Ownership-related Wage Differentials by Occupation in Vietnamese Manufacturing

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Abstract

This paper examines wage differentials for four types of workers employed by medium-large (20 or more employees) wholly-foreign multinational enterprises (WFs), joint-venture multinationals (JVs), state-owned enterprises (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.

JEL Classification Codes: F23, J31, L60, O53
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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 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).

[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.

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 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]

[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).

[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

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.

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

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).

intensity, worker sex, and worker education in 2009 (Section 4). Finally, Section 5 offers some conclusions and suggestions for future research.

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 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

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

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 are able proxy human capital investment with measure 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

[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 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-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.

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.

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]

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 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,

[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).

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.

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

[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.

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 in 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 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.

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

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.

4. Conditional wage differentials: econometric estimates

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 six regions and as many as 29 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.

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

[13] The regions are the North Mountainous Area, Central Coast Area, Central Highland Area, South East Area, Mekong Delta, and Red River Delta (used as the base dummy). Industries are defined to have at least 2 firms of each ownership type in them.

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 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

[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.

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.

5. Conclusions

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.

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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	28	28	28	28
	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	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 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	10.8 a	10.8 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	0.0008	0.672	0.0022	0.866
RQ	0.1708	0.000	0.1743	0.000	0.1366	0.000	0.1398	0.000
SH	0.0089	0.012	0.0089	0.012	0.0029	0.509	0.0015	0.511
SM	-0.0013	0.504	-0.0012	0.510	-0.0023	0.237	-0.0018	0.238
SF	-0.0003	0.788	-0.0003	0.763	-0.0016	0.090	-0.0015	0.088
DW	0.5355	0.001	0.5324	0.001	0.2798	0.003	0.2698	0.004
DJ	0.4291	0.000	0.4225	0.001	0.3694	0.000	0.3754	0.000
DS	-0.0201	0.806	-0.0207	0.798	0.0235	0.598	0.0312	0.614
Test DW=DJ	11.66	0.000	11.57	10.230	10.84	0.000	10.75	0.000
Obs./R^2	3,177	0.371	861	0.370	890	0.324	890	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	924	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.