coefficients and equation details are available from the authors.

Appendix Table 1: Sales of sample firms reporting compensation by ownership, and industry

Industry	Private firms	SOEs	WFs	JVs
Manufacturing, 11 sample industries	237,944	85,990	248,369	85,990
Food & beverages	75,591	15,716	53,331	15,716
Textiles	7,880	2,963	13,859	2,963
Apparel, leather, & footwear	15,866	4,122	40,786	4,122
Wood products & furniture	17,564	1,677	14,008	1,677
Paper	7,861	2,396	5,620	2,396
Chemicals, rubber, & plastics	26,975	17,060	30,292	17,060
Non-metallic mineral products	16,493	12,498	2,937	12,498
Basic metals & metal products	40,807	10,504	15,336	10,504
General machinery	4,056	1,228	4,501	1,228
Electronic machinery	11,730	6,685	48,880	6,685
Transportation machinery	13,121	11,143	18,818	11,143
Excluded industries and firms	143,065	30,159	67,489	37,021

Note: Samples include firms with 20 or more paid workers and positive output, worker compensation, and fixed assets; excluded industries are tobacco, publishing and printing, petroleum products, and recycling.

Source: Author's compilations from firm-level data underlying General Statistics Office (2011, 2013).

Appendix Table 2: Mean compensation per paid worker, excluding employer contributions to social insurance, in firms reporting compensation by occupation, ownership, and industry

Industry	Private firms	SOEs	WFs	JVs
Managers, 11 sample industries	41.16	43.05	84.94	92.16
Food & beverages	31.84	44.05	115.78	111.29
Textiles	27.76	40.01	86.54	61.63
Apparel, leather, & footwear	112.19	29.82	69.49	46.14
Wood products & furniture	28.05	32.93	80.64	73.97
Paper	29.72	52.67	76.74	45.59
Chemicals, rubber, & plastics	37.10	66.05	84.83	96.71
Non-metallic mineral products	29.31	47.86	112.17	73.95
Basic metals & metal products	30.86	37.33	82.79	89.21
General machinery	32.29	30.65	72.18	50.25
Electronic machinery	39.20	51.35	103.70	167.70
Transportation machinery	29.99	32.63	86.03	127.23
Professionals & technicans,11 sample industries	18.63	24.91	33.12	34.76
Food & beverages	20.16	27.06	31.75	36.55
Textiles	16.94	21.36	29.98	24.93
Apparel, leather, & footwear	18.35	17.04	33.28	25.21
Wood products & furniture	16.93	15.41	29.86	33.68
Paper	17.64	24.86	45.86	36.52
Chemicals, rubber, & plastics	21.29	34.08	33.05	35.77
Non-metallic mineral products	17.59	25.71	32.17	36.44
Basic metals & metal products	18.23	24.30	32.43	26.25
General machinery	20.60	23.11	28.81	37.19
Electronic machinery	20.39	31.94	44.13	44.63
Transportation machinery	18.32	21.33	28.10	34.03
Clerical & support workers, 11 sample industrie	13.90	18.54	21.68	23.42
Food & beverages	13.25	19.57	23.38	22.04
Textiles	12.24	14.22	18.46	14.96
Apparel, leather, & footwear	17.41	13.17	19.71	18.88
Wood products & furniture	12.06	13.39	23.62	16.84
Paper	12.48	19.52	23.11	10.24
Chemicals, rubber, & plastics	14.17	26.14	25.38	22.98
Non-metallic mineral products	13.29	17.51	16.68	22.53
Basic metals & metal products	15.14	16.61	20.37	31.23
General machinery	14.64	17.79	21.21	14.73
Electronic machinery	14.70	29.17	24.59	29.29
Transportation machinery	12.99	15.99	17.72	30.60
Excluded industries	13.60	23.85	18.60	17.01

Appendix Table 2 (continued)

