CHINA’S INDUSTRIAL TRANSFORMATION:
Investigations into Enterprise, Competition, and Performance

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Abstract

This study is motivated by two paradoxes in transition economies. The first is the contrast between the rapid economic growth in China and the deep output decline in Eastern European and former Soviet Union Countries. China’s rapid economic growth occurred in the absence of several conditions that are deemed necessary for economic growth. The second paradox is posed by the contrast between the rapid economic growth and the deterioration of enterprise performance in China. By focusing on the study of Chinese enterprise performance and enterprise behaviour, this study tries to shed lights on these two puzzles.

While most of the studies of Chinese enterprise performance have focused on whether it has improved or not, this thesis investigates first the impact of enterprise reform and increased competition on enterprise efficiency, and then looks beyond the ‘within-firm’ effects of economic reform and market competition, investigating whether economic reform has facilitated a dynamic competitive market selection process.

Methodologically, this study applies Data Envelopment Analysis (DEA) to evaluate the impacts of economic reform on firm efficiency, utilizes Baily et al. (1992) methods of productivity growth decomposition to analyze the dynamics of firm’s entry, survival and exit, and then employs a Hazard model to analyze firm exit behavior in the context of China. To my knowledge, neither of these latter two methods has been applied in the context of transition economies.

This study finds that that there is a divergence of technical efficiency from technology frontier rather than a convergence of technical efficiency to
technology frontier as is expected in a more competitive market. This study has also discovered that efficiency differences between State Owned Enterprise (SOEs) and non-SOEs may have resulted from their different speeds in 'catching up' with the technology advance.

By analysing the dynamic process of firm's entry, survival and exit, and decomposing productivity growth into the contribution of each, the study finds that the competitive selection process is taking shape in China. While productivity growth mainly comes from new entry, and exits are playing an increasing role. By applying a hazard model to analyse firm exit behaviour specifically, this study establishes that the exit threat as a corporate governance mechanism has not been set up effectively for SOEs, while non-SOEs are increasingly subject to the discipline of market forces, indicating that competitive selection process is not, as yet, providing a sufficient substitute for corporate governance mechanisms based on ownership. Therefore, this study suggests that more radical reform, based on ownership and property rights, is needed.
Acknowledgement

How could I acknowledge adequately all those who taught and inspired me during the past five years at Surrey?

Special gratitude will go to Paul Temple. I could not have asked for a better Supervisor than Paul Temple. Paul was always here to inspire, push, guide, ask, answer, motivate, support, compliment and complement whenever needed. I am deeply grateful to Paul.

I am also immensely grateful to Graham Bird, David Hawdon, and Lester Hunter for the Departmental Graduate Assistantship, without which I probably would not have done a PhD, let alone to have done it with the freedom of choosing the research topics I wanted.

This thesis is dedicated to:

   My Parents, who showed me the path that I follow;

   My Wife, with whom I travel it;

   My Son, whose path awaits him.
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Glossary

ADB: Asian Development Bank
CCP: Chinese Communist Party
CCPC: Chinese Communist Party Congress
CEE: Central and Eastern Europe
CIS: Confederation of Independent States
CLI: Cumulative Liberalization Index
CMEA: The Council for Mutual Economic Assistance
COEs: Collective Owned Enterprises
CRS: Constant Return to Scale
DEA: Data Envelopment Analysis
DMUs: Decision Making Units
EBRD: European Bank of Reconstruction and Development
FSU: Former Soviet Union
GIO: Gross Industrial Output
IFC: International Finance Corporation
NMP: Net Material Product
OECD: Organisation for Economic Co-operation and Development
SBC: Soft Budget Constraint
SETC: State Economic and Trade Commission, China
SEZ: Special Economic Zone
SFA: Stochastic Frontier Analysis
SOEs: State Owned Enterprises
TVEs: Township and Village Enterprises
UNCTAD: United Nations Conference on Trade and Development
VRS: Variable Returns to Scale
WBF: Wafangdian Bearing Factory
WBGC: Wafangdian Bearing Group Corporation
Chapter 1 Introduction

China’s historic economic reform in the year of 1978 marks the beginning of the transition from former centrally planned socialist economies to market economies. Since the fall of the Berlin Wall in 1989, transition has spread to socialist economies in Central and Eastern Europe (CEE) and the former Soviet Union (FSU) countries. The transition is possibly one of the two largest economic experiments the last century witnessed, providing a unique opportunity for the economic researcher to get an insight into the operation of the market system. While both China, CEE and FSU countries have all been experiencing transition from centrally planned socialist economies to market economies, one difference, however, is fundamental: China’s reform is characterised by an experimental, gradual and ‘dual track’ strategy. Indeed, only since 1993 has the idea of “setting up a market economy” been formally endorsed; the transition in CEE and FSU has been both comprehensive and rapid. However, a decade after the beginning of transition in CEE and FSU countries and two decades after the beginning of China’s transition, China’s economic reform has been deemed largely successful, while the transition experience in CEE and FSU has been considered far less satisfactory (Stiglitz, 2000; Fischer, 2001). How to explain this difference convincingly remains a challenge for academic researchers. The view adopted in this thesis is that, firms are the real entity on the supply side of markets, responding to market signals and policy initiatives. Hence the explanation for this difference lies with understanding firms’ behaviour during transition in the two contexts.

Focusing on the experience of China’s transition at the microeconomic level, this thesis examines how firms have responded to China’s gradual and experimental economic reform, considering to what extent this experimental and gradual reform has set up an effective market mechanism. In view of that, this thesis also
attempts to shed some light on the sources of China’s economic growth, and why China is different in terms of its transition strategy and economic performance.

1.1 Motivation and Objectives

This study is motivated by two puzzles within transition economies: the first puzzle is the rise of China and the fall of Russia; and the second rests with Chinese economy in particular, the continuous growth of the macro economy, and the decline of enterprise financial performance at the microeconomic level.

1.1.1 The Rise of China and The Fall of Russia

Since the beginning of its transition, China has achieved an annual 10% average growth of GDP for the past two decades or so (See Fig 1.1). For the period between 1978 and 2001, China’s GDP has increased by nearly 7 times, and GDP per capita has increased by nearly 6 times. Meanwhile, the living standard of ordinary Chinese people has improved significantly. For the period between 1978 and 2001, the rural and urban household incomes per capita have increased by 4 times and 3 times respectively.
At the same time, China has gradually transformed itself from a closed centrally planned economy to an emerging market economy. China's foreign trade has grown from $20.64 billion in 1978 to $509.8 billion in 2001. The ratio of import and export to GDP has increased from 9.8% in 1978 to 44.0% in 2001. Currently there are more than 200,000 foreign companies and joint ventures in China, investing $875 billion by 2001.

China’s economic reform has been deemed largely successful (World Bank, 2001) despite both the initial pessimism and the recent slowing down of GDP growth since 1997\(^1\). Its extraordinary economic performance, regarded as a 'miracle' (Lin et al., 1996), is considerably more impressive when compared with that of other transition economies in Central and Eastern Europe (CEE) and the countries of the former Soviet Union (FSU), which have all experienced large and rapid declines in GDP in the initial stage of transition since 1990, ranging from

\[^1\] For the period between 1997 and 2002, China's GDP has been growing at a slower yet still impressive rate of 7.5% annually.
20% to 60% (World Bank, 2001). The two largest economies in transition, China and Russia, have clearly exemplified this difference (see Figure 1.2).

For the period between 1989 and 2002, China’s GDP more than tripled, but Russia’s GDP more than halved. In 1990, China’s GDP was only nearly half of that in Russia, but in 1998, Russia’s GDP was less than half of that in China. A central paradox of the impressive record in China is that its achievement is a “puzzle” according to Nolan (1994), with the absence of a number of factors commonly deemed to be essential for a successful transition. These include reasonably complete market liberalization, large-scale privatisations, secure private property rights, and democracy (Chow, 1997).

1.1.2 Declining Enterprise Financial Performance

The second puzzle of the Chinese economy relates to performance at microeconomic level. While the macro economy has been growing rapidly, the
financial performance of many firms has been deteriorating despite the claims that economic reforms have improved enterprise performance (see Fig 1.3).

![Fig 1.3 Falling State Owned Enterprise Profitability (%)](chart)

While the macro economy grows continuously, the enterprise profitability, especially that of State Owned Enterprises (SOEs), has been plummeting, as we can see from Fig 1.2. Pre-tax profit-asset ratio of SOEs declined from around 25% in 1978 to 9.8% in 1993, which was even lower than the interest rate; the pre-tax profit-asset rate declined further to 6.5% in 1996. Similarly, the profit share in Gross Industrial Output declined from 25% or so in 1978 to 10% in 1996\(^2\). At the same time, the numbers of loss-making SOEs, and the amounts of those losses, have been increasing. In 1985, there were only 10% of SOEs making losses; this figure rose to 23% in 1993, and by 1997 this figure had risen to 50%. It is not just SOEs who were making losses - in 1995 nearly 40% of foreign-funded enterprises were in deficit.

\(^2\) The decline of profitability may also due to the decreasing return of capital (Wolff, 2003). However, this is not the case in Chinese SOEs, as their trend of profit-asset ratio is similar to that of profit-output ratio, indicating that the capital productivity has almost been constant since 1978.
1.1.3 Objectives: Performance, Ownership, and Competition

The key questions are: why China’s macro economy performs well while its microeconomic entity – firms - perform less well, whether the current impressive economic growth can be sustained, and whether an effective market mechanism has been set up to drive forward significant economy growth.

Resolution of these puzzles is important when assessing the role of current and future reforms, especially given the increasing concerns for the sustainability of China’s economic growth (Sachs, Woo and Yang\(^3\), 2000; Borensztein and Ostry\(^4\), 1996), amid the recent slowdown of economic growth and the deteriorating financial performance of firms, which lend credence to these concerns.

As firms, in my view, are the real entities in the markets - responding to market signals and to reform policies - and enterprise reforms have always been the focus of China’s economic reform, the resolution of these puzzles lies with the analysis of firm behaviours. Hence this thesis will focus on the firm, in particular how firms have responded to economic reform, and it will examine whether economic reform has facilitated the functioning of market mechanisms - in particular the dynamic competitive selection process - rather than simply examining whether economic reform has improved firms’ performance.

My basic argument is that China’s SOE reform, characterised by gradually expanding managerial autonomy, has been relatively successful in providing

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\(^3\) Sachs et al. (2000) expressed concern that in the absence of constitutional transition, the dual track approach to economic transition adopted in China may generate very high long-term cost that might well outweigh its short-term benefit, hence the current rapid economic growth might not be sustained.

\(^4\) Borensztein and Ostry (1996) suggest that without further reform in SOE and financial sectors, benefits from economic reform might be exhausted, and the pursuit of high growth rates may generate serious macroeconomic problems.
short-term incentives to improve enterprise performance. However, it has also released the agency problem that the central planning system had managed to constrain, which has limited the further improvement of enterprise performance. On the other hand, encouraging the entry of non-state firms and the consequent increased market competition, further significant components of China's enterprise reform, has to some extent provided effective monitoring and long-term incentives for enterprises. However, the functioning of market competition has not been effective owing to the slower pace of SOE reform, especially in the pace of ownership-related reform.

### 1.2 Two Stages in China's Economic Reform

China’s “reform and opening up” policy proposed in the Third Plenum of The Eleventh Chinese Communist Party Congress (CCPC) on December 18-22 1978 marked the beginning of China’s reform era. At the beginning of reform, China’s policy makers had reasonably clear objectives relating to increases in productivity and improvements in living standards (CCPC, 1978). However, at that time, even in western countries, deregulation and privatisation remained controversial topics, let alone in socialist countries. Hence there was no obvious model for the purposes of institutional emulation. The reforms therefore proceeded by using an experimental method\(^5\), which established reforms in a few sectors and in a few cities, before implementing them at a national level. In this stage, the reforms are characterised by gradually loosening state control and bureaucratic restrictions, introducing incentives at both the enterprise and local government levels, gradually aligning price determination to the underlying supply and demand through the “dual track” price system, opening up to the outside world, and encouraging the entry of non-state economic forces. In particular, enterprise reform in this stage includes the promotion of Township and Village Enterprises (TVEs), allowing them to enter into industries that were

\(^5\) This is described as “crossing the river by groping for stones”.
previously served only by SOEs, and expanding managerial autonomy and granting profit sharing directly to SOEs.

The next key landmark was 1992, when the Fourteenth CCPC met in September. At this meeting, for the first time, the “socialist market economy” was endorsed as a description of the nature of China’s reform goal (CCPC, 1992). This meeting thus established a rather rough breakdown into stages of the reform process as a whole. The initial stage from 1978-1992 was characterised by the retention of the dominance of the planning mechanism, while trying to establish a balance between planning and the market. Official ideology vacillated between the idea of “planning supplemented by market” and that of a “planned commodity economy”. The second stage, from 1993, involved an explicit goal of establishing a “socialist market economy” to replace the old planning system. In this stage, the reforms recognized that the phase of dual track development might have reached its conclusion, and the reforms had comprehensive, coherent and radical features. Enterprise reform, in this stage, introduced some significant changes with regard to establishing a modern company system. Furthermore, the privatisation of small and medium enterprises was introduced on a large scale from 1996.

Two key questions are how enterprises have responded to these two stages of reforms, and whether the acceleration of economic reform since 1992 has had any impact on firms’ behaviour.

1.3 Data

This thesis is based mainly on firm level empirical study. The data set used in the study is from Liaoning, a North Eastern Chinese Province, covering around 20,000 to 30,000 enterprises. These enterprises include various ownership forms, administration structures and sizes, and are distributed in various industrial sectors in the period 1987-1996. This is a period for which we have
data and when the economic reform gradually moved from 'crossing the river by groping for stones' to establishing a market economic system, and when the SOE reform gradually changed from expanding managerial autonomy and allowing profit sharing to establishing a modern enterprise system and the large scale privatisation of small SOEs.

Liaoning Province is the sixth largest Province in China in terms of GDP, and is an area in which the central planning system has perhaps been most deeply rooted. It used to be the centre of China’s manufacturing industry, its industrial output accounted for more than one tenth of the total industrial output in China, and the number of large and medium sized State Owned Enterprises in this Province accounted for one tenth of the number of large and medium state owned enterprises in China as a whole. The foundation of Liaoning’s industrial structure was laid down in China’s first five-year plan period (1952-1957), and was characterised by heavy industry and huge SOEs. In fact, before 1979, gross industrial output from heavy industry accounted for more than 80% of the provincial gross industrial output, and gross industrial output from large and medium enterprises accounted for more than 60% of provincial gross industrial output. The most famous example of a large SOE in Liaoning is Anshan Steel and Iron Company, which had long been the biggest enterprise in China prior to 1995, and its workforce typically accounted for 15% of the 1.5 million urban population of Anshan city, where the company is located.

Historically, to some extent the economy in this Province is a snapshot of the entire Chinese economy. Compared with China in general, Fig.1.4 shows that the GDP growth rate in Liaoning Province has experienced similar ups and downs, although it has been more volatile.
Fig. 1.5 shows the SOE share of gross industrial output in both Liaoning Province and China as a whole. The SOE shares of gross industrial output in both Liaoning Province and China as a whole have shown a similar declining trend, decreasing from more than 80% in 1975 to less than 30% in 1997.
Liaoning Province has been a pioneer in several reform initiatives, for example the first case of bankruptcy and the first example of a Shareholding Company both occurred here; recently, the reform of the social security system has been tested on a large scale in this Province as well. This Province has 14 cities, 5 of which are coastal cities; one of the latter - Da Lian - was one of the earliest cities to be opened up to the outside world. It is here that the problems of state owned enterprises have been the most serious, and it is here that the Chinese Government wants to make a breakthrough in the reform of State Owned Enterprises (SOEs)\(^6\).

In the process of reform, this Province has also shown some marketisation characteristics common to the whole economy. Table 1.1 below shows the

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\(^6\) In fact, in a visit to this Province in 1998, China's former Premier Zhu Rongji remarked that "Liaoning is China's key ageing industrial base, subject to many problems left over from history, where the job of reforming and getting large and medium state-owned enterprises out of their difficulties is harder. So, if Liaoning can meet on schedule the goal of reforming and getting state-owned enterprises out of their difficulties, the whole nation can certainly do so too."
similarity between the provincial marketisation and that of the national economy. The table gives a few indicators of the degree of marketisation in China’s regions.

Table 1.1 Selected Data from China’s Regions in 1995

<table>
<thead>
<tr>
<th></th>
<th>Output</th>
<th>Multinational Share</th>
<th>State owned Share</th>
<th>Import Share</th>
<th>Wage Premium</th>
<th>Tariffs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beijing</td>
<td>1909</td>
<td>0.215</td>
<td>0.555</td>
<td>0.075</td>
<td>0.366</td>
<td>0.413</td>
</tr>
<tr>
<td>Tianjin</td>
<td>2094</td>
<td>0.240</td>
<td>0.284</td>
<td>0.430</td>
<td>0.522</td>
<td>0.306</td>
</tr>
</tbody>
</table>

Including “Open Coastal Cities” or SEZ (Group II)

<table>
<thead>
<tr>
<th></th>
<th>Output</th>
<th>Multinational Share</th>
<th>State owned Share</th>
<th>Import Share</th>
<th>Wage Premium</th>
<th>Tariffs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liaoning</td>
<td>4975</td>
<td>0.042</td>
<td>0.389</td>
<td>0.022</td>
<td>0.475</td>
<td>0.227</td>
</tr>
<tr>
<td>Hebei</td>
<td>3996</td>
<td>0.066</td>
<td>0.327</td>
<td>0.007</td>
<td>0.360</td>
<td>0.289</td>
</tr>
<tr>
<td>Shandong</td>
<td>8456</td>
<td>0.054</td>
<td>0.274</td>
<td>0.007</td>
<td>0.308</td>
<td>0.282</td>
</tr>
<tr>
<td>Jiangsu</td>
<td>11813</td>
<td>0.102</td>
<td>0.176</td>
<td>0.008</td>
<td>0.353</td>
<td>0.223</td>
</tr>
<tr>
<td>Shanghai</td>
<td>5129</td>
<td>0.290</td>
<td>0.294</td>
<td>0.080</td>
<td>0.452</td>
<td>0.163</td>
</tr>
<tr>
<td>Zhejiang</td>
<td>8088</td>
<td>0.075</td>
<td>0.082</td>
<td>0.010</td>
<td>0.270</td>
<td>0.240</td>
</tr>
<tr>
<td>Fujian</td>
<td>2801</td>
<td>0.270</td>
<td>0.068</td>
<td>0.035</td>
<td>0.387</td>
<td>0.298</td>
</tr>
<tr>
<td>Guangdong</td>
<td>9535</td>
<td>0.271</td>
<td>0.000</td>
<td>0.075</td>
<td>0.330</td>
<td>0.215</td>
</tr>
<tr>
<td>Guangxi</td>
<td>1666</td>
<td>0.065</td>
<td>0.357</td>
<td>0.014</td>
<td>0.357</td>
<td>0.252</td>
</tr>
<tr>
<td>Hainan</td>
<td>193</td>
<td>0.204</td>
<td>0.054</td>
<td>0.348</td>
<td>0.436</td>
<td>0.172</td>
</tr>
<tr>
<td>Average</td>
<td>5665</td>
<td>0.144</td>
<td>0.202</td>
<td>0.061</td>
<td>0.373</td>
<td>0.236</td>
</tr>
</tbody>
</table>

Not including “Open Coastal Cities” or SEZ (Group III)

<table>
<thead>
<tr>
<th></th>
<th>Output</th>
<th>Multinational Share</th>
<th>State owned Share</th>
<th>Import Share</th>
<th>Wage Premium</th>
<th>Tariffs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>1736</td>
<td>0.035</td>
<td>0.551</td>
<td>0.028</td>
<td>0.418</td>
<td>0.214</td>
</tr>
</tbody>
</table>

Notes:
1. This Table is extracted from Branstetter and Feenstra (1999)
2. SEZ: Special Economic Zone
3. Output is measured in 100 million RMB, where 8 RMB=$1. Multinational share, State owned share and Import shares are the shares of domestic spending on multinational, state owned enterprises and imports. The wage premium equals wages paid by multinationals minus that in urban collectives, divided by that in multinationals.

From this table, we can also see that the degree of marketisation is on the
national average. It has the lowest multinational share, the highest state-owned share and the highest wage premium among provinces with open costal cities or special economic zones (SEZ), and its import share and tariff level are below the group average. However, compared with the averages in provinces not including “open coastal cities” or SEZ, the multinational share and wage premium are higher, the state owned share and tariffs are lower, and the import share is smaller than those of only three other provinces in this group.

Arguably, therefore, the enterprise reforms in this Province, especially the reform of State Owned Enterprises (SOEs), are representative of the enterprise reform in China’s manufacturing sector more generally.

1.4 Overview of Thesis Chapters

Chapter 2 explores the concept of transition and identifies the two fundamental components of transition: reallocation and restructure. Then it compares the progress that transition economies have made so far in market building, resource reallocation, and enterprise restructuring, and then the macro causes of variant transition performance, in particular the contrasts between China and other transition countries, are investigated. There are two schools of thought in explaining why China’s transition performance is different from that of CEE and FSU countries: the gradualist school and the “Big Bang” school. While the gradualist school gives credit to the evolutionary and experimental nature of China’s reform, the “Big Bang” school emphasizes China’s favourable initial conditions as a developing East Asian country. However, neither of these two schools of thought can explain China’s experience convincingly, and neither of them has actually dealt with how firms have responded to market mechanisms, and how markets have evolved through firms’ participation. Neglecting the micro-foundations of transition is thus established as a limitation of these two schools of thought.
In light of the conclusions drawn from Chapter 2, Chapter 3 focuses on China’s enterprise reform. In more detail, Chapter 3 illustrates the two primary elements of China’s enterprise reform: the decentralisation of SOEs through separating the state from SOEs, and promoting reform by encouraging the entry of non-SOEs. The enterprise reform process is therefore depicted as a process driven forward by these two elements. However, the effects of enterprise reform upon SOE performance, as we have surveyed, are inconclusive. One school of economists, based on the improvement of TFP, claim that reforms have improved SOEs’ performance. Another school of economists, based on the decline of SOE profitability, claim that the performance of SOEs has not been improved, and that SOEs have actually become a destabilizer of the whole economy. However, neither productivity nor profitability is a good indicator of firms’ performance in the context of transition economies. For example, improved productivity could mean greater allocation distortion, when firms are not profit maximizers, which is common in transition economies. Moreover, the decline of profitability can be the result of increased competition, the latter being a desirable result. Therefore, an appropriate indicator for enterprise performance is needed.

As efficiency improvement is a major objective of economic reform, and is considered a survival condition for firms in a competitive environment and is central to firms’ long term growth (Bain, 1969), Chapter 4 attempts to evaluate enterprise efficiency directly by applying the technique of Data Envelopment Analysis (DEA). Chapter 4 also attempts to estimate the impacts of enterprise reform and increased competition upon enterprise efficiency. We expect to see that both enterprise reform and increased competition will have positive effects on enterprise efficiency. Furthermore, we expect to see that increased competition will also facilitate a dynamic market selection mechanism, which drives enterprises to catch up with the technology frontier. Consequently, enterprise efficiency will tend to converge towards the technology frontier.
Diverging enterprise efficiency from technology frontier would mean that the market selection mechanism is not effective.

Chapter 5 specifically looks into this dynamic market selection process by investigating micro dynamics of entry, exit, and productivity growth in Chinese manufacturing in the process of transition to market economy, in particular looking for changes resulting from the latest stage of reform. This dynamic process may be becoming increasingly important for the continuing growth of manufacturing, as the agricultural sector as a source of surplus labour begins to decline. We expect to see that as a market economy is gradually taking shape in China, the pattern and characteristics of firms’ entry, and their subsequent survival and exit, would be increasingly consistent with those of firms in an advanced market economy. Due to the gradual nature of China’s economic reform, we also expect to see that while the old firm is still an important stabilizing element in determining the trend of the economy, it is new entries that have contributed the most to productivity growth. Exits, however, may contribute little to productivity growth, unlike its counterpart in advanced economies. Yet, the acceleration of economic pace since 1992 may have increased the pace of exit.

Chapter 6 studies one specific aspect of the competitive market selection process: firm exit. By applying the hazard model to estimate the effects of various factors upon the propensity of firms to exit, this chapter aims to investigate what determines a firm’s exit in the context of China’s transition, what barriers a firm might be facing in making an exit decision, whether the exit threat has been established as an effective corporate governance of SOEs, and whether the reform since 1992 has any effect on a firm’s exit behaviour. Chapter 7 concludes the thesis.
Chapter 2. A Comparative Analysis of Economic Transition and Transition Performance

The beginning of China’s economic reform in the year 1978 probably marks the beginning of transition. Since the fall of the Berlin Wall in 1989, transition has spread to all former socialist countries in Central and Eastern Europe (CEE) and the Former Soviet Union (FSU). One difference, however, is fundamental: while China’s reform is characterised by an experimental, gradual and ‘dual track’ strategy, and was greeted initially with doubts and pessimism, the transition in CEE and FSU has been both comprehensive and rapid, and has raised “enormous expectations” (Klaus, 1999). However, a decade after the beginning of transition in CEE and FSU countries, and two decades after the beginning of China’s transition, China’s economic reform has been deemed largely successful (World Bank, 2001), despite the initial and continuing doubts and pessimism (one example of such pessimism is represented by Chang’s (2003) The Coming Collapse of China), while the experience of transition in CEE and FSU has proved to be more painful, difficult and lengthy than had been expected (Stiglitz, 2000; Fischer, 2001; Kornai, 2000a).

While China’s GDP has been growing at an annual rate of 10.1% since 1978, all the CEE and FSU countries have experienced large and rapid declines in GDP in the initial stage of transition since 1990, ranging from 20% to 60% (World Bank, 2001). Moreover, there is a wide variation in recovery thereafter within CEE and FSU, despite the fact that they inherited similar socialist legacies and faced the common challenge of transition from a centrally planned system to a market economy. In CEE, after a few years’ decline, all the countries began to recover, and by 2000, all CEE countries except Romania and Bulgaria had recovered to their 1989 GDP level. For FSU countries, the decline is more serious, and it was only by 1997 that most of the FSU countries began to show signs of recovery, and by 2000 most of them had not reached their GDP level of 1989. The three largest economies
in transition, China, Russia and Poland, have clearly exemplified this difference (see Figure 2.1).

![Figure 2.1 GDP in China, Poland and Russia, 1989-2002](image)

Source: IMF Database

The search for the explanation of these variations in economic performance has sparked enormous interest from both economists and policy makers, and the literature has been piling up. Indeed, how to explain in a convincing way the differences in transition strategies and transition performance is now seen as one of the main challenges facing those studying transition economies (e.g. Blanchard, 1997). While initial interest focused on the effects of transition strategies and the speed and sequence of transition strategy implementation, the recent focus has been on the institutional and behavioural underpinnings of transition economics (e.g. EBRD, 1999; World Bank, 2000). Although there has been growing agreement on many issues, and near consensus on some issues, there remain important disagreements among economists on many transition issues; one such example concerns China's differential experience.

In this chapter, I will first describe the concept of transition and consider the progress made so far by the transition economies; then the macro causes of variant transition performance will be investigated. The limitations of this approach will be established, and the importance of an approach which
emphasizes the role of firms in establishing markets and in providing an explanation of variation in transition performance will be presented.

2.1 The Concept of Transition

2.1.1 Transition: Definition

Transition refers to the process by which former socialist economies are transforming themselves into market economies, moving from a "more or less planned socialist system to a private market economy, one in which private ownership predominates and most resources are allocated through markets" (Fischer and Gelb, 1991). "The process of transition begins when society shifts away from the fundamental characteristic of the socialist system", summarised by Kornai (1992) as "undivided power of the Marxist-Leninist Party", "the dominant position of State (and quasi-state) enterprises" and "the preponderance of bureaucratic coordination". It finishes when society reaches the configuration characteristics of capitalism: "political power friendly to private property and the market, dominant private property and preponderance of market condition" (Kornai, 2000b). The main features of each system and the process are illustrated in diagram 2.1:
China’s reform of 1978 was construed initially as introducing market mechanisms into a socialist framework to improve the efficiency of the economy in order to achieve rapid economic growth and to improve people’s living standards (CCPC, 1978). However, there were no clear ideas as to how to achieve these objectives and where this reform would lead. “Economic reform is the biggest experiment”, hence “the river should be crossed by groping for stones” (Deng, 1985). However, in a second phase dating from 1993, building up the “market economy” has been set up as the primary objective of economic reform (CCPC, 1994).

Countries in CEE and FSU started their transition 10 years later; however, their objective was explicitly set up as establishing the structure of society to resemble – at least in its main features - the most highly developed capitalist countries (e.g. Lipton and Sachs, 1990a; Kornai, 1995; Klaus, 1995). In the words of the leaders of transition economies, it was “returning to Europe”\(^1\)

\(^1\) Essentially the leaders of Eastern Europe’s revolution of 1989 stressed their countries’ place in the mainstream of European history, politics, arts and economy, which had been deprived them by the “artificially imposed division of Eastern and Western Europe” (Lipton and Sachs, 1990a).
(Lipton and Sachs, 1990a) and jumping “from the grey, stagnating, totalitarian past into a bright, rich and civilized future” (Yeltsin, 2000). In the post-1992 account of transition objectives, the goal of creating an effective institutional framework also emerged (Aslund, 1997). At this stage it needs emphasising that while the objectives of transition were relatively clearly defined, the precise model of capitalism toward which the transition economies were aiming was much less clear.

Countries categorised as transition economies are listed in the following box:

**Box 2.1. Transition Countries**

<table>
<thead>
<tr>
<th>Transition economies in Europe and the Former Soviet Union</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE  Albania, Bulgaria, Croatia, Czech Republic, FYR Macedonia, Hungary, Poland, Romania, Slovak Republic, Slovenia</td>
</tr>
<tr>
<td>Baltic States  Estonia, Latvia, Lithuania</td>
</tr>
<tr>
<td>CIS  Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transition economies in Far East Asia:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia, China, Laos, Mongolia, Vietnam</td>
</tr>
</tbody>
</table>

### 2.1.2 Why? The Initial Conditions

Despite clear social, cultural and geographical differences, the key underlying similarity between transition economies is that they all began transition with the following common characteristics:

**Communist Party Control.** However, we should note here that while the Communist party in Soviet Union had been in power since 1917, the
Communist Parties in other transition countries commenced their period of control only after 1945.

A Central Planning Mechanism with Common Biases. In all these countries, state-led industrialization (Gerschenkron, 1952; Sachs, 1996) was strategically biased towards the rapid establishment of a “heavy-industrial base” (e.g., Nove, 1977) – i.e., towards raw materials, energy and capital equipment. In addition, resource allocation was achieved through a planning administration that organized both production and exchange (Gerschenkron, 1952; Lin et al., 1996). Essentially, the market was considered as representing the existing pattern of demand which was, as such, inimical to socialist development (Feldman, 1928; Domar, 1957). As a result of this strategic bias, extremely high rates of capital accumulation were actually achieved in industrial sectors, which consequently led to a relative over-development of heavy industry and the underdevelopment of services (e.g., in distribution) compared with market economies (Kornai, 1992; Sachs, 1996; and Roland, 2000). Table 2.1, for example, shows clear differences in these respects.

Table 2.1 Sectoral Allocation of Labour in the OECD and Centrally Planned Economies (% Of Total Labour Force)

<table>
<thead>
<tr>
<th></th>
<th>Agriculture</th>
<th>Industry</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OECD, 1991</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eight Richest Countries</td>
<td>5.5</td>
<td>29.8</td>
<td>64.7</td>
</tr>
<tr>
<td>Eight Middle Countries</td>
<td>5.9</td>
<td>30.4</td>
<td>63.9</td>
</tr>
<tr>
<td>Eight Poorest Countries</td>
<td>17.9</td>
<td>29.5</td>
<td>52.6</td>
</tr>
<tr>
<td><strong>Socialist Economies, 1989</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDR</td>
<td>10.0</td>
<td>44.1</td>
<td>45.9</td>
</tr>
<tr>
<td>Czechoslovakia</td>
<td>11.6</td>
<td>46.8</td>
<td>41.6</td>
</tr>
<tr>
<td>Hungary</td>
<td>17.5</td>
<td>36.1</td>
<td>46.4</td>
</tr>
<tr>
<td>Poland</td>
<td>27.2</td>
<td>36.3</td>
<td>36.4</td>
</tr>
<tr>
<td>USSR (1986)a</td>
<td>19.0</td>
<td>38.0</td>
<td>43.0</td>
</tr>
<tr>
<td>China (1981)b</td>
<td>72.0</td>
<td>16.3</td>
<td>11.7</td>
</tr>
<tr>
<td>Vietnam (1983)c</td>
<td>70.9</td>
<td>11.1d</td>
<td>18.0</td>
</tr>
</tbody>
</table>


*a* Soviet History Archive, Slavic Research Centre Library; *b* From China Statistics Yearbook (1981);
The Dominance of State Owned Enterprises (SOEs). In order to keep the economy running as it was planned, SOEs were set up to work as subordinates to implement economic planning (Sachs, Woo and Yang, 2000; Lin et al., 1996; Gerschenkron, 1952). The share of the public sector in socialist economies was much higher than that in capitalist economies. In a typical advanced capitalist economy, the share of the public sector was generally less than 20% of GDP. In socialist economies, it was generally higher than 70% (See Table 2.2).

At the enterprise level, the SOEs were established by the state with unlimited liability, and operated under direct control of the government. The government drew up production plans; government ministers exercised their power over SOEs and took any measures that were necessary to ensure the targets were met. Enterprises structures were characterised by the absence of financial discipline and accountability. Enterprise incentives were characterised by bonuses for fulfilment and over-fulfilment of the planned output (Roland, 2000; Nove, 1958). Big firms were favoured, partly because this made it easier to plan output and monitor managers’ behaviour (Roland, 2000). While share of employment in industry by firms with 500 staff and over in socialist economies was typically more than 80%, in capitalist countries this share was generally less than 70% (see Table 2.2).
<table>
<thead>
<tr>
<th></th>
<th>Year</th>
<th>Share of Public Sector</th>
<th>Share of Employment in Industry by firms with 500 staff and over</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Socialist Countries</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Czechoslovakia</td>
<td>1988</td>
<td>99.3</td>
<td>96.5</td>
</tr>
<tr>
<td>East Germany</td>
<td>1988</td>
<td>96.4</td>
<td>87.9</td>
</tr>
<tr>
<td>Hungary</td>
<td>1988</td>
<td>92.9</td>
<td>79.3</td>
</tr>
<tr>
<td>Poland</td>
<td>1988</td>
<td>81.2</td>
<td>80.4</td>
</tr>
<tr>
<td>Romania</td>
<td>1980</td>
<td>95.5</td>
<td></td>
</tr>
<tr>
<td>Soviet Union</td>
<td>1990</td>
<td>95.0</td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>1978</td>
<td>79.0</td>
<td></td>
</tr>
<tr>
<td>Vietnam</td>
<td>1987</td>
<td>71.4</td>
<td></td>
</tr>
<tr>
<td><strong>Capitalist Countries</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Austria</td>
<td>1978-79</td>
<td>14.5</td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>1982</td>
<td>16.5</td>
<td>52.6</td>
</tr>
<tr>
<td>Greece</td>
<td>1979</td>
<td>6.1</td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td>1982</td>
<td>14.0</td>
<td>40.4</td>
</tr>
<tr>
<td>Spain</td>
<td>1979</td>
<td>4.1</td>
<td></td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1978</td>
<td>11.1</td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td>1983</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>West Germany</td>
<td>1982</td>
<td>10.7</td>
<td>62.0</td>
</tr>
</tbody>
</table>

Source: Kornai (1992), EBRD (1997), and China Statistical Yearbook

\(^a\) This figures refer to the percentage of national income in the case of socialist countries and to the percentage of GDP in the case of capitalist countries
2.1.3 Why Transition? Problems of Socialist Economies

When socialism first became a reality in Russia in 1917, a protracted debate – running from the 1920s to the 1940s - was initiated concerning the feasibility of socialism, and it included the well-known contributions of von Mises and Hayek, Lange, Lerner and Schumpeter. This main criticism of the socialist system focused on information and incentive problems. Mises (1920) and Hayek (1935) argued that due to the absence of a price system, a socialist economy did not have the ability and incentive to collect and process the information needed for the calculation required to make rational decisions even under the specific form of market socialism proposed by Lange (1938) and Lerner (1936,1937).

In fact, the central planning system did produce rapid industrialization after World War II (see Figure 2.2).

![Figure 2.2 Growth Rate of NMP in the Soviet and Eastern Europe (%), 1950-1990](image)

Source: Lavigne (1995); NMP: Net Material Product

In the 1950s, the Soviet bloc countries achieved 4.5% annual growth rate in per capita GNP, exceeding the 3.7% rate of growth of a comparison group of market economies. Indeed, as Figure 2.2 shows, it was only in the 1970s that stagnation began to be felt. Unsurprisingly, strong economic growth in the
Soviet Union and other socialist economies in the early post World War Two period left this initial debate languishing. Only more recently did stagnation re-ignite discussion about the endemic properties of socialism as such. This introduced or developed a number of themes, with no immediate presumption as to cause and effect, but of importance in the development of this thesis. Here I discuss the concept of the soft budget constraint, the role of chronic shortage, and stagnant economic growth.

