Chapter 9 The Transition Takes Hold: Ownership, Concentration, Wages, and Productivity in Vietnamese Manufacturing after the Enterprise Law

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9.1 Introduction

In January 2000, Vietnam began implementing a far-reaching Enterprise Law that reduced numerous barriers to private business. This was followed by regulatory reforms and further legal changes such as unification of various enterprise and investment laws in 2006. Partially as a result of these important institutional changes, systematic biases that constrained private firms were removed or greatly reduced, and official compilations indicate that the number of private firms increased 140 percent in 2000-2004, and another 47 percent in 2004-2006 (General Statistics Office various years a). The number of foreign-owned multinational corporations (MNCs) increased at somewhat slower rates (107 percent and 34 percent, respectively) while the number of state-owned enterprises (SOEs)

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declined 20 percent during 2000-2004, and another 19 percent in 2004-2006, reflecting accelerating efforts to advance privatization. Private firms have always been the most numerous, accounting for 83 percent of all firms in 2000, 92 percent in 2004, and 94 percent in 2006.

Figure 1 illustrates how private firms also experienced relatively rapid growth in sales in recent years. However, private firms' shares of total enterprise sales remained relatively small (e.g., 25 percent in 2000, 37 percent in 2004, and 42 percent in 2006). In other words, despite rapid growth, private firms tended to remain substantially smaller than SOEs or MNCs. In contrast, the share of MNCs remained relatively constant at 18-22 percent in 2000-2006, while the shares of SOEs fell precipitously from 55 percent in 2000 to 41 percent in 2004 and 36 percent in 2006. The decline in SOE shares of enterprise sales contrasted with the stability of SOE shares of current non-household GDP as reported in the national accounts (56 percent in 2000-2004 and 53 percent in 2006; Figure 2). There are many possible reasons for discrepancies between these two data sources, but the large differences in trends of SOE and private shares are difficult to explain.[2]

Although the institutional and ownership structures of the Vietnamese economy have been analyzed in numerous previous studies, the relationships of these changes to producer concentration, wages, and productivity have not been well examined.[3] The purpose of this chapter is to thus

[2] Discrepancies in trends over time could result if the coverage of the enterprise surveys has changed markedly over time or if the GDP estimates have failed to account for the extent to which the private sector has grown and the SOE sector shrunk. It is also possible that different definitions of state-ownership are used in national accounts and the enterprise surveys. Finally, calculations from the firm- and product-level enterprise survey data (Ramstetter and Phan 2008, Table 1) indicate that the decline in the SOE share of value added was slower in manufacturing firms (41 to 34 percent in 2000-2004) than corresponding declines in shares of sales (40 to 29 percent). However, the reason for large discrepancies in trends of SOE shares observed between Figures 1 and 2 remains unclear.

[3] Vu (2005) is the only known study examining the extent of competition and competition policy in

examine interactions between ownership structure, producer concentration, wages, and productivity in Vietnam's manufacturing industries. Although it would be a mistake to attribute all changes observed to institutional changes, legal and regulatory reforms have had profound effects and the chapter thus reviews Vietnam's Enterprise Law and related reforms in some detail (Section 9.2) before proceeding to examine how ownership patterns changed during this period (Section 9.3).[4] The analytical sections of the chapter then examine trends and patterns of producer concentration and their relationship to ownership changes (Section 9.4), trends and patterns of wages (measured as total employee compensation) and how they are related to concentration and ownership (Section 9.5), as well as trends and patterns of productivity, and their relationships to concentration and ownership (Section 9.6). Finally, some concluding remarks are offered (Section 9.7).

9.2 Vietnam's Enterprise Law and Related Reforms[5]

Prior to the implementation of the Enterprise Law, private businesses had a weak legal status and faced a myriad of administrative and regulatory barriers that impeded the establishment and operations of private businesses to a much greater extent than they affected SOEs or even MNCs. This institutional structure was a legacy of the planned economy that prevailed until the *doi moi*

Vietnam. However, he does not analyze the relationship between ownership structure and the extent of competition. On the other hand, there are numerous studies examining various issues related to the ownership structure of the Vietnamese economy (e.g., Phan and Ramstetter 2004, Van Arkadie and Mallon 2003, pp. 103-175).

[4] It is important to recognize that Vietnam is a rapidly growing, low-income economy and that the corporate sector would generally be expected to grow relatively rapidly in such economies.

[5] This section draws heavily on Ramstetter and Phan (2007), Van Arkadie and Mallon (2003), and Vu (2005), and is a rough English translation of Ramstetter (2008, Section 2, pp. 39-41).

(reforms) of 1986 began the transition toward a market economy. Early in the reform process a relatively liberal FDI (foreign direct investment) Law was approved in 1987. This law was subsequently amended several times (1990, 1992, 1997, and 2000) and always been liberal in the sense that it imposed relatively few formal restrictions on investing MNCs, though it did reserve discretionary power for the government to reject foreign investments it found objectionable. On the other hand, implementation of this law has not always been smooth and a number of other laws and regulations affecting MNC operations (e.g., regarding land use or construction permits) remained unclear and their implementation uneven. A law governing domestic investment was also promulgated in 1994 and amended in 1998, as were also separate laws governing the behavior of SOEs (1995) and various forms of private firms (a law on joint stock companies, limited liability companies, and unlimited liability companies in 1990 [amended in 1994]; as well as a law on cooperatives approved in 1996).

The largest contributions of the 2000 Enterprise Law were to unify many provisions of these laws and consolidate the legal status of private businesses by putting them under the same legal umbrella as SOEs. However, there was still a plethora of laws and regulations governing private firms, including the Bankruptcy Law (approved 1993), the Commercial Code (approved 1997), the Land Law (approved 1987 and amended in 1993 and 2001), and the Labor Code (approved 1994), as well as several sector specific laws governing firms in mining (1996) and finance (approved 1997), and insurance (approved 2000). Recognition of this continued legal and regulatory overlap was a major factor behind the promulgation of a single Investment Law governing investment from all

sources and a concurrent revision of the Enterprise Law to be consistent with the new Investment Law, which were implemented in 2006.

The 1997 Commercial Law is also particularly important in this context because it contains articles that serve as the basis for Vietnam's limited competition policy. The law forbids a number of non-competitive practices, ensures equal treatment for firms of all ownership types, and guarantees the property and other legal rights of private traders. On the other hand, the law also includes provisions which, for example, set out state guidelines for each sector, highlight the leading role of the state in commercial activities and price management, and encourage private firms to form joint ventures with state trading companies. Vietnam's government has also had substantial power to control prices under the Cabinet's Price Decision of 1992 and later the 2002 Price Ordinance, though these laws were intended as a competition policy tools but rather as means of central planning.

The preceding discussion highlights four important points regarding the Enterprise Law and related reforms. First, the legacy of central planning is still strong in that the government has substantial power to encourage SOEs, control both local and foreign private firms, and regulate prices in so-called key sectors of the economy. Second, the Enterprise Law of 2000 was a major step toward reducing the discretionary power of the government to control firm activity and the major beneficiaries of this change were clearly local private businesses. Third, although the 1997 Commercial Law and the 2002 Price Ordinance establish a legal basis for competition policy, Vietnam has yet to implement competition policy often or consistently. Fourth, the implementation of these laws as well as related decrees and regulations has been uneven, partially because the

plethora of measures have created a complex regulatory environment and partially because many bureaucrats have been slow to discard old practices that favored SOEs and facilitated strong government intervention in private business.

9.3 Changing Ownership Patterns in Vietnamese Manufacturing

This and the following sections describe the changing ownership patterns of manufacturing firm sales in Vietnamese manufacturing and relates those changes to changes in industry-level producer concentration as well as firm-level wages and productivity, focusing on 2000 and 2004. In order to facilitate such analyses, three subsets of the micro-data that underlie Vietnam's enterprise surveys are used. The largest subset is used to examine ownership and concentration in this and the following section. This subset includes all firms that reported both positive employment and positive sales, but excludes several records that appear to be duplicates.[6] The number of duplicates increased with time, with the largest reductions being among relatively small private firms.[7] Despite reductions in overall sample size and employment estimates, estimates of sales for all mining, manufacturing, and utilities' firms from these samples are slightly larger than corresponding

[6] See Ramstetter and Phan (2007a) for details on these samples, including firm numbers, employment, and sales (Tables 1, 2, 3; Appendix Tables 1a-1f, 2a-2f, 3a-3f) as well as detailed description of how duplicates were identified and dealt with (Appendix A). The focus is on analysis of the 2000-2004 period, primarily because datasets for 2000, 2002, and 2004 contain information on labor quality that is omitted from other years.

[7] For example, in all mining, manufacturing, and utilities' firms combined (of which manufacturing accounts for the vast majority), the number of all firms was reduced by 2.1 percent in 2004, compared to 0.3 percent in 2000. The number of workers in these firms amounted to 0.2 percent of the total in 2004 and 0.1 percent in 2000. For private firms, reductions in numbers amounted to 2.3 and 0.3 percent, respectively, while reductions in employment were 0.3 percent and 0.2 percent, respectively. Note that there are no published figures for manufacturing by ownership group.

published estimates (Table 1).[8] These differences were largest for SOEs and MNCs in 2004, but much smaller in other groups and years.

In 2000-2004, sales grew especially rapidly among private manufacturers, 256 percent on average, followed by MNCs at 161 percent and SOEs at 88 percent (Table 1). Sales of MNCs were the largest among the three ownership groups, accounting for 41 percent of the total in 2000 and 43 percent in 2004. In 2000, SOEs had slightly smaller shares than MNCs in 2000 while private firm sales were much smaller at just over one-fifth the total. However, by 2004, the relatively rapid growth of the private sector resulted in roughly equal shares for SOEs and private firms (28-29 percent).

The rapid growth of private firms is even more evident at the industry level, with their sales growing 300 percent or more during 2000-2004 in 13 of the 27 individual manufacturing industries listed in Table 1.[9] However, similarly rapid growth was only observed in four industries each for SOEs and MNCs.[10] On the other hand, private firms remained relatively small in many of the industries in which they grew rapidly. For example, private firms were largest of the three groups in only four industries in both years, wood, plastics, furniture, and the small recycling industry. In contrast, MNC dominance was particularly notable in the seven machinery industries (industries

[8] For example, if all mining, manufacturing, and utilities' firms are combined, sample estimates exceeded published estimates by 0.01 percent in 2000 and 1.9 percent in 2004. In these samples, manufacturing firms accounted for 78 percent of this total in 2000 and 82 percent in 2004, though corresponding shares of firm numbers and employment were much smaller.

[9] These were leather, publishing, chemicals, rubber, non-metallic mineral products, basic metals, fabricated metals, general machinery, office & computing machinery, electrical machinery, and radio, television, and communication machinery, furniture, and recycling.

[10] For SOEs, these industries were electrical machinery, motor vehicles, furniture, and miscellaneous manufacturing. For MNCs, they were leather, publishing, motor vehicles, and furniture.

from general machinery through other transportation equipment in Table 1).[11] MNCs were also largest in both years in petroleum products as well as three more labor intensive industries, leather, footwear, and miscellaneous manufacturing. SOEs were largest for both years in four industries, tobacco, publishing, rubber, and non-metallic products. In the remaining eight industries, there were changes in ownership patterns with private firms taking over the largest share from SOEs in food and paper, and from MNCs in the two metals industries. Meanwhile MNCs supplanted SOEs to become largest in textiles, apparel, and chemicals, while the reverse pattern was observed in chemicals.

9.4 New Competition, Exit, and Producer Concentration

The large increase in enterprise activity described in the previous section highlights the extremely dynamic nature of Vietnam's corporate sector after the implementation of the Enterprise Law. This is underscored by the fact that 65 percent of 2004 sales by private manufacturers were made by new competitors that entered the market between 2001 and 2004 (Table 2). Corresponding shares were smaller for SOEs and MNCs, but new competitors still accounted for over a third of sales by these firms as well. New competitors can be divided into new entrants and old firms changing industries and the category of new entrants is much larger.[12] Firms that subsequently exited also accounted for about a third of sales in SOEs and private firms in 2000, suggesting

[11] MNCs often dominate these industries because they are characterized by relatively high overhead related to research and development (R&D) and marketing expenses (e.g., advertising, network building). Thus, MNCs have advantages over non-MNCs in the long-run, because they can often share such costs among geographically disbursed affiliates at relatively low marginal cost.

