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**PRODUCTIVITY, EFFICIENCY AND INSTITUTIONS:
ECONOMIC REFORMS AND NON-STATE MANUFACTURING
FIRM PERFORMANCE IN VIETNAM**

by

THI BICH TRAN

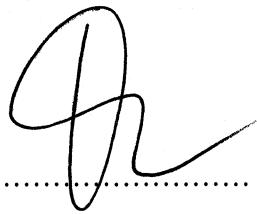
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CONTRIBUTION

The contents of this thesis are original work by the PhD candidate, Thi Bich Tran. Portions of the work done in this thesis are contributions to joint research and will be published as journal papers, or have been published as working paper or presented in international conferences. These papers are:

- Thi Bich Tran, R.Quentin Grafton, and Tom Kompas, 2008 (forthcoming). *Firm Efficiency in Vietnam*. Asian Economic Journal, 22(1).
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A handwritten signature in black ink, consisting of a large, stylized capital 'T' followed by a cursive 'B' and 'T'.

.....
Thi Bich Tran

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ABSTRACT

The domestic non-state sector is a potential core component of the economy of Vietnam. Many institutional changes have been made by the Vietnamese government during the transition to a market economy to support the development of the non-state sector. The thesis provides an in-depth investigation into the effects of privatisation on the new domestic non-state manufacturing sector's performance in Vietnam in a series of three core essays.

The first essay (Chapter 3) examines the technical efficiency level of non-state small and medium manufacturing firms by using the stochastic frontier approach and data for small and medium enterprises in 1991, 1996, and 2001, from the Ministry of Labour, Invalids and Social Affairs of Vietnam. Both cross-section and panel models are estimated, showing a high level of technical efficiency of non-state small and medium manufacturing firms and an improvement in their technical efficiency level over the period studied. The results indicate that a greater use of family labour and a metropolitan location are associated with an improvement in technical efficiency, while direct government financial and non-financial assistance to businesses has few benefits.

The performance of the non-state small and medium manufacturing firms is further investigated in the second essay (Chapter 4). In this essay, a new method called 'the error index decomposition method' is developed to analyse the contribution of productivity, firm size, and the prices of outputs and intermediate inputs to a firm's value-added. The method introduces an error term into the decomposition equation to capture measurement biases and white noise that are generated by using the industry deflator instead of the observed price to resolve the dimensionality problem. Empirical application of the method using the data set of non-state small and medium

manufacturing firms in 1996 and 2001 indicates that total factor productivity is the most important factor contributing to a firm's value-added. The findings, again, reveal the ineffectiveness of the government assistance program.

The third essay (Chapter 5) examines the impacts of institutional reforms with a particular focus on the second phase of the economic reforms in Vietnam since 2000 on non-state firms' economic performance. The results indicate that the improvement of government practices and institutional performance including information provision, land tenure security and labour training assistance is positively associated with non-state firm performance. By contrast, the presence of a weak judiciary system and administrative reforms impede growth of the non-state sector.

The findings from the thesis imply that if the lack of a skilled labour force and capital shortages are addressed, administrative obstacles are overcome, and market information provision and the judiciary system are strengthened to promote cooperation among firms, the non-state sector in Vietnam will continue to improve overall economic performance.

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LIST OF ABBREVIATIONS

ASMED	Agency for Small and Medium Enterprise Development
BDS	Business Development Services
CIE	Centre for International Economics
CIEM	Central Institute for Economic Management
CPI	Consumer Price Index
CRTS	Constant Returns to Scale
CSEG	Crawford School of Economics and Government
DEA	Data Envelopment Analysis
DRTS	Decreasing Returns to Scale
EIDM	Error Index Decomposition Method
FIEs	Foreign Invested Enterprise
FPF	Frontier Production Function
GSO	General Statistics Office
GTZ	German Agency for Technical Cooperation
GUM	General Unrestricted Model
IFC	International Finance Corporation
ILSSA	Institute of Labour Science and Social Affairs
IMF	International Monetary Fund
INPD	Index Number Profit Decomposition
IRTS	Increasing Returns to Scale
LP	Labour Productivity
LUR	Land Use Right
LURC	Land Use Right Certificate
MLE	Maximum Likelihood Estimation
MOLISA	Ministry of Labour, Invalids and Social Affairs
MPDF	Mekong Private Sector Development Facility
MPI	Ministry of Planning and Investment
MRD	Mekong River Delta
PCI	Provincial Competitiveness Index
RRD	Red River Delta
SFA	Stochastic Frontier Approach
SITC	Standard International Trade Classification
SM	Small and Medium
SMEs	Small and Medium Enterprise
SOEs	State-Owned Enterprise
SSE	Stockholm School of Economics
TE	Technical Efficiency
TFP	Total Factor Productivity
TIE	Technical Inefficiency
UNIDO	United Nations Industrial Development Organization
USAID	The United States Agency for International Development
VA	Value-added
VATFP	Value-added Total Factor Productivity
VCCI	Vietnam Chamber of Commerce and Industry
VHLSS	Vietnam Household Living Standards Survey
VNCI	The USAID-funded Vietnam Competitiveness Initiatives

CHAPTER 1

INTRODUCTION

The transition from a centrally planned to a market economy is often identified by the increasing share of the private sector in GDP and rapid institutional changes. Literature on transitional economies has often focused on the causal-effects between privatisation and firm performance changes. For instance, Frydman et al. (1999), Megginson and Netter (2001), Djankov and Murrell (2002), and Bennett et al. (2004) investigate the effectiveness of the privatisation programs in Central and Eastern Europe and the former Soviet Union. Walder (1995), Bai et al. (1997), Lin et al. (1998), and Fung et al. (1999) examine the impacts of privatisation on firm performance in China.

In an attempt to shed light into the efficiency of privatisation in Vietnam, Che et al. (2001) investigate the impacts of market reform on the productivity of agriculture, Pham (2001) examines the effectiveness of market policies on the export performance of foreign invested enterprises (FIEs), and Vu (2003) analyses the effects of the privatisation programs on the performance of state-owned enterprises (SOEs). However, questions still remain regarding the effects of privatisation on the performance of the new domestic manufacturing non-state sector in Vietnam. This thesis gives a comprehensive insight into the new domestic manufacturing non-state sector in Vietnam, including its performance and the impacts of institutional reforms since the start of the economic reform '*Doi moi*' process.

Doi moi began in 1986 with gradual reforms. Their first objective was to rescue the economy from the economic crisis that resulted from the ineffective central planning. To achieve this aim, the reforms were targeted: (i) to improve the efficiency of SOEs, and (ii) to promote the development of the non-state sector.

The SOE reform in Vietnam which began in 1981 and preceded the economic reforms can be divided into three phases. The first round of the reform was carried out from

1981 to 1985 under the centrally planned framework. A few changes, such as allowing SOEs to produce and sell partially their products in free markets, were taken and the impacts were moderate (Vu 2002). The second round of reform took place in the period 1986-96 when the country moved towards a market economy. Reform measures during this period were strengthened with the issuance of Decree No. 338/HDBT on the 20/11/1991 on establishing and liquidating SOEs and the Law on SOEs in 1995. These bold measures of economic reform and the favourable economic conditions in the middle of the 1990s had a positive impact on SOEs' economic performance. However, difficulties facing SOEs after the Asian financial crisis in 1997 led to a considerable number of loss-making SOEs. This triggered the third round of reform from 1997 which has continued to the present. This reform focused on the privatisation of SOEs under the guidelines of Decrees No.28/CP, 07/05/1996, No.44/1998/ND-CP and No.64/2002/ND-CP.

The SOE reform process has resulted in a significant fall in the number of SOEs, from 12,000 in 1991 to 6,000 in 1994 (CIEM 2002) and to 4,086 in 2005 (GSO 2007). The share of industrial output of SOEs has also diminished from 49.63% in 1996 to 25.10% in 2005 (GSO 2007). Although the reforms have eliminated some priorities previously given to SOEs, they have granted more autonomy to SOEs. Consequently, the performance of SOEs has improved (Mekong Economics 2002; Vu 2002). Nevertheless, a recent study on efficiency of small and medium enterprises (SMEs) by Nguyen et al. (2007) shows no differences in efficiency performance among SOEs and private ownership firms.

The economic reforms in Vietnam also promote the development of the non-state sector. This sector includes FIEs and the domestic non-state sector. FIEs were the result

of the foreign direct investment program, which began in 1988. Although FIEs account for only 3.27% of all enterprises and generates 19.56% of the total employment, they produce 43.70% of the value of industrial outputs in 2005 (GSO 2007). This remarkable performance, compared to that of the state and domestic non-state sectors has attracted a large body of literature such as, Pham (2001), Le (2002), Freeman (2002), and Tran (2007). These studies investigate the performance of FIEs and recommend policy options that assist Vietnam in attracting foreign direct investment.

On the other hand, despite its legal recognition since the beginning of the 1990s and the increasingly crucial role in the economic development process, little attention has been given to exploring the development of the domestic non-state sector in Vietnam. This is partly due to the unavailability of relevant data. Most of the studies on the domestic non-state sector focus on the policy environment (MPI-UNIDO 1999; Sakai and Takada 2000; Steer and CIE 2001; Schaumburg-Muller 2005; CIEM 2006). Analyses also emphasise obstacles impeding the development of domestic non-state enterprises through small-scale surveys (Ronnas et al. 1998; Webster and Taussig 1999; CSEG and CIEM 2002; Carlier and Tran 2004a; IFC/MPDF 2005). Attention has been recently extended to quantitative analyses. For instance, Vijverberg and Haughton (2002) investigate the survival and growth rate of non-farm household enterprises in Vietnam during the period 1993-98. Hansen et al. (2004), Kokko and Sjöholm (2004), and Kokko and Tingvall (2005) analyse the survival and growth rate of non-state SMEs from 1991-2001 and the impact of government support and internationalisation on their survival and growth.

Despite the above efforts, questions still remain: (i) how efficient and productive are domestic non-state enterprises? (ii) which factors influence their efficiency and

productivity? what is the determinant of the success of a domestic non-state firm? and (iii) how have institutional changes during the transition affected firm economic performance?

Under the current legal framework, the domestic non-state sector (to this end the non-state sector) in Vietnam includes informal household enterprises, cooperatives, and the private sector's four types of ownership: sole-proprietorships, limited companies, shareholding or joint-venture companies and partnership enterprises. The common characteristic of non-state enterprises is that they are at small and medium scale with nearly 99% of firms employing up to 300 workers and 90% of enterprises having fewer than 50 employees (GSO 2003). Generally, non-state enterprises experience working capital shortages and possess obsolete technology (GSO 1998, 2003), but the situation has improved in limited and shareholding companies.

In terms of economic performance, the non-state sector performs well in generating employment and job growth. By 2004, the proportion of employment generated by the non-state sector had increased to 52.39% (GSO 2005). Despite this contribution and the upsurge in the number of non-state firms, the non-state sector's share in the industrial outputs has increased slightly, from 24.5% in 2000 to 29.0% in 2004 (GSO 2005). This relatively slow increase in economic importance and the growth and survival rate of non-state enterprises (Carlier and Tran 2004a; Hansen et al. 2004) raise concerns about the economic performance of this sector.

A key contribution of the thesis is the exploration of the technical efficiency of non-state manufacturing enterprises and factors influencing this efficiency level. More importantly, the thesis gives insights into the performance of non-state enterprises by extending previous work (Fox et al. 2002) and introducing a new method, called 'the

error index decomposition method', to decompose the contribution of productivity to a firm's economic performance. The thesis also surveys institutional changes in Vietnam during the transition period and models impacts of these changes on firm performance. Understanding the actual performance and factors that constrain the performance of non-state enterprises effectively directs government and policy makers towards better policies to promote the sustainable development of the non-state sector.

The thesis is composed of three core essays which are presented in Chapters 3 to 5. The first two core chapters (3 and 4) examine non-state SME enterprise performance in terms of technical efficiency and productivity. The last core chapter (chapter 5) analyses the impacts of institutional changes on firm economic performance during the transition period with a particular focus on the second phase of the economic reform in Vietnam since 2000.

In the first core essay, presented in Chapter 3, the stochastic frontier approach is applied to the data of non-state manufacturing SMEs collected by the Institute of Labour Science and Social Affairs (ILSSA) of the Ministry of Labour, Invalids and Social Affairs (MOLISA) of Vietnam in collaboration with the Stockholm School of Economics (SSE) of Sweden in 1991, 1996 and 2001. The results show that average levels of efficiency of the non-state small and medium manufacturing industries are high. The results also indicate an improvement in technical efficiency over the period studied and a considerable variation in efficiency levels among firms. The determinants of such differentials are identified, showing that a greater use of family labour and a metropolitan location are associated with improvement in technical efficiency. The results indicate few benefits from direct government financial and non-financial assistance to businesses.

The second core essay (Chapter 4) develops a new method called 'the error index decomposition method' to decompose the contributions of productivity, prices and firm size to a firm's value-added. The method introduces an error term into the decomposition equation to capture measurement biases which are caused by using the deflator instead of the observed price. An application of the method is given using the same data set as in Chapter 3, but excluding the data in 1991. The error index decomposition method provides a comparison of performance of all firms to the hypothetical representative firm. The analysis allows firms and policy makers to realise the key factors contributing to the success or failure of a firm, and suggest strategies to improve firm economic performance.

In the third core essay (Chapter 5) we investigate institutional reforms in Vietnam, focusing on three aspects of institutional performance: (i) provision of information; (ii) security of private property rights; and (iii) lower transaction costs that arise from reduced administrative procedures and less discretion by state officials. The impacts of institutional changes on firm economic performance are investigated using countrywide firm-level data collected by the General Statistics Office (GSO) of Vietnam in 2005 and the provincial competitiveness index 2006 (PCI06). The PCI06 reflects the improvement of institutions since the second phase of economic reforms in Vietnam in 2000 and differences in the implementation of the central government's regulations and policies at provincial level in creating a fair business and policy environment to all economic sectors.

The results of Chapter 5 are compelling. They show that provincial competitiveness is economically and statistically significant in explaining cross-province differences in firm performance. We find that a one percentage improvement in government practice

could increase the daily value-added of an average firm by an amount equivalent to nearly three times daily per capita GDP. The results indicate that an improvement in providing market information, more secure land tenure and labour training assistance has a positive effect on firm performance. By contrast, weaknesses in the judiciary system and administrative reforms impede the growth of non-state firms. Overall, findings imply that governance is an important obstacle to the development of the non-state sector in Vietnam.

The structure of the thesis is as follows. Chapter 2 provides the background of the non-state sector in Vietnam. This chapter is an overview of the legal framework for the formation and development of the non-state sector. It also discusses the general characteristics, performance and constraints facing non-state enterprises during the transition period. This is followed by two core chapters (Chapters 3 and 4) investigating the economic performance of non-state enterprises in terms of efficiency and productivity. Several factors that affect firm performance are also investigated in these two chapters. Chapter 5 focuses on the effectiveness of the privatising program in Vietnam. Concluding remarks are offered in Chapter 6.

CHAPTER 2

THE NON-STATE SECTOR IN VIETNAM

2.1 Introduction

The economic crisis in Vietnam early in the 1980s led to economic reforms in 1986, which transformed the economy from a centrally planned system to a market economy, with a socialist orientation. The reforms targeted: (i) improving the efficiency of SOEs and (ii) stimulating the development of the non-state sector. This sector was expected to overcome drawbacks of SOEs including inefficiency, weak competitiveness and failure in generating sufficient jobs. More importantly, the non-state sector was supposed to sustain economic growth and become a core component of the economy.

In an attempt to promote the development of non-state enterprises, the Vietnamese government has carried out a number of policy changes to create a better business environment and a 'level playing field' for all economic sectors. However, weaknesses in institutions supporting markets, lack of experience in managing the market economy on the government's side, and attitudes favouring the state sector have resulted in many constraints towards the operation and development of non-state enterprises. Although market-entry barriers have been lessened, obstacles such as limited access to factors of the production, markets and information have been challenging non-state enterprises.

Consequently, the non-state sector has stayed small with the dominance of household enterprises. According to the enterprise countrywide surveys conducted during 2000-02 by GSO, 99% of non-state enterprises employ up to 300 workers and 90% of enterprises have less than 50 employees. Policy and institutional changes have promoted the increase of more evolved ownership types such as limited and shareholding companies. Nevertheless, the inverse transformation from sole-proprietorships to household enterprises is a warning for an over-regulated environment. The difficult business environment constrains the performance of non-state enterprises. Although they

perform well in generating job and despite the dramatic increase in the number of non-state firms, the share of the non-state sector in industrial output has increased slowly and its contribution to GDP has decreased during the period 1995-2004 (GSO 2005).

This chapter reviews economic reforms and provides background of the non-state sector, focusing on the characteristics, performance and constraints facing non-state enterprises in Vietnam. Following discussion of the features of the economy before 1986 in Section 2.2, attention is turned to economic reforms with a particular focus on institution building for non-state sector development in Section 2.3. The general characteristics, performance and constraints facing non-state enterprises are provided in Section 2.4. Section 2.5 concludes.

2.2 Economy of Vietnam before *Doi moi* reforms

In 1954, after the Geneva Agreement, Vietnam was divided into two parts, characterised by two contradictory economic systems. North Vietnam adopted a centrally planned, socialist economy while South Vietnam followed a capitalist model.

In the early years of the socialist economy (1954-1957), North Vietnam accepted multi-economic sectors based on different ownership types: the state, collectives¹, and private ownership types, including individual businesses and private-state joint-venture [*Công ty hợp danh*]. In 1957, the state sector provided only 26.9% of GDP (Nguyen and Hoang 1990: 35).

¹ In collectives, people contributed all their assets, worked together, and received the same returns. This sector concentrated on agricultural and handicraft areas.

To mobilise all resources for the “war against the Americans”, the following period (1958-1960) witnessed the determination of North Vietnam to transfer private and individual ownership types into state-owned enterprises (SOEs) and collectives. However, individual businesses still played an important role in the economy during this period. Their contribution to GDP was 33.4% in 1960 (Nguyen and Hoang 1990: 41).

Following the Third Communist Party Congress² (1960), the period 1961-75 experienced the mass restructure of all private ownership types into the state and collectives. North Vietnam also applied a large-scale heavy industry scheme. Until 1975, not only were private ownership types considered illegal, but they also faced discrimination. No materials and credits were allocated to private enterprises if they existed (Vietnam Academy of Social Sciences 2006). Individual ownership forms were limited to small-scale enterprises. Small-scale traders were not allowed and were transferred into collectives. The contribution to GDP was mainly from the state sector, accounting for 88.4% of GDP. The formal and informal private sector contributed only 10% of GDP in 1975 (Nguyen and Hoang 1990: 46).

After reunification in 1976, the northern economic system was applied to the south. Private companies were either transferred into SOEs or re-structured as private-state joint-ventures where the state held controlling interest. The economy was dominated by two state economic sectors: SOEs and collectives. Private and individual ownership firms were considered ‘the enemy of socialism’ and existed illegally in the ‘grey zone’ as informal household businesses.

² The political system in Vietnam has a unique ruling Communist Party, which holds a National Congress every five years to adopt a five-year strategy for socio-economic development.

Under the centrally planned economy, the government made all decisions about the production process, from the allocation of inputs to the distribution of outputs. SOEs and collectives acted in the economy as main production units for the government. There were no market transactions and prices, credit and interest rates mal-functioned (Le 1999). The mechanism of this model was based on the average distribution. That meant everyone received the same return, regardless of the individual's productivity. This could not create the incentives needed for economic development and squandered the country's scarce resources. In addition, the development strategy, of boosting large-scale heavy industry right after reunification (1976) while lacking capital, advanced technology as well as talented managers with technical and managerial skills, was inappropriate. It was also clearly ill-suited to the predominantly agricultural economy and small-scale industry of Vietnam and the need for alleviating prevalent starvation after the "American war" (Dao 1990). Consequently, GDP growth rate was less than that of population growth as shown in Table 2.1 (page 33). The economy fell into a severe economic crisis at the beginning of the 1980s with hyperinflation and widespread famine that needed comprehensive reforms.

2.3 Economic reforms and legal framework for the non-state sector

The economic crisis revealed the inefficiency of SOEs and collectives. They did not provide enough outputs and services for the economy. Furthermore, widespread starvation and the failure of the state sector in absorbing the expansion of the labour force showed that the prohibition of the non-state sector was unwise (Dao 1990: 19). In fact, its existence was necessary to overcome drawbacks of the state sector. This triggered the so-called 'Renovation Process' '*Doi moi*' that focused on economic reform and began in 1986. This paved the way for the issuance of a series of legal documents

for the formation and development of the non-state sector.

The development of the non-state sector in Vietnam can be divided into three periods. The first, from 1986 to 1992, was considered as the launching period of economic reform. This brought the non-state sector from the 'grey zone' for the first time and transformed the economy from a centrally planned model to a market economy with socialist orientations. Nevertheless, institutions supporting markets had not been created yet. The non-state sector faced many obstacles to registering and operating businesses.

The second period, from 1993 to 1998, witnessed little improvement in the policy environment though a number of legal decrees had been issued. However, favourable economic conditions during this period following trade liberalisation in 1993 improved firm economic performance. In addition, there were numbers of firms which transformed from simple ownership forms to more complex ones. Though many constraints still remained, this period can be named the *transformation* period to indicate efforts from both government and firms to improve economic performance.

The last period, from 1999 until present, is one of rapid changes in institutions and policies to streamline costly administrative procedures and stimulate the development of the non-state sector. This period has witnessed a huge increase in the number of non-state enterprises. However, the performance of this sector is less than satisfactory. Yet, with the growth in firm numbers and achievements that firms obtain, this period can be known as the *development period*.

2.3.1 First period (1986 – 1992): Launch of economic reforms

The Sixth Party Congress of Vietnam in 1986 marked a milestone for the legal existence of the non-state sector. It acknowledged officially the multi-sectoral

economy, including the state sector, the collective sector, the private sector, individuals and households (Vietnamese Communist Party 1986) for the first time since 1975. Following the Party Congress, a number of legal decrees were issued to set up the legal framework for non-state sector operations. The first was the Decision No.27-HDBT³, 9 March 1988 on policies towards the non-state economic sector. This Decision transformed the strategy of the Sixth Party Congress into specific policies towards the non-state sector. Following this was Resolution No.16/NQTW⁴, 15 July 1988 on small-scale non-state-sector activities, which stated that the non-state sector would be allowed to operate outside the state planning process and should not be discriminated against.

The recognition of the non-state sector was re-iterated at the Seventh Party Congress in mid-1991, where the property rights of individuals and private ownership types were to be protected legally for the first time (Vietnamese Communist Party 1991). To encourage the development of the non-state sector, a series of legal documents was issued including the Land Law (1988), the Company Law (1991a), the Law on Private Enterprises (1991b) and Decree No.66/HDBT, 2 March 1992.⁵ More importantly, the property rights of different economic sectors were re-confirmed in the Constitution (1992). This also stated that all economic sectors had rights to be treated equally while preserving the leading role in the economy of the state sector (MPI-UNIDO 1999: 7).

³ Decision no.27-HDBT, 9 March 1988, by the Council of Ministers on Policies Towards Private Manufacturing Sector, Services and Transportation [Nghị Định số 27-HDBT ngày 9-3-1988 ban hành quy định về chính sách đối với kinh tế cá thể, kinh tế tư doanh sản xuất công nghiệp, dịch vụ, công nghiệp xây dựng, vận tải]

⁴ Resolution No.16/NQTW, 15 July 1988, by the Politic Bureau on the Renovation of Management Policies and Mechanisms Towards the Non-state Economic Sectors [Nghị quyết số 16/NQTW ngày 15-7-1988 của Bộ Chính trị về đổi mới chính sách và cơ chế quản lý đối với các cơ sở sản xuất thuộc các thành phần kinh tế ngoài quốc doanh]

⁵ Decree No.66, 2 March 1992 on household enterprises and small traders [Nghị định số 66-HDBT ngày 2-3-1992 về cá nhân và nhóm kinh doanh có vốn thấp hơn vốn pháp định quy định trong nghị định số 211-HDBT ngày 23-7-1991]

The issuance of the law on private enterprises and the company law in 1991 led to the registration of a number of informal household businesses as private enterprises of which the majority is sole-proprietorships.⁶ Collectives were transformed into either household businesses or private associations under the name 'cooperative'. Those cooperatives were, however, basically synonymous to socialist collectives. Under the contemporary legal framework, the domestic non-state sector in Vietnam included the following ownership kinds: cooperatives, sole-proprietorships, limited companies and household enterprises. In reality, there has been one more ownership form, known as partnership⁷ enterprises, operating under no specific law (MPI-UNIDO 1999: 7).

The classification by ownership is largely administrative. Households are small firms with up to 20 workers (Schaumburg-Muller 2005: 356). If they wish to expand further, they must register under the private enterprise law. Sole-proprietorships differ from household firms mainly due to their larger size and greater reliance on paid labour. Partnerships are distinguished from sole-proprietorships in that they have two or more owners. In reality, sole-proprietorships and *de facto* partnerships are somewhat similar since one of the owners of partnerships is only nominal (Ronnas 1992: 12).

Even though the legal framework brought the non-state sector out of the 'grey zone', weaknesses of the government in managing the market economy did not encourage the development of this sector. Registration procedures were too complicated and costly.

⁶ In Vietnam, a sole-proprietorship is officially named a 'private enterprise'. To avoid confusion, we use the word 'sole-proprietorship' for this kind of enterprise while the word 'private enterprise' is used to indicate private ownership types in general, which include sole-proprietorships, limited and shareholding companies, and partnership enterprises.

⁷ The author believes that this kind of ownership originated from the category 'private-state joint-venture' under the centrally planned economy. It was, then, transferred to *de facto* private enterprise under the market economy. However, the basic legal framework at that time had not been changed to capture this ownership type

Private property rights were unclear. For instance, the Land Law (1988) only gave enterprises and individuals the right of using land in the long term. It did not state that land users had the right to use land as loan collateral, restricting a firm's ability to access capital. Capital and labour markets, which did not exist at that time, were also constraints to firms' operations. In addition, the state sector was given priority to keep a leading role resulting in unequal treatment between the state and non-state sectors in practice. Consequently, non-state enterprises faced many difficulties at the outset.

Constraints toward firm entry limited the number of household businesses to register as private enterprises. In addition, a tendency of transferring from collectives to household firms following the de-collectivisation movement late in the 1980s led to the dominance of household enterprises in the economy (Table 2.2, page 33). As shown in Table 2.2, sole-proprietorships constituted only a small number during this period. The number of SOEs was small as well because they dominated other sectors such as education and administration that are excluded from this Table.

Despite difficulties facing the non-state sector, economic reforms positively affected the economic growth of Vietnam. GDP growth rate was 4 times that of population in 1993 as shown in Figure 2.1 (page 32). The country had one of the highest economic growth rates in the region.

2.3.2 Second period (1993-1998): Transformation

Many constraints facing the non-state sector in the first period still remained during this time. The issuance of a number of legal documents such as the Land Law (1993), the Labour Code (1993), the Law on Bankruptcy (1994), Amended Company Law (1994a), Amended Law on Private Enterprise (1994b) and the Cooperative Law (1996) did not

improve the policy environment. The unfavourable policy environment was reflected in the Resolution of the Eighth Party Congress in 1996, which still favoured the state sector by confirming the consistent policy of developing the multi-sectoral economy under the socialist orientation while preserving the leading role of the state sector (Vietnamese Communist Party 1996).

The sole improvement of the legal framework in this period was the Land Law (1993), which allowed land users to transfer land use rights and to use land as loan collateral. Other changes were minor. For example, compared with the Company Law and the Law on Private Enterprises, the only change in the Amended Company Law and Amended Law on Private Enterprise was the change of registration agencies from the provincial economic arbitrage to the provincial planning and investment committee. In addition, despite the encouragement from the Resolution of the Eighth Party Congress to develop *de facto* cooperatives and the issuance of the cooperative law in 1996, a few cooperatives were established. Nevertheless, the favourable economic condition during this period following the opening-up of the economy to the world in 1993 increased the number of non-state enterprises. Furthermore, trade liberalisation led to the appearance of more evolved private ownership types such as shareholding or joint-venture companies.⁸ In 1994 only, the number of licensed businesses was little more than half of that of the period 1991 to the end of 1993 (Table 2.3, page 34).

Not much improvement in the policy environment could be seen during the transformation period. However, the favourable economic environment promoted the development of the non-state sector in both qualitative and quantitative aspects. Most

⁸ In our paper, we use the word 'shareholding' and 'joint-venture' company interchangeably.

enterprises during this period benefited from high GDP growth rate (Figure 2.2, page 32) and demand expansion. Firms were more profitable, accumulated enough capital and upgraded technology.

2.3.3 Third period (1999 -2005): Development

The economic slowdown in Vietnam late in the 1990s brought the attention of the Vietnamese government to the non-state sector for its potential to create jobs and sustain economic growth. In this period many government efforts were made to create a better policy environment and a level playing field for non-state enterprises. A milestone was the issuance of the Enterprise Law (1999) that was considered the most successful legislation. This helped to simplify the registration procedures and market entry of firms. However, the leading role of the state sector was reconfirmed in the Ninth Party Congress in 2001 (Vietnamese Communist Party 2001). This explains why the non-state sector still faces an unfair competitive environment and can not achieve the robust development.

Easier entry during this period pushed the number of non-state registered firms up to a high level (Table 2.4, page 34). Furthermore, the passing of the new Law on Cooperatives (2003) led to an increase in the number of cooperatives. In the period from 2000 to September 2003 alone, the number of non-state registered firms, including cooperatives, sole-proprietorships, limited and shareholding companies was almost double that in the previous decade, from 45,000 to 83,890 firms (Carlier and Tran 2004a: 1-2). For household enterprises, there have been no officially published figures so far. According to World Bank working paper No.30434 (Carlier and Tran 2004a: 6), the number of informal non-state and household enterprises may be up to 2 million at the end of 2002. If this figure is correct, the non-state sector in Vietnam is

characterised mainly by household firms, which account for around 95% of total non-state firms (calculation based on the number of non-state registered firms).

Despite the ease of entry barriers, constraints towards firms' operation remained. In addition, the financial crisis in East Asia in 1998 caused a half decline in FDI and GDP of Vietnam in both 1998 and 1999 in compared with the previous period (see Figure 2.2, page 32). This led to a contraction of both external tradable activities and domestic aggregate demand. The less favourable economic environment and the increasing competition as a result of the considerable rise in the number of non-state firms increased the number of loss-makers (World Bank 1999b). According to the GSO, the number of operating firms was equal to nearly half of the registered establishments (second line in Table 2.4, page 34).

To promote the development of the non-state sector, the Vietnamese government implemented the SOEs reform program with a particular focus on privatising SOEs and promoting the non-state sector. As a result, Resolution 05⁹ of the Ninth Central Party Committee¹⁰ in 2002 on reforming mechanisms and policies to stimulate the development of the private sector, and Decision 94/2002/QĐ-TTĐ¹¹ on 17th July 2002 about government programs to implement Resolution 05 were issued. Government attention was also addressed to SMEs as they accounted for more than 99% of the non-state sector (GSO 2003). Consequently, a program that supports SMEs was

⁹ Translated from the Vietnamese: 'Nghị quyết Hội nghị lần thứ 5 Ban Chấp Hành Trung Ương Đảng khóa IX về tiếp tục đổi mới cơ chế, chính sách, khuyến khích và tạo điều kiện phát triển kinh tế tư nhân'.

¹⁰ Central Party Committee members are elected through the Communist Party Congress. They meet every two months to specify the Party Congress' strategy into Resolutions.

¹¹ Translated from the Vietnamese: 'Quyết định số 94/2002/QĐ-TTĐ ngày 17/07/2002 về chương trình hành động của chính phủ thực hiện Nghị quyết hội nghị lần thứ 5 Ban Chấp Hành Trung Ương Đảng khóa IX về tiếp tục đổi mới cơ chế, chính sách, khuyến khích và tạo điều kiện phát triển kinh tế tư nhân'.

implemented following the government Decree No.90/2001/CP-ND¹² on supporting the development of SMEs.

The most valuable legal document which reflects government efforts in creating a 'level playing field' is the new enterprise law in 2005. This law is applied for all kinds of enterprises regardless of their economic sectors. Limited and shareholding companies in which the state holds less than 50% of legal capital also operate under this law.¹³ Recently, the Tenth Party Congress, in March 2006, confirmed supporting programs for SMEs and the sentence "preserving the leading role of the state sector" was removed (Vietnamese Communist Party 2006). This promises more favourable economic conditions for the sustainable development of the non-state sector in the future.

2.4 The non-state sector

2.4.1 Characteristics

Ownership structure and economic activities

The non-state sector in Vietnam consists of a small part of formal private enterprises and cooperatives, and a major part of informal household businesses. At the beginning of the reform process, private ownership types were more concentrated under the form of sole-proprietorships. Calculations based on the number of firms in Panel A, Table 2.5 (page 35) show that this ownership form accounted for more than 70% (72.09% from 1991 to 1993, and 78% in 1994). Multiple owners (limited and shareholding companies)

¹² Translated from the Vietnamese: 'Nghị định của Chính phủ số 90/2001/ND-CP ngày 23 tháng 11 năm 2001 về trợ giúp phát triển doanh nghiệp vừa và nhỏ'.

¹³ Before 2005, the enterprise law was applied only for domestic private enterprises. SOEs and FIEs operated under the law on SOEs and the foreign investment law.

were limited, reflecting the risky business environment as well as the insecure property rights. Economic activities were also concentrated in manufacturing industry, trade and services, finance, and construction (Panel A, Table 2.5, page 35). Although new registered enterprises were outnumbered by private enterprises, their registered capital was small compared with that of SOEs (Panel B, Table 2.5). This suggests that private enterprises are equipped with less mechanised capital and are concentrated in labour-intensive areas.

Within the manufacturing industry, non-state enterprises concentrate on food processing, construction materials, and wood products (Table 2.6, page 36). It is understandable because these industries require low capital investment, have low risk and generate high interest. Entry to more high-tech industries such as equipment and machinery, electronics, and chemical industries seems to be constrained because of lack of capital and the monopoly of the state sector during this period. Constraints facing non-state enterprises will be studied further in Section 2.4.3.

Efforts of the Vietnamese government in creating a sound business and policy environment have affected the ownership structure. According to the countrywide enterprise surveys carried out from 2000 to 2004 by the GSO, the percentage of multiple ownership types including limited and stock companies has increased significantly, whereas the percentage of sole-proprietorships has reduced from 58.70% in 2000 to 35.69% in 2004 (Table 2.7, page 37), much lower compared to the more than 70% at the beginning of the reform process.¹⁴ This decrease can be partly explained by the inverse transformation from sole-proprietorships to household firms to benefit from

¹⁴ It should be noted that the ownership structure in Table 2.7 does not include cooperatives. If this kind of ownership is added, the proportion might be changed.

tax advantages¹⁵ and avoid an over-regulated environment towards private firms. Though the number of private ownership types has increased considerably, the non-state sector is still dominated by household enterprises, which accounted for 98.84% of the non-state sector in 1999 (GSO 2002).