Industry	Private firms	SOEs	WFs	JVs
Production workers, 11 sample industries	13.88	19.09	16.90	20.53
Food & beverages	13.59	19.21	19.77	21.89
Textiles	11.22	13.21	14.36	17.07
Apparel, leather, & footwear	11.52	12.53	14.39	13.72
Wood products & furniture	14.30	11.59	14.21	15.89
Paper	12.72	19.38	17.69	3.47
Chemicals, rubber, & plastics	14.67	24.16	20.67	21.99
Non-metallic mineral products	13.60	22.59	18.79	21.66
Basic metals & metal products	14.88	18.36	17.55	24.17
General machinery	16.22	19.78	19.55	19.79
Electronic machinery	18.06	26.02	16.44	23.76
Transportation machinery	17.87	17.73	15.95	23.00

Note: Samples include firms with 20 or more paid workers and positive sales, worker compensation, and fixed assets; excluded industries are tobacco, publishing and printing, petroleum products, and recycling.

Source: Author's compilations from firm-level data underlying General Statistics Office (2011, 2013).

Appendix Table 3: Shares of workers with secondary education in firms reporting compensation by ownership, and industry (percentage per workers)

Industry	Private firms	SOEs	WFs	JVs
Manufacturing, 11 sample industries	13.15	15.08	11.46	16.15
Food & beverages	12.07	18.44	15.52	18.19
Textiles	9.59	10.14	10.13	6.81
Apparel, leather, & footwear	6.71	6.34	6.10	4.79
Wood products & furniture	8.39	9.50	4.23	13.79
Paper	11.60	9.88	10.55	27.78
Chemicals, rubber, & plastics	15.76	15.02	14.41	18.68
Non-metallic mineral products	11.67	12.01	15.94	21.89
Basic metals & metal products	19.63	19.61	16.33	17.27
General machinery	27.62	28.92	20.03	32.17
Electronic machinery	25.67	17.49	13.25	18.69
Transportation machinery	22.83	16.16	13.25	13.65

Source: Author's compilations from firm-level data underlying General Statistics Office (2011, 2013).

Appendix Table 4: Number of sample firms reporting compensation by occupation, ownership, and industry

Industry	Private firms	SOEs	WFs	JVs
Manufacturing, 11 sample industries	5,198	490	1,821	286
Food & beverages	843	95	143	51
Textiles	268	27	141	9
Apparel, leather, & footwear	646	42	401	36
Wood products & furniture	772	27	182	26
Paper	293	14	56	2
Chemicals, rubber, & plastics	559	53	323	41
Non-metallic mineral products	714	73	45	29
Basic metals & metal products	642	55	210	43
General machinery	154	18	54	7
Electronic machinery	130	29	139	20
Transportation machinery	177	57	127	22
Excluded industries and firms	5,813	204	1,145	86

Note: Samples include firms with 20 or more paid workers and positive output, worker compensation, and fixed assets; excluded industries are tobacco, publishing and printing, petroleum products, and recycling.

Source: Author's compilations from firm-level data underlying General Statistics Office (2011, 2013).

Appendix Table 5: OLS estimates of ownership-related wage differentials and other slope coefficients for managers and technicians/professionals; all p-values based on robust standard errors

