

**Foreign Workers, Foreign Multinationals, and Wages
after Controlling for Occupation and Sex in Malaysia's
Manufacturing Plants during the mid-1990s**

Eric D. Ramstetter

Asian Growth Research Institute and Kyushu University, Japan

Working Paper Series Vol. 2017-13
July 2017

The views expressed in this publication are those of the author(s) and do not necessarily reflect those of the Institute.

No part of this article may be used reproduced in any manner whatsoever without written permission except in the case of brief quotations embodied in articles and reviews. For information, please write to the Institute.

Asian Growth Research Institute

Foreign Workers, Foreign Multinationals, and Wages in Malaysia's Manufacturing Plants after Controlling for Occupation and Sex during the mid-1990s

Eric D. Ramstetter (ramstetter@gmail.com)
Asian Growth Research Institute and Kyushu University
July 2017

Abstract:

This paper investigates the effects of foreign worker shares and MNE ownership on wages after controlling for worker sex and occupation in Malaysian manufacturing plants during 1994-1996, an important period during which use of foreign workers began to increase substantially. In a previous paper, I estimated similar wage equations separately for five occupation groups of both sexes in large heterogeneous samples of plants in many industries and more homogeneous samples of plants in seven industries. Results indicated that use of foreign workers generally had insignificant effects on plant wages for most occupation-sex-(and industry) combinations and that that MNE-local differentials were almost always insignificant in three industries and consistently significant in only one. Although separate estimation by sex and occupation has the strong advantage of accounting for worker characteristics relatively well, it has the disadvantages of complexity (10 results per sample) and being difficult to compare to more common approaches, which use sex and occupation as controls. The primary purpose of this paper is thus to see if using sex and occupation as independent variables generates results that differ from estimating wage equations separately for each sex-occupation cohort. Results suggest that the effects of foreign worker shares differ substantially among foreign worker occupations and among industries. Plants that have relatively large foreign manager shares tend to pay relatively high wages in most industries, but the effects of other foreign worker occupations are usually insignificant or inconsistent. Results that assume all foreign workers impart the same effects thus appear misleading, as do results assuming identical slope coefficients among industries. Similar to previous estimates, MNE-local wage differentials were consistently positive and significant in only two relatively small industries, chemicals and food, in marked contrast to previous results for 2000-2004, which did not account for the effects of foreign worker shares.

JEL Codes: F22, F23, F66, J61, L60, O24, O53

Keywords: foreign workers, multinational enterprise, wages, manufacturing, Malaysia

Acknowledgement: This paper is one result of the project "Regulations and Systems that Facilitated the Growth of Asia's Newly Industrialized Economies: Lessons for Japan", financed by Japan Society for the Promotion of Sciences grant #26285062 in fiscal years 2014-2016; I thank JSPS for this finance. I also thank Erbiao Dai, Evelyn Devadason, Tatsuo Hatta, Charles Yuji Horioka, Linda Low, Aya Nushimoto, and Shandre M. Thangavelu, among others for comments on related research and advice. However, I am solely responsible for the content of this paper, including all errors and opinions.

1. Introduction

Malaysia has historically relied heavily on foreign workers and foreign multinational enterprises (MNEs). Foreign worker shares of paid workers in manufacturing plants also increased markedly during 1994-1996 (World Bank 2013), an important period at the end of the economic boom which lasted from about one decade and preceded the Asian Financial Crisis that began in mid-1997. Detailed plant-level data containing information on use of foreign workers and other key variables are also available for this period. Because separate estimation of wage equations by sex and five occupation classes (10 estimates per sample examined) has the strong advantage of accounting for worker characteristics relatively well, I previously estimated 10 equations each for large heterogeneous samples of plants in many industries and more homogeneous samples of plants in seven industries (Ramstetter 2016). Results indicated that use of foreign workers generally had insignificant effects on plant wages for most occupation-sex combinations. MNE-local differentials were almost always insignificant in three of the seven industries and consistently significant in only one, in marked contrast to previous findings of more pervasive MNE-local differentials for 2000-2004 (Ramstetter 2014).

Although it accounts for worker characteristics relatively well, the previous study's approach has the important disadvantage of complexity and is difficult to compare with results of more common approaches, which use sex and occupation as independent variables in wage equations. The primary purpose of this paper is thus to see if using sex and occupation as independent variables generates results that differ from estimating wage equations separately for each sex-occupation cohort. This "aggregate" approach will also allow a more direct comparison to similar results for foreign workers in 2000-2006 from Tham and Yiew (2014) and MNEs in 2000-2004 (Ramstetter 2014). The analysis also compares estimates for both large heterogeneous samples in many industries combined and smaller more homogeneous samples in seven industries.

The sample period is important because it coincides with the end of the decade-long economic boom that preceded the Asian financial crisis, when Malaysia's economy and manufacturing industries grew rapidly. Malaysia's manufacturing plants (including foreign MNEs) were beginning to employ large numbers of foreign workers during the sample period. On the other hand, MNE shares of Malaysian manufacturing employment and production were lower in the mid-1990s than in the 1970s, for example (Ramstetter 1999).

Numerous studies have examined the effects of foreign MNEs in Malaysia and other Asian economies (Section 2). There are also studies analyzing the wage effects of foreign workers in Malaysia, using both manufacturing plant data and data on individual workers, but relatively few studies of other developing economies in Asia or elsewhere. As far as I know, this study and the previous one are among the most detailed examinations of wage determinants in firms or plants in developing economies, including Malaysia, and also among the first attempts to analyze the wage effects of foreign workers and MNE ownership simultaneously using plant- or firm-level data. After the literature review (Section 2), the paper describes the data and highlights important patterns revealed by descriptive statistics (Section 3). It then describes the equations used to estimate the effects of foreign workers and MNEs (Section 4) and major results of econometric estimation (Section 5). The paper concludes with a summary of important findings and suggestions for future research (Section 6).

2. Literature Review

There are two distinct strands of relevant literature. The first examines how foreign workers affect host economy wages and focuses on the extent foreign workers are substitutes for or complements to local workers in the production process.¹ The second strand of literature focuses on how MNEs tend to pay relatively high wages, largely because they hire relatively

¹ See Borjas (2003), Borjas et al. (2011), Kerr and Kerr (2011), Ottaviano and Peri (2008) for some well-known studies and surveys of related issues.

large shares of relatively skilled labor and possess relatively sophisticated sets of generally intangible assets related to production technology, marketing, and management.²

2a. Foreign Workers and Wages in Malaysia

If foreign workers are usually willing to work for relatively low wages and are engaged in similar occupations, then they are likely to create downward pressure on wages of competing local workers. On the other hand, if foreign workers specialize in low-wage tasks that local workers tend to shun, for example, they can help facilitate specialization of local workers in occupations with relatively high productivity and wages.

World Bank (2013) uses recent (2007-2010) labor force data to estimate the effects of foreign workers on worker wages indirectly by calculating how migration-induced changes in employment affect wages in Malaysia. The main conclusion of this exercise is that “changes in employment caused by increases in immigration to a specific region and industry do not lead to changes in the wages of Malaysian workers” (p. 50). In other words, “results suggest that a sufficient number of Malaysian workers are highly mobile across industries (and possibly also regions) so as to allow wages to rapidly equalize”.

However, both employment and wage effects differ somewhat among worker groups. First, “increases in demand for Malaysian workers due to immigration do not result in changes in relative wages across industries” but “they do increase the overall wage level in Malaysia”, with positive effects “most apparent when foreigners work in low-skilled services and agriculture”. When workers are distinguished by personal characteristics, results suggest increased immigration increases male wages but has a very small effect on women’s wages (World Bank 2013, p. 51). Likewise, wage elasticities were large and positive for workers with post-secondary and lower secondary education, but negative for workers with primary

² See Caves (2007), Dunning (1993), and Markusen (2002) for surveys documenting the tendency for MNEs to be relatively technology- or skill-intensive compared to non-MNEs.

education, and small but positive in other education groups.

Although their primary focus is estimation of foreign worker effects on labor productivity and unit labor costs, Tham and Yiew (2014) use plant-level data from Malaysia's manufacturing censuses and surveys for 2000-2006 to estimate the effect of foreign worker shares on plant wages, using a methodology similar to that used in this paper.³ They include controls for capital-intensity, capital size, and (majority-) MNE plants, plant age, market concentration, and competitiveness (whether a plant had negative profits or not). Their estimates don't account for the influence of worker education, which Ramstetter (2014) shows is an important determinant of wages when using the same data for 2000-2004. However, Tham and Yiew (2014) have the important advantage of access to two alternative measures of foreign worker presence: (1) the foreign worker share of total workers and (2) foreign shares of six alternative occupations. Models are estimated by instrumental variables accounting for endogeneity of foreign share, as well as industry- and plant-level fixed effects. In other words they ask how changes in foreign worker shares affect plant wages, not how levels of foreign shares affect wages.

Results of their aggregate specification suggest that the coefficient on the total foreign worker share was negative and highly significant (at the 1 percent level; Tham and Liew 2014: 151), but results from the disaggregated specification indicate that the foreign share of only one occupation, plant and machine operators and assemblers employed through contracts, was negative and significant at the standard 5 percent level. The coefficient on the foreign share of directly employed plant and machine operators and assemblers was also negative and weakly significant at the 10 percent level. Coefficients on foreign shares of the other four occupations, which generally demand higher worker skills, were not significant determinants of wages.

³ Note that Tham and Yiew (2014) and Athukorala and Devadason (2012, 2013) discussed below mistakenly refer to these as firm-level data or industry-level compilations of firm-level data. However, they are actually plant-level data and the distinction is important in Malaysian manufacturing, because many industries are dominated by large, multi-plant firms.

Athukorala and Devadason (2012, 2013) use industry-level compilations of these plant-level data to estimate the effects of foreign worker shares on average wages in alternative industry-level panels covering 1992-1999 (excluding 1998 when the manufacturing survey was not published) and 2000-2008 or 2000-2005.⁴ Estimates for 2000-2008 control for industry size (real value added), capital intensity, skill intensity (the share of professionals and managers in employment), average firm size (employees per plants), foreign ownership (share of majority-foreign plants), the share of exports in gross output, industry concentration, and a dummy identifying industries where national trade union membership is prohibited. Instrumental variables estimates using random effects or fixed effects are used, and alternative estimates are made for the average wage of all workers as a function of the total foreign worker share and the average wage of unskilled workers as a function of the foreign share of unskilled workers.

All estimates indicate that the coefficient on the foreign share was negative and highly significant (Athukorala and Devadason 2012). In other words, wages tended to be lower in industries and years with relatively high foreign worker shares, after the influences of the controls are accounted for. Similar results are obtained using a more limited set of controls for 2000-2008, but not for 1992-1999, when the foreign worker share was a significantly negative determinant of unskilled worker wages, but not wages of all workers. The authors conclude “We do find a statistically significant negative impact of foreign worker dependency on real manufacturing wages, but the magnitude of the impact is small. Real manufacturing wages seem fundamentally embedded in the structure and performance of domestic manufacturing, with the influx of foreign workers having an impact only at the margin” (p. 1508).

Both results from the manufacturing plant data thus suggest that relatively unskilled foreign workers contributed to lower plant-level wages (Tham and Liew 2014) or that all foreign workers contributed to relatively low industry-level wages (Athukorala and Devadason 2012).

⁴ Results in Athukorala and Devadason (2012) cover through 2008 and are the focus here.

On the other hand, analysis of the labor force data by World Bank (2013) suggest that foreign workers usually contributed to increased wages of local workers. Although apparently contradictory results, they are not necessarily inconsistent for at least two reasons. First, the measure of the wage effect differs. In the manufacturing data, the fixed effects estimates focus on the effects of changes in foreign worker shares on average plant- or industry-level. In contrast, the labor force data analyses focus more precisely on the wages of different classes of local workers. Second, as Athukorala and Devadason point out, the manufacturing data include small plants in census years (1993, 2000, 2005) only. The manufacturing plant samples are thus different from the manufacturing sample in the labor force data used by the World Bank, which presumably includes foreign and local workers in many small plants.

2b. Foreign MNEs and Wages in Malaysia and other Asian Developing Economies

MNEs are often found to pay relatively high wages than local firms or plants, partially because MNEs tend to hire relatively skilled workers. Ramstetter's (2014) study of Malaysian plants in 2000-2004 accounted for variation in shares of workers in high paying occupations and shares of workers with higher or moderate education.⁵ In large, heterogeneous samples of plants in many manufacturing industries combined, MNE-local wage differentials remained positive and highly significant (at the 1% level or better) in six alternative estimates accounting for these plant characteristics.⁶ When separate estimates were performed for 17 more

⁵ Highly paying occupations were defined as (1) proprietors, business partners, (2) managers, professionals, executives, and (3) technicians, professionals. Highly educated workers were those with education beyond the fifth year of secondary school (i.e., some level of vocational school, college, university, or graduate school). Moderately educated workers were those successfully completing of the Malaysian Education Certificate (SPM), an exam taken by all students in the fifth year of secondary school, but no further education. The study also accounted for female shares of the workforce, capital intensity, and plant size

⁶ Estimates were performed using both contemporary and lagged values of all independent variables for 2001-2004, and contemporary values for the larger 2000-2004 sample. Estimates were also performed by pooled OLS and random effects panel estimates for each of these three

homogeneously defined industries, MNE-local differentials remained positive and significant at the standard 5% level in all estimates for six industries and in most estimates for another five industries. Differentials were often insignificant in another six industries. However, local plants and MNEs may hire different shares of foreign workers, and this aspect of worker quality should also be considered simultaneously as in Tham and Liew (2014).⁷

In the aforementioned study of foreign worker effects on industry wages, Athukorala and Devadason (2012) also include the share of output produced by majority-foreign MNEs in some their estimates for 2000-2008. Its coefficient was significant at the standard 5 percent level in only one of the eight estimates they present for this period (random effects estimates for all workers).⁸ Their failure to find a significant correlation may be because the distinction between foreign MNEs is discrete and MNE wage effects are easier to capture with a dummy variable at the plant level, rather than a continuous variable measured at the industry level.