**Soft Budget Constraint and Low Efficiency**

The concept of the Soft Budget Constraint (SBC) was first coined by Kornai (1986) to refer to the phenomenon that in a socialist economy, when an SOE incurs losses, the government will provide it with additional funding, such as a tax cut, or other forms of compensation, without the expectation of future repayment. This is essentially because the government is unwilling to accept the social consequences of its closure. Therefore many firms may survive despite sustained or continued losses. The existence of SBC was attributed to the government’s “parentalism” (Kornai, 1986) or alternatively to SOEs’ social objectives other than profit maximization (Shleifer and Vishny, 1994).

Dewatripont and Maskin (1995) explain SBC as a more general commitment problem. In their model, SBC arises due to central planners’ inability to commit to not refinancing a failing firm ex post. In fact, the distorted price system made the problem of the SBC worse, as profit could not be used to evaluate SOEs’ performance effectively.

A major problem arising from SBC at the enterprise level is the low efficiency of SOEs. For example, compared with typical capitalist countries, energy and steel consumption per US $1,000 in socialist countries are much higher (see Table 2.3).
### Table 2.3 An International Comparison of Efficiency: Energy and Steel Intensity

<table>
<thead>
<tr>
<th></th>
<th>Energy Intensity in kg/Coal equivalent Consumed per 1,000 US Dollars of Output, 1979</th>
<th>Steel Intensity in kg/Steel equivalent Consumed per 1,000 US Dollars of Output, 1980</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Socialist Countries</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>East Germany</td>
<td>1356</td>
<td>88</td>
</tr>
<tr>
<td>Poland</td>
<td>1515</td>
<td>135</td>
</tr>
<tr>
<td>Six CMEA Countries</td>
<td>1362</td>
<td>111</td>
</tr>
<tr>
<td>China (1980)</td>
<td>2779</td>
<td>147</td>
</tr>
<tr>
<td><strong>Capitalist Countries</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>502</td>
<td>42</td>
</tr>
<tr>
<td>Italy</td>
<td>655</td>
<td>79</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>820</td>
<td>38</td>
</tr>
<tr>
<td>West Germany</td>
<td>565</td>
<td>52</td>
</tr>
</tbody>
</table>


Since the *ex post* possibility of bail out reduces the *ex ante* incentives, SBC leads to *ex post* inefficiency (Roland, 2000; Kornai, 1993; Dewatripont and Maskin, 1995). In order to bail out failing firms, resources have to be extracted from good firms to subsidise bad firms, which leads to a ratchet effect, providing disincentives to both good and bad firms, and leading to lower efficiency (Dewatripont and Roland, 1997).

SBC has also been blamed for the final demise of the socialist regimes, because the centrally planned economies lack the capacity to innovate due to
their inability to screen innovation projects *ex post* in the same way as a market economy (Qian and Xu, 1998; Maskin and Xu, 2001).

**Shortage, Monetary Overhang and Repressed Inflation**

A further pervasive problem in the socialist economy was that of chronic shortage (Kornai, 1980). Under socialism, shortage phenomena could be found in every sector of the economy. It was frequent rather than exceptional and sporadic, and it was ‘intensive’ and ‘chronic’ (Kornai, 1992). Perception of shortage led to all sorts of behaviour, such as hoarding (Weitzman, 1991), including the hoarding of labour, resulting in overstaffing in SOEs, or ‘forced substitution’ (Kornai, 1992), i.e., the substitution of an available input or material for an unavailable one, leading to possible quality deterioration (Roland, 2000). If forced substitution is not acceptable, forced saving takes place, the buyer’s setting aside the unspent money awaiting a supply to match his demand. As money accumulates through forced saving, a ‘monetary overhang’ is generated, expanding across the sphere of consumer goods and services (Kornai, 1992).

The causes of chronic shortage are attributed to the distorted price system and SOEs’ SBC. As lower than market equilibrium prices discourage supply and encourage demand, that leads to the full range of economic shortage, and SBC leads to increased demand for inputs (Kornai, 1980, 1992). However, shortage reduces the benefits the firm with SBC gets from refinancing (Qian, 1994). Therefore as the shortage is removed, SBC will probably be worse. The causes of chronic shortage also combine to create and sustain a propensity towards inflation, with resultant government price controls creating repressed inflation (Kornai, 1992). Turning repressed inflation into open inflation will not eliminate shortage as long as firms’ budgets are soft - shortage and inflation will remain since it is the distortion to relative prices that is the root of the problem (Kornai, 1992).
Slow Technology Progress

It is widely accepted that rapid economic growth after World War II was achieved initially through a high level of investment rather than through technological progress (Kornai, 1992; Ofer, 1987). One indicator of slow technological progress is the low contribution of TFP growth to index compared with typical capitalist economies (see Table 2.4).

Table 2.4 Share of TFP in the Growth of Output: International Comparison

<table>
<thead>
<tr>
<th>Period</th>
<th>Average Annual Growth Rate (%)</th>
<th>Share of TFP Growth in Output</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Output</td>
<td>Total Productivity</td>
</tr>
<tr>
<td>Socialist Countries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>1952-75</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>1975-81</td>
<td>5.9</td>
</tr>
<tr>
<td></td>
<td>1978-95</td>
<td>8.2</td>
</tr>
<tr>
<td>Czechoslovakia</td>
<td>1960-75</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>1976-80</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td>1981-88</td>
<td>1.4</td>
</tr>
<tr>
<td>Poland</td>
<td>1960-75</td>
<td>5.1</td>
</tr>
<tr>
<td></td>
<td>1976-80</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td>1981-88</td>
<td>0.8</td>
</tr>
<tr>
<td>Soviet Union</td>
<td>1960-75</td>
<td>4.6</td>
</tr>
<tr>
<td></td>
<td>1976-80</td>
<td>2.3</td>
</tr>
<tr>
<td></td>
<td>1981-88</td>
<td>1.9</td>
</tr>
<tr>
<td>Capitalist Countries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>1960-73</td>
<td>5.8</td>
</tr>
<tr>
<td></td>
<td>1973-79</td>
<td>2.8</td>
</tr>
<tr>
<td></td>
<td>1979-88</td>
<td>1.9</td>
</tr>
<tr>
<td>Japan</td>
<td>1960-73</td>
<td>10.8</td>
</tr>
<tr>
<td></td>
<td>1973-79</td>
<td>3.6</td>
</tr>
<tr>
<td></td>
<td>1979-88</td>
<td>4.1</td>
</tr>
<tr>
<td>UK</td>
<td>1960-73</td>
<td>2.9</td>
</tr>
<tr>
<td></td>
<td>1973-79</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>1979-88</td>
<td>2.2</td>
</tr>
</tbody>
</table>

Source: China’s data is from World Bank (1985, 1997), data for others are from Kornai (1992)
In the Soviet Union the share of TFP in the growth of output was 33% during the period 1960-1975. This figure dropped to 13% during the period 1981-88. In the UK, this figure was 76% during the period 1960-73, and 95% during the period 1979-88. With slow technical advance, the potential for high returns on investment eventually exhausted itself, and the decline of rate of growth accelerated from the mid-1970s (Ofer, 1987; Bergson, 1991; Weitzman, 1970, 1972). In fact, in the years preceding the transition, the deceleration of growth turned into absolute decline in NMP.

Sachs (1996) and Sachs, Woo and Yang (2000) have provided an additional explanation, which is quite relevant to the current debate on the long-term growth prospects of transition economies. They argued that state-led industrialisation by Soviet bloc countries - as latecomers - could mimic the efficient pattern of division of labour generated gradually by capitalist developed countries. This generated the impressive economic growth at the beginning. However, in the absence of a capitalist infrastructure, and as the potential for imitation was exhausted, the intrinsic costs of central planning would outweigh its short-term benefit, which explains the stagnation in the later stage of socialism.

2.1.4 Effecting Transition: Reallocation and Restructuring

The stagnation and the decline of communist economies, and the consequent relative decline in living standards, created expectations that by moving to a market economy, the centrally planned economies would generate more rapid economic growth and gradually catch up with middle income developed countries (Poznanski, 1995). After the unsuccessful market socialism experiment in CEE and FSU countries, further such attempts for market socialism, the ‘third way’, were dropped (Lipton and Sachs, 1990a; Klaus\(^2\), 1991). Capitalist market economy, especially the American and Western European style capitalist market economy, became the ultimate goal of

\(^2\) Klaus (1991) claimed that the “The third way is the fastest way to the third world”.
transition: in the words of the leaders of transition economies, it was “returning to Europe” (Lipton and Sachs, 1990a) and jumping “from the grey, stagnating, totalitarian past into a bright, rich and civilized future” (Yeltsin, 2000).

To achieve the transition objectives, it has been generally acknowledged that transition processes involve four key changes:

- **Political changes.** “The biggest challenge of any economic reform is the political one” (Laffont and Qian, 1999). Political changes are required to make the transition feasible (Fischer and Gelb, 1991).
- **Change from central planning to market co-ordination,** i.e., correcting the distortions of socialism through the introduction of flexibility in relative prices and the creation of a competitive market environment open to the world economy, ‘moving from a sellers’ market to a buyers’ market’ (Kornai, 1994).
- **Change to novel incentive mechanisms** by enforcing a hard budget constraint via privatisation and by eliminating various government support mechanisms such as budget subsidies, directed low cost credits, and tax exemptions (Kornai, 1994). Privatisation is a key component of such change, but so is encouraging the entry of new private firms and the creation of an entrepreneurial class.
- **Change from an institutional framework for a socialist economy to an effective institutional framework for a market economy.** The invisible hand of the market depends heavily on the support of a thick ‘glove’ of rules, norms, and institutions, including government (Fischer and Gelb, 1991; Stiglitz, 1999; Florini, 1999; North, 1997).

While the first three changes have been acknowledged since the beginning of the transition, the fourth one has been recognised only recently, or at least it has not been emphasized from the beginning (Fischer and Gelb, 1991).

These changes generate two fundamental components of transition: reallocation and restructuring, which to a large extent shape the process of
transition (Blanchard, 1997). Reallocating resources from old to new activities via closures and bankruptcies, combined with the establishment of new enterprises and restructuring within surviving firms via labour rationalisation, product line change and new investment, constitute the core of the process that Schumpeter (1943) termed 'creative destruction'.

**Reallocation**

As we have discussed previously, compared with advanced capitalist economies, the centrally planned socialist economies were characterized by a high rate of accumulation of physical (and human) capital and by a pattern of production bias in favour of the industrial sector and a relative neglect of service sectors. Moreover, within the socialist economies, chronic shortage is pervasive and production is inefficient. It is believed that after price liberalisation and the replacement of central planning by the market, the change in relative prices will eliminate economic shortages, induce a reallocation of resources, and improve economic efficiency. The simplest general equilibrium view of reallocation is illustrated in Diagram 2.2
The production of the service and agriculture sectors is measured along the vertical axis \((X_2)\) and the production of industrial output is measured along the horizontal axis \((X_1)\). The production possibility curve \(AB\) describes all the combinations of \(X_1\) and \(X_2\) the economy is capable of producing given the resources of land, labour and capital available to it and the state of technical knowledge.

\(CD\) represents the budget constraint in the context of a closed economy, and \(FG\) represents the consumer preferences in the form of a community indifference curve. Prior to the transition, the economy is at point \(P\), which is away from the possible production \(P'\) due to perverse economic inefficiency. Price liberalisation in both factor markets and product markets, coupled with appropriate incentives for profit maximization and a competitive environment, are meant to bring the economy from point \(P\) under central planning to point \(E\) after price liberalisation. Liberalisation should induce an allocative shift with an increase in the production of goods 2 from \(X_2^P\) to \(X_2^E\) and a relative decrease in the production of goods 1 from \(X_1^P\) to \(X_1^E\). Elimination of production inefficiency should also bring the economy to the productive frontier. Liberalisation should thus bring about a substantive sectoral reallocation together with an improvement in economic efficiency. According to this static general equilibrium view of reallocation, the transition should be instantaneous. However, in reality such a reallocation cannot be instantaneous, due to the existence of frictions of various kinds; one such example is labour market frictions. This raises the question of the optimal speed of sectoral reallocation.

In the context of the labour market, Blanchard (1997) has described the mechanism of reallocation in a two-sector model. The basic idea of this model can be illustrated in Diagram 2.3. The pre-transition equilibrium is point \(A\), where the real wage is \(w\) and there is no unemployment. The elimination of subsidies to the state sector shifts the labour demands from \(SS\) to \(SS'\), while the demand for labour in the private sector is unaffected. Therefore, at a given real wage \(w\), the result is a decrease in state employment, no change in
private sector employment, and hence an increase in unemployment. As long as the real wage does not decline to \( w' \), transition leads to an initial increase in unemployment, which will consequently lead to decline in output. At a given real wage, restructuring may also lead to an increase in unemployment by an increase in productivity and output. After the initial adjustment, the high productivity in the private sector leads to the creation of private employment. The pace of private employment creation depends upon the installation of new capital, new expertise, and the real wage.

![Diagram 2.3 Employment after Liberalisation](source: Blanchard (1997))

**Restructuring**

Restructuring SOEs to improve economic efficiency has been a main theme of transition (for example in Lipton and Sachs (1990a, 1990b), and Fischer and Gelb (1991)), and indeed has been playing an increasing role over time (Blanchard, 1997).

As the main problem of SOEs has been expressed in the literature in terms of Soft Budget Constraints arising from the significant separation of ownership and control under socialism, the meaning of restructuring can be analysed by an application of Laffont-Tirole’s (1986) model of the contract between an
agent – the manager – and a principal – either the planner or the firm’s owner. In this model, the firm’s productivity depends on both the manager’s ability and efforts. However, information asymmetries ensure that the principal can observe neither effort nor ability but only the level of the firm’s profit, putting the principal at a bargaining disadvantage. In order to induce the manager to make the firm more productive, the principal can offer the manager incentives, such as making pay depend upon the firm’s profit.

According to this model, the firm’s inefficiency comes from four aspects. Firstly, the principal’s aim may be at odds with maximising profit; secondly, the informational costs arise from the separation of ownership and control; the third source of enterprise inefficiency is the manager’s ability; the fourth arises from the government’s inability to commit to not bail out failing firms and to extract profitable firms, with the former leading to the firm’s soft budget constraint, and the latter to the ratchet effect (Kornai, 1992; Roland, 2000).

Hence, the model suggests that restructuring can be achieved by providing managers with better incentives, flattening the organisational hierarchy, and by selecting a better manager. These can all be done through privatisation. However, efficiency improvement can also be achieved by giving managers performance-contingent contracts, granting more managerial autonomy, and by selecting better managers. Market competition in the capital market, product market and managerial market may all help to reinforce the internal discipline based on performance contingency incentive contracts (McMillan, 1997). These will be further discussed in Chapter 3.

2.1.5 Effecting Transition: Transition Policies

The above simplifications do not do justice to the continuing sharp debates on how to implement transition in practical contexts. One school of thought advocates broadly the elements of the so-called Washington consensus (Williamson, 1990), including the view that more rapid and earlier implementation is generally better (to varying degrees, with Sachs (1996) at
the extreme end). A second school of thought argues that transition can occur quickly, which will, however, cause more costly disruption than beneficial restructuring and therefore risk undermining the will to continue. Aghion and Blanchard (1994), Blanchard and Kremer (1997), and Roland and Verdier (1999) exemplify the theoretical work along these lines. Stiglitz (1999) — with whom the former do not necessarily agree— argues with hindsight, that excessive speed was indeed a problem in practice and that it explains the dramatic failures of privatization and the lack of recovery in many transition countries, including, for example, Russia. A third school of thought focusing on institutions argues, as does Murrell (1992), that stabilization and liberalization are needed but that they will not have the intended results if the institutions of market operations are inadequately developed.

**Policy Components**

Despite the apparent significance of the differences, it needs to be stressed that there was a wide consensus regarding the variety of policies which needed to be implemented. These key policies include:

- Macroeconomic stabilization.
- Liberalisation.
- Privatisation and restructuring.
- The creation and shaping of market institutions.

It has been argued that the liberalization of trade, production and price is the prerequisite of a market system. However, the liberalisation of trade and prices will also turn the two chronic problems of socialism - monetary overhang and overstaffing - into unemployment and open inflation, and falling output will ensue. Therefore there exists a necessity for macroeconomic stabilization as a precondition for successfully starting the process of transition (Lipton and Sachs, 1990a; Berg and Sachs, 1992; Fischer and Gelb, 1991).
The necessity of enterprise reform, including the imposition of financial
discipline, definitions and changes of ownership, and the reform of
management, has also received considerable attention. Whereas private
ownership has been regarded as the foundation of a market system,
privatisation, especially the necessity for large-scale privatisation, is often
taken for granted as synonymous with enterprise reform. However, a point of
contention concerns the mechanisms involved. Privatisation is said to be able
to eliminate government intervention, as well as to provide better incentives,
thereby improving enterprise efficiency; moreover, politically, large-scale
privatisation can give rise to the irreversibility of the reform (Boycko et al.,

Institution-building, providing a framework for the efficient functioning of the
market, has attracted attention recently (Havrylyshyn and van Rooden, 2000;
reforms include changing both the formal and informal rules that structure
human interaction. However, institution-building, especially institution
enforcement and the changing of informal institutions, is a gradual process
(North, 1997), as the formal rules can be changed overnight, informal rules
and the enforcement of new institutions evolve slowly.

Despite the consensus on the elements of transition policy, the priority given
to each element has varied among economists. For Lipton and Sachs
(1990a), repressed inflation is a “fundamental factor in many of the deepest
economic problems of the Eastern European economies” (Lipton and Sachs,
1990a), including problems such as chronic shortage. Therefore, they
suggested “the first step must be to end excess demand” by “a strong dose of
macroeconomic austerity” (Lipton and Sachs, 1990a). Aslund (1991) and
Balcerowicz (1994) are other authors who have attached a very high priority
to macro-stabilization policies.

For Fischer and Gelb (1991) “macroeconomic measures can help to reduce
budget and trade deficits”, but their results would be conditioned by the size of
the market and the restructuring of microeconomic behaviour. Indeed, they
suggested that enterprise reform, which “requires the imposition of bottom-line discipline, definition and change of ownership, and reform of management”, should instead be at the heart of the transition process.

For Dewatripont and Roland (1997), transition is ‘a process of large scale institutional change’, and “relates to the necessary large-scale institutional changes: the creation and development of markets”, “the institution and enforcement of property rights” and “political changes”. Therefore, institution-building should be given a high priority.

**Sequence of Transition: “Big Bang” vs. Gradualism**

More important policy disagreement emerged at least in the initial stage of transition in terms of how and when to implement these policies, the sequencing of transition. This debate is often put into the framework of ‘Big Bang’ versus ‘gradualism’. The ‘Big Bang’ strategy tries to implement all the policy elements simultaneously in ‘one stroke’ (Kornai, 1990), while the ‘gradualist’ strategy tries to achieve its objectives through a gradual ‘trial and error’ process and the policy elements are implemented sequentially (Dewatripont and Roland, 1997).

**The Case for a “Big Bang” Strategy**

The ‘Big Bang’ strategy was first proposed by Kornai (1990) in his book *The Road to A Free Economy*, and was characterized by its comprehensiveness and simultaneity. This strategy involves the rapid liberalisation of prices, and rapid privatisation of SOEs, together with the speedy elimination of the government’s budget deficit. He and other advocates of this approach believe that in the transition from a central planning socialist system to a western-type market economy, these processes are highly interdependent, forming a so-called ‘seamless web’ (Lipton and Sachs, 1990a) in which the necessary reform measures are conditional on each other (Kornai, 1990). Therefore, the transition needs both radical and comprehensive ‘shock therapy’ in which all
elements constitutive to the market economy are introduced simultaneously (Lipton and Sachs, 1990a).

The economic rationale behind this strategy is that structural reform could not work without a working price system. However, the price liberalization will transform the two problems of overstaffing and excess demand in a socialist economy into unemployment, falling output and open inflation. Therefore a working price system cannot be put in place without a tight macroeconomic policy ending excess demand and creating convertible currency; reciprocally, tight macroeconomic policy cannot be sustained unless prices are rational. A more subtle belief is that once the government has dealt with the essential issues and got out of the way, private markets would allocate resources efficiently and generate robust growth (Williamson, 1997). Accordingly, as has been suggested, a series of laissez-faire policies should be implemented “at one stroke” (Kornai, 1990). Politically, the advocates of ‘Big Bang’ argued that early “windows of opportunity” or periods of “exceptional politics” should be exploited to push reforms through as fast as possible and to create irreversibility of reform (Balcerowicz, 1994).

From the point of view of the Big-Bang strategists, gradual and partial reform was criticized as both ‘inconsistent and sluggish’ as well as ‘ambiguous’ (Kornai, 1990). Such an approach would disorganize the economy (Murphy et al., 1992), and it may even be impossible to implement given the likelihood of political frictions. For advocates of ‘Big Bang’, the potential contributions of existing institutions are dismissed, and the over-riding strategic objective is to take decisive steps to ensure that existing structures and interests cannot derail reform (Murrell, 1993).

In fact, the transition process in Central and Eastern Europe and Russia was to a large extent based on the above ideas, which formed the foundation of the so-called ‘Washington Consensus’ (Williamson, 1997). The Big Bang packages usually consisted of macro-stabilization by tightening monetary and fiscal policies, rapid liberalisation of prices, trade and exchange rates, and mass privatisation (Lavigne, 1995; Lipton and Sachs, 1990a; Fischer and
Realistically, however, it is impossible to implement all policies in one go, and hence the sequencing and the speed of transition were extensively discussed (Fischer and Gelb, 1991). A general consensus was reached on the point that stabilization coupled with liberalization should precede restructuring, and in order to make the transition credible, a quick move to privatization and de-monopolization were also recommended (Fischer and Gelb, 1991; Boycko, Shleifer and Vishny, 1995).

Poland and Czechoslovakia were the first two countries to implement the ‘Big Bang’ approach. Poland established its programme in January 1990. It consisted of macro-stabilization, price liberalization, trade liberalization, promotion of the private sector, and the mass privatization of state owned enterprise (Lipton and Sachs, 1990a; Klaus, 1993). Czechoslovakia’s “Big Bang” was launched in January 1991, and was considered the most radical and in many ways the yardstick of “shock therapy” (Klaus, 1992). Similar packages were later devised for other countries, for example with Russia implementing its ‘Big Bang’ in 1992.

The Case for a “Gradual” Strategy

Reforms in China and Vietnam are gradual and experimental compared with their counterparts in CEE and FSU countries. The ‘Gradual’ reforms were implemented while the Communist parties were still dominant. Here the goals of reform are achieved by a “dual-track system”, in which the elements of a new system are developed side by side with the old unreformed system, and if things go well, reforming the old system in line with the positive developments emerging from the new components of the economy. It reduces central planning slowly rather than eliminating it completely, permitting the coexistence of the planning and market mechanisms, and a two-tier price system (Gao, 1993; Naughton, 1995; McMillan and Naughton, 1992).

For gradualists, it is not only impractical to implement many necessary changes simultaneously but also highly undesirable. They argued that privatization couldn’t be achieved instantaneously, (here as we have seen,
even advocates of ‘Big Bang’ acknowledge that it is impossible to privatise in this way (e.g. Kornai, 1990, Lipton and Sachs, 1990a)). Consequently, the whole fabric of the economy cannot be changed too much, as it is still the unreformed SOEs that respond to the liberalized prices and the macro stabilization policies, which could lead to further social welfare loss (Kornai, 1992; Qian, 1994)³. In practice, therefore, the lag in enterprise reform represents the biggest ‘seam’ in the so-called ‘seamless web’. Rapid liberalization will result in an inefficient rise in laid-off production factors, both of labour and capital, which cannot be moved instantly from old state owned firms to the new private sector (Aghion and Blanchard, 1994; Castanheira and Roland, 2000). Too-tight monetary and fiscal policies will reduce firms’ demand for credit and decrease firms’ investment at a time when human and physical capital improvements are necessary.

Contrary to the idea that a gradual approach is costly, adherents argue that it is easier to initiate and allows for flexible experimentation, because it gives an additional option of early reversal at a lower cost. Additionally, a gradualist strategy may be a less costly way of overcoming the bias towards the status quo as it does not need to give up too much in rent, while a “Big Bang” may have to give away too much (Laffont and Qian, 1999)⁴. The strong complementarities however do not necessarily postpone and reverse the reform process, but may, on the contrary, give it an additional advantage by building constituencies for further reform (Dewatripont and Roland, 1992).

Gradualists have also stressed that transition is a process of large-scale institutional change (Dewatripont and Roland, 1995). The creation and development of markets, the enforcement of property rights, and other related

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³ According to Qian (1994), shortage is an optimal mechanism to curb SBC in socialist economies. Therefore as shortage is eliminated due to price liberalisation and reduced governmental control, the SBC problem can become worse.

⁴ Laffont and Qian (1999) argue that in order to make economic reform acceptable, people in power need to be bought out. However, compensation is limited by the lack of commitment and liquidity, which makes simultaneous reform in all sectors and regions not feasible politically because people in power cannot be compensated at the same time.
legal and political changes, are also very important aspects of economic transition within a gradualist framework. With limited institutional infrastructure, the new markets cannot emerge fully-fledged. However, institution-building, especially institution enforcement and the changing of informal institutions, is a gradual process as stressed by North (1997), Stiglitz (1999) and Kolodko (2000).

This short discussion of the debate that has surrounded transition processes needs to be complemented by a discussion of economic performance in the economies involved. The focus in doing this is to draw out some stylised facts regarding the relationship between performance and the strategies involved, with particular reference to the comparative performance of ‘Big Bang’ and more ‘gradualist’ strategies.

2.2 The Comparative Performance of Transition Economies

There have been significant variations in transition performance; as we shall see, this is most evident when comparing three groups: China and Vietnam, the Central and Eastern European Countries (CEE), and those countries in the Former Soviet Union (FSU). In CEE and FSU, initial moves towards the market economy were greeted with euphoria and a degree of triumphalism. To some extent this was fuelled by the experience of structural adjustment encountered in distorted market economies elsewhere (for example in Bolivia, Israel, etc.), leading some to believe that the process of building market-oriented economies would be both simple and short, and the consequent rising living standards and economic growth would be rapid and strong (Gaidar\textsuperscript{5} as quoted in Zagalsky (1994); Kornai\textsuperscript{6}, 1990; Shatalin Program\textsuperscript{7},

\textsuperscript{5} Gaidar (as quoted in Zagalsky (1994)), who was First Deputy Chairman of the Council of Ministers of the Russian Federation for the Economic Reform and behind Russia’s ‘Big Bang’, went even further promising that people would “feel the improvement” very soon, “almost next month”.

\textsuperscript{6} Kornai (1990) suggested that the reforms could be put in place in a year.
As a result, transition was simply taken as a short-term policy issue, and was implemented in the belief that transition would deliver both sure and efficient gains (IMF et al.\textsuperscript{8}, 1990; Kornai, 1990; Lipton and Sachs\textsuperscript{9}, 1992). Although the costs involving transition, such as a drop in GDP in the short term, were acknowledged (Lipton and Sachs, 1990a; Kornai, 1990), they were considered an affordable price to pay to achieve efficient market mechanisms.

However, output declined rapidly in both CEE and FSU countries at the beginning of transition, and recovered sluggishly thereafter especially in FSU, which surprised both economists and policy makers. Moreover, a fully-fledged market economy was slow to emerge. Even 10 years after the transition, “almost everyone is surprised that its dismantling is not fast enough and that it actually takes time to replace it with a fully-fledged market economy” (Klaus, 1999). As a result, even some of the most determined advocates of Big Bang have now acknowledged that the transition to a market economy is complex, painful, and cannot be done in one fell swoop (Yeltsin, 2000; Kornai, 2000).

By contrast, the gradual reforms in China and Vietnam were greeted initially with doubts and pessimism. No economists, including some the currently devoted advocates of gradualism, anticipated that the partial and hesitant reforms initiated in the late 1970s would lead to significant economic growth – at least in the absence of some of the allegedly necessary conditions for economic growth. Indeed, some feared that partial reform could lead to a reduction in total output (Murphy \textit{et al.}, 1992). However, economic growth in both China and Vietnam has been substantial in the post-reform era, a fact in stark contrast to the experienced of CEE and FSU countries. Indeed, China’s economic reform has been deemed the most successful, and China has

\textsuperscript{7} The Shatalin program (1990) drawn up under Gorbachev, and upon which the later Russian transition package was based, envisaged the completion of the transition in 500 days.

\textsuperscript{8} It was predicated that “the benefits of sustained economics are likely to be very great”, output would start climbing “within two years or so”, “the growth in productivity and output would likely exceed that of most mature market economies”.

\textsuperscript{9} Lipton and Sachs (1992) suggested that an enormous increase in average living standards would occur within “a few years”.

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already been referred to as a market economy (Gardner, 1998; Gregory and Stuart, 1999). In some perspectives, China and Vietnam are considered more advanced than the transition economies in CEE and FSU (Nuti, 1997).

In order to compare performance in detail I propose to discuss a number of yardsticks. In the next section, I will first describe progress toward a market economy - using the objectives of transition as a yardstick.

2.2.1 The Progress of Transition

Table 2.5 gives a rough overview of the speed and sequencing of reforms in selected transition countries. It shows both differences and similarities in the transition strategies in various countries. An immediate impression derived from this table is that Vietnam has followed a Big Bang-style transition, and Hungary and Slovenia have followed a gradualist strategy. However, one fundamental aspect of the transition separates them: in China and Vietnam, the economic reforms have not brought about significant constitutional change, the transition in CEE and FSU has. Additionally, in Vietnam, by the time of rapid liberalisation the private sector already accounted for more than 60% of GDP (Roland, 2000).

As liberalisation is considered the prerequisite of a market system and will be conducive to the creation of a market system, I will present the progress of liberalisation.
<table>
<thead>
<tr>
<th>Country</th>
<th>Political Reform</th>
<th>Liberalization</th>
<th>Stabilization</th>
<th>Tax Reform</th>
<th>Entry</th>
<th>Privatisation</th>
<th>Enterprise Restructuring</th>
<th>Bankruptcy Reform</th>
<th>Banking Reform</th>
</tr>
</thead>
</table>

Liberalisation

Almost all the transition countries in CEE and FSU embraced the "Big Bang" style of liberalisation, although the process in Hungary and Slovenia was comparatively gradual. Prices were quickly liberalised (with the exception of a number of key prices), the institutions governing trade with the Soviet Bloc were abolished, and many countries opened up rapidly to international trade. However, the CEE and Baltic countries were more successful in promoting trade liberalisation than were CIS countries (See Figure 2.3), which shows the EBRD liberalisation index\textsuperscript{10}.

![Figure 2.3 Price and Trade Liberalisation Index In CEE and FSU By 2000](image)

Source: EBRD (2001)

In CEE and FSU countries, a big drop in trade-flows followed the liberalisation due to the dislocation of traditional domestic and international links and the collapse of regional trade (Rodrik, 1992; Lavigne, 1995). Between 1991 and

\textsuperscript{10} EBRD constructs annual transition indicators covering enterprise, financial sector, legal, and market and trade reform. Individual indicators range from 1 to 4 +, with 1 representing little or no change from the previous regime and 4 + indicating the most progress in reforms as measured against the standards of industrial market economies.
1993, the CEE countries’ exports to the rest of the world declined by 12%. For the same period, the FSU countries’ exports to the world declined 37% and their imports from the rest of the world declined more than 60%.

However, the volume of international trade began to accelerate in 1993. The EU has replaced the FSU as the major partner for all the CEE. As of 1994, some 70% of all exports of the Visegrad countries – the Czech Republic, Hungary, Poland and the Slovak Republic – were going to Western Europe. By 2000, 74% of CEE countries’ exports were going to Western Europe. The growth rate of exports to the EU was highest for the Czech and Slovak Republics, followed by Bulgaria and Poland.

In China, dual track prices were first introduced in 1984, and had almost ended by 1993, with ‘plan track’ accounting for only 5% of retail sales (Qian, 1999). Policies for expanding foreign trade were first introduced in two provinces, then rolled out to the whole country. In Vietnam, complete price liberalisation was introduced in 1989, but trade liberalisation was introduced only gradually. In any event, exports have been a leading force in both China and Vietnam’s growth. For example, China’s foreign trade has grown from $20.64 billion in 1978 to $474.3 billion in 2000. China’s exports in 2000 were $249 billion, which is 24.1 times higher than that in 1978 and ranks the 10th in the world. The ratio of the value of trade (import plus exports) to GDP increased from 17.2% in 1983 to 49% in 2000. Foreign trade in Vietnam has also been growing rapidly, rising from US$2.13 billion in 1983 to US$ 29.51 billion in 2000, and the ratio of the value of trade to GDP increased from 11.9% in 1983 to 109% in 2000.

**Macroeconomic Stabilization**

After liberalisation was introduced, nearly all the transition economies, including both China and Vietnam, experienced high inflation. However, the FSU economies fared the worst. All FSU countries experienced annual inflation of more than 1,000% in the year of maximum inflation. In the two countries worst affected - Armenia and Ukraine - the inflation rate reached
more than 10,000% in the year of maximum inflation. In CEE countries, inflation rates were lower. Even so, the Czech Republic, the Slovak Republic and Hungary were the only three countries in which annual inflation remained below three digit rates in the year of maximum inflation.

Starting with Poland in 1990, stabilization packages had been put in place by 1995 in all CEE and FSU countries except Turkmenistan. Such packages normally include both fiscal and monetary discipline imposed through increases in taxes and cuts in government spending, increases in interest rates, and the direct regulation of bank lending. By 1995, most of the CEE countries had brought down their inflation rate to less than 30%, but the inflation rates in most FSU countries were in still in three digits. By 2000, inflation rates had been brought down to single digits in all CEE countries except Romania, which was still 35% in 2000. In most FSU countries, inflation rates had been brought down to less than 30% by 2000 (all figures from EBRD, 2000).

Compared with the CEE and FSU countries, inflation in China and Vietnam has been more moderate, although the initial hyperinflation in Vietnam has been similar to that in CEE and FSU. In China, inflation has never been more than 30% since 1978. The first serious increase in inflation occurred in 1980, when consumer prices rose by 7.5 percent. The second surge of inflation started in 1985, when the consumer price index (CPI) rose by 9.3%, and this surge of inflation peaked in 1988 and 1989, when the CPI rose by 18.8% and 18% respectively. The period between 1993 and 1995 witnessed another surge of inflation, peaking in 1994 at 24%.

In Vietnam, the monetary-reform plan introduced in late 1985 initiated unprecedented inflation, which increased from about 50% in late 1985 to 700% by September 1986. Through the imposition of state regulations and the reintroduction of price subsidies, inflation in Vietnam was brought down to two digits in 1989. By 1992, it was brought down to fewer than 20%, and to less than 5% in 1996.
Privatisation

Remarkable differences also exist in the progress towards the privatisation of large and medium sized firms across countries. Table 2.6 shows the methods and the progress of the privatisation of large and medium sized firms in selected CEE and FSU countries.

Estonia, Hungary and the Slovak Republic have progressed privatisation surprisingly effectively through direct sale of individual state owned enterprise to outsiders as their primary privatisation method; by 2000 up to 75% of former state owned enterprise assets had been privatised. Poland and Slovenia moved slowly in privatising state owned enterprises. However, they relied heavily on the creation of new private firms and the "commercialisation" of state owned enterprises: in the case of the latter, firms remained state owned but were run by independent appointed supervisory boards rather than directly by the state. Russia and Ukraine have opted for rapid mass privatisation through subsidized management employee buyout as their primary privatisation method. Czech Republic and Lithuania carried out equal access voucher privatisation\(^\text{11}\), which created a widely dispersed ownership (Lieberman, 1997; EBRD, 1997). The extent of privatisation that has taken place in transition countries is unprecedented. Nellis (1999) estimated that around 60,000 large size and medium size enterprises were privatised in the transition economies.

\(^{11}\) The idea of Czech republic's voucher privatisation came from Vaclav Klaus and the think tank he gathered into his federal Ministry of Finance in early 1990. As originally conceived, everything would be exchanged for vouchers in a single, rapid process. Voucher privatisation was included as a possibility in the government's conception of economic reform, debated and agreed in September 1990. Implementation took place over two 'waves' starting in 1992 and completed at the end of 1994, disposing respectively of 12% and 5% of the country's total fixed assets.
<table>
<thead>
<tr>
<th>Countries</th>
<th>Privatisation Index in 2000</th>
<th>Direct sales</th>
<th>Vouchers</th>
<th>MEBO</th>
<th>Major Player</th>
</tr>
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<tbody>
<tr>
<td><strong>CEE</strong></td>
<td></td>
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<tr>
<td>Albania</td>
<td>2</td>
<td></td>
<td>Secondary</td>
<td>Primary</td>
<td></td>
</tr>
<tr>
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<td>Primary</td>
<td>Secondary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Czech Republic</td>
<td>4</td>
<td>Secondary</td>
<td>Primary</td>
<td></td>
<td>Investment Privatisation Fund</td>
</tr>
<tr>
<td>Hungary</td>
<td>4</td>
<td>Primary</td>
<td>Secondary</td>
<td></td>
<td>Domestic Private Companies</td>
</tr>
<tr>
<td>Poland</td>
<td>3+</td>
<td>Primary</td>
<td>Secondary</td>
<td></td>
<td>Workers and Managers</td>
</tr>
<tr>
<td>Romania</td>
<td>3-</td>
<td>Secondary</td>
<td>Secondary</td>
<td></td>
<td>Primary</td>
</tr>
<tr>
<td>Slovak Republic</td>
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<td>Primary</td>
<td>Secondary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slovenia</td>
<td>3+</td>
<td>Secondary</td>
<td>Secondary</td>
<td></td>
<td>Primary</td>
</tr>
<tr>
<td><strong>FSU</strong></td>
<td></td>
<td></td>
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<td>Secondary</td>
<td></td>
<td></td>
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<td>Secondary</td>
<td></td>
<td></td>
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<td>Lithuania</td>
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<td>Secondary</td>
<td>Primary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Russia</td>
<td>3+</td>
<td>Secondary</td>
<td>Primary</td>
<td></td>
<td>Workers and managers</td>
</tr>
<tr>
<td>Ukraine</td>
<td>2+</td>
<td>Secondary</td>
<td>Primary</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
Progress in the privatisation of medium and large enterprises is measured by the EBRD privation index. A score of 2 indicates that up to 25% of state owned enterprise assets have been privatised, a score of 3 indicates that up to 50% of these assets have been privatised, a score of 4 indicates that up to 75% of these assets have been privatised.