[12] New entrants accounted for 88-90 percent of new competitor sales for MNCs and private firms, and 79 percent for SOEs (Ramstetter and Phan 2007a, Appendix Tables 6a-6b).

particularly large turnover in these groups. The large turnover of SOEs seems somewhat strange in view of Vietnam's efforts to privatize SOEs and suggests that SOE restructuring may have led to the simultaneous closing and opening of firms as a result of mergers or other tie ups.[13] On the other hand, the relatively low rate of exit among MNCs is consistent with the common view that MNCs experience relatively low turnover, partially because they incur relatively large start-up costs and are thus hesitant to abandon investments when business conditions become difficult.

Rapid firm growth and the surge in new competition have been accompanied by substantial reductions of producer concentration in Vietnam. For example, the mean 4-firm concentration ratio (CR4) for the 27 manufacturing industries listed in Table 3 (and previous tables) fell from 42 percent in 2000 to 35 percent in 2004 and the mean Herfindahl index, another common measure of producer concentration, fell a larger percentage, from 0.115 to 0.063. Decreased concentration was widespread across industries as CR4 fell in 22 of the 27 industries and the Herfindahl index declined in 24 industries. Declines of 10 percentage points or more were observed in almost a third (8) of the industries and by 2004, CR4 exceeded 40 percent in exactly one third (9) of the industries, compared to just under one half (13) in 2000. Conspicuous exceptions to the trend toward increased producer competition were observed in tobacco and beverages, where CR4 increase 10 percentage points or more. As indicated above, there was also relatively large SOE presence in both industries as well as relatively large MNC presence in beverages (Table 2).

[13] The authors have been told that when two SOEs merge, the new firm is assigned the code of the largest firm involved. However, the large number of new SOEs (436 between 2000 and 2004) and their relatively large size (average sales per firm of 113 billion dong) suggests that this principle may have not been implemented consistently (Ramstetter and Phan 2007a, Appendix Table 6a).

Despite the trend toward lower concentration, 4-firm concentration ratios suggest a persistently high level of producer concentration in a number of industries, especially if the relatively high level of aggregation in Tables 1-3 is considered. For example, despite declines in many of these industries, CR4 was equal to or exceeded 40 percent for both years in nine of the 27 industries: beverages, tobacco, leather, petroleum products, office and computing machinery, precision machinery, motor vehicles, other transport equipment, and recycling (Table 3). In 2000-2004, CR4 did decline 10 percentage points in three of these highly concentrated industries (petroleum products, precision machinery, recycling), but concentration remained relatively high despite these declines.

Despite trends toward reduced producer concentration, several caveats are important. First, in the industrial organization literature (Martin 2002; Schmalensee 1989) it has generally been most common to define markets in terms of production or sales by firms or plants at a more disaggregate level such as the 3- or 4-digit level of Vietnam's Standard Industrial Classification (VSIC), which is very similar to revision 3 of the International Standard Industrial Classification. However, this approach is problematic when large multi-product firms must be classified into a single industry and when greater disaggregation than the 2-/3-digit breakdown in Table 3 creates very small industries, as it does in Vietnam. Second, the existence of intermediate transactions between firms in different industries also complicates the definition of a market and the meaning of producer concentration.[14] Third, the inability to account for the existence of intra-industry conglomerates (e.g.,

[14] For example, if a manufacturer sells a product to a wholesale trader, who then sells it using the services of a logistics firm to facilitate sale to a retailer, who then makes the sale to the final consumer at a price that includes substantial rents resulting from the exercise of market power, one has to determine how much of the market power is exercised by each of these firms.

ownership-related firms or plants operating in the same industry or market) can lead to underestimation of concentration. Fourth, although standard approaches to industrial organization (e.g., Martin 2002; Schmalensee 1989) usually assume a closed economy, the literature on small, open developing economies such as Thailand and Vietnam (e.g., Athukorarla 2006, Nikomborirak 2005, and Vu 2005) often emphasizes how the degree of competition is closely related to the degree of protection in these economies. And in Vietnam, imports and exports were both relatively large relative to sales in a wide range of industries (textiles, apparel, leather and footwear, petroleum products, electrical machinery, radio, television, and communication machinery, and precision machinery, (Ramstetter and Phan 2007a, Table 7).

The descriptive data presented above suggest a possible correlation between MNC and SOE ownership on the one hand, and concentration on the other. In the remainder of this section, the effects of ownership patterns or changes in those patterns on changes in producer concentration are examined after controlling for other factors suggested by the standard industrial organization literature (e.g., Levy 1985, p. 61). This approach specifies long-term changes in an industry's producer concentration over a period as a function of two measures of entry barriers (minimum efficient scale for a firm in an industry, the capital requirements of a minimum efficient scale firm in an industry) in the initial year, market growth during the period studied (the growth of industry sales during the period), and the level of concentration in the initial year, which reflects the adjustment toward long-run equilibrium. The entry barrier variables are all expected to be positively correlated with changes in concentration, while initial concentration is expected to be negatively correlated,

reflecting the difficulty firms face in maintaining large market shares over time.[15] Entry barriers are often expected to be higher in slower growing industries, and if this is the case, the market growth variable will be negatively correlated with changes in concentration. On the other hand, it may also be possible for large firms to expand relatively rapidly in anticipation of higher growth, and if this is the case, the correlation will be positive correlation (Levy p. 57).

Most previous studies using this approach (e.g., Levy 1985 and Sleuwaegen and Yamawaki 1988) analyze relatively long periods of about a decade or more in samples of 100-200 industries. However, the time span available (4 years) is much shorter and the industry samples (27 or 61) are much smaller. Smaller samples result because use of more detailed industry classifications would yield a number of inappropriately small industries in the Vietnamese case. Although the 27-industry sample shown in previous tables is uncomfortably small, estimates using this sample are thought to be perhaps the most realistic in the Vietnamese case. Estimates are also performed using a 61-industry sample of 3-digit VSIC industries, to check the robustness of the results to the degree of aggregation. Similarly, two measures of changes in concentration, the 4-firm concentration ratio and the change in the Herfindahl index, are used to examine the robustness of the results to alternative measures of concentration. All equations are estimated by ordinary least squares with robust standard errors because it is highly likely that the market barrier variables are a cause of heteroscedasticity.[16]

[15] This original specification is also cited in Martin's (2002) standard textbook and included a fifth explanatory variable (the advertising-sales ratio) but this variable is not available in the enterprise surveys. The ratio R&D-to sales ratio is another potential indicator of entry barriers but R&D is very small in Vietnam and the inclusion of this variable did not affect the results much and added no explanatory power to the equations.

[16] Results without robust standard errors are available from the corresponding author.

Detailed estimation results (see Ramstetter and Phan 2007a, Table 8) are omitted to conserve space, but three points regarding the results for these control variables should be emphasized. First, the estimated equations fit the smaller 27-industry sample somewhat better than the 61-industry sample, but the major qualitative results are similar across samples. Second, the two entry barrier variables are never significant at the standard 5 percent level or even at the weaker 10 percent level. Third, coefficients on sales growth and initial concentration (Table 4) are negative and significant in most estimates, and insignificant in all other equations. This suggests that producer concentration fell most rapidly in industries that experienced rapid sales growth in 2000-2004 or were relatively highly concentrated in 2000, which is consistent with the patterns observed in Tables 1 and 3.

The important point here is to add initial shares or changes in shares of both SOEs and MNCs to this basic specification and examine the effects of SOE and MNC presence, or changes in that presence, on changes in concentration. Coefficients on these variables and initial concentration are reported in Table 4. SOE shares and changes in SOE shares were both positively correlated with changes in concentration in the 27-industry regressions. These coefficients were significant at standard levels except in the Herfindahl equation which used the initial SOE share, but this relationship in question was weakly significant at the 7 percent level. In the 61-industry regressions, the relationship of changes in concentration to changes to SOE shares was also positive and highly significant but the relationship to initial SOE shares was not significant at standard levels. Changes in concentration were positively and significantly related to initial MNC shares in the 27-industry regressions and to changes in MNC shares in the 61-indsutry regressions. However relationships to

the changes in MNC shares in the 27-industry regressions and to initial MNC shares in the 61-industry regressions were insignificant.

In short, these estimates first suggest that changes in producer concentration were unrelated to initial entry barriers in Vietnamese manufacturing during 2000-2004, but negatively correlated with market growth and initial levels of concentration in most specifications. The results also suggest that correlations between changes in concentration on the one hand, and initial levels of ownership shares or changes in those ownership shares on the other hand, were either positive or statistically insignificant for both SOEs and MNCs. Significant or weakly significant and positive relationships were more common and consistent across estimates for SOE shares or their changes (6 of 8 estimates) than for MNC shares or their changes (4 of 8 estimates).

9.5 Wage Differentials and Spillovers

There is thus some evidence that SOE or MNC presence exerted a positive effect on concentration in Vietnam. Given this, how then did SOE and MNC presence, as well as concentration, affect wage levels in Vietnamese manufacturing? This section addresses this question, while the following section will take up the related issue of productivity effects. When discussing the effects of ownership on wages or productivity, it is important to distinguish direct effects that result from wage or productivity differentials and indirect effects that result from so-called wage or productivity spillovers among ownership groups.

9.5.1 Related Literature and Some Indicators of Wage Differentials

Studies of manufacturing plants in Indonesia by Lipsey and Sjöholm (2004a, 2004b, 2006) provide some of the most sophisticated evidence that MNCs pay relatively high wages even after accounting for the influences of labor quality, as well as other firm-level characteristics related to wages.[17] They also provide important evidence of positive wage spillovers and a tendency for foreign takeovers to lead to higher wages. In addition, although it is not a focal point of their analysis, Lipsey and Sjöholm's (2004a, Tables 4-5) finding that SOE plants tended to pay higher wages than locally-owned private firms is of particular importance in the Vietnamese context, though they did not test for spillovers from SOEs to private firms.

The peculiar nature of MNCs is a major reason that analysis of wage differentials and spillovers is usually focused on MNCs rather than on other ownership groups such as SOEs. For example, many theorists (e.g, Dunning 1988, 1993; Hymer 1960; Markusen 1991) argue that MNCs' tendency to possess firm-specific assets, especially intangible assets related to production techniques and processes, marketing networks, and/or management ability, in relatively large amounts is a crucial distinguishing characteristic that allows a firm to become a multinational.[18] The possession of these assets is in turn thought to make MNCs more efficient than non-MNCs. A related trait is that

[17] Lipsey and Sjöholm distinguish four types of labor by educational achievement and estimate separate equations for both white and blue collar workers. In contrast similar studies of Thailand (Matsuoka-Movshuk and Movshuk 2006, Ramstetter 2004) could not distinguish labor by educational or skill level, but were able to distinguish blue and white collar workers. Another study of Venezuela and Mexico (Aitken et al 1996) was also unable to control for worker education levels.

[18] Other theorists (e.g., Buckley and Casson 1992; Casson 1987; Rugman 1980, 1985) dispute this, asserting that internalization is the sole necessary condition for a firm to become a MNC, and that the possession of firm-specific assets is a sufficient but not a necessary condition for a firm to become a MNC. However, all agree that MNCs tend to possess these assets in relatively large amounts.

MNCs also tend to be relatively technology- and human-capital-intensive compared to non-MNCs. MNCs thus tend to pay relatively high wages because they demand relatively skilled workers and because their workers are often more efficient than in non-MNCs, which do not have access to the MNCs' intangible assets.

In addition, MNCs are often asserted to influence the performance of non-MNCs through several channels. For example, MNCs will often purchase inputs from local suppliers or subcontract certain production lines to local firms. Especially in developing countries such as Vietnam, the local supplier base is often relatively weak and the MNC must teach its local partners how to guarantee proper quality control, creating a technological spillover to the local firm involved. Labor mobility is a second avenue of spillovers from MNCs to local firms and labor mobility is often rather high in Southeast Asia's developing economies for example, especially among relatively skilled workers. The entry of MNCs can also increase the level of competition in a local market, forcing local firms to increase their efforts to become more efficient.

On the other hand, workers may also be relatively reluctant to work for MNCs and demand a premium for working in a less familiar MNC environment. A related consideration is the fact that developing economies such as Vietnam, Indonesia, and Thailand often face limited supplies of the skilled workers that MNCs often seek to hire. As a result, labor turnover is often extremely high, especially for middle- or top-level managers and technical personnel, and MNCs may pay relatively high wages as a means of reducing turnover and related training and/or adaptation costs. Although the influence of labor quality may not have been completely controlled for, the findings of Lipsey

and Sjöholm (2004a, 2004b, 2006) discussed above are particularly important in this context because they suggest that MNCs probably pay a wage premium above and beyond what is required to compensate for differences in labor quality.