Studies of Indonesian manufacturing plants in 1996 and 2006 (Lipsey and Sjöholm 2004; Ramstetter and Narjoko 2013) estimate separate wage equations at the plant level for production workers and non-production workers. The Indonesian evidence suggests that the wage gap between non-production and production workers was larger for MNEs than for private plants.⁹ Equivalently, both unconditional and conditional MNE-private wage differentials were larger for non-production workers than for production workers, and differentials were often significantly positive for both types of workers.

⁷ Ramstetter used a dataset from which information on foreign workers was redacted.

⁸ For this period, the authors show random and fixed effects estimates for all workers and for unskilled workers using both random and fixed effects.

⁹ 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.

Recent evidence for Vietnam also suggests that MNE-private wage differentials were usually positive significant after accounting for worker education and occupation in 2007 and/or 2009, and much larger for high-wage managers and professionals than for relatively low-wage clerical and production workers in 2009 (Nguyen and Ramstetter 2015, forthcoming). Similarly, for a small sample of Chinese firms in five large cities, Hale and Long (2011) found that foreign ownership had a stronger impact on wages of managers and professionals than ordinary workers. However, their results differed from those for Indonesia and Vietnam 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. In contrast, previous results for Malaysia from Ramstetter (2016) did not reveal relatively large MNE-local differentials for highly paid occupations.

In addition to hiring relatively high quality labor, there are at least three additional reasons MNEs may pay a wage premium above that required for local plants. First, MNEs often find it difficult to identify and retain suitably qualified workers. For example, in 1998, securing adequate quantity and quality of labor was the third most common of 27 possible problems for Japanese affiliates operating in the ASEAN-4 (the four largest developing economies in the Association of Southeast Asian Nations: Indonesia, Malaysia, the Philippines, and Thailand), this problem being cited by 8.5 percent of these MNEs (Japan, Ministry of Economy, Trade and Investment 2001, pp. 536-537).¹⁰ Other surveys also indicated that securing labor supply was the third most frequently cited of 14 investment motives of Japanese affiliates in Malaysia (Ramstetter 2014). Correspondingly, many studies suggest that MNEs pay relatively high wages to secure or retain labor in economies like Malaysia. This factor was probably relatively important during the high growth period studied in this paper.

¹⁰ The most commonly cited problems were (1) competition for product markets (11.2 percent) and (2) political instability (8.6 percent).

Second, workers in host economies are often relatively familiar with management practices in local firms and may therefore be relatively reluctant to work for MNEs that often use less familiar management styles. This may lead them to demand a premium for working in the relatively unfamiliar MNE environment. However, recent surveys of Malaysian graduates suggest this factor is not particularly important in Malaysia because MNEs are among the more popular employers for educated workers in this economy.¹¹ My rather substantial experience in Malaysia around the period studied suggests similar attitudes prevailed then as well.

Third, MNEs are often hypothesized to have relatively large amounts important firm-specific assets.¹² These firm-specific assets are generally intangible, and many of them are related worker quality. However, the MNE's possession of firm-specific assets has the potential to make workers more productive in MNEs than in non-MNEs, even if labor quality is identical in MNEs and non-MNEs. In such cases, MNEs may find it profitable to pay relatively high wages to compensate for their relatively high productivity, especially when the ability to utilize firm-specific assets is related to workers' firm-specific experience or motivation, for example.

Partially reflecting differences in firm-specific assets, MNE-local wage differentials are thought to result from differences in other plant-level characteristics that might affect labor productivity and/or wages. For example, much of the literature suggests that firms or plants which are relatively large or capital-intensive often pay relatively high wages and have relatively high labor productivity. In addition, location and industry affiliation are found to have important influences on the wage levels in firms or plants. Plants with relatively large shares of

¹¹ For example, seven of the 10 top-ranked employers in 2008 were foreign companies (<http://malaysias100.com/media/foreign-firms-the-favorite>).

¹² Some theorists (especially Dunning 1993) view the possession of firm-specific assets or ownership advantages as a key necessary condition for a firm to become an MNE (in addition to internalization and location advantages). Other theorists (Buckley and Casson 1992; Casson 1987; Rugman 1980, 1985) dispute this view, choosing instead to emphasize the key role of internalization as the key distinguishing characteristic between MNEs compared to non-MNEs. However, the key point here is that all agree that MNCs tend to possess these kinds of firm-specific assets in relatively large amounts.

female workers often tend to pay relatively low average wages because females generally earn less than males, and Malaysia is no exception.¹³ This paper will follow the previous literature and estimate earnings equations that include plant size, factor intensity, location, and industry affiliation, as well as shares, of major ethnic groups in paid workers, foreign worker shares, and MNE ownership, as independent variables.

3. Data and Descriptive Statistics

This paper uses compilations and econometric estimates from plant- (establishment-) level data from Malaysia's surveys of manufacturing plants in 1994, 1995, and 1996 (Department of Statistics various years a). Data from the more comprehensive census in 1993 were not available. However comparisons of the 2000 census with data from surveys in 2001-2004 suggest that the Malaysian surveys in non-census years effectively cover most, if not all large plants (Ramstetter 2014).¹⁴ The survey data obtained for 1994-1996 are distinguished by the detail provided on the workforce by occupation, sex, nationality (local vs. foreign), and local worker ethnic group. Thus, although the data set contains no direct information on labor quality such as educational background, it is possible account for much of the variation in labor quality among plants by controlling for related workforce characteristics. In this paper, we distinguish five types of workers grouped by wage level: (a) managers, (b) technical and supervisory workers, (c) clerical and skilled workers, (d) general and semi-skilled workers, and (e) unskilled and part-time workers.¹⁵ Workers in high paying occupations (e.g., managers and technical and

¹³ For evidence on Malaysia, see Chapman and Harding (1985), Lee and Nagaraj (1995), Milanovic (2006), and Schafgans (2000).

¹⁴ Data for two other years, 1997 and 1999, were also available, but these years were excluded from this analysis because they differed greatly from the sample period.

¹⁵ Clerical workers include clerks, typists, stenographers, personal secretaries, sales personnel, and others. General workers include drivers, conductors, lorry attendants, telephone operators, office boys, watchmen, gardeners, among others. Skilled, semi-skilled, and unskilled workers include both directly employed and contract workers in these categories.

supervisory workers) often earn relatively high wages in Malaysia, partially because they have superior educational backgrounds and work experience. Males and ethnic Chinese often earn relatively high wages for similar reasons.

Four industries are excluded from this analysis because their technical and/or regulatory characteristics differ greatly from other industries (tobacco, printing and publishing, oil and coal products) or because they are defined heterogeneously (miscellaneous manufacturing). The seven sample industry groups hired the vast majority of paid workers in Malaysian manufacturing plants. Because one goal of this paper is to compare results with more detailed estimates of by occupation and sex (Ramstetter 2016), this paper also examines seven broad manufacturing industry categories as shown in Table 1. These sample industries employed 1.15-1.34 million paid workers in 1994-1996, or 94-95 percent of the published totals for all manufacturing plants (Department of Statistics, various years a). Electronics-related machinery was by far the largest employer accounting for 34-36 percent of sample totals, followed by wood, paper, and furniture, chemicals, rubber, and plastics, and metals and non-metallic mineral products (10-16 percent of sample totals). On the other hand, the wood group was the largest employer of foreign workers (30-41 percent of sample totals), followed by electronics-related machinery (21-26 percent of sample totals). Other industries were much smaller employers of foreign workers.

As expected, MNEs tended to pay relatively high wages, with unconditional MNE-local plant, mean wage differentials increasing from 20 to 25 and 32 percent in 1994-1996 (calculated from Table 1). The differentials in mean wages were substantially smaller than corresponding differentials in 2000-2004, which exceeded 40 percent (Ramstetter 2014: 60). MNE-local differentials differed markedly among industry groups. They were highest in the food (50-72 percent) and chemicals (32-51 percent) groups but much smaller in industries in the larger industry groups (-2 to +2 percent in electronics-related machinery and 1-10 percent in

the wood group).

Foreign worker shares also varied substantially among industries (Table 2). Mean shares of all foreign workers in total paid employment (i.e., the average of plant-level foreign shares) were highest in the wood and metals groups, increasing from 14 to 17 percent and from 9.0 to 13 percent, respectively, in 1994 to 1996. In the large electronics-related machinery group, foreign worker shares were relatively low, but increased rapidly from 5.4 to 9.7 percent, during this period. As a result, the mean foreign share for all sample plants combined rose from 8.5 to 11 percent during this period. Because a very large number of plants had relatively low foreign worker shares, trends in these mean shares fail to illustrate the extremely rapid increase in the number of foreign workers from 100,110 in 1994 to 133,971 in 1995 and 194,744 in 1996 and their shares of all paid workers in sample plants from 10 to 12 and then 17 percent.¹⁶ Not surprisingly, most foreign workers were engaged in relatively low paying, general and semi-skilled or unskilled and part-time occupations. Mean foreign shares of these low-paying occupations and of clerical and skilled workers tended to increase relatively rapidly.

4. Estimation Methodology

This paper follows many of the previous studies reviewed above and estimates the effects of foreign worker dependence and MNE ownership on plant wages, after accounting for the effects of a plant's capital intensity and size (measured by output), as well as the distribution of the plant's workforce among occupations, local worker ethnic groups, and sexes. On the other hand, the Malaysian data for 1994-1996 do not contain information on worker education, creating a potentially important omitted variable bias. The simplest version assumes the effects of all foreign worker occupations are identical and is specified as follows:

¹⁶ The 1996 estimates were similar to than the World Bank's (2013, pp. 24, 193) estimates for all manufacturing plants from the 2000 census (219,633 foreign workers and a foreign share of 14 percent).

$$LW=a0+a1(LKE)+a2(LOU)+a3(SL1)+a4(SL2)+a5(SL3)+a6(SL4)+a7(SLC)+a8(SLI)+a9(SLF)+a10(SF)+a11(SFF)+a12(DMNE) \quad (1)$$

where

LW=natural log of the real wage paid to workers of the same occupation and same sex in the plant

LKE=natural log of the real capital-labor ratio in the plant

LOU=natural log of real output in the plant

SL1=share of local managers in all workers in the plant, percent

SL2=share of technical & supervisory local workers in all workers in the plant, percent

SL3=share of clerical & skilled local workers in all workers in the plant, percent

SL4=share of general & semi-skilled local workers in all workers in the plant, percent

SLC=share of ethnically Chinese local workers in all workers in the plant, percent

SLI=share of ethnically Indian local workers in all workers in the plant, percent

SLO=share of other non-Malay local workers in all workers in the plant, percent

SLF=share of female local workers in all workers in the plant, percent

SF=share of all foreign workers in all workers in the plant, percent

SFF=share of all foreign, female workers in all workers in the plant, percent

DMNE=1 if the foreign MNE ownership share of the plant is 50% or more; =0 if not.

Capital-intensive and large plants are expected to have relatively high labor productivity and wages; hence *a1* and *a2* are expected to be positive. Plants with relatively large shares of high earning local managers and technical & supervisory workers are likely to pay relative high average wages; thus *a3* and *a4* are expected to be positive. Because local unskilled and part-time are treated as a control group than their share excluded, plants with relatively large shares of local, clerical and skilled and/or general and semiskilled workers are also likely to pay relative high wages; thus, signs of *a5* and *a6* are also likely to be positive, though this is less clear *a priori*. In Malaysia, ethnic Chinese, and to a lesser extent, ethnic Indians are often thought to earn relatively high wages, partially because they tend to have relatively strong educational and work experience backgrounds; thus, *a7* and *a8* are also expected to be positive if significant. Note that the government has long sought to redress these ethnic differences through affirmative action policies that favor ethnic Malays and to some extent, other

minorities (the omitted groups). Hence the ethnic group coefficients capture a number of effects related to worker quality, government policies, and racial prejudice. Finally, because females generally learn less than males in Malaysia, a_9 and a_{11} are expected to be negative. Although coefficients on ethnicity and sex are not the analytical focus, inclusion of these variables is important to avoid potential omitted variable bias.

The coefficients of most interest, are a_{10} and a_{11} , which show the effects of larger foreign worker shares, total and female respectively, on a plant's average wage, and a_{12} , which reveals the extent of MNE-local plant wage differentials after accounting for the influences of a plant's capital intensity, size, distribution of local workers among occupations and sex, and the foreign worker share. As discussed above, previous research suggests that a_{12} is likely to be positive if significant. However, the sign of a_{10} depends on the extent to which foreign workers complement other workers and contribute to increases in mean worker productivity and wages.

As emphasized by Tham and Yiew (2014), it is also possible that the effects of foreign workers depend on the occupation of the foreign workers involved. To check this possibility, the following equation is also estimated:

$$\begin{aligned}
 LW = & b_0 + b_1(LKE) + b_2(LOU) + b_3(SL1) + b_4(SL2) + b_5(SL3) + b_6(SL4) + b_7(SLC) + b_8(SLI) \\
 & + b_9(SLF) + b_{10}(SF1) + b_{11}(SF2) + b_{12}(SF3) + b_{13}(SF4) + b_{14}(SF5) + b_{15}(SFF) \\
 & + b_{16}(DMNE)
 \end{aligned} \tag{2}$$

where

$SF1$ =share of foreign managers in all workers in the plant, percent

$SF2$ =share of foreign technical & supervisory workers in all workers in the plant, percent

$SF3$ =share of foreign clerical & skilled workers in all workers in the plant, percent

$SF4$ =share of foreign general & semi-skilled workers in all workers in the plant, percent

$SF5$ =share of foreign unskilled & part-time workers in all workers in the plant, percent, omit all other variables as defined below equation (1) above.

Here again the coefficients of most interest are b_{11} - b_{15} , which show the effects of larger foreign worker shares on a plant's average wage, and b_{16} , which reveals the extent of conditional MNE-local plant wage differentials, after accounting for the influences of a plant's

capital intensity, size, distribution of local workers among occupations and sex, as well as the distribution of foreign workers among occupations and sex.