In contrast to ownership structure, the distribution of economic activities has not been changed much during this period compared with the beginning period of the reform process. Firms have still concentrated in trade, hotel and food processing industries (World Bank 2004). This suggests that lack of capital and human resources, as well as the state sector monopoly, constrain non-state enterprises to engage in high-tech and high-return industries. In addition, most non-state enterprises produce products for domestic markets. They neither engage much in export activities nor compete with imports (Kokko and Tingvall 2005).

Firm size and technology

Generally, the domestic non-state sector stays small compared to the state and foreign invested sectors. According to the enterprise countrywide surveys from 2000-02 by the GSO (2003), nearly 99% of non-state enterprises are at small and medium scale, having up to 300 workers (as shown in the bottom of Table 2.8, page 38). Of these, more than 90% have up to 50 workers and a capital of under 10 billion VND¹⁶ (bottom of Tables 2.8 and 2.9, pages 38, 39). Figures in Table 2.10 (the first and fourth column, page 40) show that, on average, non-state enterprises employed 29.74 workers during the 2000-

¹⁵ In Vietnam, household enterprises are not required to retain accounting records for calculation of value-added and profit taxes, but pay lump-sum taxes to local authorities (MPI-UNIDO 1999)

¹⁶ VND is Vietnamese currency. The exchange rate in 2000 is: US\$ 1 = 14 168 VND.

04 period, one twelfth of that of state enterprises and one ninth of that of foreign invested companies. Among non-state ownership types, limited and shareholding companies are the largest.

Domestic non-state enterprises are far behind SOEs and FIEs not only in terms of labour, but also in terms of capital. For instance, figures in Table 2.10 show that working capital, fixed assets and long-term financial investment per unit of labour of non-state enterprises are much smaller than those of SOEs and FIEs. Less capital is also reflected in Table 2.11 (page 41) where non-state enterprises, particularly cooperatives, are found to use the highest proportion of only hand tools in 1998. This suggests that the non-state sector possesses obsolete technology.

2.4.2 Performance

Reducing poverty

Though the number of non-state enterprises has risen significantly, they are concentrated in some developed areas such as the Red River Delta (especially Hanoi, the capital), the south east, and the Mekong River Delta (especially Ho Chi Minh City, the biggest commercial city in the country). Based on the Vietnam household living standards surveys (VHLSS) 1992 and 1998, Vijverberg (1998) and Vijverberg and Haughton (2002) give evidence of higher standards of living and participation in a non-farm household enterprises. Moreover, the report written by Steer and the Centre for International Economics (Steer and CIE 2001) states that regions with higher numbers of registered private enterprises have relatively low poverty rates. However, this result must be examined further as regions with higher concentration of non-state enterprises are also home to higher proportions of SOEs and FIEs (World Bank 2004).

Generating employment

One of the biggest issues for the Vietnamese leader is to create jobs for the expanding labour force, of which more than 50% are untrained and unskilled workers (World Bank 2004). Furthermore, labour redundancies from the state sector following the privatisation and the movement of unskilled workers from rural to urban areas are pressing concerns, as to how to create enough jobs for these workers. Non-state enterprises have become a good part of the solution. According to the annual countrywide enterprise surveys carried out during the period 2000-2004 by the GSO, the percentage of employment in non-state enterprises has increased from 33.26% in 2000 to 52.39% in 2004 (Panel B Table 2.12, page 42). On the other hand, the proportion of jobs in the state sector has decreased because of privatisation. It should be noted that the GSO collects data from formally registered firms, so the data may miss a proportion of employment in household and informal private enterprises. If these enterprises are added, the proportion of jobs created by the non-state sector may be considerably higher than the published figures. The VHLSS 1997-8 find that the non-state sector employed more than 64% of industrial workers in 1997. Given these facts, the non-state sector plays an important role in generating employment for the whole economy.

Efficiency and contribution to GDP

The enterprise countrywide surveys 2000-2 conducted by the GSO reveal that among ownership types, the non-state sector exhibits the highest percentage of loss-making enterprises (20.4%) and the lowest ratio of profit per unit of capital. Figures in Table 2.13 (page 42) also indicate that non-state enterprises have lower revenue per unit of labour than SOEs. These figures make non-state enterprises appear to be less efficient

than SOEs. However, if we compare differences between capital and revenue per unit of labour, the performance of non-state firms is not trivial. For instance, in 2000, while non-state enterprises used nearly one-third the capital of SOEs, they produced similar revenue per unit of labour.

Despite the increasing number of firms, the contribution to GDP of the non-state sector during this period is diminishing (Table 2.14, page 43). A possible explanation is the increasing contribution to GDP of the foreign invested sector. Nevertheless, the results raise concerns about the sustainable growth of the non-state sector and its role as the core component of the economy. Chapters 3 and 4 give a deep insight into the performance of this sector.

2.4.3 Constraints

Despite the easing of entry barriers and the improvement in the business environment, non-state enterprises still face many constraints towards their operation and development. Limited access to factors of production such as land and capital, lack of market opportunity and information on markets, insufficient transparency in the existing legal framework leading to red tape and the discretion of state officials, unskilled workers and managers as well as negatively biased social norms, are all hindrances.

Capital

Given the fact that most non-state enterprises own obsolete technology and are short of both working and fixed capital, access to government loans, especially low interest rate credits, is the critical condition for firms to develop. In the surveys on non-state SMEs carried out by ILSSA in 1991, 1996 and 2001, the majority of firms consider lack of capital as the major constraint to their development. The countrywide enterprise

surveys in 2000-2 by the GSO show that the proportion of credit capital of all ownership types accounts for 38% of the increasing investment capital. This credit capital is mainly provided to SOEs and FIEs. A very minor proportion of credit capital comes to non-state enterprises.

Limited access to capital is attributed to complicated procedures and harsh requirements on collateral biased towards non-state enterprises. While SOEs can use any of their assets, including business contracts, as collateral, banks accept only land use right as collateral if borrowers are non-state enterprises and most do not have this. Machinery and business contracts are not accepted as collateral. In addition, to be an eligible candidate, firms must have a profile of long-term operation. This is impossible for non-state enterprises as the non-state sector was legally recognised only a decade ago.

Land

According to the industrial countrywide survey in 1998 by the GSO, on average, an SOE has 1610 square metres (m²) of premises and land, a FIE has 550 m², whereas a non-state enterprise has only 170 m². While SOEs do not use all their premises, non-state firms experience a lack of sufficient premises to develop their operation (World Bank 2004).

The survey of 300 non-state firms in Hanoi and surrounding areas carried out by the World Bank in 2004 draws a gloomy picture about the development of the non-state sector due to lack of land. The survey reveals that most firms interviewed are concerned about premises constraints and consider this an obstacle for their robust development. Non-state firms complain that it takes time for them to find appropriate premises, but the rent contract term is often short as landlords expect to raise rents in the near future.

To have large premises for their production processes, non-state firms have to rent from SOEs or in industrial zones, or they must find places in other provinces. However, SOEs can not lease their premises formally. Furthermore, due to lack of infrastructure in industrial zones and other provinces, as well as complicated procedures and highly informal costs, most non-state enterprises give up their expanding production plans (Carlier and Tran 2004a).

Market opportunity

Another obstacle for non-state enterprises is access to markets. To survive and grow, firms need a larger market share. However, the enterprise countrywide surveys in 2000-2 by the GSO reveal that 48% of firms find it hard to access market information (World Bank 2004). Carlier and Tran (2005) find that important market opportunities, for instance, public bidding contracts, are designed deliberately to be biased in favour of SOEs. Moreover, promoting commercial contracts between non-state enterprises and larger firms such as SOEs or FIEs is limited due to lack of an efficient judiciary system to protect property rights and solve economic disputes in Vietnam. Support from government to access market information is inefficient. Non-state firms have to rely on their own personnel while most of their managers lack marketing and management skills.

Discretion of tax officials

Lack of transparency in the existing legal system causes red tape and the discretion of officials in government bodies. These result in many problems for non-state firms. Tax officials often visit firms, reasoning that non-state enterprises are dishonest and have 'tax fraud' behaviour. The time a firm needs to receive tax officials requires a full-time

employee to take charge of this duty. Furthermore, the existing legal system in Vietnam requires that a formal transaction should be justified by a 'red invoice'¹⁷ and the procedure of getting a 'red invoice book' is very complicated and costs time (see Carlier and Tran (2004a) for more detail). In addition, arbitrariness by tax officials in determining what items and how much could be deducted as expenses, is very common. To avoid these troubles, firms choose bribes as the most efficient solution. This, in turn, causes no motivation for firms to report their genuine financial situation. Consequently, they lose potential investors and opportunities to access credit.

Unskilled workers and inefficient out-sourcing services

The majority of the labour force in the non-state sector is unskilled and has a low training level. Except for a small proportion, people often engage in the non-state sector after failing to get jobs in SOEs or FIEs. This stems from social norms, which consider non-state enterprises as dishonest and vulnerable (Webster 1999), contributing to biased attitudes towards the non-state sector from public and government bodies.

Given poorly trained workers and managers, non-state firms can benefit from outsourced services. Yet, free business development services from the government are of low quality and often cannot meet firms' need. Also, paid services are too expensive for their quality (Service-Growth Consultants Inc and Thien Ngan Co.Ltd 1998). In addition, firms lack information about business development services and their roles towards enterprise development. Even worse, firms hesitate to use outsourcing fearing that their internal information may benefit rivals (GTZ-VCCI-Swisscontact 2002).

¹⁷ The 'red invoice' is considered formal and approved by the state budget in Vietnam. It is red and issued by the Ministry of Finance.

Consequently, non-state enterprises relying on their in-house services need to employ more staff, which increases costs of labour. This weakens their competitiveness.

2.5 Conclusion

This chapter provides an investigation of the historical development, general characteristics, performance and constraints facing the non-state sector in Vietnam.

'*Doi moi*' economic reforms in 1986 created a legal framework for the formation and development of the non-state sector. Since then, a number of legal decrees have been issued aiming at building a better policy environment for non-state firms to develop. However, the emphasis on the 'leading role' of the state sector causes an 'uneven playing field' between economic sectors.

The non-state sector in Vietnam consists of a small proportion of private enterprises and cooperatives, and a larger proportion of household businesses. At the beginning of the reform process, the ownership structure of private enterprises was concentrated in sole-proprietorships. Their activities were also focused in labour-intensive areas with low capital investment such as food processing, trade and services. Policy changes have promoted the development of more evolved ownership types including limited and shareholding companies. However, there has also been an inverse transformation from sole-proprietorships to household firms to avoid the over-regulated environment. In addition, economic activities have not changed much, suggesting that there are still obstacles in some economic areas.

Generally, non-state enterprises are small in terms of both labour and capital compared to the state and foreign invested sectors. Although they perform well in generating jobs and there has been a significant increase in the number of new entry firms, their

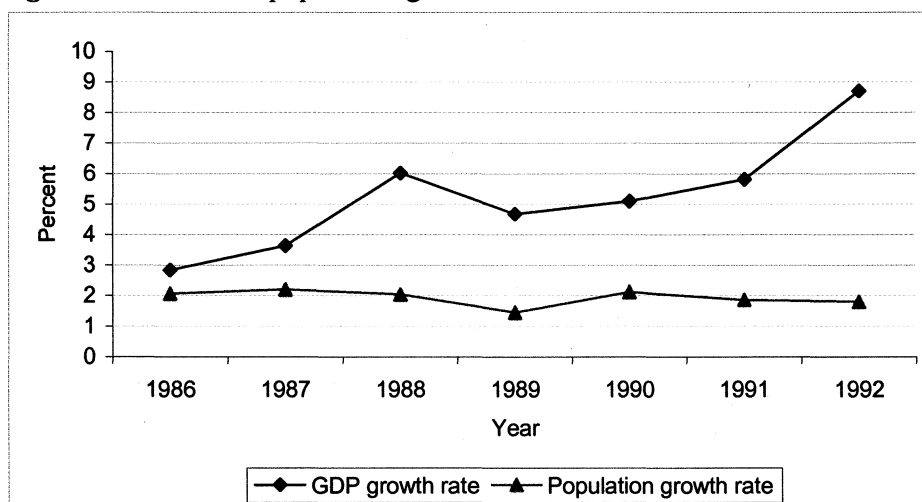
contribution to industrial output and GDP is modest, raising concerns about their economic performance.

Despite the easing of entry barriers for firms, constraints towards the operation and development of non-state enterprises still remain. Capital shortages, limited access to capital, land, market opportunities and information, all impede the development of non-state firms. The discretion of government officials, especially tax officials, unskilled workers and managers, as well as social norms, are also hindrances. The second round of the reform focusing on promoting sustainable development of the non-state sector, especially the removal of the emphasis on 'preserving the leading role of the state sector', promises a fair competitive environment and the sustainable development of the non-state sector.

2.6 Appendix 2.1

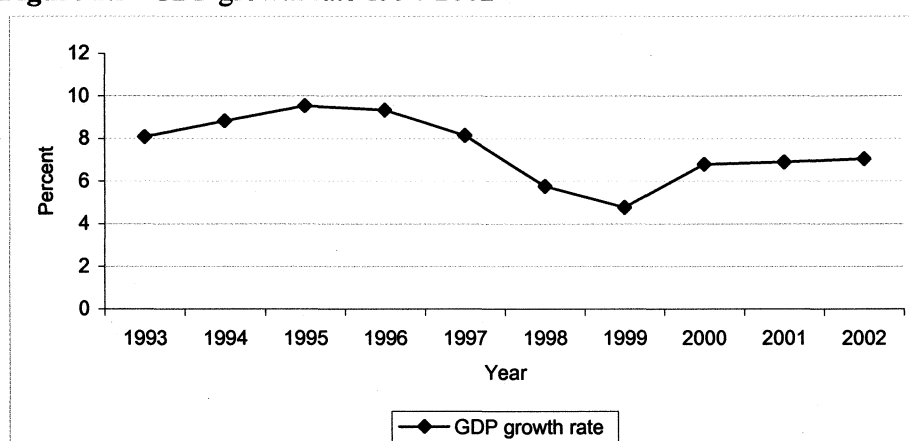
Figures

Figure 2.1 GDP and population growth rate



Source: GSO (1994)

Figure 2.2 GDP growth rate 1994-2002



Source: Asian Development Bank (various years)

Table 2.1 Annual growth rate (%)

	GDP	National income	Population
1955-1960	13.5	9.0	3.5
1961-1965	9.6	7.1	2.9
1966-1970	0.7	0.4	3.0
1971-1975	7.3	6.5	2.6
1975-1980	1.4	0.4	2.0

Source: Dao (1990: 16)

Table 2.2 Number of non-state industrial establishments (at 01 Jan annually), 1986-1992

Year	Total	SOEs	Cooperatives	Sole proprietorships	Household firms
Panel A: Absolute value					
1986	41 357	3 141	37 649	567	N/A
1987	37 609	3 157	33 962	490	N/A
1988	354 020	3 111	32 034	318	318 557
1989	359 506	3 020	21 901	1 248	333 337
1990	393 518	2 762	13 086	770	376 900
1991	459 158	2 599	8 829	959	446 771
1992	377 105	2 268	5 723	1 114	368 000
Panel B: Percentage					
1986	100	7.59	91.03	1.37	N/A
1987	100	8.39	90.30	1.30	N/A
1988	100	0.88	9.05	0.09	89.98
1989	100	0.84	6.09	0.35	92.72
1990	100	0.70	3.33	0.20	95.78
1991	100	0.57	1.92	0.21	97.30
1992	100	0.60	1.52	0.30	97.59

Note: N/A: not available

Source: GSO (1994)

Table 2.3 Number of licensed business by ownership kind, 1991-1994

	Total (To the end of 1994)		From 1991 to the end of 1993		1994	
	Number of firms	Registered capital (Bill.VND)	Number of firms	Registered capital (Bill.VND)	Number of firms	Registered capital (Bill.VND)
Total	19 025	6 620.8	12 180	4 700.6	6 845	1 920.2
Sole proprietorships	13 772	2 000.2	8 684	1 321.2	5 088	679
Limited companies	5 120	3 598.8	3 390	2 572.7	1 730	1 026.1
Shareholding companies	133	1 021.8	106	806.7	27	215.1

Source: Statistical year book (GSO 1994)

Table 2.4 Number of registered and operating firms, 2000-2002

	31/12/2000	31/12/2001	31/12/2002
I. Number of registered firms*	59,413	80,453	101,988
II. Number of operating firms**	34,695	43,839	54,655
Of which			
Cooperatives	3,237	3,646	4,104
Sole proprietorships	20,548	22,777	24,794
Limited companies	10,458	16,291	23,485
Share holding companies ^a	452	1,125	2,272

Note: (a) This kind of ownership includes only non-state shareholding, not companies with state stockholders. The total number, hence, may differ slightly from the figures published by the GSO.

Source: (*) Ministry of Planning and Investment (2003)

(**) The enterprise countrywide surveys 2001-2003

Table 2.5 Number of licensed enterprises by ownership type and economic activity from 1991 to 1994

Ownership types	Sole proprietorship	Ltd. company	Stock company	SOEs	Total	Sole proprietorship	Ltd. company	Stock company	SOEs	Total
Economic activities	Panel A: Number of firms From 01/01/1991 to end of 1993					Panel B: Registered capital (%) From 01/01/1991 to end of 1993				
Total	8506	3197	96	4602	16401	4.44	8.41	2.63	84.52	100.00
Agriculture, forestry	74	42	4	789	909	1.24	1.84	0.10	96.82	100.00
Fishery	908	23	2	66	999	22.59	6.44	7.73	63.24	100.00
Mining	9	4	0	58	71	0.43	3.94	-	95.63	100.00
Manufacturing industry	3083	1083	27	1903	6096	3.90	6.90	0.79	88.40	100.00
Construction	676	447	8	750	1881	7.62	14.89	1.59	75.90	100.00
Trade, services	1306	1538	16	907	3767	3.59	15.80	0.64	79.97	100.00
Hotel	80	56	0	64	200	9.25	20.51	-	70.24	100.00
Finance, credit	2370	4	39	65	2478	9.16	0.25	36.57	54.02	100.00
	1994					1994				
Total	6097	1646	30	333	8106	13.30	19.06	4.51	63.12	100.00
Agriculture, forestry	21	23	1	28	73	1.68	6.64	0.49	91.19	100.00
Fishery	1163	11	1	4	1179	90.97	3.78	2.42	2.83	100.00
Mining	2	5	0	4	11	0.04	0.71	-	99.25	100.00
Manufacturing industry	2103	391	7	159	2660	7.50	13.78	1.31	77.42	100.00
Construction	253	217	2	39	511	15.75	47.61	10.11	26.53	100.00
Trade, services	710	929	9	74	1722	12.39	42.34	4.67	40.60	100.00
Hotel	131	65	0	23	17.49	15.75	-	66.76	100.00	
Finance, credit	1714	5	10	2	1731	55.26	0.43	43.98	0.33	100.00

Source: GSO (1994)

Table 2.6 Percentage of operating firms by industry from 1990 to 1993

	1990	1991	1992	1993
Private enterprises				
Total	100.00	100.00	100.00	100.00
Equipment and machinery	3.38	3.65	1.89	3.52
Electronics	1.82	1.36	0.90	1.08
Metallic products	2.60	2.29	1.97	1.96
Chemical	3.64	3.23	2.60	3.28
Construction materials	13.77	22.52	23.52	13.91
Wood and wood products	18.44	16.48	22.17	12.16
Food processing	45.84	37.96	21.54	51.20
Textile	5.58	4.59	17.68	6.92
Other	4.94	7.92	7.72	5.96
Cooperatives				
Total	100.00	100.00	100.00	100.00
Equipment and machinery	4.05	4.86	5.33	5.01
Electronics	0.83	1.01	0.86	0.81
Metallic products	9.21	10.98	10.90	10.89
Chemical	6.07	7.79	8.26	7.45
Construction materials	21.41	22.31	20.28	18.50
Wood and wood products	12.41	11.67	11.81	10.42
Food processing	27.07	21.66	21.97	32.08
Textile	11.62	11.62	12.85	7.32
Other	7.33	8.11	7.75	7.51
Household enterprises				
Total	100.00	100.00	100.00	100.00
Equipment and machinery	4.75	3.86	2.82	1.90
Electronics	1.38	1.22	0.94	0.27
Metallic products	7.11	6.95	4.92	4.63
Chemical	1.18	0.96	1.00	0.78
Construction materials	7.74	8.34	11.16	11.93
Wood and wood products	16.21	16.11	18.17	19.56
Food processing	35.93	36.61	40.14	39.11
Textile	19.66	19.08	14.58	14.00
Other	6.04	6.87	6.28	7.81

Source: GSO (1994)

Table 2.7 Non-state ownership structure from 2000 to 2004

	2000	2001	2002	2003	2004
Number of non-state enterprises	35004	44314	55236	64526	84003
Total percentage	100.00	100.00	100.00	100.00	100.00
Cooperatives	9.25	8.23	7.43	6.43	6.37
Sole proprietorships	58.70	51.40	44.89	39.76	35.69
Partnerships [†]	0.01	0.01	0.04	0.03	0.02
Limited companies	29.88	36.76	42.52	46.75	48.71
Stock companies with State shareholder	0.87	1.06	1.01	1.04	0.97
Stock companies	1.29	2.54	4.11	6.00	8.24

Note: [†] This new legal form of partnerships differs from that existed at the beginning of the reform process. They were more evolved and defined, and added to the private sector in the enterprise law in 1999.

Source: The countrywide enterprise surveys 2000-2004 (GSO). These surveys do not collect data from household enterprises.

Table 2.8 Non-state enterprises by size (number of workers), 2000

	Number of firms	Classified by number of workers								
		Up to 5	5 - 9	10 -49	50 -199	200 - 299	300 - 499	500 - 999	1000- 4999	5000 to more
Total	34695	10132	10772	10447	2599	282	227	147	87	2
+ Cooperative	3237	114	993	1472	493	50	49	45	21	
+ Sole proprietorships	20548	9203	6014	4659	583	42	33	8	6	
+ Limited companies	10458	801	3683	4137	1390	175	132	85	53	2
+Shareholding companies	452	14	82	179	133	15	13	9	7	
2001										
Total	43839	11742	13750	14074	3357	371	280	165	96	4
+ Cooperative	3646	191	1249	1607	469	51	37	30	12	
+ Sole proprietorships	22777	9384	7020	5564	701	54	35	13	6	
+ Limited companies	16291	2042	5295	6429	1944	228	179	105	65	4
+Shareholding companies	1125	125	186	474	243	38	29	17	13	
2002										
Total	55236	12005	17992	19130	4735	538	445	269	117	5
+ Cooperative	4104	173	1309	1960	524	59	43	29	7	
+ Sole proprietorships	24794	9166	7989	6600	889	72	46	26	6	
+ Limited companies	23485	2431	8159	9499	2632	299	253	142	65	5
+Shareholding companies	2272	226	524	948	436	56	40	26	16	

Source: From the website of GSO (www.gso.gov.vn/surveys/industry/firms) classified by number of workers [các cuộc điều tra/doanh nghiệp/số lượng doanh nghiệp phân theo qui mô lao động]

Note: Percentage of firms having up to 300 workers: Of SMEs, firms up to 50 workers account for:

2000: 98.66%	2000: 91.58%
2001: 98.75%	2001: 91.39%
2002: 98.48%	2002: 90.31%

Table 2.9 Non-state enterprises by capital employed, 2000

	Number of firms	Classified by capital employed (Bill.VND)							
		Up to 0,5	0,5 -1	1 - 5	5 -10	10 -50	50 -200	200 - 500	500 to more
Total	34695	16112	6334	9239	1569	1240	170	21	10
+ Cooperative	3237	1208	467	1240	187	122	12	1	
+ Sole proprietorships	20548	13058	3648	3383	310	137	11	1	
+ Limited companies	10458	1798	2183	4420	1012	905	125	14	1
+ Shareholding companies	452	48	36	196	60	76	22	5	9
2001									
Total	43839	18039	8252	13191	2247	1820	255	27	8
+ Cooperative	3646	1406	491	1399	217	124	7	2	
+ Sole proprietorships	22777	12764	4536	4821	438	201	15	1	1
+ Limited companies	16291	3672	3097	6527	1453	1335	188	18	1
+ Shareholding companies	1125	197	128	444	139	160	45	6	6
2002									
Total	54655	18454	10846	18856	3353	2699	387	48	12
+ Cooperative	4104	1486	587	1588	280	158	4	1	
+ Sole proprietorships	24794	12248	5316	6300	608	299	20	3	
+ Limited companies	23485	4443	4678	9975	2152	1916	284	32	5
+ Shareholding companies	2272	277	265	993	313	326	79	12	7

Source: From the website of GSO (www.gso.gov.vn/surveys/industry/firms) classified by capital [các cuộc điều tra/doanh nghiệp/số lượng doanh nghiệp phân theo qui mô nguồn vốn]

Note: Percentage of firms having up to 10 Bill.VND

2000: 95.85%

2001: 95.18%

2002: 94.24%

Table 2.10 Firm characteristics by ownership types in 2000 and 2004

	2000			2004		
	Average labour (number of workers)	Working capital per labour (billion VND)	Fixed assets & LT [†] financial investment per labour (billion VND)	Average labour (number of workers)	Working capital per labour (billion VND)	Fixed assets and LT financial investment per labour (billion VND)
	(1)	(2)	(3)	(4)	(5)	(6)
Total	83.64	0.28	0.12	62.89	0.34	0.13
SOEs	362.66	0.32	0.11	489.53	0.50	0.16
Central SOEs	629.52	0.44	0.14	771.42	0.64	0.19
Local SOEs	213.25	0.12	0.06	278.63	0.22	0.11
Non-state enterprises	29.74	0.09	0.03	29.47	0.17	0.06
Cooperatives	56.31	0.04	0.02	29.51	0.08	0.03
Sole proprietorships	11.50	0.07	0.03	14.41	0.10	0.04
Partnerships	28.25	-	0.05	21.19	0.28	0.08
Limited companies	49.42	0.09	0.03	34.06	0.15	0.06
Stock companies with state share holder	202.86	0.17	0.05	225.83	0.42	0.12
Non-state stock companies	96.43	0.45	0.08	44.44	0.28	0.08
Foreign invested companies	267.26	0.56	0.36	331.07	0.40	0.23
Firms with 100% foreign investment	334.87	0.29	0.16	370.52	0.25	0.13
Joint-venture with foreign partner	181.21	1.20	0.85	218.85	1.10	0.70

Source: Enterprise countrywide surveys in 2000 and 2004 (GSO)

Note: [†] LT: long term.

Table 2.11 Number of industrial firms by technology and ownership types, 1998

	Total (number)	Proportion of enterprises by technology		
		Power driven and semi- power driven machinery	Manually operated machinery	Only hand tools
Total	9299	21.51	62.30	16.19
Central SOEs	569	37.96	60.11	1.93
Local SOEs	1252	32.67	59.66	7.67
Cooperatives	949	9.28	48.25	42.47
Sole proprietorships	4213	10.09	72.63	17.28
Limited companies	1438	26.91	57.37	15.72
Stock companies with state shareholder	33	24.24	63.64	12.12
Stock companies	30	23.33	63.34	13.33
Foreign invested companies	435	51.73	41.83	6.44
Joint-venture between State and foreign	294	62.93	35.71	1.36
Joint-venture between private and foreign	76	51.32	46.05	2.63
Joint-venture between mix of economic sectors	10	60.00	40.00	0.00

Source: The countrywide enterprise survey 1998 (GSO)

Table 2.12 **Percentage of employment by economic sectors, 2000-2004**

Economic sector	2000	2001	2002	2003	2004
Panel A: Number					
Total	3 129 433	3 443 939	3 966 715	4 314 833	4 725 350
State sector	2 088 531	2 114 324	2 260 306	2 264 942	2 249 902
Domestic non-state sector	1 040 902	1 329 615	1 706 409	2 049 891	2 475 448
Panel B: Percentage					
Total	100.00	100.00	100.00	100.00	100.00
State sector	66.74	61.39	56.98	52.49	47.61
Domestic non-state sector	33.26	38.61	43.02	47.51	52.39

Source: the countrywide enterprise surveys: 2000-4 (GSO)

Table 2.13 **Revenue per unit of labour by ownership types, 2000-2004**

(Billion VND/labour)

	2000	2001	2002	2003	2004
Total	0.21	0.21	0.25	0.27	0.29
SOEs	0.21	0.22	0.27	0.29	0.32
• Central SOEs	0.24	0.25	0.32	0.34	0.36
• Local SOEs	0.16	0.16	0.18	0.20	0.25
Non-state enterprises	0.20	0.20	0.21	0.24	0.26
• Cooperatives	0.05	0.07	0.07	0.08	0.07
• Sole proprietorships	0.30	0.28	0.27	0.27	0.32
• Partnerships	0.21	0.29	5.78	15.89	0.09
• Limited companies	0.20	0.20	0.22	0.24	0.26
• Stock companies with State shareholder	0.17	0.19	0.20	0.26	0.34
• Stock companies	0.14	0.16	0.17	0.21	0.24

Source: The countrywide enterprise surveys: 2000-2004 (GSO)

Table 2.14 Contribution to GDP by ownership types (%)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ownership types										
SOEs	40.18	39.93	40.48	40.00	38.74	38.52	38.40	38.38	39.08	39.10
Non-state enterprises	53.52	52.68	50.45	49.98	49.03	48.20	47.84	47.86	46.45	45.76
Cooperatives	10.06	10.03	8.91	8.90	8.84	8.58	8.06	7.99	7.49	7.09
Private enterprises	7.44	7.40	7.22	7.24	7.26	7.31	7.95	8.30	8.23	8.49
Individual businesses	36.02	35.25	34.32	33.83	32.93	32.31	31.84	31.57	30.73	30.19
Foreign invested companies	6.30	7.39	9.07	10.03	12.24	13.27	13.76	13.76	14.47	15.13

Source: From the website of GSO ([www.gso.gov.vn/statistics/national account/](http://www.gso.gov.vn/statistics/national_account/)) contribution to GDP by ownership [số liệu thống kê/tài khoản quốc gia/cơ cấu tổng sản phẩm trong nước theo giá thực tế phân theo thành phần kinh tế và ngành kinh tế]

CHAPTER 3

FIRM EFFICIENCY:

Effects of family labour, location and government support

3.1 Introduction

The non-state sector in Vietnam has played an important role in reducing poverty and generating jobs, especially for low skilled labour from rural areas (Webster and Taussig 1999; World Bank 1999a; Kokko and Sjöholm 2004; Rand et al. 2004; Schaumburg-Muller 2005). Nevertheless, its contribution to GDP has diminished, from 53.52% in 1995 to 48.20% in 2000 and 45.76% in 2004 (GSO 2005). In addition, constraints facing non-state enterprises have impeded this sector to grow to a larger scale. Until 2002, the non-state sector was still characterised as small scale with more than 90% of firms employing up to 50 workers (GSO 2003).

Concerns about the non-state sector performance has generated a series of papers analysing qualitatively the effects of market oriented policies on non-state firm performance such as MPI-UNIDO (1999), Sakai and Takada (2000), Steer and CIE (2001), Schaumburg-Muller (2005) and CIEM (2006). The examination is recently extended to the quantitative analysis of the non-state sector performance (Vijverberg 1998; Vijverberg and Haughton 2002; Gustavsson and Kokko 2004; Hansen et al. 2004; Kokko and Sjöholm 2004). However, questions remain as to the effects of market policies on firm efficiency and factors, including location and government support that have contributed to improve efficiency across industries. Answers to such questions provide guidance to promote efficient performance of the non-state sector.

This chapter uses the data of non-state manufacturing SMEs collected by ILSSA of Vietnam in collaboration with the SSE of Sweden in 1991, 1996 and 2001 and the stochastic frontier approach to investigate technical efficiency (TE) of non-state firms. The results provide insights as to what contributes to improved performance and what

might be done to improve firm technical efficiency.

The remainder of the chapter is organised as follows. Section 3.2 outlines the basic concept of TE and its determinants in the manufacturing sector. Section 3.3 reviews the theoretical framework of the stochastic frontier method based on which econometric estimates of production and inefficiency functions are performed. A brief description of data and variables is given in Section 3.4. Section 3.5 characterises econometric models. Empirical results are provided in Section 3.6 and Section 3.7 concludes.

3.2 Technical efficiency: basic concept and its determinants

3.2.1 The basic concept of technical efficiency

TE of an individual firm can be defined as the ratio of its actual/observed output to the maximum output that the firm can obtain given the input level and production technology. Maximum output can be achieved if the firm can apply best practice techniques and if it faces no constraints from the environment in which it operates. In this case, the firm is fully technically efficient. The maximum or frontier output can be estimated using either the parametric method such as the stochastic frontier approach (SFA) or non-parametric method as data envelopment analysis (DEA). Firms that operate below the frontier production function (FPF) are technically inefficient. The gap between the actual and frontier output is referred to as technical inefficiency and is caused by various determinants including non-price, organisational and institutional factors.

3.2.2 Determinants of technical inefficiency

Pitt and Lee (1981) provided a pioneering empirical work that studies the effects of a

firm's attributes including firm size, age and ownership on TE. Using pooled data obtained from individual Indonesian weaving firms in 1972, 1973, and 1975, they applied the SFA with two-stage analysis¹⁸ and found a positive relationship between firm size and efficiency. In contrast, the correlation between firm age and efficiency is negative. They also found that domestic firms performed better than foreign ownership enterprises.

Following Pitt and Lee (1981), Little et al. (1987) applied the same methodology of a two-stage analysis to examine the effects of factors such as firm size, age, worker and owner experience, and owner education level on TE. Using cross-sectional data obtained from firm surveys in five manufacturing industries (shoemaking, printing, soap, machine tooling and metal casting) in India in 1977, Little et al. found no relationship between firm size and TE in all industries, except for machine tooling industry. They concluded that the relationship between firm size and TE for small industries may be either positive or negative depending on how superior or inferior was organisation ability. The relationship between firm age and TE was also insignificant and human capital had either positive or insignificant effects. Little et al., then, suggested that entrepreneur marketing and financial management skills are more important for small and handicraft industries.

The development of the SFA of Kumbhakar et al. (1991) and Reifschneider and Stevenson (1991) to analyse the determinants of technical inefficiency in one stage since 1991 has induced a series of papers in the efficiency area. Admassie and

¹⁸ The stochastic frontier approach with two-stage analysis runs the frontier production function first, then, regresses the predicted inefficiency effects or technical efficiency level on its supposed determinants. However, this approach is noted as inconsistent by Kumbhaka et al. (1991) and Reifschneider and Stevenson (1991).

Matambalya (2002), using cross-sectional data from a small and medium enterprises (SMEs) survey in Tanzania in 1991, found that younger firms were more efficient and the effect of firm size on TE was mixed. The effect of human capital, as proxied by the average duration of training of labour and management, is mixed as well.

Similar results were found in Asia countries for SMEs. Wiboonchutikula (2001) found that small firms were more efficient in Thailand, while Yao (1998), and Mini and Rodriguez (2000) revealed the inverse relationship in China and the Philippines. A negative impact of firm age on TE is found in Kalirajan and Hill (1993) for the Indonesian garment industry in 1986. Other papers such as Liu and Liu (1996), Kong et al. (1999), and Vu (2003) provide empirical evidence on the effect of the performance bonus system on firm TE.