Variable, indicator	Managers				Professionals & technicians			
	Lagged		Contem-poraneous		Lagged		Contem-poraneous	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
Food and beverages								
KI	-0.0120	0.664	0.0169	0.391	0.0291	0.219	0.0059	0.698
RQ	0.2036	0.000	0.1907	0.000	0.1812	0.000	0.1630	0.000
SH	0.0100	0.000	0.0100	0.000	0.0071	0.000	0.0072	0.000
SM	-0.0010	0.548	-0.0010	0.549	0.0000	0.997	0.0000	0.988
SF	0.0008	0.530	0.0008	0.558	0.0005	0.612	0.0005	0.590
DW	0.6800	0.000	0.6858	0.000	0.2557	0.000	0.2515	0.000
DJ	0.6238	0.000	0.6295	0.000	0.3128	0.000	0.3070	0.000
DS	0.1875	0.008	0.1890	0.007	0.1896	0.002	0.1841	0.002
Test DW=DJ	41.03	0.000	42.17	0.000	12.67	0.000	12.39	0.000
Obs./R^2	1,132	0.404	1,132	0.403	1,132	0.3327	1,132	0.3318
No. *DI* s	3		3		3		3	
Textiles								
KI	0.0180	0.603	-0.0298	0.246	-0.0085	0.741	-0.0074	0.736
RQ	0.0871	0.122	0.1193	0.000	0.0714	0.055	0.0671	0.001
SH	0.0046	0.485	0.0040	0.540	0.0071	0.176	0.0071	0.171
SM	-0.0058	0.046	-0.0064	0.022	-0.0051	0.021	-0.0050	0.018
SF	0.0003	0.858	0.0007	0.695	-0.0006	0.675	-0.0006	0.664
DW	0.6627	0.000	0.6566	0.000	0.3141	0.000	0.3135	0.000
DJ	0.6584	0.000	0.6593	0.000	0.5760	0.006	0.5741	0.005
DS	0.0727	0.599	0.0727	0.599	0.1004	0.339	0.0999	0.339
Test DW=DJ	28.13	0.000	25.42	0.000	11.28	0.000	12.02	0.000
Obs./R^2	445	0.344	445	0.339	445	0.2686	445	0.2685
No. *DI* s	0		0		0		0	
Apparel and leather products								
KI	-0.0164	0.544	-0.0068	0.719	-0.0543	0.014	-0.0300	0.042
RQ	0.1078	0.005	0.1263	0.000	0.0856	0.003	0.0958	0.000
SH	-0.0015	0.760	-0.0014	0.777	0.0000	0.991	0.0001	0.978
SM	-0.0060	0.082	-0.0060	0.081	-0.0063	0.007	-0.0062	0.007
SF	-0.0036	0.088	-0.0037	0.086	-0.0039	0.016	-0.0039	0.016
DW	0.4834	0.000	0.4845	0.000	0.2781	0.000	0.2795	0.000
DJ	0.1312	0.467	0.1363	0.452	0.1806	0.118	0.1842	0.111
DS	0.0148	0.864	0.0223	0.796	-0.0645	0.382	-0.0563	0.441
Test DW=DJ	23.73	0.000	24.00	0.000	17.64	0.000	17.91	0.000
Obs./R^2	1,125	0.213	1,125	0.212	1,125	0.1823	1,125	0.1814
No. *DI* s	1		1		1		1	

Appendix Table 5 (continued)

Variable, indicator	Managers				Professionals & technicians			
	Lagged		Contem-poraneous		Lagged		Contem-poraneous	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
Wood products and furniture								
KI	0.0115	0.629	0.0065	0.694	0.0126	0.487	-0.0015	0.908
RQ	0.1321	0.000	0.1609	0.000	0.1216	0.000	0.1322	0.000
SH	0.0058	0.070	0.0058	0.065	0.0063	0.036	0.0063	0.037
SM	-0.0017	0.431	-0.0017	0.444	-0.0031	0.123	-0.0031	0.128
SF	-0.0050	0.000	-0.0049	0.000	-0.0034	0.000	-0.0033	0.000
DW	0.5225	0.000	0.5279	0.000	0.1950	0.001	0.1936	0.001
DJ	0.7208	0.000	0.7276	0.000	0.2314	0.043	0.2352	0.040
DS	0.0323	0.793	0.0395	0.745	-0.2079	0.084	-0.2090	0.081
Test DW=DJ	34.93	0.000	36.58	0.000	7.42	0.001	7.94	0.000
Obs./R^2	1,007	0.414	1,007	0.414	1,007	0.342	1,007	0.3413
No. *DI* s	1		1		1		1	
Paper products								
KI	0.0415	0.543	0.0183	0.621	0.0344	0.495	-0.0064	0.841
RQ	0.1478	0.005	0.1608	0.000	0.0993	0.076	0.1485	0.000
SH	0.0056	0.180	0.0060	0.136	0.0024	0.408	0.0036	0.228
SM	0.0023	0.477	0.0026	0.425	0.0012	0.670	0.0019	0.496
SF	0.0013	0.477	0.0014	0.486	0.0018	0.301	0.0018	0.331
DW	0.5225	0.000	0.5196	0.000	0.3515	0.003	0.3550	0.004
DJ	0.0161	0.937	-0.0092	0.966	-0.4104	0.663	-0.4551	0.645
DS	0.3140	0.081	0.3149	0.081	0.1164	0.368	0.1269	0.336
Test DW=DJ	7.04	0.001	6.67	0.001	5.7	0.010	4.26	0.008
Obs./R^2	365	0.310	365	0.309	365	0.2991	365	0.2886
No. *DI* s	0		0		0		0	
Chemicals, rubber and plastics								
KI	0.0200	0.564	0.0252	0.196	0.0427	0.092	0.0097	0.523
RQ	0.1009	0.025	0.1588	0.000	0.1195	0.000	0.1308	0.000
SH	0.0119	0.000	0.0119	0.000	0.0092	0.000	0.0089	0.000
SM	-0.0017	0.342	-0.0017	0.347	-0.0004	0.723	-0.0008	0.497
SF	0.0007	0.585	0.0006	0.632	-0.0008	0.370	-0.0006	0.462
DW	0.4771	0.000	0.4830	0.000	0.3088	0.000	0.2848	0.000
DJ	0.6064	0.000	0.6122	0.000	0.2624	0.004	0.2528	0.005
DS	0.1296	0.219	0.1456	0.165	0.1722	0.036	0.1780	0.030
Test DW=DJ	30.82	0.000	31.11	0.000	16.99	0.000	15.97	0.000
Obs./R^2	976	0.365	976	0.364	976	0.3239	976	0.3127
No. *DI* s	3		3		3		3	