MEBO=Management Employee Buy-Out.

Source: EBRD.
By 1999, the private sector in most of the CEE and FSU countries already accounted for more than 50% of GDP. In some of the more advanced transition countries, such as the Czech Republic, Hungary, Poland, the share was even larger, at 70%. The development of private sector shares of GDP in selected transition countries is shown in Figure 2.4.

![Figure 2.4 Private Sector Shares of GDP in Selected CEE and FSU Countries (%), 1990-2000](image)

The development of the non-state sector in China and Vietnam has been achieved by encouraging the entry of new non-state enterprises. For example, in China, the numbers of industrial enterprises have been increasing from about 3 million in 1980 to 7.34 million at the end of 1995. Most of these new entries are non-state firms. By 1998, China’s private sector had produced 32% of GDP, up from negligible levels in 1980, and the share of state sector in industrial output had declined from around 80% to less than 25% in 1998 (all figures from the Chinese Statistical Yearbook). In Vietnam, the number of private registered enterprises increased from 770 in 1990 to nearly 26,000 in 1997. In fact, by 1999 non-state sectors had accounted for 53% of industrial production. Recent statistics (Vietnam General Statistics Office) show that in year 2002, the number of non-state enterprises accounted for 47% of the total, and nearly 60% of the industrial production (Vietnam General Statistics Office).
Legal System Reform

Legal system reform is another key element in the process of transition, yet the progress of transition countries in this respect is not identical either. The countries that have made the greatest progress in establishing a functioning legal framework are CEE and Baltic countries. No countries in CIS have succeeded in rapidly developing a legal system and institutions that would be highly conducive to the preservation of private property and to the functioning market economy (EBRD, 2001). Figure 2.5 shows two legal system reform indices devised by the EBRD since 1996 describing the extensiveness and effectiveness of the financial legal framework being developed.

![Figure 2.5 Legal System Reform Index In CEE and FSU by 2000](image)

Source: EBRD (2001)

The EBRD’s measure of the legal system’s “extensiveness” attempts to measure how closely legal rules affecting investment follow international standards, and the "effectiveness" measure attempts to capture how commercial laws are being "enforced and administered." The data is obtained from a survey of lawyers in the region.

According to these indices there was significant difference between the countries: for example in terms of the legal effectiveness index, the best countries in Eastern Europe scored 4+, the laggards in Eastern Europe and
Russia scored 3, while Ukraine and much of the former Soviet Union scored 2 or less. Moreover, for CIS countries, although international standard laws have been put in place, their effectiveness is still lagging far behind.

In addition, despite the significant improvements in legal system reform that have been made, transition countries are still lagging behind in combating corruption (see Fig 2.6).

![Figure 2.6 Transparency International Corruption Perception Index 2002](image)

Note: The transparency index is in the range of 0-10, while 10 is the most transparent.
Source: Transparency International

**Transition Index**

In order to compare the transition progress in different countries more comprehensively, we have constructed an annual liberalisation index for each country based on a methodology put forward in De Melo et al (1996) and data from Transition Report (various years). The liberalisation index is the weighted average (with weights of 0.3, 0.3, 0.4 proposed by De Melo et al. (1996)) of 0 to 1 rankings of liberalisation in the following three areas:

12 The weights used in aggregating the components of the index are notional estimates of the relative impact of price liberalization, trade liberalization and the changing ownership of fixed assets.
• Price liberalisation,
• Trade and Foreign Exchange Liberalisation
• Privatisation (privatisation of large and small scale enterprises, and banking reform)

As the corresponding data are unavailable for Asian Transition countries, the liberalisation index is calculated for only CEE and FSU countries. Figure 2.7 below shows the progress of transition:

![Figure 2.7 Cumulative Transition Index (1989-2000)](image)

Sources: EBRD and Own Calculation

It appears that the Transition countries in CEE and the Baltic States have achieved a higher level of liberalisation than have the CIS countries; however, the pace of transition in CEE is not faster than that in CIS although they started with relatively favourable initial conditions. Meanwhile, although the Baltic States started with similar initial conditions to those in CIS, they quickly caught up with CEE countries; by 1994 they had already achieved the same liberalisation level as that in CEE.

At the level of the individual economy, the CEE countries have shown a continuous increase in liberalisation as shown in Figure 2.8. By 2000, Hungary had achieved the highest liberalisation level, followed by Poland, Slovenia, and Czech Republic. Albania achieved the lowest score within CEE.
The path of liberalisation in CIS countries has been more diverse however. Most of the countries in CIS have showed continuous progress in the level of liberalisation. Yet Russia from 1997, as well as Belarus from 1995, and Uzbekistan from 1996, began to reverse their liberalisation processes.

![Figure 2.8 Cumulative Transition Index in Selected Transition Countries (1989-2000)](image)

China is already being referred to as a market economy (Gardner, 1998; Gregory and Stuart, 1999). Indeed from some perspectives, both China and Vietnam are considered more advanced than the transition economies in CEE and FSU. Nuti (1997) observed that “both countries (China and Vietnam) have gone further than a reformed Soviet-Type economy” and that China “may be ahead of even some transition economies” at least in terms of market competition and the building of financial institutions (as quoted in Kolodko (2000)).
2.2.2 Macroeconomic Performance

The Evolution of GDP

After having reviewed the differences in the progress of transition across countries, it is useful to look at the difference in terms of macroeconomic performance. There are three patterns of GDP performance.

Both China and Vietnam have experienced a continuous, smooth and strong growth after liberalisation (See Figure 2.9). For example, during the period of 1978 to 1999, China’s average annual GDP growth rate was 9.7%, which is much higher than the growth rates of most countries in the world during the same period. Over the same period, the GDP per capita in China grew by 8.3% annually. GDP growth in Vietnam has been significant as well, averaging 7% annually since 1987.

By contrast, a larger than expected initial sharp decline in output immediately followed the transition in both CEE countries and FSU countries, especially the latter (See Fig 2.10). The magnitude and the duration of the transition recession were comparable to that of developed countries during the Great Depression, and for most of them it was much worse (Roland, 2000; Boettke...
and Leeson, 2003). Compared with their GDP levels in 1989, GDP declined by around 18% in Poland, Hungary and Czech Republic, 25% in Slovak Republic, 26% in Romania, and 27% in Bulgaria. The worst GDP decline in CEE occurred in Albania, 40% compared with 1989. The output decline was far steeper in the FSU countries. All the FSU countries, except Estonia and Uzbekistan, declined by more than 45% in GDP after liberalisation. The two largest economies among FSU countries, Russia and Ukraine, declined by 47% and 63% respectively before they began to show signs of recovery, and the worst GDP decline (75%) occurred in Georgia.

![Figure 2.10 GDP Growth in Transition Economies (1989=100)](image)

**Figure 2.10 GDP Growth in Transition Economies (1989=100)**

- Baltics
- CEE
- FSU

Source: EBRD (2001)

However, while the output decline in CEE was followed by a fast recovery, the output decline in FSU countries has proved both lengthy and stuttering (see Table 2.10). All the CEE countries started to recover after 3-4 years of recession; by the year 2000, all the CEE countries except Romania and Bulgaria had surpassed their GDP levels of 1989. The best example among CEE countries is Poland, whose recession lasted only 2 years, and its recovery has been strong and steady. By 2000 Polish GDP was 28% higher than its GDP level in 1989. In contrast, the recovery in FSU countries has been sluggish. Most of them have experienced at least 5 years of recession. It was only in 1996 or 1997 that recovery began to occur in this area. By 2000, all the FSU countries except Uzbekistan were still a long way from recovering.
their 1989 GDP levels, with Russian and Ukrainian levels at just 2/3 and 40% of their 1989 figures. More detailed information is contained in Table 2.7.

Table 2.7 Evolution of GDP in CEE and FSU Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Years of Output Decline</th>
<th>Output Decline (%)</th>
<th>Did GDP fall after some growth</th>
<th>Average Annual Rate of GDP Growth</th>
<th>Real GDP in 2000 (1989=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China and Vietnam</td>
<td></td>
<td></td>
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<tr>
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<td>4.6</td>
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<tr>
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<td>-3.7</td>
</tr>
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<td>CEE</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td>Albania</td>
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<td>4.4</td>
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<td>-8.8</td>
<td>3.6</td>
</tr>
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<td>Yes</td>
<td>-5.2</td>
<td>-3.7</td>
</tr>
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<td>-4.4</td>
<td>4.4</td>
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<td>3.6</td>
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<td></td>
<td></td>
<td></td>
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<td>-6.4</td>
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<td>62.0</td>
<td>No</td>
<td>-18.2</td>
<td>0.3</td>
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</tbody>
</table>

Output Decline during the Great Depression 1930-1934

<table>
<thead>
<tr>
<th>Country</th>
<th>Years of Output Decline</th>
<th>Output Decline (%)</th>
<th>Did GDP fall after growth</th>
<th>Average Annual Rate of GDP Growth</th>
<th>Real GDP in 2000 (1929=100)</th>
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<td>6</td>
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<td>N/a.</td>
<td>N/a.</td>
</tr>
</tbody>
</table>

Sources: EBRD, China Statistical Yearbook, and ADB
The Evolution of Industrial Output

Given the strategic bias in the former socialist economies towards industry, it is interesting to note the impact of reform on industrial output. Output in the manufacturing and other industrial sectors of the transition countries has shown an even greater diversity among transition countries. In CEE and FSU countries, while activity declined in nearly all sectors after liberalisation, the decline in industrial production was much larger than that of aggregate output, followed in turn by a weaker recovery.

![Figure 2.11 Gross Industrial Output (1990=100) 1989-2000](source: EBRD (2001))

In Poland, industrial gross output declined 30%; in Hungary, it declined 26%; in Czech Republic and Slovenia, the figures are 35% and 33% respectively.
The FSU countries have seen an even larger decline in industrial output. Gross industrial output declined 55% in Russia, 51% in Ukraine, and the declines lasted 9 years for both of them.

Although the declines in industrial output are steeper, the recovery that followed has also been weaker, a pattern not normally observed following recession in advanced capitalist economies. By 2000, in CEE countries, only
Poland and Hungary had recovered their industrial gross output level of 1989, Bulgaria and Romania were still at around only 40% of their 1989 level of industrial output, and in Russia and Ukraine, the levels of industrial gross output were still 47% and 43% respectively below their 1989 levels.

As a result of the faster decline and weaker recovery in industrial output, in most CEE and FSU countries the share of industrial output in GDP had fallen to less than a third. This indicates an important aspect of transition: reallocation, as the centrally planned economies had too large a manufacturing sector, and too small a service sector. Therefore part of the adjustment took the form of reallocating activities from manufacturing to the service sector. Boeri (1996) showed the degree of resource reallocation by constructing the “Lilien index”\(^{13}\), a measure first introduced by Lilien (1982) to estimate the extent of structural change by calculating the standard deviation of annual rates of change in employment across sectors for each year. According to his calculation, the Lilien index since the beginning of transition has been 20.9% for Czech republic, 14.2% for Slovak Republic, 20.3% for Poland, and 9% for Poland.

In sharp contrast to the above experience, in both China and Vietnam industrial output (as illustrated in Figure 2.14) has been growing at an even faster rate than that of GDP.

\(^{13}\) The "Lilien index" (Lilien, 1982) is constructed according to the following formula:

\[
\tilde{\sigma} = \left[ \frac{\sum_{i=1}^{n} \frac{X_i}{X} \left( \Delta \log x_i - \Delta \log X \right)^2}{X} \right]^{1/2}
\]

where \(X_i\) is the number of employees of industry \(i\) at time \(t\); and \(X\) is its equivalence of whole industry. Lilien computes this measure as a proxy for the size of sectoral shocks and investigates its relationship to the unemployment rates.
Over the past 20 years, China’s industrial output\textsuperscript{14} has been growing at an average growth rate of 11.6%. However, this does not mean an increasing share of the industrial sector; in fact the share of the industrial sector in GDP has been relatively stable. In Vietnam, industrial output has been growing at an average growth rate of 9.6% for the period between 1985 and 2000, and its share of GDP has been relatively stable as well until 1997. However, this stability disguises a significant reallocation process within the industrial sector. In order to capture this reallocation effect, we constructed a Lilien Index for the Chinese economy. From 1978 to 1999, the Lilien index for China was 32.7% (deconstructing the economy into 16 sectors), which is rather significant even when compared with advanced transition countries, such as Poland and Czech Republic.

\textit{Unemployment}

The transition has also brought about significant unemployment in transition countries. This is true even in China and Vietnam, a phenomenon unknown

\textsuperscript{14} Industrial value added
before the transition. As shown in Figure 2.15, unemployment rates rose most rapidly in CEE and the Baltic States.

![Figure 2.15 Unemployment Rate In Transition Countries (%), 1990-2000](image)

Sources: EBRD and China Statistical Yearbook

Within two years of the beginning of transition, the unemployment rate rose to double digits in most of the CEE countries. By 1993, for example, the unemployment rate in Bulgaria and Poland reached 16%, 14% in Hungary and Slovakia, 10% in Romania and 9% in Slovenia. The highest unemployment rate occurred in Albania (24%), and the lowest unemployment rate occurred in Czech Republic (3.5%). The rise of unemployment rates reflected high rates of inflow into unemployment as firms laid off workers, and the relatively low outflow rates from unemployment.

In the FSU countries, unemployment rates rose more slowly compared with the CEE countries, as firms were slower to lay off workers and used wage reductions and payment in arrears as devices to hold onto workers (Svejnar, 2002). By 1993, none of the FSU countries had more than 10% unemployment rate with the exception of Azerbaijan. The unemployment rate was 6% in Russia, and 0.6% in Ukraine.
Over time, the patterns of unemployment in CEE have shown variation. The Czech Republic’s unemployment rate had gradually increased to 9.9% by 1999. All the other CEE countries managed to reduce their unemployment during the period 1994 to 1998, yet in the period since 1998 the unemployment rate has bounced back. The Slovak Republic, Romania and Bulgaria have even reached their highest unemployment rates of the whole transition period.

At the same time, all the FSU countries experienced increases in unemployment as their transition proceeded. By 1998, the unemployment rate was 13.3% in Russia, 3.7% in Ukraine, and 9.9% in Estonia. This trend may have begun to reverse since 1999 in some countries, at least in Russia, where the unemployment rate was reduced to 9.7% by 2000 from its peak of 13.3% in 1998. Latvia, Lithuania, and Estonia have seen significant increases in unemployment after 1993.

Rather than experiencing declines in employment, employment in China and Vietnam was increasing up until the mid-1990s. However, since then, unemployment has begun to rise. In the case of China, employment has been increasing from 398.6 million in 1978 to 705.9 million in 1999. A decline in employment has occurred in the manufacturing sector only since 1995 due to the restructuring of SOEs; however, the unemployment rate has been moderately stable at around 3%.

**Living standards and Quality of Life**

Another key indicator of performance outcomes in transition economies is that of measuring living standards. In CEE and FSU countries, the transition has witnessed declines in such measures. For example, the number of people living in extreme poverty has increased sharply. In 1998, one in every 20 people in CEE and FSU countries had an income below US $ 1 a day, up from less than one in 60 a decade earlier (World Bank, 2000). Even in the
most successful country, Poland, poverty rates\textsuperscript{15} were still higher in 1998 than in 1991 (EBRD, 2000; World Bank, 2000).

Poverty increased not just because of falls in output, but also because of greater inequality in the distribution of income. The increase in inequality has been more modest in the CEE countries (World Bank, 2000). Figure 2.16 shows the increase in inequality in transition countries. In Hungary, the Gini coefficient rose from 0.21 in 1987 to 0.25 a decade later. In Poland, it increased from 0.28 in 1987 to 0.33. In FSU countries, the increases have been extremely significant. In Russia, the Gini coefficient increased from 0.26 in 1987 to 0.47 in 1998. In Armenia, it increased from 0.28 to 0.61 in the same period (World Bank, 2000).

Another phenomenon in CEE and FSU countries is the decrease in life expectancy. This is clearly the case in Russia and Ukraine where life

\textsuperscript{15} Poverty is defined as the population living on less than US$1 per person a day.
expectancy decreased from around 70 years in 1989 to 67 years in 1997, and to some extent the case in Romania and Bulgaria.

Once again, China and Vietnam offer a contrast. The economic reforms in both China and Vietnam have greatly improved people’s living standards. In 1980, two years into China’s reform, per capita income in rural and urban households increased 39% and 27% respectively (see Fig 2.17). In 1988, ten years into the reform, per capita income in rural households had tripled, and the figure for urban households had nearly doubled. By 1998, per capita income in rural household had been quadrupled, and per capita income in urban household had more than tripled (Chinese Statistical Yearbook). In Vietnam, Per Capita GDP has increased from $123 in 1990 to $400 in 2000 (ADB Database).

The increased income significantly reduced the number of people living in poverty. According to Chinese official statistics, the number of persons living
below the national poverty line\textsuperscript{16} in China was reduced from 250 million at the start of its reform process in 1978, to 80 million by the end of 1993, and to 29.27 million by 2001 (Chinese Statistics Yearbook).

China's market-oriented reforms also saw substantial improvements in other indicators of human development, such as the adult literacy rate and the infant mortality rate. However, China's economic reform has also significantly increased inequality in the distribution of income. The Gini index for household income has increased from 36\% during the period 1987-89, to 42\% for the period 1993-97 (Chinese Statistics Yearbook).

In Vietnam, the population living in poverty has also been reduced substantially during the past two decades. According to World Bank statistics, the percentage of people living below the poverty line fell from over 70\% in 1985 to 10\% in 2000.

### 2.3 Understanding Comparative Performance in Transition

The different transition strategies and the consequent differing economic performance have, of course, sparked enormous interest from both economists and policy makers. The search for explanations has concentrated on three fundamental questions: \textit{How to explain the sharp output fall in CEE and FSU countries, how to account for the different recovery performance within CEE and FSU countries, and why China is different.} Indeed, Blanchard (1997) has suggested that the problem of explaining convincingly the difference in terms of transition strategy and transition performance between CEE countries, FSU countries and China has become one of the challenges facing those studying transition economies. In this

\textsuperscript{16} The present poverty line in China was set in 1986, which took into account the basic need for existence and our social capability to provide assistance. It is measured in terms of income. If in a household, the annual income level is below RMB$\text{206}$ per capita (measured in the price level of the year 1985) or RMB$\text{625}$ per capita (measured in the price level of the year 1999), then it will be considered as being below the poverty line.
section, we will briefly review various explanations of the three questions above.

2.3.1 Liberalisation and Output Fall

The extent of the sharp and rapid decline in output after the inception of transition in CEE and FSU came as a surprise to both academic researchers and policy makers (EBRD, 1999), and triggered the search for an explanation of the output collapse. Initial studies of the output fall were conducted in the framework of neo-classical economics, and focused mainly on the role of exogenous shocks on aggregate demand and supply. However, more recent research has been conducted within the framework of property rights theory and new institutional economics.

**Macroeconomic Explanations of Output Fall**

In the early literature, macroeconomic explanations are focused primarily on four demand-side mechanisms:

Firstly, it has been suggested that, as price liberalisation turned the repressed inflation typical of a ‘shortage economy’ into ‘open inflation’, the process soaked up the unspent purchasing power (or so-called ‘monetary overhang” (Nove, 1993)). The resultant declines in the real value of purchasing power consequently led to a demand-side explanation of the output decline. Yet, there is evidence that the rate of increase in prices was strongly correlated with the rate of change in the monetary supply, whereas the rate of change in output was not (Koen and Marrese, 1995; Popov, 2000; Aslund et al., 1996). This suggests that high inflation was largely of monetary origin and was caused mostly by demand-pull factors rather than cost-push factors.

Secondly, it has been argued that the ‘excess stabilisation’ in combating hyper-inflation further held back aggregate demand, as government purchases of arms, energy and housing as well as government investment
were all generally reduced (Rosati, 1994; Berg and Blanchard, 1994). The contraction in aggregate demand carried over into a contraction in supply, as the lack of investment induced a shift in the aggregate supply curve (Kolodko, 2000; Berg and Sachs, 1992). A problem with this view is that the initial output falls were not correlated with the initial macroeconomic stabilization (e.g., Allsopp and Kierzkowski, 1997). For example, the output fall was as large in Hungary and the Czech Republic, which had only moderate initial inflation, as that in Poland which had been experiencing hyperinflation, and it is difficult to say that Russia experienced excess stabilization in 1992, the year of its biggest output fall (Roland, 2000). Moreover, from the experience of Western economies, stabilization policies leading to depreciation or low real interest rates are thought to increase output beyond its equilibrium (Blanchard, 1997).

Thirdly, the collapse of the CMEA together with the dissolution of the Soviet Union and Former Yugoslavia are suggested as exogenous demand shocks, leading to the collapse of the many formal and informal bilateral agreements, and increasing trade barriers between former members (Blanchard, 1997), which have consequently caused a big drop in demand because of the dislocation of traditional domestic and international links and the collapse of regional trade (Rodrik, 1992; Djankov and Freund, 2000). Notably, however, the output fall in Poland in particular came before the collapse of CMEA.

Fourthly, the deflationary overdose, or excessive contraction in aggregate demand, aimed at removing hidden inflation was the major cause of the excessive recession, and “the failure in government management of the state sector” should be blamed (Kolodko, 1993, 2000). While the first three explanations all see the disruption of economy “in part the inevitable price of, and in part a condition for” transition which might be welfare enhancing (e.g. Gomulka, 1991), the fourth explanation tends to see the recessions as excessive and avoidable rather than a normal price exacted by macroeconomic mismanagement (Portes, 1993; Kolodko, 2000).

The demand side by itself clearly cannot provide a satisfactory explanation. Indeed, the experience of developing and developed countries shows that
stabilization policies in themselves do not necessarily lead to sharp output falls (e.g., in Israel), and may in some cases lead to increases in output (Kiguel and Liviatan, 1992).

On the aggregate supply side, there is no shortage of explanations either. Here, explanations have been based on the most conventional approach to transformational recession, such as the collapse of investment, the reduction of employment, the decline in TFP, and the slow pace of sectoral reallocation (De Broeck and Koen, 2000; Berkowitz et al., 1997). Yet, they cannot provide convincing explanations without serious microeconomic underpinnings relating to the institutional context of transition (Roland and Verdier, 1999).

The most obvious aggregate supply side explanation is the collapse of factor inputs. It is argued that the decline in output reflected the reductions in employment and investment (De Broeck and Koen, 2000), which was amplified by a downward shift in the production function due to the lack of corporate governance (Bofinger, 1993; Stiglitz, 1999).

As the command economy was characterized by an artificially-created employment shortage (Kornai, 1992), it is therefore argued that the removal of this high excess employment leads to an inevitable drop in natural output and employment together with a reduction in real wages (Bofinger, 1993). However, the reduction in employment was also supposed to improve economic efficiency, which would be conducive to economic growth, and in the case of former Soviet Union countries, the degree of reduction in employment has been moderate.

From the perspective of investment, as the socialist economies were characterised by their extensive growth nature, it is argued that putting in place the stabilization policy and strengthening financial disciplines eliminated firms’ subsidies and contracted the aggregate investment, which consequently led to the decline in output (Winiecki, 1990). Moreover, the investment collapse had additional negative effects, as it made worse the obsolescence of capital stock due to the absence of replacement investment (Akopian,
However, Wolf (1999), Havrylyshyn et al. (1998), and Campos and Coricelli (2002) all conclude that investment has not been a significant determinant of growth. Furthermore, investment was supposed to increase, at least from foreign investors, as former socialist economies committed to a market economy, and the elimination of subsidies was supposed to harden budget constraints, and consequently improve efficiency.

The structural adjustment following price liberalisation is another supply-side explanation for the output decline in transition. It is argued that transition economies inherited from the centrally planned economy structural distortions such as high militarization, over-industrialization, underdevelopment of the service sector, etc. Price liberalisation led to the change in relative prices, energy prices increased as a result, which, coupled with the overly tight credits, did not allow firms to pay for their inputs and forced them to contract supply. The change in relative prices also necessitated structural adjustment, which requires a transition period to allow the factors to be allocated to their most efficient uses. During this period, the process of structural change is supposed to associate with output decline, as the decline of products in less demand cannot be offset by the increase of supply in greater demand due to the presence of significant adjustment cost and uncertainty (Popov, 2000). However, such sectoral shifts take place in other economies, and do not necessarily lead to such steep output declines. Moreover, evidence did not show a strong sectoral shift taking place directly after liberalisation (Finglton et al., 1996), which was supposed to be quick and welfare-enhancing.

It has also been argued that the collapse of the CMEA and the USSR came as a shock to the aggregate supply, as this collapse destroyed the institutional and technological links of the Soviet centrally planned system, and disrupted the supply of inputs for production, which led to the decline in output. Yet again, Poland's output decline occurred before the breakup of CMEA.

**Micro-foundations of Output Fall**

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As neither aggregate demand nor aggregate supply can provide a satisfying explanation, it is important to have micro-foundations for such a fall. Four possible micro explanations have been identified; these will be discussed in turn.

Transformational Recession

Gomulka (1992) and Kornai (1994) have provided explanations of the output fall as being related to price liberalisation. The basic idea is that by moving the sellers' market towards the buyers' market, price liberalisation would lead to changes in relative prices, which in turn would lead to the change in economic structure and the eventual elimination of the shortage. While the supply of goods in greater demand usually cannot be increased easily, because it takes time, the supply of the goods in less demand is reduced quickly (Gomulka, 1992; and Kornai, 1994). This produces an overall fall in output immediately. The output fall reduces incomes and may have a further reducing effect on output. This process was termed by Kornai 'transformational recession' (Kornai, 1994).

If this were the case, one would expect a decline in shrinking sectors, and at best no growth in sectors experiencing rising prices. However, as pointed out by Rosati (1994), the sharp drop in output usually occurred in all economic sectors rather than simply in the sectors producing goods in less demand, and was steeper than had been expected.

Credit Crunch

The second micro explanation is the 'credit crunch' hypothesis put forward by Calvo and Coricelli (1992). It held that as stabilisation policies were put in place and high real interest rates were imposed on enterprises, in conjunction with a hardening of budget constraints, enterprises significantly reduced their demand for credit which was urgently needed to accommodate necessary enterprise restructuring and resource reallocation, thereby reducing their output levels (Calvo and Coricelli, 1992). Indeed, evidence shows that
following the monetary contraction, the amounts of real credit and the explicit subsidies to enterprises drastically declined in many transition economies (Poznanski, 1993, 1995; Thompson, 2000).

Even though this explanation seems to be important, it cannot be the whole story. As it has been noted, in response to the decline in bank credits, inter-enterprise barters, enterprises trading with one another without the use of money, and inter-enterprise arrears, have been rising simultaneously (Schaffer, 1998; EBRD, 1997; Carlin et al., 2000). Bartering and arrears help to maintain production by creating a deal-specific collateral that softens the liquidity squeeze (Marin et al., 2000). The chains of inter-enterprise arrears thus created tend to reduce the credibility of a no-bailout policy and to soften the budget constraints (Perotti, 1998). Furthermore, evidence shows that state banks have been unable to limit credit supplies to financially defunct state owned enterprises (Coricelli and Rocha, 1991).

*Monopoly Behaviour after Liberalisation*

Another explanation for the output fall is based on monopoly behaviour by enterprises after liberalisation. After the dismantling of central planning and centralised organisation of production, monopolistic and vertically interdependent enterprises in the chain of production begin to pursue their own monopoly profits by either passing on price increases to the buyers of their outputs or by restricting output and inter-firm trade to increase their monopoly to the detriment of the economy as a whole (Li, 1999; Samonis and Hunyadi, 1993; Blanchard, 1997). This would cause output to fall, as each enterprise in the chain would face an upward shift in its marginal cost curve. This partly explains the rise of inflation and the sharp decline in output. The problem with the monopoly argument is twofold. Firstly, the fall in output is associated with unwanted outputs, making it hard to believe that the cause is restricted production. Secondly, the assumption of monopoly power is debatable. Whilst it is valid that production links were tightly organized, this does not necessarily mean that potential competition was absent, especially foreign competition.
**Disorganisation**

The most interesting explanation for the output fall is related to the disorganising effect of liberalisation on existing production links (Blanchard and Kremer, 1997; Roland and Verdier, 1999).

As the pre-transition economies were organised around a central plan rather than around markets, and production in the state sector was organized around bilateral relations between state firms, firms quite often had only one supplier (Blanchard, 1997; Qian et al., 1999), and had little information about alternative suppliers (Ickes and Ryterman, 1995). This highly specialised production and trading pattern has been extended to all the Eastern European and Former Soviet countries through CMEA (Bevan et al., 2001). While the collapse of communism destroyed the co-ordinating central planning system, however, market co-ordination did not follow immediately and automatically (Brada, 1995). In fact, there is a ‘no-man’s land’, where bureaucratic co-ordination no longer applies and market co-ordination does not yet apply (Kornai, 1994).

The elimination of the central planning system forced enterprises to bargain directly with other enterprises, with little or no expectation that the links would be long term. Due to incomplete contracts and asymmetric information, there is bargaining inefficiency (Blanchard and Kremer, 1997). When the bargain is not successful, they have to search for new partners. The problem of search friction and investment specificity will also lead to disruption of output following liberalisation (Roland and Verdier, 1999), as relation-specific investments can only take place after a new long-term partner is found. Therefore, aggregate output will fall because of the failure of enterprises to replace obsolete capital with a consequent fall in investment demand.

These two models are interesting to the extent that they do not assume that markets already exist at the time of liberalisation or that they are created instantaneously. However, bargaining inefficiencies, search friction and
investment specificity are not peculiar to transition economies. Actually, what both these models take for granted – the removal of the central planner as co-ordinator of these bilateral relationship between firms – is the most fundamental problem that makes bargaining inefficiency, search friction and investment specificity more serious during transition. The speedy removal of state control leads to the vacuum in economic organisation necessary for the co-ordination of a high level of division of labour (Yang, 1997). However, the concept of ‘disorganisation’ in this sense has not been modelled.

2.3.2 Explanations of the Recovery and Growth Difference in CEE and FSU

While theoretical explanations have been suggested to account for the output fall, a large empirical literature on the impact of the pace of reform on economic performance has been generated, including works by Aslund, Boone and Johnson (1996), Berg et al. (1999), de Melo, Denizer, and Gelb (1996), Selowsky and Martin (1997), Fischer, Sahay and Vegh (1996), Fischer and Sahay (2000), and Wolf (1999). These studies focus mainly on the effect of four sets of factors, primarily the first two sets of variables, (i) differences in initial macroeconomic conditions; (ii) the policies followed in the field of stabilization, liberalization and privatisation; (iii) the availability of external finance; and (iv) exogenous shocks (such as the breakdown of the central planning system, the dissolution of the Soviet Union, wars and civil strife) (World Bank, 2002; Fischer and Sahay, 2000; Berg et al., 1999).

One approach to the econometric evaluation of the source of differences in economic performance has been spurred by the construction of the cumulative liberalization index (described above) by De Melo et al. (1996), and the subsequent transition progress indicators published by the European Bank for Reconstruction and Development (EBRD). Perhaps the most comprehensive study of this kind is the one by Berg et al. (1999). Firstly, most of the growth models tested in previous papers are nested in their specifications; second, dynamic effects of the explanatory variables are
explicitly introduced; finally, the authors allow for differential effects of the independent variables on public and private sector output. Using several specifications and a general to specific econometric approach, Berg et al. (1999) deconstruct the relative contributions to growth of initial conditions, structural reforms and macroeconomic variables. They find that “the driving forces behind the recovery are overwhelmingly structural reforms”, which they define as price liberalisation, trade liberalisation, and the development of private sector. “The macroeconomic stabilization helps, but its quantitative impact appears relatively small” (Berg et al., 1999). They also claimed that the larger initial output decline in FSU is mainly explained by slower structural reforms and much less by more adverse initial conditions. What they find strongly supports a radical approach to reforms, the faster the better, even in the face of adverse initial conditions.

However, these attempts to link differences in output performance to the cumulative liberalization index and to macro stabilization are not without their critics, and the results are not always convincing. Firstly, there are the potential problems of omitted variables, especially those reflecting geography. One study shows that dummies, reflecting such factors as membership in the Rouble zone and war destruction, are much more important explanatory variables than either the liberalisation index or inflation (Åslund, Boone and Johnson, 1996). Secondly, studies that explicitly take into account the effects of initial macroeconomic conditions found that initial conditions “go far in accounting for performance” (Fischer and Sahay, 2000).

There are also problems in using the cumulative liberalization index (CLI) when examining hypotheses of the relationship between the speed of reform and growth. Firstly, the use of CLI glosses over the distinction between policy and policy changes. The liberalisation measures do not reflect changes in the policy stance, but rather the state of policy (Heybey and Murrell, 1999). Hence, countries like Slovenia and Hungary, which started reforms in the 1950s and 1960s, had high levels of the three liberalization indices in 1989, even though post-socialist reforms in these two countries have not been particularly speedy. Secondly, the CLI cumulates the liberalization measures
over time, from 1989 onwards, introducing a further problem in trying to discern the effects of the speed of reform. While communism fell in some countries in 1989, it lasted until 1991 in others. Since communist regimes severely limited the scope of economic reforms, one group of countries (those formerly in the USSR) would have a lower score on the CLI in 1995 simply because they were captives of communism until 1991. This makes the CLI a proxy for many other factors, such as being a former republic of the USSR or having had a less hard-line communist regime in the 1980s. Since these factors are plausibly related to growth performance, but none of these factors reflects the speed of reforms, the CLI will reflect much more than the influence of speed. Indeed, empirically Selowsky and Martin (1997) suggested that performance depends positively on the accumulated stock of reform, but negatively on the speed of liberalization. De Melo et al. (1997) found similar results. While this suggests that the level of (cumulative) liberalisation is beneficial, it is the cost of adjustment which is positively related to the speed of liberalisation, indicating that the cost of transition can be reduced by adopting a slower pace of liberalisation, because under such a scenario the transition cost can be spread over time.

Problems with the endogeneity of reform variables have also undermined the robustness of these results. Berg et al. (1999), for example, consider the reform variables as exogenous variables. Yet, reform policy choices result from politically constrained processes affected by economic variables and are not exogenous decisions. Heybey and Murrell (1999) argue that the liberalization index is endogenous to economic performance, and to growth in particular. Actually, both Wolf (1999) and De Melo et al. (1997) conclude that reforms are affected by initial conditions. Taking the speed of transition as an endogenous variable, Heybey and Murrell (1999) find that initial conditions are much more important than policy changes in determining growth performance in the first four years of transition, and that growth affects the speed of reform rather than the opposite.
2.3.3 Why Is China Different?

As we have seen, China’s growth poses an interesting contrast to CEE and FSU countries. The Chinese path of reform and its associated rapid growth is puzzling because it seems to defy much of the conventional wisdom about transition. For most of the past two decades, China’s reform succeeded without complete liberalization, without mass privatisation, and without democratisation (Chow, 1997). Is China an example of the argument that gradual reform is superior to shock therapy? Or are there other fundamental differences that make the Chinese example irrelevant to the CEE and FSU cases? What lessons can be learned from China? Broadly speaking, two schools of thoughts have emerged to explain the Chinese experience: the Gradualist school, and the Big Bang school. Generally, both schools see China’s market reforms as unleashing the rapid growth since 1978.

The gradualist school gives great credit to the evolutionary, experimental, and incremental nature of China’s reforms (for example, Laffont and Qian, 1999; Nolan, 1994; Rawski, 1994; Dewatripont and Roland, 1992, 1995, 1997; Lau et al., 1997), where the typical features of gradualism apply. In addition to the advantage of a gradualist strategy, it has also been claimed that China’s fragmented planning system has helped China’s growth. It is suggested that the emphasis on local self-sufficiency before transition has led to an economic structure with low regional specialization, and large numbers of small and medium sized firms, which resemble the M-form structure (Qian et al., 1999; Qian and Xu, 1993). This heterogeneous planning and output structure have made possible decentralization along regional lines rather than along functional lines, and have encouraged a decentralized, experimental approach to reform (Qian et al., 1999), and to some degree have avoided the disorganisation that has occurred in other transition countries (Blanchard, 1997). This has also assisted in opening up the economy to international trade, making it possible to introduce international trade to some contained and experimental areas at the initial stage.
Furthermore, the decentralisation of government has allowed for forms of competition between local government, which have been facilitated by the M-form structure (Maskin et al., 2000). This in turn has helped to accelerate the reform process, as local government competes to experiment with new reform initiatives. Fiscal competition, to attract foreign and private capital, can help to harden the budget constraints for local government, in the absence of privatisation, and to provide further incentives for local government to develop local economies (Qian, Roland and Xu, 1999; Qian and Weingast, 1997). This argument predicts that SOEs under the supervision of lower-level government would face better incentives than would SOEs supervised by central government.