The effects of urban location are considered to be positive on firm performance as firms can benefit from better educated workers, well-informed information and a more accessible technology market. However, Glancey (1998) argues that firms located in urban areas may face higher factor prices due to greater competition for factors of production, especially land and labour, hence, may be less efficient than those in rural areas. Empirical evidence in Liu and Liu (1996), Kong et al. (1999), and Vu (2003) support Glancey's argument.

Studies on the impact of government support including financial provision, technical and marketing consultation, training workers and managers, and facilitating subcontracts on firm TE are rather limited. For instance, Mini and Rodriguez (2002) revealed a positive relationship between subcontracting and TE in the textile industry in the Philippines. On the other hand, Iqbal and Urata (2002), by summarising Kimura's paper, stated that subcontracting might not be a source of efficiency. Though, not

studying TE, Rasiah (2002) gave evidence of various government supports, especially support in providing maximum information for subcontract-searching, promoting subcontractor performance in Malaysia.

3.3 Theoretical framework

To assess those factors that contribute to efficiency in the Vietnamese non-state small and medium manufacturing enterprises, we estimate a stochastic production frontier. This approach was first independently developed by Aigner et al. (1977) and Meeusen and Van Den Broeck (1977). The issue was later fully developed for panel data in Battese and Coelli (1995).

Following Battese and Coelli (1995), the stochastic FPF for unbalanced panel data can be written as:

$$Y_{it} = f(X_{it}, \beta, t) e^{v_{it} - u_{it}} \quad (3.1a)$$

or in logarithmic form as:

$$\ln(Y_{it}) = \beta \log X_{it} + V_{it} - U_{it} \quad (3.1b)$$

where Y_{it} denotes output of firm i , at time t . X_{it} is the vector of inputs for firm i at time t . β is the vector of unknown parameters to be estimated. Time t is included in the frontier function to measure either technological progress (Battese and Coelli 1995; Kong et al. 1999) or the effect of unobservable variables on output over time (Kompas et al. 2004). Random error term, v_{it} , is independently identical distribution $N(0, \sigma_v^2)$ and independently distributed of u_{it} . V_{it} takes into account a random variation of frontier output due to factors beyond the control of firms such as weather, input

breakdowns and damaged products. U_{it} reflects one-side deviations of actual output from the maximum level of production due to the technical inefficiency resulting from factors under the firm's control in the direction that all actual output is below the maximum level. If a firm is fully technical efficient, $u_{it}=0$, otherwise it will be greater than zero depending on the level of efficiency. The subtraction of the non-negative random variable u_{it} from v_{it} means that the logarithm of y_{it} is smaller than it would otherwise be if technical inefficiency did not exist.

The more generalised assumption for the distribution of u_{it} is that it follows a normal non-negative truncation of the $N(\mu_{it}, \sigma_u^2)$ distribution (Kumbhakar and Lovell 2000). This assumption eases to a certain level the criticism of the distributional effect on estimated parameters and TE level. Furthermore, it allows uses of the maximum likelihood estimation (MLE) method, which can estimate the parameters of both frontier and inefficiency functions simultaneously. This overcomes the estimation inconsistency of the two-stage analysis and outweighs the conventional estimation methods of panel data in the sense that MLE takes into account different influences on the FPF of different efficiency levels (Coelli et al. 1998).

To analyse the determinants of technical inefficiency, the common assumption is that the mean of normal truncated at zero distribution $N(\mu_{it}, \sigma_u^2)$ is a function of explanatory variables including firm-specific characteristics as well as institutional factors and can be specified by equation (3.2) as:

$$\mu_{it} = \delta_0 + z_{it}\delta + \omega_{it} \quad (3.2)$$

where z_{it} is a vector of explanatory variables determining the technical inefficiency of

production over time. δ is a vector of unknown coefficients to be estimated. ω_{it} follows a normal distribution $N(0, \sigma_\omega^2)$. Provided that the inefficiency effects are stochastic, some input variables can be included in the inefficiency function such as the way suggested by Huang and Liu (1994) to capture the non-neutral shift of the FPF. Time trend or dummy year variable can be also included into the model (3.2) depending on whether data is time series or at a point in time to investigate technical inefficiency change.

The individual technical efficiency can be measured as:

$$TE_{it} = \frac{Exp(\ln Y_{it} / u_{it}, x_{it})}{Exp(\ln Y_{it} / u_{it} = 0, x_{it})} = e^{-u_{it}} \quad (3.3)$$

where Y_{it} in the numerator is the actual output, and Y_{it} in the denominator is evaluated at the MLE (Kalirajan and Hill 1993). TE_{it} will take values between zero and one, depending on whether a firm is completely inefficient or fully efficient.

Following Coelli et al. (1998), although the specifications in equations (3.1) and (3.2) are defined in terms of panel data, they can be estimated for cross-sectional data using FRONTIER 4.1 software (Coelli 1996). Both cross-sectional and panel models are estimated in this chapter.

3.4 Data and variables

3.4.1 Data

The data used in this chapter were collected by ILSSA, an institute of MOLISA of Vietnam in collaboration with the SSE of Sweden. The sample is of small and medium

non-state enterprises in Vietnam in 1991, 1996 and 2001. In accordance with the dominance of the small-scale non-state sector, the data is limited to firms with less than 100 employees.

The sample consists of key information on non-state SMEs. Firms are selected equally between the southern and northern parts of the country and between metropolitan or more developed areas including Ha Noi, Hai Phong and Ho Chi Minh city, and non-metropolitan or less developed areas¹⁹ such as Phu Tho, Ha Tay, Quang Nam and Long An. A wide range of activities is covered including processing of agricultural products, other manufacturing, repair shops, commerce/trade, hotels, restaurants, cafes and catering, and transport. The data set used in this chapter is confined to only non-state enterprises in the manufacturing industry.

By adopting the standard international trade classification (SITC) revision 3, firms in the sample can be classified in sub-industries including (1) SITC0-food processing, (2) SITC5-chemicals, (3) SITC6-manufactured goods classified chiefly by material, (4) SITC7-machinery and transport equipment, and (5) SITC8-miscellaneous manufactured articles.

In 1991, the survey collected data of more than 900 firms with different ownership types including household firms, sole-proprietorships, cooperatives, partnership enterprises, and a small number of small state enterprises in both metropolitan and non-metropolitan areas of Vietnam. After dropping state enterprises and missing values, only 233 observations remain in the sample.

¹⁹ The surveys use the word 'urban' and 'rural' to indicate metropolitan and non-metropolitan areas, respectively.

During the 1991 survey, there had been no thought of a repeat survey. Therefore, when the second survey was implemented in 1996, only around 300 firms were detected as previously sampled. Thus, the second survey in 1996 collected data on 300 previously surveyed firms together with 500 new ones. 608 observations remain in the sample after dropping missing values. For more information about the first and second surveys, readers can refer to Ronnas and Ramamurthy (2001).

In 2001, the survey collected data of 900 new firms and 600 previously surveyed enterprises including those that had survived from 1991 to 1996. Since the second round survey, two other ownership kinds, including limited and shareholding companies, have appeared on the scene. They are somewhat similar in economic characteristics and are known as more advanced technical and managerial skills firms. There has been a significant transformation in ownership during this period as well. Households have become more similar to sole-proprietorships but are reluctant to register as private firms. In contrast, many sole-proprietorships have transformed into households to benefit from tax regulations. Furthermore, the old type of cooperatives, which were synonymous with socialist collective enterprises either disappeared or were transformed into market-oriented genuine cooperatives²⁰ (Ronnas and Ramamurthy 2001: 22). After dropping missing values, 1131 observations are left in the sample. Detailed information about the third survey can be found in Rand et al. (2004).

Table 3.1 (page 70) provides the structure of firm ownership and size for each year. As seen in this Table, household enterprises have the smallest size, around 6 workers per enterprise, on average. Other ownership forms are much larger, especially limited and

²⁰ A new cooperative is an independent production unit. It does not rely on government assistance and has power in decision-making.

shareholding companies. Overall, the proportion of micro firms, having up to 10 workers, is highest in food processing (SITC0) and miscellaneous (SITC8) industries, while the chemical industry (SITC5) has the lowest proportion of micro firms.

Since the number of observations in the short-run 1991-96 and the long-run 1991-96-2001 panel models are small²¹, these models may suffer measurement errors that can be overcome with large samples. Therefore, to give the most accurate picture about efficiency of non-state SMEs in Vietnam between 1991 and 2001, the chapter estimates separately cross-sectional models for each year and the short-run unbalanced models for the period 1996-2001. To control for heterogeneity in technology among industries, separate functions for each industry are estimated.

3.4.2 Variables

In the frontier functions, output is measured by the value of total products²² produced in the observed year at current price. Capital is total owned assets including buildings and land on which the building is constructed, machinery and hand tools reported by firms. Since the surveys failed to collect the number of working hours that is more suitable for a small industry characterised by households, as pointed out by Little et al. (1987), the chapter uses the number of workers as labour input. Materials include the value of intermediate inputs and energy. For the panel model, outputs and materials are deflated by the GDP deflator, calculated by the GSO of Vietnam. Since statistical yearbooks in Vietnam are presented in different formats before and after 1995, it is difficult to find a

²¹ Among 300 firms detected as observations in the panel since 1991, only 191 and 110 enterprises survive until 1996 and 2001, respectively.

²² The value of total products consists of a main part of total revenue, which includes revenue from sale of goods, services, lease of equipment and interest received reported by the surveys.

suitable statistical criterion to deflate capital. Hence, the chapter relies on the expenditure shares of GDP on fixed investment calculated by the Asian Development Bank as a deflator for capital. Details of some key variables across years and industries are summarised in Tables 3.2, 3.3 and 3.4 (pages 71, 72, 73).

3.5 Econometric models

The two most common functional forms for the stochastic FPF described by equations 3.1a and 3.1b are the Cobb-Douglas and the Transcendental Logarithmic Production Function or translog specifications. The advantages of the translog model over the Cobb-Douglas are that the translog function relaxes the restrictions of constant input elasticities and the requirement that the elasticity of substitution is equal to one (Berndt and Christensen 1973). The functional forms for both specifications are expressed as follows:

Cobb-Douglas form:

$$\ln Y_{it} = \beta_0 + \beta_1 \ln K_{it} + \beta_2 \ln L_{it} + \beta_3 \ln M_{it} + v_{it} - u_{it} \quad (3.4a)$$

Translog form:

$$\begin{aligned} \ln Y_{it} = & \beta_0 + \beta_1 \ln K_{it} + \beta_2 \ln L_{it} + \beta_3 \ln M_{it} \\ & + \beta_4 \ln K_{it} \ln L_{it} + \beta_5 \ln K_{it} \ln M_{it} + \beta_6 \ln L_{it} \ln M_{it} \\ & + \beta_7 (\ln K_{it})^2 + \beta_8 (\ln L_{it})^2 + \beta_9 (\ln M_{it})^2 + v_{it} - u_{it} \end{aligned} \quad (3.4b)$$

where Y_{it} is output, K_{it} , L_{it} , and M_{it} are three factors of production (capital, labour and materials respectively). The second line of equation 3.4b expresses the interaction terms between logarithm of input factors, and the third line describes their squared terms. The

subscript t is equal to 1 if the model is cross-sectional.

For the preferred model, the generalised likelihood ratio test²³ is used to test the null hypothesis that the Cobb-Douglas is an adequate representation for the data given the translog form. Results from the tests are provided in Table 3.5 (page 74). As shown in the Table, manufactured goods industry (SITC6) has the consistent Cobb-Douglas production function whereas miscellaneous industries (SITC8) are characterised by a translog specification for the whole period studied. Changes in technologies used are found for other industries. However, the translog specification, which is often found in micro data, dominates the industries studied.

Determinants of TE that are found in the literature are modeled in the inefficiency function. This function is written separately for 1991 in equation 3.5a, and for 1996 and 2001 in equation 3.5b. This is because the limited group has appeared since 1996.

$$\mu_{it} = \delta_0 + \delta_1 hh_{it} + \delta_2 cooperative_{it} + \delta_3 metropolitan_{it} + \delta_4 size_{it} + \delta_5 age_{it} + \delta_6 exper_{it} + \delta_7 bonus_{it} + \delta_8 ca_{it} + \delta_9 nfa_{it} + \delta_{10} sub_{it} + \omega_{it} \quad (3.5a)$$

$$\mu_{it} = \delta_0 + \delta_1 hh_{it} + \delta_2 soleproprietorship_{it} + \delta_3 cooperative_{it} + \delta_4 metropolitan_{it} + \delta_5 size_{it} + \delta_6 age_{it} + \delta_7 exper_{it} + \delta_8 bonus_{it} + \delta_9 ca_{it} + \delta_{10} nfa_{it} + \delta_{11} sub_{it} + \omega_{it} \quad (3.5b)$$

²³ The likelihood ratio (LR) test is twice differenced in the log-likelihood value for the unrestricted and restricted functions and calculated as:

$$LR = 2(L_u - L_r)$$

The LR has approximately chi-squared distribution with the degree of freedom equal to the number of parameters assumed to be equal to zero in the null hypothesis. The critical value of LR is drawn from Kodde and Palm (1986).

where *hh* is a dummy variable for household enterprises, *soleproprietorship* is a dummy variable for sole-proprietorships and *cooperative* is a dummy that takes the value 1 if a firm is a cooperative and 0 otherwise. There are only four kinds of ownership appearing in the inefficiency function because the characteristics of partnerships are similar to those of sole-proprietorships, they are regrouped in the 'sole-proprietorship' group. Similarly, characteristics of shareholding and limited companies are also very alike, they are also combined in the 'limited' group. To avoid the dummy trap, the sole-proprietorship group is excluded from the model (3.5a) as a reference group, and the limited group is excluded from the model (3.5b) as a base.

A dummy variable *metropolitan* takes the value 1 if a firm is located in metropolitan areas and 0 otherwise, to control for differences in location. Firm size, defined by *size*, is a dummy variable that takes the value 0 for micro firms and 1 for small and medium enterprises employing up to 200 workers.²⁴ Firm age, defined by *age*, is the number of years calculated since a firm's establishment. A dummy variable *exper* takes the value 1 if the entrepreneur engages in production of similar products prior to establishing a firm and 0 otherwise. A dummy variable *bonus* takes the value 1 if a firm applies a performance bonus system and 0 otherwise. Government assistance to firms is denoted by the type of aid in terms of credit (*ca*) and non-financial assistance (*nfa*). *Sub* is a dummy variable taking the value 1 if a firm is a subcontractor and 0 otherwise.

Under the assumption of normal distribution for v_{it} and the truncated normal distribution for u_{it} , the coefficients of the frontier and inefficiency functions can be

²⁴ Though the surveys limit firm size to less than 100 employees, some enterprises in the sample employ up to 200 workers.

estimated jointly by the maximum likelihood method. Battese and Corra (1977) derive the likelihood function of the parameter γ , which has the value between 0 and 1 depending on whether σ_u^2 or σ_v^2 is equal to zero, in terms of the two-variance parameters of the frontier function:

$$\gamma = \frac{\sigma_u^2}{\sigma^2} \text{ where } \sigma^2 = \sigma_v^2 + \sigma_u^2$$

and σ_v^2 and σ_u^2 are variances of noise and the inefficiency effects, respectively. If the value of γ is near zero, deviations from the frontier function are attributed mostly to noise, while the value of nearly 1 indicates that deviations are mainly due to firm-specific technical inefficiency.

3.6 Empirical results

3.6.1 Cross-sectional models

The three-step procedure of FRONTIER 4.1 allows us to obtain the frontier function evaluated at the maximum of the likelihood function when u_i equals 0. If a firm is inefficient, its actual output is placed below the frontier level by the term u_i , depending on how much inefficiency exists. FRONTIER 4.1 also reports the result of the null hypothesis that technical inefficiency effects are absent.²⁵ This is the case of no inefficiency function and no deviation due to technical inefficiency (i.e. $\gamma = \delta_0 = \delta_1 = \dots = \delta_{11} = 0$). The model is then equivalent to the average response of

²⁵ The value for this test is calculated by FRONTIER4.1 and reported as the 'LR test of the one-sided error'.

the frontier function, which can be estimated by ordinary least squares (OLS). Results from the likelihood ratio test confirm the presence of technical inefficiency effects in all industries (Table 3.6, page 74) except in manufactured goods (SITC6) in 1991 and food processing (SITC0) in 1996.

Results from estimated stochastic FPF for the 1991 (Table 3.7, page 75) raise concerns about the correct measurement of capital since the coefficient of this input is insignificant in almost all industries. The significant coefficient is found in the food processing industry (SITC0) but it is negative. A possible explanation for the measurement error in capital is due to difficulties to evaluate exactly the value of such an input. It should be noted that total owned asset is mainly measured by the value of buildings including the value of land on which the building is constructed. The difficult evaluation was due to a 'land fever' [sốt đất] which happened in Vietnam in 1991 (Ministry of Finance 2005) when land prices shot to an abnormally high level. It would be the case that some firms might exaggerate their building values because their evaluation might be distorted by either 'land fever' or market transaction reasons.

In the inefficiency functions, insignificant effects of determinants are often found. This, again, suggests that there might be problems with measurement errors and also more observations may be needed. Given these limitations, little can be told from the 1991 models.

The estimated models for 1996 and 2001 are presented in Table 3.8 (pages 76, 77). Based on the estimated FPF, productions elasticities are calculated and given in Table 3.9 (page 78). Two main points can be drawn from Table 3.9. First, the main component of output results from intermediate inputs followed by labour suggesting that non-state SMEs in Vietnam have low added values and low returns. Second, the structure of

elasticity does not change much during the period studied. This implies that SMEs still stick to low-cost labour advantages. Webster (1999), by summarising findings from other developing countries, states that if firms cannot get rid of a low-cost labour trap and fail to build the ability to climb up the value-added ladder, they cannot compete in the market. The results and Webster's conclusion raise concerns about the competitiveness of non-state SMEs in Vietnam if nothing will be changed in the near future. This issue should be considered in the SME promoting program.

Regarding to the determinants of technical inefficiency effects for non-state SMEs in Vietnam during 1996-2001, the likelihood ratio test in Table 3.6 (page 74) confirms the presence of technical inefficiency effects in almost all industries during this period. Two more hypotheses are tested in Table 3.10 (page 78) to find the most suitable method of estimation and the effects of firm and environment-specific characteristics given the presence of technical inefficiency effects.

The first null hypothesis in Table 3.10, which specifies that technical inefficiency effects are not stochastic, is rejected. Thus the suitable estimation method is MLE. If the null hypothesis cannot be rejected, ie, $\gamma = 0$, the variance of the inefficiency effects, σ_u^2 , is also equal to zero and the model reduces to a traditional mean response function in which variables in the inefficiency function are included in the frontier function. In that case, the parameter δ_0 is not identified. Hence, the critical value for this null hypothesis is χ^2 -distribution. The estimate of nearly 1 for γ shows that all deviations of actual output from the frontier level are due to technical inefficiency

The second null hypothesis that firm specific and institutional factors do not affect technical inefficiency ($\delta_i = 0$ for all i , and $\delta_i = 0$ for all $i > 0$) is also rejected. This

indicates that the joint effect of these explanatory variables in the inefficiency models is significant although the individual effects of some variables are statistically insignificant. Based on the estimated results of technical inefficiency functions for 1996 and 2001 in Table 3.8, a summary of these findings in terms of inefficiency effects is made and given in Table 3.11 (page 79).

Family labour effects

The sign and power of each ownership variable in Table 3.11 indicate that technical efficiency in terms of ownership varies with industry. No difference in efficiency among ownership types is found in food processing (SITC0) and chemicals (SITC5) industries. However, household enterprises appear to be more efficient than limited companies wherever a statistical effect is estimated. This finding is surprising because limited and shareholding companies are hypothesised, on average, to be more advanced in both technology and management skills. A possible explanation for the unexpected result is due to a higher proportion of family labour in household enterprises such as in manufactured goods (SITC6) in 1996, machinery and transport equipment (SITC7), and miscellaneous manufacture (SITC8) in 2001 (Table 3.12 – page 79).

The consistent trend of less efficiency of micro firms relative to SMEs is only found in machinery and transport equipment (SITC7) in both 1996 and 2001. Results in other industries show inconsistency. In those industries that use more family labour, it would appear that micro firms tend to be more technically efficient than the small and medium group. Evidence for this conclusion is that when the ratio of family to total labour in micro firms, calculated using the data set, decreases from 0.223 in 1996 to 0.183 in 2001 in chemical industries (SITC5), micro firms turn from more efficient in 1996 to less efficient than the small and medium group in 2001. This finding bears out the

suggestion of Little et al. (1987) that the number of working hours is the better indicator for labour input in small industries characterised by households because family labour often works longer, and with more commitment than hired labour. Thus, the frontier functions, which fail to capture the number of working hours, may indicate that smaller firms are more efficient.

Firm age

Empirical studies often show that firm age has either insignificant or negative impacts on technical efficiency. The small and medium manufacturing industry in Vietnam is no exception. For instance, Table 3.11 (page 79) shows either insignificant or statistically negative efficiency effects of firm age during the period 1996-2001. The negative effect of firm age on technical efficiency implies that firm age reflects differences in technology generation, rather than the 'learning by doing' process. This does not mean that 'learning by doing' is not important in Vietnam, but rather it reflects the fact that new established firms benefit more from advanced technology. Indeed, the data set reveals that firms concentrate on either 'very young' or 'very old' poles. For these old firms, their 'learning by doing' process may be offset by obsolete technology compared to that of younger firms. The same result is found in Little et al. (1987) for the case of India. They conclude that firm age may have little independent effect and it probably reflects the impact of obsolete technology. This issue will be discussed more in panel 1996-2001 models.

Metropolitan effects

The results in Table 3.11 (page 79) indicate the presence of agglomeration economies. Better-educated workers and managers, easier access of information, and market

opportunities are all factors that tend to make firms in metropolitan areas more technically efficient than their counterparts in less developed areas in all industries, with the exception of miscellaneous industries (SITC8) in 2001. According to Malesky (2004), both workforce and owners in metropolitan areas of Vietnam have much higher technical and managerial training as well as educational level than their counterparts in less developed areas. Another factor that may make firms in non-metropolitan areas less efficient is market opportunities. For instance, the survey from which the data are obtained shows that lack of demand is the most common reason given for temporarily shutting down a business. The percentage of firms in non-metropolitan areas that give this reason is much higher than in metropolitan areas, as shown in Table 3.13 (page 80).

Government assistance and institutions supporting market

A pressing concern for Vietnam is how to continue to reduce poverty in the face of the expansion of the labour force, and sustain economic growth. In this context, the private sector becomes the key element for institutional changes. The private sector promotion program carried out in 1999 with the issuance of the new enterprise law lowers entry and transaction cost significantly. As a result, the number of start-up non-state enterprises, most of which are household and micro firms, increased substantially. The objective of the government with the current reform and assistance package is to provide more credit and non-financial supports including consultations for managerial and technical problems, training managers and workers, and providing information for subcontract searching. This support should improve firm performance. However, results from Table 3.11 (page 79) do not reveal any systematic effect of direct government support on firm performance across years and industries. For instance, we find a positive effect of government support on technical efficiency in machinery and transport

equipment (SITC7), and miscellaneous industries (SITC8) in 1996 via credit assistance; in machinery and transport (SITC7) sectors in 1996, and food processing (SITC0) and miscellaneous manufacturing (SITC8) in 2002 via technical support.

We observe that access to government's support increased over the period 1996-2001 (Table 3.14, page 80), but this was associated with a change in the profiles of recipients. Firms seeking government support in 1996 are more profitable, at larger scale, younger, and the majority of them are located in metropolitan areas while the inverse is found for 2001. The finding supports suggestions of Kokko and Tingvall (2005) that recipients of government aid are selected randomly, depending on the searching effort on firm side. Thus, it seems likely there are two kinds of firms searching for government support: strong firms that face many constraints restricting their potential growth (as in 1996) and weak firms that need support to survive (as in 2001). This also coincides with findings from Ronnas et al. (1998) and Ramamurthy (1998) that most of the successful firms in Vietnam rely on their own sources to grow.

Sub-contracting

The impact of institutions supporting markets on firm performance can be investigated indirectly through subcontracting. In the environment where the property rights are protected by a good legal system, firms are more willing to cooperate and thus promote their production (Levine 1998; McMillan and Woodruff 2002; Laeven and Woodruff 2004). By contrast, without strong judicial institutions, firms find many business activities too risky (World Bank 2002), which impedes cooperation (Carlier and Tran 2005). Calculations from the data set show around 30% of firms in the 1996 sample subcontract, and this percentage decreases to 18% in 2001. In our study, subcontracting has a positive effect on technical efficiency in manufactured goods (SITC6) in 1996

and food processing (SITC0) in 2001. However, such benefits from subcontracting are not evident in other sectors. Doan (1999) points out that weak enforcement of contracts and legal verdicts limits the relationship between subcontractors and contractors mainly to long-term cooperation. It appears that the passing of the new enterprise law has not improved the situation (CSEG and CIEM 2002; Carlier and Tran 2005) and enforcement of contracts remains a constraint facing non-state SMEs in Vietnam.

Other variables effects

Owner experience has either an insignificant or negative impact on technical efficiency in all industries, with the exception of the chemicals sector (SITC5) in 2001. Insignificant effects of performance bonuses are found in most industries during the period 1996-2001. Vu (2003) also finds an insignificant relationship between bonuses and technical efficiency level among SOEs in Vietnam. This may be due to the fact that workers in Vietnam often consider bonuses as a normal part of their salary rather than as an individual reward for good performance.

3.6.2 Panel 1996-2001 models

The estimation of panel models is induced from the mixed effects of firm age on technical efficiency. The conclusion from the estimated cross-sectional models is that firm age reflects differences in technology rather than the 'learning by doing' process, which is considered important in transition economies. Thus, if the impact of differences in technology is controlled for, firm age in the inefficiency function reflects more truly the 'learning by doing' process.

Likelihood ratio tests confirm similar functional forms for the panel 1996-2001 data as for cross-sectional data and the presence of technical inefficiency effects in all

industries. Table 3.15 (page 81) provides estimated functions for separate industries. As can be seen in this Table, results in inefficiency functions bear out findings from cross-sectional models. The effect of bonuses is rather clearer. For those firms, which survive until the fifth year, their owners must gain more experience in motivating workers.

In order to separate the effects of technology and human capital proxied by firm age, a dummy variable *year2001* is introduced into the frontier function. The idea is that if the impacts of technology are filtered, firm age in the inefficiency function captures genuine human capital. The dummy variable *year2001* is assumed to capture changes in output in the frontier function during the period 1996-2001 due to unobserved effects such as technology and business environment changes. *T*-tests in Table 3.16 (page 82) confirm the presence of *year2001* in food processing industry (SITC0) and in manufactured goods industries (SITC6) at 5% and less.

The estimated models with the year dummy variable for food processing industry (SITC0) and manufactured goods industries (SITC6) are provided in Table 3.17 (page 83). For the convenience of comparison, models without dummy year variable of these industries are replicated in this Table. As shown in Table 3.17, *year2001* is negative and significant at 5% in food processing industry (SITC0) and at 1% in manufactured goods industries (SITC6).

The negative impact of *year2001* reflects appropriately the current context of Vietnamese economy. The worsen business environment following the Asian financial crisis in 1998 (World Bank 1999a; 2003b; Ramstetter 2004) and degradation in technology used by non-state SMEs place down firm output in 2001 in food processing (SITC0) and manufactured goods (SITC6) industries.

In the inefficiency functions, firm age is still insignificant, showing no relationship with technical efficiency. Little et al. (1987:199) argued that marketing and financial managements are the key factor for the success of a firm in small industries characterised by craftsman-entrepreneurs. Sakai and Takada (2000:6), in their research of SMEs in Vietnam, stated that 'most owner-managers of SMEs know little about managing a company, and go about it in their own way'. This is confirmed in Carlier and Tran (2005:5). Evidently, these initial low endowments cannot enable managers to catch up in the more complicated and increasing competitive environment, which requires high managerial skills. These findings may explain the fact that SMEs in Vietnam cannot grow to a larger scale (Carlier and Tran 2004).

3.6.3 Mean technical efficiency

Table 3.18 (page 84) documents TE level computed based on cross-sectional models for SMEs across years and industries. As can be seen from this Table, except for food processing industry (SITC0) in 1991 where mean efficiency level is equal to 55%, the average level of TE in other industries ranges from 71.9% (miscellaneous industry (SITC8) in 1996) to 90.8% (chemicals industry (SITC5) in 2001). The mean TE of SMEs in Vietnam is almost identical to the 87% of average efficiency obtained for SME manufacturing industry in Thailand by Wiboonchutikula (2001), and higher than the 78% found for SOEs in Vietnam by Vu (2003). The percentage of firms reaching near maximum level (greater than 90%) of TE is high in 2001, especially in chemical industries (77.78%). However, efficiency level varies in a wide range from 0.001 to 1.00 (Panel B, C and E) suggesting a number of firms with very poor efficiency level.

Overall, there is an improvement in TE over the period studied in all industries except for machinery and transport equipment (SITC7) and miscellaneous (SITC8)

industries. In these industries, the percentage of firms reaching a higher level of efficiency decreases over time (Panel D and E).

Firm characteristics by efficiency group are also summarised in Table 3.19 (page 85, 86). It can be easily seen from this Table that the higher efficiency groups have higher rates of returns measured by the ratio of average profit over capital. Firms in these groups are younger and mostly located in urban areas. Figures in the Table confirm the advantages of family labour. For instance, if firms in the highest efficiency level group are small, the percentage of family labour is higher compared to other efficiency groups (SITC0, 2001; SITC5, 1996; 2001; SITC7, 2001).

3.7 Concluding remarks and policy implications.

The chapter provides the estimate of technical efficiency of non-state small and medium manufacturing industries in Vietnam. Using firm level data in Vietnam in 1991, 1996 and 2001, stochastic frontier analysis shows that average levels of efficiency of the non-state small and medium manufacturing industries was high and increased during the period studied. Results also show a wide range in efficiency differences among firms, and the determinants of such differentials are identified.

A micro enterprise with fewer than 10 employees in labour intensive industries, and a metropolitan location are both shown to be positively associated with higher levels of technical efficiency. The efficiency benefits of a micro enterprise may be explained by the benefits associated with family labour. The metropolitan efficiency effect is most likely due to the availability of better-educated workers and managers, and also market opportunities in metropolitan areas relative to non-metropolitan areas.

The calculated production elasticities indicate that non-state manufacturing SMEs in Vietnam still stick to low-cost labour advantages and thus, have low added value and returns. In addition, the dominance of insignificant effects of firm age reflects no gain from the 'learning by doing' process. By contrast, positive and significant impacts of firm age in few sector, reflect differences in technology generation during the transition period. The results raise concerns about competitiveness of this sector. This matter should be considered in the private sector promoting program.

The results indicate few benefits from government assistance in terms of credit and non-financial services. However, support from government does not appear to be systematically based on any performance criteria. This suggests that government promotion of technical efficiency should refocus its support on economic criteria. Strengthening technical assistance and institutions that promote cooperation among firms may also be helpful in terms of improving technical efficiency.

Some suggestions are also made for the follow-up surveys. Firstly, attention should be focused on collecting capital information. Secondly, the number of working hours, instead of the amount of labour, should be collected if possible so that the effect of firm size will be calculated more appropriately.

3.8 Appendix 3.1

Table 3.1 Firm ownership and firm size

	SITC0			SITC5			SITC6			SITC7			SITC8		
	1991	1996	2001	1991	1996	2001	1991	1996	2001	1991	1996	2001	1991	1996	2001
Ownership (percentage)															
•Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
•Household	29.63	59.74	85.32	15.38	31.68	48.15	23.53	45.89	72.82	15.38	20.93	69.18	39.29	44.44	73.46
•Private [†]	59.26	28.57	6.75	73.08	38.61	16.05	60.00	28.50	12.66	71.79	53.49	13.21	39.29	28.89	8.46
•Cooperative	11.11	2.60	1.98	11.54	13.86	11.11	16.47	14.98	6.33	12.82	16.28	6.92	21.43	10.56	6.15
•L&S		9.09	5.95		15.84	24.69		10.63	8.18		9.30	10.69		16.11	11.92
Firm size (average number of workers)															
•Household	3.00	5.19	6.56	4.00	6.44	8.69	4.05	4.69	6.61	3.50	6.22	6.34	5.00	6.46	8.18
•Private [†]	6.94	14.18	12.65	20.00	14.95	22.38	15.73	17.59	14.91	11.54	16.39	17.52	10.14	26.69	31.14
•Cooperative	42.33	21.50	24.20	33.00	25.36	27.44	25.21	31.90	33.54	25.40	27.86	28.54	39.08	35.42	33.75
•L&S		54.28	46.07		43.31	38.8		35.77	28.16		52.50	23.00		37.48	39.48
Percentage of micro firm in each industry															
	77.78	74.02	81.35	38.46	48.51	46.91	43.53	55.55	57.69	56.41	39.53	65.41	60.71	43.89	69.13

Note: [†] The word 'private' used in this Table indicates sole-proprietorship firm to save space.