In the Vietnamese case, it is also important to note that economic policies reinforce the tendency for MNCs to pay higher wages than private firms in particular (McCarty 1999, Brassard 2004). Perhaps the most important policies in this regard are those requiring MNCs and SOEs to pay relatively high minimum wages and provide more comprehensive access to social security and other non-wage forms of compensation than private firms. Moreover, MNCs are often required to pay more compensation per employee than SOEs, and wholly-foreign MNCs must pay more than joint ventures. SOE wages are also largely controlled by the state and tend to be set above market levels.

Comparisons of SOEs and other firm types are considerably different than comparisons of MNCs and non-MNCs. Economists often emphasize that the primary difference between SOEs and non-SOEs is the existence of a relatively weak profit motive in SOEs. This in turn leads to expectations that SOE managers are less motivated to foster efficiency in their firm's operations than non-SOEs and that SOEs will thus tend to be more inefficient than non-SOEs. Although rudimentary (failing to account for other influences on wages), previous industry-level evidence from Vietnam's industrial survey of 1998 data suggests SOEs generally had higher wage levels than local plants but lower levels than MNCs (Phan and Ramstetter 2004, pp. 390-391). On the other hand, the aforementioned finding of relatively high wages in Indonesia's SOEs is more difficult to explain away because the aforementioned influences are controlled for in some detail. Results from Vu

(2003) which suggest that Vietnam's SOEs "recorded a rather high level of technical efficiency, as well as a moderate improvement in technical efficiency between 1997 and 1998" (p. 87) are also more difficult to reconcile with expectations that SOEs will generally be more inefficient than non-SOEs.[19] Thus, the extent to which SOEs are more or less efficient than non-SOEs, or to which they pay higher wages, would appear to be an empirical matter. In addition, although there are no known studies trying to evaluate the extent of spillovers from SOEs, it is interesting to see if SOE presence is correlated with wages in local private firms. This evaluation is of particular interest because Vietnamese policy makers have often emphasized how SOEs should play leading roles in industry and that private firms should seek to cooperate with SOEs (Vu 2005, pp. 304-306).

Simple comparisons of wages among medium-large firms with 20 or more workers, measured as the mean total compensation per worker, suggest that MNCs paid by far the most, an average of 173 more than private firms and 95 percent more than SOEs in 2000 (Table 5).[20] However, by 2004 these compensation differentials fell markedly to 92 percent and 22 percent, respectively. On the other hand, the differential between SOEs and private firms increased slightly from 40 percent to 57 percent. In the 27 industries in Table 5, MNC-private differentials ranged widely, from 49 to 895

[19] Several surveys of the empirical literature (e.g., Aharoni 2000; Megginson and Netter 2001, and Stretton and Orchard 1994) also highlight a number of cases in which SOE do not appear to be less profitable and/or less efficient than private firms, while two of Northeast Asia's most efficient steel firms in the 1990s were a SOE (Taiwan's China Steel) and a former SOE which was recently privatized (Korea's Pohang Steel, Ramstetter and Movshuk 2005).

[20] Analyses of wages focus on slightly smaller subsets of the enterprise data excluding firms reporting non-positive labor compensation and fixed assets, in addition to firms reporting non-positive sales or employment. The analytical focus is also limited to medium-large firms because these firms accounted for 99.5 percent or more of the sales by MNCs and SOEs in these manufacturing samples and comparisons of larger MNCs and SOEs with small private firms are not though to be meaningful; note also that private firms accounted for 93-97 percent of the sales by excluded small firms in 2000 and 2004 (Ramstetter and Phan 2007b, Appendix Tables 1i-1p).

percent in 2000 and from 19 to 948 percent in 2004. There was less pronounced but substantial variation across industries for MNC-SOE and SOE-private differentials as well.[21] Despite the variation, wages still tended to be highest in MNCs, followed by SOEs, and then private firms, and these differentials generally diminished over time. There was no industry in which MNCs paid lower compensation than private firms and MNC-private differentials were 100 percent or larger in 20 of 25 industries for which comparisons were possible in 2000 and 9 of 26 in 2004. MNCs also paid higher compensation than SOEs in the vast majority of industries (23 of 24 in 2000 and 19 of 25 in 2004) and MNC-SOE differentials were 50 percent or larger in three-fourths of the industries (18) in 2000 but only one-third (8) in 2004. Meanwhile, SOE-private differentials were also positive in the vast majority of industries and the number of industries with differentials of 50 percent or larger increased from one-fourth of 24 industries in 2000 to 48 percent of 25 industries in 2004.

Thus both the industry-level data and the aggregate data suggest that (1) MNCs pay the highest compensation and differentials between MNCs and other firms (private firms or SOEs) diminished over time and (2) SOEs also pay more than private firms and SOE-private differentials widened somewhat. However, these simple comparisons ignore the fact that other firm characteristics such as capital intensity, size, and labor quality can affect wage differentials. For example, there was a very strong tendency for MNCs to use more fixed assets per worker than private firms or SOEs. By this measure, capital intensity for MNCs was on average 10 times higher

[21] MNC-SOE differentials varied between -7 and 213 percent in 2000 and between -26 and 309 percent in 2004, while SOE-private differentials varied between -10 and 338 percent in 2000 and between -16 and 221 percent in 2004.

than private firms in 2000 and 6.6 times higher than SOEs (Ramstetter and Phan 2007b, Table 3). Similar to trends in wage differentials, these capital intensity differentials fell over time but SOE-private differentials increased some. As with compensation per worker there was also wide inter-industry variation in capital intensity but there was also a strong tendency for MNCs to be the most capital intensive, followed by SOEs, at the industry level. SOEs and MNCs were also much larger than private firms, even when comparisons are limited to medium-large firms. Size differentials increased some over time as employment per firm increased in SOEs and MNCs but declined slightly in private firms.

The only measures of labor quality that are available suggest somewhat more varied patterns, however (Ramstetter and Phan 2007b, Table 4). For example, shares of science and technology workers in total employment were largest for MNCs in 2000, followed by SOEs and private firms, but SOEs had the largest share in 2004, followed by MNCs, and private firms. The share of female workers in the total was also highest in MNCs in both years, suggesting lower worker quality in MNCs because female workers are often less educated or trained than their male counterparts. There is also a tendency to pay female workers less than their male counterparts even after these differences are accounted for (Liu 2004).

9.5.2 Conditional Wage Differentials

In order to simultaneously account for the influences of these factors on wage differentials, we estimated equations that viewed compensation per employee as a function of four firm-level control

variables, capital intensity, size, skill intensity (measured as the share of science and technology workers), and the share of female workers. Coefficients on firm-level controls were almost always highly significant at the 1 percent level or better with the expected signs (negative for the share of female workers, positive for other controls; Ramstetter and Phan 2007b, Appendix Tables 5a-5b).[22] The effects of industry-level producer concentration on firm-level compensation are then investigated by adding either CR4 or the Herfindahl index for 25 of the 27 industries listed in Tables 1-4 to compensation equations.[23] Other industry-specific effects are accounted for by either including intercept dummies for seven of eight industry groups in a sample of all manufacturing firms or by doing separate estimates for these groups. These groups are defined to include industries in which multi-product firms are likely to compete with other firms in the same group.

Wage differentials can then be estimated after accounting for the influences of the firm- and industry-level controls by adding dummy variables identifying firms that were MNCs and SOEs. Table 6 reports the coefficients on these dummies (i.e., conditional wage differentials) as well as coefficients measuring the influence of concentration on wages in cross sections for 2000 and 2004.[24]

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[22] Among the industries reported in Table 6, the only exceptions were in motor vehicles and other transportation equipment group, where all coefficients were still significant at the standard 5 percent level or better, with the expected signs.

[23] Two industries, printing and publishing and petroleum products were omitted from the regression analysis because they have special characteristics that make them very different from the other manufacturing industries studied. Because the concentration variables are defined using a more detailed industrial classification than industry dummies (see note 15 below) it is possible that the coefficients on the concentration variables may also pick up other industry-related effects. It should also be noted that these concentration measures come from larger samples of all firms reporting positive sales and employment, because they are designed to include the effect of competition from smaller firms and other firms excluded from the estimation sample (e.g., firms with some missing variables or negative sales, employment, fixed assets, and employee compensation).

[24] Ramstetter and Phan (2007b, Table 5, Appendix Tables 5a, 5b) also include estimates for 2002 and full estimation details, which are omitted here to conserve space. Cross sections are used because

The results summarized in Table 6 suggests that MNCs do indeed pay higher compensation even after accounting for related firm-level characteristics, as well as differences among industry groups and the effects of concentration. Coefficients on the MNC dummy are positive and highly significant (at the 1 percent level or better) in all equations and samples for which estimates are performed. These estimates of conditional MNC-private differentials are also similar regardless of the concentration measure used but they do vary over time and among industry groups. In the equation for all manufacturing, for example, the coefficient on the MNC dummy declined from 0.49-0.50 in 2000 to 0.38 in 2004, which is consistent with the trends observed in Table 5.

There was a wide variation across industries, however, with relatively large differentials (minimum of 0.40 or more) in food, etc., chemicals, etc., non-metallic mineral products, etc., machinery, and motor vehicles, etc., and relatively small differentials (maximum of 0.30 or less) in textiles, etc., and wood, etc. Moreover, estimates for the seven industry-groups suggest that MNC-private differentials generally increased over time (food, etc. and non-metallic minerals, etc. were the two exceptions) and that changes in MNC-private differentials (a maximum change of 0.09 in wood, etc.) were relatively small. In short, these results suggest that large declines in compensation differentials observed between 2000 and 2004 in Table 5 and the relatively large declines in estimates of conditional differentials for all manufacturing firms combined largely disappear if differences among industry groups are more fully accounted for (i.e., if all slopes are allowed to vary across industries). All conditional MNC-private differentials were also much smaller than corresponding

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they are better able to answer the questions of who paid more in a single year.

differentials in Table 5, suggesting that a large part of those simple differentials are indeed related to firm-level characteristics and labor quality. It also suggests that use of more complete measures of labor quality might further reduce the conditional differentials.

Conditional SOE-private differentials (Table 6), which were negative and significant in many cases, also contrast sharply with the simple differentials in Table 5, which were usually positive. For example, in the estimates for all manufacturing combined, the SOE-private differential was -0.10 in 2000 and 0.06 in 2004. In estimates for three industry groups (food, etc., textiles, etc., wood, etc.) conditional SOE-private differentials were always negative and significant at the standard 5 percent level or weakly significant at the 10 percent level. These differentials were always positive and significant in two other industries (chemicals, etc. and motor vehicles, etc.) and positive in one of the two years in the remaining two industries. The conditional differentials were also relatively small in absolute value, which indicates that large portions of the SOE-private compensation differentials observed in Table 5 resulted from relatively high capital intensity, large size, and labor quality, and that these characteristics were sometimes important enough that negative conditional differentials are observed once their influence is accounted for.

The coefficients on producer concentration were often insignificant at standard levels suggesting little relationship between these measures of competition and compensation levels. In the equation for all manufacturing, the coefficient on the CR4 was positive and significant in both years and the coefficient on the Herfindahl index was significant in 2004. However, results from industry groups again differ markedly, with food, etc. in 2000 being the only group for which higher

concentration had a significant and positive effect on compensation. In contrast, the relationship between producer concentration and compensation was always negative in three of the industry groups examined (textiles, etc., wood, etc., and motor vehicles, etc.), as well as in 3 of 4 samples for non-metallic mineral products, etc.

9.5.3 Wage Spillovers

In addition to paying higher wages than their local counterparts, MNCs are also thought to influence compensation and wage levels in local plants through spillovers as described above. Also as described above, SOEs are purported to play a leading role in Vietnamese industry so it is interesting to see if evidence is consistent with the existence of similar spillovers originating in SOEs as well. The extent of compensation spillovers to private firms is also examined by estimating compensation per employee as a function of firm-level controls (capital intensity, size, the share of science and technology workers, and the share of female workers) and the set of seven industry-group dummies in samples of all private manufacturing firms. SOE and MNC shares of employment in the same 25 industries are added to see if large SOE and/or MNC presence in an industry has any influence on local firm wages. The coefficient on these share variables then indicates whether related spillovers are positive or negative.