In addition to decentralised government, the gradualist school has also emphasized the role played by a strong state in enhancing the market-preserving mechanisms and promoting economic growth. As Murphy et al. (1992) pointed out, there exists a tendency for 'input diversion' from plan track to market track in gradual and partial transition; in order for the dual-track to work, the state must be able to enforce the original plan and to make the economic agents honour their obligations under the plan. They attribute China's success to the central government's ability to enforce the state quotas. In order to preserve market incentives, a strong state is also needed. By analysing both China and Russia as federations, Blanchard and Shleifer (2000) argue that the reason why local government in China has contributed to the growth of new firms, and the local government in Russia on the other hand has hindered growth, lies in the different degrees of political centralization in China and Russia. They argue that transition in China has taken place under the tight control of the Communist Party. Therefore, central government is in a strong position to reward and punish local administrations, reducing the risk of local capture and the scope of competition for rent. In contrast, transition in Russia has come with the emergence of a partly dysfunctional democracy. The central government has been neither strong enough to imposes its views, nor to set clear rules about the sharing of the proceeds of growth. They conclude that the helpful role played by federalism in promoting China's economic growth lies in the centralizing role of central government.
government, and that Russian federalism fails because of political decentralization.

The Big Bang school holds that China’s successes are in line with the performance of other East Asian economies, which are based on a strategy of the rapid export growth of labour-intensive manufactures (see for example Sachs and Woo, 2000). They argued that the rapid growth was the result of a favourable economic structure at the commencement of reform, and that it occurs in spite of gradualist reform. This school puts great emphasis on China’s unique initial conditions—namely, a large agricultural labour force, low subsidies to the population— as a major explanation of rapid growth, and believes that China’s experience is not transferable to CEE and FSU countries (Woo 1994; Sachs and Woo 1994; Sachs and Woo, 2000; World Bank, 2002).

The idea of this school is summarised in the World Bank (2001)’s Transition: The First Ten Years:

“Despite the industrialization efforts of the 1950s and 1960s, China started its reform as a very poor and largely rural economy, with far greater scope for reallocating labour and larger room to catch up with advanced economies than Russia. Agriculture employed 71% of the work force and was heavily taxed to support industry (Lin et al., 1996; World Bank, 2000). Social safety nets extended only to the state sector—about 20% of the population. In 1990, only 13% of Russian labour force worked in agricultural sector, and around 90% were employed in the state sector.”

“Because the agricultural sector had been so heavily repressed in China, freeing it up had immediate payoffs. Between 1981 and 1984 agriculture grew on average by 10% a year, largely due to the shift to household responsibility. The increases in productivity in agricultural sector freed surplus labour, which allowed for the reallocation of surplus agricultural labour to new rural industries, which generated 100 million new jobs between 1978 and 1994.
Higher income from higher agricultural production provided a market for goods and services produced by rural industry."

However, neither the gradualist school nor the Big Bang school can fully explain China’s experience. One such example is that the gradualist school is weak in explaining the poor performance of SOEs in terms of profitability, and the Big Bang school has underestimated the effect of gradual reform in avoiding disorganisation. Additionally, as firms are the real entities in the market - responding to market signals and reform policies - whether it is because of favourable initial conditions and a good development strategy or a gradualist strategy, they all need micro-foundations as well. However neither school has actually dealt with how firms respond to market mechanisms, how firms’ activities foster the development of the market, and how market competition disciplines firms’ behaviour, a dynamic process underlying China’s economic reform.

2.4 Conclusion: Enterprise Is Central

In this chapter, we discussed firstly the concept of transition, and have shown that problems with the socialist system, such as low efficiency and low technology progress, shortage and monetary overhang, generally arise from the government and enterprise relationship under central planning, summed up in Kornai’s term “soft budget constraint”. Secondly, we have evaluated the progress and performance of transition, in which we have demonstrated that in the progress of transition, three groups of countries, namely China and Vietnam, CEE, and FSU, have displayed significant differences in both transition strategy and transition performance. Finally, explanations for such differences have been surveyed. We conclude from the above discussion that whether it be the example of China or that of European transition economies, the biggest flaw of the Big Bang approach is probably its negligence of the micro-foundations of transition, and we suggest that enterprises and their interaction with the market and the state should be central to the study of transition economies. In the next chapter, in light of the conclusions above, I will discuss in detail Chinese economic reform from the perspective of company level experiences.
Chapter 3 China’s State Owned Enterprise Reform: Decentralisation, Competition, and Enterprise Performance

As we have discussed in Chapter 2, the macroeconomic perspective does not provide a sufficient explanation for the puzzles associated with China’s significant economic growth. In order to resolve these puzzles, we have to turn to the microeconomic perspective and look into the reform of China’s State Owned Enterprises (SOEs). SOEs had been the focal point of China’s economic reform and the backbone of China’s economy. Even by 1999, they still employed 58.9% of workers in urban areas, utilized 53.4% of national investment, and produced about 30% of national industrial output. It follows that successful SOE reform is not only the key to the success of the whole of economic reform but it is also vital to the building up of a market economy and the long-term development of the Chinese economy (CCPC, 1984,1999; Rawski, 2000).

In this chapter, I depict SOE reform as a dynamic process of promoting market competition, decentralising the state and the SOE relationship, and choosing reform policies. This chapter is divided into 4 sections. In section 1, the theory relating to firms and the theoretical framework of corporate governance are reviewed. In section 2, the dynamic process of decentralisation, competition, and policy choice, which drives forward China’s SOE reform, is explained; Section 3 reviews the literature on enterprise performance and enterprise reform in the Chinese context; Section 4 concludes the chapter. A case study is also presented in the Appendix to illustrate SOE reform in a typical Chinese SOE.
3.1 Theory relating to Firms and the Theoretical Framework of Corporate Governance

3.1.1 A Review of Theory relating to Firms

3.1.1.1 Neoclassical theory of Firms

Neoclassical theory views the firm as a set of feasible production plans. An owner-manager presides over this production set, buying and selling inputs and outputs in markets and choosing the plan that maximizes owners’ welfare. Welfare is represented by profit or expected net present value of future profit when there is uncertainty. In fact, the neoclassical theory of the firm is the theory of production decision-making given the existence of the firm. The ‘invisible hand’ of the price system coordinates production and exchange.

However, neoclassical theory does not explain why the firm exists, what its boundaries are, how production is organized within a firm, how conflicts of interest between a firm’s various constituencies – its owners, managers, workers, and consumers – are resolved, and how the goal of profit-maximization is achieved. It is from these aspects that economists have challenged the neoclassical theory of the firm. All these challenges can be categorized into three groups: (1) the contractual approach to the firm; (2) the entrepreneurial approach to the firm; (3) the managerial approach to the firm. These approaches transform the study of a firm’s performance into a study of the internal structure of the firm resulting from different institutional arrangements.

3.1.1.2 The Contractual Approach to The Firm

to the contractual approach to the theory of the firm. The principal idea of this approach is that the firm is a “nexus of contracts” (Jensen and Meckling, 1976). However, the contract cannot be complete due to the existence of transaction costs (Grossman and Hart, 1986; Hart and Moore, 1990). Therefore, property rights are important, as the distribution of property rights will affect economic efficiency in the presence of transaction costs (Coase, 1960). Grossman and Hart (1986) and Hart and Moore (1990) distinguish between residual claim rights and residual control rights. They defined ownership as the purchase of these residual rights, and proved that under an incomplete contract, an efficient ownership allocation should require that the party whose behaviour is more difficult to observe and more important for the investment decision should purchase the residual rights. Alchian and Demsetz (1972) also introduce transaction costs to the study of firms’ internal structure. According to them, firms are primarily teams, and the inseparability of “team production” raises the problem of ‘shirking’ in a firm. In order to reduce shirking, some members of the team can specialize as monitors to check the input performance of team members, yet in order to make monitoring efficient, monitors must be made residual claimants. Similar to Alchian and Demsetz (1972), Jensen and Meckling (1976) considered the ‘agency cost’ as the decisive factor in a firm’s ownership of property rights. Agency cost originates from the fact that managers are not the owners of the firm.

3.1.1.3 The Entrepreneurial Approach to the Firm

Although the contractual approach to the firm is more familiar to modern economists, it is the entrepreneurial approach that challenges the neoclassical theory of firm the most. For neoclassical economists, the firm is a production function; in contract theory, the firm is a nexus of contracts, but in the entrepreneurial approach, the firm is regarded as a personalized mechanism. Knight (1921) looked at the firm’s existence from the perspectives of uncertainty and entrepreneurship. He pointed out that, under uncertainty, the primary
problem or function of a production activity is to decide what to do and how to do it. This primary function is entrepreneurship. For Knight (1921), the firm is a risk-sharing device through which the entrepreneur is rewarded for taking on all the risks while the workers are paid a fixed wage.

Kirzner, Schumpeter, Shackle and Casson, etc., have also made major contributions to the theory of entrepreneurship. Kirzner (1979) consider the entrepreneur as a 'middle-man', who not only perceives opportunities but also captures opportunities and makes profit. Their perception of opportunities and their special knowledge distinguish them from others. Schumpeter (1943) regards entrepreneurs as innovators, who can reform and innovate methods of production. Shackle's (1979) entrepreneur possesses remarkable imagination while making decisions. Casson (1982) extends and generalizes these views of the entrepreneur. He defines the entrepreneur as a person who is good at making rational decisions regarding the coordination and utilization of scarce resources, and who is a creator of markets.

3.1.1.4 **The Managerial Approach to the Firm**

The managerial approach to the firm can be traced back to the hypothesis of "the separation of ownership and control" proposed by Berle and Means (1932). The hypothesis asserts that as the ownership of shareholding companies is widely distributed, the control of companies is in fact in the hands of managers, whose interests are normally different from those of owners (Baumol, 1959; Marris, 1964; Williamson, 1964). Baumol (1959), Marris (1964) and Williamson (1964) represent the three best-known theories modelling the managerial approach to the firm. They all keep the basic hypothesis of Berle and Means that managers' objectives are different from those of shareholders. However, Baumol argues that the objective of managers is to maximize revenue subject to a minimal profit target. Marris (1964) argues that the objective of managers is to maximize firms' growth subject to the minimal share value. Williamson (1964) suggests that
managers maximize utility subject to minimal profit. Typically, managers have information advantage over owners, which makes difficult the monitoring of managers' behaviour and it makes possible the encroachment upon owners' interest by managers under the separation of ownership and control (Vickers and Yarrow, 1988; Jensen and Meckling, 1976).

3.1.2 The Theoretical Framework of Corporate Governance

Corporate Governance provides a unifying concept associated with the problem of principal and agency problems which arise due to the separation of ownership and control (Hart, 1995; Mayer, 1996; Shleifer and Vishny, 1997). It mainly concerns methods of aligning the interests of different participants and ensuring that firms are operated to increase the wealth of investors (Mayer, 1996). It can therefore be regarded as a dynamic interaction mechanism among shareholders, management, the board of directors, and other stakeholders such as government, regulators etc., in order to determine corporations' direction, performance, and allocation of returns (Monks and Minow, 1995). Although corporate governance is most frequently associated with large public companies, corporate governance is an issue even in small firms (Hart, 1995). In order to make managers' behaviour compatible with that of shareholders, there must exist checks and balances on managerial behaviour. A major part of corporate governance focuses on the design of such checks and balances (Hart, 1995).

The issue of corporate governance has been an important one in advanced Western economies; it is certainly even more important in transition economies where the initial situation was one of state control and where adopting adequate corporate governance is likely to have an impact on the overall economic performance of these countries. Indeed, paying no attention to corporate governance in transition packages and a lack of proper corporate governance
after mass privatisation loom large as reasons for the poor performance of the corporate sector in Eastern European and Former Soviet Union countries (Stiglitz, 1999; Roland, 2000; Boycko et al., 1995).

Hart (1995) argues that the most common approaches to corporate governance mechanisms are the following: firstly, the board of directors. Shareholders elect the board to act on their behalf, and the board in turn monitors top management and ratifies major decisions. Secondly, proxy fights. A dissident shareholder can put up candidates against incumbent managers, and tries to persuade other shareholders to vote for his/her candidates. Thirdly, major shareholders. Major shareholders have the incentive to collect information and monitor management, and to reduce the agency cost and the problem of free riders. Yet, major shareholders can take advantage of their power to improve their own interests at the expense of minor shareholders; therefore good corporate governance also involves the legal protection of minority shareholders against majority shareholders. Fourthly, hostile takeover. In a hostile takeover, a bidder who identifies an under-performing company makes an offer of tender to the dispersed shareholders of the target firm, and takes control of the target firm if the shareholders accept the offer. Fifthly, corporate financial structure, especially the choice of debt. As management have to commit to repay the debt, they will not be distracted from investors' interest too much. Yet, the discipline of debt must be backed up by an appropriate bankruptcy procedure.

All of the above mechanisms are useful internal checks and balances; however, their efficiency and effectiveness rely on the existence of appropriate legal protection for investors and upon competitive markets. The legal protection of

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1 Boycko et al. (1995) showed that in Russia, the weakness of corporate governance mechanisms leads to the substantial diversion of assets by managers of many privatised firms, and the virtual non-existence of external capital supply to firms.
investors is the prerequisite for investors to exercise their voting rights, and competitive and transparent markets make it possible for shareholders to exercise their voting rights (Shleifer and Vishny, 1997).

While legal protection of investors gives investors rights to vote on important corporate issues such as mergers and liquidations, and helps guard against exploitation by managers, competitive product markets and factor markets complement firms’ internal governance structure by providing simple and effective information for investors in order to monitor managerial behaviour. A competitive product market, together with the threat of entry, provides sufficient benchmark information – profitability - for owners to monitor managers’ behaviour (Hart, 1983). In a competitive managerial market, the concern for a future career induces efficient managerial behaviours (Fama, 1980; Holmstrom, 1999). The existence of the threat of ‘takeover’ in the capital market also acts as an incentive mechanism that deters management from the pursuit of policies that are substantially at variance with the interests of shareholders (Vickers and Yarrow, 1988; Fama and Jensen, 1983; Grossman and Hart, 1980). Financial markets link managers’ rewards to the firm’s performance and provide managers with an incentive to boost productivity (McMillan, 1997).

In practice, there are two typical models of corporate governance: the bank-dominated German-Japan model and the shareholders’-oriented Anglo-American model. While the Anglo-American model relies on liquid and transparent capital markets, with ease of exit and lively takeover activities, the German-Japanese model relies heavily on major shareholders through bank ownership and corporation cross shareholding, with minimal takeover activities.

3.1.3 Inconclusive Debates: State Ownership, Privatisation and Competition
While state ownership was regarded as the foundation stone of a socialist economy, state ownership in western economies is viewed as an instrument for government to overcome market failure by implementing price controls that takes into account the social marginal cost (Atkinson and Stiglitz, 1980; Shapiro and Willig, 1990). Half a century ago, government ownership of firms was favored by economists “when any market inequities or imperfections were even suspected” (Shleifer, 1998); state ownership in the last 20 years, however, has been considered less efficient than its private counterparts (Vickers and Yarrow, 1988).

The advantages of private ownership over state ownership are believed to stem from a variety of reasons. Firstly, state owned firms have objectives other than maximising profit. For example, government may seek to maintain employment, to keep prices low, and to maximize social welfare rather than profits (Shleifer and Vishny, 1994; Yarrow and Vickers, 1988). Moreover, government objectives may be inconsistent from one administration to the next. The inability of government to commit to a credible policy can reduce firms’ efficiency (Vickers and Yarrow, 1988; Kornai, 1980). Secondly, managers do not have sufficient incentives, as it is difficult to assess the enterprise’s performance and to tie managers’ incentive to the returns from their decisions due to multiple objectives. Thirdly, there are no markets for corporate control and no hard financial constraints such as bankruptcy, liquidation, and the threat of takeover, etc., (Vickers and Yarrow, 1988; Laffont and Tirole, 1993). Finally, government can intervene in state owned firms’ operation (Yarrow and Vickers, 1988; Shleifer and Vishny, 1994).

Privatisation, being broadly defined as the deliberate sale of state ownership by a government to private economic agents, has consequently become a legitimate tool in more than 100 countries since its introduction in Britain in the 1980s (Megginson and Netter, 2001). It is believed that privatisation will alter and strengthen incentive mechanisms by changing ownership from state to private,
and introducing the profit maximization objective into privatised enterprises. It will also sever the relation between government and firms, reducing government’s involvement in firm activities, introducing hard financial budget constraints, and making enterprises themselves bear the commercial risks (Vickers and Yarrow, 1988; Megginson and Netter, 2001; Shleifer, 1998). Thus, privatisation will eventually improve enterprise performance (Vickers and Yarrow, 1988, 1991).

However there is no conclusive empirical evidence demonstrating that privatisation will necessarily lead to better enterprise performance in advanced economies. While most literature suggests that private ownership is more effective than public ownership in competitive markets (Boardman and Vining, 1989; Kikeri, Nellis, and Shirley, 1992; La Porta and Lopez-de-Silanes, 1999; for a general review see Megginson et al. (2001) and Shleifer (1998)), other studies get mixed or ambiguous results (Martin and Parker, 1997; Bishop and Kay, 1989; Newbery and Pollitt, 1997; Kole and Mulherin, 1997), which have cast doubt upon the efficiency of private ownership especially in monopoly markets (Vickers and Yarrow, 1988). In fact, Laffont and Tirole (1993), in their book, remarked that “the empirical literature on the relative efficiency of the two ownership structures is itself currently inconclusive”. Furthermore, competition and deregulation are argued to be more important than privatization and governance changes in improving firms’ performance (Yarrow, 1986; Kay and Thompson, 1986; Bishop and Kay, 1989; Vickers and Yarrow, 1991).

As in Western market economies, the relative efficacy of privatisation and competition has also been widely debated in transition economies. However, the empirical evidence suggesting that privatised firms perform better than state owned enterprises is even more ambiguous. For example, Pohl et al., (1997), based on data from more than 6,000 industrial firms in seven CEE countries, show that productivity growth in privatised firms was three to five times higher than that in state firms between 1992 and 1995 for which they have data. Yet, the
endogeneity of privatisation methods undermines the result, with arguably the best firms singled out first for privatisation. Frydman et al. (1999), based on a panel of over 200 privatised and state firms in the Czech Republic, Hungary and Poland, found that not all privatised firms perform better than state firms, “the post-privatisation performance of companies controlled by certain types of owners is not significantly different from state firms” along any performance measurement they employed. Carlin et al., (2001), based on a survey of 3,300 firms in 25 transition countries, recently found that there is no significant relationship between a firm’s ownership type and its performance among firms established during the socialist era in terms of growth in sales, although state owned firms have engaged in significantly less development of new products. Bevan et al., (2001) has found in the context of Russia that ownership and performance are not well correlated. In particular, there is no strong evidence that outsider ownership leads to better performance or higher levels of restructuring activity than insider ownership, which they indicate is due to market imperfections and governance deficiencies. A more extreme case was in Mongolia, where Anderson et al., (2000) find that wholly private firms are 30% to 70% less efficient than completely state owned firms.

While the effect of ownership upon firm performance is inconclusive, the positive impact of product market competition on enterprise performance improvement has been largely established. For example, Djankov and Murrell (2002), using Meta-Analysis, pool 17 studies reporting the positive impact of competition on performance. Whereas for the non-CIS, both domestic and foreign competition is effective, for the CIS countries, only domestic competition is significant. Carlin et al., (2001), Angelucci et al., (2001) and Grosfeld and Tressel (2002) find that the effects of competitive pressure vary depending on the ownership type of the firm and the presence of soft budget constraints. Hong and McMillan (1996) and Pinto et al., (1993) provide evidence that even without privatisation, state owned
enterprises begin to restructure due to increased competition and improved financial incentives.

3.2 The Dynamic Process of SOE Reform: Decentralization, Competition and Policy Choice

3.2.1 SOEs: Logic and Problems

China’s SOEs may be regarded as the endogenous product of the heavy industry development strategy (Lin et al., 1996). In order to build capital-intensive industry in a country of low economic development and high capital scarcity, a central planning system was required to maintain the artificially repressed price of inputs and to guarantee the resources flow to favoured industries. This required that the private enterprises were nationalised to a great extent, so that state owned enterprises became the dominant forces in China’s economy (Lin et al., 1996). Before 1978, around 80% of the SOE investments in capital construction were financed by the state budget. By 1978, SOEs accounted for around 80% of gross industrial output. Although the development of such a system might be inefficient at that time (Lin et al., 1996), it did provide the foundation for the rapid economic growth since reform (Nolan and Wang, 1999).

By definition, SOEs were owned by the Chinese people, but their management was delegated to governments and managers at various levels. Therefore, there

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2 Other than specified, data on China are all from China Statistical Yearbooks (various years)
3 Lin et al. (1996) argued that the heavy industry development strategy was not compatible with the resource advantage at that time, abundant labour force and scarce capital. For example in 1957, the profit capital ratio in light industry was 1.7 times higher than that in heavy industry. In 1980, this figure in light industry is 2.1 times higher than that in heavy industry.
4 They claim, “large scale upstream industry and downstream industry are the Siamese twins of China’s industry revolution” (Nolan and Wang, 1999).
existed a “separation of ownership and control”. Moreover, managerial mechanisms for the state enterprise were very hierarchical, ranging from the top-level bureaucracy down to lower level bureaucracy, managers, and finally workers. This further extended the principle agent chain and made the monitoring more difficult and the collusion of agents possible (Tirole, 1986; Zhang, 1995).

As external governance mechanisms, competitive product markets, competitive managerial markets, and competitive capital markets, were absent in China under central planning, the price signals were distorted and the cost of monitoring managers’ behaviour was high. In order to constrain the high agency problem, tight political control became the only option. Moreover, to make managers’ and workers’ interests compatible with the heavy industries development strategy, managerial autonomy was scarcely warranted (Lin et al., 1996; Zhang, 1997). SOEs worked only as subsidiaries of government, implementing production and investment plans. The state carried out direct management of SOEs by appointing managers of SOEs, fixing product prices, giving detailed administration targets and centrally allocating resources (Gao and Yang, 1999). Although superficially SOEs were defined as independent units of accountability, profits and losses in SOEs were not necessarily linked to enterprise performance. Moreover, the losses they incurred would always be covered by the state. Hence, their budgets were soft. They were administrated along both functional and regional lines (Qian and Xu, 1993; Qian et al., 1999; Gao and Yang, 1999). Each SOE was subordinated to one of the four levels of government: central, provincial, prefecture and county, and each SOE was also directly or indirectly subordinated to a central ministry department.

The effects of the SOE system in place were well known as lifetime employment (iron rice bowl) with no risk of being laid off for workers and no risk of being punished for managers, and egalitarian income (big pan meal) no matter how well or badly you worked, which consequently resulted in low efficiency in SOEs.
Two indicators of SOEs' low efficiency were high cost and large inventory. Compared with South Korea, the energy consumption per dollar of gross industrial output in China in 1980 was twice as high, and the iron and steel consumption was 21.3% higher (World Bank, 1985).

In addition, as the economy developed, central planning became more and more complex. The number of SOEs subordinated to central government increased from 2,800 in 1953 to 10,533 in 1965, and the number of commodities subjected to central planning increased from 132 in 1958 to 579 in 1965 (Qian, 1999), with many more being subordinated to the control of local government. Hence the strength and effectiveness of central administration weakened (Zhang, 1995). Consequently the intrinsic deficiencies of SOEs, such as soft budget constraints and a lack of innovation, came to the fore. One indicator of these problems is the low capital utilization rate. In the early 1980s, the share of current capital to total capital in China was 32.7%, which was 45% higher than that of Japan in 1950s, and 1.6 times higher than that of the U.K in the 1970s (Lin et al., 1996).

The growth in industry at that time was achieved mainly through the large amount of material input rather than technological progress. Between 1957 and 1978, inputs in SOEs increased by 6.7 fold, yet gross output in SOEs increased by only 3.9 fold. The growth of labour productivity was far below that of gross industrial output, and TFP growth was estimated to contribute less than 10% of industrial output growth between 1958 and 1976 (World Bank, 1985; Chen et al., 1988).

3.2.2 The Dynamic Process of SOE Reform: Decentralisation, Competition, and Policy Choice
At the beginning of the reform, tight political control and the consequent lack of managerial and worker incentives were considered responsible for low efficiency in SOEs\(^5\) (CCPC, 1978). An early target of SOE reform, therefore, was to separate the state from enterprise management, and to make SOEs become “independent and energetic productive and managerial units” (Xue, 1979). Hence, the reform of SOEs, being considered central to the entire reform, has been focusing on separating the state from SOEs’ management by delegating managerial autonomy to SOEs and allowing SOEs to share profits with the state (CCPC, 1982, 1987; Wu and Reynolds, 1988).

At the same time, non-state owned enterprises were encouraged initially to fill the market niches left by central planning and to work as a ‘beneficial complementary’ to SOEs (McMillan and Naughton, 1992; CCPC, 1982, 1987); the former have become unexpectedly the ‘leading engine of China’s economic growth (IMF, 1997). The entry of non-state firms, which was fervently promoted by the decentralised local governments, creates competition and drives market development, leading to a decline in state control and monopoly.

Figure 3.1 shows the remarkable progress made in the non-state sector. For the 20-year period, the share of gross industrial output by non-state enterprises has increased from slightly more than 20% in 1978 to more than 70% in 1999, the share by SOEs in contrast has declined from nearly 80% in 1978 to less than 30% in 1999. Notably, it is since 1993 that the non-state sector has begun to overtake SOEs.

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\(^5\) It was acknowledged in the summary report of the third plenary of 11th CCPC that over-concentration of political control was the most serious problem in China (CCPC, 1978)
The delegation of managerial autonomy and profit sharing rights to SOEs, and the emergence of market track, on the one hand provided SOEs with incentives to improve productivity. On the other hand, it may have also released the agency problem that the old central planning system had managed to restrain, providing SOEs with incentives to defect from planning and compete with the state for the share of profits (Murphy et al., 1992). This will eventually lead to the decline in the share of state revenue and the encroachment upon state interests by SOEs. Figure 3.2 shows the share of state revenue in GDP. It is clear from this figure that the share of state revenue from SOEs has been declining from around 27% in 1978 to less than 10% in 1995, while the share of state revenue from non-state sectors has been stable.
In order to sustain the power of the state, the state has to ensure the stability of financial revenue. This implies enforcing hard budget constraints upon SOEs on the one hand and encouraging the entry of non-state enterprises on the other to increase the tax base.

SOEs, facing increasing competitive pressures from both SOE counterparts and non-state owned enterprises, the relative price changes, and hard budget constraints, consequently reduced the profitability level (Naughton, 1991; McMillan and Naughton, 1992; Rawski, 1996). Figure 3.3 shows SOE profitability for the period between 1978 and 1996. Between 1978 and 1996, the before-tax profit asset ratio had declined from 25% in 1978 to 6.5% in 1996. It is worthwhile to note that the before-tax profit asset ratio has been lower than the interest rate since 1993.
The declining profitability levels constrain the capacity of SOEs to increase wages and bonuses; consequently SOEs, with improved knowledge of the operation of non-state enterprises, lobby governments for more managerial autonomy or more subsidies (Rawski, 1996). Yet as the share of government revenue coming from state sectors decreases, the share of SOEs in the economy declines, and the numbers of loss-making SOEs increase, governments have less finance and interests to subsidise SOEs, which leads governments to grant further managerial autonomy to SOEs, and eventually to the privatisation of small SOEs.

Driven by the above dynamics, we may conclude the progress of SOE reforms has been proceeding along three lines:

1). A gradual expansion SOEs' managerial autonomy, granting SOEs more contractual and residual rights.

2). The promotion of competition between SOEs and non-SOEs through encouraging the entry of non-state owned firms.

3). Fostering market competition by government.
The details of these three lines will be discussed in the following sections.

3.2.3 Encouraging the Entry of Non-SOEs

China's non state-owned enterprises consist of the Collective Owned Enterprises (COE) and private enterprises. COEs include urban COEs and township and village enterprises (TVEs) in rural areas. COEs are owned collectively by the members of a community. The private enterprises include individual enterprises, domestic private enterprises\(^6\), and enterprises with foreign investment. For a long time before 1978, non-SOEs existed officially only in the form of Collective Owned Enterprises (COEs), which were established as supplements rather than competitors to SOEs, while private enterprises existed only at the margin in the form of self-employment. The market-oriented reform in 1978 gave impetus to the revival of non-state business, and the local governments, functioning as a 'helping hand' for local economic development, became intimately involved in promoting non-state economic activities (Frye and Shleifer, 1997; Qian and Weingast, 1996; Che and Qian, 1998). Moreover, the most significant of them all are the emergence of TVEs and enterprises with foreign investment. In fact, in the first 15 years of reform between 1979 and 1993, most new entries were neither private firms nor SOEs, but COEs, especially TVEs.

3.2.3.1 The Development of Township and Village Enterprises (TVEs)

TVEs\(^7\) represent a form of decentralised ownership, which are typically owned by local communities of a few thousand people. However their property rights are

\(^6\) Individual enterprise is defined as a business employing less than 8 employees, while domestic private enterprise is defined as a business employing more than 8 employees.

\(^7\) Despite TVE being frequently referred as 'private' or 'quasi-private', throughout the 1980s and into 1990s, local governments have maintained strong ownership rights over TVEs within their
TVEs are managed by Township and Village governments and the profits are shared by villagers (Weitzman and Xu, 1994; Naughton, 1994a, b). They originated in the Commune and Brigade enterprises, and were among the first to benefit from economic reform. Commune and Brigade enterprises in rural areas existed in fact long before 1979, yet they did not begin to obtain the freedom to seek profits in industries other than those related to agriculture until after economic reform. The ‘household responsibility reform’ of 1978 emancipated peasants from the people’s commune system, providing the necessary surplus labour for the development of TVEs. They were further encouraged in 1979 by the issue of “Regulation on Some Questions Concerning the Development of Enterprises Run by People’s Commune and Production Brigades”, which allowed local governments to grant tax holidays of 2-3 years to new commune and brigade enterprises. Meanwhile, they were no longer restricted to the industries that served agriculture, and were allowed to enter into most industries unrelated to agriculture where previously only state enterprises had access. They no longer used only local resources and could sell beyond local markets (Qian, 2000; Byrd and Lin, 1990).

In January 1984, the government further promoted the commune and brigade enterprises by encouraging “peasants to invest in or buy shares of all types of enterprises and to pool their funds and jointly set up various kinds of enterprises by following the principle of voluntary participation and mutual benefits”. After this, restrictions on bank loans to TVEs were also relaxed (Byrd and Lin, 1990), and previous administrative restrictions against entry of rural enterprises were removed from almost all industries. In March 1984, the former commune and brigade enterprises were renamed as “Township and Village Enterprises”.

jurisdiction (Che and Qian, 1998; D. Li, 1996). After the abolition of the commune system, township and village governments enthusiastically supported rural industrialisation because they relied heavily on the development of rural industry to generate their revenue.
These changes have brought about a significant growth of TVEs (See Fig 3.4). By 1992, the employment in TVEs increased by 2 times compared with that in 1983. And the output increased by 16 times during the same period. The development of TVEs was so unexpectedly significant that Mr Deng Xiaoping praised TVEs during his tour to the South, saying that “[TVEs] emerged from nowhere like an ambushing army”. Much of this development occurred as urban enterprises, in order to reduce production costs, increase economic efficiency and evade environmental protection requirements, began to shift part of their production to TVEs. Since 1993, the Development of TVEs was further boosted by China’s commitment to a market economy. Between 1992 and 1999, TVEs employed some 130 million workers or about half of China’s surplus rural labour, and their output had increased by 5 times. Consequently, their share of GDP increased to 16% by 1995, which rose to 30.5% by 2001.

3.2.3.2 Joint Ventures and Foreign Direct Investment
The entry of foreign firms has also been actively encouraged by governments in order to acquire foreign technology, equipment and know-how, especially in the designated special investment zones. China utilised a number of methods to attract foreign investment, including barter trade, compensation trade, processing arrangements, joint ventures, and wholly foreign-owned enterprises. Preferential treatment in the form of tax and other incentives is available to foreign investors in the Special Economic Zones, designated coastal cities and other special investment zones, as well as to approved export-oriented and technologically advanced enterprises. Joint ventures have been the preferred form of foreign investment enterprise because of the need for local involvement. However until 1991, the amount of foreign investment was small, most of FDI came from small and medium enterprises in Hong Kong and were highly concentrated in Guangdong province. Production of foreign invested enterprises was overwhelmingly export-oriented and had little link with the domestic economy (Naughton, 1996). The take off of foreign investment, in particular Foreign Direct Investment (FDI), took place in 1992. Beginning in 1993, China emerged as the largest recipient of FDI among developing countries (UNCTAD, 2003). Between 1979 and 1999, China has attracted more than US$306 billion in foreign investments. Of this, 50% is in ordinary processing industries with concentration on labour-intensive projects, 10% is in power, oil and other basic industries, 24.4% in real estate (OECD, 2000). Foreign investment has greatly contributed to the integration of China's domestic production capacity into global markets. During the second half of the 1980s, the share of exports by enterprises with foreign participation increased from 1.88% to 12.58% in 1990. By 2000, this share further increased to 47.93%. At present, there are over 200,000 foreign invested enterprises from over 170 countries and regions. 200 of them are among the world’s 500 largest enterprises. China is only second to the US in terms of attracting foreign investment.
In China, the emergence of individual businesses was even more significant than joint ventures although they were less proclaimed. Before 1978, domestic private ownership had long been a taboo in China. Yet under the pressure to increase employment opportunities and to improve living standards, by 1978 an underground private economy was already emerging quietly in the form of individual business. Once the shift of policy started in 1978, individual businesses were encouraged by local government as a quick way to respond to the mounting pressures of unemployment in urban areas and to soak up the rural surplus labour generated by the improved labour productivity under the house responsibility system (IFC, 2000; Chai, 1997).

Individual businesses were normally set up by a single family, or jointly by some families and individuals. This was especially important in rural areas with many households specialized in non-agricultural activities and becoming “specialized households”. In urban areas, it existed in the form of self-employment. At the beginning, individual business still had experimental features, yet they developed rapidly. By 1981, the number of individual businesses increased to 1.8 million from 0.14 million in 1978. Most individual businesses were concentrated in the service sector in general and in wholesale and retail trade in particular. Indeed, only 12% of individual businesses were engaged in industry (Chai, 1997). The legal status of this sector was only confirmed in 1981 by a set of State Council regulations. These regulations defined a new business category, Geti GongShang Hu, individual industrial and commercial proprietor, and limited the number of employees this type of business could hire to eight people. In 1983, the state council introduced a series of central and local regulations for the licensing and control of individual business. These further encouraged the development of individual business (See Fig 3.5). By 1985, the number of individual businesses has already increased to 11.71 million, employing 17.66
million workers. Since China's commitment to market economy in 1992, individual businesses have been developing even more rapidly. By the end of 1999, the number of individual businesses increased from 15.33 million in 1993 to 31.6 million in 1999, and the number of workers employed increased from 24.57 million in 1993 to 38.26 million in 1999. During the same period, the contribution to gross industrial output of individual businesses in industrial sectors increased from 5.8% in 1992 to 18.2% in 1999.

![Graph showing development of individual businesses, 1978-1999](image)

### 3.2.3.4 Domestic Private Enterprises

Domestic private enterprise began to develop as early as 1981. They developed either from *getihu* (individual proprietorship) taking more employees or through the leasing of state or collective enterprises to individuals. However, they were not officially registered as a category at that time. Most private enterprises were disguised as COEs in order to avoid social prejudice and government restrictions, as well as to gain access to the benefits of the 'collective title' in the form of tax reductions and tax exemptions. In return they had to submit an
administration fee to the local government (Gregory and Tenev, 2001a). It was not until 1987 that private enterprises were formally recognized as a legitimate part of China’s economy by the 13th CCPC congress. In 1988, the state council issued the Tentative Stipulations on Private Enterprises to govern the registration and management of private enterprises, which defined private enterprises as “a for-profit organisation that is owned by individuals and employs more than eight people” and identified three types of private enterprises: those under sole ownership, partnership, and limited liability companies. In spite of formal recognition, the growth of private enterprises in the late 1980s was slow because of social prejudice against private enterprises and numerous restrictions. The latter included complicated registration procedures, their banning from foreign trade and joint ventures with foreign firms, the imposition of various administrative fees on them, and the denial of credit to them by state banks (Gregory and Tenev, 2001b).