Table 3.2 Summary statistics for key variables in 1991

		Average	St dev	Min	Max
(a) Food processing – SITC0 (27 obs)					
• Output	Thousand dong(*)	56 793.41	47 793.17	1425	146 778
• Capital	Thousand dong	34 555.3	72 015.61	120	266 500
• Labour	Number of workers	9.70	13.30	1	54
• Materials	Thousand dong	42 624.59	37 840.63	1330	106 547
• Age	Year	7.07	7.35	1	32
(b) Chemicals – SITC5 (26 obs)					
• Output	Thousand dong	153 487.2	199 581.7	600	950 000
• Capital	Thousand dong	133 648.1	233 536.7	210	1 071 000
• Labour	Number of workers	19.04	29.24	3	152
• Materials	Thousand dong	177 326.9	281 861	4 886	1 250 160
• Age	Year	6.46	6.32	1	26
(c) Manufactured goods classified chiefly by materials – SITC6 (85 obs)					
• Output	Thousand dong	98 194.07	160 859.5	1 500	1 013 760
• Capital	Thousand dong	120 397.1	350 783.6	10	3 060 900
• Labour	Number of workers	14.54	18.65	1	154
• Materials	Thousand dong	81 407.04	160 935.6	410	924 184
• Age	Year	5.92	6.57	1	34
(d) Machinery and transport equipment – SITC7 (39 obs)					
• Output	Thousand dong	83 348.21	119 146.3	3 000	651 440
• Capital	Thousand dong	83 364.13	133 268.6	1 050	500 000
• Labour	Number of workers	12.07	11.01	2	50
• Materials	Thousand dong	63 350.18	89 723.36	850	469 210
• Age	Year	8.18	8.99	1	34
(e) Miscellaneous manufactured articles – SITC8 (56 obs)					
• Output	Thousand dong	116086.9	219978.9	1500	1000000
• Capital	Thousand dong	73686.91	164819.8	15	747600
• Labour	Number of workers	14.32	17.49	2	70
• Materials	Thousand dong	90 907.02	186 418.9	280	850 000
• Age	Year	8.59	8.68	1	34

Note: (*) Dong is the currency in Vietnam. The exchange rate in 1991 was 8,850 dong per USD (this source of exchange rate is provided in Ronnas (1992: 22))

Table 3.3 Summary statistics for key variables in 1996

		Average	St dev	Min	Max
(a) Food processing – SITC0 (77 obs)					
• Output	Thousand dong(*)	1 350 378	4 668 553	7 200	34 200 000
• Capital	Thousand dong	286 763.7	742 186.4	2 500	5 320 000
• Labour	Number of workers	12.65	26.54	1	215
• Materials	Thousand dong	1 096 136	4 032 439	4 800	30 400 000
• Age	Year	8.21	7.79	1	38
(b) Chemicals – SITC5 (101 obs)					
• Output	Thousand dong	1 098 770	2 826 791	6 480	18 000 000
• Capital	Thousand dong	869 154.8	2 252 038	6 100	16 800 000
• Labour	Number of workers	18.19	32.02	2	300
• Materials	Thousand dong	867 925.8	2 431 071	2 325	16 400 000
• Age	Year	9.68	9.28	1	37
(c) Manufactured goods classified chiefly by materials – SITC6 (207 obs)					
• Output	Thousand dong	1 072 392	4 774 284	4 500	64 500 000
• Capital	Thousand dong	484 787.4	1 140 371	10	10 700 000
• Labour	Number of workers	15.75	23.28	1	200
• Materials	Thousand dong	868 223.9	4 424 647	2 828	60 000 000
• Age	Year	8.26	8.23	1	38
(d) Machinery and transport equipment – SITC7 (43 obs)					
• Output	Thousand dong	1 187 895	2 207 314	25 440	10 800 000
• Capital	Thousand dong	730 485.1	1 388 263	500	6 910 000
• Labour	Number of workers	19.49	21.63	2	100
• Materials	Thousand dong	883634.5	1818325	16188	8768000
• Age	Year	11.37	9.24	1	37
(e) Miscellaneous manufactured articles – SITC8 (180 obs)					
• Output	Thousand dong	1 298 777	4 321 848	350	53 400 000
• Capital	Thousand dong	750612.7	2537670	1000	26 600 000
• Labour	Number of workers	20.36	23.80	1	150
• Materials	Thousand dong	901 883	2 471 439	1 128	27 400 000
• Age	Year	9.15	8.95	1	59

Note: (*) Dong is the currency in Vietnam. The exchange rate in 1996 was 11,033 dong per USD (source: <http://www.imfstatistics.org/imf/ifsBrowser.aspx>)

Table 3.4 Summary statistics for key variables in 2001

		Average	St dev	Min	Max
(a) Food processing – SITC0 (252 obs)					
• Output	Thousand dong(*)	1 083 997	3 378 779	9 000	31 800 000
• Capital	Thousand dong	777 642.9	2 326 228	3 000	22 700 000
• Labour	Number of workers	9.68	15.82	1	120
• Materials	Thousand dong	894 722.5	3 007 186	4 490	28 400 000
• Age (**)	Year	10.75	8.15	1	50
(b) Chemicals – SITC5 (81 obs)					
• Output	Thousand dong	2 768 684	6 980 204	25 000	41 000 000
• Capital	Thousand dong	2 738 038	5 575 052	3 000	41 500 000
• Labour	Number of workers	20.41	33.47	2	250
• Materials	Thousand dong	2 288 995	5 828 910	9 340	35 500 000
• Age	Year	9.29	6.39	1	27
(c) Manufactured goods classified chiefly by materials – SITC6 (379 obs)					
• Output	Thousand dong	878 911.8	2 876 967	3 000	33 900 000
• Capital	Thousand dong	824 500	2 129 446	1 600	21 200 000
• Labour	Number of workers	11.12	18.06	1	257
• Materials	Thousand dong	774 464.3	2 740 695	2 941	31 100 000
• Age	Year	9.06	8.23	0	71
(d) Machinery and transport equipment – SITC7 (159 obs)					
• Output	Thousand dong	813 796.8	1 525 079	6 500	9 680 000
• Capital	Thousand dong	935 979	2 002 814	720	20 400 000
• Labour	Number of workers	11.14	13.24	1	85
• Materials	Thousand dong	680 574.3	1 426 910	3 296	9 140 400
• Age	Year	11.52	9.64	1	59
(e) Miscellaneous manufactured articles – SITC8 (260 obs)					
• Output	Thousand dong	1 414 168	4 897 688	5 000	43 000 000
• Capital	Thousand dong	1 144 303	2 734 624	3 300	21 200 000
• Labour	Number of workers	15.43	20.62	1	129
• Materials	Thousand dong	1 169 018	4 291 188	1 850	36 800 000
• Age	Year	10.06	8.10	0	42

Note: (*) Dong is the currency in Vietnam. The exchange rate in 2001 was 14,725 dong per USD

Source: <http://www.imfstatistics.org/imf/ifsBrowser.aspx>

Table 3.5 Generalised likelihood ratio tests for functional form

	SITC0	SITC5	SITC6	SITC7	SITC8
Null Hypothesis	Production function is Cobb Douglas $\beta_4 = \beta_5 = \dots = \beta_9 = 0$				
$\chi^2_{0.99}$ - value	16.074				
χ^2 - statistic					
1991	14.52	2.18	14.48	8.44	19.16
1996	17.00	46.78	12.20	6.78	73.64
2001	61.52	34.92	12.90	36.32	40.72
Panel 96-2001	25.95	100.30	12.44	26.93	25.49
Decision					
1991	Accept H_0	Accept H_0	Accept H_0	Accept H_0	Reject H_0
1996	Reject H_0	Reject H_0	Accept H_0	Accept H_0	Reject H_0
2001	Reject H_0	Reject H_0	Accept H_0	Reject H_0	Reject H_0
Panel 96-2001	Reject H_0	Reject H_0	Accept H_0	Reject H_0	Reject H_0

Note: (1) The critical value for the hypothesis is obtained from Kodde and Palm's (1986) Table 1

(2) SITC0: food processing; SITC5: chemical; SITC6: manufactured goods classified by materials; SITC7: machinery and transport equipment; SITC8: miscellaneous manufacture

Table 3.6 Generalised likelihood ratio test for the absence of technical inefficiency effects

	SITC0	SITC5	SITC6	SITC7	SITC8
Null Hypothesis	Technical inefficiency effects are absent $\gamma = \delta_0 = \delta_1 = \dots = \delta_{11} = 0$				
$\chi^2_{0.99}$ - value	25.55				
χ^2 - statistic					
1991(*)	45.68	74.41	21.72	29.58	34.18
1996	25.49	108.00	154.57	26.78	241.97
2001	129.03	93.15	182.56	107.89	83.35
Decision					
1991	Reject H_0	Reject H_0	Accept H_0	Reject H_0	Reject H_0
1996	Accept H_0	Reject H_0	Reject H_0	Reject H_0	Reject H_0
2001	Reject H_0	Reject H_0	Reject H_0	Reject H_0	Reject H_0

Note: (1) The critical value for 1991 $\chi^2_{0.99}$ is equal to 24.05 since the inefficiency functions include only 10 variables.

(2) SITC0: food processing; SITC5: chemical; SITC6: manufactured goods classified by materials; SITC7: machinery and transport equipment; SITC8: miscellaneous manufacture

Table 3.7 The estimated frontier and technical inefficiency functions for 1991

Number of observations	1991									
	SITC0		SITC5		SITC6		SITC7		SITC8	
	27		26		85		39		56	
	Coeff.	Std-er	Coeff.	Std-er	Coeff.	Std-er	Coeff.	Std-er	Coeff.	Std-er
1 Stochastic FPF										
Constant	1.443***	0.079	1.858***	0.542	1.927***	0.309	1.738***	0.622	6.232***	1.084
K	-0.091***	0.022	0.025	0.021	0.028	0.020	0.044	0.058	0.291*	0.158
L	0.498***	0.058	0.191***	0.050	0.177***	0.065	0.589***	0.131	0.189	0.424
M	0.953***	0.027	0.823***	0.038	0.786**	0.035	0.744***	0.053	-0.179	0.247
K*L									0.024	0.023
K*M									-0.017	0.021
L*M									-0.044	0.036
K*K									-0.006	0.009
L*L									0.045	0.060
M*M									0.055***	0.015
2 TIF [†]										
Constant	0.058	0.458	3.092**	1.396			-0.136	0.498	-1.622	1.090
Household	-0.213	0.154	-7.119***	2.547			-0.176	0.461	1.004**	0.510
Cooperative	1.302***	0.325	2.863*	1.483			0.488	0.317	-1.367	1.037
Metropolitan	-0.409***	0.132	-6.527***	1.323			0.346	0.516	0.985*	0.542
Small and medium group	0.233	0.167	-7.741***	1.784			0.636	0.394	0.182	0.651
Age	-0.006	0.009	-0.144	0.114			0.019	0.012	0.039**	0.019
Experience	0.605	0.468	0.994	1.034			-0.769**	0.359	-0.035	0.510
Bonus	0.316***	0.094	1.187	1.719			0.504*	0.279	0.116	0.524
Government credit assistance	-0.141	0.501	0.714	1.013			0.413	0.472	0.526	0.796
Non-financial assistance	0.204	0.152	1.929	1.293			-0.028	0.311	0.284	0.413
Subcontract	-1.376***	0.308	8.817***	2.712			0.547***	0.204	-1.220	0.770
Sigma squared	0.012***	0.004	2.004***	0.497			0.098*	0.055	0.184***	0.061
Gamma	0.999***	0.017	0.998***	0.001			0.164	0.653	0.684***	0.120
Log likelihood	23.66		-0.932				-8.193		-8.269	
Mean technical efficiency	0.55		0.736				0.735		0.827	

Notes: *, **, *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively

[†] Technical inefficiency function. The inefficiency function for SITC6 disappears as the likelihood ratio test rejects the presence of technical inefficiency effects

Table 3.8 The estimated frontier and technical inefficiency functions for 1996 and 2001

	SITC0				SITC5				SITC6			
	1996		2001		1996		2001		1996		2001	
Number of observations	77		252		101		81		207		379	
	Coeff.	Std-er	Coeff.	Std-er	Coeff.	Std-er	Coeff.	Std-er	Coeff.	Std-er	Coeff.	Std-er
1 Stochastic FPF												
Constant	4.974***	1.768	3.645***	1.002	1.761*	0.998	6.092***	1.058	2.492***	0.164	2.013***	0.159
K	-0.548**	0.255	-0.065	0.127	0.442	0.351	0.092	0.138	0.033**	0.014	0.013	0.011
L	1.449***	0.536	1.233***	0.294	-0.519	0.689	0.206	0.261	0.258***	0.036	0.220***	0.023
M	0.612**	0.309	0.431**	0.171	0.579*	0.349	0.116	0.147	0.769***	0.019	0.826***	0.014
K*L	-0.105**	0.046	-0.019	0.023	0.143**	0.068	0.066**	0.031				
K*M	0.059**	0.027	-0.018*	0.010	-0.190***	0.056	-0.034**	0.016				
L*M	-0.034	0.052	-0.104***	0.027	-0.031	0.071	-0.081***	0.031				
K*K	0.003	0.015	0.015**	0.006	0.066**	0.030	0.007	0.006				
L*L	0.085*	0.045	0.132***	0.032	-0.134	0.091	0.008	0.021				
M*M	-0.015	0.018	0.034***	0.009	0.105***	0.027	0.053***	0.012				
2 TIF [†]												
Constant			-4.933***	0.249	-0.177	0.809	0.160	0.547	1.311*	0.748	-4.808***	1.472
Household			0.135	0.155	-0.102	0.714	-0.115	0.508	-4.871***	1.282	0.560	0.759
Sole-proprietorship			-0.055	0.149	-0.164	0.562	0.272	0.408	-5.121***	1.487	1.668	1.274
Cooperative			0.583	0.411	0.712	0.929	-0.118	0.484	-2.545***	0.872	3.322**	1.611
Metropolitan			-0.361***	0.096	-2.903***	0.605	-0.434*	0.223	-0.627	0.610	-0.473*	0.267
Small and medium group			3.646***	0.192	2.171***	0.671	-0.597*	0.354	-1.463*	0.803	1.670**	0.713
Age			0.048***	0.004	0.012	0.025	-0.015	0.018	0.058**	0.023	-0.017	0.018
Experience			-0.063	0.062	-0.600	0.772	-0.797***	0.212	-0.628	0.525	0.410**	0.177
Bonus			-0.172*	0.092	0.177	0.477	-0.143	0.182	-0.886	0.586	-0.109	0.148
Government credit assistance			0.153	0.134	-0.045	0.852	-0.128	0.276	0.554	0.665	0.808***	0.106
Non-financial services			-0.320**	0.150	0.733	0.600	1.123***	0.341	-0.313	0.718	-0.162	0.613
Subcontract			-0.124*	0.074	0.264	0.628	0.089	0.214	-1.429*	0.773	-0.715	0.676
Sigma squared			0.449***	0.022	0.263***	0.098	0.075***	0.013	1.151***	0.198	0.515***	0.131
Gamma			0.925***	0.012	0.820***	0.067	0.861***	0.023	0.966***	0.007	0.904***	0.046
Log likelihood			15.37		-15.33		52.28		-46.99		-65.98	
Mean technical efficiency			0.894		0.811		0.908		0.818		0.876	

Notes: *, **, *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively

[†] Technical inefficiency function. The inefficiency function for SITC0 for 1996 disappear as the likelihood ratio test rejects the presence of technical inefficiency effects 76

Table 3.8 (continued)

	SITC7				SITC8			
	1996		2001		1996		2001	
Number of observations	43		159		180		260	
	Coeff.	Std-er	Coeff.	Std-er	Coeff.	Std-er	Coeff.	Std-er
1 Stochastic FPF								
Constant	3.154***	0.276	6.881***	0.966	10.556***	0.932	6.088***	0.982
K	-0.044**	0.017	0.115	0.106	0.132	0.142	0.047	0.159
L	0.217***	0.037	1.557***	0.271	1.161***	0.299	1.305***	0.251
M	0.799***	0.019	-0.241	0.170	-0.758***	0.182	-0.041	0.146
K*L			0.004	0.024	0.017	0.027	0.009	0.024
K*M			-0.025*	0.014	-0.023	0.019	-0.018	0.016
L*M			-0.130***	0.034	-0.077***	0.028	-0.137***	0.029
K*K			0.007	0.005	0.005	0.015	0.006	0.008
L*L			0.063*	0.037	-0.029	0.038	0.102***	0.033
M*M			0.065***	0.012	0.078***	0.009	0.056***	0.012
2 TIF [†]								
Constant	-0.168	0.455	0.191	0.458	-3.044***	1.005	-5.414***	1.175
Household	0.604	0.444	-2.206***	0.326	0.957	0.611	-1.576***	0.517
Sole-proprietorship	0.695	0.443	-0.813**	0.363	0.914*	0.512	1.125*	0.635
Cooperative	0.913*	0.491	0.829**	0.393	1.304	0.838	-1.417*	0.862
Metropolitan	-0.246**	0.116	-0.589**	0.266	-3.809***	0.707	1.276***	0.337
Small and medium group	-0.241**	0.097	-1.942***	0.319	1.144*	0.593	-0.620	0.402
Age	0.001	0.004	0.018***	0.007	0.038**	0.017	0.122***	0.026
Experience	0.019	0.073	0.958***	0.267	0.618	0.693	1.951***	0.368
Bonus	0.287***	0.096	-0.421*	0.224	-3.131***	.732	-0.398	0.295
Government credit assistance	-0.275**	0.130	-0.013	0.232	-1.265*	0.721	1.408***	0.461
Non-financial services	-0.188**	0.090	0.769***	0.220	2.145***	0.453	-1.111***	0.365
Subcontract	-0.118	0.074	-0.100	0.201	-0.314	0.392	0.508*	0.308
Sigma squared	0.017***	0.004	0.284***	0.049	1.402***	0.239	0.911***	0.152
Gamma	0.762***	0.112	0.920***	0.020	0.989***	0.004	0.881***	0.029
Log likelihood	34.91		12.07		-44.36		-131.61	
Mean technical efficiency	0.835		0.835		0.719		0.824	

Notes: *, **, *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively

[†] Technical inefficiency function

Table 3.9 Production elasticities of parameters in the FPF

	SITC0	SITC5	SITC6	SITC7	SITC8
1996					
Capital	0.025	0.109	0.033	-0.044	0.021
Labour	0.176	0.211	0.258	0.217	0.314
Materials	0.858	0.714	0.769	0.799	0.622
Returns to scale	1.059	1.034	1.060	0.972	0.957
2001					
Capital	0.046	0.001	0.013	-0.004	0.002
Labour	0.202	0.092	0.220	0.303	0.237
Materials	0.857	0.838	0.826	0.747	0.764
Returns to scale	1.105	0.931	1.059	1.046	1.003

Note: SITC0: food processing; SITC5: chemical; SITC6: manufactured goods classified by materials; SITC7: machinery and transport equipment; SITC8: miscellaneous manufacture

Table 3.10 Likelihood ratio tests for random and firm-specific effects

	SITC0	SITC5	SITC6	SITC7	SITC8
Null hypothesis					
			1. $\gamma = 0$		
$\chi^2_{0.99} - \text{value}$			8.27		
$\chi^2_2 - \text{statistic}$					
1996		144.78	56.68	10.74	213.52
2001	109.08	160.76	58.06	78.24	65.08
Decision					
1996			Reject H_0		
2001					
Null hypothesis					
			2a. $\delta_0 = \delta_1 = \dots = \delta_{11} = 0$		
$\chi^2_{0.99} - \text{value}$			25.55		
$\chi^2_{12} - \text{statistic}$					
1996		80.82	65.46	26.78	128.52
2001	128.4	81.52	67.14	69.84	62.34
Decision					
1996			Reject H_0		
2001					
Null hypothesis					
			2b. $\delta_1 = \dots = \delta_{11} = 0$		
$\chi^2_{0.99} - \text{value}$			24.05		
$\chi^2_{11} - \text{statistic}$					
1996		38.18	53.56	201.98	84.5
2001	99.92	33.6	53.08	49.44	37.88
Decision					
1996			Reject H_0		
2001					

Note: The critical value for the hypothesis is obtained from Table 1 in Kodde and Palm's (1986)

Table 3.11 Summary for inefficiency effects

	SITC0		SITC5		SITC6		SITC7		SITC8	
	2001	1996	2001	1996	2001	1996	2001	1996	2001	1996
Household	+	-	-	***	+	+	***	+	***	***
Sole-proprietorship		-	+	***	+	+	**	+	+	+
Cooperative	+	+	-	***	***	+	***	+	-	*
Urban	***	***	*	-	*	**	**	***	***	***
Small and medium group	***	***	*	*	***	**	***	+	-	-
Age	***	+	-	***	-	+	***	***	***	***
Experience	-	-	***	-	***	+	***	+	***	***
Bonus	*	+	-	-	-	***	*	***	-	-
Government credit assistance	+	-	-	+	***	**	-	*	***	***
Government assistance during operation	**	+	***	-	-	**	***	***	***	***
Subcontract	*	+	+	*	-	-	-	-	+	*

Notes: *, **, *** denote statistical significance at the 0.10, 0.05 and 0.01 level respectively

The correlation between any variable in the Table and TE is contrary to the sign appearing in that Table.

The likelihood ratio test confirms no technical inefficiency effects in food processing industries in 1996

Table 3.12 Proportion of family labour across year and industry (proportion)

	SITC0		SITC5		SITC6		SITC7		SITC8	
	1996	2001	1996	2001	1996	2001	1996	2001	1996	2001
Household	0.44	0.39	0.36	0.21	0.49	0.29	0.27	0.31	0.37	0.31
Sole-proprietorship	0.17	0.13	0.11	0.08	0.12	0.11	0.07	0.07	0.08	0.06
Cooperative	0.00	0.00	0.03	0.02	0.02	0.01	0.00	0.01	0.03	0.01
L&S	0.03	0.01	0.02	0.01	0.03	0.02	0.01	0.02	0.03	0.04

Table 3.13 Reasons some firms have to close their businesses temporarily

	Lack of input	Lack of demand	Lack of labour	Other	Total
1996					
Metropolitan	3 (3.95)	43 (56.58)	0 (0.00)	30 (39.47)	76 (100.00)
Non-metropolitan	18 (20.22)	59 (66.29)	2 (2.25)	10 (11.24)	89 (100.00)
2001					
Metropolitan	1 (1.49)	40 (59.70)	0 (0.00)	26 (38.81)	67 (100.00)
Non-metropolitan	20 (10.70)	132 (70.59)	5 (2.67)	30 (16.04)	187 (100.00)

Note: The number in parentheses is in percentage.

Table 3.14 Profiles of government support recipients

	1996	2001
Credit assistance		
• Percentage of recipients	15.62	28.12
• Firm average profit(*) (thous.VND)	149 082.00	86 889.06
• Firm size (average number of workers)	29.58	13.61
• Firm age	8.61	9.39
• Metropolitan located (percentage)	57.89	23.89
Technical assistance		
• Percentage of recipients	22.20	44.83
• Firm average profit (thous.VND)	141 659.50	72 312.44
• Firm size (average number of workers)	29.64	14.73
• Firm age	8.72	10.28
• Metropolitan located (percentage)	67.41	36.88

Note: (*) Profits are reported by firms and deflated by the inflation rate

Table 3.15 Panel 1996-2001 models

	Coefficients				
	SITC0	SITC5	SITC6	SITC7	SITC8
Functional form	Translog	Translog	Cobb-Douglas	Translog	Translog
Number of observations	93	88	227	92	203
1 Stochastic production frontier function					
Constant	7.411***	6.219***	2.497***	4.905***	4.766***
K	-0.109	0.057	0.011	0.310*	0.247
L	2.053***	1.032***	0.314***	0.829*	1.035***
M	-0.247	-0.062	0.774***	-0.035	0.024
K*L	-0.011	0.024		-0.014	-0.009
K*M	0.008	-0.021		-0.054***	-0.037
L*M	-0.192***	-0.096**		-0.026	-0.065
K*K	0.002	0.006		0.013*	0.009
L*L	0.165***	0.013		-0.019	0.018
M*M	0.055***	0.056		0.065***	0.056***
2 Technical inefficiency function					
Constant	-4.484***	-0.200	-1.521*	-1.298	-5.482***
Household	2.743***	0.377*	-3.048***	-1.737***	-0.156
Sole-proprietorship	0.273	0.696*	-2.274**	-0.631	3.433***
Cooperative	3.475***	0.259	0.053	0.214	2.026**
Urban	-1.411***	-1.458***	-2.025***	-0.291	-1.872***
Small and medium group	2.419***	0.829***	2.245**	-0.878**	1.466*
Age	-0.022	-0.010	0.009	0.024***	0.088***
Experience	0.709	0.061	-0.709	1.615***	0.246
Bonus	-1.306***	-0.635***	-0.419	-0.199	-3.047***
Government credit assistance	-0.756	-0.551	1.254*	-0.347	-0.659
Government assistance during operation	1.137*	0.678**	-1.055	1.072***	1.711**
Subcontract	-0.961	-0.239**	-1.350**	-0.390	-1.313
Sigma squared	0.378***	0.102***	1.242***	0.186***	1.606***
Gamma	0.951***	0.775***	0.963***	0.893***	0.929***
Log likelihood	22.828	26.764	-91.979	19.148	-134.547
Mean technical efficiency	0.862	0.878	0.801	0.865	0.765

Table 3.16 Testing for the presence of dummy variable *year2001*

	SITC0	SITC5	SITC6	SITC7	SITC8
Null Hypothesis	No dummy year in the frontier model				
	$\beta_{year2001} = 0$				
$t_{0.95} - value$			1.96		
$t - statistic$	-2.15	-1.21	-3.05	-0.27	-0.22
Decision	Reject H_0	Accept H_0	Reject H_0	Accept H_0	Accept H_0

Note: SITC0: food processing; SITC5: chemical; SITC6: manufactured goods classified by materials; SITC7: machinery and transport equipment; SITC8: miscellaneous manufacture

Table 3.17 Models with dummy year variable

	Coefficients			
	SITC0: Translog		SITC6: Cobb-Douglas	
	No dummy year	Dummy year	No dummy year	Dummy year
1 Stochastic production frontier function				
Constant	7.411***	8.999***	2.497***	2.402***
K	-0.109	-0.229	0.011	0.028***
L	2.053***	2.369***	0.314***	0.310***
M	-0.247	-0.462*	0.774***	0.771***
K*L	-0.011	-0.012		
K*M	0.008	0.018		
L*M	-0.192***	-0.223***		
K*K	0.002	0.003		
L*L	0.165***	0.182***		
M*M	0.055***	0.061***		
Year2001		-0.118**		-0.133***
2 Technical inefficiency function				
Constant	-4.484***	-2.133**	-1.521*	-4.485***
Household	2.743***	1.433**	-3.048***	-2.977***
Sole-proprietorship	0.273	-0.533	-2.274**	-1.963***
Cooperative	3.475***	1.893**	0.053	0.643
Urban	-1.411***	-1.081***	-2.025***	-1.319***
Small and medium group	2.419***	1.917***	2.245**	3.059***
Age	-0.022	-0.009	0.009	0.001
Experience	0.709	0.215	-0.709	-1.047***
Bonus	-1.306***	-1.095***	-0.419	-0.008
Government credit assistance	-0.756	-0.951	1.254*	1.723***
Government assistance during operation	1.137*	0.682	-1.055	-1.078***
Subcontract	-0.961	-0.577	-1.350**	-1.078***
Sigma squared	0.378***	0.208***	1.242***	1.798***
Gamma	0.951***	0.922***	0.963***	0.978***
Log likelihood	22.828	23.778	-91.979	-83.017
Mean technical efficiency	0.862	0.875	0.801	0.799

Table 3.18 Efficiency level

	Panel A: SITC0			Panel B: SITC5			Panel C: SITC6	
	1991	1996	2001	1991	1996	2001	1996	2001
Efficiency range	0.19-0.99		0.11-1.00	0.003-0.97	0.08-0.97	0.31-0.98	0.04-0.96	0.04-1
Percentage of firms in range								
≤ 0.50	51.85		1.58	11.54	7.92	3.70	5.31	1.58
0.51-0.70	29.63		1.59	15.38	4.95	1.23	6.76	2.37
0.71-0.80	7.41		4.36	23.07	10.89	3.70	14.01	5.01
0.81-0.90	3.70		24.21	26.92	45.54	13.58	59.90	45.91
≥ 0.91	7.41		68.25	23.08	30.69	77.78	14.00	45.12
Mean efficiency	0.55		0.894	0.736	0.811	0.908	0.818	0.876
	Panel D: SITC7			Panel E: SITC8				
	1991	1996	2001	1991	1996	2001		
Efficiency range	0.18-0.98	0.56-0.98	0.15-0.97	0.18-0.97	0.001-0.97	0.03-0.96		
Percentage of firms in range								
≤ 0.50	30.77		5.03	8.93	20	2.31		
0.51-0.70	7.69	11.63	6.92	5.36	15	3.08		
0.71-0.80	5.13	32.56	11.32	12.50	12.78	19.61		
0.81-0.90	0.00	18.60	40.25	30.36	36.67	68.07		
≥ 0.91	56.41	37.21	36.48	42.86	15.55	6.92		
Mean efficiency	0.735	0.835	0.835	0.827	0.719	0.824		

Table 3.19 Firms characteristics by efficiency group

Characteristics	Unit	SITC0					
					2001		
Efficiency range					<80%	80% to 90%	>90%
• Size	# Workers				30.71	18.31	5.27
• Age	Years				14.76	10.40	10.47
• Unpaid labour ratio	# unpaid workers/# workers				0.07	0.14	0.44
• Profit/capital	VND				10	100	160
• Urban ratio	Urban firms/total firms				0.53	0.44	0.34
SITC5							
			1996			2001	
Efficiency range		<80%	80% to 90%	>90%	<80%	80% to 90%	>90%
• Size	# Workers	21.25	24.33	8.71	10.28	14.80	22.39
• Age	Years	14.00	8.71	7.89	8.57	7.40	9.67
• Unpaid labour ratio	# unpaid workers/# workers	0.09	0.06	0.16	0.14	0.11	0.05
• Profit/capital	VND	40	90	260	50	20	80
• Urban ratio	Urban firms/total firms	0.42	0.69	0.91	0.43	0.80	0.95
SITC6							
			1996			2001	
Efficiency range		<80%	80% to 90%	>90%	<80%	80% to 90%	>90%
• Size	# Workers	23.69	11.71	19.24	21.47	12.98	6.69
• Age	Years	10.69	7.60	7.18	10.77	9.29	8.49
• Unpaid labour ratio	# unpaid workers/# workers	0.07	0.43	0.08	0.05	0.13	0.25
• Profit/capital	VND	110	190	240	30	70	80
• Urban ratio	Urban firms/total firms	0.63	0.65	0.64	0.43	0.30	0.48

Table 3.19 Continued

Characteristics		Unit						
		SITC7						
		1996			2001			
Efficiency range		<80%	80% to 90%	>90%	<80%	80% to 90%	>90%	
• Size	# Workers	15.28	17.11	25.56	9.89	12.79	10.24	
• Age	Years	12.94	14.67	7.75	15.08	11.11	9.94	
• Unpaid labour ratio	# unpaid workers/# workers	0.07	0.06	0.04	0.17	0.11	0.17	
• Profit/capital	VND	80	210	190	130	20	90	
• Urban ratio	Urban firms/total firms	0.89	0.89	1.00	0.43	0.68	0.79	
		SITC8						
		1996			2001			
Efficiency range		<80%	80% to 90%	>90%	<80%	80% to 90%	>90%	
• Size	# Workers	14.97	26.65	21.19	13.03	16.09	16.55	
• Age	Years	10.58	8.26	7.31	15.95	8.51	6.80	
• Unpaid labour ratio	# unpaid workers/# workers	0.17	0.06	0.05	0.18	0.14	0.15	
• Profit/capital	VND	70	140	110	30	90	350	
• Urban ratio	Urban firms/total firms	0.39	0.73	0.88	0.44	0.39	0.15	

CHAPTER 4

CONTRIBUTION OF PRODUCTIVITY AND FIRM SIZE TO VALUE-ADDED:

Case study of non-state firms

4.1 Introduction

An understanding of the factors contributing to a firm's profit and value-added, also at the industry level, is important to both firm owners and policy makers. In this chapter an index number profit decomposition method is extended to account for the nature of manufacturing industrial data, i.e., firms produce different numbers of outputs and use different numbers of inputs, to evaluate firm and industry performance. This different dimensionality results in difficult problems of aggregating and decomposing separate price effects with the profit decomposition method.

To overcome the problem of decomposing profit and value-added given the data characteristics, a new indexing decomposition method, called the error index decomposition method (EIDM), is developed using the value-added of total factor productivity (TFP) measurement. The EIDM allows for differences in a firm's value-added to be decomposed into separate effects due to variations in productivity and firm size in both labour and capital. It also helps resolve the dimensionality problem by using the industry deflator instead of the observed price. This approximation introduce biases into TFP measurement (Coelli et al. 2003; Diewert 2006b) and, thus, an error term is added into the decomposition equation to capture measurement biases and white noise. The method is applied to non-state small and medium manufacturing enterprises in Vietnam over the period 1996-2001 and shows that productivity is a core contributor to the success of a firm.

The remainder of the chapter is organised as follows. Section 4.2 describes the profit decomposition and the EIDM. Details of data and variable measurement are presented in Section 4.3 while Section 4.4 discusses the value-added TFP index for non-state SMEs in Vietnam. The decomposition of factors contributing to a firm's value-added

is analysed in Section 4.5. Section 4.6 concludes with suggestions as to how to promote firm and industry performance in Vietnam.

4.2 Methodology

Lawrence, Diewert and Fox (LDF) (2001) and Fox, Grafton, Kirkley and Squires (FGKS) (2003) have developed an index-number profit decomposition (INPD) method that explains changes in a firm's variable profits from productivity, output prices, variable input prices and firm size. LDF apply this method to assess the contribution of these factors on profitability of Telstra, Australia's major telecommunications carrier. FGKS extend this approach to multiple cross-sectional data and compare firm performance in the British Columbia halibut fishery. The current chapter adapts and extends the methodology to the manufacturing firm level data in Vietnam.

The INPD method defines the variable non-zero profits of an arbitrary firm b , π_b relative to the variable profits of another firm a , π_a as:

$$\Gamma^{a,b} = \pi^b / \pi^a \quad (4.1)$$

Using Fisher's weak reversal test, the variable profit index defined in equation (4.1) is a product of price and quantity indexes, i.e.,

$$\Gamma^{a,b} = P^{a,b} Q^{a,b} \quad (4.2)$$

where $P^{a,b}$ and $Q^{a,b}$ are the price and quantity indexes of the 'netputs', respectively. In the 'netputs' vector, output quantities are treated as positive while variable input quantities are treated as negative. The result from equation (4.2) is, hence, the relative variable profit or the gross return to capital index between two firms.

Using the translog identity exploited by Diewert and Morrison (1986), FGKS prove that if a firm's profit function π is in translog form, and under the profit maximising behaviour, the capital TFP²⁶ index between two firms a and b is exactly equal to a Tornqvist implicit netput quantity index, divided by the capital index. That is:

$$R^{a,b} = \frac{Q^{a,b}}{K^{a,b}} \quad (4.3)$$

where $R^{a,b}$ is the capital TFP index. $Q^{a,b}$ is the implicit netput quantity index derived from (4.2) and $K^{a,b}$ is the capital quantity index.

Deriving $Q^{a,b}$ from (4.2), substituting into (4.3), and rearranging, we have:

$$\Gamma^{a,b} = R^{a,b} P^{a,b} K^{a,b} \quad (4.4)$$

$P^{a,b}$ and $K^{a,b}$ are also in the Tornqvist form and calculated as:

$$P^{a,b} \equiv \exp\left[\sum_{m=1}^M \frac{1}{2}(s_m^b + s_m^a) \ln(p_m^b / p_m^a)\right] \quad (4.5)$$

$$K^{a,b} = \exp\left[\sum_{n=1}^N \frac{1}{2}(s_n^b + s_n^a) \ln(k_n^b / k_n^a)\right] \quad (4.6)$$

p_m is the price of m^{th} commodity and k_n is the quantity of n^{th} capital component, $s_m = p_m y_m / \sum p_m y_m$ is the profit share of netput m and $s_n = r_n k_n / \sum p_m y_m$ is the profit share of fixed input n . Using the multiplicative nature of the Tornqvist index,

²⁶ We call this productivity the capital TFP as the denominator is only the capital index rather than the index of primary inputs as in value-added TFP or the aggregate index of all inputs including capital, labour and intermediate inputs in gross output TFP.

$P^{a,b}$ and $K^{a,b}$ can be further decomposed into individual or group component effects of output and variable input prices and capital as:

$$P^{a,b} = \prod_{m=1}^M p^{a,b} \quad (4.7)$$

$$\text{and } K^{a,b} = \prod_{n=1}^N k^{a,b} \quad (4.8)$$

4.2.1 Adapted method

When applying the method of FGKS to firm level data in Vietnam, we face the problem of different dimensionality. It is very often the case that two different firms produce different numbers of heterogeneous outputs and use different numbers of intermediate inputs in the same industry. Hence, the traditional bilateral index number theory breaks down as it requires the same dimensionality (Bresnahan and Gordon 1996; Gordon and Griliches 1997; Diewert 2003). Consequently, we cannot decompose the price index $P^{a,b}$ into the output and intermediate input price indexes to calculate each individual index. There are two approaches to correct the problem.