Because small plants employ few foreign workers, and because most MNEs are large plants, equation (1) is estimated in plants with more than 9 paid workers.¹⁷ This also removes many outliers because measurement and reporting errors are most prevalent among small plants. All monetary variables (wages, fixed capital stocks, output) are deflated by the industry-level GDP deflators (Department of Statistics 2006) to obtain real values in 1987 ringgit.¹⁸ However, there is no information on potentially important differences in inflation rates of output or fixed assets. When estimates are performed for all industries combined, dummy variables are added to equation (1) to account for the intercept effects of the 7 industry groups. Intercept dummies are also added to all estimates to distinguish 10 locations and the year of observation.¹⁹

Two specifications and two samples are used. First, to partially account for potential simultaneity, particularly the potential for wages to affect capital intensity, scale, and ethnic and foreign worker shares, a lagged specification is estimated for 1995-1996. In this specification, all independent variables except industry, location, and year dummies are lagged one year. Although the lagged specification is probably preferable econometrically to an alternative contemporaneous specification where wages and all independent variables are measured in the

¹⁷ Plants with 9 or fewer employees accounted for less than 1 percent of all paid workers in all years in the total sample and in six of the seven industry groups; in food and beverages these small plants accounted for 2.1 percent of paid workers in 1994 and 1.1 percent each in 1995-1996 (author's calculations). Part of the reason is that plants with 9 or fewer workers were excluded from many samples (Department of Statistics various years a, 1994 issue, pp. 93-103).

¹⁸ Industry definitions used in deflator calculations (2-digit) do not correspond exactly to the industry group definitions used in this paper, but are quite similar.

¹⁹ Location dummies are defined at the state level with three exceptions where the lack of observations makes it necessary to combine states with similar population densities and/or nearby locations (a-Perlis and Kedah, b-Kelantan, Terengganu, and Pahang, and c-Sabah, Sarawak, and Labuan). It is very difficult to use more detailed industry dummies when dummies for 9 regions, 1 or 2 years, and a relatively small number of MNEs are included.

same year, it's use has the important disadvantage of greatly reducing sample size.²⁰ Thus, results of the contemporaneous specifications for 1995-1996 and 1994-1996 are compared to illustrate the consequences altering specification and sample size. I interpret these alternative estimates as sensitivity or robustness checks.

Because the MNE dummy is time invariant, it is impossible to estimate MNE-local wage differentials using a fixed effects estimator, which would reveal how changes in MNE ownership affect plants wages. Fixed effects estimates would also depict how changes foreign worker shares affect wages, not how levels of foreign worker shares affect plant wages. Because the primary focus of this paper is on the questions of how the levels of foreign worker shares affect wages and the extent of MNE-local plant wage differentials, pooled OLS or random effects estimators are more appropriate. Breusch and Pagan tests indicate that the null of no random effects is always rejected at the 1% level or better and the text focuses on random effects estimates.²¹ All estimates use robust standard errors to account for heteroskedasticity.

5. Results

As expected, capital intensive and large plants tended to pay relatively wages. The correlation to plant size was particularly strong and the corresponding coefficient (a_2) was positive and statistically significant at the standard 5 percent level in all estimates performed. The correlation to capital intensity was also strong and significantly positive in all but two of the samples examined. However, but this coefficient (a_1) was insignificant in the lagged specification in two of the industry-level samples (the metals group and general and transportation machinery).

²⁰ When all sample plants are included, using the lagged specification reduces the 1995-1996 sample by over one-third from 10,675 to only 6,782 plants. Adding 1994 to the contemporaneous specification increases the sample by another 63 percent to 17,443 plants.

²¹ However, pooled OLS estimates in Appendix Tables A2-A9, are also important because they suggest that important qualitative results are sometimes sensitive to choice of estimator, in addition to the choice of sample size and the use of lagged independent variables.

Table 3 summarizes coefficients on local worker shares, which are also key controls, and the overall R-squared from estimates of equation (1); corresponding results for equation (2) are similar and available in Appendix Tables A2-A9. First, the model's fit is surprisingly good for short panels with R-squared exceeding 0.5 in all estimates except one, the lagged specification in the wood group. Second, coefficients on local workers shares in the 3 highest paying occupations were always positive as expected and usually significant. Coefficients on the share of local general and semi-skilled workers were also positive and usually significant in the contemporaneous specification, but became insignificant in the lagged specification. Also as expected, coefficients on the share of local ethnic Chinese workers were always positive and usually significant, while coefficients on the share of local female workers were always negative and significant with one exception, the lagged specification for the textiles group. Although results for all industries combined indicate that the coefficient on the share of local ethnic Indian workers was also positive and significant, this coefficient was usually insignificant when estimated at the industry level. In short, the model explains the variation of wages reasonably well and results for control variables were largely as expected.

Tables 4 and 5 show the coefficients of primary concern, those on foreign worker shares and the MNE dummy from estimates of both equations (1) and (2), respectively. Assuming that foreign workers in all occupations have the same effect on plant wages, the coefficient on the total foreign share was positive and significant in contemporaneous estimates in large samples of all industries combined, but negative and significant in the lagged specification (Table 4). However, results were consistent with this finding for only one of the seven more homogeneously defined industries, the relatively small food group. In the large electronics-related group, coefficients were consistently negative and significant, and relatively large in absolute value. The evidence thus suggests that negative effects were largest in electronics-related machinery and negligible in three other industries, the chemicals, textiles, and

transportation machinery groups, where all coefficients were insignificant at the standard 5 percent level. In the other three industries, contemporaneous specifications indicated positive and significant effects, but the lagged specification suggested negative or insignificant effects.

Coefficients on the share of foreign female workers were generally insignificant, which suggests that the sex composition of the foreign workforce did not affect plant wages much (Table 4). The most notable exception was in wood group, where plants with large foreign female shares tended to pay significantly lower wages than others. In electronics-related machinery the opposite result was obtained; in other words, plants with relatively large total foreign shares paid relatively low wages in this industry, but this effect was weaker in plants with relatively large foreign female shares.

One likely reason for some of the apparently contradictory results in Table 4 is the fact that foreign workers in different occupations are very likely to impart different effects on plant wages. For example, foreign managers are usually paid relatively well in developing economies like Malaysia in 1994-1996. Correspondingly, estimates of equation (2) indicate that plants with relatively large shares of foreign managers paid relatively high wages (Table 5). However, coefficients on the other four foreign shares were usually insignificant, indicating that wage effects of other occupations were generally negligible. Tests of the null hypothesis that coefficients on the five different foreign shares were equal indicated that foreign share effects differed significantly by occupation in most samples examined, even though consistent and significant effects were confined to a relatively few foreign managers. Coefficients on foreign female shares were usually insignificant and never consistently significant.

Consistent with the disaggregated estimates in Ramstetter (2016), estimates of the generally preferred equation (2) indicated consistently positive and significant, conditional MNE-local wage differentials were rare, being observed only in the chemicals and food groups (Table 5). Results for all industries combined were consistent with results for these two industries, but

MNE-local differentials were insignificant in the other five industries. This contrast highlights the importance of inter-industry heterogeneity; mistakenly assuming that slope coefficients are equal in these seven industry groups leads to the misleading conclusion that significant MNE-local were more common than industry-level estimates reveal. Comparisons with previous results for 2000-2004 (Ramstetter 2014), which indicate more pervasive MNE-local differentials even at the industry level but do not include foreign worker shares as explanatory variables are also important because they suggest that failure to account for foreign worker shares may create important, omitted variable bias in Malaysia.

5. Conclusions

This paper has studied the effects of foreign worker shares and MNE ownership on wages after controlling for worker sex and occupation in Malaysian manufacturing plants during 1994-1996, an important period during which use of foreign workers began to increase substantially. In a previous paper (Ramstetter 2016), I estimated similar wage equations separately for five occupation groups of both sexes in large heterogeneous samples of plants in many industries and more homogeneous samples of plants in seven industries. Results indicated that use of foreign workers generally had insignificant effects on plant wages for most occupation-sex-(and industry) combinations and that that MNE-local differentials were generally insignificant in three of seven industries and consistently significant in only one.

Although separate estimation by sex and occupation has the strong advantage of accounting for worker characteristics relatively well, it has the disadvantages of complexity (10 results per sample) and being difficult to compare to more common approaches, which use sex and occupation as independent variables. The primary purpose of this paper is thus to see if using sex and occupation as independent variables generates results that differ from estimating wage equations separately for each sex-occupation cohort. Results suggest that the effects of foreign worker shares differ substantially among foreign worker occupations and among industries.

Plants that have relatively large foreign manager shares tend to pay relatively high wages in most industries, but the effects of other foreign worker occupations are usually insignificant or inconsistent. Results that assume all foreign workers impart the same effects thus appear misleading, as do results assuming identical slope coefficients among industries. Similar to previous estimates, MNE-local wage differentials were consistently positive and significant in relatively few industries, only chemicals and food. The contrasts with previous results for 2000-2004, which could not account for the effects of foreign worker shares. Combined with results from the previous study, the results suggest that foreign worker shares were usually weakly correlated with plant wages and that significant MNE-local wage differentials were scarce during this period in Malaysian manufacturing.

Many extensions or alternative analyses with these data would be of interest. One extension would be to use a fixed effects estimator to investigate the effects of changes in foreign worker shares and MNE ownership on plant wages. It would also be helpful if good instruments could be found to better account for simultaneity, though this will be difficult because of the limited variables in the data. Comparisons of wage equations to corresponding estimates of labor productivity or total factor productivity similar to those in Tham and Yiew (2014) would also be of interest, especially because there are no known productivity analyses of these data for the important 1994-1996 period.

References

- Athukorala, Prema-chandra and Evelyn Devadason (2011), "The Impact of Foreign Labor on Host Country Wages: The Experience of a Southern Host, Malaysia", *World Development*, 40(8), 1497-1510.
- Athukorala, Prema-chandra and Evelyn Devadason (2013), "Foreign labor in Malaysian manufacturing", in Niny Khor and Devashish Mitra eds., *Trade and Employment in Asia*, Oxford, UK: Routledge, pp. 246-280.
- Borjas George J. (2003), "The labor demand curve is downward sloping: Reexamining the impact of immigration on the labor market", *Quarterly Journal of Economics*, 118, 1335-1374.
- Borjas, George J., Jeffrey Grogger, and Gordon H. Hanson (2011), "Substitution between Immigrants, Natives, and Skill Groups", NBER Working Paper 17461, <http://www.nber.org/papers/w17461>.
- Buckley, Peter J. and Mark Casson (1992), *The Future of the Multinational Enterprise*, 2nd Edition. London: Macmillan.
- Casson, Mark (1987), *The Firm and the Market: Studies on the Multinational and the Scope of the Firm*, Cambridge, MA: MIT Press.
- Caves, Richard E. (2007), *Multinational Enterprise and Economic Analysis*, 3rd edition, London: Cambridge University Press.
- Chapman, Bruce J. and J. Ross Harding (1985), "Sex Differences in Earnings: An Analysis of Malaysian Wage Data", *Journal of Development Studies*, 21(3), 362-376.
- Department of Statistics (2006), *Annual National Product and Expenditure Accounts, 1987-2005*, Kuala Lumpur: Department of Statistics.
- Department of Statistics (2015), *Malaysia Economic Statistics – Time Series 2015*, Kuala Lumpur: Department of Statistics.
- Department of Statistics (various years a), *Annual Survey of Manufacturing Industries*, 1994 and 1996-1998 issues (1994-1997 data), Kuala Lumpur: Department of Statistics.
- Department of Statistics (various years b), *Yearbook of Statistics Malaysia*, 2000-2014 issues, Kuala Lumpur: Department of Statistics.
- Devadason, Evelyn S. "2011. Policy chaos over migrant workers in Malaysia", <http://www.eastasiaforum.org/2011/01/11/policy-chaos-over-migrant-workers-in-malaysia/>, downloaded 15 December 2015.
- Dunning, John H. (1993), *Multinational Enterprises and the Global Economy*. Workingham, U.K.: Addison-Wesley Publishing Co.

- Immigration Department (2015), “Recruitment Terms and Conditions of Foreign Workers”, <http://www.imi.gov.my/index.php/en/main-services/foreign-worker>, December.
- Hale, Galina and Cheryl Long (2011), “Did Foreign Direct Investment Put an Upward Pressure on Wages in China?”, *IMF Economic Review*, 59(3), 404-430.
- Kerr, Sari Pekkala and William R. Kerr (2011), “Economic Impacts of Immigration: A Survey”, NBER Working Paper 16736, <http://www.nber.org/papers/w16736>.
- Lee, Kiong-Hock and Shyamala Nagaraj (1995), “Sex Differences in Earnings: An Analysis of Malaysian Wage Data”, *Journal of Development Studies*, 31(3), 467-480.
- Lipsey, Robert E. and Frederik Sjöholm (2004), “Foreign direct investment, education and wages in Indonesian manufacturing”, *Journal of Development Economics*, 73(1), 415-422.
- Markusen, James R. (2002), *Multinational Firms and the Theory of International Trade*. Cambridge, MA: M.I.T. Press.
- Milanovic, Branko (2006), “Inequality and Determinants of Earnings in Malaysia”, *Asian Economic Journal*, 20(2), 191-216.
- Nguyen, Kien Trung and Eric D. Ramstetter (2015), “Ownership-related Wage Differentials by Occupation in Vietnamese Manufacturing”, Working Paper 2015-06, Kitakyushu: Asian Growth Research Institute, <http://en.agi.or.jp/workingpapers/WP2015-06.pdf>.
- Nguyen, Kien Trung and Eric D. Ramstetter (forthcoming), “Wage Differentials among Ownership Groups and Worker Quality in Vietnamese Manufacturing”, *Global Economic Review: Perspectives on East Asian Economies and Industries*, <http://www.tandfonline.com/doi/full/10.1080/1226508X.2017.1298459>.
- Ottaviano, Gianmarco I.P. and Giovanni Peri (2008), “Immigration and National Wages: Clarifying the Theory and the Empirics”, NBER Working Paper 14188, <http://www.nber.org/papers/w14188>.
- Ramstetter, Eric D. (1999), “Comparisons of Foreign Multinationals and Local Firms in Asian Manufacturing Over Time”, *Asian Economic Journal*, 13(2), 163-203.
- Ramstetter, Eric D. (2014), “Wage Differentials between Foreign Multinationals and Local Plants and Worker Quality in Malaysian Manufacturing”, *Asian Development Review*, 31(2), 55-76.
- Ramstetter, Eric D. (2016), “Foreign Workers, Foreign Multinationals, and Wages by Occupation and Sex in Malaysia’s Manufacturing Plants during the mid-1990s”, Working Paper 2016-23, Kitakyushu: Asian Growth Research Institute, <http://en.agi.or.jp/workingpapers/WP2016-23.pdf>.
- Ramstetter, Eric D. and Dionisius Narjoko (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, <http://en.agi.or.jp/workingpapers/WP2013-23.pdf>.