Attitudes towards private ownership have changed since Deng Xiaping called for further market-oriented reforms in 1992, providing private entrepreneurs with a more hospitable social and psychological environment. By the end of 1992, China had 140,000 private firms. The Fourteenth Party Congress, calling for the creation of a level playing field and addressing the enterprise reform in terms of property rights and ownership, opened the door for the privatisation of SOEs and COEs. Between 1992 and 1995, private firms developed rapidly, increasing in number from 139,600 in 1992 to 654,500, with employment increasing by 312%, and output by 750% over the same period (IFC, 2000). The greatest change in official attitude toward private ownership came at the 15th CCPC congress held in 1997, when private enterprise was recognized as an important component of the economy. In 1999, private ownership was further incorporated into the Chinese constitution, and was placed on an equal footing with state ownership.
3.2.3.5 *The Contribution of Non-State sectors to Economic Growth*

As a result of these moves, there was a rapid development of the non-state sectors. Between 1978 and 1994, new COEs accounted for about 65% of new entries into the industrial sector above town level, of which township enterprises accounted for a third. Actually, between 1984 and 1997, COEs had led the growth of gross industrial output and contributed 35% of gross industrial output growth (See Fig 3.6); private ownership played only a minor role, contributing less than 15% of the gross industrial output growth.

![Figure 3.6 Decomposition of Gross Industrial Output Growth (%)](source: Own Calculation)

Since 1997, private enterprises (including foreign owned firms, joint ventures and shareholding companies) began to lead the growth, contributing more than 40% of gross industrial output growth. Consequently, the share of the state sector has been declining. By 1993, the non-state sector had overtaken the state sector, contributing more than 50% of national gross industrial output. And by 1996, the non-state sectors contributed more than two third of national gross industrial output, of which private ownership contributing a third.
3.2.4 Decentralising the State and SOE Relationship

As for SOEs themselves, reform has been achieved through decentralising the relationship between SOEs and the State. There are two aspects of this decentralisation, one aspect is that the State grants managerial autonomy and profit-sharing rights to SOEs, as a result the residual claimants and control rights of SOEs have been in effect shared by managers, workers and government departments in charge of the SOEs. The other aspect is that the State makes an effort to secure its interest as an owner, as the relaxation of political control releases the agency problem that tight political control prior to reform tried to reduce. This decentralisation of the relationship between SOEs and the State has been achieved in four phases, each with their own characteristics. These four phases are listed in table 3.1:

Table 3.1: Stages of SOE Reform

<table>
<thead>
<tr>
<th>Period</th>
<th>Characteristics</th>
<th>Enacting Conferences and Directives</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Phase</td>
<td>1979-1987 Expanding managerial autonomy and profit</td>
<td>The 3rd plenary of CCP’s 11th Congress in 1978</td>
</tr>
<tr>
<td></td>
<td>sharing</td>
<td></td>
</tr>
<tr>
<td>Third Phase</td>
<td>1993-1997 Corporatization and Modern Enterprise System Reform</td>
<td>The 3rd plenary of CCP’s 14th congress in 1993</td>
</tr>
<tr>
<td>Fourth Phase</td>
<td>1997- Gripping the big ones and letting free the small ones</td>
<td>The 15th Party Congress of September 1997</td>
</tr>
</tbody>
</table>
3.2.4.1 Profit-Sharing: Profit Retention, Profit Contract, and Tax for Profit (1978-1987)

During this phase, as the lack of managerial autonomy and deficiency in motivation were considered the main problems of SOEs, SOE reform naturally started from expanding managerial autonomy and providing financial incentives by allowing profit-sharing according to the logic of 'crossing the river by gripping for stones'.

The experiment of expanding managerial autonomy and profit retention rights to SOEs was first conducted in Shichuan province in 1978 before being rolled out to the whole country. SOEs were allowed to produce more than the planned quota and to sell products to the market after fulfilling plan quotas. They were also granted the authority to promote middle level managers without government approval (Qian, 1999). In the meantime, SOEs could retain part of the profits, allowing managers to strengthen workers' incentives by paying more in bonuses.

The initial profit retention scheme allowed SOEs to retain profits at a fixed percentage determined through bargaining between SOEs and the government in such a way that the SOE could just meet its decentralised investment. By 1980, over 6,000 SOEs, accounting for about 60% of industrial gross output, joined the experiment and obtained some limited managerial autonomy (Chai, 1997). These enterprises were required to put retained profits into three separate funds: welfare of employees, bonuses, and development. SOEs had control over the use of these funds.

From 1981, inspired by the success of contract responsibility in agriculture, the contract responsibility system was introduced into SOEs. Under profit contract
system, enterprises negotiate with their supervisory bodies for annual profit remittance quotas, retaining 40% to 100% of the above quotas’ profits. This scheme aimed to provide financial incentives to SOEs, while at the same time attempting to ensure the steady growth of the State’s financial income. By early 1982, 80% of all SOEs at county level and above had adopted the system (Chai, 1997; Lin et al., 1996).

Yet, the incentive effect of the increased share of profits seems to have been quite weak, the anticipated efficiency improvement did not materialize, and most efficiency indicators lagged behind their industry target in 1981 (Chai, 1997). SOEs’ labour productivity in 1981 actually decreased by 1.8%, and increased only by 2.3% in 1982. At the same time, the share of loss-making SOEs increased to 20.4% by 1982, and losses jumped to 4.8 billion Yuan RMB in 1982.

The profit contract system had also arguably aggravated the structural imbalance (Chai, 1997; Qian, 1999; Zhou, 1984; Byrd, 1983). As it was only since 1984 that the ‘dual track’ price for industrial goods was officially permitted, profit therefore reflected planned prices rather than performance, hence encouraging SOEs with more financial freedom to pursue profits aggravated the existing structural problems, such as the shortage of raw material, energy and transports.

In 1983, in order to reduce the uncertainties associated with bargaining between SOE and the State and to ensure the steady inflow of state finance, the tax for profit system (Li Gai Shui) was fully endorsed by the State Council. Under this system, SOEs had to pay a universal 55% of profit to the State in the name of income tax for the use of natural resources and state-owned capital, and they

8 For example, in 1980, the ex-factory prices of metallurgical products, coal, timber, and building material increased by 6.1%, 6.4%, 4.5% and 2.4% respectively, and the overall inflation rate shot up to 6.1% in 1980, the first serious inflation since 1978.
retained a contracted percentage of after-tax profit. By July 1983 this system was applied to 98% of SOEs.

This system did, however, apparently change the trend in declining state financial income, which increased by 13% and 17% in 1983 and 1984 respectively. Yet, this scheme encountered resistance from both local governments and SOEs, as it raised the enterprise burden of profits remission in the new name of income tax, and reduced local government share of State financial income (Lee, 1991). Moreover, after the rapid growth of State financial income in 1983 and 1984, financial income had been declining for 4 successive years beginning in 1985.

3.2.4.2 Management Contract Responsibility (1987-1995)

Since 1986, some local governments began to implement the management contract responsibility system on a one to one basis to reverse declining financial income and to fulfil financial targets. The management contract responsibility system fixed a profit submission base scheduled to grow at an agreed rate, and allowed SOEs to retain the excess. At the same time, the shareholding system was also proposed as a competing policy option. While the contract responsibility system seeks to restructure SOEs without addressing the issues of property rights, the shareholding system focuses on restructuring SOEs by clarifying property rights and allowing diverse ownership. Yet, the implementation of the shareholding system encountered various doubts and resistance due to ideological constraints (Lin et al., 1999; Gao and Yang, 1999), and was only tried in a few SOEs. The management contract system, by contrast, was endorsed by the state council and adopted by 90% of SOEs by the end of 1987, and was the primary enterprise reform approach for the late 1980s and early 1990s. Under this system, SOEs and the State’s rights and responsibilities were legalised through contracts, which normally lasted for at least three years, covering not only profits but also production and investment targets, etc. SOEs were
supposed to operate independently, to be responsible for their own losses and to submit the contracted profit. They could retain the profits beyond the contracted profit, but must make up the shortfall from their own fund. The Management Contract Responsibility system tried to emphasize SOEs' responsibility to the State while giving them more managerial autonomy and profit sharing rights.

Under this system, managers were no longer supposed to be under the party committee's leadership, and the practice of egalitarian bonuses was replaced by the internal contract system. By the end of 1987, about 80% of large and medium sized SOEs adopted the contract responsibility system. In 1988, the enterprise management contract responsibility system was put into company law. By 1989, nearly all SOEs had adopted it, which continued until 1995. In 1992, the contract responsibility system was further enhanced by “The Regulations on Transforming the Management Mechanism of State Owned Industrial Enterprises” issued by the state council. Under this regulation, SOEs’ managerial autonomy was further expanded in 14 areas: (i) production and management, (ii) pricing, (iii) sale, (iv) procurement; (v) foreign trade (vi) investment; (vii) use of retained funds; (viii) disposal of assets; (ix) merger and acquisition; (x) labour; (xi) personnel management; (xii) wages and bonuses; (xiii) internal organisations; and (xiv) refusal to pay unauthorized charges by the government.

Results (see Table 3.2) from three surveys on SOEs' managerial autonomy conducted in 1993, 1994 and 1999 show that over the years SOEs had expanded their autonomy in all aspects, and government intervention had receded from all aspects, although by no means evenly. For example in 1999, while 96% of managers had production autonomy, only 44.6% of managers had autonomy in refusing extra levy and fees.
Table 3.2: Realization of Enterprise Autonomy (%)\(^9\)

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Production Autonomy</td>
<td>88.7</td>
<td>94.0</td>
<td>97.3</td>
<td>96.1</td>
</tr>
<tr>
<td>Pricing Autonomy</td>
<td>75.9</td>
<td>73.6</td>
<td>85.4</td>
<td>86.8</td>
</tr>
<tr>
<td>Sale</td>
<td>88.5</td>
<td>90.5</td>
<td>95.9</td>
<td>92.5</td>
</tr>
<tr>
<td>Pursuing</td>
<td>90.9</td>
<td>95.0</td>
<td>97.8</td>
<td>97.7</td>
</tr>
<tr>
<td>Exports and Imports</td>
<td>15.3</td>
<td>25.8</td>
<td>41.3</td>
<td>66.9</td>
</tr>
<tr>
<td>Investment</td>
<td>38.9</td>
<td>61.2</td>
<td>72.8</td>
<td>87.1</td>
</tr>
<tr>
<td>Use of retained profit</td>
<td>63.7</td>
<td>73.8</td>
<td>88.3</td>
<td>96.2</td>
</tr>
<tr>
<td>Dispose of asset</td>
<td>29.4</td>
<td>46.6</td>
<td>68.2</td>
<td>73.4</td>
</tr>
<tr>
<td>Merger and acquisition</td>
<td>23.3</td>
<td>39.7</td>
<td>59.7</td>
<td>62.3</td>
</tr>
<tr>
<td>Employment decision</td>
<td>43.5</td>
<td>61.0</td>
<td>74.8</td>
<td>88.0</td>
</tr>
<tr>
<td>Personnel decision</td>
<td>53.7</td>
<td>73.3</td>
<td>74.8</td>
<td>81.5</td>
</tr>
<tr>
<td>Distribution of wage and bonus</td>
<td>70.2</td>
<td>86.0</td>
<td>93.1</td>
<td>95.5</td>
</tr>
<tr>
<td>Internal organisation design</td>
<td>79.3</td>
<td>90.5</td>
<td>94.4</td>
<td>97.4</td>
</tr>
<tr>
<td>Refusal of extra levy and fees</td>
<td>7.0</td>
<td>10.3</td>
<td>17.4</td>
<td>44.6</td>
</tr>
<tr>
<td>Number of Samples</td>
<td>2620</td>
<td>2756</td>
<td>3300</td>
<td></td>
</tr>
</tbody>
</table>

Sources: Survey Results of managers by China Entrepreneur Survey System.

After the implementation of the management contract system, both gross industrial output and labour productivity continued to grow. Between 1987 and 1995, the average growth rate of gross industrial output was 7.6%, and the annual growth rate for labour productivity during the same period was 6.2%. However, SOEs' financial performance continued to deteriorate, SOEs' losses increased rapidly from 6.1 billion Yuan RMB in 1987 to 34.9 billion Yuan RMB in 1990, then reached up to 64 billion Yuan RMB in 1995, and the share of loss-making SOEs increased from 13% in 1987 to 35.5% in 1995. In fact, it was estimated that only around 1/3 of SOEs made profits. As a result, State direct subsidy to loss-making SOEs rose from 18.2 billion (1.2 % of GDP) in 1988 to

\(^9\) Percentage of top managers answered yes to each question

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84.4 billion Yuan (2.4% of GDP) in 1993. The poor SOE financial performance forced the authorities to relax its stance on monetary and fiscal policy to reinvigorate the economy in the course of its effort to control high inflation during 1988-1991.

Three problems have been identified associated with the management contract responsibility system. The first is that the one to one periodical State and SOE bargaining relationship cannot ensure a rational enterprise and government relationship in the long term. The second problem is that SOEs were still owned by the State, which had indefinite responsibility for SOEs' failure, hence SOEs in fact share only the profit and the State takes the losses. The de facto sharing profit rather than losses led to widespread short-term SOE behaviours (Gao and Yang, 1999; Lin et al., 1999). The third problem is the existence of 'insider control' problems, in which the 'insiders', both enterprise managers and enterprise workers, abuse State assets for their own interests. Ambiguous property rights were considered the main cause of all these problems.

3.2.4.3 Establishing the Modern Enterprise System – Corporatisation (1993-1997)

During this period, enterprise reform was addressed in terms of clarifying property rights and ownership, rather than expanding enterprise autonomy as before. Transforming SOEs into “modern enterprises” with “clarified property rights, clearly defined responsibility and authority, and scientific internal management”, and separating enterprises from the government, were endorsed as the objectives of enterprise reform in the 3rd plenary of 14th CCPC in 1993. SOEs were proposed to be transformed into “corporate entities and market competitors operating independently and responsible for their own profits and losses, and having the ability to keep self-restraint and to seek self-
development”. It also proposed that central industrial departments be transformed into state-owned holding companies, large and medium SOEs were to be converted into single investor companies, limited liability companies or shareholding companies, and small SOEs were to be restructured through contracting out, leasing, and converting to shareholding cooperatives, or they could be sold out (CCPC, 1993).

The expectation underlying the initiation of the modern enterprise system was that managers and workers in SOEs would avoid short-term behaviours and the encroachment of state assets once ownership was clearly defined and owners’ interests were represented by the board of directors. Moreover, as government functions were separated from enterprise management, enterprises would become real legal entities with civil rights and obligations for profits and losses by establishing corporate property rights.

Under this proposal, between 1993 and 1994 all SOEs were first transformed into legal entities, and SOEs’ property rights were clarified. Further managerial autonomy was given to 10,000 large and medium SOEs in 1994. Supervisors were sent by the central government to 1,000 key enterprises to monitor the operating of state assets. In 1995, 100 SOEs pioneered the corporatization experiment under China’s Corporation Law, which became effective in 1994. The corporatized SOEs were required to set up a director board and supervisory board, and government administrative functions were required to be separated from SOEs’ commercial functions. However, this reform had only been implemented on an experimental basis until 1997 owing to the debate regarding whether the modern enterprises system could be applied within the framework of socialism.

The implementation of the modern enterprise system did not change significantly the internal structure of SOEs. Members of the boards of directors and the
supervisory boards were normally dominated by both government officials and SOE managers, and the State shareholders were generally over-represented on both the boards of directors and the supervisory boards (Xu and Wang, 1997, 1999). In addition to these internal organizational problems, SOEs did not have the requisite external conditions for establishing an effective corporate governance structure, such as a developed stock market and a proper legal framework. Consequently, the modern enterprise system experiment did not contribute noticeably to improving SOEs' financial performance. In 1996, for the first time, industrial SOEs with independent accounts made net losses of 38 billion Yuan, and more than 40% of large and medium SOEs made losses. As the losses of SOEs accumulated, the State's ability to sustain the survival of the loss-making SOEs was further impaired.

3.2.4.4 Grip the Big one and Let Go the Small One

Since early 1990s, performance of small and medium SOEs has been worse than that of large SOEs (see Fig 3.7). The profit of small and medium SOEs has been declining, while the profit of large SOEs has been relatively stable.

![Figure 3.7 Profit of Large, Medium and Small SOEs (100 Million Yuan)](image)
After 1994, small SOEs began to make net losses, and so did the medium SOEs after 1995. In 1996, the losses in both small and medium SOEs increased significantly. Furthermore, small and medium SOEs have been playing a less and less important role in the state sector; their share of gross industrial output had been declining from 43.3% in 1993 to 33.8% in 1997.

At the same time, SOEs’ external environment was gradually tightened. The banking reform started in 1993, state banks became more and more commercialised, and the profitability and repayment capability played an increasing role in bank lending decisions. Consequently, the chance of SOEs getting soft loans from state banks was reduced. In 1994, the government carried out tight monetary policy, the growth of investment was reduced from 24.8% in 1993 to 12.7% in 1994, and most of the reduction was in the State sector. State subsidies to SOEs were also significantly reduced from 7.5% of GDP in 1992 to 3.9% of GDP in 1994. Yet, SOEs were still a heavy drain on state finance. The state’s subsidies to loss-making SOEs still amounted to more than 10% of state revenue between 1989 and 1994 (except 1992), and SOEs were still subsidized indirectly and tacitly through soft bank loans.

As most of the small and medium SOEs were subordinated to local governments, local governments especially felt the pressure of increased numbers of loss-making SOEs. The tax reform in 1994 put further strains on local governments, their financial income in 1994 was down by 40% as the result. Furthermore, SOEs’ financial performance was so poor that it was not worthwhile to invest in SOEs, as SOEs’ before-profit asset ratio had been lower than the gross interest rate since 1993.

As the Chinese government acknowledged that support of all SOEs were a heavy drain on the economy and could not be maintained indefinitely, and that SOEs were so widespread that it was very difficult for the State to monitor all
SOEs, the new reform initiative - ‘Grip the Large and Let Go the Small’ - was proposed with simultaneous experiments in several cities and provinces, and was later formalized in the Fifth Plenary of 14th CCPC in September 1995, and was put into the ninth five-year plan in 1996. The 15th CCPC in 1997, in which State ownership was downgraded to a “pillar of the economy”, private ownership was promoted to an “important component of the economy”, and the meaning of public ownership was redefined to include not only State and collectively-owned sectors but also State and collectively-owned elements in the sector of mixed ownership, has further paved the way for restructuring large firms and privatising medium and small firms.

**Reforms in Small and Medium Enterprises: ‘Letting Go the Small one’**

It is not known when exactly the experiment of “letting go the small one” had started, yet by 1994 it had spread through China. Shunde in Guang Dong province, and Zhucheng in Shandong province, are two of the pioneer cities. This experiment consisted of contracting out, leasing, bankruptcy, merger and acquisition, as well as selling SOEs or transforming SOEs into employee-held companies or shareholding cooperatives (SETC, 1996). As usual this process has a characteristic Chinese name, GaiZhi, meaning changing mechanisms, yet by international standards, GaiZhi really is privatisation. The best-known example is Zhucheng city in Shandong province, which started privatising SOEs in 1992 when two-thirds of its SOEs were losing money or just breaking even; since then 210 State-owned and collective enterprises (out of a total of 288) have been privatised (Dong, 1999).

In 1996, the State Economic and Trade Commission put forward the “Advice on Letting Free and Enlivening Small SOEs”, which approved the local experiments. At the 15th CCPC in 1997, transforming small SOEs into shareholding cooperatives was officially endorsed as a primary method of “letting go the small”
SOEs. Under this scheme, management and workers are sold shares equivalent to the net assets, each worker has about the same number of shares, decisions are based on one worker one vote rather than one share one vote, and profits are shared between management and workers. By making employees shareholders, this approach secures their support for enterprise restructuring and gives them a personal stake in improving enterprise performance. According to recent surveys, shareholding cooperatives are by far the most popular method of restructuring small SOEs.

Direct sale to private domestic or foreign investors or firms, corporatization into a limited liability or joint stock company, merger, leasing and bankruptcy are other favorite approaches (Realistic Choice, 1997). Local governments have designed policies to assist private purchasers, purchasers are allowed to use various methods to purchase related companies, and employees are encouraged to purchase firm shares at a discount rate. In some cases, “zero price transfer” is used as buyers take over control of the firm and all its debt for nothing. By the end of 1996, up to 70% of small SOEs had been privatised in pioneering provinces and about half had been privatised in many other provinces (Qian, 2000).

Reforms in Large SOEs: Grip the Big Ones

While 'letting go the small one' was mainly initiated from local governments, 'gripping the big ones' was proposed by central government. The essence of "gripping the big" SOEs is to support and enliven about 1,000 large SOEs, based on the fact that large SOEs play an important role in the Chinese economy. In 1997, the largest 500 industrial SOEs comprised just 0.7% of industrial SOEs, but accounted for 37% of total assets, 63% of SOE profit, and 46% of sale tax (Wu, 1997). In December 1995, the State Economic and Trade Commission put forward the measure of 'gripping the big SOEs', including restructuring, R&D
support, and better monitoring. In the 5th Plenary of 14th CCPC in 1996, the idea of ‘gripping the big ones and letting go the small ones’ was formalised. Thereafter, 512 large enterprises were selected for “gripping” and two major policies were announced to develop large enterprises. The first one was to establish 3 to 5 large firms among the world’s top 500. In order to achieve this, the central government has channelled extra funds to selected large enterprises. The second one was to develop a modern corporate governance system in large SOEs. In 1996, central government announced that a main bank relationship would be developed in a pilot of 300 firms. At the provincial level, similar programme has been implemented.

In the 15th CCPC in 1997, the restructuring of large SOEs was made explicit to include converting large SOEs into joint stock companies, listing better-performing large SOEs on stock markets, and setting up large enterprise groups in strategic sectors. A number of large and medium SOEs were transformed into joint stock companies. At the end of 1996, 4300 SOEs had been transformed into joint stock companies. A number of better-performing large and medium enterprises have been listed on either the Shanghai, Shenzhen, Hong Kong or New York stock exchanges. At the national level, the state council is backing 57 large enterprise groups in predominantly heavy industries such as machine building, metallurgy, and chemicals. A number of large enterprises and enterprise groups are also being developed at the provincial level as well. These enterprise groups are often either listed companies themselves or have subsidiaries listed on either domestic or overseas stock markets.

3.2.5 Fostering Market Competition

In China, encouraging competition is a crucial feature of what has been seen as a “reform from below” gradual process (Naughton, 1994b). Market competition is encouraged through promoting product market competition and facilitating the mobility of factor markets.
3.2.5.1 Product Market Competition

While the significant entry of non-state firms has greatly increased competition in product markets, product market competition has also been facilitated by removing exit barriers, dismantling SOEs’ monopoly in China, removing trade barriers, and setting up and enforcing competition law.

The Threat of Exit

China’s first bankruptcy law was enacted in 1986. For years, it was rarely applied. From 1988 to 1991, there were less than 300 cases of bankruptcy, and all of them were small firms. The first bankruptcy case of large and medium SOEs occurred in 1992, six years after the enactment of bankruptcy law. In 1996, a new bankruptcy law, largely resembling that in market economies, was enacted. Currently, bankruptcy has become a realistic threat. The number of bankruptcies has risen sharply from 98 in 1989 to 5048 in 1997 (Li, S., 2001). From 1998 to 2000 the figure became stable at around 5,000 per year. In fact, 1.5% of the total SOEs were in bankruptcy proceedings in 1999-2000 (Wang, 2001).

Dismantling State Monopoly

While the SOEs in the manufacturing industry have long been facing increasing competition arising from the entry and growth of non-state firms, the SOEs in the utility industry, being considered as the last ‘fortress’ of China’s state monopolies, have been facing growing entry threat as well. Furthermore, their monopoly status has also been gradually dismantled. For example, in the telecommunications industry, China TELCOM, used to being the only supplier of telecommunication services, has had to face emerging competition from another three telecommunications companies in specialised areas since the early 1990s.
Under the recent reform initiatives, in 1999 China TELCOM was divided into four parts, responsible for different services. In the electricity sector, from December 30, 2002, the monopoly status of the State Power Corporation of China has been dismantled into 5 generating companies, 5 transmission companies, 2 consultancy companies and 2 construction companies. Similar reforms are going on in other utility sectors as well.

**Removing Trade Barriers**

Through more than 20 years of opening up to the world, China’s foreign trade regime has gradually changed from a highly centralized, planned and import substitution regime to a more decentralized, market-oriented and export promotion regime. China has been accepted as a full member of WTO, its general tariff level had been reduced to 12% by 2002, and China has promised to cut the average tariff level to less than 10 per cent by 2005. Trade liberalization forces firms to compete with imports. However, while opening up to global markets, domestic trade barriers are endemic (World Bank 1994, Young, 2000; World Bank, 1994; Branstetter and Feenstra, 1999). Inter-provincial trade has fallen from the equivalent of 37% of national retail trade in 1985 to about 25% in 2001, while the average distance traveled by freight shipments within China fell to 310 kilometers in 2001 from 395 kilometers in 1978, despite the rapid expansion of national highways, ports and air-cargo facilities (Gilley, 2001). In order to dismantle the inter-provincial trade barriers, the State Council has issued many circulars and directives against them. In the most recent of such directives, issued in April 2001, central government explicitly outlaws regional blockades.
Setting up and Enforcing Competition Law

Setting up and enforcing competition law is another way of fostering market competition. China’s current competition law, China’s Law of Anti-Unfair Competition, was promulgated in 1993. This law does address some of the anti-trust issues, such as prohibiting tie-in sales against the wishes of a buyer and price fixing or bid rigging. It also addresses many other issues, including bribery, deceptive advertising, coercive sales, etc. On average 600 cases of competition restriction in monopolized sectors, involving water and power supply, railroad transport, insurance, post and telecommunications, commercial banking and tobacco processing, have been detected and investigated annually. Anti-trust law is currently being drafted and is expected to come into being in the near future.

3.2.5.2 Labour and Managerial Market Competition

Massive transfer of labour from agriculture to industry in rural area has occurred since the reform. In 1978, rural industry employed roughly 28 million workers; in 1995 rural industry employed 100 million workers. This wave of labour transfer underpins the development of TVEs, joint ventures, and private enterprises that make up China’s dynamic non-state sector. Labour transfer occurs in urban areas as well. Workers and managers are gradually allowed to move from state sectors to non-state sectors, especially to private enterprises and foreign joint ventures, and to move from relatively closed interior areas to open coastal areas. Dismissal of regular urban workers is now commonplace in Chinese industry. In July 1996, the official number of laid-off employees had reached 7.5 million. Between 1995 and 2000, the number of industrial enterprise employees dropped from its peak of 109.38 million in 1995 to 89.24 million in 2000. The government’s labour and employment bureau’s central control of labour gives way to the
booming labour market including a large number of employment agencies, job centres and expertise markets.

China has also achieved sweeping managerial turnover since reform, even though its firms remained un-privatized and the new managers were installed by the state (Groves et al., 1995). In the first decade of reform, nearly 90 percent of China's state firms acquired a new top manager; by 1989 the average incumbent had held the job for less than six years (Groves et al., 1995). These changes are primarily a reflection of the functioning of the market for managers: only 25% of turnover is the result of retirement. One of the innovative methods for uncovering managerial talent in China during 1980s is the auctioning of jobs, where potential managers could bid for jobs running state enterprise. The winning team had to post a bond, and would be rewarded for achieving performance targets. Managers are frequently fired for poor performance and in such cases often lose part of their security deposit. There is evidence that the auctions succeeded in installing competent managers (Groves et al., 1995).

3.2.5.3 **Capital Market Competition**

In China, the state budget was almost the only source of finance of both fixed asset investments and working capital for SOEs before reform. On average, between 1950 and 1979, 84% of investments were financed directly by the state budget. The economic reforms have introduced significant changes in SOE finance. Since 1978, debt finance from state banks has gradually taken over state-budget (equity) finance as the major financial instrument of SOEs. In 1980, about 52% of SOE investments were funded through state finance. By 1997, only 2.8% of enterprise investment was directly funded through state finance, the rest being funded through either bank loan (18.9 %) or fundraising (67.7%). State banks are becoming increasingly commercialised. Even though China's banks
continue to make 'soft' loans to favourite borrowers, profitability and repayment capability play an increasing role in bank lending decisions.

China's stock market was established in the late 1980s, and it has been developing rapidly since 1995 (See Fig 3.8). By the end of 2000, there were more than 1,088 listed firms in China's Shanghai and Shenzhen Stock Markets, with total capitalisation of 4.8 trillion RMB Yuan and total turnover of 6.1 trillion Yuan. Chinese enterprises raised a total of 210.3 billion Yuan on the domestic stock markets during the year 2000, up from 9.4 billion RMB Yuan in 1992 (China Statistical Yearbook, 2002)

As the stock market has gradually become an important fund channel, the market for corporate control is developing. Between 1994 and 1996, changes in the majority shareholder have taken place in 20 listed companies (Lin and Dong et al., 1999). Between 1997 and 2001, changes in the majority shareholder occurred in another 392 listed companies (Shen, 2002). However, 60% of these changes were not accompanied by a change in the chairman of the board of
directors (Shen, 2002). Most of the changeovers have been achieved through negotiation or free transfer rather than through hostile takeover (Yu, 2003), as most of the majority shareholders are either state shareholders or legal person shareholders who are not allowed to trade in the open market.

3.3 Enterprise Reform, Competition and Enterprise Performance: A Review of Literature

In the course of China's Economic Reform over the past 20 years, doubt persists about the dimension of China's reform achievements, and the performance record of state-owned enterprises is a particular focus for controversy (Jefferson et al., 1996; Jefferson et al., 2000; Hay et al, 1994; Sachs and Woo, 2000; Woo et al., 1994; Woo, 1998). This is analysed within the framework of the structure conduct performance paradigm and measured by the enterprise's productivity and profitability.

Two contradicting views emerged from studies of China's enterprise performance since 1978. The first view is that China's enterprise reform is a success and there has been a positive productivity growth in the state sector, due to expanded managerial autonomy, stronger incentives, and increased competition pressure from the entry of non-state firms as the results of the gradual enterprise reform, although the productivity improvement in SOEs is less than that of TVEs, joint ventures and foreign enterprises (Jefferson et al., 1996; Jefferson et al., 2000; Hay et al, 1994; Groves et al., 1994, 1995; Li, 1997). This view is empirically based on the estimated TFP improvement in SOEs.

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10 Between 1994 and 2001, 70.3% of the changeovers were through negotiation, 22.3% through free transfer, and only 5 cases were through hostile takeover.
The second view argues that it is impossible to achieve a significant improvement in firms’ performance due to the pervasive existence of non-commercial objectives, political interference, lack of incentives for performance and severe principal agent problems in China. Therefore where improvements do occur, they are small, likely to be short-lived and unsustainable, and SOEs have actually become a stabilizer for the whole economy (Sachs and Woo, 2000; Woo et al., 1994; World Bank, 1996; Fan and Woo, 1996). This view is primarily based on the declining profitability of SOEs. It suggests that the increase in TFP as estimated by the first view is due to the invalid use of output and input inflators, which caused overstatement of gross output and understatement of the inputs (Sachs and Woo, 2000). In the sections below I will discuss these two contradictory views in detail.

3.3.1 Enterprise Reform and Improved Total Factor Productivity

3.3.1.1 Improved Total Factor Productivity

Total Factor Productivity, an indicator of innovation and efficiency, has been widely used in the assessment of enterprise performance in China. A majority of the studies based on TFP estimation show that the TFP of China’s SOEs has been improved since reform, especially during the 1980s (Chen et al., 1988; Wu, 1993; Jefferson et al, 1992, 1996; Jefferson et al., 1999; Jefferson et al., 2000)

The first study of this kind is Chen et al., (1988), which found a definite rising trend of TFP in China’s state industry during 1980-1985. Their results showed that from 1978 to 1985, the growth of TFP ranged between 5.2 and 5.9%. Jefferson et al., (1992) confirmed the rising trend of TFP growth in state industry. They estimated that for SOEs, from 1980 to 1988, the annual average TFP growth was 2.4%. However, TFP growth in COEs outpaced SOEs by a considerable margin during 1980-1988. Similarly, Macmillan and Naughton
(1992) found in their study that the TFP of Chinese State owned enterprises increased 3%-4% annually, and Gordon and Li (1995) found that the annual TFP growth was 3-4% for the period of 1983 to 1987.

In a later study by Jefferson et al., (1996), they confirmed the accelerating TFP growth in both state and collective sectors during the 1980s; however, they found a marked decline in TFP growth during 1988-1992 for the state sector. They suggested that the contribution of TFP growth to real output growth, having increased to 43% during 1984-1988, declined to 31% during 1988-1992, while TFP growth within the non-state sector was about twice that of the state sector.

In a more recent study investigating Chinese industrial productivity from 1980-1996, Jefferson et al., (2000) reinforced the earlier findings of long-term productivity growth and the recent trend of declining of TFP growth. Furthermore, they found that TFP in the state sector declined between 1992 and 1996 by –1.11% annually. However, they attributed this TFP decline to the transfer of high performance firms and resources to new entities in the foreign-linked and shareholding sectors, and China's limited capacity to restructure failing enterprises by means of bankruptcy or mergers, but they did not quantify the contribution of these factors. Their study also confirmed that TFP in COE surpasses TFP in SOEs by a large margin.

For all the above studies, estimates of TFP are based on production function and derived from the following function:

\[
\text{TFP}(t) = \exp[\ln DGV - \alpha_k \ln DNPT(t) - \alpha_l \ln LAB(t) - \alpha_m \ln DINT(t)]
\]

where TFP represents total factor productivity, \( t \) indicates time, \( DGV \), \( DNPF \), and \( DINT \) are the deflated values of gross output, net industrial fixed assets, and intermediate purchases, \( LAB \) is the average workforce exclusive of non-industrial workers, and \( \alpha_k \), \( \alpha_l \) and \( \alpha_m \) are the output elasticity for capital, labor, and
materials obtained from production-function estimates for 1987. Hay et al. (1994) and Groves et al., (1994) also adopted a similar methodology to estimate the effect of reform upon SOEs’ TFP growth. There are many other studies, using similar methodology but sometimes a different data set. They are presented in the Appendix.

In order to estimate production function and TFP, profit-maximizing enterprise behaviors and competitive product and factor markets are assumed. However, neither of these two conditions is compatible with a reforming socialist economy. Li. W (1997) tried to tackle the above-mentioned problems by allowing productions to differ arbitrarily across enterprises. He deconstructed the rate of output growth as:

\[
\frac{\Delta Q_{n,t}}{Q_{n,t-1}} = \sum_{X=K,L,M} P_{n,t} A_{n,t} \frac{\partial F_n}{\partial X_{n,t}} \frac{\Delta X_{n,t}}{P_{n,t} Q_{n,t-1}} + \sum_j \frac{A_{n,t}}{Q_{n,t-1}} \frac{\partial F_n}{\partial R_{j,n,t}} \Delta R_{j,n,t} + \frac{\Delta A_{n,t}}{A_{n,t-1}}
\]

where \(Q_{n,t}\) is enterprise \(n\)'s output in year \(t\), and can be written as:

\[Q_{n,t} = F_n(L_{n,t}, K_{n,t}, M_{n,t}, R_{n,t})A_{n,t}\]

\(F_n\) is an enterprise specific production function, and \(A_{n,t}\) represents an enterprise and time specific random productivity shock, and \(L_{n,t}, K_{n,t}\) and \(M_{n,t}\) are labour, capital and inputs employed, \(R_{n,t}\) represent the vector of institutional environment. The coefficient of \(\frac{\Delta X_{n,t}}{P_{n,t} Q_{n,t-1}}\) in equation (1) \(P_{n,t} A_{n,t} \frac{\partial F_n}{\partial X_{n,t}}\), is a first order approximation to the marginal product of factor \(X\) valued at year \(t\)’s market price.

Adopting this methodology, Li used the same data set as that in Jefferson et al. (1992), Hay et al. (1994) and Groves et al. (1994) to measure the changes in TFP by comparing actual changes in output to actual changes in inputs and in
the institutional environment. He also found marked improvement in TFP and marginal factor productivity during the period 1980 and 1989. According to this study, the annual TFP growth was 4.68%, and TFP growth accounted for 73% output growth.

3.3.1.2 Accounting for Productivity growth: Productivity and Enterprise Reform

It is generally believed that productivity growth in China’s SOEs is due to expanded managerial autonomy, stronger financial incentive and competitive pressure from the entry of non-state firms as the results of gradual enterprise reform.

The effect of enterprise reform upon the enterprise performance of China’s SOEs has been studied within the framework of Structure-Conduct-Performance (SCP). The most typical works are Groves et al., (1994) and Hay et al. (1994). In the former, Groves and his colleagues first assessed whether the managers of SOEs responded to the expanded managerial autonomy by strengthening the discipline imposed on workers, such as proportion of wages paid in the form of bonus and the proportion of contract workers, during which they did find that the increase in managerial autonomy raised workers’ income. Then they further estimated whether the stronger financial incentive led to significant improvement in productivity, and they found that productivity increased with the increase in bonus payments and in contract workers. Therefore they concluded that enterprise autonomy and profit-sharing have a positive impact on productivity. They also found that the increase in autonomy raised investment in enterprises as well, but tended not to raise remittances to the state. However, this work does not take into account the effect of increased competitive pressures upon SOEs.
In Hay et al., (1994), a range of econometric analyses of aspects of enterprise behaviours under the changing institutional environment, such as employment and wages, productive efficiency, profitability, investment, etc., have been conducted. They concluded that “enterprises during the period of reform began to behave in a ‘neoclassical’ manner associated with enterprises in the west, within the constraints that continued to be imposed on them”. Moreover, they suggest that the reforms have gone a long way to inducing state-owned enterprises to be more responsive to price signals in a manner which is consistent with a degree of profit-maximizing, cost minimizing behaviour. As far as productive efficiency is concerned, the main effects are related to the payment of bonuses from retentions. Yet, there remains a moot point whether further increases in bonus payments would generate equally dramatic improvements.