4.2.1.1 The relationship between value-added TFP and capital TFP

Decomposing the ‘netputs’ price index $P^{a,b}$ into two components as follows:

$$P^{a,b} = P_{*}^{a,b} P_L^{a,b} \quad (4.9)$$

where $P_L^{a,b}$ is the labour price index and $P_{*}^{a,b}$ is an aggregate price index of other “netputs” including output, non-energy intermediate input and energy.

As a result, the profit decomposition method can be rewritten as:

$$\Gamma^{a,b} = R^{a,b} P_*^{a,b} P_L^{a,b} K^{a,b} \quad (4.10)$$

The capital TFP index $R^{a,b}$ can be calculated based on its relationship with value-added TFP as:

$$\ln KTFP = \frac{L(VA^b, VA^a)}{L(\pi^b, \pi^a)} \ln VATFP \quad (4.11)$$

where $KTFP$ is the capital TFP, $VATFP$ is the value-added TFP, VA is value-added, π is variable profit, $L(VA^b, VA^a)$ and $L(\pi^b, \pi^a)$ can be calculated using the logarithmic mean tool. The relationship in equation (4.11) is proved in Appendix 4.1.

4.2.1.2 The VATFP measurement based approach

First, we define the value-added total factor productivity (VATFP) index of firm b relatively to firm a as follows:

$$\theta^{a,b} = \frac{Q_{VA}^{a,b}}{Q_{KL}^{a,b}} \quad (4.12)$$

where $\theta^{a,b}$ is the VATFP index, $Q_{VA}^{a,b}$ is the value-added quantity index and $Q_{KL}^{a,b}$ is the primary inputs (capital, labour) quantity index. The non-zero value-added is defined as revenue minus the intermediate cost, that is,

$$va = r - c_M = py - wx \quad (4.13)$$

where r is revenue, c_M is intermediate cost, y is output quantity, x is intermediate input quantity, p and w are the price of those factors, respectively. In this TFP measurement approach, the intermediate inputs are treated as negative outputs. Any production unit is considered as a mechanism that turns capital and labour into 'value-added'. Thus the

productivity measured in (4.12) is the difference in the value-added quantity that cannot be explained by differences in capital and labour.

If $Q_{VA}^{a,b}$ cannot be calculated directly, for example, if the data of outputs and intermediate inputs are only available in terms of value, it is preferable to use the implicit VA quantity index based on Fisher's weak reversal test, i.e.,

$$Q_{VA}^{a,b} \equiv \frac{\Omega^{a,b}}{P_{VA}^{a,b}} \quad (4.14)$$

where $\Omega^{a,b}$ is value-added index and $P_{VA}^{a,b}$ is the price index of output and intermediate inputs.

Substituting $Q_{VA}^{a,b}$ into (4.12) and rearranging, we obtain:

$$\Omega^{a,b} \equiv \theta^{a,b} P_{VA}^{a,b} Q_{KL}^{a,b} \quad (4.15)$$

In practice, when we face the problem of different dimensionality, as in the case in the Vietnamese data we use, it may not be possible to aggregate $P_{VA}^{a,b}$ based on the observed price information from the data set. In such cases, it is possible to use the aggregate price index or deflator for the industry published by the national statistics office. The VATFP index is now defined as:

$$\theta^{a,b} = \frac{\Omega^{a,b} / P_{VA}'^{a,b}}{Q_{KL}^{a,b}} \quad (4.16)$$

where $P_{VA}'^{a,b}$ is the deflator for each industry. The use of the deflator as a proxy for the observed price is an approximation and, thus, may introduce biases into the TFP measurement due to the deviation of individual price from the deflator or the average

price. To see how these biases could occur in practice, readers can refer to Coelli et al. (2003). Equation (4.15) now can be written as:

$$\Omega^{a,b} \approx \theta'^{a,b} P_{VA}'^{a,b} Q_{KL}^{a,b} \quad (4.17)$$

In equation (4.17), capital and labour are exogenous, the deflator is given. If $\theta'^{a,b}$ is computed independently, the identity would be exact only if $\Omega^{a,b}$ is the product of the components on the right-hand side of this equation. If errors in measurement exist, they will be captured in the derived $\Omega^{a,b}$. It is more reasonable to treat VATFP as a residual that captures the unexplained differences between outputs produced and inputs used. However, with the presence of measurement biases and white noise, the residual TFP also captures this error. A way to correct this potential problem is to decompose $\theta'^{a,b}$ in (4.15) into two components as follows:

$$\theta'^{a,b} = \theta'^{a,b} \alpha \quad (4.18)$$

where $\theta'^{a,b}$ is calculated independently, which captures unexplained differences between outputs and inputs due to factors relating to TFP; α captures unexplained differences caused by measurement biases and noise.

Equation (4.17) thus can be redefined as:

$$\Omega^{a,b} \equiv \theta'^{a,b} \alpha P_{VA}'^{a,b} Q_{KL}^{a,b} \quad (4.19)$$

In this equation, all components but α are computed independently. The term α is treated as a residual which captures measurement biases and noise. This approach is analogous to the stochastic frontier approach where the error term is decomposed into technical efficiency and white noise (see Aigner et al. 1977; Meeusen and van den

Broeck 1977).

If we employ the Tornqvist index, we can decompose the primary input index into labour and the capital quantity indexes as follows:

$$\Omega^{a,b} \equiv \theta^{a,b} \alpha P_{VA}^{a,b} Q_K^{a,b} Q_L^{a,b} \quad (4.20)$$

where $Q_L^{a,b}$ and $Q_K^{a,b}$ are the quantity index of labour and capital, respectively. This indexing method allows differences in a firm's VA to be broken down into separate effects due to productivity difference, the composite impacts of differences in the price of output and intermediate inputs, and firm size in terms of both labour and capital.

Because many firms in the sample cannot meet the requirement of having positive variable profits if using the first approach, we decide, in this chapter, to apply the second approach to analyse the effects of productivity, price of VA, and firm size on a firm's VA.

4.2.2 Benchmark firm

For cross-sectional comparative purposes, a benchmarking firm must be chosen in the index decomposition. The FGKS method uses the most profitable firm as the reference. This benchmarking firm is also used in Fox et al. (2006) and Grafton et al. (2006). Their purpose is to compare every firm with the best performing one to help identify what factors may be constraining profits in the rest of the industry. However in the context of the transitional economy, the most profitable firm may be the 'star'. In other words, there could be very large differences between the most profitable firm, the 'star', and the majority of firms, making such a comparison difficult. For instance, firms may lag far behind the 'star' due to big differences in technology used, management skills and marketing skills. To facilitate comparison, especially where large differences exist

among firms, we use a 'sample mean' firm as a reference and compare every firm with this hypothetical representative firm.

We use the method pioneered by Christensen et al. (1981) and Caves et al. (1982) for multilateral cross-country comparisons. In their works, output, productivity and input levels of an arbitrary firm/country are compared with the hypothetical representative firm/country defined as the geometric mean with output vector $\overline{\ln Y_i}$ and input vector $\overline{\ln X_i}$ where Y_i and X_i are output and input levels of each individual firm/country. The advantage of using the geometric sample mean firm is that it allows indexes to satisfy the transitivity condition to allow multilateral comparison (see Appendix 4.2 for the proof). A number of papers (Baily et al. 1992; Hill 1997; Motohashi 2005) follow this approach in making cross-sectional comparisons. The results of using the geometric mean firm as a benchmark are similar or somewhat better to those using the arithmetic mean firm.²⁷

In our approach, we create the hypothetical representative firm for the total manufacturing industry, and make comparisons to this level. Given that output and intermediate inputs are measured in terms of the value of deflated revenue and cost, the quantity indexes are calculated implicitly. Capital quantity is measured by the sale price of assets while labour is measured by the number of workers. This is comparable across firms.

²⁷ All results using the arithmetic mean firm are available from the author upon request.

4.3 Data and variable measurement

4.3.1 Data

The EIDM is applied to the pooled sample of non-state manufacturing SMEs in Vietnam. The data were collected by the ILSSA of MOLISA of Vietnam in collaboration with the SSE of Sweden in 1996 and 2001. The sample covers different non-state ownership characteristics including household firms, sole-proprietorships, cooperatives, partnership enterprises and limited companies.

In 1996, the survey collected data from nearly 800 firms. The 2001 survey collected data of around 1400 firms of which approximately 600 were surveyed in 1996. After dropping missing and irrelevant values²⁸, 307 and 603 observations remain in the 1996 and 2001 samples, respectively, making the total number of the pooled sample 910. Among these firms, only 90 enterprises were surveyed in both years. In our chapter, we divide the sample into two groups: micro firms with less than 10 workers and small and medium (SM) firms that employ between 10 and 300 workers.²⁹ Table 4.1 (page 128) documents the characteristics of firms by ownership types.

4.3.2 Variable measurement

Labour

Labour quantity is measured as the number of workers. The implicit labour price for each firm is calculated by taking total wage divided by the number of paid workers. For

²⁸ A number of firms do not meet the requirement of having positive value-added as required by the indexing method.

²⁹ Although medium firms are defined as having up to 300 workers, in reality, almost all small and medium enterprises in Vietnam have fewer than 50 workers.

enterprises which use only family labour, their labour price is replaced by the minimum implicit labour price. This is because calculations from the data set show that mean profit of these enterprises is just below half of that of enterprises using paid labour. The profits are the return to family labour. Total wage of every firm is then adjusted by taking the implicit labour price multiplied by total number of workers.

Capital

The surveys collected data of total owned assets including buildings, machinery and inventories at their current sale price for each firm. It should be noted that the survey lumped land value into the value of buildings, and so we use the term 'building' to indicate the total value of building and land. According to Morrison (1999), inventories should not be included as a capital measure as they do not provide productive services.³⁰ In our case, inventories account for a small proportion of capital, we follow Morrison's (1999) suggestion of excluding inventories from the measure of capital.

Price of capital

To calculate the primary input quantity index, we need a capital cost to compute the relevant cost share. In the standard case, the rental price or user cost of capital is the sum of depreciation cost, interest rate cost and risk premium. Unfortunately, in transitional and developing countries, a risk premium is not available and is hard to calculate. As a result, the premium is not included as a capital cost.

³⁰ This opinion is, however, objected to by Diewert (2006b).

As the surveys did not collect any information about the age of assets, we follow the suggestion of Diewert (2006a) to compute the rental price of an n -year old asset as follows:

$$f_n^t = [P_n^t - (1+i^t)P_{n+1}^t / (1+r^t)] \quad (4.21)$$

where: f_n^t is the rental price of an n -year old asset,

P_n^t is the purchase price of the asset at the beginning of period t

P_{n+1}^t is the value of the depreciated asset at the end of period t

i^t is the expected asset inflation or depreciation rate, which is assumed to be equivalent to the inflation rate in this chapter

Since P_{n+1}^t will only be received by the end of the period, it must be divided by the discount factor $(1+r^t)$ where r^t is the nominal interest rate.

When applying this approach, it turns out that almost all f_n^t values are negative. The results confirm the suggestion of Morrison (1999) that land is virtually meaningless in terms of its productive input because if land values are improving, its rental price could be negative. This is also true in the case of Vietnam where land prices increased substantially during the period studied. As there is no way, given the data available, to exclude land value from the value of 'building', we calculate the rental price of capital as the interest rate cost only.

To provide accurate measures of the contribution to value-added changes, we convert all values into 1994 constant prices. Outputs and intermediate inputs are deflated by the appropriate deflator for the two-digit sub-industry in which the firm belongs. Wages are

deflated by the consumer price index (CPI). To compute the deflator for capital quantity, we use either the investment for construction, or the value of an increase in fixed assets under investment³¹. Both criteria give the same result. Capital cost is deflated by the inflation rate to get the real user cost of capital. Summary statistics of the data are provided in Table 4.2 (page 128).

4.4 VATFP index for non-state manufacturing SMEs in Vietnam

The VATFP index $\theta^{a,b}$ in equation (4.20) is calculated for the pooled sample based on the value-added TFP approach suggested by Balk (2003). Following Balk (2003), the relationship between the gross-output and the VATFP indexes can be expressed as:

$$\ln VATFP = \frac{L(r^1, r^0)}{L(VA^1, VA^0)} \ln GOTFP \quad (4.22)$$

where $IGOTFP$ is the gross-output TFP index, r^1, r^0 are revenue at periods 1 and 0 and VA^1, VA^0 are value-added at period 1 and 0. $L(r^1, r^0)$ and $L(VA^1, VA^0)$ are developed using the tool of logarithmic mean as follows:

$$L(a, b) = \frac{a - b}{\ln(a/b)} \text{ where } a \text{ and } b \text{ are two real numbers.}$$

Based on the above relationship, the VATFP index for cross-sectional data can be developed as follows:

³¹ These deflators are computed by taking current price divided by the constant price in 1994 (sources: the General Statistics Office website - www.gso.gov.vn, Vietnam Statistical Yearbook 2001, and IMF 2001).

$$\ln IVATFP^{a,b} = \frac{L(r^b, r^a)}{L(VA^b, VA^a)} \left\{ \begin{aligned} & \ln Q_0(p^b, y^b, p^a, y^a) - \frac{L(c_M^b, c_M^a)}{L(r^b, r^a)} \ln Q_i''(\omega_M^b, x_M^b, \omega_M^a, x_M^a) \\ & - \frac{L(VA^b, VA^a)}{L(r^b, r^a)} \ln Q_i'(\omega_{KL}^b, x_{KL}^b, \omega_{KL}^a, x_{KL}^a) \end{aligned} \right\} \quad (4.23)$$

where $Q_0(\cdot)$ is the output quantity index, $Q_i''(\cdot)$ is the intermediate input quantity index, and $Q_i'(\cdot)$ is the primary input quantity index, r is revenue, c_M is intermediate cost, y is output quantity, x is intermediate input quantity, p and w are the price of those factors, respectively.

This approach is similar to the two-stage index. In the first stage, $Q_i''(\cdot)$ aggregates the intermediate input quantities and $Q_i'(\cdot)$ aggregates the primary input quantities. These two sub-indexes, in turn, are aggregated in the second stage. Unless $Q_i''(\cdot)$ and $Q_i'(\cdot)$ are superlative but not necessarily of the same form, the consistency in aggregation condition is achieved (Diewert 1978; Balk 2003; Pursiainen 2005).

The primary input quantity index is computed using the Tornqvist form as:

$$\ln Q_i' = \sum_{i=1}^2 \frac{\omega_i^b + \omega_i^a}{2} (\ln q_i^b - \ln q_i^a) \quad (4.24)$$

where $\omega_i = \frac{p_i q_i}{\sum_{i=1}^2 p_i q_i}$ is the cost share of each primary input. If firm a is the average

benchmark, its weight is calculated as:

$$w_i^a = \frac{1}{n} \sum w_i \quad (4.25)$$

The VATFP index is calculated using equations (4.23) and (4.24). The reference firm is

chosen as the geometric mean firm having the output vector $\overline{\ln Y_i}$ and input vector $\overline{\ln X_i}$. Output and intermediate input quantity indexes are computed by relating the deviation of firm deflated revenues and intermediate costs from the industry mean. The appropriate deflator for these indexes is the output prices constructed for particular industries (Morrison 1999; Coelli et al. 2003). The list of sub-industries, number of observations and the price deflator are provided in Appendix 4.3. The plotted VATFP indexes are presented for the whole manufacturing industry in Figures 4.1-2 (page 124).

In Figures 4.1-2, observations of each year are separated by the solid vertical line while the dashed line separates firms in each year (1996 and 2001) into micro and SM groups. The horizontal line divides TFP indexes below and above 1. The above 1 group includes firms with a TFP level greater than that of the average firm, and the below 1 group contains firms with a TFP level less than the level of the average firm.

Figure 4.1 represents TFP indexes by observation, where firms are ranked in ascending order of capital. As shown in this Figure, there is an increasing trend of TFP indexes along with capital in 1996, but the pattern is less pronounced in 2001. This may be because a large proportion of 'building' is land and its values rose considerably due to land specification in 2000 (Ministry of Finance 2005). Thus, more capital does not necessarily imply more machinery or more advanced technology, at least for the latter period. In order to analyse the relationship between TFP and technology, we graph TFP indexes in ascending order of machinery (Figure 4.2, page 124). The increasing trend of TFP indexes is clearer for both 1996 and 2001. Firms with higher machinery capital have higher TFP levels.

A striking feature of the Figures is that the majority of firms in the 1996 sample have TFP indexes greater than 1 while the inverse is found for 2001. In other words,

many firms in 2001 have TFP levels less than that of the average firm. An explanation for this finding is that the 2001 sample included more household enterprises, which are considered to have a large proportion of land, but use much less machinery, as shown in Table 4.1 (page 128).

Firm ownership and performance

The non-state sector in Vietnam includes four ownership types. They are household enterprises, sole-proprietorships, cooperatives and limited and shareholding (L&S) companies. To examine which kind of ownership performs more efficiently, we graph VATFP index distribution for each kind of ownership³² in Figure 4.3 (page 125). As shown in Figure 4.3, household enterprises perform less efficiently than sole-proprietorships and L&S companies. This is, perhaps, not surprising because sole-proprietorships and L&S companies are considered to be more advanced than household enterprises in terms of both technology and management skills.

In Chapter 3, we find that household enterprises appear to be more technically efficient than L&S companies. Furthermore, micro firms are more efficient than larger establishments. The results in this chapter indicate that household and micro firms are less efficient than more advanced enterprises at larger scale in terms of TFP. One possibility is that sole-proprietorships, limited companies and larger firms may have higher allocative efficiency than household and micro firms. In seeking for more explanation, we try to link the relationship between TFP and technical efficiency (TE) by using the simplest case where there are only two firms. For simplicity, we assume that each firm produces one output y and uses one input x .

³² The transitivity property of using the sample mean benchmark allows us to compare performance among different firms (Coelli et al. 1998).

The situation can be summarised as: two firms a and b where firm b is of a larger scale than firm a . Firm a has higher TE than firm b , i.e., $TE_a / TE_b > 1$ while TFP_a is less than TFP_b , i.e., $TFP_b / TFP_a > 1$.

$$\text{Let us define: } TFP = \frac{\text{Actual_output}}{\text{Actual_input}} = \frac{\text{Actual_output}}{\text{Potential_output}} * \frac{\text{Potential_output}}{\text{Actual_input}} \quad 33$$

$$\text{or } TFP = \frac{y}{x} = \frac{y}{y^*} \cdot \frac{y^*}{x} \quad (4.26)$$

where y^* is defined from the frontier production function (FPF) estimated by the stochastic frontier approach. Equation (4.26) can be written as:

$$TFP = TE \cdot TFP^* \quad (4.27)$$

$$\text{Then } TFP_b = TE_b \cdot TFP_b^* \quad (4.28) \text{ and } TFP_a = TE_a \cdot TFP_a^* \quad (4.29)$$

Divided (4.28) by (4.29), we have:

$$\frac{TFP_b}{TFP_a} = \frac{TE_b}{TE_a} \cdot \frac{TFP_b^*}{TFP_a^*} \quad \text{or} \quad \frac{TFP_b}{TFP_a} = \frac{TE_b}{TE_a} \cdot \frac{y_b^* / x_b}{y_a^* / x_a} \quad (4.30)$$

Two cases are followed:

- Case 1: $x_b = x_a$, then $y_b^* = y_a^*$ as two firms have the same FPF. Thus, (4.30)

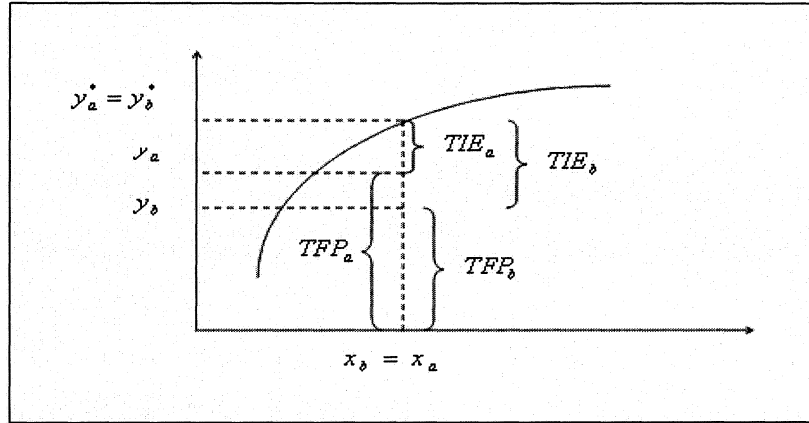
becomes:

$$\frac{TFP_b}{TFP_a} = \frac{TE_b}{TE_a} \cdot \frac{y_b^*}{y_a^*} \cdot \frac{x_a}{x_b} \quad \text{This is contradictory to the situation as } \frac{TFP_b}{TFP_a} > 1 \text{ and } \frac{TE_b}{TE_a} < 1.$$

³³ I am grateful to Professor Kaliappa Kalirajan for his advice on this equation.

The case can be illustrated as in graph 1 below:

Graph 1: $x_b = x_a$



Note: TIE is technical inefficiency.

If $x_b = x_a$ and $TE_a > TE_b$, TFP_a must be greater than TFP_b . Therefore, the case that $x_b = x_a$ is ruled out.

- Case 2: $x_b \neq x_a$, then $y_b^* \neq y_a^*$

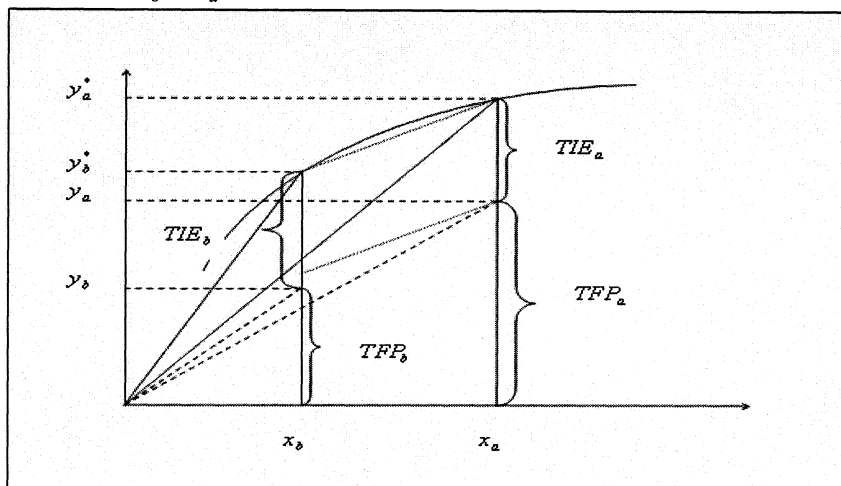
From equation (4.30), we have:

$$\frac{y_b^* / x_b}{y_a^* / x_a} = \frac{TFP_b}{TFP_a} \cdot \frac{TE_a}{TE_b} > 1$$
 as each component on the right-hand side is assumed to be greater than 1.

Then: $\frac{y_b^*}{x_b} > \frac{y_a^*}{x_a}$.

- If the FPF exhibits diminishing returns to scale (DRTS), the situation is satisfied when $x_b < x_a$ as illustrated in graph 2.

Graph 2: $x_b < x_a$ and DRTS

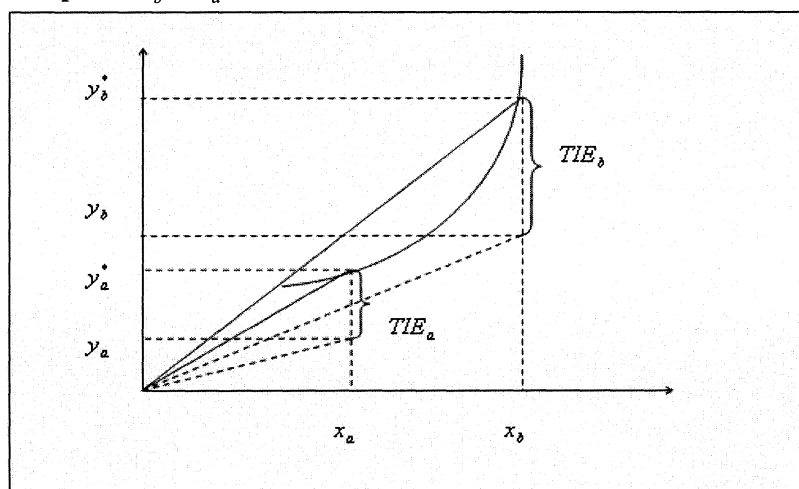


As can be seen from graph 2, when $TFP_b > TFP_a$ and $TE_a > TE_b$, then $\frac{y_b^*}{x_b} > \frac{y_a^*}{x_a}$.

However, this case is also ruled out as it violates the assumption that firm b is at a larger scale than firm a .

(ii) If the FPF exhibits increasing returns to scale (IRTS), then x_b must be greater than x_a as illustrated in graph 3.

Graph 3: $x_b > x_a$ and IRTS



As shown in graph 3, $\frac{y_b^*}{x_b} > \frac{y_a^*}{x_a}$, $TFP_b > TFP_a$ and $TE_a > TE_b$. This situation is also

satisfied when the FPF exhibits constant returns to scale (CRTS).

In conclusion, the conditions $TFP_a < TFP_b$ and $TE_a > TE_b$ are simultaneously satisfied when the FPF does not exhibit DRTS. Returns to scale (RTS) coefficients calculated based on the estimated frontier production functions in Chapter 3 are approximately equal to or greater than 1 in almost all sub-industries. This, together with the above relationship between TFP and TE may imply that many non-state SMEs in Vietnam exhibit the IRTS function. If this possibility dominates other reasons such as allocative efficiency, SMEs can increase their input level to maximise profits provided that their management skills meet the scale operation.

4.5 Value-added decomposition

4.5.1 Factors contributing to value-added

Our focus is to analyse the contribution of factors including productivity, the composite effects of output and intermediate input prices, labour and capital, to value-added of an arbitrary firm relative to the pooled sample mean firm in the period 1996-2001.

When comparing the index values in the indexing decomposition method, if a value-added index is greater (less) than 1, value-added of a compared firm is higher (lower) than that of the hypothetical representative firm. For decomposition, a component index of more (less) than 1 implies that the contribution of that factor to value-added is higher (lower) than it is for the reference firm. The contribution to value-added of each factor of an arbitrary enterprise relative to the average firm can be investigated through Figures 4.4a-f (page 126), where pooled indexes are plotted in ascending order of labour and capital.

As can be seen in Figures 4.4a-f, VA indexes increase as firm size gets larger. Particularly, for the SM group, the majority of indexes is above 1 in both 1996 and 2001. One of the important contributions to this increasing trend is TFP. The larger the firms are, the higher is the contribution of productivity to VA (Figure 4.4b). Labour is another important contributing factor (Figure 4.4c) while the contribution of capital to VA is not consistent. At each level of firm size, capital indexes vary in a range with a somewhat similar lower value. However, the upper value gets larger as firm size increases (Figure 4.4d). This is because more capital sometimes implies a higher proportion of land rather than advanced technology. Finally, a rise in the price of outputs and intermediate inputs in the manufacturing industry during the period 1996-2001 leads to a higher contribution of price to VA in 2001 compared to 1996 (Figure 4.4e, page 126). Error indexes reported in Figure 4.4f reveal that the bigger the firm is the unexplained difference between outputs and inputs due to measurement biases and less noise.

To provide an insight into the contribution of each factor of production, we provide the plotted partial productivity indexes of labour and capital in Figures 4.5-6 (page 127). Partial productivity or average product of labour and capital is defined as the value-added per employee and per unit of capital, respectively.

As can be seen in Figure 4.6 (page 127), capital productivity increases with firm size in each year, reflecting the efficient use of capital of larger firms. On the other hand, labour productivity (Figure 4.5, page 127) is similar across firm sizes, except for a slightly increasing trend for the 'micro' group in 1996. Similar labour productivity indicates no advantage in the unit labour cost of larger firms. The increasing contribution of labour to VA is, therefore, solely attributed to a higher absolute value of VA as a result of a higher proportion of wages when firms hire more labour rather

than the increase in the value of a product. This indicates that in order to increase their competitiveness and profits, SMEs should increase capital or/and reduce the wage proportion in VA by increasing labour productivity. Given the fact that most SMEs in Vietnam face a capital shortage (Ramamurthy 1998; Ronnas et al. 1998; MPI-UNIDO 1999; World Bank 1999b; Sakai and Takada 2000; Malesky 2004), increasing labour productivity that leads to lower unit labour cost should be a priority. This, in turn, requires better management methods and skilled workers.

Geometric means of indexes in Table 4.3 (page 129) support the findings from Figures 4.4a-e, i.e., the average contribution of all factors in the SM group is higher than in the micro group. During the period studied, 1996 marks the significant contribution of productivity to value-added. Nevertheless, smaller productivity indexes in 2001 do not imply the decreasing trend of productivity. Rather, it reflects that the 2001 sample includes many more inefficient performers.

The above results depict an accurate picture of the economy of Vietnam during the period 1996-2001. Entry constraints including complicated registration procedures, long processing of application forms and corruption, pushed entry costs up to a very high level (GTZ-CIEM-UNDP 2004) early in the 1990s. This limited non-state firms to the best performers only. In addition, favourable economic conditions in the mid-1990s with rapid economic growth and expanding effective demand (World Bank 1999b; 2003a; Ramstetter 2004) have probably made firms more productive.

The success of the non-state sector and the awareness of constraints facing private SMEs led to programs promoting the private sector in 2000 with the issuance of the law on private enterprise. This has simplified registration procedures and lowered entry costs, resulting in a boom of registered private firms. However, the majority of new

entry firms are household and micro firms with obsolete technology and low management skills. In addition, the contracted demand following the financial crisis in Asia in 1998 may have lowered average performances in 2001.

To investigate which of several possible factors contribute to the success or failure of a firm, we categorise the pooled sample into 20 quantiles and extract the highest, lowest and middle 5% performing groups. The value-added decomposition for each group is provided in Tables 4.4, 4.5 and 4.6 (page 130-2).

A cross-comparison of these Tables shows that productivity is the most important factor contributing to the success of the top 5% (Table 4.4, page 130), while in the bottom 5% the contribution of productivity is small (Table 4.5, page 131). The contribution to value-added in the middle 5% group is equally divided between three factors including productivity, labour and capital (Table 4.6, page 132). Thus, it is suggested that to grow sustainably, firms must shift to productivity as a core contributor.

4.5.2 Government assistance and firm characteristics

To analyse the impact of government support on a firm's performance, we categorise government assistance in terms of both financial and non-financial supports including consultations for managerial and technical problems, training workers and providing market opportunities in Table 4.7 (page 133).

Panel B of Table 4.7 shows differences among groups. The middle 5% receives the least in government support. Most government support is allocated to the lowest and the top 5% groups. In Vietnam, government support is provided in response to requests from firms. It would seem there are of two kinds of firms that look for support: weak performers that need support to survive, and strong firms that face constraints

restricting their potential growth. In addition, there has been an increase and a shift in government assistance during the period studied. While the top 5% group received more support than the bottom 5% in 1996, the opposite was true in 2001, and the differential in receiving support between the two groups became larger.

A lower proportion of better performing firms receiving government credit assistance may be attributed to complicated procedures and high costs of accessing credit application, which deflect efficient firms from borrowing and lead to adverse selection. The other possibility may be due to the weakness of the banking sector in appraising commercial credits (Calier and Tran, 2004). A high proportion of poorly performing firms with lower management skills that resort to government non-financial support reflects the ineffectiveness of this program. Surveys on business services for private SMEs in Vietnam (Service-Growth Consultants Inc and Thien Ngan Co.Ltd 1998; GTZ-VCCI-Swisscontact 2002) show that lack of information about non-financial support and its role in the growth of firms, and its quality, are hindrances. Consequently, better performers have to rely on their internal services leading to an increase in recruitment, and hence, operating costs. This may explain why larger firms have no advantage in unit labour cost.

Characteristics of the 5% groups are provided in Table 4.8 (page 133). As shown in this Table, gross returns to capital³⁴ of the top 5% of firms are much higher than those of the middle 5%, while the bottom 5% experience losses. This raises concerns about the survival rate of poorer performers. Among ownership kinds, household enterprises account for a small proportion in the top 5% in comparison with above 90% of that kind

³⁴ For self-employed enterprises, variable profits are the return to both family labour and capital.

of ownership in the bottom and the middle 5% groups. On the other hand, the percentage of more evolved ownership types, such as private enterprises and limited and shareholding companies, are higher in the top 5%. Although gaining some tax advantages³⁵, this suggests that by being reluctant to become formalised, household enterprises may suffer from loss of access to larger markets. Table 4.8 indicates that firms in the top 5% group are much larger than those in the other groups, on average. Moreover, most of the firms in this group are located in urban areas while the majority in the bottom and the middle 5% groups are located in rural areas. A higher percentage of urban firms in the top 5% group most likely reflects advantages of having higher technical and managerial training, as well as educational level of workers and managers in urban areas in Vietnam (Malesky 2004).

4.6 Concluding remarks

An indexing method is developed to decompose the contribution of productivity, prices and firm size to a firm's value-added. To avoid the problem of different dimensionality of outputs and inputs within the same industry, an industry deflator is used instead of the observed price. The use of the deflator gives an approximation and may introduce biases into total factor productivity measurement. Thus, an error term is added into the decomposition equation to capture measurement biases and white noise. The method is then applied to non-state small and medium manufacturing firm-level data in Vietnam between 1996 and 2001.

³⁵ In Vietnam, household enterprises are not required to retain accounting records for calculation of value-added and profit taxes, but pay lump-sum tax to local authorities (MPI-UNIDO 1999).

The results reveal an increasing trend of total factor productivity with the use of machinery capital and value-added with firm size. The decompositions indicate that total factor productivity is the most important factor contributing to a firm's value-added. Moreover, larger firms use capital more efficiently than smaller firms, while labour productivity is somewhat similar among different firm sizes. Thus, the increasing contribution of labour to value-added is attributed only to the higher absolute value of value-added as a result of higher wage proportion, not necessarily to a higher value of a product. This finding raises concerns about weak management skills, unskilled workers and weak competitiveness of non-state small and medium manufacturing enterprises in Vietnam.

In order to compete in the world market, it would seem Vietnamese private small and medium enterprises should increase their productivity, especially labour productivity by investing more in advanced technology and/or training managers and workers, as well as using out-sourcing services from the government to release burdens from over-recruitment. This, in turn, requires an effective government support program.

Although the Vietnamese government has created a better policy environment and increased assistance services to firms, the analysis shows that the majority of recipients are poor performers. Given that productivity is a core component factor to the success of firms, which can benefit from skilled workers, managers and outside specialised services, the Vietnamese government should improve its non-financial support program. A particular focus should be on providing information and improving quality of assistance services as well as on smart selection of which kinds of firms to support to enhance their economic performance.

4.7 Appendix 4.1

The relationship between value-added TFP measure and the capital TFP measure

To develop the relationship between the value-added TFP and the capital TFP, we use the logarithmic mean tool:

$$L(a, b) = \frac{a - b}{\ln(a/b)} \text{ where } a \text{ and } b \text{ are two positive real numbers}$$

Let us define:

$$VA = R - C_I \text{ and } C_{KL} = C_L + C_K$$

Where VA is value-added, R is revenue, C_I is intermediate cost, C_L and C_K are labour and capital cost, respectively.