- Rugman, Alan M., (1980) "Internalization as a General Theory of Foreign Direct Investment: A Re-Appraisal of the Literature," *Weltwirtschaftliches Archiv*, 116(2), 365-379.
- Rugman, Alan M. (1985) "Internalization is Still a General Theory of Foreign Direct Investment," *Weltwirtschaftliches Archiv*, 121(3), 570-575.
- Schafgans, Marcia M.A. (2000), "Gender Wage Differences in Malaysia", *Journal of Development Economics*, 63(2), 351-378.
- Tham, Siew Yean and Liew Chei Siang (2014), "The Impact of Foreign Labor on Labor Productivity and Wages in Malaysian Manufacturing, 2000-2006", in Adams, Richard H. Jr and Ahmad Ahsan, eds. (2014), *Managing International Migration for Development in East Asia*, Washington, D.C.: World Bank, 136-158, <http://documents.worldbank.org/curated/en/2014/06/23036792/managing-international-migration-development-east-asia>
- Velde, Dirk Willem te and Oliver Morrissey (2003), "Do Workers in Africa Get a Wage Premium if Employed in Firms Owned by Foreigners?", *Journal of African Economics*, 12(1), 41-73.
- World Bank (2013), *Immigration in Malaysia: Assessment of its Economic Effects, and a Review of the Policy and System*, downloaded August 2014, <http://psu.um.edu.my/images/psu/doc/Recommended%20Reading/Immigration%20in%20Malaysia.pdf>.

Table 1: Mean wages (1987 ringgit) and paid workers (number) by industry and year, plants with 10+ paid workers and positive capital intensity and output

Year	1994	1995	1996	1994	1995	1996	1994	1995	1996
	Mean wage, all plants			Mean wage, MNEs			Mean wage, local plants		
All sample industries	10,256	11,394	12,501	11,901	13,741	15,779	9,908	10,960	11,929
Food & beverages	9,068	10,396	11,048	13,231	15,300	18,137	8,796	10,070	10,603
Textiles, apparel, footwear	8,603	9,289	9,725	9,485	11,135	11,042	8,415	9,029	9,561
Wood, furniture, paper	8,819	9,516	10,580	8,923	9,795	11,507	8,808	9,483	10,494
Chemicals, rubber, plastics	11,185	12,931	14,693	13,717	17,358	19,931	10,425	11,747	13,236
Metals, non-metallic mineral products	11,396	12,689	13,568	14,423	15,014	16,395	10,910	12,343	13,176
Electronics-related machinery	10,816	11,955	13,519	10,754	11,859	13,683	10,900	12,062	13,360
General & transport machinery	12,803	13,509	15,588	14,217	16,403	18,655	12,634	13,130	15,113
	Paid workers, all			Paid workers, foreign total			Paid workers, foreign female		
All sample industries	1,148,600	1,277,309	1,343,077	104,186	139,104	200,450	28,843	39,297	60,386
Food & beverages	84,722	94,015	99,738	5,191	6,575	9,724	892	977	2,210
Textiles, apparel, footwear	113,533	122,348	113,273	8,601	12,808	18,460	1,107	2,044	4,559
Wood, furniture, paper	189,207	203,997	209,781	42,893	47,935	60,675	12,011	12,394	16,829
Chemicals, rubber, plastics	159,742	174,349	174,687	12,924	18,284	25,566	1,527	2,218	4,070
Metals, non-metallic mineral products	118,876	148,961	162,385	9,290	14,490	22,070	575	581	1,292
Electronics-related machinery	404,366	437,897	478,626	21,952	32,238	52,098	12,655	21,003	31,178
General & transport machinery	78,154	95,743	104,587	3,335	6,774	11,856	76	80	247

Notes and sources: See Appendix Table A10 for industry definitions; compiled by author from plant-level data underlying Department of Statistics (various years a).

Table 2: Mean foreign worker shares of all workers by occupation (percent)

Year	1994	1995	1996	1994	1995	1996	1994	1995	1996
	All occupations			Managers			Technical & supervisory		
All sample industries	8.46	8.67	11.69	0.33	0.32	0.34	0.08	0.09	0.10
Food & beverages	5.67	5.75	8.24	0.10	0.09	0.09	0.05	0.04	0.06
Textiles, apparel, footwear	6.36	7.61	10.15	0.25	0.23	0.22	0.05	0.08	0.10
Wood, furniture, paper	14.41	14.95	17.04	0.19	0.23	0.18	0.12	0.12	0.12
Chemicals, rubber, plastics	7.74	6.92	10.40	0.47	0.54	0.59	0.05	0.05	0.07
Metals, non-metallic mineral products	9.04	9.64	13.54	0.42	0.38	0.37	0.10	0.10	0.13
Electronics-related machinery	5.43	6.81	9.71	0.65	0.58	0.66	0.07	0.17	0.07
General & transport machinery	6.01	7.04	9.85	0.40	0.40	0.51	0.10	0.13	0.11
	Clerical & skilled			General & semi-skilled			Unskilled & part-time		
All sample industries	0.83	0.96	1.40	2.46	2.77	3.96	4.77	4.53	5.91
Food & beverages	0.53	0.51	0.71	1.90	1.99	3.09	3.10	3.11	4.28
Textiles, apparel, footwear	1.14	1.52	2.00	1.95	2.21	4.35	2.96	3.57	3.49
Wood, furniture, paper	1.15	1.20	1.88	4.13	4.60	5.20	8.84	8.80	9.66
Chemicals, rubber, plastics	0.74	0.76	1.18	1.85	1.92	2.93	4.63	3.66	5.64
Metals, non-metallic mineral products	0.81	1.03	1.42	2.91	3.37	4.90	4.81	4.76	6.73
Electronics-related machinery	0.78	1.03	1.78	1.33	1.96	3.09	2.60	3.07	4.11
General & transport machinery	0.58	0.87	1.10	1.76	2.46	3.08	3.17	3.18	5.03

Notes and sources: See Appendix Table A10 for industry definitions; compiled by author from plant-level data underlying Department of Statistics (various years a).

Table 3: Random Effects Estimates of Coefficients on Local Worker Shares and R-squared from Equation (1), Plants with 10+ Paid Workers

Slope Coefficient, Sample	Lagged	Contemporaneous	
	1995-96	1995-96	1994-96
R^2 =R-squared, overall			
All sample industries	0.58	0.59	0.60
Electronics-related machinery	0.56	0.57	0.56
Wood, furniture, paper	0.47	0.52	0.52
Chemicals, rubber, plastics	0.68	0.66	0.67
Metals, non-metallic mineral products	0.52	0.55	0.57
Textiles, apparel, footwear	0.51	0.58	0.57
General & transportation machinery	0.51	0.52	0.53
Food & beverages	0.63	0.62	0.63
$SL1$ =share of local managers			
All sample industries	0.0109067 a	0.0179557 a	0.0167270 a
Electronics-related machinery	0.0074968 b	0.0166226 a	0.0183434 a
Wood, furniture, paper	0.0172034 a	0.0181560 a	0.0179234 a
Chemicals, rubber, plastics	0.0100918 a	0.0206013 a	0.0208629 a
Metals, non-metallic mineral products	0.0122375 a	0.0172950 a	0.0174131 a
Textiles, apparel, footwear	0.0091665 b	0.0243272 a	0.0162228 a
General & transportation machinery	0.0106916 a	0.0160034 a	0.0162579 a
Food & beverages	0.0090429 a	0.0160378 a	0.0135518 a
$SL2$ =share of local technicians & supervisors			
All sample industries	0.0064956 a	0.0115059 a	0.0111970 a
Electronics-related machinery	0.0022487	0.0091782 a	0.0094123 a
Wood, furniture, paper	0.0047974 b	0.0150506 a	0.0124782 a
Chemicals, rubber, plastics	0.0086557 a	0.0122245 a	0.0124398 a
Metals, non-metallic mineral products	0.0052026 a	0.0117725 a	0.0109460 a
Textiles, apparel, footwear	0.0063383 b	0.0105413 a	0.0122695 a
General & transportation machinery	0.0068548 a	0.0069131 a	0.0073091 a
Food & beverages	0.0086231 a	0.0142902 a	0.0144447 a
$SL3$ =share of local clerical & skilled foreign workers			
All sample industries	0.0017977 a	0.0047818 a	0.0044223 a
Electronics-related machinery	0.0007858 c	0.0023618 a	0.0019461 a
Wood, furniture, paper	0.0012294 c	0.0048893 a	0.0046142 a
Chemicals, rubber, plastics	0.0023846 a	0.0048480 a	0.0043939 a
Metals, non-metallic mineral products	0.0018259 a	0.0056075 a	0.0050810 a
Textiles, apparel, footwear	0.0021962 a	0.0040331 a	0.0040574 a
General & transportation machinery	0.0014228 c	0.0054464 a	0.0057319 a
Food & beverages	0.0012506 b	0.0046040 a	0.0045159 a
$SL4$ =share of local general & semi-skilled foreign workers			
All sample industries	0.0004541 b	0.0019950 a	0.0019136 a
Electronics-related machinery	-0.0002910	0.0002634	0.0005941 c
Wood, furniture, paper	0.0005674	0.0025740 a	0.0021934 a
Chemicals, rubber, plastics	0.0006402	0.0023051 a	0.0015123 a
Metals, non-metallic mineral products	0.0005507	0.0020870 a	0.0021623 a
Textiles, apparel, footwear	0.0004138	0.0012898 b	0.0020485 a
General & transportation machinery	0.0006950	0.0013911 b	0.0021547 a
Food & beverages	0.0007846	0.0026467 a	0.0023190 a

Table 3 (continued)

Slope Coefficient, Sample	Lagged	Contemporaneous	
	1995-96	1995-96	1994-96
<i>SLC</i> =share of local ethnic Chinese workers			
All sample industries	0.0024571 a	0.0020018 a	0.0025123 a
Electronics-related machinery	0.0034520 a	0.0021443 a	0.0028254 a
Wood, furniture, paper	0.0032582 a	0.0022800 a	0.0029331 a
Chemicals, rubber, plastics	0.0038732 a	0.0009499 c	0.0016539 a
Metals, non-metallic mineral products	0.0013046 b	0.0016519 a	0.0019851 a
Textiles, apparel, footwear	0.0009396	0.0020047 a	0.0022769 a
General & transportation machinery	0.0034865 a	0.0025774 a	0.0030760 a
Food & beverages	0.0017503 a	0.0020915 a	0.0025217 a
<i>SLI</i> =share of local ethnic Indian workers			
All sample industries	0.0007435 b	0.0006052 b	0.0008904 a
Electronics-related machinery	0.0023665 b	-0.0001986	-0.0000379
Wood, furniture, paper	0.0009602	0.0005153	0.0010944 c
Chemicals, rubber, plastics	0.0009220	-0.0002722	0.0002443
Metals, non-metallic mineral products	-0.0003218	0.0005357	0.0008822
Textiles, apparel, footwear	0.0004584	0.0007220	0.0001209
General & transportation machinery	0.0012444	0.0009565	0.0008563
Food & beverages	0.0012215 c	0.0009909	0.0015273 a
<i>SLF</i> =share of local female workers			
All sample industries	-0.0045810 a	-0.0029667 a	-0.0031298 a
Electronics-related machinery	-0.0052200 a	-0.0036736 a	-0.0032294 a
Wood, furniture, paper	-0.0039260 a	-0.0028047 a	-0.0033033 a
Chemicals, rubber, plastics	-0.0049095 a	-0.0029664 a	-0.0031975 a
Metals, non-metallic mineral products	-0.0058263 a	-0.0026342 a	-0.0025539 a
Textiles, apparel, footwear	-0.0019487 c	-0.0033173 a	-0.0029317 a
General & transportation machinery	-0.0051260 a	-0.0031361 a	-0.0029523 a
Food & beverages	-0.0035478 a	-0.0014122 b	-0.0019429 a

Notes: a=significant at 1%, b=significant at 5%, c=significant at 10%; P-values are based on robust standard errors to account for heteroskedasticity; standard errors are clustered by plant; Breusch and Pagan tests reject the null of no random effects at 1% or better for all samples; in lagged specifications, all independent variables except industry, state/region, and year dummies are lagged one year; see Appendix Tables A2-A9 for other slope coefficients, sample sizes, R-squared, Breusch and Pagan tests, and pooled OLS estimates; all estimates include 6 industry dummies, 9 state/region dummies, and 1 or 2 year dummies; full results including all dummy variable coefficients and the constant available from the author.

Table 4: Random Effects Estimates of Foreign Worker Share and MNE Dummy Coefficients from Equation (1), Plants with 10+ Paid Workers

Slope Coefficient, Sample	Lagged	Contemporaneous	
	1995-96	1995-96	1994-96
<i>SF</i> =share of all foreign workers			
All sample industries	-0.0008156 b	0.0011565 a	0.0012276 a
Electronics-related machinery	-0.0048401 a	-0.0036124 a	-0.0020650 b
Wood, furniture, paper	-0.0001254	0.0023005 a	0.0023427 a
Chemicals, rubber, plastics	-0.0009249	-0.0005028	0.0001379
Metals, non-metallic mineral products	-0.0007988	0.0017704 a	0.0014742 a
Textiles, apparel, footwear	0.0001779	0.0003096	0.0007015
General & transportation machinery	0.0006463	0.0017140 c	0.0014406 c
Food & beverages	-0.0021312 b	0.0019864 b	0.0022197 a
<i>SFF</i> =share of female foreign workers			
All sample industries	-0.0005908	-0.0005190	-0.0003799
Electronics-related machinery	0.0008822	0.0048712 a	0.0043179 a
Wood, furniture, paper	-0.0028789 c	-0.0033311 b	-0.0051195 a
Chemicals, rubber, plastics	0.0004648	0.0014557	0.0011063
Metals, non-metallic mineral products	0.0093007 b	-0.0010189	-0.0001179
Textiles, apparel, footwear	0.0040223	0.0012111	0.0026832 c
General & transportation machinery	0.0061473	-0.0080156 c	-0.0017342
Food & beverages	0.0026928	-0.0006907	-0.0008216
<i>DMNE</i> =MNE dummy (i.e., conditional MNE-local plant wage differential)			
All sample industries	0.0641680 a	0.0651680 a	0.0529455 a
Electronics-related machinery	-0.0121359	0.0122499	-0.0016364
Wood, furniture, paper	0.0697450 b	0.0509794 b	0.0469399 b
Chemicals, rubber, plastics	0.1417031 a	0.1774184 a	0.1341344 a
Metals, non-metallic mineral products	0.0559988	0.0471957 c	0.0601552 b
Textiles, apparel, footwear	-0.0343808	0.0295293	0.0276536
General & transportation machinery	0.1038486 b	0.0890392 b	0.0644747 b
Food & beverages	0.1599567 a	0.1000663 a	0.0981274 a

Notes: a=significant at 1%, b=significant at 5%, c=significant at 10%; P-values are based on robust standard errors to account for heteroskedasticity; standard errors are clustered by plant; Breusch and Pagan tests reject the null of no random effects at 1% or better for all samples; in lagged specifications, all independent variables except industry, state/region, and year dummies are lagged one year; see Appendix Tables A2-A9 for other slope coefficients, sample sizes, R-squared, Breusch and Pagan tests, and pooled OLS estimates; all estimates include 6 industry dummies, 9 state/region dummies, and 1 or 2 year dummies; full results including all dummy variable coefficients and the constant available from the author.