Cross section results (Table 7) suggest that spillovers from MNCs and SOEs were both negligible (insignificant) in 2000, but positive and significant in 2002 and 2004. Although coefficients on all control variables were of the expected sign and highly significant at the 1 percent

level or better, the explanatory power of these equations, which are estimated for private firms only, was quite a bit lower than for the wage-differential equations which were estimated in samples including MNCs and SOEs and described in the previous section. Although these results may seem like reasonable descriptions of the relationship between wages in local firms and SOE or MNC presence at a given point in time, there is a potential for simultaneity to result in inconsistent estimates because MNCs and SOEs may be attracted to high wage industries. Thus, fixed effects panel estimates (Table 7) measure how private firm compensation changes over time after controlling for so-called unobserved firm-specific characteristics, in addition to the observable characteristics specified in equations (5) and (6). In many ways, these panel estimates are more appropriate for examining spillovers, because they focus more on the question of whether larger MNC or SOE presence leads to increases or decreases of compensation in private firms over time rather than on the cross section question of whether compensation in private firms is related to the size of MNC or SOE presence. By focusing on changes in wages rather wage levels, they are also less likely to be affected by simultaneity.

Given the different focus of the questions posed by fixed effects estimates, it is perhaps not surprising that fixed effects results differ from the cross section results in several respects.[25] First, of the coefficients on the four control variables, only the capital intensity coefficient is consistently significant at standard levels (5 percent or better) and these coefficients are positive as expected

[25] Random effects models were also estimated and Hausman tests performed to get an indication of which specification was more appropriate. These tests all indicate that the fixed effects formulation should be preferred.

(Ramstetter and Phan 2007b, Appendix Tables 6-7). Coefficients on the share of scientific and technological workers are also positive and significant at standard levels for 3-year sample and weakly significant at the 10 percent level or better for the 2002-2004 sample, but is insignificant in the 2000-2002 sample. Coefficients on size and the female share are never significant and often have signs that contradict expectations. Second, the MNC share coefficient is never significant at standard levels and is weakly significant in only one of the equations in the 3-year sample. Thus, these estimates suggest compensations spillovers from MNCs were not very strong. Third, the SOE share coefficients are highly significant in all specifications, but in contrast to the cross section results, they are negative, suggesting larger SOE presence leads private firms to reduce wages over time. Fourth, coefficients on the concentration variable are highly significant and negative in two of the three samples (2002-2004 and the 3-year sample), indicating that private firms pay more in less concentrated industries, at least in recent years.

The stark contrast between the panel and cross section results is probably closely related to differences in the questions posed by the two modes of analysis but there are also a large number of potential problems in the panel analysis that do not exist in the cross sections. However, panel analysis is very difficult for this period in Vietnamese economic history because many firms entered manufacturing or changed industries in Vietnamese manufacturing as documented in Table 2. Thus, panels covering even a short two-year period become highly unbalanced, complicating estimation and interpretation. There are also other technical problems that make the panels of questionable

reliability.[26] On the other hand, both the cross sections and the panels have potential simultaneity problems, and these problems are potentially more severe in the cross sections. Dealing with such problems is a major task for future research but is quite complicated when using these data sets.[27]

9.6 Productivity Differentials and Spillovers

There is a now a wide ranging literature examining the hypothesis that ownership modes affect the efficiency of firm operations and Vietnam is an interesting case in which to study these issues. For example, as described in the previous section, economists often assert that MNCs tend to be relatively efficient because they have relatively large amounts of technology-related proprietary assets (i.e., patents and other R&D-related knowledge), management know-how, and marketing resources. On the other hand, SOEs are often thought to be relatively inefficient because management is weakly motivated to pursue profits and thus efficiency.[28] In addition, MNCs are often though to generate spillovers that affect the efficiency of non-MNCs that are related to MNCs in some way, for example, as a supplier or purchaser of goods and services from the MNC and/or a competitor with the MNC. Similar spillovers can also be imagined in the case of SOEs in transition

[26] For example, to facilitate panel estimates, fixed assets and compensation were both deflated using sector-specific producer price indices, but classifications used in the producer price data and the firm data do not match exactly. It is also unclear if this is the best deflator for these variables by (i.e., for labor compensation, one might arguably prefer to use the consumer price index as a deflator). There are also potentially important problems with the firm codes and duplicates as described above and in Ramstetter and Phan (2007a, Appendix A), which can make the panels of limited reliability.

[27] The major problem is the inability to identify proper instruments. The inability to identify such instruments is a major reason that most previous studies of wage differentials have usually relied on single-equation estimation techniques.

[28] See Stretton and Orchard (1994) for a survey of the theoretical literature on this topic. See Jefferson (1998) for an application of the theory to issues raised by China's SOEs.

economies like Vietnam where SOEs are supposed to play leading roles in industry. The degree of competition in the market place is another key element that has long been recognized to affect the efficiency of firms and the nature of productivity spillovers.

9.6.1 Related Literature and Some Indicators of Productivity Differentials

Partially because the theoretical rationale for expecting productivity differentials among ownership modes is relatively straightforward and strong, firm- or plant-level investigations of productivity differentials among ownership modes are relatively scarce compared to the number of studies examining spillovers or the effects of privatization, for example. There are also many possible levels of aggregation when analyzing productivity differentials, spillovers, or privatization. Here we focus on the literature examining firm- or plant-level evidence because they are able to account for the influence of other related more rigorously than studies based on more aggregate (e.g., industry-, region-, or country-level) data and because they are more directly comparable to this one, which is employs firm-level data.

Even this limited comparison suggests that the existing evidence regarding the productivity differentials is not always as clear as the theory would lead one to expect. For example, studies of productivity differentials between MNCs and non-MNCs in the manufacturing sectors of Malaysia (Oguchi et al 2002) and Thailand (Ramstetter 2004, 2006) suggest that differentials tended to be relatively small and were often statistically insignificant in the latter case. Other evidence from Malaysia (Menon 1998, Oguchi et al. 2002) indicates that the growth of total factor productivity

(TFP) was often less rapid in MNCs than non-MNCs. Evidence from Indonesia suggests productivity differentials were somewhat larger, and always statistically significant in samples of all manufacturing plants combined (using industry dummies), but here again the differentials become statistically insignificant in a number of cases when plants are disaggregated by industry (allowing for differences in production function slopes, as well as the constant, Takii 2006). The only known evidence for China also suggests significant differences in both capital- and labor-productivity when all manufacturing firms are combined into one sample (Jefferson and Su 2006). Meanwhile, alternative evidence shows that takeovers of SOEs by MNCs have generated the larger productivity gains than takeovers by locally owned private companies in Eastern Europe (Brown et al., 2004, 2005), which suggests MNCs are best able to improve the productivity of their takeover targets.

Direct evidence regarding differences between SOEs and non-SOEs is also rather limited and understandably focused on transition economies like China and those in Eastern Europe. For China, Jefferson and Su's (2006) results indicate that capital- and labor-productivity were significantly lower in SOEs than private firms or MNCs, who had the highest productivity by both measures. They go on to indicate that conversion of SOEs to shareholding corporations contributed to increases in productivity. Results from Brown et al (2004, 2005) suggest that privatization resulted in relatively large productivity gains in manufacturing firms in Hungary and Romania, but a relatively small one in Ukraine and declines in productivity in Russia. Evidence from a sample of firms in 25 transition economies located Eastern Europe, the Commonwealth of Independent States (CIS), and Central Asia also suggests that the degree of competition had a key impact on privatization outcomes (Carlin

et al 2001). The survey by Djankov and Murrell (2002) reinforces this finding in the case of Eastern Europe, but not in the case of the CIS. The one known rigorous study of privatization in Vietnam (Truong et al 2006) is also consistent with the proposition that privatization improves firm performance but Nguyen's (no date; 2004) focused study of textiles and apparel found that SOEs are more efficient than locally owned private firms but less efficient than MNCs in this industry.[29]

Thus, most of this evidence seems consistent with the conclusion of Megginson and Netter's (2001, p. 380) survey that "Research now supports the proposition that privately owned firms are more efficient and more profitable than otherwise-comparable state-owned firms". However, these studies, as well as earlier surveys by Aharoni (2000), and Stretton and Orchard (1994) also highlight a number of cases in which SOE do not appear to be less profitable and/or less efficient than private firms. Thus, although the general extent and direction of productivity differentials between SOEs and non-SOEs seems to be somewhat clearer than of those between MNCs and non-MNCs, the size and directions of both differentials would still seem to be an empirical matter.

The productivity spillover literature is now quite vast and focuses on the ability of MNCs to influence the performance of non-MNCs through several channels as described in the section on wages. The empirical analysis of spillovers has generated varied results, with some researchers emphasizing the mixed evidence regarding such spillovers. For example, the review by Görg and

[29] Vu (2003, p. 87) also suggests that Vietnam's SOEs "recorded a rather high level of technical efficiency, as well as a moderate improvement in technical efficiency between 1997 and 1998". Industry-level evidence from Vietnam's industrial survey of 1998 data also suggests SOEs generally had higher labor productivity and wage levels than local plants but lower levels than MNCs (Phan and Ramstetter 2004, pp. 390-391). In a study closely related to this one, Ramstetter and Phan (2007b) also found MNCs paid the highest wages followed by SOEs and private firms, but that there were no wage spillovers from MNCs to other firms.

Greenaway (2003, p. 7) emphasizes results of six studies for manufacturing industries in Venezuela, Spain, the Czech Republic, Bulgaria, and Romania which suggest that productivity spillovers were negative in these economies. They also point to another 11 studies suggesting that productivity spillovers were statistically insignificant in a wide range of economies and emphasize that spillovers have generally been negative or negligible in transition economies such as Vietnam. On the other hand, there is growing evidence consistent with the existence of positive productivity spillovers in several Asian economies such as China (Buckley et al.2006, 2007; Hale and Long 2006, Tong and Hu 2003), Indonesia (e.g., Lipsey and Sjöholm 2005; Takii 2006), and Thailand (Kohpaiboon 2006, Ramstetter 2006). Kohpaiboon's study of Thai manufacturing also highlights how spillovers tend to be higher in industries where competition is relatively strong and Kokko (1996) emphasizes how competition between MNCs and local firms appears to have fostered relatively large productivity spillovers in Mexico.

We know of no previous studies analyzing the extent of productivity spillovers from SOEs, probably because SOEs are not thought to possess the firm-specific assets and related competitive advantages that MNCs are hypothesized possess.[30] On the other hand, at least in the Vietnamese case, there has clearly been a tendency for the government to regulate the behavior of locally owned private firms more in industries with a large SOE presence than in others.[31] Because many of the regulations encourage inefficiency, we think it is reasonable to hypothesize that large SOE presence

[30] Note, however, Gabriele (2001) does discuss the possibility of positive productivity spillovers from SOEs in China.

[31] See Ramstetter and Phan (2007a, pp. 3-8) for details on the Vietnam's Enterprise Law and related reforms. See Van Arkadie and Mallon (2003) and Vu (2005) for more details on these subjects.

may be correlated with lower efficiency in local firms, creating the possibility of negative spillovers. Evaluation of this possibility is of particular interest in Vietnam because policy makers have often emphasized how SOEs should play leading roles in industry and that private firms should seek to cooperate with SOEs (Vu 2005, pp. 304-306).

In Vietnamese manufacturing, simple calculations suggest large changes in average productivity differentials among ownership groups between 2000 and 2004. For example, in 2000, the MNC-private differential for mean value added per worker was 255 percent but by 2004, this differential fell to 180 percent (Table 8). The number of industries with MNC-private differentials of 200 percent or more also decreased from 10 of 25 to 7 of 26, but the number of industries in which these differentials were 100 percent or more was constant at 16. In other words, average labor productivity was clearly much higher in MNCs than in private firms (SOEs) during this period, both in the aggregate and at the industry level, though there was some reduction in these differentials over time. In contrast, the SOE-private differential for all manufacturing firms increased from 9 to 82 percent, respectively as SOE-private differentials were negative in 15 of 24 industries in 2000 but became positive in 16 of 25 in 2004. Moreover, the number of industries with SOE-private differentials of 50 percent or more increased from five to eight. Meanwhile, MNC-SOE differentials were also substantial, exceeding 50 percent in 18 of 24 (2000) or 17 of 25 (2004) industries.