1 Value-added TFP index

The value-added TFP index is defined as:

$$\ln VATFP = \ln Q_{VA} - \ln Q_i' \quad (1)$$

Using Fisher's weak reversal test, the primary cost index can be defined as:

$$c_{KL}^1 / c_{KL}^0 = P_i' Q_i' \quad (2) \text{ where } P_i' \text{ and } Q_i' \text{ are price and quantity indexes of primary inputs.}$$

In a similar manner, we have:

$$c_K^1 / c_K^0 = P_K Q_K \quad (3) \text{ and } c_L^1 / c_L^0 = P_L Q_L \quad (4)$$

In order to compare the VATFP and the capital TFP indexes, we decompose the

primary cost ratio using the logarithmic mean formula as:

$$\begin{aligned}\ln(c_{KL}^1 / c_{KL}^0) &= \frac{c_{KL}^1 - c_{KL}^0}{L(c_{KL}^1, c_{KL}^0)} = \frac{c_K^1 + c_L^1}{L(c_{KL}^1, c_{KL}^0)} - \frac{c_K^0 + c_L^0}{L(c_{KL}^1, c_{KL}^0)} = \frac{c_K^1 - c_K^0}{L(c_{KL}^1, c_{KL}^0)} + \frac{c_L^1 - c_L^0}{L(c_{KL}^1, c_{KL}^0)} \\ \Rightarrow \ln(c_{KL}^1 / c_{KL}^0) &= \frac{L(c_K^1, c_K^0) \ln(c_K^1 / c_K^0)}{L(c_{KL}^1, c_{KL}^0)} + \frac{L(c_L^1, c_L^0) \ln(c_L^1 / c_L^0)}{L(c_{KL}^1, c_{KL}^0)}\end{aligned}\quad (5)$$

Substitute (2), (3) and (4) into (5), we get:

$$\begin{aligned}\ln P_i' Q_i' &= \frac{L(c_L^1, c_L^0)}{L(c_{KL}^1, c_{KL}^0)} \ln P_L + \frac{L(c_K^1, c_K^0)}{L(c_{KL}^1, c_{KL}^0)} \ln P_K + \frac{L(c_L^1, c_L^0)}{L(c_{KL}^1, c_{KL}^0)} \ln Q_L + \frac{L(c_K^1, c_K^0)}{L(c_{KL}^1, c_{KL}^0)} \ln Q_K \\ \therefore \ln Q_i' &= \frac{L(c_L^1, c_L^0)}{L(c_{KL}^1, c_{KL}^0)} \ln Q_L + \frac{L(c_K^1, c_K^0)}{L(c_{KL}^1, c_{KL}^0)} \ln Q_K\end{aligned}\quad (6)$$

Equation (6) shows how capital and labour can be aggregated into the primary input quantity index.

Plugging (6) into (1), we get an alternative way to calculate VATFP index:

$$\ln VATFP = \ln Q_{VA} - \frac{L(c_L^1, c_L^0)}{L(c_{KL}^1, c_{KL}^0)} \ln Q_L - \frac{L(c_K^1, c_K^0)}{L(c_{KL}^1, c_{KL}^0)} \ln Q_K \quad (7)$$

2 The capital TFP index

Define the variable profits or the gross return to capital as:

$$VP = VA - C_L$$

Then we have:

$$\ln(vp^1 / vp^0) = \frac{vp^1 - vp^0}{L(vp^1, vp^0)} = \frac{va^1 - c_L^1}{L(vp^1, vp^0)} - \frac{va^0 - c_L^0}{L(vp^1, vp^0)} = \frac{va^1 - va^0}{L(vp^1, vp^0)} - \frac{c_L^1 - c_L^0}{L(vp^1, vp^0)}$$

$$\therefore \ln(vp^1 / vp^0) = \frac{L(va^1, va^0) \ln(va^1 / va^0)}{L(vp^1, vp^0)} - \frac{L(c_L^1, c_L^0) \ln(c_L^1 / c_L^0)}{L(vp^1, vp^0)}$$

$$\Rightarrow \ln P_{VP} Q_{VP} = \frac{L(va^1, va^0)}{L(vp^1, vp^0)} \ln P_{VA} - \frac{L(c_L^1, c_L^0)}{L(vp^1, vp^0)} \ln P_L + \frac{L(va^1, va^0)}{L(vp^1, vp^0)} \ln Q_{VA} - \frac{L(c_L^1, c_L^0)}{L(vp^1, vp^0)} \ln Q_L$$

Then,

$$\ln Q_{VP} = \frac{L(va^1, va^0)}{L(vp^1, vp^0)} \ln Q_{VA} - \frac{L(c_L^1, c_L^0)}{L(vp^1, vp^0)} \ln Q_L \quad (8)$$

The capital TFP is defined as:

$$\ln TFP_K = \ln Q_{VP} - \ln Q_K \quad (9)$$

Substitute (8) into (9), we have:

$$\ln TFP_K = \frac{L(va^1, va^0)}{L(vp^1, vp^0)} \ln Q_{VA} - \frac{L(c_L^1, c_L^0)}{L(vp^1, vp^0)} \ln Q_L - \ln Q_K$$

Or:

$$\ln TFP_K = \frac{L(va^1, va^0)}{L(vp^1, vp^0)} \left[\ln Q_{VA} - \frac{L(c_L^1, c_L^0)}{L(va^1, va^0)} \ln Q_L - \frac{L(vp^1, vp^0)}{L(va^1, va^0)} \ln Q_K \right] \quad (10)$$

The part between the brackets of equations (7) and (10) has the same structure but the weights for labour and capital quantity indexes are different. The following result can be drawn:

Theorem 1

$$\ln TFP_K = \frac{L(va^1, va^0)}{L(vp^1, vp^0)} \ln VATFP \quad \text{if } VA = C_{KL}$$

Proof:

$$VA = VP + C_L = C_{KL} = C_K + C_L. \text{ If } VA = C_{KL} \Rightarrow VP = C_K$$

Then, the term in the brackets of equation (10) is equal to the right hand-side of (7):

$$\begin{aligned} & \ln Q_{VA} - \frac{L(c_L^1, c_L^0)}{L(va^1, va^0)} \ln Q_L - \frac{L(vp^1, vp^0)}{L(va^1, va^0)} \ln Q_K \ln VATFP \\ &= \ln Q_{VA} - \frac{L(c_L^1, c_L^0)}{L(c_{KL}^1, c_{KL}^0)} \ln Q_L - \frac{L(c_K^1, c_K^0)}{L(c_{KL}^1, c_{KL}^0)} \ln Q_K \\ &\therefore \left[\frac{L(c_L^1, c_L^0)}{L(c_{KL}^1, c_{KL}^0)} - \frac{L(c_L^1, c_L^0)}{L(va^1, va^0)} \right] \ln Q_L = \left[\frac{L(vp^1, vp^0)}{L(va^1, va^0)} - \frac{L(c_K^1, c_K^0)}{L(c_{KL}^1, c_{KL}^0)} \right] \ln Q_K \end{aligned} \quad (12)$$

4.8 Appendix 4.2

Benchmark firm in profit decomposition method and transitivity condition

1 Benchmark firm in profit decomposition method

Most works in the profit decomposition area including Fox et al. (2003), Fox et al. (2006), and Grafton et al. (2006) use the best performer as a benchmark firm when making multi-cross comparisons. The singular advantage of this benchmark is that it helps other firms in the sample recognise which may be constraining their performance. The geometric mean firm, on the other hand, achieves the transitivity condition, thus making the multi-cross comparison valid.

2 Transitivity or circularity condition.

The transitivity condition requires that, for any three firms: k , s and l , a direct comparison between k and s yields the same index as an indirect comparison through l . That means:

$$I_{ks} = I_{kl} / I_{sl} \quad (1)$$

Therefore, if we can prove $\ln I_{ks} = \ln I_{kl} - \ln I_{sl}$, the comparison satisfies the circularity test. In fact, not many indexes, including the Fisher Ideal index, satisfy this test. The problem seems to be much related to the weight used when calculating indexes (Dreschler 1973; Caves et al. 1982). Caves et al. (1982) prove that the Tornqvist-Theil index satisfies the transitivity condition when making multi-cross-section comparison with the use of the geometric mean as a benchmark.

2.1 Geometric mean firm as a benchmark

To generalise, we take the output index to illustrate all the proofs. By convention, the bilateral output index of firm k relative to firm s is defined as:

$$\ln q_{ks} = \frac{1}{2} \sum_i (R_i^k + R_i^s) \ln(Y_i^k / Y_i^s) \quad (2)$$

Where R_i is the share of output i in the total revenue and Y_i is the output level.

The index in (2) is named by Caves et al. (1982) as the translog bilateral output index that has the base-invariant property. That means whatever firms are used as a base makes no difference.

Supposing we define the bilateral comparison of each firm k and s to the geometric mean firm l , as having the output vector $\overline{\ln Y_i}$ and the revenue share $\overline{R_i}$. They are calculated as:

$$\ln Y_i^l = \overline{\ln Y_i} = \frac{1}{2} (\ln Y_i^k + \ln Y_i^s) \quad (3)$$

$$R_i^l = \overline{R_i} = \frac{1}{2} (R_i^k + R_i^s) \quad (4)$$

Using equation (2) for the bilateral comparison of each k and s to the geometric mean l , we have:

$$\ln q_{kl} = \frac{1}{2} \sum_i (R_i^k + \overline{R_i}) (\ln Y_i^k - \overline{\ln Y_i}) \quad (5)$$

$$\text{And: } \ln q_{sl} = \frac{1}{2} \sum_i (R_i^s + \overline{R_i}) (\ln Y_i^s - \overline{\ln Y_i}) \quad (6)$$

If we can prove:

$$\ln q_{ks} = \ln q_{kl} - \ln q_{sl} \quad (7)$$

the transitivity condition is satisfied.

Plugging (5) and (6) into (7), yields:

$$\ln q_{ks} = \frac{1}{2} \sum_i \left[(R_i^k + \bar{R}_i)(\ln Y_i^k - \bar{\ln Y}_i) - (R_i^s + \bar{R}_i)(\ln Y_i^s - \bar{\ln Y}_i) \right] \quad (8)$$

Rearranging (8), we get:

$$\ln q_{ks} = \frac{1}{2} \sum_i \left[\begin{aligned} & (R_i^k \ln Y_i^k + \bar{R}_i \ln Y_i^k - R_i^k \bar{\ln Y}_i - \bar{R}_i \bar{\ln Y}_i) \\ & - R_i^s \ln Y_i^s - \bar{R}_i \ln Y_i^s + R_i^s \bar{\ln Y}_i + \bar{R}_i \bar{\ln Y}_i \end{aligned} \right] \quad (9)$$

Substituting (3) and (4) into (9), we obtain:

$$\begin{aligned} \ln q_{ks} &= \frac{1}{2} \sum_i \left[\begin{aligned} & (R_i^k \ln Y_i^k + \frac{R_i^k + R_i^s}{2} \ln Y_i^k - R_i^k \frac{\ln Y_i^k + \ln Y_i^s}{2}) \\ & - R_i^s \ln Y_i^s - \frac{R_i^k + R_i^s}{2} \ln Y_i^s + R_i^s \frac{\ln Y_i^k + \ln Y_i^s}{2} \end{aligned} \right] \\ &= \frac{1}{2} \sum_i \left[\begin{aligned} & R_i^k \ln Y_i^k + \frac{R_i^k}{2} \ln Y_i^k + \frac{R_i^s}{2} \ln Y_i^k - \frac{R_i^k}{2} \ln Y_i^k - \frac{R_i^k}{2} \ln Y_i^s \\ & - R_i^s \ln Y_i^s - \frac{R_i^k}{2} \ln Y_i^s - \frac{R_i^s}{2} \ln Y_i^s + \frac{R_i^s}{2} \ln Y_i^k + \frac{R_i^s}{2} \ln Y_i^s \end{aligned} \right] \\ &\Rightarrow \ln q_{ks} = \frac{1}{2} \sum_i \left[R_i^k \ln Y_i^k + R_i^s \ln Y_i^k - R_i^s \ln Y_i^s - R_i^k \ln Y_i^s \right] \\ &= \frac{1}{2} \sum_i \left[R_i^k (\ln Y_i^k - \ln Y_i^s) + R_i^s (\ln Y_i^k - \ln Y_i^s) \right] \end{aligned}$$

Thus, we have:

$$\ln q_{ks} = \frac{1}{2} \sum_i \left[(R_i^k + R_i^s)(\ln Y_i^k - \ln Y_i^s) \right] \quad (10)$$

Comparing (2) and (10), we obtain $\ln q_{ks} = \ln q_{kl} - \ln q_{sl}$ (5). Thus, the transitivity condition is satisfied.

2.2 An arbitrary firm as a benchmark

Using the best performing firm in the profit decomposition method is similar to the case of using an arbitrary firm as a benchmark.

Supposing that l is an arbitrary firm in the sample of 3 firms: k , s and l .

Similar to the previous case, we plug the translog bilateral output index into (7).

Remember that l now is an arbitrary firm.

$$\ln q_{ks} = \frac{1}{2} \sum_i \left[(R_i^k + R_i^l)(\ln Y_i^k - \ln Y_i^l) - (R_i^s + R_i^l)(\ln Y_i^s - \ln Y_i^l) \right] \quad (11)$$

Rearranging (11), we have:

$$\ln q_{ks} = \frac{1}{2} \sum_i \left[\begin{aligned} &R_i^k \ln Y_i^k + R_i^l \ln Y_i^k - R_i^k \ln Y_i^l - R_i^l \ln Y_i^l \\ &- R_i^s \ln Y_i^s - R_i^l \ln Y_i^s + R_i^s \ln Y_i^l + R_i^l \ln Y_i^l \end{aligned} \right] \quad (12)$$

Adding and subtracting $R_i^s \ln Y_i^k$ and $R_i^k \ln Y_i^s$ into (12), we get:

$$\begin{aligned} \ln q_{ks} &= \frac{1}{2} \sum_i \left[\begin{aligned} &(R_i^k + R_i^s) \ln Y_i^k - (R_i^k + R_i^s) \ln Y_i^s - R_i^s \ln Y_i^k \\ &+ R_i^k \ln Y_i^s + R_i^l \ln Y_i^k - R_i^k \ln Y_i^l - R_i^l \ln Y_i^s + R_i^s \ln Y_i^l \end{aligned} \right] \\ &= \frac{1}{2} \sum_i \left[\begin{aligned} &(R_i^k + R_i^s)(\ln Y_i^k - \ln Y_i^s) - R_i^s (\ln Y_i^k - \ln Y_i^l) \\ &+ R_i^k (\ln Y_i^s - \ln Y_i^l) + R_i^l (\ln Y_i^k - \ln Y_i^s) \end{aligned} \right] \end{aligned}$$

Then:

$$\ln q_{ks} = \ln q_{ks} - \frac{1}{2} \sum_i R_i^s (\ln Y_i^k - \ln Y_i^l) - R_i^k (\ln Y_i^s - \ln Y_i^l) - R_i^l (\ln Y_i^k - \ln Y_i^s)$$

The transitivity condition is, therefore, not satisfied.

4.9 Appendix 4.3

List of industry and deflator

1996	307	
15: Food product and beverages	58	1.2335
17: Manufacture of textiles	20	1.2244
19: Manufacture of leather products	8	1.4375
20: Manufacture of wood and wood products	16	1.4228
21: Paper and paper products	20	1.2037
22: Publishing and printing	2	2.0097
24: Chemicals and chemical products	4	1.1991
25: Rubber and plastic product	43	1.2998
26: Manufacture of other non-metallic mineral products	12	1.1477
28: Fabricated metal products	39	1.2178
29: Machinery and equipment n.e.c	6	1.2165
30: Office, accounting and computing machineries	4	1.0228
31: Electrical machinery and apparatus n.e.c	11	1.1841
33: Medical and optical instruments, watches and clocks	3	1.2420
35: Manufacture of other transport	13	1.5111
36: Manufacture of furniture, manufacturing n.e.c	48	1.3654
2001	603	
15: Food product and beverages	156	1.8236
17: Manufacture of textiles	36	1.7082
18: Manufacture of wearing apparel	9	1.7885
19: Manufacture of leather products	4	1.6563
20: Manufacture of wood and wood products	57	1.7125
21: Chapter and chapter products	19	1.7155
22: Publishing and printing	9	1.8942
24: Chemicals and chemical products	6	1.4736
25: Rubber and plastic product	38	1.6866
26: Manufacture of other non-metallic mineral products	39	1.2373
27: Manufacture of basic metals	10	1.6825
28: Fabricated metal products	57	1.8587
29: Machinery and equipment n.e.c	64	1.6147
30: Office, accounting and computing machineries	7	3.0603
31: Electrical machinery and apparatus n.e.c	9	2.1825
33: Medical and optical instruments, watches and clocks	3	2.7356
36: Manufacture of furniture, manufacturing n.e.c	59	1.9941
37: Recycling	21	1.3393

4.10 Appendix 4.4

Figures

Figure 4.1 Value-added TFP index on capital

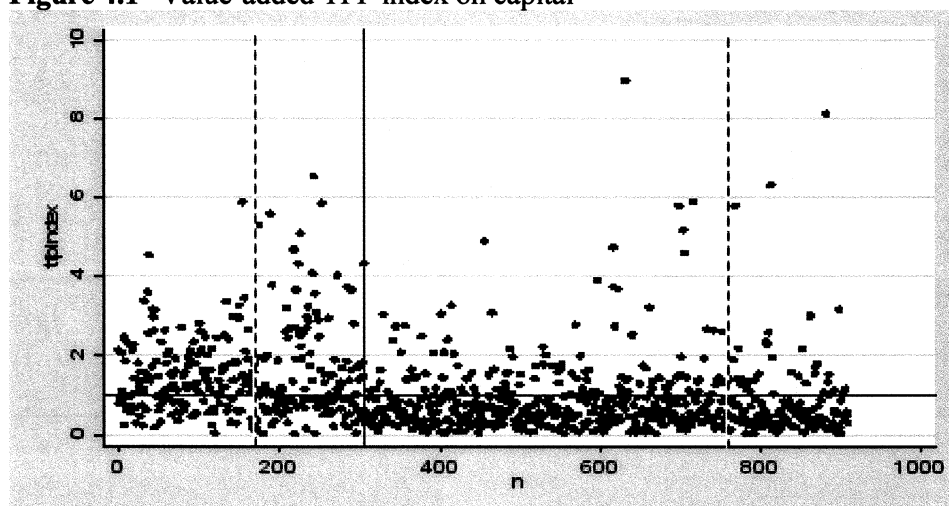


Figure 4.2 Value-added TFP index on machinery

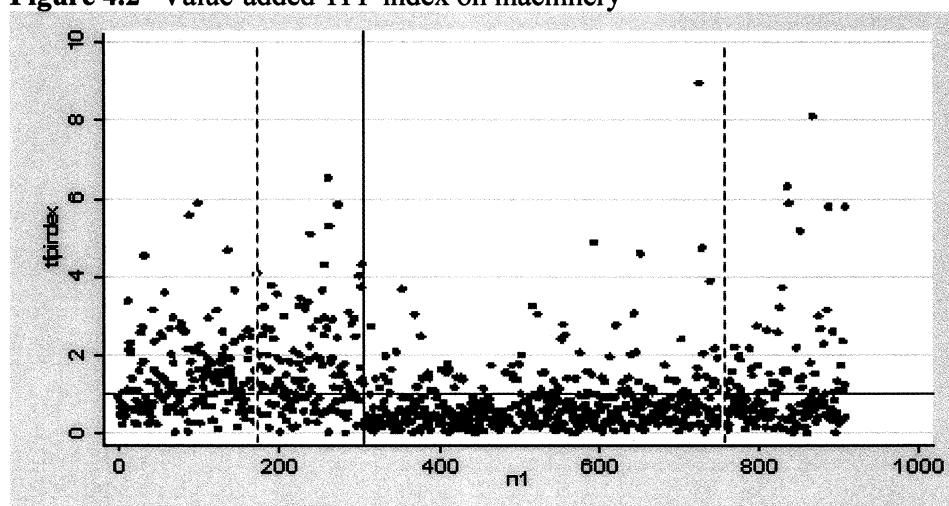


Figure 4.3 TFP distribution by ownership

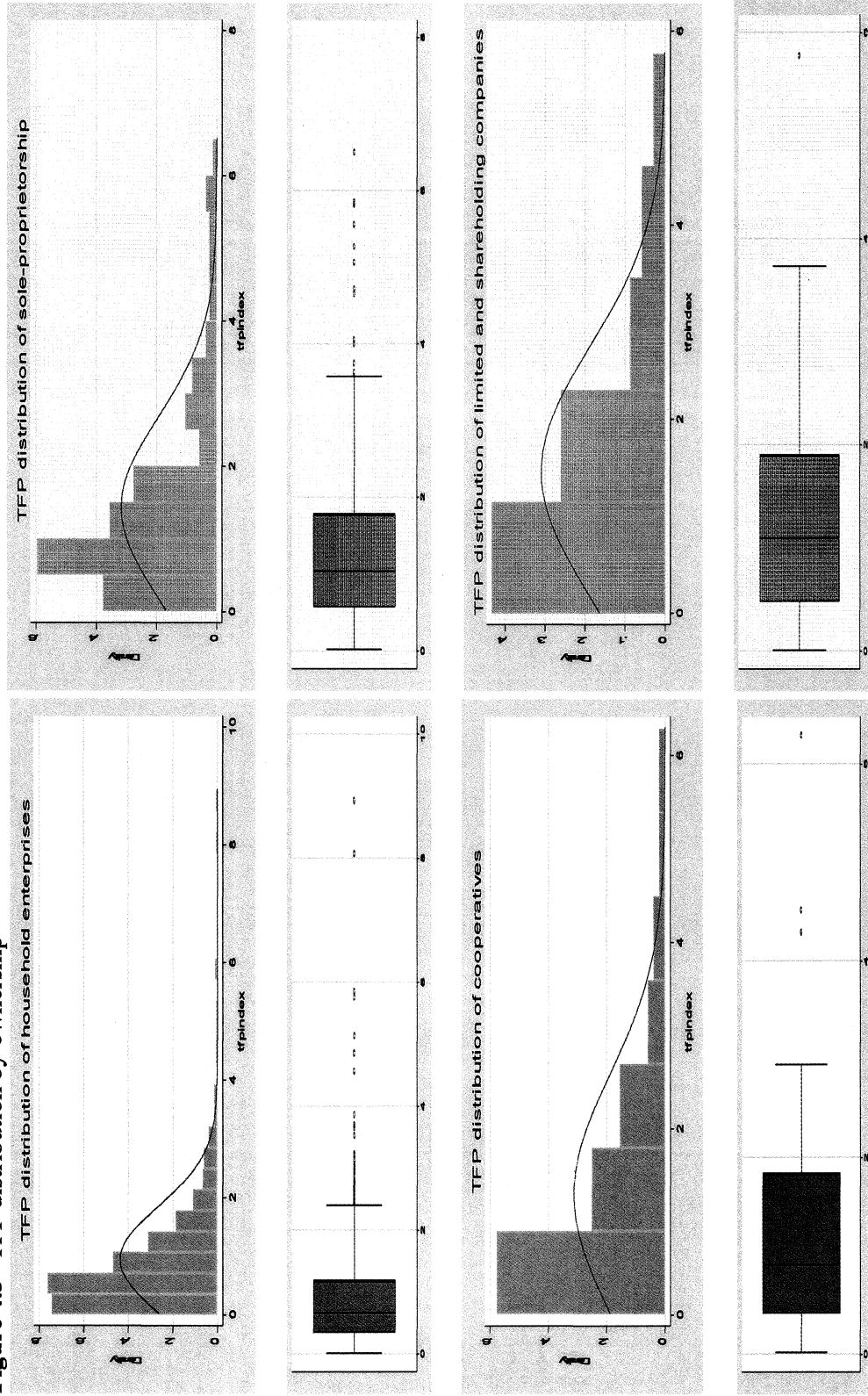
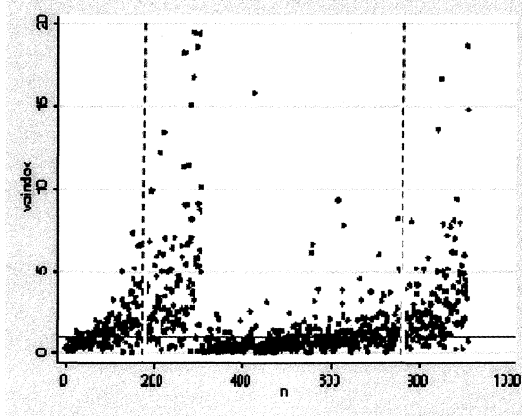
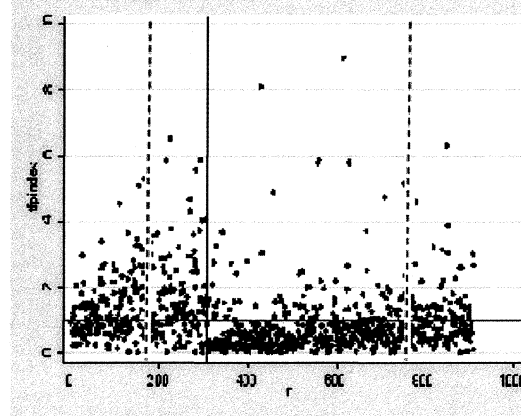


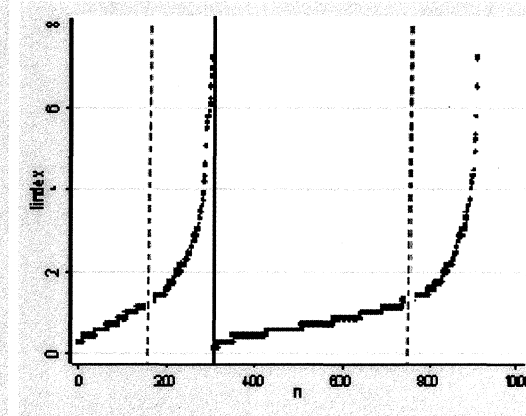
Figure 4.4 Plotted indexes for the whole manufacturing industry



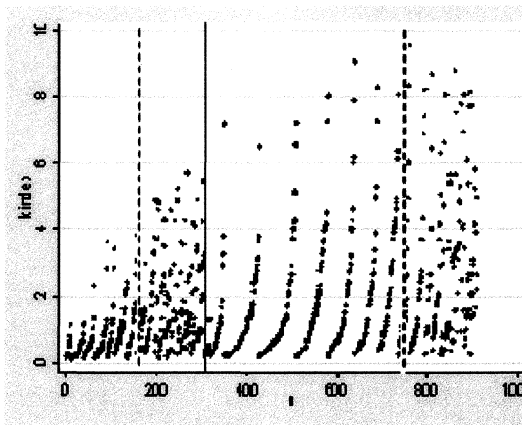
4.4a: Value-added indexes



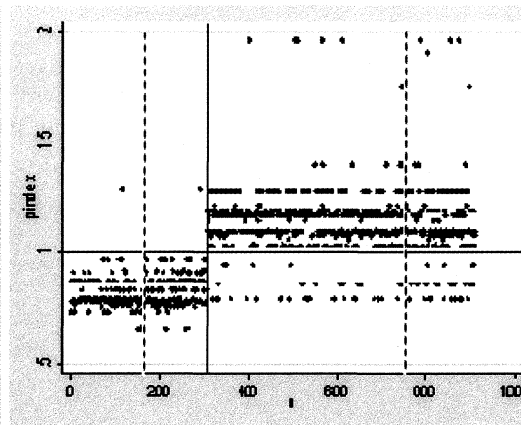
4.4b: VATFP indexes



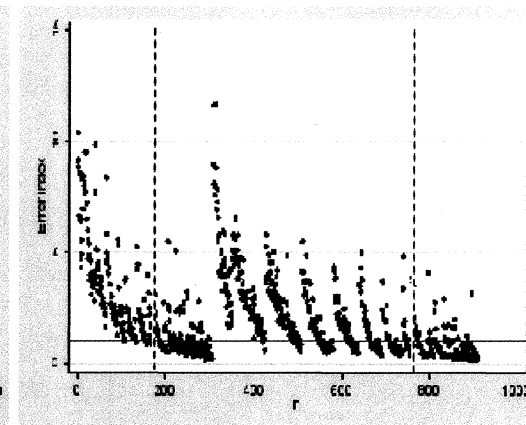
4.4c: Labour indexes



4.4d: Capital indexes



4.4e: Composite price indexes



4.4f: Error indexes

Figure 4.5 Labour productivity

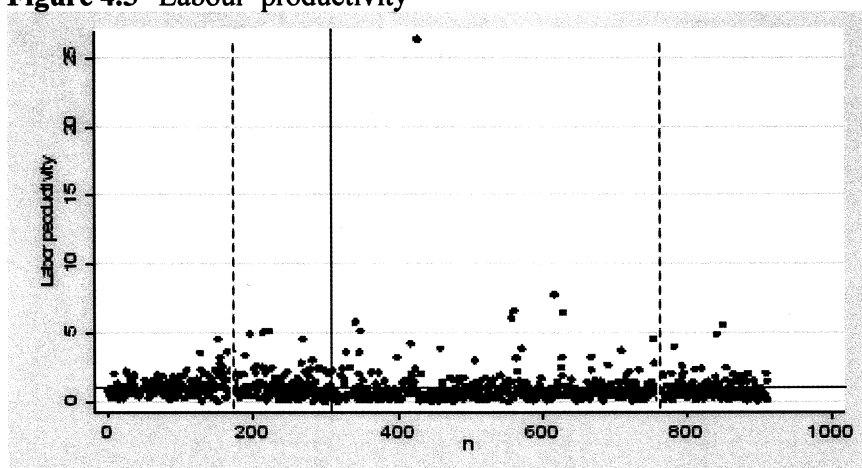
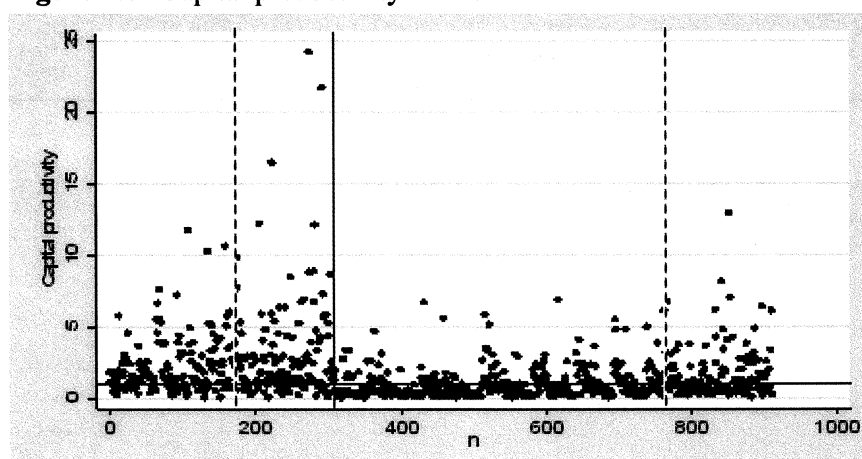


Figure 4.6 Capital productivity



Tables

Table 4.1 Firms' characteristics by ownership

Ownership type	Percentage	Average size (# of workers)	Average machinery capital (Thous.VND [†])	% of micro firm ^{††}
1996				
• Household	45.93	6.48	33,318.76	82.27
• Private ^{†††}	37.13	14.28	86,460.03	42.11
• Cooperative	13.36	19.49	100,928.70	17.07
• L&S ^{††††}	3.58	19.00	186,152.50	18.18
2001				
• Household	71.10	6.89	31,451.33	81.23
• Private	19.23	10.47	83,576.40	60.65
• Cooperative	6.37	19.41	88,796.34	5.88
• L&S	3.30	18.53	199,061.90	21.05

Note: [†] VND is the Vietnamese currency

^{††} Proportion of micro firms for each ownership type

^{†††} The word 'private' used in this Table indicates sole-proprietorship to save space

^{††††} L&S are limited and share holding companies, which are considered as modern enterprises with more advanced technology and management skills.