Yao (1997) assessed a simultaneous model of output, bonus and retained profit. He confirmed that the financial incentive, such as the bonus rate, had a positive and sizeable impact on productivity. His results suggested that a 10% rise in the ratio of bonus to wage plus bonus could raise productivity by about 4.56%. By deconstructing the growth rate of value-added (1983-1987) into the contribution of capital growth, labour growth and the bonus/wage ratio, Yao’s study suggested that the bonus/wage ratio contributed 53.8% of value-added growth, more than the combined contribution of labour and capital growth. This study does not take into account the effect of competitive pressures either. Some other studies have also proved the positive effects of profit-sharing and bonus upon productivity, such as Liu and Liu (1996).

Although the disciplinary effect of increased market competition has been widely acknowledged as another important aspect of China’s enterprise reform, most of the above studies do not take into account the effect of increased competitive pressures. One exception is Li. W (1997). In his study, Li estimated not only the effect of improved incentive, which he proxied using the increase ratio of bonus
to wage, but also the effect of increased competition, which he proxied using the
decrease in the relative price of output to material inputs. He found that the
growth of bonuses per worker had a significantly positive impact on the growth of
TFP; a 1% increase in bonuses per worker raised the TFP growth rate by
0.089% between 1980 and 1984 and 0.06% between 1985 and 1989. He also
found that between 1980 and 1989 the increase in competition also contributed
to productivity, a 1% reduction in the inflation rate of output prices relative to that
of material input prices elicited a 0.732% in productivity growth between 1980
and 1984, and 0.456% in productivity between 1985 and 1989. According to this
study the improved incentives and intensified competition in product markets
accounted for 49% of TFP growth. However, their effects declined.

In some other studies, the effect of increased competition has been indicated
rather than been explored. Jefferson and Xu (1992) found that enterprises tend
to converge in TFP, and productivity for labour, capital, and materials tend to
converge as well. The convergence is most rapid and most complete among
enterprises that are most exposed to market forces. They attributed this
convergence in TFP to the allocative efficiency resulting from tendency of factor
returns to equalise across firms as factor and product markets develop and
become more competitive.

3.3.1.3 Critics and Concerns of TFP Accounting

There are several concerns about the calculation of TFP. The first concern is the
restrictions on the form of production function. Most of the studies adopted Cobb-
Douglas production function or its variations. However, one of the assumptions
underlying the production function is perfect market competition, which is absent
in transition economies. For studies using aggregate data, this concern is
especially noteworthy, as there are still strong regional and sectoral segregations
within China even after 20 years of reform (Young, 2000). Apart from this, there
are other restrictions, such as the assumption of Hicks-neutral and the labour augmenting technical changes, etc.

The second concern is the use of deflators for output and inputs. Actually, the use of proper deflators has been a hotly debated issue, on which to a large extent the debate between Jefferson et al (1999) and Sachs and Woo (2000) is based. Sachs and Woo (2000) challenged the validity of the output and input deflators used in Jefferson et al. (1992) and argued that the TFP growth estimated in Jefferson et al. (1992) is biased and miscalculated (Sachs and Woo, 2000; Woo et al, 1994) due to the unexpected declines in the implicit price index for industrial value-added, and the upward bias in estimates of real output growth. Young (2003) in estimating the TFP growth in the Chinese economy suggested that the estimated TFP growth could vary between 1% and 5.6% for the whole economy depending on the GDP deflators used and other assumptions adopted.

The third concern is the pro-cyclical feature of TFP growth. Measures of TFP are sensitive to economic fluctuations. Apart from the technological shocks, policy shocks, and changes in factor reallocation, TFP growth is also likely to be influenced by demand shocks or supply disruptions that cause the variations in capacity utilization. Li (1997) found that the growth of TFP was positively correlated with the fluctuations in GNP growth and the effect of incentive and market competition appeared to be pro-cyclical. Yao (1997) also suggested that economic fluctuations play an important part in deciding TFP growth.

Fourthly, TFP growth indicates the enterprise performance over time rather than intra-firm performance. As we have seen from many studies, although SOEs have improved TFP growth, they have been surpassed by TVEs and private enterprises; consequently they might not be able to survive even if they have
achieved TFP growth. Hence, firms’ comparative performance is more important for firms’ long-term survival.

The fifth concern is the use of average TFP growth as an indicator of all SOEs. All the studies used either simple arithmetic average TFP as the indicator for all SOEs or were based on aggregate data. However, changes in aggregate productivity conceal a rich variety of microeconomic behaviours. Firms enter, grow or decline, and exit, and large firms always tend to have more influence upon the whole industry.

The sixth concern is the selection of sample. Nearly all the important works in this area, such as Hay et al. (1994), Groves et al. (1994), Li (1997), Liu and Liu (1996) and Jefferson et al. (1996), are based on the same data set, the CSSA survey conducted in 1988. This sample tends to be biased toward larger and more successful enterprises. More creditable estimates of total factor productivity growth should be based on populations of enterprise data.

Furthermore, most of the above studies are based on observations in the 80s or at best early 90s, and studies on enterprise performance in the 90s and inter-firm comparative studies are scarce, especially after 1993 when China embarked explicitly on the transition to a market economy.

3.3.2 Enterprise Reform and Enterprise Profitability

3.3.2.1 Falling Profitability

Although most of the empirical studies have concluded that TFP in state enterprises has been improved, there is no doubt that SOEs’ financial situation has been deteriorating since the early 80s as we have shown in the previous sections. In the 1990s, it became more and more obvious. In the meantime, the numbers of loss-making SOEs and the amount of losses incurred have been
increasing. SOEs have difficulties in competing in the product market, which leads to a large amount of product inventory and the consequent difficulties in repaying bank loans. Most SOEs are operating well below full production. This phenomenon has been addressed by Premier Zhu Rongji as follows: “The current problem of SOEs are excessive investments in fixed assets with very low return rates, resulting in the sinking of large amounts of capital; low sales to production ratio giving rise to mounting inventories” (Zhu, 1996).

The deterioration of SOEs’ financial performance has increased the State’s financial burden through two channels: the decrease of financial revenue from SOEs and the increase of direct and indirect financial subsidises by the state to loss-making SOEs. Consequently, the financial weakness of SOEs destabilised the economy through increasing the state budget and bad bank loans. As a result, SOEs were a constant source of inflationary pressure. Jin (1995) observed that whenever the SOEs faced increased competition, they would intensify their lobby for credit, and monetary expansion would result. When SOEs’ losses could no longer be fully covered by the budget, they turned to state banks. Out of the concern for the safety net function and for ideological reasons, state banks largely ignored the financing needs of the new dynamic non-state sector, and focusing their lending on SOEs, leading to a high proportion of bad and idle debts in banks and the possibility of financial crisis (Economist, 1997).

3.3.2.2 Accounting for the Fall in Profitability

The deterioration of SOEs’ financial performance casts doubts upon the dimension of China’s reform achievements. In response to SOEs’ failing financial performance, the literature has identified four possible factors as being responsible for disappearing SOE profits. The first factor is the emergence of competition from non-state enterprises (Naughton, 1995; Jefferson and Rawski, 1994). Naughton (1995) suggested that growing competition has eroded SOEs’
monopoly, causing profits to decline in the state sector. His hypothesis is supported by the fact that profits tended to converge across industrial branches and is tested by Singh et al (1994) using provincial data and sectoral data. However, this view is challenged by Sachs and Woo (2000) and by Fan and Woo (1996). They showed that SOEs' profitability in sectors of industry with little entry of non-state firms declined dramatically as well, and their regression of change in the SOE profit rate on the change of SOE market share yielded an insignificant relation with an $R^2$ of 0.3.

The second factor is the problem of “insider control” caused by expanded autonomy and relaxed state control. It is argued that decentralizing reform, which gives SOEs more autonomy, has made the principal and agent problems more severe in SOEs and has led to “insider control” of SOEs, under which SOE insiders can appropriate the income and assets of SOEs. Moreover, they can even manipulate the account (Sicular, 1995).

As the state's control recedes, SOEs' managers have little incentives to resist wage demands from insiders. Woo et al. (1994), Woo (1994) and Fan and Woo (1996) show that the sum of direct income and indirect income increased more than labour productivity growth. Bouin (1998) calculated that the marginal product labour of industrial SOEs increased by 5% in 1989-1993 while the product wage of industrial SOEs rose by 7%. Meng and Perkins (1996) found that SOEs were maximising income per employee like labour-managed firms. The increase in workers' income is also done through indirect means like better housing, improved transportation, etc. Direct expenditure by SOEs on social services for their workers is now approximately equal to the budget transfers and implicit financial subsidies they receive from the banking system (World Bank 1996).
The third factor is the lagging behind of building a fair competition environment (Lin et al., 1998, 1999). In recognizing the same problem of insider control and continued soft budget constraints, this view suggested that building an effective market environment is the main concern rather than privatisation. It is argued that the problems of insider control and soft budget constraint are caused by high monitoring costs under the separation of ownership and management rather than by the tacit definition of ownership. The separation of ownership and control is pervasive in an advanced market economy as well; however the existence of effective product markets, managerial market and capital markets lowers the monitoring costs and makes managers' objectives consistent with that of owners.

The fourth one is the unfavourable competition conditions for SOEs (Lin et al., 1998, 1999). It is argued that SOEs' poor performance is to a great extent caused by SOE's unfavourable competition conditions, such as a heavy employee pension and insurance burden, irrational capital structure originating from the heavy industry preferred industrial development strategy, heavy debt burden, and a heavy fee and levy burden. Moreover, certain reform policies have also helped to reduce SOEs' ability to compete in the market, such as substituting financial grant with bank loans, etc. These unfavourable competition conditions in turn provide excuses for SOEs' soft budget constraints.

3.4 Conclusion

China's SOEs have always been the backbone of China's economy; even by 1999, 20 years into China's economic reform, SOEs still employed 58.9% of employees in urban areas, utilized 53.4% of national investment and produced about 30% of national industrial output. Since 1978, SOE reform has been the focal point of China's economic reform. A successful SOE reform is not only the key to the success of the entire economic reform but also vital to the building up
of a market economy and the long-term development of the Chinese economy (CCPC, 1984, 1999; Rawski, 2000).

Like reform in other areas, China’s SOE reform has also progressed in a gradual and incremental way. The progress of SOE reform has been driven forward by the dynamic process of decentralising the state and SOEs relationship, and by promoting competition, and has been coordinated by the state’s helping hand.

Decentralising the state and SOEs relationship is characterised by gradually expanding SOEs’ managerial autonomy and allowing SOEs to share profits. The delegation of autonomy and the granting of profit-sharing rights to SOEs have provided better incentives for SOEs to improve their performance. Transferring decision-making rights from central government to managers on the spot makes SOEs adapt to the markets, which is also aligned with efficiency improvement. On the other side, the expansion of SOE autonomy also has its costs. It has released the major problem of SOEs, the separation of ownership and control, which the old planning system tackled through central planning and highly suppressed enterprise autonomy. Furthermore, decentralising the state and SOE relationship in a dual track system carries the risk of disorganizing the whole economy.

Encouraging competition is a crucial feature of SOE reform. Market competition is encouraged through removing entry and exit barriers, dismantling SOEs’ monopoly and facilitating the mobility of factor markets. The most significant competition comes from the rapid entry of new firms, which are mostly non-state enterprises. The rapid entry of non-state firms has greatly reduced the monopoly status of SOEs, and has contributed to the rapid decline in state industry’s relative share of industrial output. The entry of non-state firms, together with the setting up of managerial markets, financial markets and the necessary market infrastructure, has greatly increased the competition pressure that SOEs have to
face. SOEs, facing accelerated competitive pressures from both SOE counterparts and non state-owned enterprises, relative price changes and hard budget constraints, consequently reduced the profitability level. As a result, state revenue from SOEs has been falling as well. Therefore, governments have less finance and interests to subsidise SOEs, which makes governments grant further managerial autonomy to SOEs, and eventually leads to the privatisation of small SOEs.

The state’s co-ordination has worked through preserving SOE economic activities to provide the foundation for the functioning of the market track and constraining state monopoly and providing credible commitment in preserving market incentives and encouraging the entry of non-state firms. These have been attributed to the merits of ‘the two track system’, which is a typical Chinese characteristic. Under the dual-track system, the existing central economic plan, and the distribution of rents under it are left intact; liberalisation is carried out at the margin; and economic agents have both the right and the incentives to participate in the free market provided that the obligations under the plan track are fulfilled. Consequently, the risk of “disorganisation” has been constrained, and the competition from non-state firms has been encouraged, which are further helped by the competition between local governments and the desire for local governments to develop local economies as results of the decentralisation of the central and local government relationship. Moreover, through the interaction between the ‘plan track’ and ‘market track’, the plan track has actually provided the foundation for the emergence of market track.

As China’s enterprise reform goes on, the effect of expanded managerial autonomy and profit-sharing on enterprise performance has been broadly studied, yet until now there is no clear cut conclusion from these studies, in fact two contradictory views emerged from the vast amount of research into enterprise performance (see Sachs and Woo (2000) and Jefferson et al. (1999)
for a general review of the debate). Moreover, the effect of increased competition has been rarely dealt with although promoting competition is another perspective of China’s enterprise reform and its effect has been widely acknowledged. Even in the few studies of the relationship between enterprise performance and competition, “competition” is taken as a kind of market structure rather than a dynamic process. Moreover, how competition has worked in China during the transformation period, and how enterprise has responded to the increased competitive pressure have been rarely addressed. In fact, to study how enterprise has responded to increased competitive pressure is important when assessing the role of current and future reforms, especially among increasing concerns for the sustainability of China’s economic growth (Sachs, Woo and Yang, 2000; Borensztein and Ostry, 1996) amid the recent slowdown of economic growth and firms’ deteriorating financial performance which lend credence to these concerns.
Appendix 3.1: Enterprise Reform in WBGC: A Case Study

In this section, I will utilise data from a typical SOE – WBGC (Wafangdian Bearing Group Corporation) - and the three-digit industry to which the WBGC belongs to illustrate the restructuring of China’s SOE since 1987. Information on WBGC comes from its various published and unpublished annual reports.

Background Information on WBGC

WBGC is a state controlled company group, and is one of the 500 largest industrial enterprises in China. It is China’s largest manufacturer of rolling bearings. Its predecessor is WBF (Wafangdian Bearing Factory), which was set up originally in 1938 and was expanded and renovated during the 1950s. By 1996, WBGC had about 25,000 employees and had accumulated $150 million of fixed assets. It produced more than 4,200 varieties of bearings and exported to more than 70 countries (http://www.zwz-bearing.com). Between 1987 and 1996, WBGC’s gross output value had been more than doubled, with an average growth rate of 11% annually, and the labour productivity had been growing at 6.9% annually.

WBF was a typical state owned enterprise, its asset was completely owned by the State. Since 1979, WBF and its successor WBGC have always been on the front of SOE reform. WBF was among the first to experiment contract responsibility system. In 1995, WBF was converted into state holding company WBGC. In 1997, WBGC’s main subsidiary, Wafangdian Bearing Company Limited, was listed in the ShenZhen Stock Exchange. In 1999, Debt for Share Swap scheme was implemented in WBGC.

Retrospectively, the reforms in WBF and WBGC have been carried out from four perspectives sequentially and sometimes simultaneously: profit sharing, contract responsibility, organisational restructuring and ownership reform. I will discuss them in more detail in the following.
Enterprise Reform in WBGC

Performance Wages and Profit Sharing

Responding to the reform of delegating managerial autonomy and sharing profit, WBF began to implement performance contingent wages and profit sharing schemes in 1982. Under these schemes, WBF was allowed to retain part of its profit contingent upon its performance. The wages of workers and managers changed from fixed wage to flexible wage, linked directly to their own output and the performance of WBF. From 1981 to 1986, the ratio of retained profit to its pre-tax profit increased from negligible in 1981 to nearly 30% in 1986. The share of the bonus in total wages increased from negligible in 1980 to 37% in 1988. From the following figure, we can see that the growth of wage is positively related to the growth of sales. Yet in 1981, even when sales revenue declined by 15%, the total wages still increased by 5%.

![Gross Growth Rate of Wages and Sales](chart)

**Contract Responsibility system**

Contract responsibility system, the primary method of SOE reform between 1987 and 1995, was experimented in WBF before 1987. By 1987, contract responsibility system was made formal in WBF and had been carried out up to 1995. Between 1987 and 1995, there were two rounds of responsibility contracts signed between WBF and Dalian Manufacturing Administrative bureau, WBF’s up-layer administrative bureau. Each contract was intended to last for 5 years. The second contract was meant to finish by the end of 1996. However, at the end of 1995, intending to implement a new round of
enterprise reform – setting up a modern corporate system, the government terminated the responsibility contract with WBF. The contract adopted in WBF, nicknamed ShuangBao YiGua (double guarantees and one contingent), was mainly designed for large SOEs. Under this type of contract, SOEs had to guarantee the contracted profit and tax submission and to guarantee the completion of the planned investment and technology advance, the wage was contingent on the realisation of pre-tax profit. The contracted targets and SOEs' share of profits are usually the results of bargaining between the governments and SOEs. In the following, I will describe in detail the contract WBF signed with its local government in the second round of the process in 1992. The details of the contract are from Xiao (1996)

The first clause of the contract specified that WBF had to guarantee the submission of the contracted profit and tax, which should be rising annually at a rate agreed in the contract. WBF had the right to keep the profit beyond the contracted submission. When it failed to submit the contracted target, WBF had to pay the difference from its own finance.

However, it is not defined in the contract what to do if WBF fails to meet the targets and cannot pay the difference from its own finances. As bankruptcy was not yet a likely solution for large SOEs, consequently the risk of loss is undoubtedly taken by the State. This feature of the contract encourages the managers to pursue more risky investment. Also from this term we can see that the firm will pursue the maximisation of retained profit rather than the maximisation of profit.

The second clause specified that the contract was valid from 01/01/1992 to 12/31/1996.

However, this contract was terminated by the government in 1995 in order to implement modern corporate system reform. The relative shortness of this contract, compared with the 15 and 50 years responsibility contract in agriculture, provides the managers incentives to pursue short run interests rather than long-run interests. Managers had the incentives to exploit
maximally the existing capital rather than to invest. As the next round’s contract would be based on the current performance, managers also had the incentive to conceal current profits, which was made possible by their expanded autonomy.

The third clause specified the various contract targets. First, WBF had to invest 0.28 billion Renminbi Yuan on technology improvement in the next 5 year period. And the accumulative pre-tax profit should be no less than 0.52 billion Renminbi Yuan for the same period. Based on the profit and tax submitted in 1991, which was 44.55 million Renminbi Yuan, the submitted profit and tax should be increased by 7% annually.

These are the targets WBF should fulfil. There are some other monitoring targets as well, such as sale revenues, exports, the increase of state assets, the increase of R&D expenditure, etc. By this clause, the government tried to ensure WBF’s submission of profit and tax and to restrict WBF’s potential short-term opportunism.

The fourth clause specified that WBF’s wage should be contingent on its pre-tax profit. The ratio of wage to pre-tax profit should be no higher than 80%, 95% and 100% depending on whether the ratio of profit to fixed assets was less than 17.6%, between 17.6% and 18%, or more than 18%.

It defined the upper limit of the wage, however profit is broadly defined in this term, including the increases of R&D expenditure, depreciation of fixed asset and the increase of current assets. It should be noted as well that this term does not mention how the wage should be paid when the firm makes a loss. Actually, the whole contract assumes that WBF will make a profit. In fact, nearly all the responsibility contracts in this period have this feature.

The fifth and the sixth clauses specified that the welfare expenditure of employee should be contingent upon WBF’s profit and should not
exceed over 38% of pre-tax profit and that the fixed assets used for providing employee welfare should not be over 24% of fixed assets.

These two clauses specified how the welfare expenditure of employees should be funded. However, these two clauses are very difficult to monitor. As the material, energy and labour used in the industrial production can be easily transferred into welfare use.

_The seventh term emphasized that WBF should abide by government’s standards and provisions on quality, safety, and environment._

_The eighth term stressed that WBF had autonomy to make its annual plan as long as it sticks to the 5 year plan agreed by the government._

This clause specifies that WBF can only have autonomy on the annual plan if they commit to fulfil the central plan. Therefore, the central government plan still plays an important role in WBF.

_The ninth clause specifies that WBF had the right to enjoy the current policy on reduction and exemption of export tax and any new priority policies for improving SOEs’ operating environment apart from policies changing profit and tax submission targets._

This clause tries to ensure the stability of the profit and tax submission.

_The tenth term specified that the two sides of the contracts should abide by the Company Law to ensure the WBF’s full management autonomy._

In 1992, the state government put forward formally the provision that granting SOEs full managerial autonomy in 14 issues: producing, pricing, sales, procurement, exports/imports, investment, using of retained profits, disposing of assets, merger/acquisition, employment, personnel management, setting wage and bonuses, deciding the firm structure and rejecting improper fees. However, in two sequential surveys on SOEs’ autonomy conducted in 1993
and 1994, it was found that SOEs were still unable to reject extra levies and fees, and they still had very low autonomy in the areas of exports and imports, acquisition and mergers, and asset management.

**The eleventh term stressed that the management of WBF would be rewarded or punished according to the fulfilment of the contract.**

However it had not been detailed on how the management would be rewarded or punished. It is more likely that the management will be promoted to a higher position in the government or other SOEs as a reward. But their wages are very rarely connected with SOEs’ performance.

**The twelfth clause emphasised that all the issues not being mentioned in the contract would be dealt with according to the state’s rule on contract responsibility system and the related city government’s provisions.**

**The thirteenth clause explained that the government departments consisted of the city bureau of machinery industry, the city taxation bureau, the city labour bureau, the city bureau of state asset management and the city economic and trade commission.**

However the state owned banks were not included in the contract, although they had a significant stake in WBF.

From this contract, we can see that the Contract responsibility system intended to expand SOEs’ managerial autonomy and to provide SOEs with financial incentives. However, WBF was still subordinated to its supervisory government bureau, which to a great extent still controlled WBF either through the one to one bargaining or through administration control. Second, the contract only acknowledged WBF’s managerial autonomy in productive activities. It did not specify any rights for WBF in regard to the state asset. The contract lasted for only 5 years, this could not ensure the long term development of SOEs, and encouraged the managers in SOEs to pursue
short-term interests at the expense of long term interests. This contract also tried to establish a monitoring mechanism by the contracted investment target, profit and tax submission target. However, this contract is asymmetric, it is based on the assumption that WBF will make profits. It does not specify WBF’s responsibility when it cannot meet the contracted targets.

Organisational Restructuring

Organisational restructuring in WBF has been conducted parallel to contract responsibility contract since 1987. It was deepened since 1993 when WBF was corporatized. The organisational restructuring implemented included: internal contract, chunking off subsidiaries, enterprise group and corporatization.

Internal Contract

Initially, the organisational restructuring was in the form of internal contract. Within WBF, the internal responsibility contract was applied to every single production unit. The relationships between WBF, its subsidiaries, production units and workers were all specified in various internal responsibility contracts. Based on these contracts, workers inside each production units were allowed to reorganize themselves in order to achieve optimal labour mix. By 1994 around 4000 workers were made redundant from their post, yet still remained in WBF, and were partially paid.

Spinning off Subsidiaries

At the same time, in order to separate WBF’s social burdens and to give its subsidiaries more managerial autonomy, several WBF’s production accessories, which were set up originally to take up WBF employee’s family members, were set aside as independent collective owned enterprises. Before WBF was corporatised in 1995, 5 of its industrial accessories were spun off and made financially independent. Some other accessories, which
provided social welfare, such as hospitals, schools, were also made financially independent.

**Enterprise Group**

At the industry level, in order to facilitate the cooperation between bearing firms in the region, to mobilize the technology transfer and capital flow between the bearing firms and to save the badly performing firms, an industrial group was established with WBF as the centre of the group and several other enterprises as closely integrated affiliates and the rest as semi-integrated affiliates under the initiative of the provincial government.

**Corporatization**

In preparation for setting up modern corporate system, WBF was transformed into a legal entity in 1993. Its assets were re-examined. The assets invested by the state, legal persons, domestic individuals and foreign investor were separated. However the state was the only registered investor, this indicates that WBF did not invest from its own retained profits in the past. DianLian Machinery Administrative Bureau was recognized as the representative of the owner of the state assets. WBF was formally granted the right to use state assets and the right to have its own assets as a legal person. Under the new arrangement, WBF had to be responsible for the financial consequences of its own activities. The former top manager of WBF became WBF’s legal person representative, the selection of which was still subject to the decision of DianLian Machinery Administrative Bureau.

**Ownership Restructuring**

**Shareholding and Floating in the Stock Market**

In October 1995, as an experiment approved by the Liao Ning provincial government, WBF together with its close affiliates, such as the five accessories that had been made independent before 1995, was converted
into a State holding Company, WBGC. Its subsidiaries were converted into companies with WBGC as their parent company holding their majority shares. WBGC had a total of 551.5 million shares, among them 88.2% are legal person shares and 11.8% of them are employee shares. 95.6% of its employees are shareholders. All the legal person shares are owned by the state.

In July 1996, approved by Dalian City Government, WBGC initiated to establish WBC, Ltd. as a joint stock company by public offering. WBGC put 50% of its assets into WBC, and converted them into shares, of which WBGC held 87.22% and employees held 12.78%. A few months later the employees' shares in WBC were converted into WBGC's debt to employees. In February 1997, approved by the State council, WBC was floated in China's Shenzhen Stock Exchange and issued domestic listed foreign investment shares (B Shares). WBC had a total of 330 million shares, among them 200 million were held by WBGC, and the other 130 million were held by foreign shareholders, among them Sweden's SKF held 65 million, and British Airways Pensions Trust was the second largest foreign shareholder with 2 million shares. However, the mobility of these shares was limited. According to China's law, state shares, legal person shares and employee shares were not allowed to circulate in the stock market. The transfer of state shares must be approved by the National State Asset Management Bureau and Provincial State Asset management Bureau. In the case of WBGC, only the 130 million shares owned by foreign investors can be transferred in the stock market, however they can only be circulated among foreign investors. By the end of 2001, while SKF still held 65 million, the British Airways Pensions Trust sold out at least 90% of its shares in WBC. The limited mobility of shares tends to weaken the shareholder's discipline upon management.

In accordance with China's Company Law, WBC set up its shareholders meetings, Board of Directors and Boards of Supervisors. However, on the Board of Directors, all the 13 directors were internal directors, and 10 of them are top managers of WBGC, the other three are from SKF. WBGC's president was the president of WBC, and WBGC's CEO was the CEO of WBC. The ten
Directors from WBGC included the Secretary General, the Vice Secretary General of Communist Party and the president of the Worker Union in WBGC. There are 9 supervisors on the board of supervisors, three of them were from WBGC, five were from government departments, and one was from the Industrial and Commercial Bank. The insiders controlled both the Board of Directors and the Board of Supervisors.

Theoretically, the President of Share Holding Company should be selected through shareholder meeting, and CEO should be nominated by the President. As WBGC controls more than 60% shares of WBC, it has a decisive influence upon the selection of the president. Meanwhile, the State controls more than 80% of WBGC's asset, and WBGC's top management are still appointed by the Government, therefore the government still has a significant influence upon the selection of the CEO. Furthermore, in WBGC the President, the CEO and the General Secretary of Communist Party are all appointed or approved by the Government, and they all have the same status in the bureaucratic hierarchy, therefore there are potential conflicts of objectives between them.

**Merger, Liquidation and Debt Share Swap**

Since its corporatization in 1995, WBGC's assets began to have some degree of mobility. From 1995 onwards, WBGC has made attempts to merge with other SOEs, to liquidate its own subsidiaries and to write off its debts, however the local government has actually initiated some of these attempts.

In 1996, WBGC merged with Liaoyang Bearing Company under the initiative of the provincial government. Liaoyang Bearing Company is located in another city in Liao Ning province and was a medium SOE. It was an affiliated member of the Enterprise Group evolved around WBF before 1995. During 1990s, it performed poorly, although it did not make a loss, it just broke even. In September 1996, under the initiation and approval of LiaoNing Council of Economy and Trade, Liao Yang Bearing Company merged with WBGC. In November 1997 WBGC's share in LiaoYang Bearing was transferred to WBC.
Huamei Company was a joint venture WBF set up jointly with an American company in 1990. WBF held 69.7% of Huamei’s equity; and Huamei was an associated company of WBC after its floatation in the stock market. In September 1999, Huamei started liquidation procedure, which lasted for 18 months. Eventually the foreign party received an amount of RMB 248,000 of the book value of net assets according to a ratio other than investment ratio. And the WBC received all the rest of the assets and liabilities and was responsible for the settlement of Huamei’s employees.

In 2001, in order to reduce WBGC’s debt level, the interests for which accounted for 4.8% of sale revenue in 1996, under the Debt Share Swap Scheme, WBGC’s Power Supply Company was set up jointly by WBGC, China Huarong and Greatwall Asset management Corporations, which are two of the four Asset management Corporations (AMC) created by China’s 4 big banks to relieve SOEs’ enormous debts. Under Debt Share Swap, Huarong and Great Wall AMC converted WBGC’s bad debt, which they acquired from WBGC’s creditors Agricultural Bank of China and Industrial and Commercial Bank of China, into the shares they hold in the power supply company. Among the 250 million Yuan RMB of Registered Capital, Huarong and Great Wall accounted for 90.3%. As the result of the Debt Share Swap, WBGC’s debt asset ratio reduced by 15%.

**Joint Ventures**

WBG has successfully established joint ventures with some of the world famous bearing manufacturers such as Koyo Seiko (Japan), THK (Japan) and American General Bearing Corporation Limited and has established strategic partnership with SKF (Sweden).

In 1990, WBF and an American company jointly set up Huamei Company, which WBF held 69.7% of its equity. In March 1996, WBGC and American General Bearing Corporation Limited jointly set up Wafangdian General Bearing Co., Ltd, WGBC. Later on in 1997, WBGC transferred its share in this
joint venture to WBC. In August 1996, WBGC, and Koyo Seiko Toyota Tsusho Corporation set up a joint venture Dalian Koyo Wazhou Automobile Bearing Co., Ltd. In March 1996, DaLian THK Co., Ltd. was set up as a joint venture between JANPAN THK Co., Ltd. and WBGC with investment of $2,990,000, in which the former hold 70 percent and the latter 30 percent. In May 1998, WBC and SKF Investment Co., Ltd jointly set up SKF Wuzhou Company with respective capital contribution of 49% and 51% of equity.

**Industrial Dynamics in General Machinery Parts Manufacturing Industry**

The general machinery parts manufacturing industry, which WBGC belongs to, is a three-digit industry. In 1987, there were 660 firms in this industry, among them 87 were SOEs, 561 were COEs, 7 of the remaining 12 firms were joint ventures between SOEs and COEs, the ownership of the other 5 was not identified. By 1996, the number of firms in this industry was 1055, and the number of SOEs and COEs were 112 and 888 respectively. The number of foreign invested firms increased from zero to 34. And the number of small firms increased by 371.

| Number of Firms in General Machinery Parts Manufacturing Industry in Liaoning Province |
|---------------------------------------------|--------|--------|
|                                            | 1987   | 1996   |
| SOEs                                       | 87     | 112    |
| COEs                                       | 561    | 888    |
| Foreign Invested                           | 0      | 34     |
| Total                                      | 660    | 1055   |
| SOE share in Sales (%)                     | 59     | 52     |

The inflow of non-SOEs had only slightly reduced the share of SOEs' sale in the industry from 58.8% to 51.8% between 1987 and 1996. The 4 firms' concentration ratio had stayed relatively stable around 34%. However the relatively stable SOE share and CR4 do not mean the market is static. Contrast to the stable aggregate picture, the industry has showed a significant turnover. For example, from 1988 to 1992, there were 486 new firms entered
the industry, while 346 old firms exit the industry, 769 of the new entries and exits are small COEs. Moreover, incumbent firms had also showed significant turnover, only 3 of the top ten firms with the highest sales in 1987 were still on the top 10 in 1996. In 1987, there were two non-state firms on the top ten, one of them was COE and was a subsidiary of WBF, and the other one was a state and collective joint venture. By 1996, there were two COEs and one Foreign Owned Firm on the top ten. The foreign owned firms actually ranked the second in terms of revenue.

**WBGC (WBF)'s Performance**

From 1987 to 1996, WBGC's gross output value had more than doubled, with an average growth rate of 11% annually and its labour productivity had been growing 6.9% annually, and has always been the leader of the industry. Yet, the emerging and development of non-state enterprises has posed significant competitive pressures upon it. WBF's profit margin has been declining. Its pre-tax profit sale ratio declined from 33.6% in 1980 to 11.7% in the later 1995. Its debt asset ratio has been rising from 15% in 1980 to 65% in 1994.

![Profitability and Debt/Asset Ratio in WBGC (%)](chart)

While WBGC's profitability has been declining, the share of WBGC's retained profit has tended to increase, which WBGC did not put into investment as it was proved in 1995 that the State was the only registered investor. As a
consequence of declining profitability and a rising share of retained profit, the share of profits and taxes submitted to the state declined.

![Distribution of Profit (%)](image)

WBGC has also witnessed the rapid increase of inter-enterprises arrears since 1985. The ratio of payment due to receive to sales increased from 4.9% in 1984 to 41.8% in 1995, and the ratio of payment due to pay to sales increased from 0.7% in 1984 to 23.6% in 1994.

![Inter Enterprises Arrears (% of Sales)](image)
Chapter 4: Efficiency Evaluation of Chinese Enterprises from 1987-1996, a DEA Measure

4.1 Introduction

As was discussed in the previous chapter, there exist two contradictory views about the effect of China's economic reform on SOE performance. One view is that China's economic reform has improved SOE performance, characterised by increasing TFP since the 1980s (Chen et al., 1988, Jefferson et al., 1996; Jefferson and Singh, 1999). The other view, based on the evidence of declining SOE profitability, is that economic reform has not improved SOEs' performance, and that SOEs have actually become a destabilizing influence on the whole economy (Sachs and Woo, 2000).

However, neither productivity nor profitability is necessarily a good indicator of enterprise performance in transition economies. On one hand, Bai et al. (1997) suggested that improved productivity could possibly be an index of even lower economic efficiency given the significant non-profit objectives of SOEs. They suggested that when the objectives of the manager differs from that of profit maximization, higher productivity can induce distorted behaviour that partially or totally offsets efficiency gains from improved technology. On the other hand, falling profitability may result from the emergence of competition from non-state enterprises, which is a desirable effect of economic reform (Naughton, 1995; Jefferson and Rawski, 1994). Moreover, falling profitability could be the result of expanded managerial autonomy, as when managers' autonomy expands, they have both the incentive and discretion to manipulate the financial account (Sicular, 1995).

¹For example, when SOEs' performance is assessed by output level, manager's objectives will be biased toward increasing output, and deviate further from profit-maximizing output level. One such evidence in China is the high level of inventory. According to the China
In order to assess accurately the effect of China's enterprise reform, there is clearly a need to measure enterprise performance in a more robust fashion. As efficiency improvement is a major objective of economic reform, and is considered a survival condition for firms in a competitive environment and is central to firm's long term growth (Bain, 1969), in this chapter we will assess directly enterprises' efficiency, and investigate the effects of economic reforms and increased competition upon enterprise efficiency.

This chapter is organised as follows: in section 2, the concept of efficiency and the efficiency measurement used in this chapter are introduced: Data Envelopment Analysis (DEA) and the Malmquist Productivity Index; in section 3, the data used in this chapter are described. In section 4, the estimations of DEA and the Malmquist index are implemented and the results of these estimations are reported. In Section 5, we discuss a number of mechanisms by which enterprise efficiency can be improved, and a panel data analysis is used to estimate the effect of enterprise efficiency determinants upon firms' efficiency indexed by the efficiency score estimated in section 4. In section 6, a dynamic panel data analysis is applied to study the dynamic process by which firms strive to catch up with technology frontier. The final section concludes.

4.2 Concept of Efficiency and Efficiency Measurement

4.2.1 Concept of Efficiency

The efficiency of a production unit is defined as the ratio of observed to optimal values of its output and input. The comparison can take the form of the ratio of observed to maximum potential output obtainable from the given

input, or the ratio of minimum potential to observed input required producing the given output (Lovell, 1993). In this comparison, the optimum is defined in terms of production possibility, and efficiency is technical. The optimum can also be defined in terms of the behavioural goal of the production unit, and efficiency is measured by comparing the observed and optimal cost, revenue, profit, or other organisational objectives subject to constraints on quantities and prices. Under such a comparison, efficiency is economic. Economic (or productive) efficiency of a firm consists of two components: technical efficiency, which reflects the ability of a firm to obtain maximal output from a given set of inputs, and allocative efficiency, which reflects the ability of a firm to combine the inputs and the outputs in optimal proportions, given their respective prices.

Koopmans (1951) provided a formal definition of technical efficiency: a production unit is technically efficient if an increase in any output requires a reduction in at least one other output or an increase in at least one input, and if a reduction in any input requires an increase in at least one other input or a reduction in at least one output. Debreu (1951) and Farrell (1957), who drew upon the work of Koopmans (1951), introduced a measure of technical efficiency, which is defined as one minus the maximum equi-proportionate reduction in all inputs that still allows continued production of given outputs. Lovell (1993) provided a measure of economic efficiency by the ratio of minimum cost to observed cost, given the objective of the production unit is cost minimisation. A measure of allocative efficiency can then be calculated by the ratio of economic efficiency to technical efficiency.