Table 5: Random Effects Estimates of Foreign Worker Share and MNE Dummy Coefficients from Equation (2), Plants with 10+ Paid Workers

Slope Coefficient, Sample	Lagged	Contemporaneous	
	1995-96	1995-96	1994-96
<i>SF1</i> =share of foreign managers			
All sample industries	0.0241922 a	0.0347115 a	0.0364014 a
Electronics-related machinery	0.0028136	0.0248636 b	0.0289575 a
Wood, furniture, paper	0.0430120 a	0.0314255 a	0.0413051 a
Chemicals, rubber, plastics	0.0289698 b	0.0326496 a	0.0307828 a
Metals, non-metallic mineral products	0.0122313 b	0.0283713 a	0.0326304 a
Textiles, apparel, footwear	0.0522346 a	0.0604802 a	0.0628951 a
General & transportation machinery	0.0066753	0.0314820 a	0.0297025 a
Food & beverages	0.0558959 a	0.0519167 a	0.0660262 a
<i>SF2</i> =share of foreign technicians & supervisors			
All sample industries	-0.0055070	0.0115354 a	0.0124734 a
Electronics-related machinery	-0.0088152 a	0.0114325 a	0.0160249 a
Wood, furniture, paper	-0.0150696	0.0029734	0.0075538
Chemicals, rubber, plastics	-0.0069379	0.0370998 a	0.0242987 c
Metals, non-metallic mineral products	0.0055280	-0.0082113	-0.0077941
Textiles, apparel, footwear	0.0090261	0.0209912	0.0247849 c
General & transportation machinery	0.0036269	0.0185320 c	0.0316110 a
Food & beverages	-0.0096420	-0.0137955	-0.0009010
<i>SF3</i> =share of foreign clerical & skilled foreign workers			
All sample industries	-0.0014927	0.0017430 a	0.0018584 a
Electronics-related machinery	-0.0044689	-0.0029438	-0.0017155
Wood, furniture, paper	0.0001415	0.0026357 b	0.0040587 a
Chemicals, rubber, plastics	-0.0029017	-0.0024060	0.0002241
Metals, non-metallic mineral products	0.0000497	0.0034770 a	0.0023906 c
Textiles, apparel, footwear	-0.0018587	-0.0002086	0.0002732
General & transportation machinery	-0.0030024	0.0051620 b	0.0040473 b
Food & beverages	-0.0036203	0.0037077 b	0.0024404 c
<i>SF4</i> =share of foreign general & semi-skilled foreign workers			
All sample industries	-0.0010855 c	0.0019334 a	0.0021038 a
Electronics-related machinery	-0.0063189 a	-0.0018707	-0.0006164
Wood, furniture, paper	-0.0006558	0.0031755 a	0.0030653 a
Chemicals, rubber, plastics	-0.0017137	0.0002543	0.0001789
Metals, non-metallic mineral products	-0.0020366 c	0.0028182 a	0.0027003 a
Textiles, apparel, footwear	-0.0005634	0.0003061	0.0008882
General & transportation machinery	0.0030690	0.0019304	0.0020526 c
Food & beverages	-0.0023947 c	0.0024109 a	0.0029076 a
<i>SF5</i> =share of foreign unskilled & part-time foreign workers			
All sample industries	-0.0006651	0.0000735	0.0001559
Electronics-related machinery	-0.0035381 c	-0.0048175 a	-0.0034097 a
Wood, furniture, paper	0.0003110	0.0014010 b	0.0014318 a
Chemicals, rubber, plastics	-0.0007000	-0.0015897 c	-0.0005221
Metals, non-metallic mineral products	-0.0003845	0.0004007	0.0001469
Textiles, apparel, footwear	0.0007378	-0.0005915	-0.0005440
General & transportation machinery	-0.0008279	0.0003468	-0.0003416
Food & beverages	-0.0017281	0.0011981	0.0012596

Table 5 (continued)

Slope Coefficient, Sample	Lagged	Contemporaneous	
	1995-96	1995-96	1994-96
<i>SFF</i> =share of foreign female workers			
All sample industries	-0.0005290	-0.0004158	-0.0002400
Electronics-related machinery	0.0010629	0.0041562 a	0.0039763 a
Wood, furniture, paper	-0.0028661 c	-0.0029015 b	-0.0046114 a
Chemicals, rubber, plastics	0.0007006	0.0012177	0.0008123
Metals, non-metallic mineral products	0.0089241 b	-0.0005591	-0.0000893
Textiles, apparel, footwear	0.0044324	0.0019647	0.0031813 b
General & transportation machinery	0.0068347	-0.0081089	-0.0012205
Food & beverages	0.0026593	-0.0005698	-0.0004280
<i>DMNE</i> =MNE dummy (i.e., conditional MNE-local plant wage differential)			
All sample industries	0.0438339 a	0.0338223 a	0.0222901 b
Electronics-related machinery	-0.0132869	0.0000476	-0.0136437
Wood, furniture, paper	0.0318975	0.0200693	0.0057045
Chemicals, rubber, plastics	0.1175612 a	0.1322705 a	0.0947146 a
Metals, non-metallic mineral products	0.0358950	0.0195855	0.0255378
Textiles, apparel, footwear	-0.0660277	-0.0234549	-0.0061182
General & transportation machinery	0.0864241	0.0442718	0.0214750
Food & beverages	0.1318140 a	0.0789436 a	0.0726572 b
<i>TestSFs</i> =Wald test that coefficients on <i>SF1</i> = <i>SF2</i> = <i>SF3</i> = <i>SF4</i> = <i>SF5</i>			
All sample industries	39.78 a	107.40 a	176.04 a
Electronics-related machinery	3.14	13.21 b	20.18 a
Wood, furniture, paper	13.53 a	24.31 a	42.73 a
Chemicals, rubber, plastics	7.50	60.96 a	55.25 a
Metals, non-metallic mineral products	9.68 b	21.61 a	32.43 a
Textiles, apparel, footwear	13.31 a	18.78 a	28.88 a
General & transportation machinery	2.75	16.09 a	29.09 a
Food & beverages	16.23 a	15.26 a	20.60 a

Notes: a=significant at 1%, b=significant at 5%, c=significant at 10%; P-values are based on robust standard errors to account for heteroskedasticity; standard errors are clustered by plant; Breusch and Pagan tests reject the null of no random effects at 1% or better for all samples; in lagged specifications, all independent variables except industry, state/region, and year dummies are lagged one year; see Appendix Tables A2-A9 for other slope coefficients, sample sizes, R-squared, Breusch and Pagan tests, and pooled OLS estimates; all estimates include 6 industry dummies, 9 state/region dummies, and 1 or 2 year dummies; full results including all dummy variable coefficients and the constant available from the author.

Appendix Table A1: Number of plants mean output per plant, and mean capital intensity for all plants and MNEs (values in thousand 1987 ringgit) by industry and year, plants with 10+ paid workers and positive capital intensity and output

Year	1994	1995	1996	1994	1995	1996	1994	1995	1996
	Number of all plants			Mean output per plant, all			Mean capital intensity, all		
All sample industries	6,768	5,171	5,504	21,429	34,320	34,182	35.285	58.024	102.890
Food & beverages	1,110	996	1,032	18,719	24,874	27,112	37.137	40.106	61.625
Textiles, apparel, footwear	677	575	589	8,852	14,034	13,765	16.035	20.483	50.399
Wood, furniture, paper	1,405	860	960	9,111	16,088	15,525	23.673	28.167	58.593
Chemicals, rubber, plastics	1,088	725	790	15,742	31,619	29,345	55.721	190.862	337.283
Metals, non-metallic mineral products	1,128	1,064	1,175	15,368	21,113	22,781	47.735	53.104	79.608
Electronics-related machinery	656	441	466	87,863	155,637	144,966	29.287	33.168	56.363
General & transport machinery	704	510	492	18,972	32,875	39,922	28.106	28.613	62.022
	Number of MNE plants			Mean output per plant, MNEs			Mean capital intensity, MNEs		
All sample industries	1,180	807	818	59,136	99,534	99,487	55.469	62.835	96.281
Food & beverages	68	62	61	50,119	63,591	75,857	72.864	87.437	97.379
Textiles, apparel, footwear	119	71	65	22,495	47,558	48,800	29.331	46.264	139.076
Wood, furniture, paper	131	91	81	18,159	26,979	29,247	30.331	38.194	83.212
Chemicals, rubber, plastics	251	153	172	23,459	47,947	42,331	92.079	102.203	140.120
Metals, non-metallic mineral products	156	138	143	26,524	39,104	40,140	83.622	85.349	103.909
Electronics-related machinery	380	233	230	123,946	228,198	232,345	30.719	34.059	54.056
General & transport machinery	75	59	66	55,874	78,764	72,004	69.391	53.822	85.529

Notes and sources: See Appendix Table A10 for industry definitions; compiled by author from plant-level data underlying Department of Statistics (various years a).

Appendix Table A2: Estimates of wage equations (1) and (2) for plants with 10+ paid workers, all sample industries combined

Slope Coefficient, Indicator	Pooled OLS						Random Effects					
	Lagged		Contemporaneous				Lagged		Contemporaneous			
	95-96		95-96		94-96		95-96		95-96		94-96	
	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.
Equation (1)												
LKE	0.03876	0.00	0.03328	0.00	0.03555	0.00	0.03243	0.00	0.03763	0.00	0.03735	0.00
LOU	0.10624	0.00	0.11782	0.00	0.11968	0.00	0.10542	0.00	0.11181	0.00	0.10737	0.00
SL1	0.01645	0.00	0.01874	0.00	0.01854	0.00	0.01091	0.00	0.01796	0.00	0.01673	0.00
SL2	0.00917	0.00	0.01215	0.00	0.01147	0.00	0.00650	0.00	0.01151	0.00	0.01120	0.00
SL3	0.00268	0.00	0.00503	0.00	0.00471	0.00	0.00180	0.00	0.00478	0.00	0.00442	0.00
SL4	0.00090	0.00	0.00212	0.00	0.00203	0.00	0.00045	0.05	0.00200	0.00	0.00191	0.00
SLC	0.00311	0.00	0.00220	0.00	0.00278	0.00	0.00246	0.00	0.00200	0.00	0.00251	0.00
SLI	0.00087	0.00	0.00101	0.00	0.00111	0.00	0.00074	0.04	0.00061	0.04	0.00089	0.00
SLF	-0.00479	0.00	-0.00347	0.00	-0.00381	0.00	-0.00458	0.00	-0.00297	0.00	-0.00313	0.00
SF	-0.00090	0.01	0.00121	0.00	0.00103	0.00	-0.00082	0.03	0.00116	0.00	0.00123	0.00
SFF	-0.00014	0.89	-0.00203	0.00	-0.00173	0.00	-0.00059	0.62	-0.00052	0.41	-0.00038	0.51
DMNE	0.07362	0.00	0.08520	0.00	0.07046	0.00	0.06417	0.00	0.06517	0.00	0.05295	0.00
R ²	0.5925	-	0.5955	-	0.6040	-	0.5845	-	0.5940	-	0.6010	-
Observations	6,782	-	10,675	-	17,443	-	6,782	-	10,675	-	17,443	-
Breusch-Pagan	-	-	-	-	-	-	817.37	0.00	1,106.60	0.00	3,020.33	0.00
Equation (2)												
LKE	0.03544	0.00	0.03081	0.00	0.03259	0.00	0.02971	0.00	0.03522	0.00	0.03463	0.00
LOU	0.10845	0.00	0.12054	0.00	0.12229	0.00	0.10665	0.00	0.11381	0.00	0.10880	0.00
SL1	0.01620	0.00	0.01842	0.00	0.01823	0.00	0.01090	0.00	0.01777	0.00	0.01661	0.00
SL2	0.00880	0.00	0.01172	0.00	0.01110	0.00	0.00636	0.00	0.01107	0.00	0.01087	0.00
SL3	0.00266	0.00	0.00494	0.00	0.00463	0.00	0.00180	0.00	0.00470	0.00	0.00435	0.00
SL4	0.00087	0.00	0.00199	0.00	0.00191	0.00	0.00044	0.06	0.00190	0.00	0.00183	0.00
SLC	0.00316	0.00	0.00228	0.00	0.00285	0.00	0.00251	0.00	0.00207	0.00	0.00258	0.00
SLI	0.00089	0.00	0.00104	0.00	0.00111	0.00	0.00078	0.03	0.00065	0.03	0.00090	0.00
SLF	-0.00479	0.00	-0.00343	0.00	-0.00377	0.00	-0.00459	0.00	-0.00295	0.00	-0.00311	0.00
SF1	0.02896	0.00	0.03524	0.00	0.03625	0.00	0.02419	0.00	0.03471	0.00	0.03640	0.00
SF2	-0.01033	0.01	0.00087	0.79	0.00104	0.74	-0.00551	0.21	0.01154	0.00	0.01247	0.00
SF3	-0.00168	0.09	0.00096	0.11	0.00106	0.04	-0.00149	0.12	0.00174	0.01	0.00186	0.00
SF4	-0.00103	0.05	0.00214	0.00	0.00197	0.00	-0.00109	0.07	0.00193	0.00	0.00210	0.00
SF5	-0.00083	0.03	0.00022	0.49	0.00006	0.81	-0.00067	0.11	0.00007	0.82	0.00016	0.56
SFF	0.00001	0.99	-0.00172	0.00	-0.00142	0.01	-0.00053	0.66	-0.00042	0.49	-0.00024	0.66
DMNE	0.04582	0.00	0.04617	0.00	0.03140	0.00	0.04383	0.00	0.03382	0.00	0.02229	0.02
R ²	0.5963	-	0.6009	-	0.6095	-	0.5888	-	0.5992	-	0.6063	-
Observations	6,782	-	10,675	-	17,443	-	6,782	-	10,675	-	17,443	-
Breusch-Pagan	-	-	-	-	-	-	810.09	0.00	1,107.56	0.00	3,018.99	0.00
Test SFs	14.96	0.00	23.58	0.00	41.96	0.00	39.78	0.00	107.40	0.00	176.04	0.00

Notes: All estimates include 6 industry dummies using food & beverages as the reference group, 9 state/region dummies using Kuala Lumpur as the reference region, and 1 or 2 year dummies using the earliest year in the sample as the reference; full results including all dummy variable coefficients and the constant available from the author upon request; P-values are based on robust standard errors to account for heteroskedasticity; for random effects estimates, standard errors are clustered by plant; in lagged specifications, all independent variables except industry, state/region, and year dummies are lagged one year; Test SFs show results of Wald tests that coefficients on SF1, SF2, SF3, SF4, and SF5 are equal; see text for further explanation and variable definitions.