Table 4.2 Summary statistics

	Obs	Mean	Std. Dev.	Minimum	Maximum
All year					
Revenue	910	249,707.90	360,876.50	4,025.52	3,242,805.00
Intermediate cost	910	178,718.50	285,301.40	1,447.01	2,894,285.00
Capital quantity	910	313,500.60	330,221.20	19,061.88	1,825,781.00
Capital cost	910	33,464.83	35,888.04	2,273.97	220,944.20
Number of workers	910	9.18	8.20	1.00	50.00
Wages	910	47,075.26	54,379.47	228.31	441,704.70
1996					
Revenue	307	345,656.30	500,245.70	9,721.50	3,242,805.00
Intermediate cost	307	244,882.80	403,013.00	2,464.06	2,894,285.00
Capital quantity	307	237,051.00	226,059.70	19,061.88	1,091,287.00
Capital cost	307	47,844.28	45,621.66	3,824.04	220,944.20
Number of workers	307	11.56	9.97	2.00	50.00
Wages	307	51,673.86	54,242.44	360.52	341,630.90
2001					
Revenue	603	200,858.60	249,718.70	4,025.52	1,802,157.00
Intermediate cost	603	145,032.80	192,298.70	1,447.01	1,160,767.00
Capital quantity	603	352,422.70	366,308.60	31,301.03	1,825,781.00
Capital cost	603	26,143.95	26,975.54	2,273.97	136,767.10
Number of workers	603	7.97	6.83	1.00	50.00
Wages	603	44,734.01	54,344.55	228.31	441,704.70

Table 4.3 Decomposition of VA, means

	VA index	VATFP	Labour index	Capital index	Price of VA index
All years	0.999	0.693	0.999	1	1.567
Micro	0.674	0.601	0.681	0.819	
SM	2.383	0.948	2.335	1.549	
1996	1.521	1.111	1.249	0.802	1.278
Micro	0.956	1.068	0.735	0.551	
SM	2.769	1.169	2.477	1.303	
2001	0.808	0.545	0.893	1.118	1.738
Micro	0.590	0.483	0.661	0.954	
SM	2.083	0.786	2.214	1.808	

Table 4.4 Value-added decomposition of the top 5%

Obs #	$\Omega^{a,b}$	$\theta^{a,b}$	$Q_L^{a,b}$	$Q_K^{a,b}$
866	6.333399	3.177468	2.312897	1.297316
867	6.457614	1.684347	2.746566	4.274981
868	6.474408	5.28164	1.301005	.9528158
869	6.596261	5.866185	.7227804	2.036501
870	6.596407	4.301265	1.301005	1.53367
871	6.619393	3.576254	3.469346	.2430137
872	6.662159	2.645656	3.613902	.8801882
873	6.733449	3.542949	1.445561	2.035977
874	6.939845	3.762359	2.023785	1.146909
875	6.952062	1.518718	3.035678	6.925396
876	7.006394	1.800008	2.312897	5.218863
877	7.018151	2.441775	3.903014	1.321192
878	7.114271	1.799248	2.60201	5.637445
879	7.283012	5.074273	1.156449	1.541069
880	7.638051	2.271829	2.891122	3.40723
881	7.745771	5.772073	.8673365	2.698256
882	7.814726	3.880704	2.312897	.9946132
883	7.895855	1.72758	3.758458	5.35303
884	7.963151	4.581923	1.445561	1.894851
885	8.021947	2.595615	3.035678	2.476144
886	8.112936	2.458678	3.903014	2.163472
887	8.159355	5.159977	1.301005	1.886904
888	8.664277	1.688429	7.227804	3.047371
889	8.983208	2.927916	3.035678	2.608006
890	9.033883	3.083164	3.469346	2.063438
891	9.035745	2.04375	6.215911	1.864083
892	9.267273	8.940458	.8673365	1.200402
893	9.323513	2.581944	3.32479	3.430323
894	9.85041	3.639374	1.445561	3.75634
895	10.05073	1.478439	7.227804	5.420322
896	11.28711	4.664695	2.891122	1.462522
897	11.39697	2.788985	3.469346	4.186698
898	12.15696	5.830613	1.734673	2.257531
899	13.37503	6.511017	1.879229	2.012583
900	13.56179	3.1412	2.023785	8.023771
901	14.76848	2.666792	7.227804	2.162098
902	15.04996	5.568436	3.613902	1.108375
903	15.77146	8.08873	.4336683	6.496079
904	16.62528	6.298141	2.168341	3.626308
905	16.75076	3.732363	5.059463	3.482274
906	18.22855	4.295589	2.891122	5.704945
907	18.55471	4.013647	5.782243	2.822873
908	18.65354	2.993196	6.505024	4.940689
909	19.37715	4.065256	6.938692	1.993004
910	19.46366	5.861969	5.637687	.7972013

Table 4.5 Value-added decomposition of the bottom 5%

Obs #	$\Omega^{a,b}$	$\theta^{a,b}$	$Q_L^{a,b}$	$Q_K^{a,b}$
1	.0221907	.0058328	1.156449	1.467017
2	.0261866	.0141805	.5782244	.8392093
3	.0305447	.0274159	.5782244	.3533655
4	.0389484	.0154105	.7227804	1.491514
5	.0426397	.0564953	.5782244	.2073403
6	.04392	.0333146	.5782244	.4721139
7	.0443477	.0100758	1.156449	3.058001
8	.0485871	.0500955	.5782244	.3393731
9	.0513695	.0723478	.1445561	.4098919
10	.0585476	.0639147	.4336683	.3899335
11	.06222	.018824	1.011893	2.021177
12	.0638219	.0173627	1.011893	3.029165
13	.0656434	.04895	.5782244	.6516045
14	.0677754	.0425398	1.011893	.3081507
15	.0739116	.0672411	.5782244	.4146807
16	.0763673	.1102105	.2891122	.3806861
17	.0769565	.0236812	.2891122	2.875786
18	.0775376	.0499945	.4336683	.9080416
19	.0838628	.1120451	.5782244	.2724833
20	.088127	.0756417	.8673365	.3020733
21	.0897188	.0463952	.4336683	1.287952
22	.0902585	.0516506	.7227804	1.033795
23	.0911198	.2390505	.1445561	.2081835
24	.0926844	.1670272	.4336683	.2080216
25	.0929597	.0557785	.2891122	1.23207
26	.0968796	.2179411	.2891122	.1911524
27	.0982944	.0170503	5.926799	1.017318
28	.0987843	.1395997	.4336683	.3167101
29	.1013743	.2085929	.2891122	.2265644
30	.1013836	.033455	3.758458	.6095545
31	.1045014	.0714785	.5782244	.8197838
32	.1049605	.0753954	.1445561	1.283163
33	.1072337	.0719407	.8673365	.6755761
34	.1080266	.1042017	.4336683	.6342632
35	.1097273	.2227004	.4336683	.1377913
36	.1197831	.1847934	.4336683	.2041028
37	.1201673	.18089	.1445561	.4892802
38	.1216678	.2660096	.4336683	.163633
39	.1249323	.0719875	.8673365	.9599103
40	.1260837	.2703467	.4336683	.1907057
41	.129857	.2709684	.2891122	.2373217
42	.1303425	.159084	.7227804	.3203692
43	.1318643	.1963089	.4336683	.2470345
44	.1352723	.2725876	.2891122	.2535096
45	.1366107	.2748256	.2891122	.2308466
46	.1368722	.0215595	.7227804	7.971208

Table 4.6 Value-added decomposition of the middle 5%

Obs #	$\Omega^{a,b}$	$\theta^{a,b}$	$Q_L^{a,b}$	$Q_K^{a,b}$
434	.968731	.9174145	.4336683	1.537094
435	.9741907	.586536	1.590117	.8586348
436	.9825345	.5425875	1.011893	2.017084
437	.9887013	1.391474	.7227804	.2567472
438	.9896498	1.569447	.2891122	.5933043
439	.9938028	1.012367	.8673365	.6164278
440	.9946739	.4367236	1.734673	1.733457
441	.9978226	.9042242	.7227804	.988138
442	.9983649	1.369314	.7227804	.2599848
443	1.003055	.5465402	1.011893	2.081835
444	1.012428	.6600294	1.156449	1.195613
445	1.016498	.4624216	.5782244	3.985603
446	1.019176	1.587681	1.011893	.3527386
447	1.0202	.4451812	.7227804	3.590213
448	1.028275	.9350323	1.011893	.5410814
449	1.030314	.9854756	1.011893	.6408744
450	1.032538	1.401084	.5782244	.5463328
451	1.03326	.9638195	.7227804	.9535281
452	1.033558	.4428872	2.168341	1.154233
453	1.033928	1.428662	.7227804	.2733924
454	1.036203	.5426601	.7227804	2.852403
455	1.03643	1.023699	.8673365	.605125
456	1.041772	.8285618	1.590117	.2478777
457	1.046919	.9974582	1.011893	.4616931
458	1.047215	1.015956	.5782244	1.042435
459	1.04943	.6570672	1.445561	1.031507
460	1.051274	.6304138	1.011893	1.684894
461	1.05166	.5437574	1.301005	1.71727
462	1.051839	.6157228	1.445561	1.089481
463	1.054049	.4029395	.8673365	4.000439
464	1.054935	1.33764	1.011893	.2519045
465	1.062654	.769043	.8673365	1.477553
466	1.064244	1.081061	.7227804	.7912815
467	1.068894	1.043222	.7227804	.9233864
468	1.070638	.6796292	.8673365	1.65189
469	1.076113	.5890272	1.011893	2.146587
470	1.084105	.3435616	.5782244	5.102568
471	1.087089	1.11002	.8673365	.5540317
472	1.08802	.9318534	.8673365	.9557621
473	1.091031	.7688022	.8673365	1.283229
474	1.091601	.2848977	.7227804	7.242077
475	1.092034	.8359437	1.156449	.7605289
476	1.092725	.7847553	1.156449	.9395742
477	1.093771	1.157341	1.011893	.4073623
478	1.097422	1.17784	.8673365	.4570535

Table 4.7 Government financial and non-financial assistance

		Top 5%	Bottom 5%	Middle 5%	Top 5%	Bottom 5%	Middle 5%
		Panel A: # of obs			Panel B: Percentage		
Credit assistance							
All year		44	46	45			
	Yes	9	22	5	20.45	47.83	11.11
	No	35	24	40	79.55	52.17	88.89
1996		27	7	10			
	Yes	6	1	0	22.22	14.29	-
	No	21	6	10	77.78	85.71	100.00
2001		17	39	35			
	Yes	3	21	5	17.65	53.85	14.29
	No	14	18	30	82.35	46.15	85.71
Non-financial assistance							
All year		44	43	40			
	Yes	15	26	9	34.09	60.47	22.50
	No	29	17	31	65.91	39.53	77.50
1996		27	7	10			
	Yes	12	3	1	44.44	42.86	10.00
	No	15	4	9	55.56	57.14	90.00
2001		17	36	30			
	Yes	3	23	8	17.65	63.89	26.67
	No	14	13	22	82.35	36.11	73.33

Note: Figures in panel B are in vertical percentage

Table 4.8 Characteristics of the 5% groups

	Top 5%	Bottom 5%	Middle 5%
Variable profits (thous.VND [†])	234 390.60	-8 798.98	6 136.91
Ownership (percentage)			
• Household firms	26.67	91.30	91.11
• Sole-proprietorship	42.22	2.17	8.89
• Cooperative	17.78	4.35	
• L & S ^{††} companies	13.33	2.17	
Labour (average number of workers)	21.91	5.02	6.60
Age (average year of operation)	10.58	12.04	8.49
Location (percentage)			
• Urban	71.11	21.74	46.67
• Rural	28.89	78.26	53.33

Note: [†] VND is the Vietnamese currency

^{††} L&S are limited and share holding companies, which are considered modern enterprises with more advanced technology and management skills.

CHAPTER 5

INSTITUTIONS AND NON-STATE FIRM PERFORMANCE

5.1 Introduction

Institutional economics (North and Thomas 1973; North 1991) emphasize the effects of institutions on economic growth through providing information, more secure property rights and stringent enforcement mechanisms to stimulate cooperation. Empirical investigations using cross-country-data have shown that better institutions are accompanied by higher economic performance (Hall and Jones 1999; Acemoglu et al. 2001; Rodrik et al. 2002). Studies that have used micro or national-level data to analyse the effects of institutions on economic performance are rather limited and most have focused on ex-communist economies where property rights have recently been transferred from the state to individuals (Besley 1995; Johnson et al. 2002b).

The literature on the impact of institutions on economic performance within countries has focused on enforcement issues and the administrative quality of the public sector. Berkowitz and De Jong (2003), for example, find that businesses are more likely to establish themselves in regions that have more political support from the local government in Russia, while Laeven and Woodruff (2004) show that more effective jurisdictions are associated with larger firms in Mexico. A critical survey of both theoretical and empirical impacts of institutions on economic performance can be found in Gagliardi (2007).

In this chapter we investigate institutional reforms in Vietnam and the impact on firm economic performance using a provincial competitiveness index for 2006 (PCI06), and firm level data in Vietnam from 2005. A study of Vietnam is of particular interest because although it has a homogenous political system and government structure, and relatively equal government expenditures in different parts of the country, economic performance is substantially different across provinces (VNCI-VCCI 2005).

Compared to other low-income countries, Vietnam is also characterized by a high level of discretion by local government officials (Fforde and Vyllder 1996: 260).

The chapter is structured as follows. Section 5.2 investigates institutional reforms and their implementation in different regions of Vietnam with a particular focus on the second phase of the Vietnamese reform process that began in 2000. An overview of the history and institutions in Vietnam is presented in Section 5.3 while the data and variables used in our analysis are described in Section 5.4. Section 5.5 presents the econometric model and results of our investigations into institutional explanations for differences in economic performance across Vietnam. Section 5.6 offers concluding remarks.

5.2 Vietnam: institutional reforms and implementation

The economic reform process, called '*Doi moi*' in Vietnam, has recognised the legal existence of the non-state sector since the beginning of the 1990s. Despite this legal landmark, the policy environment remained hostile to private businesses in the 1990s. Consequently, non-state firms faced many constraints to their establishment and growth.

The Asian financial crisis in 1998 led to economic stagnation and thus contributed to the second phase of Vietnamese economic reforms. These stage two reforms have targeted the sustained growth of the non-state sector and were supported by the Enterprise Law of 1999. We investigate these institutional reforms and their implementation and impacts on firm performance through firm surveys. In this Section, we focus on three aspects of institutional performance: (i) provision of information; (ii) security of private property rights; and (iii) lower transaction costs that arise from reduced administrative procedures and less discretion by state officials.

5.2.1 Providing information

Vietnam has been characterised by a lack of transparency and a service sector to support business development (IMF 2000). For instance, the Economist Intelligence Unit's report on Vietnam in 1997 observed that there were no business services (including information provision) in any of its listed labour categories.

A survey on 153 firms in Vietnam in 1998 conducted by Service-Growth Consultants Inc (Canada) and Thien Ngan (Galaxy) Co.Ltd (Vietnam), with funding from Mekong Project Development Facility (MPDF) and the International Finance Corporation (IFC), showed an increasing need for market information. One year later, in 1999, MPDF conducted a survey of 95 larger private manufacturers and found that a lack of market information was the second most important constraint to firm growth (Webster and Taussig 1999: 30). Managers often complained about their inability to find information on inputs, outputs, alternative suppliers, buyers, price and price trend (Webster 1999). Moreover, information about changes in policies and regulations as well as basic business registration such as firm name, address, and other details were not available to public and responsible officials (VNCI-CIEM 2004).

The business environment has improved with the issuance of the Enterprise Law (1999) that requires firms and business registration bodies to publicise information relating to business registration. However, due to incompatibility among government bodies and the cost of publicising information in newspapers, the requirement has not been fully implemented and varies across provinces. For example, Da Nang (a central province) and Ho Chi Minh City have a website with basic firm information. These cities also have established a commercial promotion centre to provide firms with market information. By contrast, the implementation of the Enterprise Law in other

provinces is weak. For instance, in some provinces government agencies continue to complain about lack of information on firms and do not know the number of non-state firms under their supervision (GTZ-CIEM-UNDP 2004: 17).

A lack of information persists as a major constraint to the development of non-state firms. A survey of 1200 private enterprises in 2001 carried out by the German Agency for Technical Cooperation (GTZ) and the Swiss Foundation for Technical Cooperation (Swisscontact), in collaboration with InvestConsult Group, revealed a strong demand for information about a variety of business topics. A shortage of information about market and regulations is also prevalent (GTZ-Swisscontact 2002). Another survey implemented in 2001 on 414 private enterprises by MPDF indicated that accessing market information and penetrating markets are the biggest obstacles, followed by lack of capital (Nguyen et al. 2002: 7).

Acknowledging difficulties facing non-state firms, the Vietnamese Government issued Decree No.90/2001/CP-ND³⁶ in support of the development of small and medium enterprises (SMEs)³⁷ and Decision No.94/2002/QD-TTG³⁸ to reform the mechanisms and policies to stimulate the development of the non-state sector. These decisions led to the formation of the Agency for SME Development (ASMED) in October 2002 that has as one of its key roles to provide a countrywide firm information system on technology, management, markets, promotion and government regulations related to firm operation.

³⁶ Translated from the Vietnamese: 'Nghị định của Chính phủ số 90/2001/ND-CP ngày 23 tháng 11 năm 2001 về trợ giúp phát triển doanh nghiệp vừa và nhỏ'.

³⁷ SMEs in Vietnam are defined as having up to 300 workers.

³⁸ Translated from the Vietnamese: 'Quyết định số 94/2002/QĐ-TTĐ ngày 17/07/2002 về chương trình hành động của chính phủ thực hiện Nghị quyết hội nghị lần thứ 5 Ban Chấp Hành Trung Ương Đảng khóa IX về tiếp tục đổi mới cơ chế, chính sách, khuyến khích và tạo điều kiện phát triển kinh tế tư nhân'.

To date, ASMED has worked well in undertaking business registration and regulations. Its provision of market information, however, remains weak and implementation varies across provinces, depending on the attitude of local government officials towards the non-state sector (Malesky 2004).

To overcome the shortage of information and promote cooperation among firms, firms have established their own business associations. In 2002, there were around 200 business associations operating throughout the country (Nguyen et al. 2002, p. vii) and the 2001 survey of MPDF shows that business associations perform well in providing information on policies and legal issues to members. Unfortunately, only a few large and well-known business associations provide, at a modest level, market information. For instance, the Vietnam Chamber of Commerce and Industry (VCCI) is equipped with an internet-based information system for SMEs, which is transferred from GTZ (www.smenet.com.vn), and has set up a centre to promote cooperation among firms.

Business development services (BDS) have also been encouraged by the provincial and central governments. However, a survey on 746 firms conducted in 2002 by CSEG³⁹ and CIEM⁴⁰ shows that firms often complain about the quality of information that they have bought. Consequently, many firms obtain their information informally through friends and relatives (Figure 5.1, page 162). Firms in the survey also consider that a lack of information on markets and customers weakens their competitiveness. They, in particular, demand information on markets such as identity of local buyers, overseas clients, potential partners and price (CSEG and CIEM 2002).

³⁹ Crawford School of Economics and Government (CSEG) – the Australian National University

⁴⁰ Central Institute of Economic Management (CIEM) – The Ministry of Planning and Investment of Vietnam

A recent survey conducted by the World Bank in 2004 of 42 enterprises that are contractors and subcontractors reveals that lack of information is the most limiting constraint preventing cooperation. Searching for information about contractors and subcontractors is time-consuming. Consequently, firms, especially SMEs, have to rely on personal sources to advertise their products. Similarly, contractors find it hard to identify an appropriate supplier due to lack of basic data or items such as catalogues or brochures that also limit cooperation (Carlier and Tran 2005).

In summary, institutional reforms since 2000 have improved the provision of information relating to regulations. However, weaknesses remain in providing market information and the implementation of the central government's regulations and policies varies across provinces. Given the preference of firms to rely on business associations to obtain information, the development of private institutions such as business associations and social norms to stimulate cooperation and sanction breaches is necessary. The Russian Chamber of Commerce which provides its members with information on companies that have been alleged to have breached contracts (Greif and Kandel 1995) may be a good example for Vietnamese business associations.

5.2.2 More secure property rights

In 2000, the IMF observed that Vietnam did not have secure private property rights. Six years later, the Heritage Foundation 2007 (Kane et al. 2007) gave a score of just 10% to Vietnam in terms of security of its property rights, whereas other measures of institutional performance are rated above 50%. 'Hot' problems that are related to private property rights, and often cited as impeding the private sector performance in Vietnam, are land, contract enforcement and dispute resolution.

5.2.2.1 Land

According to the Constitution of Vietnam, land belongs to the state. The Land Law 1993, however, recognises the right to use allocated land parcels. This law also allows holders to transfer and mortgage the land use right (LUR) for a specific period (Section 2 - The Land Law 1993). However, because this law does not define clearly the functions of related government bodies, the implementation of giving land use right certificates (LURC) is very weak. As a result, many non-state firms have their own premises but do not have an LURC as collateral for loans. [For instance, according to the firm survey in 2002 by CSEG and CIEM, among non-state firms having their own premises, only 51.7% hold LURC]. This limits the potential of firms to borrow and to grow their businesses (e.g. Ronnas and Ramamurthy 2001; Carlier and Tran 2004a).

A consequence of the planned economy and the Vietnam Constitution is that all utilised land is allocated to individuals and SOEs, and the procedure to apply for land for business purposes is both complicated and costly. Firms incur substantial transaction costs by visiting many government agencies, paying a large amount in terms of informal fees and waiting for around 2-3 years for the final decision (Carlier and Tran 2004b). Due to a lack of premises, non-state firms have also to rent un-utilised land from state-owned enterprises (SOEs) unofficially or from individuals, weakening their competitiveness as the market rent is high compared to the official price stipulated by the government. In addition, the contract term is often of short duration because landlords want to raise rents after short periods to ensure 'catch up' with a rising land price. As a result, non-state firms avoid investing in long term assets on their rental premises (Carlier and Tran 2004b). The net result is an increase in both transaction and transformation costs.

To increase the land supply for non-state firms, the government issued the Land Law Amendment 1998 and the Domestic Investment Promotion Amendment 1998. These promote the construction of industrial zones and require provinces to publish information on available land. However, constructing industrial zones takes time because it requires compensation be paid for confiscated land. Moreover, there is no government body in charge of confiscated non-used land and the publication of information on available land depends on local governments (Malesky 2004).

The new Land Law 2003 may be a turning point for issues associated with land tenure. As stipulated by this law, a subordinate system of Land Use Right Registration agencies⁴¹ is established to take charge of LURC. This creates a 'one stop shop', saving much money and time for LURC applicants. Further, to increase land supply for the non-state sector, an agency called the Land Fund Development Organization⁴² was created. Its function is to confiscate non-used land previously allocated to SOEs and other organisations. Another break-through of the new Land Law 2003 is that it tries to create a clear distinction between formal and informal land prices.⁴³ However, the implementation of this law, as in the case of providing market and other information, depends on practices of local government authorities (Carlier and Tran 2004b).

⁴¹ Translated from Vietnamese 'Văn phòng đăng kí quyền sử dụng đất'. This is an agency belonging to local government bodies of natural resources and environment.

⁴² Translated from Vietnamese name: Tổ Chức Phát Triển Quỹ Đất'.

⁴³ The formal price of land is the price that the state pays for confiscated land. This is much lower than the market (informal) price, generating a huge benefit for those who get LUR from the state and thus induces corruption in this area.

5.2.2.2 Contract enforcement and dispute resolution

The Vietnamese government has carried out many institutional reforms to stimulate the development of the non-state sector, but reforms of the judiciary system have been often neglected. To date, the sole improvement in this area is the anti-corruption 'voice' of the media towards the judiciary system. When weak contract enforcement has existed as part of 'business culture' (Doan 1999), the use of the courts to solve disputes is very low. For example, in a survey of 259 managers of non-state firms in Hanoi and Ho Chi Minh City in 1995-97⁴⁴, only 9% said that a court or other government agencies could help to solve their disputes (McMillan and Woodruff 1999). Although the incidence is much higher in the south than the north of Vietnam (Malesky 2004), this proportion is much lower than in other transition economies (Johnson et al. 2002a).

Weaknesses in the judiciary system and an attitude that litigation may lead to a negative reputation encourages firms to rely on business associations to solve their disputes. Calculations based on the data set of the CSEG and CIEM firm survey in 2002 shows that only 7% of firms in the sample had disputes during the period of 5 years. Once disputes arise, however, business associations are the most common method of resolution. The reasons for not using courts include fears about the complications of lawsuits, the possibility of an unfair judge and possible damage of reputation with business partners.

A low level of business disputes is not necessarily a positive indication of economic development. Rather, it may reflect too much prudence in selecting partners. The survey on non-state SMEs of the Ministry of Labour, Invalids and Social Affairs (MOLISA) in

⁴⁴ The survey was conducted with support of the Vietnam-Pacific Program and the Academic Senate of the University of California, San Diego.

1996 and 2001 reveals that cooperation is mostly between non-state SMEs and other domestic private enterprises in the same district/town. Relationships outside of the regions and with SOEs are few, and there is little cooperation with foreign companies (Table 5.1, page 165). Moreover, to get partners to enforce contract agreements, contractors (large firms) often delay their payment until the next delivery. This accumulates financial difficulties for smaller firms (subcontractors) (Carlier and Tran 2005).

As a measure to address problems in the judiciary system, firms in Vietnam prefer to rely on business associations to solve their disputes. Thus, strengthening the role of business associations should be considered in government policies. For instance, in Latin America, associations created by companies have helped to overcome problems in the judiciary system (Doner and Schneider 2000).

5.2.3 Reducing administrative procedures and official arbitrariness

A significant change in business costs has arisen from the issuance of the Enterprise Law 1999 in that many barriers preventing the establishment of firms have been reduced. Consequently, the time it takes to establish an enterprise has been reduced from 90 to 7 days, on average. The registration fee has also decreased from VND 10 million to VND 500 thousand. Also importantly, the 'bureaucratic attitude' has diminished thanks to a clearer definition of the functions of each government body (GTZ-CIEM-UNDP 2004). The Land Law 2003 has also reduced administrative costs in obtaining LURC. Business operations, thus, have become more flexible and secure.

In other areas such as tax reform, unfortunately, red tape and low transparency still remain as major obstacles to the establishment and growth of private firms. In a survey of 300 firms carried out by the MPDF and World Bank in Vietnam in 2002/03,

firms often complain about the discretion and bureaucratic attitude of tax officers. The fact that firms have to pay unofficial fees is common because tax officers usually hide information, making the regulation environment unclear (Carlier and Tran 2004a).

Other problems also exist. For instance, legal documents in Vietnam require all transactions to be proved by a 'red invoice'⁴⁵ that can be bought only at tax offices. Whenever firms come to buy, tax officers sell only one book (containing 50 invoices). This means firms have to come back in two weeks or a month to get more. For some firms, visiting a tax office is costly. According to a recent survey conducted by CIEM on 360 firms in 2007, on average, a firm has to spend 2,000 hours or 245 days per year, which is equivalent to hire one staff member to take charge of all tax procedures, while completing the tax regulations only requires about 30 days (<http://www.dautuchungkhoan.com/Nganhang-Taichinh/2007/08/23938.OTC>). The issuance of the Tax Law in 2006, which was enforced in July 2007, will help as firms are allowed to calculate and pay taxes online. This is a major administrative reform and creates a 'one-stop shop' in terms of business taxation.

5.3 Institutional implementation: reasons for differences and measurement

The political system and government structures in Vietnam are identical everywhere but the implementation of the central government's laws and regulations varies across regions. In particular, differences are more pronounced between the north and south of

⁴⁵ This is the official invoice published by the Ministry of Finance. The name comes from its colour.

the country. History, geography and the complexity of laws and regulations are key factors explaining institutional variation.

History and geography

Vietnamese culture originated in the north and in the Red River Delta (RRD) in particular. Early in its history, the RRD was characterised by a high population density with almost all in rural areas with poor infrastructure that limited communications between districts and provinces (Gourou 1936).

In terms of economic structure, the Vietnamese culture was historically characterised by wet rice cultivation and village settlements. The village was an autonomous community which collected taxes from its citizens and fulfilled its obligations to the state. Tax obligations of a village were levied on the number of its citizens. Because there was no official birth and death registration system, coupled with the difficult communication, chiefs of villages had incentives to hide the number of new births from the government to keep a proportion of collected taxes for their own benefit. The independence of villages was manifested by the sayings ‘phép vua thua lệ làng’ – translated as ‘the laws of the King yield to the customs of the village’ that is still true until today.

The population of the RRD generated little surplus production. Commercial markets were very small. Citizens produced most of their need from food to housing materials, and were inclined toward saving (Gourou 1936). In summary, a high level of independence of local governments, lack of transparency between local and central governments, and self-sufficiency are the heritage of the north.

The south, with its core area of the Mekong River Delta (MRD), has been settled by people from the north and centre of Vietnam since the 17th century. The first

migrants to the south from the north and centre were those who had lost, or could not find, a place in the villages (Thach Phuong et al. 1992). Difficulties for the first migrants stimulated a cooperative and audacious attitude among these frontiersmen (Son Nam 2000).

The contrast between the RRD and MRD is documented by Rambo (1973), Taylor (1983), Jamieson (1993) and Brocheux (1995). As described in these studies, village organisations in the south were much less rigid when compared to the closed political center of villages in the north. Moreover, less diversity in the environment reduced differences in locally adapted agricultural production and the need for systems as in the north. Contrary to the 'closed community' in the north, southern people have also been characterised as being open and less accepting of northern traditional norms. They consume more and this substantial consumption difference between RRD and MRD remains true today, as shown in Table 5.2 (page 165).

More predictable and benign weather in the MRD, coupled with a convenient water transportation system, promoted faster economic development in the south. The south also experienced a greater western influence because the French exercised direct control in the south first and later developed French rule and administered indirectly the north, through local Vietnamese administrators (Jamieson 1993: 5). Moreover, twenty-five years of exposure to the world market economy until 1975 has made southern Vietnamese more market-minded.

The complexity of laws

In Vietnam, due to the complexity of law, to guide the implementation of laws, a large number of sublaws such as decrees, decisions and regulations are issued. This, in turn, makes the regulatory environment more complicated, and the implementation of

laws depends very much on the interpretation of local officials (Gillespie 1993; Le et al. 1999; Webster 1999; GTZ-CIEM-UNDP 2004; Nguyen et al. 2004). Even when regulations are clear, there are always opportunities for local authorities to apply their own interpretation to central policies (Tenev et al. 2003).

Institution implementation measurement

History, differences in culture and geography, and the complexity of laws, have led to a high level of discretion by local authorities in the implementation of rules and decrees in Vietnam. This is particularly true in the implementation of the central government's regulations and policies towards the non-state sector. An indicator, which measures the attitude and the implementation of laws and central government regulations and policies at a provincial level, is the provincial competitiveness index (PCI). The first PCI was calculated in 2005 (PCI05) for 42 provinces, based on a firm survey and also on interviews with state officials in 2004. The PCI05 is a weighted index of 9 sub-indices: business entry costs; access to land; transparency and access to information; time costs of regulatory compliance; informal charges; implementation and consistency of policies; state sector bias; pro-activity of provincial leadership; and private sector development policies. While each sub-index is scored from 1 to 10, the PCI is marked from 1 to 100 with a higher score indicating better institutional performance.

Following the success of the PCI05, the Vietnam Competitiveness Initiative (VNCI) - a USAID (the United States Agency for International Development) funded project, and the Vietnam Chamber of Commerce and Industry (VCCI) repeated its study in 2006 based on the firm survey in 2005. Both PCI05 and PCI06 reflect the improvement of institutions at a provincial level since the issuance of the Enterprise Law in 1999. Nevertheless, the results from the PCI06 are considered more reliable for several

reasons. First, all 64 provinces of the country participated in 2005, thus increasing the number of surveyed firms three-fold (6379 businesses versus 2020 firms in 2004). Second, two new sub-indices, 'labour training' and 'legal institutions', were introduced (VNCI-VCCI 2006). The 'labour training' index assesses provincial assistance with skilled labour shortage while the 'legal institutions' index reflects the generalised trust of private businesses in the judiciary system to resolve disputes. Third, the methodology to calculate sub-indices, assigned weight, and the aggregate PCI was improved (VNCI-VCCI 2006: 1).

Overall, the PCI reflects the arbitrariness, red tape and corruption of local government officials in the way they implement legal documents and policies from the central government. As the PCI06 is more reliable in terms of statistics, most of the estimations in this chapter use the PCI06 and its sub-indices.

5.4 Data and variables

To analyse the impact of institutional changes on firm performance since the second phase of reform in 2000, we combine the use of the PCI06 described above and countrywide firm level data by province in 2005. The survey is conducted by the General Statistics Office of Vietnam. Although this is the country-wide enterprise survey, information on costs is limited to the sample. As the paper focuses on the effect of institutions on non-state enterprise performance, only the sub-sample of non-state manufacturing firms is used. In addition, the exclusion of missing and irrelevant values, including negative value-added (VA), visible outliers, large firms that employ more than 2,000 workers, and provinces with a small numbers of enterprises, reduces the sample to 1,727 observations. Summary statistics from the firm characteristics of survey data are presented in Table 5.3 (page 166)

Currently, the non-state sector in Vietnam includes household firms, cooperative enterprises, sole proprietorships, partnership enterprises, and limited and shareholding companies. However, the survey conducted by the GSO only collects information on formally registered firms. Thus, household enterprises are not included in the survey and because there are only four partnership enterprises included in the sample, we also exclude them from the analysis.

Column 1, Table 5.3 shows that the majority of non-state enterprises in the sample are limited companies, followed by sole proprietorship firms. Firms at a small and medium size, using from 10 to 300 workers, dominate this sample. Most of the firms in the sample were established at the time the reforms took place in 2000 (column 2). Other indicators including firm size, fixed asset and VA show that large firms and advanced structures, including limited and shareholding companies, have higher VA and fixed assets.

We model the effects of institutional differences by province on firm labour productivity. To control for differences in firm specific characteristics, dummy variables for firm size, including micro, small, medium and large groups⁴⁶, firm age, capital intensity (as measured as fixed assets per worker) and ownership types are included. The economic environment that affects firm performance, such as the initial endowments of provinces including human capital and market size, is included in the model as a control. Human capital is measured by the percentage of graduates in the total population of each province using the 1999 population census data. Another way of measuring human capital is the proportion of students enrolled in professional high

⁴⁶ By definition, micro firms employ less than 10 workers while large firms have 300 workers and above.

school education as a proportion of the provincial total population in 2001. This variable reflects, to some extent, local needs for skilled workers. This information is extracted from the standard statistical book for 64 provinces of Vietnam (GSO 2005). Market size is measured by the proportion of population of each province over the total population and per capita GDP. Per capita GDP is calculated as the average value for the period 2001-04 [market size is included as a control because a large market can support mass production and advanced technologies (Rosenstein-Rodan 1943; Murphy et al. 1989) that can increase labour productivity (LP)]. Appendix 5.1 provides more detail on variables and indices used in the estimated models.

5.5 Econometric model and results

The model we estimate to analyse the impacts of institutions on firm performance in Vietnam is given by equation (5.1).

$$\log(lp_{ij}) = \beta_0 + \beta X_i + \delta Z_j + \gamma \Gamma + \varepsilon_{ij} \quad (5.1)$$

where: lp_{ij} is labour productivity of firm i at province j

β_0 is firm specific effect

X_i is a vector of firm specific characteristics

Z_j is a vector of the provincial initial endowment

Γ is a vector of institution variables

ε_{ij} is the error term

As often cited in the literature, differences in history and culture are the reasons for differences in economic performance between the north and south of Vietnam. Kim (2006) finds evidence of differences in property rights between the north and south and attributes it to differentials in social norms and politics. To test the hypothesis that differences in history and culture affect firm performance, a *North* dummy variable is used as a proxy for institutions in model (5.1). Controlling for differences in firm characteristics, human capital and market size, we find the evidence that, overall, firms located in the south perform better than those in the north (specification 1, column 1 and 2, Table 5.4, page 167).

The argument that the south used to be a market economy and thus has more experience under the liberalised era than the northern bureaucracy-rooted economy seems reasonable. However, Nguyen et al. (2004) argue that history is not an important indicator as the reform process began some 15 years ago. During that period the north approached western economies faster than the south as more scholarships to study in western countries were allocated to the north and returned scholars might bring western working styles to the north. They also make a comparison of economic performance among some provinces in the south with some in the north and conclude that differences in economic performance arise from differences in the implementation of legal regulations and policies rather than history.

We argue that history still matters and differences in history and culture define the way institutions are implemented. Our evidence is that when *PCI06* is added into specification 1, it is insignificant and the power of *North* becomes smaller (column 4, Table 5.4). This is because *PCI06* is highly correlated with the north-south dummy (Table 5.5, page 167) and it is likely that the dominant impact of social norms

influences the power of the institutional variable.

The relationship between the total *PCI06* and its sub-indices with regions are also examined in Figure 5.2 (page 163) where each plotted dot reflects the province rank in implementing the central government institutions and policies. The vertical line divides provinces into northern and southern regions where northern provinces are located on the left of the line. The horizontal line goes through the middle performing points and splits plotted points into lower and higher governance performers (below and above the line, respectively). Overall, southern provinces are often found in the northeast corner of each figure, indicating that southern provinces implement the central government regulations and policies better than those in the north. It is also seen that the judiciary system is the worst performing area as the majority of provinces are located under the horizontal line (Figure 5.2e, page 163).

To investigate the impact of institutional implementation on firm performance, we include *PCI06* into model (5.1) and exclude *North* to reduce multicollinearity. The effects of sub-indices are also investigated by additional specifications presented in Table 5.6 (page 168). For instance, the effects of information provision on firm performance are examined in specifications 4 and 5 (Table 5.6). ‘*Information*’ in specification 4 presents the level of access to the central government regulations and policies at the province level, while specification 5 reflects the availability of market information. Differences in property rights can be evaluated through an ‘access to land’ index (specification 6) and disputes (specification 7). Disputes are measured by the ‘legal institutions’ index, which indicates the confidence of the private sector in the judiciary system to resolve their disputes. The possible impact of a lowering of transaction costs through simplifying administrative procedures and reducing state

officers' arbitrariness on firm performance is analysed in specification 8. This specification of institutional performance is constructed from 'entry cost' and 'time costs of regulatory compliance' indices, respecting their weight in the PCI06. 'Labour training' presented in specification 9 does not reflect institutional reforms, rather it reflects the supporting attitude of local government to promoting the development of the non-state sector. This index is included in the analysis because unskilled workers and managers may impede growth of non-state enterprises and thus government assistance in this area could be important (see Appendix 5.1 for the description of indices used in the estimated models).