Appendix Table 5 (continued)

Variable, indicator	Managers				Professionals & technicians			
	Lagged		Contem-poraneous		Lagged		Contem-poraneous	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
Non-metallic mineral products								
KI	0.0158	0.539	0.0003	0.986	0.0092	0.641	0.0008	0.953
RQ	0.1708	0.000	0.1743	0.000	0.1397	0.000	0.1366	0.000
SH	0.0089	0.012	0.0089	0.012	0.0029	0.283	0.0029	0.284
SM	-0.0013	0.504	-0.0012	0.510	-0.0023	0.149	-0.0023	0.149
SF	-0.0003	0.788	-0.0003	0.763	-0.0016	0.076	-0.0016	0.074
DW	0.5355	0.001	0.5324	0.001	0.2821	0.003	0.2798	0.003
DJ	0.4291	0.000	0.4225	0.001	0.3743	0.000	0.3694	0.000
DS	-0.0201	0.806	-0.0207	0.798	0.0251	0.687	0.0235	0.704
Test DW=DJ	11.66	0.000	11.57	10.230	10.35	0.000	10.23	0.000
Obs./R^2	861	0.371	861	0.370	861	0.324	861	0.3238
No. *DI* s	1		1		1		1	
Basic metals and metal products								
KI	0.0470	0.281	0.0327	0.105	0.0122	0.655	0.0035	0.825
RQ	0.1112	0.004	0.1280	0.000	0.1102	0.000	0.1063	0.000
SH	0.0110	0.000	0.0110	0.000	0.0053	0.000	0.0053	0.000
SM	-0.0021	0.068	-0.0021	0.070	-0.0010	0.293	-0.0010	0.303
SF	-0.0052	0.000	-0.0052	0.000	-0.0039	0.001	-0.0039	0.001
DW	0.6169	0.000	0.6135	0.000	0.3811	0.000	0.3781	0.000
DJ	0.4921	0.000	0.4935	0.000	0.3732	0.000	0.3707	0.000
DS	-0.0891	0.378	-0.0874	0.367	0.1012	0.121	0.0986	0.125
Test DW=DJ	29.09	0.000	29.48	0.000	25.02	0.000	24.53	0.000
Obs./R^2	950	0.325	950	0.325	950	0.2725	950	0.2723
No. *DI* s	3		3		3		3	
General machinery								
KI	-0.0088	0.902	-0.0309	0.440	0.0173	0.809	-0.0441	0.257
RQ	-0.0871	0.275	0.1281	0.000	0.0171	0.834	0.1073	0.001
SH	0.0069	0.012	0.0074	0.009	0.0020	0.503	0.0021	0.493
SM	0.0025	0.130	0.0027	0.103	0.0031	0.049	0.0033	0.034
SF	-0.0039	0.111	-0.0047	0.060	-0.0031	0.206	-0.0035	0.143
DW	0.5727	0.000	0.6259	0.000	0.2313	0.110	0.2430	0.086
DJ	0.4280	0.026	0.4155	0.024	0.3164	0.092	0.3014	0.092
DS	-0.0769	0.603	-0.0657	0.660	0.0871	0.565	0.0823	0.567
Test DW=DJ	9.62	0.000	10.73	0.000	2.17	0.101	2.32	0.101
Obs./R^2	233	0.398	233	0.371	233	0.2123	233	0.2005
No. *DI* s	0		0		0		0	