Appendix Table A3: Estimates of wage equations (1) and (2) for plants with 10+ paid workers, electronics-related machinery

Slope Coefficient, Indicator	Pooled OLS						Random Effects					
	Lagged		Contemporaneous				Lagged		Contemporaneous			
	95-96		95-96		94-96		95-96		95-96		94-96	
	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.
Equation (1)												
LKE	0.04410	0.00	0.04059	0.00	0.04218	0.00	0.03966	0.00	0.04114	0.00	0.04497	0.00
LOU	0.08244	0.00	0.07213	0.00	0.08002	0.00	0.09001	0.00	0.06923	0.00	0.06904	0.00
SL1	0.01235	0.00	0.01539	0.00	0.01735	0.00	0.00750	0.02	0.01662	0.00	0.01834	0.00
SL2	0.00472	0.02	0.00833	0.00	0.00834	0.00	0.00225	0.26	0.00918	0.00	0.00941	0.00
SL3	0.00135	0.00	0.00242	0.00	0.00220	0.00	0.00079	0.10	0.00236	0.00	0.00195	0.00
SL4	-0.00027	0.60	0.00030	0.48	0.00031	0.33	-0.00029	0.65	0.00026	0.58	0.00059	0.10
SLC	0.00334	0.00	0.00257	0.00	0.00322	0.00	0.00345	0.00	0.00214	0.00	0.00283	0.00
SLI	0.00166	0.10	-0.00003	0.97	0.00057	0.36	0.00237	0.05	-0.00020	0.82	-0.00004	0.96
SLF	-0.00503	0.00	-0.00426	0.00	-0.00423	0.00	-0.00522	0.00	-0.00367	0.00	-0.00323	0.00
SF	-0.00509	0.00	-0.00455	0.00	-0.00330	0.00	-0.00484	0.00	-0.00361	0.00	-0.00207	0.01
SFF	0.00193	0.51	0.00464	0.00	0.00347	0.01	0.00088	0.80	0.00487	0.00	0.00432	0.00
DMNE	0.00418	0.87	0.02441	0.26	0.01263	0.49	-0.01214	0.67	0.01225	0.61	-0.00164	0.93
R ²	0.5645	-	0.5691	-	0.5685	-	0.5576	-	0.5663	-	0.5628	-
Observations	667	-	907	-	1,563	-	667	-	907	-	1,563	-
Breusch-Pagan	-	-	-	-	-	-	71.96	0.00	106.29	0.00	244.89	0.00
Equation (2)												
LKE	0.04175	0.00	0.03644	0.00	0.03763	0.00	0.03752	0.00	0.03630	0.00	0.04026	0.00
LOU	0.08312	0.00	0.07413	0.00	0.08249	0.00	0.09058	0.00	0.07200	0.00	0.07233	0.00
SL1	0.01241	0.00	0.01538	0.00	0.01750	0.00	0.00768	0.02	0.01713	0.00	0.01898	0.00
SL2	0.00465	0.02	0.00821	0.00	0.00834	0.00	0.00230	0.25	0.00866	0.00	0.00906	0.00
SL3	0.00129	0.00	0.00241	0.00	0.00219	0.00	0.00080	0.10	0.00220	0.00	0.00181	0.00
SL4	-0.00026	0.62	0.00014	0.74	0.00025	0.45	-0.00018	0.78	0.00009	0.85	0.00049	0.18
SLC	0.00344	0.00	0.00256	0.00	0.00324	0.00	0.00351	0.00	0.00226	0.00	0.00299	0.00
SLI	0.00173	0.09	0.00007	0.92	0.00071	0.25	0.00244	0.04	-0.00001	1.00	0.00022	0.75
SLF	-0.00507	0.00	-0.00425	0.00	-0.00420	0.00	-0.00524	0.00	-0.00360	0.00	-0.00317	0.00
SF1	0.00574	0.69	0.01658	0.12	0.02011	0.02	0.00281	0.87	0.02486	0.03	0.02896	0.00
SF2	-0.00993	0.00	-0.00193	0.52	0.00000	1.00	-0.00882	0.01	0.01143	0.01	0.01602	0.00
SF3	-0.00306	0.20	-0.00553	0.00	-0.00417	0.01	-0.00447	0.16	-0.00294	0.14	-0.00172	0.27
SF4	-0.00540	0.00	-0.00296	0.02	-0.00222	0.02	-0.00632	0.00	-0.00187	0.18	-0.00062	0.57
SF5	-0.00531	0.01	-0.00517	0.00	-0.00377	0.00	-0.00354	0.10	-0.00482	0.00	-0.00341	0.00
SFF	0.00190	0.52	0.00429	0.01	0.00343	0.01	0.00106	0.76	0.00416	0.01	0.00398	0.00
DMNE	0.00205	0.94	0.01444	0.53	-0.00027	0.99	-0.01329	0.66	0.00005	1.00	-0.01364	0.48
R ²	0.5657	-	0.5732	-	0.5719	-	0.5572	-	0.5680	-	0.5642	-
Observations	667	-	907	-	1,563	-	667	-	907	-	1,563	-
Breusch-Pagan	-	-	-	-	-	-	71.13	0.00	109.62	0.00	251.99	0.00
Test SFs	0.99	0.41	1.57	0.18	2.19	0.07	3.14	0.54	13.21	0.01	20.18	0.00

Notes: All estimates include 9 state/region dummies using Kuala Lumpur as the reference region, and 1 or 2 year dummies using the earliest year in the sample as the reference; full results including all dummy variable coefficients and the constant available from the author upon request; P-values are based on robust standard errors to account for heteroskedasticity; for random effects estimates, standard errors are clustered by plant; in lagged specifications, all independent variables except industry, state/region, and year dummies are lagged one year; Test SFs show results of Wald tests that coefficients on SF1, SF2, SF3, SF4, and SF5 are equal; see text for further explanation and variable definitions.

Appendix Table A4: Estimates of wage equations (1) and (2) for plants with 10+ paid workers, wood, paper, and furniture

Slope Coefficient, Indicator	Pooled OLS						Random Effects					
	Lagged		Contemporaneous				Lagged		Contemporaneous			
	95-96		95-96		94-96		95-96		95-96		94-96	
	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.
Equation (1)												
LKE	0.03825	0.00	0.02843	0.00	0.02443	0.00	0.02914	0.00	0.03062	0.00	0.02573	0.00
LOU	0.11331	0.00	0.12558	0.00	0.13331	0.00	0.10487	0.00	0.11124	0.00	0.11902	0.00
SL1	0.02066	0.00	0.01864	0.00	0.01892	0.00	0.01720	0.00	0.01816	0.00	0.01792	0.00
SL2	0.01019	0.00	0.01546	0.00	0.01382	0.00	0.00480	0.04	0.01505	0.00	0.01248	0.00
SL3	0.00239	0.00	0.00536	0.00	0.00510	0.00	0.00123	0.07	0.00489	0.00	0.00461	0.00
SL4	0.00178	0.00	0.00301	0.00	0.00271	0.00	0.00057	0.26	0.00257	0.00	0.00219	0.00
SLC	0.00435	0.00	0.00260	0.00	0.00350	0.00	0.00326	0.00	0.00228	0.00	0.00293	0.00
SLI	0.00135	0.14	0.00151	0.03	0.00175	0.00	0.00096	0.31	0.00052	0.60	0.00109	0.09
SLF	-0.00412	0.00	-0.00320	0.00	-0.00373	0.00	-0.00393	0.00	-0.00280	0.00	-0.00330	0.00
SF	0.00031	0.64	0.00250	0.00	0.00254	0.00	-0.00013	0.86	0.00230	0.00	0.00234	0.00
SFF	-0.00257	0.07	-0.00438	0.00	-0.00577	0.00	-0.00288	0.07	-0.00333	0.01	-0.00512	0.00
DMNE	0.08800	0.00	0.06803	0.00	0.06888	0.00	0.06975	0.03	0.05098	0.05	0.04694	0.03
R ²	0.4792	-	0.5258	-	0.5240	-	0.4675	-	0.5229	-	0.5211	-
Observations	1,043	-	1,820	-	3,225	-	1,043	-	1,820	-	3,225	-
Breusch-Pagan	-	-	-	-	-	-	101.89	0.00	135.38	0.00	342.24	0.00
Equation (2)												
LKE	0.03291	0.00	0.02707	0.00	0.02253	0.00	0.02451	0.01	0.02912	0.00	0.02395	0.00
LOU	0.11724	0.00	0.12739	0.00	0.13560	0.00	0.10852	0.00	0.11343	0.00	0.12060	0.00
SL1	0.02105	0.00	0.01848	0.00	0.01875	0.00	0.01763	0.00	0.01818	0.00	0.01794	0.00
SL2	0.01034	0.00	0.01511	0.00	0.01333	0.00	0.00516	0.02	0.01446	0.00	0.01190	0.00
SL3	0.00221	0.00	0.00515	0.00	0.00486	0.00	0.00106	0.12	0.00475	0.00	0.00448	0.00
SL4	0.00173	0.00	0.00281	0.00	0.00250	0.00	0.00051	0.32	0.00242	0.00	0.00207	0.00
SLC	0.00457	0.00	0.00275	0.00	0.00365	0.00	0.00351	0.00	0.00237	0.00	0.00304	0.00
SLI	0.00141	0.12	0.00154	0.03	0.00172	0.00	0.00108	0.25	0.00048	0.62	0.00107	0.10
SLF	-0.00395	0.00	-0.00318	0.00	-0.00368	0.00	-0.00381	0.00	-0.00274	0.00	-0.00325	0.00
SF1	0.04976	0.00	0.03561	0.00	0.04615	0.00	0.04301	0.00	0.03143	0.00	0.04131	0.00
SF2	-0.01498	0.37	0.00109	0.91	0.00235	0.78	-0.01507	0.38	0.00297	0.78	0.00755	0.39
SF3	-0.00007	0.98	0.00223	0.06	0.00345	0.00	0.00014	0.95	0.00264	0.01	0.00406	0.00
SF4	-0.00011	0.91	0.00336	0.00	0.00344	0.00	-0.00066	0.53	0.00318	0.00	0.00307	0.00
SF5	0.00070	0.35	0.00177	0.00	0.00160	0.00	0.00031	0.69	0.00140	0.03	0.00143	0.01
SFF	-0.00242	0.10	-0.00393	0.00	-0.00513	0.00	-0.00287	0.08	-0.00290	0.03	-0.00461	0.00
DMNE	0.03997	0.16	0.03081	0.21	0.01986	0.32	0.03190	0.31	0.02007	0.44	0.00570	0.79
R ²	0.4887	-	0.5300	-	0.5305	-	0.4773	-	0.5269	-	0.5275	-
Observations	1,043	-	1,820	-	3,225	-	1,043	-	1,820	-	3,225	-
Breusch-Pagan	-	-	-	-	-	-	99.00	0.00	135.70	0.00	339.43	0.00
Test SFs	4.09	0.00	5.42	0.00	12.15	0.00	13.53	0.01	24.31	0.00	42.73	0.00

Notes: All estimates include 9 state/region dummies using Kuala Lumpur as the reference region, and 1 or 2 year dummies using the earliest year in the sample as the reference; full results including all dummy variable coefficients and the constant available from the author upon request; P-values are based on robust standard errors to account for heteroskedasticity; for random effects estimates, standard errors are clustered by plant; in lagged specifications, all independent variables except industry, state/region, and year dummies are lagged one year; Test SFs show results of Wald tests that coefficients on SF1, SF2, SF3, SF4, and SF5 are equal; see text for further explanation and variable definitions.