Although this partial measure suggests that labor was more efficient in MNCs and SOEs than in private firms, the reverse pattern is generally observed when average capital productivity is

calculated as the value added-fixed ratio (Table 9).[32] For example, when the mean of all manufacturing firms is calculated, the MNC-private differential was -87 percent in 2000 and -47 percent in 2004, while SOE-private differential was -73 percent in 2000, before increasing to a positive 36 percent in 2004. MNC-private differentials were also negative in the vast majority of industries, 24 of 25 in 2000 and 23 of 26 in 2004. In the case of SOE-private differentials, industry patterns differed from the aggregate, with differentials remaining negative for 21 of 24 industries in 2000 and for 19 of 24 in 2004. The discrepancy is partially related to the emergence of a very large positive differential in fabricated metals in 2004. Similarly, MNC-SOE differentials (-53 to -61 percent) were negative when the mean for all manufacturing firms is calculated. This contrasts with the increase in the number of industries with positive differentials from 7 to 14 (out of a total of 24). In short, there appears to be a relatively large industry-wise variation in average capital productivity. Patterns of average labor productivity and average capital productivity of course reflect a strong tendency for MNCs to use more fixed assets per worker than private firms and a smaller capital intensity differential between SOEs and private firms (Ramstetter and Phan 2008, Table 3). Differences in size and skill intensity described in the wage section are also likely to affect productivity as well.

9.6.2 Conditional Productivity Differentials

As with the analysis of wages, the primary drawback of the simple comparisons in the

[32] These patterns are broadly consistent with patterns observed in plant-level data for 1998 (Phan and Ramstetter 2004).

previous section is that it provides only partial perspectives on productivity differentials, which are difficult to sort out from firm-level differences in factor intensities and size, for example. The most common approach to evaluating more general differences in productivity is to estimate a production function and then recalculate the productivity differentials after accounting for the level of factor inputs, which in turn reflects firm-level differences in factor intensities and size. If output is defined as value added, it is common to view the natural logarithm of value added as a function of natural logs of labor and capital inputs, using one of three functional forms: (1) Cobb-Douglas, (2) constant elasticity of substitution (CES) or (3) translogarithmic (translog). This constant in this equation reflects productivity not explained by variation in labor and capital, and is commonly called total factor productivity (TFP). This interpretation can be problematic, however, because the constant not only reflects productivity after accounting for the use of capital and labor, but also reflects errors in measurement and specification, which can be substantial. Nonetheless, this approach is rather standard in the literature and has been adopted by most of the studies reviewed in Section 2. Because we have no better alternative to offer, this approach is adopted here as well.

In addition to accounting for the influences of generic labor and capital, it is also common to account for differences in labor quality among firms by specifying two or more types of labor inputs. In Vietnam, the data also suggest that distinguishing firms with a relatively large number of science and technology workers is important. However, there are a very large number of firms with no science and technology workers. Thus, this variable cannot be used as an independent factor of production because the log of zero is undefined. Rather the effects of skilled-labor intensity are

proxied by entering the share of science and technology workers as a shift factor (in linear form) in the production function. This also helps minimize potential problems related to multicollinearity.

In addition, the effects of producer concentration on productivity are investigated by adding either the 4-firm concentration ratio or the Herfindahl index for 25 of the 27 industries listed in Tables 1-3 to these production functions.[33] Dummy variables for MNCs and SOEs are then added, their coefficients revealing whether any ownership-related TFP differentials remain after accounting for these various firm- and industry-level characteristics.

In addition, the influence of industry concentration, it is also important to account for generic, industry-specific differences in technology. This is done in two ways. The first rather restrictive approach is to include intercept dummy variables for seven of eight industry groups when estimating equations for all manufacturing firms. A more flexible approach that allows slope coefficients to differ across industry groups is also tried by doing separate estimates for the seven major groups. Because the primary goal is to examine productivity differentials at a given point in time, the estimates are best done in simple cross sections, and major results of concern here (coefficients on the ownership and concentration variables) are reported for 2000 and 2004 in Table 10.[34]

The basic production functions performed in line with the expectations outlined above with

[33] Here again two industries, printing and publishing and petroleum products, were omitted from the regression analysis because they have special characteristics that make them very different from the other manufacturing industries studied. As in the wage analysis, the concentration measures come from larger samples of all firms reporting positive sales and employment, because they are designed to include the effect of competition from smaller firms and other firms excluded from the estimation sample (e.g., firms with some missing variables or negative value added).

[34] Estimates were also performed for 2002, but are omitted here to conserve space (see Ramstetter and Phan 2008, Table 4, Appendix Table 4).

coefficients on labor, capital, and the share of science and technology workers being positive and significant at the standard 5 percent level or better in all equations examined for these seven industries and total manufacturing combined (see Ramstetter and Phan 2008, Appendix Table 4 for details). In the translog equations, the coefficients on labor-squared term and the interaction term was generally insignificant but the capital-squared was usually significantly positive. The fit of the equations was also satisfactory for cross section estimates of this nature and the translog was the preferred functional form in all but a few cases.[35] Thus, cross section estimates of equations (1) to (4) appear to be useful for examining productivity differentials and the effect of producer concentration on productivity.

The results in Table 10 first suggest that MNC-private differentials were usually statistically insignificant at the standard 5 percent level. In estimates for all manufacturing firms combined, these differentials were significantly positive in both 2004 equations, but insignificant in 2000. Both the CR4 and Herfindahl equations also suggested significantly positive MNC-private differentials in all years for textiles, etc. On the other hand, significantly negative differentials were observed in 2000 and in wood, etc. and non-metallic mineral products, etc. However, MNC-private differentials were insignificant at the standard 5 percent level in four of seven industries in 2000 and in six industries in 2007.[36] Results for SOE-private differentials were negative in all cases where they were statistically

[35] The exceptions were in food, etc., for 2000 and chemicals, etc., for 2004.

[36] There were four equations in which they were weakly significant if a lower 10 percent level is used. These are the negative differentials in the 2004 *HF* equation for wood, paper, and furniture (in the C4 equation it was significant at the slightly lower 11 percent level) and in the 2000 *C4* equation for miscellaneous manufacturing and recycling, as well as the positive differentials for both 2004 equations in chemicals, rubber, and plastics.

significant, all manufacturing in 2000 and four of the seven industries (food, etc., wood, etc., non-metallic mineral products, etc., and machinery) in both years (Table 10). However, these differentials were also insignificant in most of the estimated equations (26 of 48). Thus, significant productivity differentials were generally less common than significant wage differentials.

The effects of concentration on productivity were more consistently significant than MNC-private or SOE-private differentials, but the direction of concentration's effects varied among industry groups. Results for all manufacturing suggest a positive relationship between productivity and concentration, which was significant in the CR4 equations for all years but the relationship was significant for only one year (2000) in the Herfindahl equations. At the industry group level, consistently positive and significant relationships were never observed but consistently negative relationships were observed in three industry groups: textiles, etc., machinery, and motor vehicles etc. It is highly possible that the concentration variables are picking up other industry-specific effects in the industry-group equations, but the large differences in production function estimates across industry groups also suggest that the industry-group estimates capture technological characteristics better than the equations for samples of all manufacturing firms.

9.6.3 Productivity Spillovers

Similar to the analysis of wage spillovers, the extent of productivity spillovers to private firms is thus examined by estimating the basic production functions including the skilled labor share and industry-level concentration for samples of local firms and adding SOE and MNC shares of industry

employment. Here the primary interest is in coefficients on concentration and ownership shares, which reveal how concentration and MNC and/or SOE presence affects local firm productivity. Following the usual practice, these equations are estimated in samples of all manufacturing industries and equations for individual industry groups are not estimated here.[37]

A summary of major cross section results (Table 11) suggests that spillovers from MNCs were consistently positive in all years. These results also suggest that spillovers from SOEs were statistically significant in 2000 and 2002, but became insignificant in 2004. All of these results come from translog specifications, which were again found to be superior to Cobb-Douglas specifications (Ramstetter and Phan 2008, Appendix Table 5). In the equations for local firms, signs and significance levels for coefficients on labor, capital, their squares, and the share of science and technology workers were all the same as in the previous equations for all firms, but the coefficient on the interaction term was insignificant in all private-firm equations. These results suggest qualitatively similar technology in the samples of private firms and of all firms. However, the explanatory power of equations for private firms was quite a bit lower than that of equations for all firms. Moreover, although these results may seem like reasonable descriptions of the relationship between productivity in local firms and SOE or MNC presence at a given point in time, as in the wage spillover analysis there is a potential for simultaneity to result in inconsistent estimates because MNCs and SOEs may be attracted to industries where productivity is high.

Fixed effects panel estimates measure how private firm productivity changes over time after

[37] This failure to account for inter-industry-group variation in spillover effects is one of the limits imposed by the commonly used methodology, but there is no practical alternative we are aware of.

controlling for so-called unobserved firm-specific characteristics, in addition to the observable characteristics specified in the production functions. Again as in the wage spillover analysis, fixed effects estimates are in many ways more appropriate for examining spillovers, because they focus more on the question of whether larger MNC or SOE presence leads to increases or decreases of productivity in private firms over time, rather than on the cross section question of whether productivity in private firms at a given point in time is related to the size of MNC or SOE presence. And here as well, by focusing on changes over time rather than productivity levels, they are also less likely to be affected by simultaneity problems.

And again as in the wage spillover analysis, fixed effects results differ from the cross section results in several respects.[38] First, Cobb-Douglas restrictions cannot be rejected at the 5 percent level in 2000 and 2004 (Ramstetter and Phan 2008, Appendix Table 6). Second, coefficients on the share of scientific and technological workers are positive and significant at standard levels only in the 3-year sample, weakly significant at the 10 percent level or better for the 2002-2004 sample, but insignificant in the 2000-2002 sample. These results both suggest marked differences in the determinants of productivity changes and of productivity levels. Third, coefficients on the MNC share are never significant at standard levels or even weakly significant. Thus, these estimates suggest that the null hypothesis of no productivity spillovers from MNCs cannot be rejected. Fourth, SOE share coefficients are negatively significant in all specifications, suggesting larger SOE

[38] Random effects models were also estimated and Hausman tests performed to get an indication of which specification was more appropriate. These tests all indicate that the fixed effects formulation should be preferred.

presence leads to lower productively in private firms.

Fifth, coefficients on the concentration variable are highly significant and negative both equations for 2002-2004. For 2000-2002 this coefficient is positive and significant in the Herfindahl equation, but only very weakly significant at the 13 percent level in the CR4 equation. Given the opposing results for the two sub-periods, it is not surprising that this coefficient is insignificant in both 3-year equations. In short, there is no consistent pattern between concentration and changes in the productivity of local firms.

Thus, here again, major results obtained from panel estimates contrast starkly with the cross section results. And here again, there are a number of potential problems in the panel analysis that do not exist in the cross sections and demand particular caution when interpreting these results. As indicated above, the largest problem results from the fact that a number of firms entered manufacturing or changed industries in Vietnamese manufacturing over this period, making panels covering even a short two-year period become highly unbalanced.[39] As in the wage analyses, both the cross sections and the panels have potential simultaneity problems, and these problems are probably more severe in the cross sections. Dealing with such problems is a major task for future research but is quite complicated when using these data sets.[40]

[39] As described in the wage section, problems related to deflation of fixed assets and productivity with sector-specific producer price indices and firm codes may make the panels of limited reliability.

[40] Again, as in the wage analyses, the major problem is the inability to identify proper instruments. The inability to identify such instruments is a major reason that this study and most previous studies of productivity differentials have usually relied on single-equation estimation techniques.

9.7 Conclusion

This chapter began by emphasizing how the 2000 Enterprise Law, and subsequent revisions to this law and related investment laws, unified laws and regulations governing various types of firms (e.g., SOEs, private firms, MNCs) and removed many of the legal and regulatory barriers that previously constrained the growth of private business. The paper then analyzed changes in ownership structure, emphasizing the large increase in the sales of private firms in 2000-2004 and the fact that private firms tended to be extremely small compared to SOEs or MNCs.