Appendix Table 5 (continued)

Variable, indicator	Managers				Professionals & technicians			
	Lagged		Contem-poraneous		Lagged		Contem-poraneous	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
Electronic machinery								
KI	0.0951	0.525	0.0387	0.319	0.0208	0.698	-0.0091	0.767
RQ	0.1234	0.188	0.0987	0.002	0.0753	0.238	0.0765	0.000
SH	0.0079	0.008	0.0075	0.008	0.0082	0.001	0.0080	0.001
SM	-0.0019	0.405	-0.0016	0.451	0.0007	0.737	0.0008	0.686
SF	0.0018	0.453	0.0019	0.424	0.0006	0.773	0.0007	0.731
DW	0.4667	0.000	0.4494	0.001	0.3344	0.001	0.3245	0.001
DJ	1.1888	0.000	1.1780	0.000	0.4337	0.009	0.4288	0.010
DS	0.0913	0.543	0.0855	0.572	0.2878	0.011	0.2867	0.012
Test DW=DJ	19.37	0.000	18.7	0.000	7.64	0.001	7.51	0.001
Obs./R^2	318	0.316	349	0.314	318	0.2646	318	0.2637
No. *DI* s	4		4		4		4	
Transportation machinery								
KI	0.0322	0.429	0.0237	0.385	-0.0207	0.531	-0.0333	0.161
RQ	0.1420	0.003	0.1485	0.000	0.0737	0.063	0.1071	0.000
SH	0.0030	0.326	0.0031	0.310	0.0043	0.051	0.0044	0.033
SM	-0.0035	0.032	-0.0035	0.031	0.0006	0.673	0.0005	0.719
SF	0.0019	0.444	0.0019	0.445	0.0013	0.483	0.0013	0.498
DW	0.4330	0.001	0.4314	0.001	0.2407	0.007	0.2416	0.007
DJ	0.6569	0.001	0.6562	0.001	0.4521	0.004	0.4604	0.003
DS	-0.1967	0.043	-0.1956	0.044	-0.0563	0.449	-0.0517	0.486
Test DW=DJ	9.23	0.000	10.04	0.000	6.43	0.002	6.65	0.002
Obs./R^2	383	0.411	383	0.401	383	0.2883	383	0.286
No. *DI* s	1		1		1		1	

Note: in the Obs./R2 rows, the coefficient column contains the number of observations and the P-value column contains the R-squared; all estimates include 5 regional dummies; see the text for definitions or region and industry dummies; the Test DFs rows show Wald tests of the hypothesis that coefficients on DW and DJ are equal and associated p-values; and full results including the constant and all dummy coefficients are available from the authors.

Appendix Table 6: OLS estimates of ownership-related wage differentials and other slope coefficients for production workers and clerical/support workers; all p-values based on robust standard errors