This idea can be illustrated in simple firms using two inputs $X_1, X_2$ to produce a single output $q$. The unit isoquant of the efficient firms is represented by $AA$ in Figure 4.1, and assumes constant returns to scale. It shows various combinations of inputs producing a unit level of output.
If Point \( P \) is a specific firm, then the output oriented technical efficiency of firm \( P \) will be defined as:

\[
\text{Technical efficiency} = \frac{OR}{OP} \tag{4.1}
\]

A producer is said to be technically efficient if production occurs on the boundary of the producer's production possibilities; it is technically inefficient if production occurs in the interior of the production possibilities set. The term technical inefficiency is used to embrace all reasons for actual performance falling short of that which could be attained given inputs. Liebenstein's (1966) \( X \)-inefficiency is one component.

In Figure 4.1, the input price is represented by the line \( BB \), so that the allocative efficiency (price efficiency) of the firm operating at \( P \) is defined as:

\[
\text{Allocative Efficiency} = \frac{OS}{OR} \tag{4.2}
\]

The economic efficiency is defined as a product of technical and allocative efficiency, which is the overall cost of producing at \( Q \) relative to \( P \):

\[
\text{Economic efficiency} = \frac{OS}{OP} = \frac{OR}{OP} \times \frac{OS}{OR} \tag{4.3}
\]
4.2.2 Efficiency Measurement: Data Envelopment Analysis (DEA)

Over the past 40 years, economic efficiency has been estimated using two frontier models: stochastic and non-stochastic. Econometric approaches and mathematics programming approaches have been used to estimate these two frontiers. Both of these two methods try to identify the production frontier and then measure how far away actual output is from the production frontier. Generally, the econometric approaches are parametric, combining the technical progress with inefficiency, while the mathematical programming approaches are non-parametric. Econometric approaches are stochastic, and try to distinguish random noise from inefficiency. Mathematical programming approaches do not distinguish noise from inefficiency. However, the econometric approaches confound the effects of misspecification of functional form with inefficiency. The mathematical programming approach is less prone to this type of specification error (Lovell, 1993). The most commonly used econometric approach is Stochastic Frontier Analysis (SFA). Data Envelopment Analysis (DEA) is the most frequently used mathematical programming approach.

**Stochastic Frontier** models assumes the following function form:

\[ y = f(X) \exp(u + \nu) \]  

(4.4)

where \( \nu \) is random disturbance that captures the effects of statistical noise and is distributed as \( N(0, \sigma^2) \), the disturbance term \( u \) is independent of \( \nu \), \( u \leq 0 \). The deterministic production frontier is \( f(X) \), which shows the technical possibility, the stochastic production frontier is \( f(X) \exp(\nu) \), which captures the random influence of environment. And technical efficiency can be estimated as below:

\[
\text{Technical efficiency (TE)} = \frac{y}{f(X) \exp(\nu)} = \exp(u) \]  

(4.5)
In order to calculate $TE$, first equation (4.4) has to be calculated, then the residual has to be deconstructed into noise and technical inefficiency. The estimation was first implemented by Aigner, Lovell and Schmidt (1977), etc. The deconstruction was first proposed by Jondrow, Lovell, Materov, and Schmidt (1982).

Data Envelopment Analysis (DEA), proposed originally by Charnes, Cooper and Rhodes (1978), involves the use of linear programming methods to construct a non-parametric piece-wise surface (or frontier) over the data, and against which the efficiency is measured. It is a generalisation of the Farrell (1957) single-input/single-output efficiency measures to the multiple-output case by constructing a relative efficiency score as the ratio of single “virtual” output to single “virtual” input.

In DEA, there are typically $n$ Decision-Making Units (DMU) to be evaluated, each DMU using different amounts of $m$ inputs to produce $s$ different outputs. DEA tries to identify a set of best practice DMUs to form an envelopment surface, called the empirical production function or the efficient frontier. This set of best practice DMUs are those for which no other DMUs or linear combination of DMUs has as much or more of every output (given a fixed amount of inputs – for an output-oriented model) or as little or less of every input (given a fixed amount of outputs – for an input-oriented model). The envelopment frontier is formed as a piecewise linear combination that connects the set of these best practice DMUs, yielding a convex production possibility set. By comparing each DMU to the envelopment surface, the DEA provides a computational analysis of relative efficiency for multiple input/output situations. Units which lie on the surface are efficient; those which do not lie on the surface are inefficient. Thus DEA provides a measure of relative efficiency.
The basic DEA model is described as follow:

\[
\max_{u,v} \frac{u^T y_i}{v^T x_i} \tag{4.6}
\]

subject to

\[
\frac{u^T y_j}{v^T x_j} \leq 1 \quad j = 1,2,...,i,...n
\]
\[
u,v \geq 0
\]

Where \((x_i, y_i)\) is the input-output vector to be evaluated, \((x_j, y_j)\) is the input-output vector of the \(j\)th production unit in the sample. This model estimates a set of non-negative weights \(u^T\) and \(v^T\) which, when applied to every production unit’s input and output, maximizes the ratio of weighted output-to-input ratio for the production unit being evaluated.

One problem with the above ratio formulation is that it has an infinite number of solutions, since if \((u^*, v^*)\) is optimal, then \((\alpha u^*, \alpha v^*)\) is also optimal for \(\alpha > 0\). Charnes et al. (1978) solved this problem by imposing the constraint \(v^T x_i = 1\), and transformed the above basic model as follows:

\[
\max_{u,v} u^T y_i \tag{4.7}
\]
\[
\text{st} \quad v^T x_i = 1
\]
\[
u^T y_j - v^T x_j \leq 0, \quad j = 1,2,...,N,
\]
\[
u^T, v^T \geq 0
\]

Using the duality\(^2\) in linear programming, an equivalent envelopment form of this problem can be derived as follows:

\[
\min_{\theta, \lambda} \theta \tag{4.8}
\]
\[
\text{st} \quad -y_i + Y\lambda \geq 0
\]
\[
\alpha_i - X\lambda \geq 0
\]
\[
\lambda \geq 0
\]

\(^2\) While the envelopment form provides information on efficiency and peers, the multiplier form provides information on shadow prices.
where $X$ is an $M \times N$ input matrix with columns $x_j$, $Y$ is an $S \times N$ output matrix with columns $y_j$, $\theta$ is a scalar, and $\lambda$ is a $N \times 1$ vector of constants.

This dual constructs a piecewise linear “envelopment” approximating to the true frontier by minimizing the levels of the inputs required to produce the given level of outputs. This envelopment form involves fewer constraints than the multiplier form ($K + M \leq N + 1$), and hence is generally the preferred form to solve. The value of $\theta$ obtained will be the efficiency score for the $i_{th}$ firm. It satisfies: $\theta \leq 1$, with a value of 1 indicating a point on the frontier and hence a technically efficient firm. This linear programming problem is solved $N$ times, once for each production unit being evaluated, to generate $N$ optimal values of $(\theta, \lambda)$.

The DEA model above imposes the restriction of constant returns to scale (CRS). Imperfect competition, constraints on finance, etc., may cause a production unit to be not operating at optimal scale. Banker et al. (1984) suggested an extension of the CRS DEA model to account for variable returns to scale (VRS) situations by adding to equation (4.8) the constraints $e^T \lambda = 1$, where $e$ is a $N$ by 1 vector of ones. The use of the CRS specification when not all DMUs are operating at the optimal scale will result in measures of technical efficiency ($TE$) that are confounded by scale efficiencies ($SE$).

The calculation of technical efficiency and scale efficiency is illustrated for a single input and a single output in Fig 4.2.

The technical efficiency of a production unit represented by point $K$ in the case of Constant Returns to Scale (CRS) is $\frac{HI}{HK}$. In the case of Variable Returns to Scale (VRS), the technical efficiency is $\frac{HJ}{HK}$, and scale efficiency is $\frac{HI}{HJ}$, so that

$$TE_{crs} = \frac{HI}{HK} \cdot \frac{HJ}{HK} = TE_{vrs} \cdot \text{Scale Efficiency}$$
DEA has already been applied widely to estimate various kind of efficiency in both public service and private sectors, one example is Leibenstein and Maital’s (1992) estimation of X-efficiency, and DEA has several features that are attractive to this study.

Firstly, unlike SFA, which assumes a common production function form for all the firms in the sample, DEA places no restrictions on the functional form of the production relationship. Each firm can have a production function of its own. It is more flexible in recognizing differences in production functions between firms. This is an advantage, which is particularly attractive for this study, as one of the assumptions for production function selection in SFA is perfect market competition, which is not applicable in transition economies.

Secondly, it deals with individual units rather than population averages. DEA is oriented toward individual firms that are regarded as responsible for utilizing inputs to produce the outputs of interest. It therefore utilizes n optimizations, one for each firm, rather than the single optimization that is usually associated with the regressions used in traditional efficiency analyses. Hence, the DEA solution is unique for each firm under evaluation. This is also advantageous for this study, as firms in transition economies - especially in a developing
transition economy such as China’s - are in a range of developmental stages and adopt a range of technologies.

Thirdly, DEA focuses on revealing the best practice production frontier rather than on the general tendency of the frontier. Firms are directly compared against a peer or combination of peers, and for each firm, a single efficiency index to measure the utilisation of input factors to produce desired outputs is produced (Charnes et al., 1994).

However, the same characteristics that make DEA attractive can also create problems. It is deterministic and only gives point estimates that do not provide information about uncertainty in estimation, and the estimation depends heavily upon the correct identification of frontier units. Hence, measurement error can cause significant problems.

4.2.3 Measurement of Productivity Change: The Malmquist Index

The concept of efficiency is closely linked with the concept of productivity, which is generally defined as the ratio of the outputs that the firm produces to a measure of the inputs that it uses. Productivity varies due to differences in production technology, differences in the efficiency of production process, and differences in the environment in which production occurs. Productivity growth therefore comes from the improvement in efficiency of the production process, the advancement of production technology (the outward shift of a production frontier), and improvement in the environment (Lovell, 1993).

As it is observed in the Chinese context that China’s economic reform has improved labour productivity and TFP at both firm level and aggregate level, we would like to see to what extent the improvement in firms’ efficiency contributes to this productivity growth. It has been discussed in Chapter 3 that there are some problems in applying TFP estimation to firms in transition economies, a non-parametric Malmquist approach, which has been developed
by Fare et al., (1989) and their associates as a way of deconstructing productivity growth, is applied to estimate a firm-specific productivity index.

Fare and Grosskopf (1992) defined an output based Malmquist productivity change index between period $s$ (the base period) and the period $t$ as:

$$m_o(y_t, x_t, y_s, x_s) = \left[ \frac{d_o'(x_t, y_t)}{d_o'(x_s, y_s)} \times \frac{d_o'(x_t, y_t)}{d_o'(x_s, y_s)} \right]^{1/2}$$

where $d_o'(x_t, y_t)$ represents the distance of firm $O$'s performance in period $t$ relative to the period $s$ technology. This Malmquist index represents the productivity change of the production point $(x_t, y_t)$ relative to the production point $(x_s, y_s)$. It is the geometric mean of a pair of ratios of output distance functions. The first ratio compares the performance of firm $O$ from periods $s$ and $t(t > s)$ relative to production possibilities in period $s$, and the second ratio compares the performance of the same data relative to production possibilities in period $t$.

The above formula can be rewritten as:

$$m_o(y_t, x_t, y_s, x_s) = \frac{d_o'(x_t, y_t)}{d_o'(x_s, y_s)} \left[ \frac{d_o'(x_t, y_t)}{d_o'(x_s, y_s)} \times \frac{d_o'(x_t, y_t)}{d_o'(x_s, y_s)} \right]^{1/2}$$

This deconstructs the Malmquist output-oriented productivity change index into the product of two terms. The first term is the ratio of two output distance functions’ technical efficiency indices from periods $t$ and $s$, which indicates whether technical efficiency has improved. The second term is a geometric mean of the shifts in the production frontier in two directions, which shows whether or not there is a technical change.

Efficiency change = $\frac{d_o'(x_t, y_t)}{d_o'(x_s, y_s)}$

Technical change = $\left[ \frac{d_o'(x_t, y_t)}{d_o'(x_s, y_s)} \times \frac{d_o'(x_t, y_t)}{d_o'(x_s, y_s)} \right]^{1/2}$
The implementation of this is similar to DEA and is achieved by solving four sets of linear programming problems, which will not be discussed here. This deconstruction is illustrated in Figure 4.3 involving a single input and a single output, where a constant return to scale technology is assumed. $F'$ and $F^s$ are production frontiers in period $t$ and $s$ respectively. The firm produces $y'(x')$ and $y^s(x^s)$ respectively in periods $t$ and $s$. In each period, the firm is operating below the technology for that period.

Using the above equations, we obtain:

Efficiency change = \( \frac{y_t}{y_d} \times \frac{y_s}{y_a} \)

Technical change = \( \left[ \frac{y_t}{y_c} \times \frac{y_s}{y_b} \right]^{1/2} \)

and

Malmquist Productivity Index = \( \frac{y_t}{y_d} \times \left[ \frac{y_t}{y_c} \times \frac{y_s}{y_b} \right]^{1/2} \).

In this section, the methods of efficiency and productivity measurements have been discussed, in particular the Data Envelopment Analysis (DEA) and the
Malmquist Productivity Index. In the section 4.4, these two methods will be applied in the context of Chinese firms to estimate firms’ efficiency and productivity improvement.

4.3 Data

The data set used in this study is an unbalanced panel of data for the period 1987-1996 from a Northern Chinese province, Liaoning, covering all the large and medium manufacturing enterprises in this province. In fact, the reform of large and medium SOEs has always been the focus of the China’s enterprise reform. Moreover, the period 1987-1996 is the period when economic reform evolved, as discussed in Chapter 3, from ‘crossing the river by groping for stones’ to establishing a market economic system, while SOE reforms gradually changed from expanding managerial autonomy and allowing profit-sharing to establishing a modern enterprise system and privatising small SOEs on a large scale.

In China, the size of enterprises is classified according to criteria put forward in 1988 and amended in 1992 by the National Economic and Trade Committee, National Planning Committee, National Statistics Bureau, National Financial Ministry and National Personnel Ministry. According to these criteria, enterprises can be classified into Extremely Large, Large I, Large II, Medium I, Medium II and Small Enterprises according to their productive capacity and/or productive fixed assets. For example, in the iron and steel industry, enterprises are classified according to their steel production capacity and/or their productive fixed assets. See the table below:

| Table 4.1 Enterprise Size Classification Criteria for Iron and Steel Industry |
|-----------------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
|     | Extreme Large | Large I | Large II | Medium I | Medium II | Small |
| Capacity | >=1.5 million tons | >=1 Million tons | 0.6 - 1 million tons | 0.3 - 0.6 million tons | 0.1 – 0.3 million tons | <0.1 million tons |
| Productive Fixed Asset | >1 billion Yuan RMB | | | | | |
Each year, enterprises may apply to upgrade their classification as long as they have reached the required criteria. Therefore, this data set is dynamic and unbalanced, as a small firm may enter the dataset when it has reached the required criteria for being a medium firm.

These enterprises consist of various ownership forms and administration structures, and are distributed in various manufacturing sectors. Table 4.2 presents the distribution of these enterprises across various ownership types over the period under study. Most of the large and medium enterprises are SOEs; however, the share of SOEs is decreasing. In 1987, 87.5% of large and medium enterprises were SOEs; this share decreased to 66.4% in 1996. The share of COEs has been relatively stable at around 15%. The number of non-public large and medium enterprises increased rapidly from 1 in 1987 to 286 in 1996.

Table 4.2: The Distribution of Large and Medium Enterprises in Liao Ning Province.

<table>
<thead>
<tr>
<th></th>
<th>Number of Firms</th>
<th>SOEs</th>
<th>COEs</th>
<th>Domestic Private</th>
<th>Joint Venture</th>
<th>Foreign Owners</th>
<th>Share holding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987</td>
<td>784</td>
<td>686</td>
<td>97</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1988</td>
<td>812</td>
<td>688</td>
<td>121</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1989</td>
<td>938</td>
<td>782</td>
<td>149</td>
<td>4</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1990</td>
<td>970</td>
<td>806</td>
<td>153</td>
<td>5</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1991</td>
<td>1054</td>
<td>866</td>
<td>169</td>
<td>0</td>
<td>14</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>1992</td>
<td>1258</td>
<td>1012</td>
<td>224</td>
<td>1</td>
<td>16</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>1993</td>
<td>1315</td>
<td>1020</td>
<td>182</td>
<td>47</td>
<td>36</td>
<td>5</td>
<td>25</td>
</tr>
<tr>
<td>1994</td>
<td>1318</td>
<td>952</td>
<td>188</td>
<td>42</td>
<td>69</td>
<td>20</td>
<td>47</td>
</tr>
<tr>
<td>1995</td>
<td>1559</td>
<td>1052</td>
<td>241</td>
<td>31</td>
<td>128</td>
<td>45</td>
<td>62</td>
</tr>
<tr>
<td>1996</td>
<td>1488</td>
<td>988</td>
<td>214</td>
<td>27</td>
<td>130</td>
<td>61</td>
<td>68</td>
</tr>
</tbody>
</table>

Similar to the picture of manufacturing enterprises at the national level, the performance of these enterprises has also shown a trend of declining profitability and rapidly increasing labour productivity. Fig 4.4 shows the labour productivity and profitability of these enterprises for the period of 1987-1996.
Labour productivity more than doubled, but the profit-sales ratio declined from around 12% in 1987 to less than 3% in 1996 (see Fig 4.4).

**Fig 4.4 Rising Labour Productivity (1987=100) and Falling Profitability (%) of Large and Medium Enterprises in Liao Ning (1987-1996)**

4.4 Efficiency and Productivity: DEA and The Malmquist Productivity Index

In this section, the efficiency index and the Malmquist productivity index are estimated for each enterprise over the 10 year period, then the average efficiency index and Malmquist index are reported, and the features of the frontier firms will also be discussed.

4.4.1 Input and Output Variables

There are five main variables involved in the estimation: four input variables (employment, two types of assets (fixed assets and current assets), and intermediate material inputs), and one output variable (industrial output). The variables are defined as follows:
**Industrial Output:** Gross value of industrial output (GVIO) in current prices is used as the measure of industrial output. This is a more appropriate measure than value-added, as value added can take negative values, which is not allowed in DEA. However, this measure also has its problems. For instance, due to the government regulation of strategic important industries, the prices of important products, such as coal, iron and steel, and oil etc., have long been subject to state controls and been set at lower than market prices, hence using gross value as the output measure of these products may underestimate the efficiency of firms in these industries. Another problem associated with using gross value of industrial output is that emphasising output maximization deviates from the market-oriented objectives of economic reform. In order to solve this problem, we include both intermediate inputs and current capital as inputs, as the unsold products are recorded as inventory, a component of current asset, according to China's accounting practice.

**Employment:** The annual average number of employees, which captures the employment situation throughout the whole year rather than just the year-end employment situation, is used in this study. However, the data do not distinguish between production workers, researchers and management (including production workers, technicians, and management). In general, large SOEs have the highest ratio of management to production workers, and TVEs and Private Enterprises have the lowest management-production ratio.

**Assets:** two types of assets - fixed assets and current assets - are distinguished. The reasons for distinguishing current assets are that they typically account for a third of a firm’s total assets, and they capture the firms’ liquidity, in which the non-state firms are constrained and SOEs are comparatively advantaged.

**Fixed assets** consist of two components: productive assets and non-productive assets, both measured at their historical prices. Productive assets include infrastructure, machinery and equipment for industrial production, whereas non-productive assets refer to apartment buildings for employees, hospitals, and sometimes even schools.
Current assets include product inventory, short-term investment, cash, accounts receivable, and notes receivable, etc. For all enterprises, both year-end value of current assets and the annual average value of current assets were recorded. As the current assets fluctuate over the accounting year, here I use the annual average current capital to capture the characteristics of current capital in a whole year.

Intermediate inputs: Intermediate inputs are measured in current prices. Intermediate inputs in general include raw materials, energy, depreciation, and other material consumption. They also include bought in components and services.

As DEA is carried out on a year-by-year basis for the 10 year period, and each firm is compared to its concurrent production frontier, measuring gross industrial output, fixed assets, current assets and intermediate inputs in current prices is not a problem. However, in order to calculate a Malmquist index, which estimates the change of efficiency and the shift of production frontiers over time, these variables have to be deflated. As the Malmquist productivity index in this study is estimated for a firm over two consecutive years, inputs and output are only deflated to the previous year’s price level. For fixed assets, only the newly increased assets are deflated. The fixed asset deflator can be found from the Statistical Yearbook of China. The intermediate input deflator can also be found from the same source. For current assets, due to its mobility, the inflation rate is used as the deflator. For Gross Value of Industrial Outputs (GVIO), we have the growth rate of GVIO in constant prices as a given, the deflated GVIO is calculated therefore by multiplying the previous year’s GVIO in current prices by the growth rate of GVIO in constant prices.

4.4.2 Economic Efficiency Index: DEA analysis

The actual calculation process of the DEA efficiency index was conducted by EMS (Efficiency Management System) Version 1.3 developed by Scheel
(2000). We did not distinguish scale efficiency and allowed for super efficiency. In order to check the robustness of the DEA results, Stochastic Frontier Analysis was also performed.

The average efficiency index and the market share weighted average efficiency index are presented in Fig 4.5. We can see that between 1987 and 1990, there was a 10% increase in the average efficiency index. However, from 1990 onwards, there was a widening gap between the best practice firms and the majority of firms, as DEA estimates the comparative efficiency. The average efficiency index had decreased from 58.36% in 1990 to 34.67% in 1996. The fact that the market share weighted average efficiency index lies above the simple average efficiency index indicates that larger firms tend to be more efficient.

![Fig 4.5. Average Efficiency Index](image)
The widening efficiency gap since 1990 has also been confirmed by the results from Stochastic Frontier Analysis (SFA)\(^3\) (See Fig 4.6), which has shown a similar tendency for the efficiency index as that estimated from DEA since 1988. Moreover, the SFA results also suggest that larger firms tend to be more efficient, as the market share weighted average efficiency index lies above the mathematical average efficiency index.

![Fig 4.6 Average Efficiency Index by SFA](image)

When we compare the average efficiency index of different ownership forms (See Fig 4.7), SOEs are the least efficient, with their average below the population average. The average efficiency index of foreign-invested firms is more than 15% higher than that of SOEs, even though they entered this dataset only after 1991. COEs also show higher technical efficiency; however, they are dominated by foreign-invested firms. It should also be noted that since 1990 and 1991, the efficiency gaps have been increasing across all ownership types.

---

\(^3\) In SFA, we assume a Translog production function, and take gross value of industrial outputs as output, total asset and the average number of employees as inputs.
This widening efficiency gap might have been caused on the one hand by the entry of new firms, which brings in new technology and new management practices and shifts forward the technology frontier; on the other hand, it might have been caused by the inability of inefficient firms to exit. Taking into account the dynamic feature of the dataset, the average efficiency indices of incumbent firms, new entries\(^4\) and exits\(^5\) are calculated. Fig 4.8 shows that new entries are indeed more efficient than incumbent firms on average; exits are less efficient than incumbent firms.

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\(^4\) New entries are generally former small enterprises developing into medium enterprises.

\(^5\) Large and Medium Firms exit normally in the form of merger.
4.4.3 Productivity Growth: Malmquist Index

In this section, firms' Malmquist productivity Index has been estimated and deconstructed into technological progress and efficiency improvement. Due to the unbalanced nature of the data set, the Malmquist Index can only be calculated for firms surviving for two continuous years. The calculation is also done by EMS (Efficiency Management System) developed by Scheel (2000).

Fig 4.9 shows the average Malmquist Productivity Index by types of ownership. Except in 1989 and 1990, the Malmquist Index has been increasing, although the average Malmquist index has been fluctuating. And for the 10-year period, the annual average growth of Malmquist productivity is 2.1%. In terms of ownership, COEs again outperform SOEs. Moreover, the Malmquist Productivity Index seems to be correlated with the growth of Gross Industrial Output.
As the Malmquist productivity index is the product of efficiency change and technological change (see section 4.2.3), by deconstructing the Malmquist index into efficiency change and the technological change (See Fig 4.10), we can see that the contribution to productivity improvement orienting from technical change seems to dominate the contribution from efficiency improvement in most years especially after 1991, indicating that productivity growth comes mainly from technical progress rather than from efficiency improvement.
4.4.4 Who Lead Technology Advance? The Features of Frontier Firms

With a panel data of firms, we can investigate the features of firms on the production frontier and the movement of firms on the frontiers, and examine what types of firms lead the technological advance in the context of China's economic reform. It is also of interest to study the stability of the efficient units, which strengthens the reliability of the approach if the same units appear on the frontier over time. We first examine the distribution of frontier units by ownership for the period between 1987 and 1996 (See table 4.3).

Table 4.3 The Distribution of Frontier Units by Ownership

<table>
<thead>
<tr>
<th>Year</th>
<th>SOE</th>
<th>COE</th>
<th>DPE</th>
<th>FOR</th>
<th>SHARE</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>1987</td>
<td>10</td>
<td></td>
<td></td>
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<td></td>
<td>10</td>
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<tr>
<td>1988</td>
<td>12</td>
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<td>12</td>
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<tr>
<td>1989</td>
<td>14</td>
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<td>1990</td>
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<td>1991</td>
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<td>1992</td>
<td>12</td>
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<td>19</td>
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<tr>
<td>1993</td>
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<td>1994</td>
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<td>1995</td>
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<td>1996</td>
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SOE: State Owned Enterprises; COE: Collective Owned Enterprises; DPE: Domestic Private Enterprises; FOR: Foreign Invested Firms; Share: Share Holding Companies
It is observed that at the beginning of the period, all the frontier units were SOEs. However, since 1989, non-state-owned enterprises began to occur on the production frontier. Most significantly thereafter is the retreat of SOEs from the production frontier and the occurrence of foreign-invested firms (joint ventures and foreign-owned) on the frontier. By 1996, of all the 17 firms on the production frontier, only 3 were SOEs, but 8 of them were foreign-owned and joint ventures. The number of COEs on the frontier was on the increase as well, especially during the early 1990s. As such, we may argue that newly-entered firms such as COEs in the 1980s, and the foreign-owned firms and joint ventures in 1990s tend to bring into the product markets new technologies or new governance mechanisms, which make them more efficient than their counterparts in state sectors. This result is arguably contrary to Jefferson et al.'s (1999) idea that SOEs lead in innovations.

The movement of firms on the technology frontier is examined in Table 4.4. Before 1993, the frontier units were relatively stable. For example, of the 10 firms on the production frontier in 1987, 4 firms were still on the production frontier in 1992; and of the 12 firms on the production frontier in 1988, 6 firms were still on the frontier in 1992. However, after 1992, the movement of firms on the production frontier accelerated. For example, of the 19 firms on the production frontier in 1992, only 2 firms were still on the production frontier in 1996.

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<td>1993</td>
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Another significant feature that should be noted is the extent of the occurrence of new entries on the production frontier (see Table 4.5). In fact, more than half of the frontier units entered the sample in the previous three years.

Table 4.5 The Occurrence of New Entries On The Production Frontier

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<td>1991</td>
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<td>1996</td>
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</tbody>
</table>

For example, of the 21 frontier units in 1990, 3 firms entered the sample in 1988, 2 of them entered the sample in 1989, and 4 of them entered in 1990; and of the 17 frontier units in 1996, 11 did not present in the sample until 1994.

Firms on the production frontier tend to have far higher efficiency scores than the population average in the following years (see Table 4.6), even though they might not be on the frontier anymore. For example, the average efficiency index of year 1987 frontier units in 1996 was nearly twice as high as that of the population average, and the average efficiency index of year 1992 frontier units in 1996 was 2.2 times as high as that of the population average.

Table 4.6 The Average Efficiency Score of Frontier Firms (%) in the Following Years

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</thead>
<tbody>
<tr>
<td>1987 Frontier</td>
<td>116.14</td>
<td>110.30</td>
<td>98.78</td>
<td>94.72</td>
<td>99.77</td>
<td>72.93</td>
<td>70.91</td>
<td>51.50</td>
<td>62.61</td>
</tr>
<tr>
<td>1988 Frontier</td>
<td>117.15</td>
<td>102.36</td>
<td>93.92</td>
<td>92.39</td>
<td>69.32</td>
<td>72.25</td>
<td>53.29</td>
<td>69.82</td>
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<tr>
<td>1989 Frontier</td>
<td>99.84</td>
<td>91.75</td>
<td>88.66</td>
<td>68.49</td>
<td>67.55</td>
<td>49.07</td>
<td>64.51</td>
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<tr>
<td>1990 Frontier</td>
<td>108.50</td>
<td>100.18</td>
<td>74.18</td>
<td>74.18</td>
<td>77.94</td>
<td>53.83</td>
<td>59.60</td>
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<td>116.79</td>
<td>81.24</td>
<td>85.26</td>
<td>74.10</td>
<td>74.30</td>
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<tr>
<td>1992 Frontier</td>
<td>82.69</td>
<td>78.37</td>
<td>67.06</td>
<td>74.48</td>
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<tr>
<td>1993 Frontier</td>
<td>92.50</td>
<td>59.66</td>
<td>58.51</td>
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<tr>
<td>1994 Frontier</td>
<td>74.66</td>
<td>75.02</td>
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<td>1995 Frontier</td>
<td>82.28</td>
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<tr>
<td>Average</td>
<td>53.83</td>
<td>48.73</td>
<td>58.36</td>
<td>54.62</td>
<td>50.67</td>
<td>47.28</td>
<td>46.10</td>
<td>34.59</td>
<td>34.67</td>
</tr>
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</table>
4.5 Economic Efficiency, Ownership, Competition and Internal Incentive

Why does firm’ efficiency differ?, why are SOEs less efficient in particular?, and what are the effects of economic reform and increasing market competition on firms’ efficiency? Using a panel data analysis, this section tries to answer these questions by estimating what determines firms’ efficiency in the Chinese context.

4.5.1 Determinants of Enterprise Efficiency

According to the theories of the firm, firms’ inefficiency arises due to the separation of ownership and control. As firms’ ownership and control are separated, there exists the agency problem - managers tending to pursue their own goals at the expense of those of shareholders (Edlin and Stiglitz, 1995; Williamson, 1964). This agency problem cannot be dealt with through a complete contract that can be monitored without cost (Hart, 1995; Mayer, 1996; Shleifer and Vishny, 1997). To induce the firm’s manager to maximize profitability and to make the firm more efficient, the principal can provide incentives to the manager, making his pay dependent on the observed cost (Laffont and Tirole, 1986), therefore firms’ efficiency can be improved by giving managers stronger incentives, or by flattening the hierarchy.

Competition in the capital market, product market and managerial market can reinforce internal discipline based on performance contingency incentive contracts. Competitive markets and the ease of entry and exit are assumed to be able to reinforce firms’ internal discipline and enhance firms’ performance (Vickers, 1995; Nickell, 1996). There are two ways that competition may affect the behaviour of firms. The first effect is described by Vickers (1995) and Nickell (1996) as “discovery and selection”, in which a low cost entrant will generate “disturbance’ to the market equilibrium and may drive high cost incumbent exit. The second effect of competition is to sharpen managers’
incentives. It is argued that both managers’ explicit incentives and implicit incentives will be improved as the numbers of competitors increase (Holmstrom, 1982; Nalebuff and Stiglitz, 1983; Hart, 1983; Nickell, 1995). Besides, in a competitive managerial market, competition helps to reveal the true ability of managers, and the concern for a future career induces efficient managerial behaviours (Fama, 1980; Holmstrom, 1999). The existence of the threat of ‘takeover’ in the capital market also acts as an incentive mechanism that deters management from the pursuit of policies that are substantially at variance with the interests of shareholders (Vickers and Yarrow, 1988; Fama and Jensen, 1983; Grossman and Hart, 1980).

As such the differences in firms’ efficiency can be attributed to the difference in the efforts of workers and managers, the organisational structure of production and the use of innovations, what Nickell termed as ‘technology’, and the differences in market conditions, including product market competition, market for corporate control and financial discipline (Nickell, 1995). In addition, firms’ size is also related to their efficiency (Hopenhayn, 1992)

Based on the above theoretical background and bearing in mind the debates around Chinese enterprise performance mentioned in Chapter 3, we will discuss the effects of ownership, market competition, and financial discipline upon enterprise efficiency in the Chinese context, together with the effects of the socialist legacy.
4.5.2 Determinants of Efficiency in Chinese Enterprises

Ownership

Chinese enterprises typically have five different ownership forms: State-Owned Enterprises (SOEs), Collectively-Owned Enterprises (COEs), Share ownership, Domestic Private-Owned Enterprises, China-Foreign Joint Ventures and Foreign Private-Owned Enterprises. Differences in the incentives of owners may result in difference in objectives of the enterprises they control, which leads to the difference in enterprise performance.

Under government intervention, SOEs may pursue objectives such as social stability rather than profit maximization, which consequently leads to soft budget constraints, and eventually inefficiency (Kornai, 1980; Shleifer and Vishny, 1994; Vickers and Yarrow, 1988).

COEs, in particular TVEs, are often believed to be more efficient than their state counterparts. COEs, in particular TVEs, are allegedly representing hybrid ownership forms emerging as transitional devices in the course of transition (Nee, 1992; Tian and Li, 1995; Tian, 2000; McMillan, 1997). Community members own these firms collectively, in fact they are controlled by community governments, and the profits are shared by community members. Although COE is a form of public ownership, they are not subject to central planning and have greater autonomy and face harder budget constraints. Furthermore, the government’s stake in COEs helps firms to access state finance and rationed materials, overcoming the problem of under-financing faced by private enterprises (Roland, 2000; Li, D., 1996; Che and Qian, 1998).

Private ownership is considered more independent from government intervention and more profit maximization-oriented, and consequently to be more efficient (Vickers and Yarrow, 1988).
In particular, foreign firms are argued to be more efficient as they possess some superior technology and expertise and operate in international competitive product markets which may induce higher efficiency and allow them to outperform domestic firms (Teece, 1977). However, the positive effect of private ownership is not yet conclusive even in western economies (Laffont and Tirole, 1993), and the relationship between ownership and enterprise performance is not clear in transition economies (compare, for example, conclusions in the recent reviews by Estrin and Wright (1999) and Djankov and Murrell (2002).

For the above reasons, SOEs are supposed to be less efficient compared with other ownership forms. Private-owned enterprises, especially foreign-owned enterprises, are supposed to be the most efficient. The efficiency of COEs should come between SOEs and private-owned enterprises.

**Internal incentives.**

Without changing ownership, China’s enterprise reform has significantly expanded SOEs’ contractual profit-sharing rights and managerial autonomy. The retained profit can be used for research and development, employees’ wage and bonuses, all of which could lead to efficiency improvement. We use the ratio of retained profit to sales revenue to capture this incentive effect for all firms, in particular their management. As employees’ bonuses are generally contingent on their output, therefore we also use the ratio of bonus to gross output value to capture this incentive effect for employees.

However, as SOEs’ managerial autonomy expands, SOE managers have more managerial discretion and face less monitoring, which consequently leads to so-called “insider control” (Aoki, 1995) - SOE insiders pursuing objectives other than profit maximization, such as income-appropriation and asset-stripping, which is easier than improving SOEs’ efficiency. Under such a condition, SOEs managers have little incentive to resist workers’ wage demands. Therefore we use wages and bonus in excess of industrial average
as a measure of the degree of ‘insider control’.

**Market Competition**

Since the start of economic reform in 1978, enterprises in China began to face increasing competition pressure coming from both SOEs and non-SOEs. However, enterprises in different sectors are not exposed to the same degree of competition. Market mechanisms were first introduced into sectors that were of no strategic importance and sectors where state-owned enterprises only account for a comparatively smaller fraction of sector outputs. As a result, while consumer goods industries now have relatively lower concentration of SOEs and stronger market competition, investment goods industries are still under a high level of government control. Furthermore, while the entry of new non-state owned firms is encouraged, another perspective of competition pressure, the exit of non-performing SOEs, is still lagging behind due to various social and economic concerns, which consequently weaken the threat coming from takeover and exit.

The usual practice of measuring the degree of market competition in the literature is to proxy the market competition using an index of concentration. The most popular measure is the concentration ratio. However, market competition is difficult to determine with any precision, and cannot be completely captured by just one variable. To avoid the problems thus created, we have used 5 measures of market competition: the four largest firm market concentration ratio (CR4), the number of competitors (the number of large and medium enterprises in three-digit industrial sector), the number of new entries in the three digit industrial sector, firm’s market share, and firm’s technology advantage, proxied by the deviation of firm’s asset labour ratio from that of minimum efficient size. We expect to see competition pressure driving up enterprises’ efficiency index in a more competitive market.

**Financial discipline**
Soft budget constraints have been allegedly responsible for enterprise inefficiency under the socialist system and consequently for its collapse (Maskin and Xu, 2001; Kornai, 1980). Hardening budget constraint has been one of the objectives of China’s enterprise reform. It is argued, however, that SOEs’ budgets are still soft due to their easy access to bank loans, government subsidies, and the concern of political and social stability associated with bankruptcy (Lin and Tan, 1999).