Appendix Table A5: Estimates of wage equations (1) and (2) for plants with 10+ paid workers, chemicals, rubber, and plastics

Slope Coefficient, Indicator	Pooled OLS						Random Effects					
	Lagged		Contemporaneous				Lagged		Contemporaneous			
	95-96		95-96		94-96		95-96		95-96		94-96	
	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.
Equation (1)												
LKE	0.04798	0.00	0.03551	0.00	0.04273	0.00	0.05381	0.00	0.03214	0.00	0.03937	0.00
LOU	0.13051	0.00	0.13154	0.00	0.13172	0.00	0.11457	0.00	0.12651	0.00	0.11714	0.00
SL1	0.01891	0.00	0.02171	0.00	0.02258	0.00	0.01009	0.00	0.02060	0.00	0.02086	0.00
SL2	0.01064	0.00	0.01257	0.00	0.01182	0.00	0.00866	0.00	0.01222	0.00	0.01244	0.00
SL3	0.00362	0.00	0.00506	0.00	0.00461	0.00	0.00238	0.00	0.00485	0.00	0.00439	0.00
SL4	0.00122	0.05	0.00205	0.00	0.00170	0.00	0.00064	0.25	0.00231	0.00	0.00151	0.00
SLC	0.00454	0.00	0.00152	0.00	0.00226	0.00	0.00387	0.00	0.00095	0.08	0.00165	0.00
SLI	0.00131	0.08	0.00032	0.60	0.00052	0.22	0.00092	0.32	-0.00027	0.68	0.00024	0.62
SLF	-0.00453	0.00	-0.00356	0.00	-0.00372	0.00	-0.00491	0.00	-0.00297	0.00	-0.00320	0.00
SF	0.00033	0.71	-0.00075	0.30	-0.00021	0.69	-0.00092	0.37	-0.00050	0.52	0.00014	0.82
SFF	-0.00077	0.79	0.00090	0.59	0.00117	0.39	0.00046	0.89	0.00146	0.36	0.00111	0.46
DMNE	0.15025	0.00	0.18917	0.00	0.15428	0.00	0.14170	0.00	0.17742	0.00	0.13413	0.00
R ²	0.6910	-	0.6634	-	0.6696	-	0.6798	-	0.6621	-	0.6676	-
Observations	961	-	1,515	-	2,603	-	961	-	1,515	-	2,603	-
Breusch-Pagan	-	-	-	-	-	-	126.89	0.00	174.60	0.00	523.10	0.00
Equation (2)												
LKE	0.04528	0.00	0.03158	0.00	0.03897	0.00	0.05172	0.00	0.02838	0.00	0.03644	0.00
LOU	0.13032	0.00	0.13463	0.00	0.13383	0.00	0.11497	0.00	0.12923	0.00	0.11910	0.00
SL1	0.01800	0.00	0.02085	0.00	0.02182	0.00	0.00969	0.00	0.02000	0.00	0.02033	0.00
SL2	0.01019	0.00	0.01189	0.00	0.01145	0.00	0.00825	0.00	0.01138	0.00	0.01190	0.00
SL3	0.00369	0.00	0.00499	0.00	0.00459	0.00	0.00244	0.00	0.00481	0.00	0.00435	0.00
SL4	0.00123	0.05	0.00187	0.00	0.00161	0.00	0.00071	0.21	0.00211	0.00	0.00143	0.00
SLC	0.00456	0.00	0.00156	0.00	0.00226	0.00	0.00392	0.00	0.00097	0.07	0.00167	0.00
SLI	0.00140	0.06	0.00050	0.40	0.00056	0.18	0.00090	0.34	-0.00004	0.95	0.00024	0.63
SLF	-0.00462	0.00	-0.00353	0.00	-0.00368	0.00	-0.00494	0.00	-0.00297	0.00	-0.00311	0.00
SF1	0.03190	0.00	0.03072	0.00	0.02940	0.00	0.02897	0.01	0.03265	0.00	0.03078	0.00
SF2	-0.01232	0.61	0.02918	0.11	0.01358	0.33	-0.00694	0.80	0.03710	0.00	0.02430	0.05
SF3	-0.00272	0.29	-0.00182	0.23	-0.00109	0.32	-0.00290	0.24	-0.00241	0.17	0.00022	0.90
SF4	-0.00096	0.45	-0.00047	0.69	-0.00024	0.78	-0.00171	0.24	0.00025	0.85	0.00018	0.85
SF5	0.00077	0.55	-0.00185	0.03	-0.00079	0.21	-0.00070	0.62	-0.00159	0.09	-0.00052	0.44
SFF	-0.00080	0.79	0.00098	0.54	0.00112	0.41	0.00070	0.84	0.00122	0.44	0.00081	0.58
DMNE	0.11825	0.00	0.14079	0.00	0.11308	0.00	0.11756	0.00	0.13227	0.00	0.09471	0.00
R ²	0.6971	-	0.6730	-	0.6768	-	0.6869	-	0.6715	-	0.6745	-
Observations	961	-	1,515	-	2,603	-	961	-	1,515	-	2,603	-
Breusch-Pagan	-	-	-	-	-	-	128.73	0.00	179.39	0.00	529.54	0.00
Test SFs	3.15	0.01	9.72	0.00	11.13	0.00	7.50	0.11	60.96	0.00	55.25	0.00

Notes: All estimates include 9 state/region dummies using Kuala Lumpur as the reference region, and 1 or 2 year dummies using the earliest year in the sample as the reference; full results including all dummy variable coefficients and the constant available from the author upon request; P-values are based on robust standard errors to account for heteroskedasticity; for random effects estimates, standard errors are clustered by plant; in lagged specifications, all independent variables except industry, state/region, and year dummies are lagged one year; Test SFs show results of Wald tests that coefficients on SF1, SF2, SF3, SF4, and SF5 are equal; see text for further explanation and variable definitions.

Appendix Table A6: Estimates of wage equations (1) and (2) for plants with 10+ paid workers, non-metallic mineral products and metals

Slope Coefficient, Indicator	Pooled OLS						Random Effects					
	Lagged		Contemporaneous				Lagged		Contemporaneous			
	95-96		95-96		94-96		95-96		95-96		94-96	
	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.
Equation (1)												
LKE	0.03651	0.00	0.02173	0.00	0.02832	0.00	0.01764	0.25	0.03259	0.00	0.03400	0.00
LOU	0.11167	0.00	0.12756	0.00	0.12600	0.00	0.11898	0.00	0.11965	0.00	0.11490	0.00
SL1	0.01672	0.00	0.01809	0.00	0.01905	0.00	0.01224	0.00	0.01730	0.00	0.01741	0.00
SL2	0.00800	0.00	0.01247	0.00	0.01131	0.00	0.00520	0.00	0.01177	0.00	0.01095	0.00
SL3	0.00274	0.00	0.00585	0.00	0.00536	0.00	0.00183	0.00	0.00561	0.00	0.00508	0.00
SL4	0.00127	0.01	0.00240	0.00	0.00226	0.00	0.00055	0.37	0.00209	0.00	0.00216	0.00
SLC	0.00224	0.00	0.00158	0.00	0.00197	0.00	0.00130	0.04	0.00165	0.00	0.00199	0.00
SLI	-0.00032	0.68	0.00055	0.38	0.00052	0.29	-0.00032	0.71	0.00054	0.42	0.00088	0.13
SLF	-0.00560	0.00	-0.00361	0.00	-0.00389	0.00	-0.00583	0.00	-0.00263	0.00	-0.00255	0.00
SF	-0.00081	0.26	0.00206	0.00	0.00160	0.00	-0.00080	0.31	0.00177	0.00	0.00147	0.00
SFF	0.01175	0.00	-0.00118	0.64	0.00033	0.86	0.00930	0.03	-0.00102	0.60	-0.00012	0.96
DMNE	0.04129	0.12	0.06077	0.02	0.06708	0.00	0.05600	0.11	0.04720	0.08	0.06016	0.01
R ²	0.5340	-	0.5534	-	0.5745	-	0.5236	-	0.5511	-	0.5708	-
Observations	1,346	-	2,239	-	3,367	-	1,346	-	2,239	-	3,367	-
Breusch-Pagan	-	-	-	-	-	-	122.31	0.00	246.99	0.00	613.71	0.00
Equation (2)												
LKE	0.03332	0.00	0.02029	0.00	0.02547	0.00	0.01546	0.32	0.03104	0.00	0.03093	0.00
LOU	0.11339	0.00	0.13011	0.00	0.12888	0.00	0.11895	0.00	0.12186	0.00	0.11623	0.00
SL1	0.01671	0.00	0.01772	0.00	0.01867	0.00	0.01249	0.00	0.01691	0.00	0.01719	0.00
SL2	0.00777	0.00	0.01226	0.00	0.01109	0.00	0.00530	0.00	0.01163	0.00	0.01107	0.00
SL3	0.00272	0.00	0.00574	0.00	0.00524	0.00	0.00185	0.00	0.00551	0.00	0.00498	0.00
SL4	0.00134	0.01	0.00233	0.00	0.00218	0.00	0.00061	0.33	0.00199	0.00	0.00206	0.00
SLC	0.00229	0.00	0.00166	0.00	0.00205	0.00	0.00131	0.04	0.00173	0.00	0.00206	0.00
SLI	-0.00026	0.74	0.00048	0.44	0.00043	0.39	-0.00021	0.81	0.00040	0.55	0.00080	0.17
SLF	-0.00558	0.00	-0.00354	0.00	-0.00385	0.00	-0.00587	0.00	-0.00260	0.00	-0.00255	0.00
SF1	0.01818	0.01	0.02956	0.01	0.03335	0.00	0.01223	0.03	0.02837	0.01	0.03263	0.00
SF2	-0.00455	0.63	-0.01310	0.15	-0.00935	0.18	0.00553	0.57	-0.00821	0.35	-0.00779	0.27
SF3	0.00039	0.87	0.00360	0.01	0.00329	0.01	0.00005	0.98	0.00348	0.00	0.00239	0.09
SF4	-0.00231	0.05	0.00271	0.00	0.00221	0.00	-0.00204	0.07	0.00282	0.00	0.00270	0.00
SF5	-0.00012	0.90	0.00104	0.11	0.00051	0.34	-0.00038	0.68	0.00040	0.55	0.00015	0.79
SFF	0.01068	0.01	-0.00066	0.78	0.00081	0.65	0.00892	0.03	-0.00056	0.73	-0.00009	0.96
DMNE	0.01754	0.52	0.02718	0.35	0.02456	0.27	0.03590	0.32	0.01959	0.50	0.02554	0.31
R ²	0.5370	-	0.5582	-	0.5804	-	0.5270	-	0.5558	-	0.5675	-
Observations	1,346	-	2,239	-	3,367	-	1,346	-	2,239	-	3,367	-
Breusch-Pagan	-	-	-	-	-	-	121.65	0.00	251.97	0.00	618.97	0.00
Test SFs	2.65	0.03	3.50	0.01	6.12	0.00	9.68	0.05	21.61	0.00	32.43	0.00

Notes: All estimates include 9 state/region dummies using Kuala Lumpur as the reference region, and 1 or 2 year dummies using the earliest year in the sample as the reference; full results including all dummy variable coefficients and the constant available from the author upon request; P-values are based on robust standard errors to account for heteroskedasticity; for random effects estimates, standard errors are clustered by plant; in lagged specifications, all independent variables except industry, state/region, and year dummies are lagged one year; Test SFs show results of Wald tests that coefficients on SF1, SF2, SF3, SF4, and SF5 are equal; see text for further explanation and variable definitions.

Appendix Table A7: Estimates of wage equations (1) and (2) for plants with 10+ paid workers, textiles, apparel, and footwear

Slope Coefficient, Indicator	Pooled OLS						Random Effects					
	Lagged		Contemporaneous				Lagged		Contemporaneous			
	95-96		95-96		94-96		95-96		95-96		94-96	
	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.
Equation (1)												
LKE	0.03450	0.01	0.01340	0.11	0.02492	0.00	0.03582	0.01	0.02161	0.02	0.03134	0.00
LOU	0.10676	0.00	0.12779	0.00	0.12396	0.00	0.10448	0.00	0.12221	0.00	0.10690	0.00
SL1	0.01385	0.03	0.02497	0.00	0.02133	0.00	0.00917	0.01	0.02433	0.00	0.01622	0.00
SL2	0.01057	0.00	0.01164	0.00	0.01230	0.00	0.00634	0.02	0.01054	0.00	0.01227	0.00
SL3	0.00308	0.00	0.00460	0.00	0.00439	0.00	0.00220	0.00	0.00403	0.00	0.00406	0.00
SL4	0.00130	0.08	0.00170	0.00	0.00202	0.00	0.00041	0.59	0.00129	0.04	0.00205	0.00
SLC	0.00167	0.01	0.00185	0.00	0.00234	0.00	0.00094	0.23	0.00200	0.00	0.00228	0.00
SLI	0.00197	0.12	0.00139	0.18	0.00123	0.12	0.00046	0.76	0.00072	0.47	0.00012	0.88
SLF	-0.00285	0.00	-0.00306	0.00	-0.00296	0.00	-0.00195	0.05	-0.00332	0.00	-0.00293	0.00
SF	-0.00042	0.71	0.00101	0.22	0.00044	0.53	0.00018	0.89	0.00031	0.77	0.00070	0.45
SFF	0.00625	0.02	0.00168	0.26	0.00328	0.02	0.00402	0.15	0.00121	0.40	0.00268	0.06
DMNE	-0.01430	0.68	0.01770	0.58	0.01768	0.44	-0.03438	0.49	0.02953	0.45	0.02765	0.36
R ²	0.5186	-	0.5823	-	0.5748	-	0.5077	-	0.5798	-	0.5694	-
Observations	693	-	1,164	-	1,841	-	693	-	1,164	-	1,841	-
Breusch-Pagan	-	-	-	-	-	-	59.18	0.00	68.83	0.00	230.05	0.00
Equation (2)												
LKE	0.02656	0.04	0.00855	0.31	0.02039	0.01	0.02927	0.04	0.01844	0.04	0.02857	0.00
LOU	0.10919	0.00	0.13226	0.00	0.12654	0.00	0.10567	0.00	0.12507	0.00	0.10638	0.00
SL1	0.01422	0.02	0.02529	0.00	0.02162	0.00	0.00937	0.02	0.02455	0.00	0.01620	0.00
SL2	0.01014	0.00	0.01126	0.00	0.01189	0.00	0.00606	0.03	0.01008	0.00	0.01177	0.00
SL3	0.00325	0.00	0.00468	0.00	0.00442	0.00	0.00237	0.00	0.00406	0.00	0.00402	0.00
SL4	0.00129	0.07	0.00170	0.00	0.00201	0.00	0.00038	0.61	0.00132	0.03	0.00200	0.00
SLC	0.00155	0.02	0.00184	0.00	0.00233	0.00	0.00091	0.25	0.00204	0.00	0.00229	0.00
SLI	0.00123	0.33	0.00087	0.39	0.00057	0.46	0.00002	0.99	0.00054	0.57	-0.00013	0.87
SLF	-0.00290	0.00	-0.00304	0.00	-0.00291	0.00	-0.00203	0.04	-0.00337	0.00	-0.00297	0.00
SF1	0.07012	0.00	0.07209	0.00	0.06480	0.00	0.05223	0.00	0.06048	0.00	0.06290	0.00
SF2	-0.01643	0.38	0.00560	0.74	0.00937	0.52	0.00903	0.65	0.02099	0.26	0.02478	0.09
SF3	-0.00327	0.11	-0.00105	0.48	-0.00102	0.41	-0.00186	0.32	-0.00021	0.90	0.00027	0.83
SF4	-0.00079	0.64	0.00135	0.16	0.00082	0.32	-0.00056	0.74	0.00031	0.78	0.00089	0.36
SF5	0.00037	0.79	0.00093	0.37	0.00016	0.86	0.00074	0.63	-0.00059	0.65	-0.00054	0.64
SFF	0.00742	0.00	0.00222	0.13	0.00372	0.01	0.00443	0.12	0.00196	0.17	0.00318	0.02
DMNE	-0.06468	0.06	-0.05717	0.08	-0.03348	0.14	-0.06603	0.19	-0.02345	0.56	-0.00612	0.84
R ²	0.5345	-	0.5950	-	0.5864	-	0.5236	-	0.5913	-	0.5794	-
Observations	693	-	1,164	-	1,841	-	693	-	1,164	-	1,841	-
Breusch-Pagan	-	-	-	-	-	-	51.16	0.00	60.21	0.00	210.57	0.00
Test SFs	7.22	0.00	5.48	0.00	8.79	0.00	13.31	0.01	18.78	0.00	28.88	0.00

Notes: All estimates include 9 state/region dummies using Kuala Lumpur as the reference region, and 1 or 2 year dummies using the earliest year in the sample as the reference; full results including all dummy variable coefficients and the constant available from the author upon request; P-values are based on robust standard errors to account for heteroskedasticity; for random effects estimates, standard errors are clustered by plant; in lagged specifications, all independent variables except industry, state/region, and year dummies are lagged one year; Test SFs show results of Wald tests that coefficients on SF1, SF2, SF3, SF4, and SF5 are equal; see text for further explanation and variable definitions.