Variable, indicator	Production workers				Clerical & support workers			
	Lagged		Contem-poraneous		Lagged		Contem-poraneous	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
Food and beverages								
KI	0.0484	0.071	0.0183	0.313	-0.0017	0.942	0.0037	0.821
RQ	0.1314	0.000	0.1447	0.000	0.1384	0.000	0.1133	0.000
SH	0.0118	0.000	0.0118	0.000	0.0074	0.000	0.0074	0.000
SM	0.0013	0.365	0.0013	0.369	-0.0023	0.123	-0.0023	0.120
SF	-0.0022	0.027	-0.0021	0.031	-0.0005	0.659	-0.0005	0.645
DW	0.1539	0.002	0.1478	0.003	0.3102	0.000	0.3117	0.000
DJ	0.1481	0.036	0.1422	0.045	0.2155	0.012	0.2156	0.011
DS	0.1687	0.005	0.1672	0.006	0.2760	0.000	0.2729	0.000
Test DW=DJ	5.59	0.004	5.22	0.005	12.46	0.000	12.77	0.000
Obs./R^2	1,132	0.364	1,132	0.363	1,132	0.233	1,132	0.234
No. *DI* s	3		3		3		3	
Textiles								
KI	0.0453	0.205	-0.0142	0.485	-0.0216	0.344	-0.0071	0.704
RQ	0.0986	0.026	0.0878	0.000	0.0834	0.051	0.0706	0.000
SH	0.0072	0.177	0.0060	0.243	0.0075	0.145	0.0076	0.135
SM	0.0025	0.139	0.0020	0.236	-0.0028	0.278	-0.0027	0.304
SF	-0.0052	0.000	-0.0049	0.000	0.0028	0.070	0.0027	0.081
DW	0.2470	0.000	0.2291	0.000	0.2198	0.003	0.2210	0.003
DJ	0.2778	0.055	0.2525	0.072	0.1638	0.232	0.1619	0.235
DS	0.0181	0.826	0.0098	0.904	0.0174	0.892	0.0168	0.895
Test DW=DJ	8.57	0.000	8.46	0.002	4.61	0.010	4.73	0.009
Obs./R^2	445	0.281	445	0.265	445	0.197	445	0.196
No. *DI* s	0		0		0		0	
Apparel and leather products								
KI	0.0121	0.527	-0.0061	0.639	0.0084	0.714	-0.0052	0.682
RQ	0.1037	0.000	0.0957	0.000	0.0483	0.061	0.0931	0.000
SH	0.0062	0.106	0.0061	0.109	0.0056	0.114	0.0057	0.105
SM	-0.0025	0.141	-0.0025	0.139	-0.0036	0.105	-0.0037	0.097
SF	-0.0025	0.031	-0.0025	0.031	-0.0018	0.167	-0.0019	0.144
DW	0.1325	0.001	0.1315	0.001	0.1338	0.016	0.1350	0.015
DJ	0.0754	0.253	0.0726	0.267	0.0130	0.932	0.0239	0.876
DS	0.1000	0.063	0.0938	0.072	-0.0166	0.797	-0.0064	0.919
Test DW=DJ	5.30	0.005	5.3	0.005	2.91	0.055	2.96	0.052
Obs./R^2	1,125	0.264	1,125	0.263	1,125	0.154	1,125	0.152
No. *DI* s	1		1		1		1	

Appendix Table 6 (continued)