After describing the large role of new competitors, the chapter then showed how producer concentration has fallen in a wide range of industries after 2000. In this respect, the Enterprise Law and its implementation have apparently achieved one of its more important aims, to stimulate the level of competition in Vietnam. Econometric analyses then indicated that large SOE or MNC presence, or increases in the SOE or MNC presence, did not lead to increased competition in Vietnamese manufacturing during this period and may have led to decreased competition. There is an important and straightforward implication of this finding for competition policy. Namely, anti-trust authorities need to pay particular attention to the potential for SOEs and MNCs to exercise market power and extract related rents in Vietnamese manufacturing. This is a rather well-known finding for MNCs, who are known to operate in imperfectly competitive markets. It also seems sensible for SOEs as well because casual observation suggests that regulations often impede competition in SOE-dominated markets as well. However, as with most anti-trust related issues, it is impossible to make general conclusions that are more specific than this. A key problem in the

Vietnamese case is the large role played by international trade and import protection. In this respect, it would be desirable to include changes in trade ratios and tariff levels as explanatory variables as Sleuwaegen and Yamawaki (1988) did for several European firms.[41] We must also emphasize that the observation of positive correlations between MNC or SOE presence or changes in that presence and changes in producer concentration does not imply that Vietnam should restrict or even regulate investing MNCs or SOEs because increased concentration can also lead to increased efficiency. Rather, it simply indicates that Vietnam's policy makers should be aware that MNC and SOE presence can raise anti-trust issues, and that they should carefully evaluate the performance of these firms in the same way they evaluate large firms and anti-competitive practices in general.

One indication of how MNCs and SOEs contribute to the Vietnamese economy emerges from subsequent analyses of wage differentials between these firms and private firms, as well as wage spillovers from them to private firms. Simple comparisons of wage levels suggest that MNC-private and SOE-private wage differentials were generally positive. MNC-private differentials were largest but declined over time, while SOE-private differentials were smaller but increased over time. More rigorous analysis suggests conditional wage differentials were generally much smaller after a number of related firm- and industry-level characteristics are controlled for. The influence of these controls was so large that conditional SOE-private differentials were negative in 2000 and much smaller, though positive in the 2004 sample. Similar to simple differentials, conditional MNC-private

[41] Lack of trade data for 2004 and difficulties with constructing a concordance between commodity-level trade and tariff data and the firm-level sales data (see Table 7) have prevented inclusion of these variables in this study. We hope to address this problem in a future study.

differentials were always significantly positive and declined somewhat overtime, but the conditional differentials were generally much smaller. Producer concentration was positively related to compensation levels, but that this relationship was not always significant depending on the year or measure of concentration used. Fourth, more detailed analysis suggests that the results regarding SOE-private differentials and concentration varied greatly among industry groups. The results regarding MNC-private differentials are thus consistent with evidence from previous studies of other Southeast Asian economies and with expectations created by Vietnam's policy of requiring MNCs and SOEs to pay relatively high wages. On the other hand, the results regarding SOE-private differentials are perhaps surprising because they suggest that SOEs often do not pay relatively high wages once controls such as capital intensity or firm size are considered.

The possibility that SOEs and MNCs generated spillovers that affected wages levels in Vietnam's rapidly growing private sector was also examined. Simple cross sections and suggested little effect of SOE or MNC presence on local firm compensation in 2000, but that larger SOE and MNC presence both led to higher compensation in private firms in 2002 and 2004. On the other hand, fixed effects panel estimates suggested that MNC presence did not have a strong effect on changes in private firm compensation during the period studied. Moreover, the fixed effects evidence suggests that increases in private firm compensation tended to be relatively low in industries with large SOE presence or high producer concentration. This in turn suggests that further efforts to spur competition and privatization of SOEs are likely to result in relatively rapid growth of worker incomes in Vietnamese manufacturing.

Simple calculations indicate that MNCs and SOEs also had substantially higher labor productivity and lower capital productivity than local, private firms. After controlling for the effects of factor intensities and producer concentration in samples of all manufacturing firms combined, total factor productivity differentials were negative for SOEs in 2000 and positive for MNCs in 2004, but statistically insignificant in other years. When seven major, broadly defined industry groups are distinguished, results varied markedly, however. SOE-private differentials were usually statistically negative in four industries, while MNC-private differentials were consistently significant and positive in one. Producer concentration and productivity were usually positively correlated in samples of all manufacturing firms but negatively significant correlations were more common than positively significant correlations at the industry level. Cross section estimates indicate that larger MNC and SOE presence was generally associated with higher productivity in private firms. However, fixed effects panel estimates, which examine the question of how SOE and MNC presence affected changes in private firm productivity over time, suggest that productivity in private firms tended to fall relatively rapidly in industries where SOEs were large, while MNC presence had no significant effect. Producer concentration also had no significant effect if all three years are combined, but varied effects in the two two-year combinations.

There are a number of potentially important problems with these rather standard estimates, and this creates a relatively long list of tasks for future research. First, these results have suggested that the results vary greatly across industry groups and experimentation with alternative definitions is an important robustness test that should be undertaken. Second, one could also try to stratify the samples

by the degree of concentration, though initial efforts to do this were not very successful. Third, there are potentially important simultaneity problems in all of the estimated equations, which should be addressed. Fourth, this study has not excluded outliers from the estimation samples because it is believed that the outliers often contain important information that should not be thrown away, but this assumption should certainly be reexamined. Fifth, although we have done a lot work cleaning these large data sets, there are clearly a number of remaining errors and further work to remove erroneous observations is certainly warranted. Redoing these analyses using revisions to our data sets and data sets for newer years would be important steps in this direction. Sixth, the study has emphasized the rapid changes of ownership patterns and concentration in Vietnamese manufacturing during the period under study. Although this is thus an extremely interesting period to study, these large changes make it very difficult to interpret many econometric and descriptive results, especially the results of fixed panel estimates. Moreover, because the pace of change inevitably has to slow some, it will be very important to revisit these issues after the pace slows. In other words, one must be very cautious when generalizing from these results.

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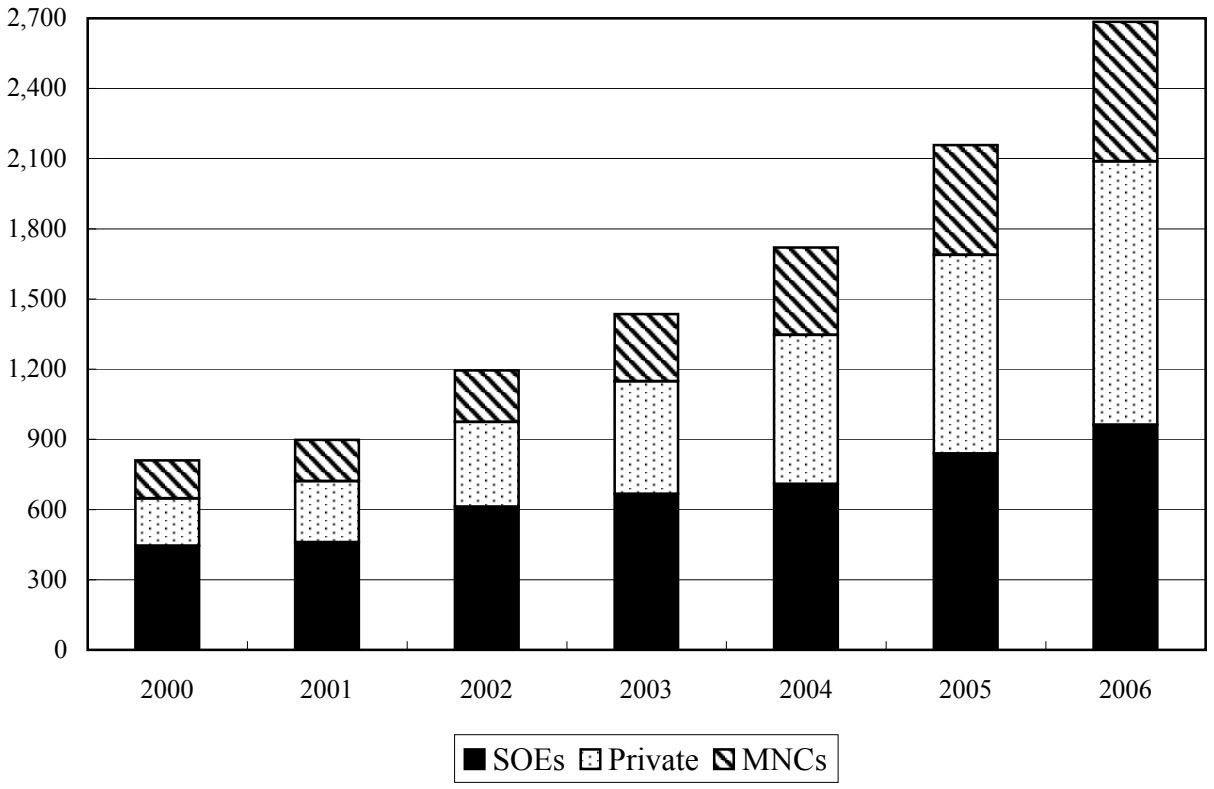
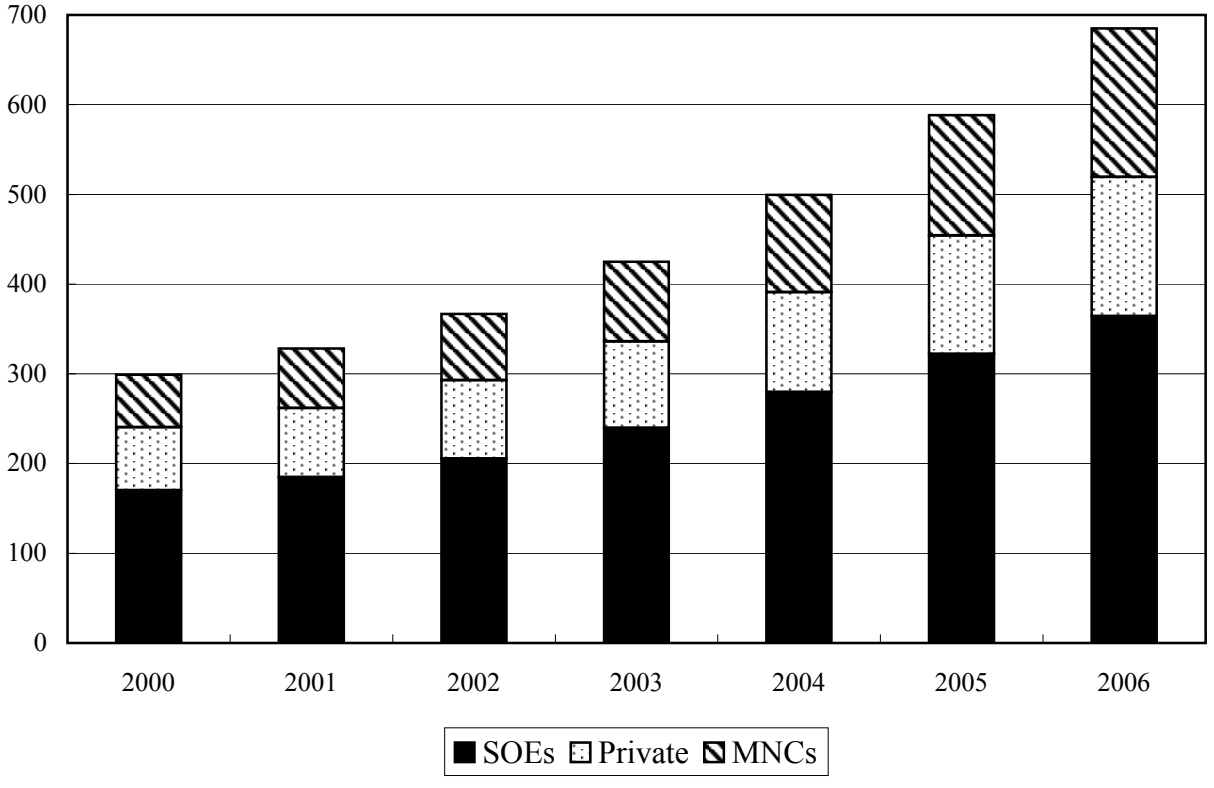
Figure 1: Enterprise Sales by Ownership (current trillion dong)



Source: Vietnam, General Statistics Office (various years a).

Figure 2: Non-Household GDP by Ownership (current trillion dong)



Source: Vietnam, General Statistics Office (various years c).