Appendix Table A8: Estimates of wage equations (1) and (2) for plants with 10+ paid workers, general and transportation machinery

Slope Coefficient, Indicator	Pooled OLS						Random Effects					
	Lagged		Contemporaneous				Lagged		Contemporaneous			
	95-96		95-96		94-96		95-96		95-96		94-96	
	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.
Equation (1)												
LKE	0.00388	0.77	0.02377	0.02	0.02785	0.00	-0.00155	0.92	0.03360	0.00	0.03693	0.00
LOU	0.11502	0.00	0.11647	0.00	0.11499	0.00	0.10861	0.00	0.11359	0.00	0.09933	0.00
SL1	0.01739	0.00	0.01835	0.00	0.01754	0.00	0.01069	0.00	0.01600	0.00	0.01626	0.00
SL2	0.00772	0.00	0.00766	0.00	0.00775	0.00	0.00685	0.00	0.00691	0.00	0.00731	0.00
SL3	0.00260	0.00	0.00534	0.00	0.00575	0.00	0.00142	0.09	0.00545	0.00	0.00573	0.00
SL4	0.00064	0.46	0.00141	0.04	0.00204	0.00	0.00070	0.47	0.00139	0.04	0.00215	0.00
SLC	0.00421	0.00	0.00303	0.00	0.00356	0.00	0.00349	0.00	0.00258	0.00	0.00308	0.00
SLI	0.00097	0.37	0.00166	0.09	0.00150	0.03	0.00124	0.31	0.00096	0.37	0.00086	0.27
SLF	-0.00565	0.00	-0.00384	0.00	-0.00383	0.00	-0.00513	0.00	-0.00314	0.00	-0.00295	0.00
SF	0.00114	0.35	0.00186	0.02	0.00149	0.03	0.00065	0.69	0.00171	0.05	0.00144	0.06
SFF	0.01352	0.07	-0.01037	0.08	-0.00367	0.43	0.00615	0.59	-0.00802	0.09	-0.00173	0.74
DMNE	0.09292	0.02	0.10772	0.00	0.07246	0.01	0.10385	0.03	0.08904	0.02	0.06447	0.05
R ²	0.5293	-	0.5229	-	0.5296	-	0.5140	-	0.5196	-	0.5263	-
Observations	640	-	1,002	-	1,706	-	640	-	1,002	-	1,706	-
Breusch-Pagan	-	-	-	-	-	-	94.53	0.00	147.31	0.00	350.80	0.00
Equation (2)												
LKE	0.00217	0.87	0.02001	0.05	0.02349	0.00	-0.00150	0.93	0.02948	0.01	0.03294	0.00
LOU	0.11800	0.00	0.12055	0.00	0.11742	0.00	0.11088	0.00	0.11504	0.00	0.09952	0.00
SL1	0.01718	0.00	0.01800	0.00	0.01718	0.00	0.01074	0.00	0.01604	0.00	0.01624	0.00
SL2	0.00694	0.00	0.00682	0.00	0.00695	0.00	0.00652	0.00	0.00658	0.00	0.00684	0.00
SL3	0.00242	0.00	0.00504	0.00	0.00543	0.00	0.00130	0.13	0.00524	0.00	0.00558	0.00
SL4	0.00037	0.68	0.00113	0.10	0.00176	0.00	0.00038	0.70	0.00127	0.06	0.00199	0.00
SLC	0.00424	0.00	0.00319	0.00	0.00367	0.00	0.00357	0.00	0.00272	0.00	0.00315	0.00
SLI	0.00088	0.41	0.00166	0.08	0.00145	0.03	0.00107	0.38	0.00107	0.31	0.00090	0.24
SLF	-0.00555	0.00	-0.00366	0.00	-0.00372	0.00	-0.00509	0.00	-0.00303	0.00	-0.00291	0.00
SF1	0.01785	0.07	0.03403	0.00	0.03259	0.00	0.00668	0.57	0.03148	0.00	0.02970	0.00
SF2	0.00693	0.77	0.01597	0.09	0.02132	0.02	0.00363	0.88	0.01853	0.08	0.03161	0.00
SF3	-0.00052	0.90	0.00413	0.03	0.00479	0.00	-0.00300	0.30	0.00516	0.02	0.00405	0.05
SF4	0.00381	0.08	0.00277	0.04	0.00237	0.05	0.00307	0.28	0.00193	0.14	0.00205	0.07
SF5	-0.00080	0.56	-0.00024	0.81	-0.00076	0.36	-0.00083	0.55	0.00035	0.76	-0.00034	0.73
SFF	0.01244	0.17	-0.01270	0.12	-0.00509	0.45	0.00683	0.58	-0.00811	0.20	-0.00122	0.83
DMNE	0.05464	0.21	0.04856	0.20	0.01420	0.65	0.08642	0.11	0.04427	0.27	0.02148	0.53
R ²	0.5346	-	0.5345	-	0.5411	-	0.5191	-	0.5309	-	0.5368	-
Observations	640	-	1,002	-	1,706	-	640	-	1,002	-	1,706	-
Breusch-Pagan	-	-	-	-	-	-	92.92	0.00	141.01	0.00	336.83	0.00
Test SFs	1.73	0.14	5.63	0.00	10.24	0.00	2.75	0.60	16.09	0.00	29.09	0.00

Notes: All estimates include 9 state/region dummies using Kuala Lumpur as the reference region, and 1 or 2 year dummies using the earliest year in the sample as the reference; full results including all dummy variable coefficients and the constant available from the author upon request; P-values are based on robust standard errors to account for heteroskedasticity; for random effects estimates, standard errors are clustered by plant; in lagged specifications, all independent variables except industry, state/region, and year dummies are lagged one year; Test SFs show results of Wald tests that coefficients on SF1, SF2, SF3, SF4, and SF5 are equal; see text for further explanation and variable definitions.

Appendix Table A9: Estimates of wage equations (1) and (2) for plants with 10+ paid workers, food and beverages

Slope Coefficient, Indicator	Pooled OLS						Random Effects					
	Lagged		Contemporaneous				Lagged		Contemporaneous			
	95-96		95-96		94-96		95-96		95-96		94-96	
	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.	coeff.	prob.
Equation (1)												
LKE	0.04222	0.00	0.04516	0.00	0.04441	0.00	0.03718	0.00	0.04788	0.00	0.04246	0.00
LOU	0.10869	0.00	0.13099	0.00	0.12898	0.00	0.10696	0.00	0.13032	0.00	0.11777	0.00
SL1	0.01543	0.00	0.01726	0.00	0.01677	0.00	0.00904	0.00	0.01604	0.00	0.01355	0.00
SL2	0.01085	0.00	0.01538	0.00	0.01463	0.00	0.00862	0.00	0.01429	0.00	0.01444	0.00
SL3	0.00194	0.00	0.00485	0.00	0.00454	0.00	0.00125	0.03	0.00460	0.00	0.00452	0.00
SL4	0.00060	0.19	0.00280	0.00	0.00267	0.00	0.00078	0.10	0.00265	0.00	0.00232	0.00
SLC	0.00227	0.00	0.00230	0.00	0.00237	0.00	0.00175	0.00	0.00209	0.00	0.00252	0.00
SLI	0.00108	0.06	0.00124	0.01	0.00122	0.00	0.00122	0.10	0.00099	0.10	0.00153	0.00
SLF	-0.00375	0.00	-0.00172	0.00	-0.00223	0.00	-0.00355	0.00	-0.00141	0.03	-0.00194	0.00
SF	-0.00195	0.03	0.00208	0.01	0.00138	0.03	-0.00213	0.03	0.00199	0.01	0.00222	0.00
SFF	0.00074	0.73	-0.00212	0.16	-0.00108	0.36	0.00269	0.26	-0.00069	0.65	-0.00082	0.54
DMNE	0.14644	0.00	0.17644	0.00	0.14561	0.00	0.15996	0.00	0.10007	0.00	0.09813	0.01
R ²	0.6420	-	0.6173	-	0.6358	-	0.6321	-	0.6152	-	0.6318	-
Observations	1,367	-	2,028	-	3,138	-	1,367	-	2,028	-	3,138	-
Breusch-Pagan	-	-	-	-	-	-	201.00	0.00	208.51	0.00	574.44	0.00
Equation (2)												
LKE	0.04070	0.00	0.04419	0.00	0.04322	0.00	0.03470	0.00	0.04676	0.00	0.04141	0.00
LOU	0.10922	0.00	0.13179	0.00	0.13030	0.00	0.10700	0.00	0.13081	0.00	0.11829	0.00
SL1	0.01504	0.00	0.01703	0.00	0.01651	0.00	0.00909	0.00	0.01597	0.00	0.01368	0.00
SL2	0.01068	0.00	0.01506	0.00	0.01446	0.00	0.00859	0.00	0.01411	0.00	0.01429	0.00
SL3	0.00200	0.00	0.00478	0.00	0.00448	0.00	0.00134	0.02	0.00453	0.00	0.00447	0.00
SL4	0.00054	0.24	0.00268	0.00	0.00254	0.00	0.00079	0.11	0.00258	0.00	0.00225	0.00
SLC	0.00234	0.00	0.00237	0.00	0.00245	0.00	0.00180	0.00	0.00214	0.00	0.00262	0.00
SLI	0.00110	0.05	0.00117	0.02	0.00119	0.00	0.00121	0.10	0.00099	0.10	0.00151	0.00
SLF	-0.00379	0.00	-0.00177	0.00	-0.00227	0.00	-0.00357	0.00	-0.00147	0.02	-0.00202	0.00
SF1	0.04263	0.00	0.06662	0.00	0.06279	0.00	0.05590	0.00	0.05192	0.00	0.06603	0.00
SF2	-0.01200	0.33	-0.00646	0.67	-0.01774	0.15	-0.00964	0.52	-0.01380	0.40	-0.00090	0.94
SF3	-0.00519	0.11	0.00174	0.30	0.00035	0.84	-0.00362	0.29	0.00371	0.02	0.00244	0.07
SF4	-0.00111	0.36	0.00359	0.00	0.00311	0.00	-0.00239	0.06	0.00241	0.01	0.00291	0.00
SF5	-0.00198	0.07	0.00091	0.37	0.00025	0.75	-0.00173	0.15	0.00120	0.21	0.00126	0.11
SFF	0.00065	0.76	-0.00210	0.15	-0.00109	0.34	0.00266	0.27	-0.00057	0.70	-0.00043	0.74
DMNE	0.12149	0.00	0.12991	0.00	0.10755	0.00	0.13181	0.01	0.07894	0.01	0.07266	0.04
R ²	0.6442	-	0.6206	-	0.6396	-	0.6343	-	0.6184	-	0.6358	-
Observations	1,367	-	2,028	-	3,138	-	1,367	-	2,028	-	3,138	-
Breusch-Pagan	-	-	-	-	-	-	201.86	0.00	207.03	0.00	575.05	0.00
Test SFs	3.08	0.02	6.43	0.00	9.54	0.00	16.23	0.00	15.26	0.00	20.60	0.00

Notes: All estimates include 9 state/region dummies using Kuala Lumpur as the reference region, and 1 or 2 year dummies using the earliest year in the sample as the reference; full results including all dummy variable coefficients and the constant available from the author upon request; P-values are based on robust standard errors to account for heteroskedasticity; for random effects estimates, standard errors are clustered by plant; in lagged specifications, all independent variables except industry, state/region, and year dummies are lagged one year; Test SFs show results of Wald tests that coefficients on SF1, SF2, SF3, SF4, and SF5 are equal; see text for further explanation and variable definitions.

Table A1: Industry definitions

Industry	ISIC revision 2 codes
7 broadly defined sample industries	
Food & beverages	
Food products	311, 312
Beverages	313
Textiles, apparel, footwear	
Textiles	321
Apparel	322
Leather products	323
Footwear	324
Wood, furniture, paper	
Wood products	331
Furniture	332
Paper products	341
Chemicals, rubber, plastics	
Chemicals	351, 352
Rubber products	355
Plastics	356
Metals, non-metallic mineral products	
Non-metallic mineral products	360
Basic metals, ferrous	371
Basic metals, non-ferrous	372
Metal products	381
Electronics-related machinery	
Office & computing machinery	3825
Electric & electronic machinery	383
Precision machinery	385
General & transport machinery	
General machinery	3821, 3822, 3823, 3824, 3829
Transport machinery	384
4 narrowly defined excluded industries	
Tobacco	314
Printing & publishing	342
Oil & coal products	353+354
Miscellaneous manufacturing	39