Variable, indicator	Production workers				Clerical & support workers			
	Lagged		Contem-poraneous		Lagged		Contem-poraneous	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
Wood products and furniture								
KI	0.0533	0.054	0.0035	0.850	0.0651	0.002	0.0256	0.136
RQ	0.2341	0.000	0.1382	0.000	0.1089	0.000	0.1113	0.000
SH	0.0097	0.021	0.0093	0.031	0.0088	0.001	0.0086	0.001
SM	0.0007	0.723	0.0007	0.723	-0.0007	0.689	-0.0006	0.732
SF	-0.0061	0.000	-0.0060	0.000	-0.0033	0.000	-0.0030	0.000
DW	0.1232	0.003	0.0870	0.037	0.2019	0.004	0.1916	0.006
DJ	0.1127	0.197	0.0971	0.309	0.1553	0.141	0.1600	0.125
DS	-0.0611	0.379	-0.1056	0.130	-0.0996	0.442	-0.1109	0.387
Test DW=DJ	4.69	0.009	2.43	0.088	5.16	0.006	4.77	0.009
Obs./R^2	1,007	0.299	1,007	0.283	1,007	0.236	1,007	0.233
No. *DI* s	1		1		1		1	
Paper products								
KI	0.1031	0.028	0.0082	0.775	0.0929	0.032	0.0000	1.000
RQ	0.0617	0.132	0.1245	0.000	0.1079	0.013	0.1102	0.000
SH	-0.0004	0.943	0.0014	0.805	0.0041	0.104	0.0046	0.101
SM	-0.0007	0.786	0.0004	0.870	-0.0028	0.194	-0.0022	0.312
SF	0.0018	0.310	0.0019	0.301	0.0031	0.132	0.0035	0.101
DW	0.0241	0.761	0.0153	0.854	0.1361	0.168	0.1081	0.282
DJ	-1.5789	0.000	-1.6830	0.000	-0.6252	0.167	-0.7274	0.177
DS	0.1222	0.484	0.1290	0.476	0.3586	0.007	0.3452	0.010
Test DW=DJ	15.45	0.000	9.72	0.000	1.95	0.144	1.52	0.221
Obs./R^2	365	0.289	365	0.255	365	0.318	365	0.303
No. *DI* s	0		0		0		0	
Chemicals, rubber and plastics								
KI	0.0155	0.572	0.0010	0.944	0.0109	0.679	-0.0050	0.737
RQ	0.0829	0.003	0.1318	0.000	0.1129	0.000	0.1249	0.000
SH	0.0076	0.000	0.0076	0.000	0.0059	0.002	0.0058	0.002
SM	0.0032	0.019	0.0032	0.020	0.0006	0.627	0.0006	0.648
SF	-0.0011	0.212	-0.0012	0.188	0.0004	0.696	0.0004	0.702
DW	0.1402	0.002	0.1400	0.002	0.2733	0.000	0.2698	0.000
DJ	0.2170	0.000	0.2166	0.001	0.3098	0.000	0.3062	0.000
DS	0.2017	0.005	0.2129	0.003	0.2991	0.000	0.3004	0.000
Test DW=DJ	8.37	0.000	8.23	0.000	16.71	0.000	16.63	0.000
Obs./R^2	976	0.340	976	0.324	976	0.258	976	0.257
No. *DI* s	3		3		3		3	

Appendix Table 6 (continued)

Variable, indicator	Production workers				Clerical & support workers			
	Lagged		Contem-poraneous		Lagged		Contem-poraneous	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
Non-metallic mineral products								
KI	0.0056	0.798	-0.0135	0.305	0.0171	0.388	-0.0064	0.637
RQ	0.1701	0.000	0.1570	0.000	0.1053	0.000	0.1260	0.000
SH	0.0084	0.000	0.0084	0.000	0.0037	0.171	0.0036	0.172
SM	-0.0030	0.002	-0.0029	0.002	-0.0029	0.054	-0.0029	0.055
SF	-0.0030	0.001	-0.0031	0.001	-0.0016	0.073	-0.0017	0.063
DW	0.1236	0.057	0.1175	0.070	-0.0376	0.685	-0.0403	0.666
DJ	0.1529	0.033	0.1403	0.045	0.2453	0.007	0.2392	0.009
DS	0.0284	0.643	0.0232	0.704	-0.0223	0.740	-0.0194	0.770
Test DW=DJ	3.57	0.029	3.18	0.042	4.08	0.017	3.84	0.022
Obs./R^2	861	0.361	861	0.360	861	0.240	861	0.237
No. *DI* s	1		1		1		1	
Basic metals and metal products								
KI	0.0538	0.056	0.0042	0.809	0.0108	0.787	-0.0198	0.246
RQ	0.1249	0.000	0.0958	0.000	0.1157	0.001	0.1155	0.000
SH	0.0073	0.000	0.0071	0.000	0.0047	0.002	0.0046	0.002
SM	-0.0003	0.748	-0.0001	0.872	-0.0014	0.139	-0.0013	0.154
SF	-0.0050	0.000	-0.0050	0.000	-0.0031	0.019	-0.0031	0.019
DW	0.2514	0.000	0.2333	0.000	0.2473	0.001	0.2375	0.001
DJ	0.1960	0.050	0.1802	0.065	0.3951	0.001	0.3896	0.001
DS	0.0582	0.269	0.0415	0.427	0.0136	0.860	0.0078	0.918
Test DW=DJ	16.34	0.000	14	0.000	10.74	0.000	9.85	0.000
Obs./R^2	950	0.239	950	0.232	950	0.197	950	0.195
No. *DI* s	3		3		3		3	
General machinery								
KI	0.0544	0.333	-0.0130	0.577	0.0132	0.834	-0.0164	0.605
RQ	-0.0043	0.951	0.0888	0.000	-0.0845	0.298	0.0851	0.010
SH	0.0062	0.000	0.0062	0.000	0.0002	0.916	0.0006	0.782
SM	0.0022	0.172	0.0024	0.129	-0.0005	0.765	-0.0003	0.839
SF	-0.0068	0.001	-0.0072	0.000	-0.0011	0.636	-0.0018	0.454
DW	0.3398	0.002	0.3511	0.001	0.3196	0.011	0.3591	0.004
DJ	0.2769	0.081	0.2607	0.093	0.0313	0.888	0.0192	0.932
DS	0.1588	0.093	0.1531	0.104	0.1423	0.342	0.1489	0.338
Test DW=DJ	5.52	0.005	6.32	0.002	3.37	0.036	4.44	0.013
Obs./R^2	233	0.285	233	0.266	233	0.179	233	0.150
No. *DI* s	1		1		1		1	