Table 1: Sales of Firms with Positive Employment and Sales(trillion dong)

	SOEs		Private		MNCs	
Industry	2000	2004	2000	2004	2000	2004
Manufacturing	94.03	176.87	50.53	179.80	101.76	266.04
Food products	25.91	35.37	21.49	57.84	15.22	36.24
Beverages	3.02	7.76	0.84	2.72	3.77	7.08
Tobacco	5.02	12.92	0.04	0.07	0.07	0.09
Textiles	6.06	8.81	1.88	6.07	5.14	9.87
Apparel	5.47	9.91	2.09	7.67	3.98	12.21
Leather	0.10	0.16	0.21	0.91	0.58	2.55
Footwear	2.45	2.32	2.33	4.63	8.65	22.28
Wood products	1.60	1.94	1.81	5.54	1.01	3.00
Paper products	4.07	3.51	2.31	7.51	0.88	3.35
Publishing	3.78	7.93	0.22	1.98	0.05	0.24
Petroleum products	0.00	0.09	0.27	0.64	0.64	0.97
Chemicals	8.99	14.47	2.05	8.43	7.39	22.35
Rubber products	1.37	3.60	0.41	2.51	0.79	2.19
Plastics	1.21	3.80	3.08	11.15	2.48	7.77
Non-metallic mineral prod.	10.67	21.80	2.50	10.80	5.55	10.36
Basic metals	2.85	9.43	1.07	9.80	4.27	9.48
Fabricated metals	1.71	3.35	2.22	14.80	3.41	9.76
General machinery	1.78	3.05	0.53	4.00	2.20	6.39
Office & computing machinery	0.00	0.00	0.01	0.21	8.49	9.79
Electrical machinery	2.17	10.60	0.93	4.40	4.22	14.16
Radio, television & commun. mach.	1.48	1.80	0.19	1.38	5.58	13.83
Precision machinery	0.10	0.14	0.18	0.50	0.77	2.09
Motor vehicles	0.82	3.56	0.53	1.58	4.86	21.16
Other transport equipment	3.02	8.04	1.39	4.85	9.30	26.72
Furniture	0.33	2.17	1.29	7.82	0.59	7.41
Miscellaneous manufacturing	0.04	0.33	0.62	1.80	1.88	4.69
Recycling	0.00	0.00	0.03	0.18	0.00	0.01
ADDEDNDUM: Sample comparisons for mining, manufacturing, and utilities						
These samples	119.93	235.96	51.15	183.42	144.08	337.65
Published estimates	119.91	224.37	51.15	184.01	144.08	334.42

Note: Samples include firms reporting positive employment and sales.
Source: Vietnam, General Statistics Office (various years a, various years b)

Table 2: New Entrants' and Exiting Firms' Shares of Total Sales by Firms with Positive Employment and Sales (percent)

	New Entrants 2001-2004, Shares in 2004			Exiting Firms 2001-2004, Shares in 2000		
Industry	SOE	Private	MNC	SOE	Private	MNC
Manufacturing	35.41	64.88	37.79	33.19	32.55	13.84
Food products	39.82	56.90	46.08	38.77	35.82	31.92
Beverages	21.52	61.89	10.20	29.35	42.67	15.77
Tobacco	31.59	68.98	40.25	36.44	65.71	68.35
Textiles	14.21	54.23	31.06	16.28	33.19	3.23
Apparel	48.58	74.47	64.63	59.82	37.85	11.47
Leather	77.02	82.44	70.22	21.06	31.45	5.49
Footwear	49.48	23.84	29.42	49.95	18.93	7.15
Wood products	35.73	69.69	72.23	27.75	33.02	28.56
Paper products	41.15	54.87	28.93	48.94	21.67	15.35
Publishing	34.37	92.45	76.01	40.04	64.87	39.34
Petroleum products	100.00	80.24	0.00	-	75.05	0.00
Chemicals	46.10	62.68	32.55	33.57	21.60	16.77
Rubber products	32.01	75.92	26.39	3.12	50.54	7.92
Plastics	16.83	56.70	43.34	16.41	30.05	6.29
Non-metallic mineral prod.	35.94	66.99	19.11	14.86	23.52	8.81
Basic metals	16.18	93.46	41.90	6.35	37.73	30.43
Fabricated metals	43.53	77.15	41.73	41.87	37.71	8.94
General machinery	48.33	84.56	23.16	34.23	37.11	4.64
Office & computing machinery	-	100.00	34.80	-	100.00	0.24
Electrical machinery	4.10	52.88	17.75	4.04	21.67	4.15
Radio, television & commun. mach.	46.67	81.96	43.43	36.49	33.09	11.60
Precision machinery	90.52	38.20	34.91	79.17	5.62	6.61
Motor vehicles	55.55	92.75	33.19	41.20	5.34	11.04
Other transport equipment	51.37	82.24	38.28	47.21	46.65	18.38
Furniture	93.60	68.02	81.75	49.87	24.39	3.02
Miscellaneous manufacturing	64.11	72.67	37.04	16.08	15.09	2.95
Recycling	-	98.79	100.00	-	97.23	-

Note: New competitors consist of 14,238 new entrants and 885 firms changing industrie into manufacturing categories; see Ramstetter and Phan (2007a, Appendix Tables 6a-6c for more information on these firms and the 4,538 exiting firms.
Source: Vietnam, General Statistics Office (various years b)

Table 3: 4-Firm Concentration Ratios (CR4) and Herfendahl Indexes (HF) for Firms with Positive Sales and Employment

	CR4 (percent)			HF (index)		
Industry	2000	2004	change	2000	2004	change
Manufacturing (mean of industries)	42	35	-7	0.115	0.063	-0.052
Food products	13	10	-3	0.009	0.006	-0.003
Beverages	42	52	10	0.063	0.097	0.034
Tobacco	61	75	14	0.123	0.161	0.039
Textiles	25	19	-6	0.027	0.018	-0.008
Apparel	21	15	-6	0.018	0.010	-0.008
Leather	40	44	4	0.057	0.041	-0.017
Footwear	36	36	0	0.047	0.050	0.003
Wood products	21	11	-10	0.018	0.009	-0.010
Paper products	45	18	-27	0.075	0.019	-0.056
Publishing	26	26	0	0.027	0.022	-0.005
Petroleum products	91	81	-10	0.278	0.195	-0.084
Chemicals	25	19	-6	0.026	0.021	-0.005
Rubber products	48	35	-13	0.068	0.046	-0.022
Plastics	18	17	-1	0.017	0.007	-0.010
Non-metallic mineral prod.	26	17	-9	0.027	0.013	-0.014
Basic metals	51	38	-13	0.082	0.047	-0.035
Fabricated metals	13	10	-3	0.012	0.007	-0.005
General machinery	43	35	-8	0.060	0.035	-0.025
Office & computing machinery	100	98	-2	0.992	0.479	-0.513
Electrical machinery	29	34	5	0.037	0.024	-0.013
Radio, television & commun. mach.	42	40	-2	0.074	0.049	-0.025
Precision machinery	62	48	-14	0.123	0.093	-0.030
Motor vehicles	48	41	-7	0.105	0.075	-0.030
Other transport equipment	51	43	-8	0.109	0.062	-0.047
Furniture	20	13	-7	0.021	0.009	-0.012
Miscellaneous manufacturing	39	24	-15	0.057	0.025	-0.032
Recycling	100	53	-47	0.554	0.082	-0.472

Note: Samples include firms reporting positive employment and sales; for C4 and HF m
Source: Vietnam, General Statistics Office (various years b, various years d)

Table 4: The Effects of Initial Concentration and Initial Ownership Shares or Changes in Ownership Shares on Changes in Producer Concentration 2000-2004, after Controlling for the Effects of Minimum Efficient Scale, Absolute Capital Requirements, and the Growth of Sales

	CR4 Equations				Herfindahl Equations			
	Specification 1		Specification 2		Specification 1		Specification 2	
Indicator	Value	p-value	Value	p-value	Value	p-value	Value	p-value
Estimates for 27 2&3-digit Manufacturing Industries								
Concentration in 2000	-0.195	0.07	-0.338	0.00	-0.615	0.00	-0.746	0.00
SOE share in 2000	0.373	0.02	-	-	0.118	0.07	-	-
Change in SOE share 2000-04	-	-	0.940	0.01	-	-	0.296	0.01
MNC share in 2000	0.405	0.01	-	-	0.144	0.00	-	-
Change in MNC share 2000-04	-	-	0.255	0.16	-	-	0.077	0.21
Estimates for 61 3-digit Manufacturing Industries								
Concentration in 2000	-0.057	0.22	-0.100	0.03	-0.276	0.00	-0.337	0.01
SOE share in 2000	0.017	0.83	-	-	-0.072	0.59	-	-
Change in SOE share 2000-04	-	-	0.419	0.00	-	-	0.652	0.01
MNC share in 2000	-0.132	0.22	-	-	-0.226	0.16	-	-
Change in MNC share 2000-04	-	-	0.409	0.00	-	-	0.629	0.01

Note: Specification 1 uses initial values of ownership variables as independent variables; specification 2 2 uses changes in ownership variables; see the source for estimation details.
Source Ramstetter and Phan (2007a, Appendix Tables 8a, 8b)

Table 5: Mean Compensation per Worker in Medium-Large Firms (million dong)

	SOEs		Private		MNCs	
Industry	2000	2004	2000	2004	2000	2004
Manufacturing, firm mean	10.23	16.99	7.30	10.81	19.90	20.77
Manufacturing, 27-industry mean	10.76	18.31	7.65	12.00	22.44	27.32
Food products	8.46	12.13	6.74	9.49	18.24	21.79
Beverages	8.80	17.05	7.36	10.59	25.90	38.29
Tobacco	21.53	35.30	4.91	11.01	20.00	44.20
Textiles	8.06	12.44	5.14	8.65	13.99	16.09
Apparel	6.92	10.93	7.48	10.92	12.96	13.59
Leather	10.68	12.20	7.53	11.35	11.25	16.03
Footwear	6.07	9.70	6.78	9.36	13.10	13.86
Wood products	7.18	10.19	5.92	8.33	9.77	15.26
Paper products	10.31	14.31	8.02	11.73	17.37	18.81
Publishing	15.45	24.23	7.84	13.19	21.25	19.47
Petroleum products	-	32.30	9.09	12.60	90.39	132.10
Chemicals	13.37	23.33	9.70	14.57	33.44	41.44
Rubber products	12.69	18.41	9.00	13.66	18.32	16.32
Plastics	13.29	22.41	8.78	11.29	17.88	20.91
Non-metallic mineral products	9.07	16.07	6.71	10.32	26.09	24.04
Basic metals	9.70	19.88	7.55	12.61	30.77	33.49
Fabricated metals	9.40	15.22	7.84	11.63	22.90	23.95
General machinery	9.41	15.49	9.38	12.96	22.52	23.99
Office & computing machinery	-	-	-	19.30	12.53	30.73
Electrical machinery	15.31	30.98	9.33	13.21	23.49	23.18
Radio, television & commun. mach.	15.58	20.85	11.23	16.35	25.36	29.16
Precision machinery	10.56	12.36	10.13	14.66	22.24	20.49
Motor vehicles	9.22	20.02	7.06	11.44	22.79	23.19
Other transport equipment	11.67	17.22	7.70	13.07	21.73	20.40
Furniture	6.48	18.86	7.19	10.30	10.72	13.98
Miscellaneous manufacturing	9.10	15.88	7.25	10.52	18.46	15.53
Recycling	-	-	3.09	10.89	-	-

Note: Samples include firms reporting positive employment, sales, labor compensation, and fixed assets.