To check the robustness of variables included into various specifications, we apply a general-to-specific modeling approach in Hendry and Krolzig (2001). Once a general unrestricted model (GUM) is formulated, the algorithm of the method checks outliers, defined by its number of $\hat{\sigma}_{\text{GUM}}$ unit. Impacts of these outliers on the dependant variable are neutralised by creating dummy variables for each outlier. In a second stage, a multiple search path using Monte Carlo simulation is used to evaluate relevant variables to be retained in the simplified model. Principally, the multiple search path removes insignificant variables from the GUM. After obtaining a specific model, the significance of parameters in the final selected model is evaluated in two over-lapping sub-samples (Owen 2003). Reliability statistics are reported. A higher reliability value indicates higher level of statistical significance of the selected variable in both the full sample and sub-samples. These results are presented in Table 5.6 (page 168).

As shown in Table 5.6 (page 168), there is no heteroskedasticity in all models studied and the Chow tests at mid-point and 90th percentile breakpoints confirm the constancy of parameters. The results indicate that firm age has a positive effect on labour

productivity. One more year of operation makes firms more efficient presumably due to the accumulation of skills and experience, reflecting the 'learning by doing' process. Among different firm sizes, large groups are excluded from the model as a reference group. The Monte Carlo study retains only micro groups in the specific models. Small and medium groups do not satisfy the statistical significance of the 'pre-search' tests and thus, are excluded from the models. This implies that statistical differences in firm performance are only found between micro and large groups. Cooperatives perform less efficiently than sole-proprietorships (excluded from the model as a base) because they have disadvantages in terms of capital and flexibility in making decisions.⁴⁷ Limited and shareholding companies are modern establishments with advanced technology and management skills, hence performing better than sole-proprietorships.

The proportion of graduates over total population in 1999 has the expected positive sign, at least in some cases (column 1 and 10, Table 5.6). The percentage of professional high school students (*edus01*) has an insignificant impact on firm performance and is excluded from the models by the general to specific modeling procedure. This may be because the number of students is not a good indicator for human capital of provinces as a proportion of students come from other provinces to study and later return to their place of origin. Per capita GDP also has the expected positive sign and the reliability of being included into the model of this variable is 100%.

⁴⁷ Under the Law on Cooperatives, all members of a cooperative enterprise have an equal vote in every business. This limits the flexibility in decision making of firms.

Institutional effects

The parameter of interest in equation (1), γ , estimated by PcGets - software which is used to implement the general to specific modeling approach - reveals an interesting aspect of the institutional reforms in Vietnam. As expected, the overall institutional index PCI06 has a positive effect on firm performance (specification 3, column 1, Table 5.6). The result shows that after controlling for differences in firm characteristics and provincial initial endowments, a one percentage point improvement in government practices increases firm LP by 0.7%. This is equivalent to an increase in the value-added of the sample mean firm by VND 77,496.5 per day that corresponds to a nearly three-fold increase in the Vietnamese daily per capita GDP (VND 28,050.12) in 2005.⁴⁸

Information provision in specification 4 (column 4, Table 5.6) reflects the impacts of the transparency in government policies and regulations on firm performance. Compared to the period before the enterprise law (1999), the availability of regulatory information has much improved with most provinces rated above the average level (Figure 5.2b, page 163). However, improvements in this area merely reduce troubles facing non-state firms in terms of acknowledging the macro-economic environment, and thus can not promote firm performance. In fact, firms need market information to expand their businesses. Although the improvement in providing market information has been moderate, it has a positive effect on firm economic performance as reflected in specification 5 (column 7, Table 5.6). Provinces with a one percentage point higher in

⁴⁸ The sample mean firm employs 131.35 workers and has a $\ln(lp) = 3.427$. An increase by 0.7% of labour productivity is equivalent to an increase of VND 590 per day. On average, this increases the VA of the sample mean firm by VND 77,546.5, nearly three times per capita GDP per day (VND 28,050.12).

providing firms with market information can increase firm LP by 5.3%. This is much higher than the increase of LP due to the improvement in the total PCI.

Institutional reforms related to land issues have positive impacts on firm performance. Results from specification 6 (column 10, Table 5.6) show a big improvement in firm performance if the governance level is better. For instance, if Hanoi - the region with the highest human capital with per capita GDP almost twice that of Soc Trang (a poor province in the south) - could improve its implementation of land reforms by 3.79 points to catch up Soc Trang, an average firm in Hanoi can increase its LP by 38.66%. This is equivalent to an increase of VA of an average firm in Hanoi by VND 37,603, or 1.34 times of the daily per capita GDP in 2005. The result is, perhaps, a good answer for the puzzle posed in Nguyen et al. (2004) 'why southern provinces grow much faster than those in the north'. However, it should be noted that the statistical reliability of 'land' reported by PcGets is only 22.3%. That means this variable is significant in the full sample, but not in both sub-samples in the overlapping analysis.

Other aspects of institutional reforms including 'dispute' and 'transaction cost' have insignificant effects on firm performance (specification 7 and 8), and hence are eliminated from the model by the multiple search path of PcGets. The insignificant effect of 'dispute' can be explained by no reform in this area. On the other hand, 'transaction cost' measures the aggregate effect of diminishing time for firm entry, land acquisition and bureaucratic compliance. Albeit that entry cost has decreased significantly since the second phase reform, this is still more costly than in other countries (Youth Newspaper⁴⁹ 12th Oct 2006) and helps firms in the establishment stage

⁴⁹ Translated from Vietnamese 'Báo Thanh Niên' ngày 12/10/2006.

only. Furthermore, red tape and discretion of state officials remain in many areas, causing difficulties for the operation of firms. Government assistance in labour training has a positive impact on firm LP (column 19, Table 5.6). This positive effect indicates that central and local governments prescribe a correct policy for a persistent illness of unskilled workers in non-state firms. The findings imply that although all governance areas need to be improved, a good reform strategy would be to focus on good governance services, labour training and effective dispute resolution.

To assess the economic significance of the effects of *PCI06*, we calculate the average of firm observed LP for each province and graph the mean observed LP on *PCI06*. We also carry out a simple simulation based on specification 3 in Table 5.6. As all coefficients in this specific model are significantly different from zero, no variable is excluded from the simulation. The predicted $\log(lp)$ is then transformed into levels. The mean of firm predicted LP is computed for each province and graphed on *PCI06* as well. If the ranking of the mean of the observed and predicted LP on the *PCI06* is different, the estimated coefficients are only statistically significant, not economically significant. Figure 5.3 (page 164) presents the rankings of the mean observed and predicted LP of firms in each province.

As shown in Figure 5.3, the pattern of the mean observed and predicted LP is not different. Overall, the average firm in provinces with higher *PCI06* has higher LP. We also categorise the predicted LP of the average firm for each province into quartiles in ascending order of *PCI06*. The average of predicted LP of the lowest and highest quartile groups is computed. The ratio of these means is 1.18, indicating that *PCI06* is both economically and statistically significant in explaining differences in firm performance. The findings imply that in the short term, provinces can promote the

sustainable development of the non-state sector by more effective implementation of central government reforms.

5.6 Conclusion

The transition period in Vietnam has witnessed much effort by the Vietnamese government in building institutions supporting markets. These institutional reforms, especially since the second phase in 2000, focus on the sustainable development of the non-state sector. The reforms have significantly improved the provision of regulatory information and, to some extent, market information. Land tenure and entry costs have been also improved. However, weaknesses remain in the judiciary system and administration reforms to reduce government officials' discretion.

The prominent feature of the institutional reforms in Vietnam is the differences in the implementation of the central government's regulations and policies in different regions of the country. These differences are more pronounced between the north and the south and the causes for this institutional variation are history, geography and the complexity of laws in Vietnam.

To examine the impact of institutional reforms on firm economic performance, we use firm level data in Vietnam in 2005 and the provincial competitiveness index in 2006 (PCI06). The results indicate that good governance practices, reflected by PCI06, are both statistically and economically significant in explaining differences in firm economic performance among provinces. Based on the estimated model, we show that a one percentage point improvement in government practices could increase the value-added of the sample mean firm by an amount equal to a nearly three-times increase in the Vietnamese daily per capita GDP.

The results indicate that an improvement of institutions in providing firms with market information, securing land tenure and labour training assistance, positively increases firm labour productivity. The implications are that central and local governments prescribe correct policies for non-state firms' persistent problems, including lack of market information, and land and skilled worker shortages. The insignificant impact of transaction costs and dispute resolution implies that attention should be paid to administrative reforms to reduce government officials' discretion and also the weakness of the judiciary system.

Overall, the results show that governance is an important obstacle to the development of the non-state business sector and that institutions matter in terms of private firm economic performance in Vietnam.

5.7 Appendix 5.1

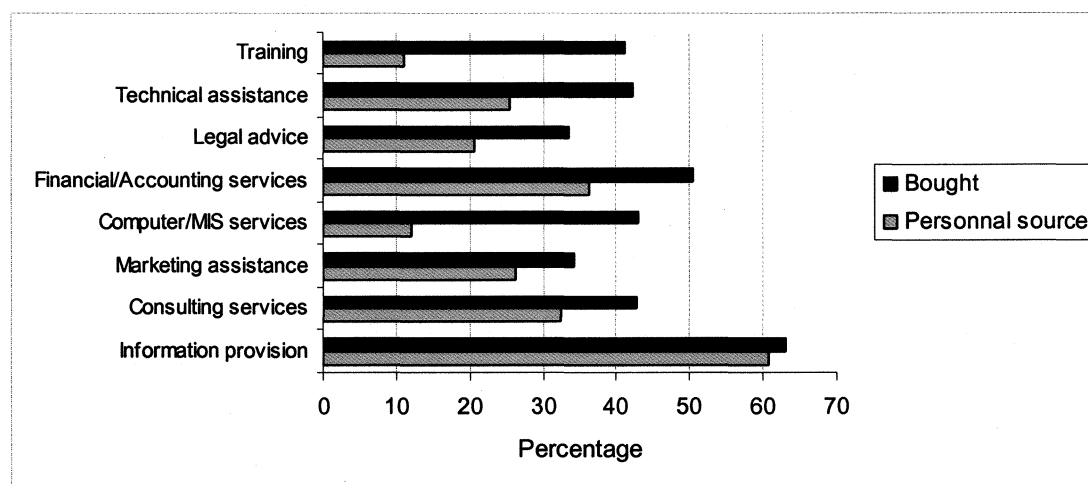
List of variables

Variables	Explanation	Source	Level
Log(<i>lp</i>)	Log of labour productivity	GSO firm survey in 2005	Firm
K*L ratio	Capital/labour ratio	GSO firm survey in 2005	Firm
Firm age	Number of years of operation	GSO firm survey in 2005	Firm
Micro	Dummy variable for micro firm	GSO firm survey in 2005	Firm
Small	Dummy variable for small firm	GSO firm survey in 2005	Firm
Medium	Dummy variable for medium firm	GSO firm survey in 2005	Firm
Large	Dummy variable for large firm – excluded from the model as a reference group	GSO firm survey in 2005	Firm
Cooperative	Dummy variable for cooperative firm	GSO firm survey in 2005	Firm
Sole-proprietorship	Dummy variable for sole-proprietorship – excluded from the model as a base	GSO firm survey in 2005	Firm
Limited	Dummy variable for limited companies	GSO firm survey in 2005	Firm
Shareholding	Dummy variable for shareholding companies	GSO firm survey in 2005	Firm
Edus01	Proportion of students enrolled in professional high school education as a proportion of the provincial total population in 2001	GSO, (2005) 'Socio-economic statistical data of 64 provinces and cities' book	Province
Edu99	Percentage of graduates in the total population of each province	GSO, population census in 1999	Province
GDPP	Average per capita GDP during 2001-04	GSO website (GDP and population)	Province
% of population	Proportion of population of each province over the total population	GSO website (population)	Province
North	Regional dummy variable		
PCI06	Provincial competitiveness index, 2006	VNCI&VCCI, 2006	Province
Information 1	'Transparency and access to information' index	VNCI&VCCI, 2006	Province
Information 2	'Private sector development services' index	VNCI&VCCI, 2006	Province
Land	'Land access and security of tenure index'	VNCI&VCCI, 2006	Province
Dispute	'Legal institutions' index	VNCI&VCCI, 2006	Province
Transaction cost	Weighted index of 'entry costs' and 'time costs of regulatory compliance' indices	VNCI&VCCI, 2006	Province
Labour training	'Labour training index'	VNCI&VCCI, 2006	Province

5.8 Appendix 5.2

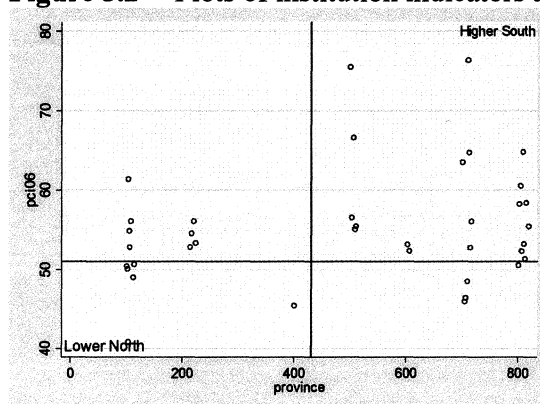
Figures

Figure 5.1 Proportion of sample firms using each kind of business services

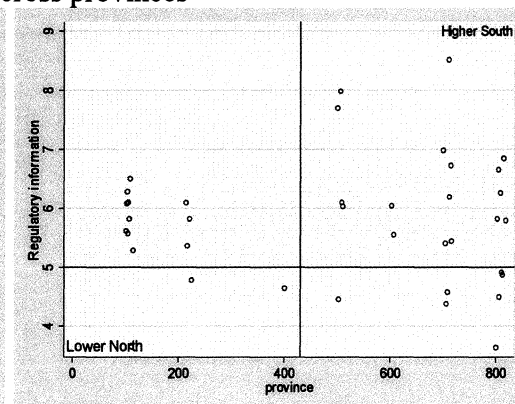


Source: Author's calculation based on the data set of CSEG & CIEM

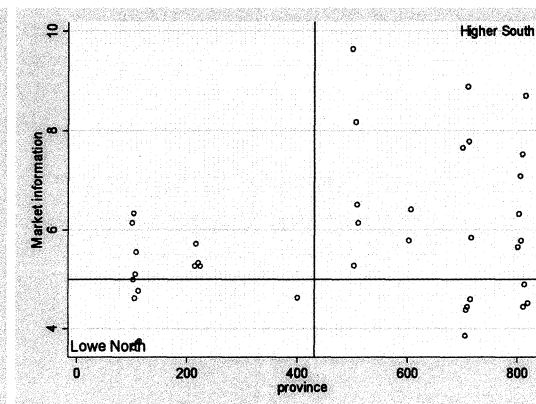
Figure 5.2 Plots of institution indicators across provinces



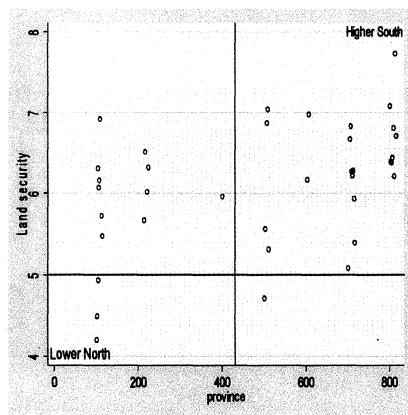
5.2a Total PCI06



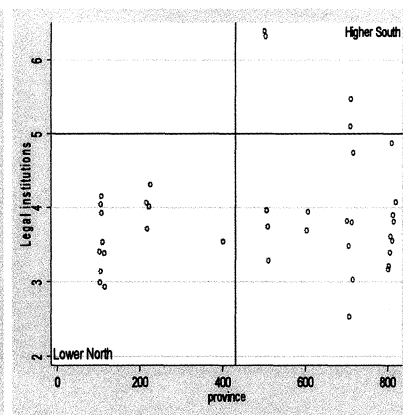
5.2b Regulatory information



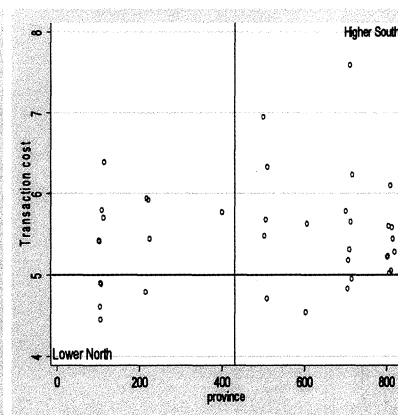
5.2c Market information



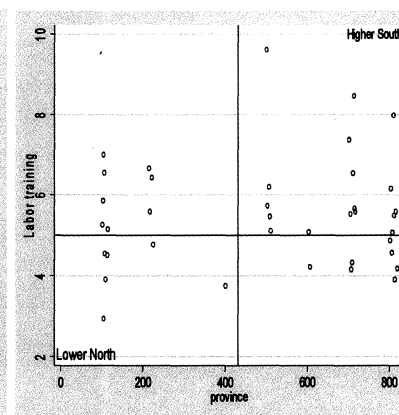
5.2d Land security



5.2e Judiciary system

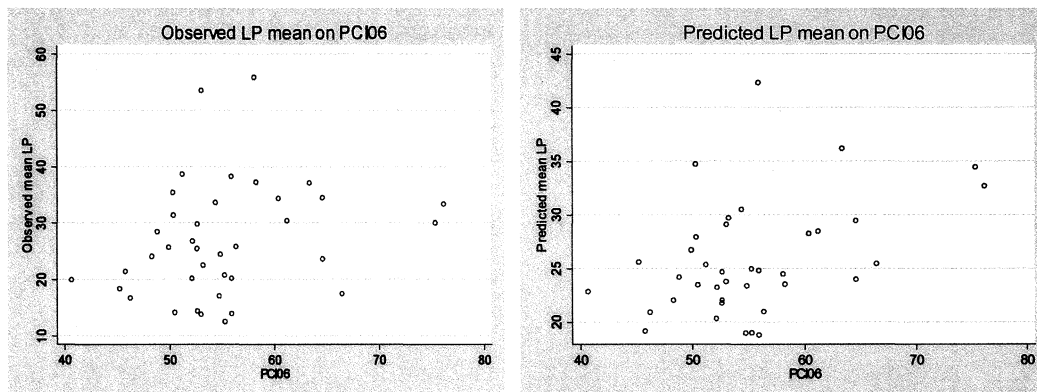


5.2f Transaction cost



5.2g Labour training

Figure 5.3 Rankings of observed and predicted mean LP on *PCI06*



Tables

Table 5.1 Distribution of contractors

	1996 (%)	2001(%)
Non-state enterprise in same district/town	65.12	43.02
Non-state enterprise outside district/town	11.63	25.58
State enterprise in same district/town	8.14	13.95
State enterprise outside district/town	6.98	11.63
Foreign company	4.65	1.16
Other	3.49	4.65
Total	100.00	100.00

Source: Author's calculation based on the data set of MOLISA on SMEs

Table 5.2 Consumption per capita 1995-2005

Year	VND [†] million/person								
	Whole nation	RRD	North East	North West	North Central Coast	South Central Coast	Central Highlands	South East	MRD
1995	1.66	1.37	0.72	0.63	0.87	1.70	0.67	4.22	1.54
1996	1.97	1.66	0.99	0.77	1.02	1.95	1.02	4.90	1.75
1997	2.15	1.76	1.08	0.71	1.14	2.20	1.16	5.22	2.00
1998	2.43	1.98	1.23	0.82	1.24	2.44	1.34	5.99	2.22
1999	2.59	2.17	1.19	0.85	1.32	2.62	1.58	6.25	2.39
2000	2.84	2.53	1.27	0.90	1.47	2.59	1.79	6.70	2.66
2001	3.12	2.74	1.72	1.01	1.59	3.07	1.85	7.14	2.86
2002	3.52	3.21	1.95	1.18	1.73	3.24	2.10	8.04	3.23
2003	4.13	3.75	2.25	1.24	1.97	3.96	2.31	9.44	3.79
2004	4.86	4.44	2.74	1.54	2.35	4.54	2.77	10.95	4.47
2005	5.78	5.31	3.18	2.01	2.75	5.31	3.38	12.94	5.36

Source: GSO (www.gso.gov.vn)

Note: [†] The currency of Vietnam.

Based on differences in geography, history and culture, and politics, Vietnam is divided into 8 ecological regions: *RRD* includes 11 provinces in the Red River area; *North East* contains 11 highland and mountainous provinces north east of Hanoi; *North West* includes 4 mountainous provinces north west of Hanoi. *North Central Coast* includes 6 north coast provinces while *South Central Coast* includes 6 south coast provinces. *Central Highlands* contains 4 highland provinces in the central south. *The South East* includes Ho Chi Minh City and other developed provinces in the south, while the *MRD* contains 12 provinces.

Table 5.3 Firm characteristics by ownership kind and firm size

	Firm ownership & size distribution (%)	% of firms established since 2000	Avg firm age (# years)	Avg firm size (# workers)	Avg fixed asset (VND billion)	Avg value-added (VND billion)
	(1)	(2)	(3)	(4)	(5)	(6)
Total	100.00	64.97	7.02 (6.84)	131.39 (229.37)	7054.76 (17599.19)	8060.82 (19816.66)
Firm ownership						
• Cooperative	4.52	28.21	14.38 (13.24)	81.55 (153.24)	1661.33 (5611.86)	3400.04 (11581.84)
• Sole proprietorship	25.07	63.74	6.60 (4.09)	50.95 (107.89)	1846.67 (4256.89)	2963.97 (10299.78)
• Limited	55.18	69.25	5.67 (3.33)	142.54 (244.29)	7889.18 (18975.54)	7926.12 (18305.15)
• Shareholding	15.23	62.36	10.45 (12.39)	237.89 (283.48)	14205.28 (24199.47)	18322.59 (31622.33)
Firm size						
• Micro	11.52	71.36	5.71 (4.29)	6.01 (2.09)	459.06 (557.45)	547.70 (2755.08)
• Small	42.04	71.07	6.15 (5.73)	24.25 (10.91)	1656.19 (3496.93)	2468.61 (9109.58)
• Medium	34.11	60.61	7.77 (7.71)	128.72 (70.20)	7987.35 (13270.39)	9631.12 (19195.41)
• Large	12.33	50.23	9.16 (8.72)	620.44 (346.29)	29038.84 (36912.01)	29798.58 (35251.00)

Source: Author's calculation based on the countrywide firm survey 2004 (GSO)

Note: Numbers in parentheses are standard errors

Table 5.4 Impact of history and culture on firm performance

Dependent variable: $\log(lp)$				
	1: <i>North</i> only		2: <i>North & PCI06</i>	
	Coeff	<i>t</i> -values	Coeff	<i>t</i> -values
	(1)	(2)	(3)	(4)
Constant	2.822	21.68	2.836	9.70
K*L ratio	0.002	10.8	0.002	10.8
Firm age	0.009	1.97	0.009	1.97
Micro	-0.114	-0.91	-0.114	-0.91
Small	0.090	0.91	0.089	0.91
Medium	0.135	1.40	0.135	1.40
Cooperative	-0.445	-2.92	-0.444	-2.91
Limited	0.163	2.11	0.164	2.09
Shareholding	0.486	4.62	0.486	4.62
Edus01	0.448	1.51	0.456	1.38
Edu99	0.003	0.14	0.002	0.11
GDPP	0.014	1.61	0.014	1.59
% of population	-0.008	-0.41	-0.008	-0.41
North	-0.290	-3.58	-0.294	-2.79
PCI06			-0.000	-0.05
# of obs [†]	1727		1727	
F test (Prob)	18.98		17.62	
R squared	0.13		0.13	

Note: [†] Number of observations. Large groups and sole-proprietorships are excluded as reference groups

Table 5.5 Correlation between PCI05 and region

	$\log(lp)$	PCI06	North
$\log(lp)$	1.000		
PCI06	0.083	1.000	
North	-0.066	-0.620	1.000

Note: Figures in the Table are correlation coefficients

Table 5.6 Reliability and coefficients of variables in the firm performance model

General model	Specific model – Dependent variable: log(labour productivity)								
	3: PCI06			4: Information 1			5: Information 2		
	Coeff	Std-err	Reliable	Coeff	Std-err	Reliable	Coeff	Std-err	Reliable
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	2.466***	0.181	1.000	2.843***	0.067	1.000	2.565***	0.122	1.000
K*L ratio	0.002***	0.000	1.000	0.002***	0.000	1.000	0.002***	0.000	1.000
Firm age	0.008**	0.004	1.000	0.008**	0.004	1.000	0.009**	0.004	1.000
Micro	-0.177**	0.080	1.000	-0.194**	0.079	1.000	-0.168**	0.079	0.700
Small	Exc [†]			Exc [†]			Exc [†]		
Medium	Exc [†]			Exc [†]			Exc [†]		
Cooperative	-0.602***	0.130	1.000	-0.579***	0.130	1.000	-0.615***	0.130	1.000
Limited	0.173**	0.063	1.000	0.222***	0.062	1.000	0.202***	0.061	1.000
Shareholding	0.486***	0.084	1.000	0.525***	0.082	1.000	0.526***	0.081	1.000
Edus01	Exc [†]			Exc [†]			Exc [†]		
Edu99	0.017**	0.007	0.592	Exc [†]			Exc [†]		
GDPP	0.016***	0.006	1.000	0.029***	0.005	1.000	0.020***	0.006	1.000
% of population	Exc [†]			Exc [†]			Exc [†]		
PCI05									
PCI06	0.007**	0.003	0.530						
Information 1				Exc [†]					
Information 2							0.053***	0.017	0.499
Land									
Dispute									
Transaction cost									
Labour training									
Number of obs	1727			1727			1727		
# of outliers	52			51			52		
Chow (864:1)	0.9260			0.9029			0.8973		
Chow (1555:1)	0.6593			0.8827			0.6858		
Hetero test (Prob)	0.5948			0.8460			0.8852		

Note: [†] Exc means the variable is not relevant and excluded from the model by the algorithm simulation.

***, ** are significant at 1% and 5%, respectively.

Table 5.6 (continued)

General model	Specific model – Dependent variable: log(labour productivity)											
	6: Land			7: Dispute			8: Transaction cost			9: Labour training		
	Coeff	Std-err	Reliable	Coeff	Std-err	Reliable	Coeff	Std-err	Reliable	Coeff	Std-err	Reliable
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
Constant	2.191***	0.329	1.000	2.843***	0.067	1.000	2.843***	0.067	1.000	2.635***	0.127	1.000
K*L ratio	0.002***	0.000	1.000	0.002***	0.000	1.000	0.002***	0.000	1.000	0.002***	0.000	1.000
Firm age	0.008**	0.004	1.000	0.008**	0.004	1.000	0.008**	0.004	1.000	0.009**	0.004	1.000
Micro	-0.209***	0.079	1.000	-0.194**	0.079	1.000	-0.194**	0.079	1.000	-0.185**	0.080	1.000
Small	Exc [†]			Exc [†]			Exc [†]			Exc [†]		
Medium	Exc [†]			Exc [†]			Exc [†]			Exc [†]		
Cooperative	-0.581***	0.131	1.000	-0.579***	0.130	1.000	-0.579***	0.130	1.000	-0.586***	0.130	1.000
Limited	0.202**	0.064	1.000	0.222***	0.062	1.000	0.222***	0.062	1.000	0.212***	0.062	1.000
Shareholding	0.504***	0.084	1.000	0.525***	0.082	1.000	0.525***	0.082	1.000	0.519***	0.082	1.000
Edu01	Exc [†]			Exc [†]			Exc [†]			Exc [†]		
Edu99	0.027***	0.010	0.700	Exc [†]			Exc [†]			Exc [†]		
GDP	0.027***	0.006	1.000	0.029***	0.005	1.000	0.029***	0.005	1.000	0.024***	0.006	1.000
% of population	Exc [†]			Exc [†]						Exc [†]		
PCI05												
PCI06												
Information 1												
Information 2												
Land	0.102**	0.049	0.223									
Dispute				Exc [†]								
Transaction cost							Exc [†]					
Labour training										0.040**	0.019	0.471
Number of obs	1727			1727			1727			1727		
# of outliers	52			51			51			51		
Chow (864:1)	0.9260			0.9029			0.9029			0.9266		
Chow (1555:1)	0.8860			0.8827			0.8827			0.8926		
Hetero test (Prob)	0.6263			0.8460			0.8460			0.7482		

Note: [†] Exc means the variable is not relevant and excluded from the model by the algorithm simulation.

***; ** are significant at 1% and 5%, respectively.

CHAPTER 6

CONCLUSIONS

The purpose of the thesis is to explore the performance of non-state enterprises in Vietnam and the impacts of institutional reforms on their performance since the '*Doi moi*' economic reforms. The reforms brought the non-state sector from an 'illegal' to 'legal' status and introduced many institutional changes to create a 'level playing field' for all economic sectors and to promote the sustainable development of the non-state sector.

An investigation into the historical development, general characteristics, performance and constraints facing non-state enterprises in Chapter 2 shows that the non-state sector in Vietnam has been characterised by operations at a small and medium scale, dominated by household enterprises. Although the non-state sector has been successful at creating jobs, especially for unskilled labour from rural areas, non-state firms' survival rates and contribution to the industrial outputs and GDP is moderate given the upsurge in the number of new firms. This may be because of constraints such as: few market opportunities, lack of market information and land, limited capital, and the shortage of skilled worker. In addition, despite efforts of the Vietnamese government in creating a favourable policy environment, non-state firms encounter a high level of discretion of government officials. Although there has been an increasing number of more advanced enterprises, including limited and shareholding companies, the non-state sector dominates labour-intensive areas with low capital investment.

The performance of non-state enterprises is examined in Chapters 3 and 4 using the data set of non-state small and medium manufacturing enterprises from 1991, 1996 and 2001. Chapter 3 uses the stochastic frontier method to estimate technical efficiency of non-state firms and evaluate factors influencing this efficiency level. The results show that the average level of efficiency of non-state small and medium manufacturing

industries was high, and increased during the period studied. Results also indicate a wide range in efficiency among firms.

Based on the estimated frontier production function, production elasticities are calculated showing that non-state small and medium manufacturing firms in Vietnam still maintain low-cost labour advantages and, thus, have low added value and returns. Moreover, the insignificant impact of firm age indicates few or no gains from the 'learning by doing' process, that may reflect low initial human capital endowments in non-state firms.

A higher proportion of hard working family labour and better-educated workers and managers in metropolitan areas appears to be relative advantageous for firms during the transition period. The results indicate few benefits from government financial and non-financial assistance and this support does not appear to be based on any identifiable performance criteria.

The performance of non-state small and medium firms is further investigated in Chapter 4. In this chapter, a new method called the 'error index decomposition method' is developed. The method introduces an error term into the decomposition equation to capture measurement biases and white noise that are generated by using the industry deflator instead of the observed price to resolve the dimensionality problem. Using the data set of non-state small and medium manufacturing firms in 1996 and 2001, the method allows a firm's value-added to be decomposed into the contribution of total factor productivity, firm size in terms of capital and labour, and prices of outputs and intermediate inputs.

The results indicate that value-added increases with firm size and there is an increasing trend of total factor productivity with the use of machinery capital. The

decompositions show that total factor productivity is the most important factor contributing to a firm's value-added. A further decomposition of total factor productivity into capital and labour productivity shows that large firms use capital more efficiently than small enterprises, while labour productivity is somewhat similar among different firm sizes. This implies that the contribution of labour to value-added is mainly due to the higher absolute value of value-added as a result of a higher wage proportion, not necessarily to a higher value of a product. This finding, again, is a warning of weak management skills, unskilled workers and weak competitiveness of non-state small and medium manufacturing enterprises in Vietnam

The results in Chapter 4 also indicate the ineffectiveness of government assistance programs because the majority of assistance recipients are poor performers. This is not because government support programs target weak firms, but costly procedures and few benefits from government support encourage strong firms to rely on their own resources.

The policy implications of the thesis are clear. Non-state enterprises in Vietnam need support from government to improve workers and managers' skills to enhance labour productivity, and, therefore, total factor productivity. They also need the government to disentangle their capital shortages to upgrading technology because the majority of firms have obtained a high level of technical efficiency given the current technology. Improving productivity is the only choice for Vietnamese non-state firms to escape a low cost-labour trap and to increase their competitiveness. Further, the development of high quality business development services that stimulate firms to use outsourcing services to release them from the burden of over-recruitment, and thus, increase the value of a product, should be considered in the non-state sector promotion program.

Constraints facing non-state enterprises in the 1990s have been somehow eased with the introduction of many policy and institutional changes favouring the development of the non-state sector since 2000. However, the implementation of these institutional reforms varies across provinces, depending on the local government attitude towards the non-state sector. The impacts of institutional changes on firm performance are analysed in Chapter 5 using firm level data in Vietnam in 2005 and the provincial competitiveness index in 2006. The results indicate that good governance practices are both statistically and economically significant in explaining differences in firm economic performance among provinces.

Institutional performance, in terms of providing market information and more secure land tenure, positively increase labour productivity. Nevertheless, administrative reforms to diminish transaction costs through simplifying administrative procedures and reducing local government officials' discretion do not appear to have any effect on firm performance. Few reforms in the judiciary system lead to insignificant impacts on a firm labour productivity. The positive effect of labour training assistance implies that central and local governments implement apparently correct policies for the persistent problem of unskilled workers in non-state firms.

The findings imply that governance is an important obstacle to the development of the non-state business sector, and that a wise strategy to promote the sustainable development of the non-state sector should focus on administrative reforms to reduce government officials' discretion. Weaknesses of the judiciary system need to be improved and other informal institutions should be developed to enhance cooperation among firms. In addition, labour training assistance and preferred loans that allow firms to upgrade their current obsolete technology promise the take-off of the non-state sector

in Vietnam.

This thesis has limitations that offer possibilities for further work. Firstly, because of the nature of the data, we can not measure economic efficiency and decompose it into allocative and technical efficiencies. Technological progress and technical efficiency changes during the period studied also could not be decomposed. The availability by the end of 2007 of the follow-up survey of non-state small and medium firms in 2005 may enrich the panel data that allows analysis of changes of firm performance during the period 1996-2005. This also offers possibilities for extending the thesis using recent extensions of the stochastic frontier such as the meta-frontier analysis (Battese and Rao 2002) and the random parameters model (Greene 2005). The meta-frontier function allows investigation of technical efficiency of firms in different groups that may not have the same technology without splitting up the data, while the random parameters model allows firm heterogeneity to be built into the stochastic frontier.

Secondly, the effect of the privatisation program in Vietnam may be better depicted if data on SOEs are available. However, the non-state small and medium enterprise surveys of the Institute of Labour Science and Social Affairs did not collect information from SOEs, making the comparison of performance between state and non-state enterprises impossible. The data set from the General Statistics Office contains information of both types of ownership. Nevertheless, the provincial competitiveness index is intentionally calculated to evaluate impacts of the policy environment on the development of non-state firms, comparisons of the effects of institutional reforms on state and non-state enterprises are also impractical. Thus, the extension of data and further exploration will extend our understanding and help achieve effective policy outcomes.

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