Appendix Table 6 (continued)

Variable, indicator	Production workers				Clerical & support workers			
	Lagged		Contem-poraneous		Lagged		Contem-poraneous	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
Electronic machinery								
KI	-0.0014	0.978	-0.0092	0.713	-0.0469	0.495	-0.0485	0.110
RQ	0.0468	0.420	0.0985	0.000	0.1198	0.130	0.1029	0.000
SH	0.0043	0.089	0.0044	0.084	0.0078	0.002	0.0078	0.002
SM	0.0009	0.656	0.0008	0.679	0.0025	0.302	0.0025	0.290
SF	-0.0075	0.000	-0.0074	0.000	0.0022	0.149	0.0021	0.156
DW	0.1778	0.024	0.1725	0.026	0.2812	0.002	0.2816	0.003
DJ	0.2171	0.113	0.2189	0.109	0.5022	0.000	0.5010	0.000
DS	0.3464	0.002	0.3533	0.001	0.3954	0.004	0.3930	0.004
Test DW=DJ	2.87	0.058	2.83	0.060	9.76	0.000	9.99	0.000
Obs./R^2	318	0.301	318	0.299	318	0.267	318	0.267
No. *DI* s	4		4		4		4	
Transportation machinery								
KI	-0.0448	0.199	-0.0838	0.000	0.0084	0.823	-0.0103	0.660
RQ	0.1014	0.026	0.1028	0.000	0.1183	0.017	0.0792	0.000
SH	0.0061	0.001	0.0063	0.000	0.0040	0.071	0.0040	0.082
SM	0.0035	0.006	0.0035	0.006	0.0011	0.439	0.0012	0.385
SF	-0.0036	0.025	-0.0037	0.023	-0.0007	0.665	-0.0006	0.682
DW	0.0533	0.507	0.0416	0.608	0.2033	0.042	0.1921	0.051
DJ	0.0990	0.392	0.0841	0.462	0.4504	0.008	0.4276	0.010
DS	-0.0546	0.411	-0.0535	0.416	-0.0225	0.838	-0.0271	0.804
Test DW=DJ	0.44	0.647	0.3	0.740	4.66	0.010	4.43	0.013
Obs./R^2	383	0.278	383	0.273	383	0.201	383	0.198
No. *DI* s	1		1		1		1	

Note: in the Obs./R2 rows, the coefficient column contains the number of observations and the P-value column contains the R-squared; all estimates include 5 regional dummies; see the text for definitions or region and industry dummies; the Test DFs rows show Wald tests of the hypothesis that coefficients on DW and DJ are equal and associated p-values; and full results including the constant and all dummy coefficients are available from the authors.

Ownership-related Wage Differentials, Worker Education,
and Worker Occupation in Vietnam's Manufacturing Firms

平成 27 年 3 月発行

発行所　公益財団法人アジア成長研究所
〒803-0814　北九州市小倉北区大手町 11 番 4 号
Tel：093-583-6202／Fax：093-583-6576，4602
URL：http://www.agi.or.jp
E-mail：office@agi.or.jp