Source: Vietnam, General Statistics Office (various years b)

Table 6: Cross Section Estimates of Compensation Differentials and Concentration's Effects on Compensation per Worker after Controlling for the Effects of Factor Intensity, Scale, Skill Intensity, and Sex Composition of the Workforce

	2000				2004			
	CR4 Eq.		HF Equation		CR4 Eq.		HF Equation	
Indicator, Industry	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
SOE-Private Firm Productivity Differentials								
Manufacturing (incl. miscellaneous)	-0.098	0.00	-0.095	0.00	0.057	0.01	0.059	0.01
Food, beverages, tobacco	-0.090	0.06	-0.086	0.07	-0.128	0.00	-0.130	0.00
Textiles, apparel, leather, footwear	-0.255	0.00	-0.255	0.00	-0.214	0.00	-0.214	0.00
Wood, paper, furniture	-0.195	0.00	-0.206	0.00	-0.092	0.09	-0.097	0.08
Chemicals, rubber, plastics	0.134	0.00	0.136	0.00	0.198	0.00	0.195	0.00
Non-metallic minerals, metals & prod.	-0.124	0.00	-0.127	0.00	-0.027	0.45	-0.026	0.46
Machinery industries	0.002	0.98	-0.009	0.89	0.164	0.01	0.157	0.01
Motor vehicles, other transport equip.	0.211	0.00	0.233	0.00	0.287	0.00	0.294	0.00
MNC-Private Firm Productivity Differentials								
Manufacturing (incl. miscellaneous)	0.497	0.00	0.494	0.00	0.377	0.00	0.376	0.00
Food, beverages, tobacco	0.561	0.00	0.562	0.00	0.528	0.00	0.528	0.00
Textiles, apparel, leather, footwear	0.274	0.00	0.276	0.00	0.277	0.00	0.278	0.00
Wood, paper, furniture	0.201	0.00	0.206	0.00	0.287	0.00	0.293	0.00
Chemicals, rubber, plastics	0.445	0.00	0.446	0.00	0.506	0.00	0.504	0.00
Non-metallic minerals, metals & prod.	0.517	0.00	0.523	0.00	0.461	0.00	0.462	0.00
Machinery industries	0.480	0.00	0.477	0.00	0.530	0.00	0.530	0.00
Motor vehicles, other transport equip.	0.449	0.00	0.467	0.00	0.478	0.00	0.489	0.00
Marginal Effects of Concentration								
Manufacturing (incl. miscellaneous)	0.003	0.00	0.005	0.37	0.002	0.00	0.009	0.01
Food, beverages, tobacco	0.008	0.00	0.039	0.00	0.000	0.82	0.000	0.96
Textiles, apparel, leather, footwear	-0.009	0.00	-0.036	0.00	-0.007	0.00	-0.029	0.00
Wood, paper, furniture	-0.007	0.00	-0.022	0.00	-0.006	0.00	-0.028	0.00
Chemicals, rubber, plastics	-0.001	0.57	-0.007	0.43	-0.004	0.01	-0.016	0.07
Non-metallic minerals, metals & prod.	-0.005	0.00	-0.023	0.00	-0.002	0.12	-0.013	0.05
Machinery industries	-0.003	0.13	-0.006	0.05	-0.001	0.73	-0.005	0.08
Motor vehicles, other transport equip.	-0.036	0.00	-0.076	0.00	-0.034	0.00	-0.082	0.00

Notes: Manufacturing includes miscellaneous manufacturing and recycling industries which are not listed separately; machinery includes, general, office and computing, electrical, radio, television & communication, and precision machinery; see the source for details
Source: Ramstetter and Phan (2007b, Appendix Tables 5a, 5b).

Table 7: Estimates of Wage Spillovers and Concentration's Effects on Local Firm Compensation after Controlling for the Effects of Factor Intensity, Scale, Skill Intensity, and Sex Composition of the Workforce

Indicator	2000 or 2000-02				2002 or 2002-04				2004 or 2000-02-04			
	CR4 Equation		HF Equation		CR4 Equation		HF Equation		CR4 Equation		HF Equation	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
Cross Section Estimates 2000, 2002, 2004												
SOE spillover	-0.0014	0.45	-0.0009	0.63	0.0038	0.00	0.0031	0.01	0.0023	0.03	0.0026	0.01
MNC spilliover	-0.0014	0.64	-0.0008	0.80	0.0077	0.00	0.0069	0.00	0.0044	0.00	0.0046	0.00
Concentration	0.0025	0.09	0.0092	0.19	-0.0030	0.01	-0.0077	0.10	0.0001	0.93	-0.0023	0.52
Panel Estimates 2000-02, 2002-04, 2000-02-04												
SOE spillover	-0.0173	0.00	-0.0177	0.00	-0.0158	0.00	-0.0169	0.00	-0.0146	0.00	-0.0156	0.00
MNC spilliover	-0.0010	0.81	-0.0014	0.72	0.0030	0.46	0.0024	0.55	0.0040	0.10	0.0035	0.15
Concentration	0.0005	0.86	0.0057	0.59	-0.0114	0.00	-0.0445	0.00	-0.0071	0.00	-0.0246	0.00

Note: See source for full results.

Source: See Ramstetter and Phan (2007b, Appendix Tables 6-7).

Table 8: Average Labor Productivity Differentials in Medium-Large Firms (percentage differences in value added per worker)

	SOE-Private		MNC-Private		MNC-SOE	
Industry	2000	2004	2000	2004	2000	2004
Manufacturing, firm mean	9	82	255	180	225	53
Manufacturing, 27-industry mean	-11	59	299	167	348	68
Food products	-29	12	107	158	193	131
Beverages	31	245	488	1,099	348	247
Tobacco	248	210	76	-6	-50	-70
Textiles	-10	13	49	66	67	46
Apparel	-5	-2	151	43	163	45
Leather	33	-20	43	192	8	266
Footwear	-6	-20	31	402	40	523
Wood products	47	40	53	161	4	86
Paper products	63	7	2	60	-37	51
Publishing	21	41	23	-17	1	-41
Petroleum products	-	-26	244	163	-100	255
Chemicals	54	65	448	361	256	179
Rubber products	-72	-61	10	-36	293	64
Plastics	-11	49	80	95	101	31
Non-metallic mineral products	58	131	384	380	207	107
Basic metals	-29	-25	910	260	1,326	383
Fabricated metals	-36	-21	186	105	345	162
General machinery	-25	-20	421	193	593	267
Office & computing machinery	-	-	-	56	-	-
Electrical machinery	-7	167	333	168	365	0
Radio, television & commun. mach.	64	8	862	180	488	160
Precision machinery	-34	-27	279	206	472	318
Motor vehicles	-39	76	792	779	1,368	400
Other transport equipment	-26	46	188	144	287	67
Furniture	-21	103	167	47	239	-28
Miscellaneous manufacturing	-43	50	125	25	296	-17

Note: Samples include firms with positive employment, sales, value added, and are not possible in recycling.
Source: Vietnam, General Statistics Office (various years b)

Table 9: Average Capital Productivity Differentials in Medium-Large Firms (percentage differences in value added per unit of fixed assets)

	SOE-Private		MNC-Private		MNC-SOE	
Industry	2000	2004	2000	2004	2000	2004
Manufacturing, firm mean	-73	36	-87	-47	-53	-61
Manufacturing, 27-industry mean	-59	26	-82	-45	-55	-57
Food products	-59	-63	-83	-66	-59	-6
Beverages	-25	269	-78	179	-70	-24
Tobacco	305	114	-10	38	-78	-35
Textiles	-82	-90	-89	-92	-36	-18
Apparel	-68	-78	-65	21	10	463
Leather	-97	-91	-93	-63	123	295
Footwear	-45	-43	-24	-36	39	13
Wood products	-67	-73	-80	-45	-39	108
Paper products	-41	-80	-76	-68	-60	58
Publishing	3	-63	53	-50	49	34
Petroleum products	-	-	-60	-38	-	-
Chemicals	-15	-10	-79	-69	-75	-66
Rubber products	-83	-85	-94	-77	-64	51
Plastics	-62	-75	-78	-78	-42	-14
Non-metallic mineral products	-95	-34	-97	-10	-26	37
Basic metals	-29	-54	-74	-31	-63	52
Fabricated metals	-56	1,152	-73	-87	-37	-99
General machinery	-67	-43	-80	-30	-41	23
Office & computing machinery	-	-	-	-38	-	-
Electrical machinery	-84	-51	-88	-54	-26	-6
Radio, television & commun. mach.	-81	-81	-82	-77	-3	17
Precision machinery	-56	-78	-41	-66	33	55
Motor vehicles	-80	97	-76	-21	18	-60
Other transport equipment	-61	18	-92	-80	-80	-83
Furniture	229	-56	-69	-10	-91	103
Miscellaneous manufacturing	-89	-77	-75	-68	129	40

Note: Samples include firms with positive employment, sales, value added, and are not possible in recycling.
Source: Vietnam, General Statistics Office (various years b)

Table 10: Cross Section Estimates of Productivity Differentials and Concentration's Effects on Productivity after Controlling for the Effects of Factor Intensity, Scale, and Skill Intensity

	2000				2004			
	CR4 Eq.		HF Equation		CR4 Eq.		HF Equation	
Indicator, Industry	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
SOE-Private Firm Productivity Differentials								
Manufacturing (incl. miscellaneous)	-0.166	0.01	-0.158	0.01	-0.072	0.06	-0.069	0.08
Food, beverages, tobacco	-0.276	0.01	-0.274	0.01	-0.256	0.00	-0.265	0.00
Textiles, apparel, leather, footwear	-0.047	0.50	-0.048	0.49	-0.051	0.43	-0.051	0.43
Wood, paper, furniture	-0.267	0.00	-0.266	0.00	-0.176	0.05	-0.172	0.05
Chemicals, rubber, plastics	-0.062	0.53	-0.059	0.55	-0.071	0.47	-0.074	0.45
Non-metallic minerals, metals & prod.	-0.441	0.00	-0.448	0.00	-0.263	0.00	-0.266	0.00
Machinery industries	-0.308	0.01	-0.346	0.00	-0.253	0.01	-0.268	0.00
Motor vehicles, other transport equip.	-0.242	0.06	-0.200	0.12	-0.111	0.35	-0.093	0.44
MNC-Private Firm Productivity Differentials								
Manufacturing (incl. miscellaneous)	-0.090	0.26	-0.093	0.24	0.082	0.02	0.081	0.02
Food, beverages, tobacco	0.002	0.99	0.010	0.95	0.002	0.99	0.004	0.97
Textiles, apparel, leather, footwear	0.247	0.00	0.250	0.00	0.199	0.00	0.201	0.00
Wood, paper, furniture	-0.416	0.00	-0.417	0.00	-0.108	0.11	-0.110	0.10
Chemicals, rubber, plastics	-0.084	0.26	-0.082	0.27	0.119	0.08	0.117	0.09
Non-metallic minerals, metals & prod.	-0.206	0.02	-0.184	0.04	-0.112	0.13	-0.112	0.13
Machinery industries	0.158	0.19	0.137	0.25	0.120	0.30	0.105	0.36
Motor vehicles, other transport equip.	-0.046	0.74	-0.020	0.89	0.127	0.29	0.146	0.23
Marginal Effects of Concentration								
Manufacturing (incl. miscellaneous)	0.009	0.00	0.033	0.00	0.003	0.03	0.008	0.31
Food, beverages, tobacco	0.010	0.00	0.051	0.00	0.000	0.80	0.006	0.45
Textiles, apparel, leather, footwear	-0.015	0.00	-0.067	0.00	-0.016	0.00	-0.070	0.00
Wood, paper, furniture	0.001	0.56	0.009	0.33	0.001	0.53	0.000	0.98
Chemicals, rubber, plastics	0.001	0.70	0.002	0.90	-0.004	0.28	-0.013	0.51
Non-metallic minerals, metals & prod.	-0.004	0.07	0.009	0.49	0.007	0.00	0.053	0.00
Machinery industries	-0.018	0.00	-0.020	0.00	-0.016	0.00	-0.017	0.01
Motor vehicles, other transport equip.	-0.038	0.00	-0.097	0.00	-0.054	0.00	-0.134	0.00

Notes: Manufacturing includes miscellaneous manufacturing and recycling industries which are not listed separately; machinery includes, general, office and computing, electrical, radio, television & communication, and precision machinery; see the source for details
Source: Ramstetter and Phan (2008, Appendix Table 4).

Table 11: Estimates of Producitivity Spillovers and Concentration's Effects on Local Firm Productivity after Controlling for the Effects of Factor Intensity, Scale, and Skill Intensity

	2000 or 2000-02				2002 or 2002-04				2004 or 2000-02-04			
	CR4 Equation		HF Equation		CR4 Equation		HF Equation		CR4 Equation		HF Equation	
Indicator	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
Cross Section Estimates 2000, 2002, 2004												
SOE spillover	0.0132	0.01	0.0125	0.00	0.0067	0.00	0.0057	0.00	0.0025	0.18	0.0024	0.18
MNC spilliover	0.0158	0.04	0.0156	0.02	0.0081	0.00	0.0069	0.00	0.0051	0.00	0.0055	0.00
Concentration	0.0074	0.04	0.0521	0.00	-0.0045	0.02	-0.0124	0.06	-0.0035	0.04	-0.0191	0.01
Panel Estimates 2000-02, 2002-04, 2000-02-04												
SOE spillover	-0.0320	0.00	-0.0321	0.00	-0.0158	0.00	-0.0175	0.00	-0.0210	0.00	-0.0221	0.00
MNC spilliover	-0.0066	0.46	-0.0073	0.41	0.0057	0.14	0.0045	0.25	0.0066	0.13	0.0058	0.17
Concentration	0.0093	0.13	0.0466	0.05	-0.0145	0.00	-0.0511	0.00	-0.0045	0.12	-0.0085	0.45

Note: see source for full results.

Source: See Ramstetter and Phan (2008, Appendix Tables 5-6)