As the State direct finance has been reduced, bank loans have become SOEs’ main source of finance. However, bank loans in China are considered soft, and become another form of soft budget constraint. Taxation arrears and intra-firm arrears have emerged as other forms of soft budget constraints. Soft bank loans and intra-firm arrears arguably increase the possibility of being bailed out. Compared with SOEs, non-state enterprises, especially privately owned enterprises, have to face tougher budget constraints. The consequence of the tougher budget constraint is that activities of non-state owned enterprises are more market-oriented, because they have to make profit in order to survive.

Here, the ratio of net interest expenditure to revenue is used as an indicator of firms’ financial discipline. For the period after 1992, debt asset ratio is also available to capture the gearing effect of capital structure. As for the effect of soft budget constraint, for the period before 1993, there are data on profit and tax that should have been submitted to the government and the data on profit and tax have been submitted, the difference of these two values can be a proxy of the indirect soft budget constraints. For the same period, my data also contain information on intra-firm arrears, which is another form of soft budget constraint. After 1993, we have data on direct government subsidy to SOEs.

**Socialist Legacy**

Our final concern is SOEs’ historical legacies and the reform costs borne by
SOEs, and their effect upon SOEs' efficiency. It is argued that SOEs have inherited from the socialist system far more social responsibilities than have their non-state counterparts, such as social security, medical care and housing, etc. As the lifelong employment policy has been gradually broken down since reform, SOEs also face large pension and insurance burdens. As SOEs’ social burden is to a large extent expressed in the form of unproductive assets, such as hospitals, schools, etc., we therefore use the unproductive fixed asset ratio as a proxy of SOEs’ social obligations.

In the study, we also control for firms' technology level and firms' scale economy. I use the per employee productive asset as a measure of technology level and use the average fixed asset of firms accounting for 50% of sales as the minimum efficient scale of firm. Firm size is also controlled, as Hopenhayn (1992) suggested that larger firms tend to be more efficient.

4.5.3 Empirical Result

In estimating the impact of ownership, market competition, financial discipline, and socialist legacy upon productive efficiency, an econometric model with unbalanced panel data is estimated. We base our model on a production function:

\[ y_{it} = a_{it} f(X_{it}) \]  

(4.9)

and

\[ a_{it} = \omega Z_{i,t} + u_i + e_{i,t} \quad i = 1, \ldots, N; \quad t = 1, \ldots, T \]

where \( y_{it} \) is firm \( i \)'s output at time \( t \), \( X_{it} \) is a vector of firm \( i \)'s inputs to produce \( y_{it} \), \( f(X_{it}) \) is linear combination of \( X_{it} \), and is firm \( i \)'s production frontier at time \( t \), \( a_{i,t} \) represents firm \( i \)'s efficiency at time \( t \), \( Z_{i,t} \) is a vector of explanatory variables, \( u_i \) is a firm specific factor, and \( \omega \) is a set of parameters to be estimated. We do not include time specific variables, as efficiency index is estimated against the concurrent envelopment frontier.
Following our discussion in the last section, the explanatory variables to be included in the regression are shown in table below:

<table>
<thead>
<tr>
<th>Table 4.7: Explanatory Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ownership</strong></td>
</tr>
<tr>
<td><strong>COE</strong> Collectively-Owned Enterprises, dummy variable</td>
</tr>
<tr>
<td><strong>FORE</strong> Foreign-Funded Enterprises (joint ventures and private owned)</td>
</tr>
<tr>
<td><strong>OTHER</strong> Firms other than SOEs, COEs and Foreign</td>
</tr>
</tbody>
</table>

**Internal Incentives**

| **RETAIN** | The ratio of retained profit to revenue |
| **RETAIN92** | Interaction of retain and P92 |
| **LNPCWAGE** | Logarithms of wages per employee |
| **DPCWAGE** | Deviation of the average wage per employee from industrial median |
| **LNPCBONUS** | Logarithms of bonus per employee |
| **DPCBONUS** | Deviation of the average bonus per employee from industrial median |

**Market Competition and Technology**

| **CR4** Defined as the output ratio of the four largest enterprises in 2-digit industry in the region |
| **NUMFIRM** Number of firms in 2-digit industry |
| **NUMNEW** The number of new firms |
| **DPCASSET** Deviation of firm’s asset labour ratio from that of minimum efficient size |
| **MARKETS** Firm’s market share, defined as firm’s share of sales in the market. |

**Financial Discipline**

| **INTEREST** The ratio of interest expenditure to revenue |
| **INTEREST92** The interaction of interest with P92 |
| **ARREAR** The ratio of tax arrear to revenue |
| **SUBSIDY** The ratio of government direct subsidy to revenue |
| **DEBTRATE** The debt asset ratio |

**Socialist Legacy**

| **UPASSET** The ratio of unproductive to productive asset |

**Dummy variable**

| **P92** P92=1 if year>=1993, otherwise p92=0 |

In order to make full use of the available data (as data on taxation arrears are only available before 1993, and data on debt and government subsidy are only available since 1993), four equations have been estimated using panel data analysis approaches. The first equation is applied to data between 1987
and 1992; the second equation is applied to data between 1993 and 1996; the third equation is applied to the full sample period, while the fourth is also applied to the whole sample period but with interactive terms to capture the effect of acceleration of economic reform since 1993. Each equation is estimated using three different panel data analysis approaches: the fixed effects model, the random effects model, and the Generalised Estimating Equations (GEE).

The fixed effects model assumes that \( u_t \) is a time unvarying firm-specific factor, and is estimated by OLS after the data are transformed by subtracting group means from each observation (see Hsiao, 1985 and 1986). However, the transformation involved in this estimation process wipes out all explanatory variables that do not vary with time within a firm. This means that any explanatory variable that is time-invariant disappears, and so we are unable to estimate a slope coefficient for that variable (Baltagi, 1995; Hsiao, 1986). In this study, firm ownership, could be an example, as the ownership of most firms is constant over the 10-year period. Furthermore, by implicitly including more than 3000 dummy variables, we will reduce the degrees of freedom by a large number (Greene, 1997). Moreover, as the number of firms is large, the estimators of the individual effects may not be consistent (Baltagi, 1995).

The random effects model assumes that \( u_i \) is a random variable with a mean zero and a constant variance: \( u_i \sim \text{IIN}(0, \sigma^2_u) \) and is independent of \( e_{it} \sim \text{IIN}(0, \sigma^2_e) \). The random model is estimated by the Generalized Least Squares method. As we have suggested that my sample may have represented a larger population of Chinese firms in general. The random effect model seems to be more appropriate. A major problem with the random effects model is that the error term might be correlated with the independent variables, which we test for using the Hausman specification test. Another problem with the random effect model is the assumption of constant variance, which will be tested using the Breusich and Pagan Lagrangian multiplier test.
The Generalised Estimating Equations (GEE) proposed by Liang and Zeger (1986) is an extension of General Linear Model (GLM) to longitudinal data and panel data, assuming the existence of a relation between the observations of a cluster, while the observations of separate clusters are independent. The key concept is that heteroskedasticity and correlated error are treated as a nuisance and only the marginal expectation is modelled as a function of covariates. While the estimates are efficient if the covariance assumptions are correct, the estimated coefficients are still approximately unbiased even with misspecification of correlation structure, and the standard errors are reasonable if the sample is large (Liang and Zeger, 1986; Zeger et al., 1988). See more details for GEE in Liang and Zeger (1986), Zeger et al. (1988), and Diggle et al. (2002).

The results from the estimations are reported in Table 4.8. We noticed that the fixed effect estimation is a very conservative estimate of the effect of ownership, especially in the case of COEs. We also noticed that the random effect estimators are superior to the fixed effect estimators, as they have considerably smaller standard errors, and bigger overall R-squares. However, both Hausman test and Breusch and pagan Lagrangian multiplier test have rejected the assumption underlying random model, suggesting that there are correlations between the error term and the independent variables. Therefore, we turn to the Generalised Estimating Equations (GEE) approach described in Liang and Zeger (1986), taking the firm-specific effect as random. In fact, the results from the Random Effect model and GEE approach are similar. The results of the estimations by GEE approach, which is my preferred approach, is presented in Columns (3), (6), (9), and (12). Evident from these regressions are positively the effect of Collective ownership and higher average wage per worker, and negatively the effect of high concentration, the number of new entries, the higher than average bonus per worker, and the level of unproductive asset. Most interesting of them all is the negative effect of concentration ratio (CR4) and the number of new entries (NEWFIRM). Focusing on the estimation by GEE approach, I will discuss the results in more detail in the following section.
<table>
<thead>
<tr>
<th>Ownership</th>
<th>Pre-1993</th>
<th>After 1993</th>
<th>Full Sample</th>
<th>Full Sample with Interactive Term</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fixed</td>
<td>Random</td>
<td>GEE</td>
<td>Fixed</td>
</tr>
<tr>
<td>COE</td>
<td>-0.01</td>
<td>0.026**</td>
<td>0.033**</td>
<td>0.005</td>
</tr>
<tr>
<td>FORE</td>
<td>-0.060**</td>
<td>0.004</td>
<td>0.010</td>
<td>0.002</td>
</tr>
<tr>
<td>OTHERS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal Incentives</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RETAIN</td>
<td>0.289***</td>
<td>0.387***</td>
<td>0.424***</td>
<td>0.003*</td>
</tr>
<tr>
<td>RETAIN92</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LNPCWAGE</td>
<td>0.178***</td>
<td>0.156***</td>
<td>0.166***</td>
<td>-0.089***</td>
</tr>
<tr>
<td>DPCWAGE</td>
<td>-0.034***</td>
<td>0.002</td>
<td>0.008</td>
<td>0.105***</td>
</tr>
<tr>
<td>LNPCBONUS</td>
<td>-0.013***</td>
<td>0.014***</td>
<td>-0.017</td>
<td>0.023**</td>
</tr>
<tr>
<td>DPCBONUS</td>
<td>0.000**</td>
<td>0.000**</td>
<td>0.000***</td>
<td>-0.006***</td>
</tr>
<tr>
<td>Market Competition and Technology</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MARKETS</td>
<td>0.003***</td>
<td>0.002**</td>
<td>0.002**</td>
<td>0.003**</td>
</tr>
<tr>
<td>Numfirm</td>
<td>0.001***</td>
<td>0.000*</td>
<td>0.000</td>
<td>0</td>
</tr>
<tr>
<td>CR4</td>
<td>0.029</td>
<td>-0.029</td>
<td>-0.004</td>
<td>-0.052</td>
</tr>
<tr>
<td>NUMNEW</td>
<td>-0.005***</td>
<td>0.004</td>
<td>0.004**</td>
<td>-0.003***</td>
</tr>
<tr>
<td>DPCASSET</td>
<td>-0.009***</td>
<td>0.002</td>
<td>0.008</td>
<td>0.003**</td>
</tr>
<tr>
<td>Socialist Legacy and Financial Discipline</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UPASSET</td>
<td>0.017</td>
<td>-0.014</td>
<td>-0.032</td>
<td>-0.008</td>
</tr>
<tr>
<td>INTEREST</td>
<td>-0.798***</td>
<td>-0.655***</td>
<td>-0.614***</td>
<td>0.004</td>
</tr>
<tr>
<td>INTEREST92</td>
<td>-0.134***</td>
<td>-0.104**</td>
<td>-0.089*</td>
<td>-0.001***</td>
</tr>
<tr>
<td>ARREAR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEBTRATI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUBSIDY</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONS</td>
<td>0.630***</td>
<td>0.478***</td>
<td>0.439***</td>
<td>1.312***</td>
</tr>
<tr>
<td>Wald CHI2</td>
<td>556.29</td>
<td>567.63</td>
<td>1059.44</td>
<td>215.73</td>
</tr>
<tr>
<td>F</td>
<td>49.67</td>
<td>0.0992</td>
<td>0.001992</td>
<td>0.1997</td>
</tr>
<tr>
<td>R²</td>
<td>0.2743</td>
<td>0.62691</td>
<td>0.11467</td>
<td>0.1147</td>
</tr>
<tr>
<td>Hosman</td>
<td>239.30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obs</td>
<td>5778</td>
<td>5778</td>
<td>5778</td>
<td>5666</td>
</tr>
</tbody>
</table>

Note: *** Significant at the 1 per cent level. ** Significant at the 5 per cent level. *Significant at the 10 per cent level.
4.5.4 Interpretation of Empirical Results

Ownership and Efficiency

For the whole sample period between 1987 and 1996, the effect of non-state ownership upon efficiency is controversial. While both collective ownership and foreign ownership have always been positively related to efficiency index as we have expected, the effects of domestic private ownership are not conclusive. For example, the coefficient for ownership type classified as Others is positive and statistically significant only in Column (6). Interestingly, this is contrasted with the conclusion we drew from section 4.4 that firms classified as “others” are more efficient than SOEs, which indicates that the efficiency advantages enjoyed by these firms may not derive from ownership structure.

Efficiency and Market Competition

All measures of competition, the number of competitors (NUMFIRM), the number of new entry (NEWFIRM), and the concentration ratio (CR4) have significant negative effects upon firms’ efficiency in Column (6), (9), and (12). In addition, the effect of newfirm was significantly negative as well for the period between 1987 and 1992 (Column 3), while the effect of CR4 was negative but not significant. All these suggest that competition increases the firms’ efficiency gap to technology frontier, and firms in more concentrated sectors lagged further behind. However, in an effective competition environment, firms’ profit maximising behaviour and the pressure to survive will drive up firm’s efficiency.

One possible reason for increasing efficiency gap to technology frontier is that there are strong exit barriers within China’s markets, as new firms find it relatively easier to enter, but inefficient ones are reluctant to or not concerned about exit. As such, with the entry of more efficient firms, the disparity...
efficiency between frontier firms and majority firms becomes larger. This aspect of the market competition will be discussed in the next chapter.

In addition, the results have also suggested that firms’ market share is positively related to firms’ efficiency, however it is not clear whether the efficiency of a firm relative to others determines its market share or firms’ market share determines firms’ efficiency. The effect of technology level, proxied by $DPCASSET$ defined as the deviation of firms’ asset labour ratio from that of minimum efficient size, is not statistically significant.

**Efficiency and Internal Incentives**

The effect of incentive measures has also been significant for the whole sample period. The regression results suggest that at the initial stage of reform, profit retention does have a significant positive effect upon efficiency. However, its positive effect seems to fade away. For example, the coefficient of $RETAIN$ in Column (3) is 0.424, and is only 0.007 in model (6). By incorporating an interaction variable of retain and P92, we find that the effect of retain92 is significantly negative (See Column (12)). Average wage per worker, another indicator of incentive mechanism, is positively correlated with the efficiency index over the two periods. Interestingly, the incentive effect of excess bonus has been significantly negative for the two periods, which indicates the existence of insider control, under which SOE managers distribute excessive bonus rather than wages to workers, probably because wage levels were more closely regulated by the government.

**Efficiency and Financial Discipline**

Regression results do show that firms respond positively to gradually hardened budget constraints. However, even 20 years into the reform, soft budget constraints still persist. As a proxy of implicit government subsidy, enterprises’ tax arrears are negatively associated with the efficiency index for 1987-1992. The government’s direct subsidy is negatively associated with the
efficiency index as well for 1993 to 1996. However, another form of soft
budget constraint, intra-firm arrears, has a positive effect upon firms’
efficiency. This can be explained as the effect of firms trying to get round the
hard budget constraint imposed by the government as the result of economic
reform.

4.6 Are Firms’ Efficiency Gaps Persistent? A Dynamic Panel
Data Analysis

The above regressions have emphasized the static relationship between
firms’ efficiency and its determinants. However, it inadequately addresses
how firms respond to dynamic competition, such as the intense competition
between large firms, the entry of new firms, etc., and some other dynamic firm
characteristics, such as change in ownership, etc. Such dynamic
characteristics may be better captured by examining the persistence of the
efficiency gaps between firms.

If competition is intense and the market selection process is effective, there is
likely to be a convergence in the efficiency of competing firms to the
technology frontier. As firms strive to catch up with the technology frontier to
improve efficiency in order to be profitable and to survive, and those lagging
behind will exit. If market selection process is not effective, then there is likely
to be a weaker convergence in firms’ efficiency. As new firms enter driving
forward the technology frontier, but inefficient firms do not exit, which provides
weaker incentives for firms to improve efficiency. In the context of China, we
expect to see that non-state firms respond faster than SOEs to the technology
advance brought about by new entrants, and SOEs are slower in catching up
with technology frontier, this might lead to the convergence of SOEs’
efficiency to the lower end of the efficiency spectrum.

Essentially, this is a Schumpetarian perspective on the competition process,
which can be described as follow:
\[ \Delta \alpha_{i,t} = \gamma_i + \beta_i (a_f - \alpha_{i,t-1}) + \varepsilon_{it} \]  \hspace{1cm} (4.10)

where \( \Delta \alpha_{i,t} = \alpha_{i,t} - \alpha_{i,t-1} \), and \( a_f \) is the efficiency of frontier units, and \( \varepsilon_{it} \) is an error term. \( a_f - a_{i,t} \) is defined as the efficiency gap of firm \( i \) at time \( t \) to technology frontier, where \( a_f = 1 \) as was defined by the characteristics of the technology frontier. This equation describes the process of firms trying to catch up with technology advance. The coefficient \( \beta_i \) is interpreted as the speed of firm catching up with technology advance (technology frontier).

Rewriting equation 4.10, we have the following equations:

\[ \Delta \alpha_{it} = \gamma_i - \beta_i \alpha_{i,t-1} + \varepsilon_{it} \]  \hspace{1cm} (4.11)

Where \( \gamma_i = \gamma_i + \beta_i \). This equation is related to the convergence literature (Barro and Sala-I-Martin, 1992; Sala-I-Martin, 1996). In the context of cross section and time series methods of testing convergence, if \( \beta_i > 0 \), then there exists \( \beta' \) convergence', indicating that less efficient firms tend to increase their efficiency faster than more efficient firms. There are three types of \( \beta \) convergence, if both \( \beta_i \) and \( \gamma_i \) are the same across firms then \( \beta \) convergence is called absolute convergence; if \( \beta_i \) is the same but \( \gamma_i \) is not constant for all the firms, then \( \beta \) convergence is called conditional \( \beta \) convergence; a third type of \( \beta \) convergence is club convergence if \( \beta_i \) is not constant for all the firms. A second test of convergence is '\( \sigma \) Convergence', which holds if the cross-sectional standard deviations of the efficiency index decrease over time. The existence of \( \beta \) convergence is a necessary condition for the existence of \( \sigma \) convergence, as it is impossible to have two firms to be closer in efficiency without the less efficient firm improving its efficiency faster. However the '\( \sigma \) Convergence' concept process maybe not especially
relevant here since this is an out-of steady state behavior. The more relevant test of the competitive process is the $\beta$ convergence.

In this chapter we first test if the dispersion of firm efficiency tends to decrease, the existence of 'convergence', by calculating the standard deviation of firms' efficiency over the period of 1987-1996. The results are presented in Fig 4.11. In general, there was an increase in the cross sectional standard deviation for efficiency from 0.15 in 1987 to 0.25 in 1993, this was followed by a decline to 0.19 in 1996, which was nevertheless still higher than that in 1986. For COEs, there was a substantial increase from 0.08 in 1986 to 0.30 in 1991, which was followed by a gradual decline to 0.18 in 1996. The increased dispersion of firm efficiency suggests that more efficient firms are entering, but less efficient ones are still staying, which may have changed since the acceleration of economic reform in 1992, as is indicated by the gradual decline in the dispersion of firms' efficiency since 1992 and 1993.

![Fig 4.11 Sigma Convergence: Standard Deviations of Efficiency](image)

In testing whether there is $\beta$ convergence, we based our estimation on the equation (4.11). However, in a dynamic context, the presence of an endogenous variable in the right hand side of the equation implies a more
complicated estimation of the model due to collinearity with the error term. This renders the conventional ordinary least square (OLS) estimator biased and inconsistent. To solve the problem, Anderson and Hsiao (1981) proposed using further lags of the level or the differences of the dependent variable to instrument the lagged dependent variables included in a dynamic panel data model. This leads to consistent but not necessarily efficient estimates of the parameters in the model.

In light of this, we rewrite equation (4.11) as follows:

$$\alpha_{i,t} = y_{i,t} + \lambda_i \alpha_{i,t-1} + \epsilon_{i,t}$$

(4.12)

where $\lambda_i = 1 - \beta_i$. This equation can be regarded as a reduced form of a more elaborate structural model involving entry, threatened entry and exit of firms, in which an efficient new entrant will generate a substantial disturbance to the market equilibrium, and may drive out some the least efficient incumbents (Vickers, 1995). In equilibrium, the level of efficiency will be:

$$\alpha_{i,t,e} = \gamma_i / (1 - \lambda_i)$$

However, equation (4.12) doesn’t differentiate between different sources of convergence in efficiency. In order to account for the different sources of convergence and different speeds of convergence due to firm ownership types and firm internal incentives, the following equation is estimated in this chapter:

$$\alpha_{i,t} = y_{i,t} + (\lambda_i + \lambda_i Y_{i,t}) \alpha_{i,t-1} + \omega X_{i,t} + \epsilon_{i,t}$$

(4.14)

where $y_{i,t}$ is a firm-specific effect, $\lambda_i = \lambda_i + \lambda_i Y_{i,t}$, $X_{i,t}$ is a vector of exogenous covariates, $Y_{i,t}$ is a set of ownership and internal incentive variables, $\epsilon_{i,t}$ is an error term, and $\lambda_i, \lambda_i$, and $\omega$ are the parameters to be estimated.
Arellano and Bond (1991), based on Anderson and Hsiao (1981), proposed a generalized method of moments (GMM) procedure treating the model as a system of equations, one for each time period. The predetermined and endogenous variables in first differences are instrumented with suitable lags of their own levels and strictly exogenous variables. GMM can be estimated by either the one-step method or the two-step method. The GMM estimator is robust in that it does not require information about the exact distribution of the disturbances and is instrumental in combating the problems associated with potential endogeneity. This procedure is considered to be more efficient than the Anderson and Hsiao (1981) estimator, and the consistency of the estimation depends on whether lagged values of the endogenous and exogenous variables are valid instruments in our regression. Also, this methodology assumes that there is no second-order autocorrelation in the errors. Arellano and Bond (1991) have derived a test for autocorrelation.

In this study, the above dynamic equation is estimated using one-step robust Arellano-Bond estimators, assuming a heteroskedastic error term. The covariates included in the estimation are presented in Table 4.9.

<table>
<thead>
<tr>
<th>Table 4.9 Explanatory Variables for Persistence of Efficiency gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCORE(-1)</td>
</tr>
<tr>
<td>SOE92</td>
</tr>
<tr>
<td>COE</td>
</tr>
<tr>
<td>FORE</td>
</tr>
<tr>
<td>OTHER</td>
</tr>
<tr>
<td>OWNCH</td>
</tr>
<tr>
<td>RETAIN</td>
</tr>
<tr>
<td>MKTS</td>
</tr>
<tr>
<td>COE*SCORE(-1)</td>
</tr>
<tr>
<td>FORE*Score(-1)</td>
</tr>
<tr>
<td>OTHE*SCORE(-1)</td>
</tr>
<tr>
<td>OWNCH*SCORE(-1)</td>
</tr>
<tr>
<td>RETAIN*SCORE(-1)</td>
</tr>
<tr>
<td>MKTS*SCORE(-1)</td>
</tr>
</tbody>
</table>
We report in Table 4.10 the estimation results from 6 different specifications: Specification 1 is the most restrictive in which both $\gamma_i$ and $\lambda_i$ are set to equal a constant which is the same for all the firms. In specification 2, $\lambda_i$ is still set to equal a constant and is the same for all the firms, but $\gamma_i$ is set to depend on $X$. Specification 3, is similar to specification 2, includes an interactive term to capture the effect of acceleration of economic reform since 1993. Specification 4 sets $\lambda_i$ to depend on $Y$, and $\gamma_i$ is set to depend on $X$. Specification 5 is applied to SOEs only, while Specification 6 is applied to COEs. The Arellano-Bond tests of first order correlation (M1) and second order serial correlation (M2) are reported in the bottom lines of the table. Estimates would be inconsistent if the null hypothesis of no second order correlation is rejected.

Both specification 1, 2, and 3 seems to suggest that there is convergence of firms' efficiency, as $\lambda_i$ is in the range of $[0.32, 0.34]$, indicating that $\beta_i$ is in the range of $[0.66, 0.68]$. However, a finer estimation in specification 4 suggests firms of different ownership types display different convergence patterns. For example, the values of $\lambda$ for SOEs, COEs, and firms being categorised as others are 0.428, 0.10, and 0.002 respectively, indicating that the speed of convergence for SOEs is slower than that for COEs and firms categorised as others, while the value of $\lambda$ for foreign firms is $-0.7$, suggesting that there is no convergence in efficiency for foreign firms. The difference in speeds of convergence between SOEs and COEs are further confirmed in specification 5 and specification 6, with the value of $\lambda$ for SOEs is 0.314, while this value for COEs is 0.226.
<table>
<thead>
<tr>
<th>Table 4.10: Persistence of Firm Efficiency Gap: A Dynamic Panel Data Study</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SCORE(-1)</strong></td>
</tr>
<tr>
<td><strong>COE*SCORE(-1)</strong></td>
</tr>
<tr>
<td><strong>FORE*SCORE(-1)</strong></td>
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<td><strong>OTHE*SCORE(-1)</strong></td>
</tr>
<tr>
<td><strong>OWNCH*SCORE(-1)</strong></td>
</tr>
<tr>
<td><strong>RETAI</strong></td>
</tr>
<tr>
<td><strong>MKTS</strong></td>
</tr>
<tr>
<td><strong>SOE92</strong></td>
</tr>
<tr>
<td><strong>COE</strong></td>
</tr>
<tr>
<td><strong>FORE</strong></td>
</tr>
<tr>
<td><strong>OTHE</strong></td>
</tr>
<tr>
<td><strong>OWNCH</strong></td>
</tr>
<tr>
<td><strong>RETA</strong></td>
</tr>
<tr>
<td><strong>MKTS</strong></td>
</tr>
<tr>
<td><strong>CONS</strong></td>
</tr>
</tbody>
</table>

**Statistical Test**

| M1 | -6.30 | 0.00 | -6.26 | 0.00 | -6.17 | 0.00 | -6.43 | 0.00 | -5.42 | 0.00 | -5.99 | 0.00 |
| M2 | 0.83 | 0.40 | 0.62 | 0.53 | 0.21 | 0.83 | 1.23 | 0.22 | 0.90 | 0.37 | -0.89 | 0.37 |

*Note: *** Significant at the 1 per cent level. ** Significant at the 5 per cent level. *Significant at the 10 per cent level.*
The results indicate that there is really a tendency for firms to catch up with the technology advance (frontier shift upward), and less efficient firms are quicker in catching up than more efficient firms. Non-state firms’ speed to ‘catch up’ with the technology frontier seems to be faster than that of SOEs. However, the dispersion of the efficiency seems to have increased, especially for the period prior 1993. Considering that fact that the average efficiency index has been declining, this seems to suggest that firms’ efficiency has been converging to the lower end of the efficiency spectrum, especially those of SOEs’. The results have also suggested that profit retention reform does not have significant effect upon firm’s speed in responding technology advance, while the partial privatisation and privatisation may have an immediate negative effect upon a ‘firm’s speed in responding to technology advance.

Considering the effects of ownership on the level of firms’ efficiency, the ownership types do not seem to have statistically significant effect on the level of firm efficiency, as none of the coefficients for \textit{COE, FORE, and OTHE} is statistically significant in Specification 4, although coefficients for \textit{FORE} are significant in Specification 2 and 3, and coefficients for \textit{OTHE} are only significant in Specification 3. As for the effect of profit retention program, it is only statistically significant for \textit{COEs}. These results seem to suggest that the efficiency difference between firms of different ownership types might have resulted from their different response to technology advance.

4.7 Conclusion:

In this chapter, we applied the DEA technique to estimate enterprise efficiency and productivity change in the context of Chinese large and medium enterprises between the reform period 1987 and 1996. Contrasted with the results of improving enterprise performance measured by TFP from other studies, there is a general tendency of an increasing efficiency gap between
average enterprise and the technology frontier rather than a decreasing efficiency gap as is expected from a competitive market.

By estimating the impacts of enterprise reform and increasing competition on firms' static efficiency and firms' dynamic progress to catch up with the technology frontier, it suggests that the effect of ownership upon firms’ static efficiency is not conclusive. While COEs are generally more efficient and more productive than SOEs, the ownership effect of foreign ownership and domestic private ownership is not clear. However, firms of different ownership types do seem to respond differently to catch up with the technology frontier, with SOEs being the slowest. These findings suggest that efficiency differences between firms of different ownership types might result from their different speed in catching up with technology advance.

The analysis also suggests that a profit retention programme does have a positive effect upon improving a firm’s efficiency at the initial stage of reform; this positive effect phases out in the later stages of reform. As for performance wages and bonuses, their effects are complicated and need to be designed properly to achieve a positive effect upon efficiency improvement.

Market competition in China seems to be working, but ineffectively. As new firms enter, thus driving up the technology frontier, but incumbent SOEs are slow to respond. Hence, we suspect that the market competitive process is not working effectively, and a lower exit probability of SOEs might account for the weaker convergence of SOE efficiency. This needs further investigation, which will be dealt with in the next two chapters.
Chapter 5: Entry, Exit and the Dynamics of Productivity Growth

5.1 Introduction

In the previous chapter, we found that technical efficiency at the enterprise level showed a tendency to diverge in the period between 1987 and 1996. It is observed that this contradicted the result that might have been expected of the transition from the former centrally planned economy to a market economy. It is hypothesised that there are two reasons underlying the divergence of technical efficiency: the entry of more efficient firms, paralleled with the survival of inefficient and value-destroying firms, especially inefficient state-owned firms. However, this can only have been sustained as long as growth remained strong.

As both the TFP and DEA approaches represent something of a black box from a micro-dynamic perspective, this chapter, looking beyond the “within firm” effects of economic reform and market competition, attempts to investigate the micro dynamics of entry, exit, and aggregate productivity growth using firm-level data on Chinese manufacturing, and gauges the extent to which the competitive process has improved as a result of the latest bout of reform since 1992, dubbed the transition to the “socialist market economy”, while the reform before 1992 had been dubbed as “crossing the river by groping for stones”. Specifically, the chapter has three main objectives: to document the actual patterns of firm entry and exit, to analyse the post-entry and pre-exit behaviour of Chinese enterprises, and to estimate the contribution of new entries, exits and survival firms to aggregate productivity growth. This chapter is organized as follows: Section 5.2 briefly surveys the literatures on firms’ entry and exit; Section 5.3 describes the pattern of entry and exit in the Chinese electrical engineering industry; section 5.4 analyses the longitudinal performance of surviving and exiting firms; section
5.5 deconstructs aggregate productivity growth; and section 5.6 concludes the chapter.

5.2 Entry and Exit in Advanced and Transition Economies

There has been a long-standing interest in understanding firms’ entry and exit behaviour and their determinants. Following Bain’s (1956) research on the process of entry and Edwin Mansfield’s (1962) plea for a greater emphasis on the research into the dynamic aspects of industrial organization, there comes an increase of such research. Several theories have been developed to study the process that generates each firm’s entry, exit, productivity growth, and market share change. They generally related to the process of “creative destruction” (Schumpeter, 1943). In most models, each of the above dimensions of performance is depicted as the optimal behaviour of forward-looking entrepreneurs with rational expectations but limited information.

Hopenhayn (1992) provides a relatively tractable formulation. In his model, firms differ only in terms of their productivity levels, each of which evolves as a random process over time according to an exogenous Markov process. He relates the exogenous characteristics of the industry, such as entry cost, total demand and the stochastic process for the productivity parameters, to the steady-state distribution of firms and to the process of entry and exit. Under such a set-up, new firms enter when the distribution from which they draw their initial productivity level is sufficiently favourable that their expected future profit stream, net of annual fixed costs, will cover the sunk costs of entry. Firms exit when they experience a series of adverse productivity shocks, driving their expected future operating profits sufficiently low that exit is their least costly option.

process, Jovanovic (1982) showed that firm productivity varies initially but eventually settles down to a constant level. As firms only learn about their true efficiency by effectively operating and producing, a process of natural selection arises whereby less efficient firms leave the industry while more efficient firms grow to their optimal size. This selection mechanism results in younger firms being on average smaller, more heterogeneous but less productive than older firms. In contrast to this ‘passive learning’ by firms, Ericson and Pakes (1995) stressed the importance of ‘active learning’ by firms through investments in productivity enhancement. In their model, a firm explores its economic environment actively and invests to enhance its profitability under competitive pressure from both within and outside the industry. Its potential and actual profitability changes over time in response to the stochastic outcomes of the firm’s own investment, and those of other actors in the same market. The firm grows if successful, shrinks or exits if unsuccessful.

As we can see from the above models, both entry and exit are modelled as the optimal responses made by innovative entrepreneurs contingent on the balance between future expected return and costs. At any point in time, an entire distribution of firms with different sizes, ages and productivity levels exists, and simultaneous entry and exit is the norm. Young firms have not yet survived a shakedown process, so they tend to be smaller and to exit more frequently. Large firms are the most efficient, on average, so their mark-ups are the largest. Nonetheless, despite all the heterogeneity, equilibrium in both Jovanovic’s and Hopenhayn’s model maximizes the net discounted value of social surplus. Thus market interventions, such as artificial entry barriers, severance laws, or policies that prop up dying firms generally make matters worse. The exogenous fixed costs, such as economies of large scale, product differentiation and absolute cost advantages of incumbent firms compared with entrants, pose barriers to both entry and exit.
A number of recent studies have examined the dynamic aspects of firm behaviours in the context of advanced economies. Examples include Acs and Audretsch’s (1989) and Audretsch’s (1995) work on U.S manufacturing, Baldwin and Goreckii’s (1991) work on Canadian industry, Geroski’s (1991a, b) work on the British manufacturing industry, Dunne et al. (1988,1989)’s work on the US manufacturing industry, Mata’s (1993) work on Portugal’s manufacturing industry, and Schwalbach (1991) on German manufacturing industries. They found that both entry and exits are common; they are large in number but small in size. They also found that substantial variations in entry and exit rates exist across industries, and that entry and exit rates are positively correlated within an industry. Entry is less likely to be successful; if it does survive, it grows larger. In fact, the research on industrial dynamics has generated the following stylised facts:

- Both entry and exits are common, but while they are large in number, they are small in size (Dunne et al., 1988; Schwalbach, 1991; Geroski, 1995).
- Exit and entry rates are highly positively correlated (Shapiro and Khemani, 1987), which indicates that entry and exit are part of a process of change in which large numbers of new firms displace large numbers of older firms.
- High rates of entry are often associated with high rates of innovation and increases in efficiency (Geroski, 1995).
- The exit rates of new entrants tend to be high (Dunne et al., 1988; Geroski, 1991), and it takes a long time for successful entrants to achieve a size comparable to the average incumbent.
- Firms’ exit rates are closely related to both firm size and age (Audretsch, 1995).
- Entry and survival rates vary considerably across industries; however, most of the total variation in entry across industries and over time is within industry variation rather than inter-industry variation (Geroski, 1995; Audretsch, 1995; Dunne et al., 1988).
This dynamic process of entry and exit is described as a revolving door at the bottom of the industry size distribution (for a general discussion, see Caves (1998)).

Firms in former centrally planned economies were not concerned with this competitive selection process. This competitive selection process had been replaced with a bureaucratic one, in particular an easy exit and easy entry mechanism was substituted with one that precludes the timely termination and formation of enterprises. Central planners decided which enterprises should be created, enlarged, and contracted. Enterprise failures were treated through various subsidies and mergers. This has been argued accountable for the lack of dynamic efficiency in former socialist countries (Poznanski, 1993). As the formerly centrally planned economies are transforming into market economies, the creation, survival and growth of newly established firms and the downsizing and exit of traditionally large, dominant state-owned firms are vital to the success of this transition process. It is also central to the long-term health of those economies.

The above-named stylized facts in advanced economies may also be expected in a transition market economy. If restructuring and reallocation of resources in an economy moving from plan to market occurs efficiently, we would expect that the firms established before transition, large and potentially the least efficient, producing low quality and low demand commodities, will shrink and be replaced by new small and more efficient firms with more “fashionable” goods. These new firms, if they succeed, are expected to grow with time. However, one feature to be noted is that the break with the old regime necessitated a central change in the paradigm. Transition countries have to channel resources from the industrial sector to services, de-concentrate their industrial structure, and untangle irrationally bundled assets. An unusually large amount of resources must be liberated from their entrenched uses and moved to places where they can be of the highest value.
All the above studies are conducted in advanced economies, such as US, UK, Germany, Japan, etc. They all assume that firms are profit-maximizing and respond the same way to the same market signals apart from the difference caused by their scale advantage or disadvantage. They also assume the environment in which firms operate is homogeneous. While these assumptions might be quite appropriate in advanced economies, they are not appropriate for economies in transition, where the new market economic institutions are still in the making, and the old central planning legacies remain. For example, in Russia, "the most productive companies not only can't make a buck, but are being driven out of business by government-subsidized productivity laggards" (Lewis, 1999).

5.3 Entry and Exit in the Electrical Engineering Sector

There are a number of ways in which the effectiveness of the reform process can be judged, and the most popular approach has been to compare total factor productivity over time and across different firms. For a recent review see Jefferson et al. (1996). A possible problem with this technique is the difficulty of comparing like with like. Given the tendency of small firms and firms in the non-state sector to enter market niches, it seems likely that the comparison may not be robust to the output deflators employed. Further, the approach represents something of a black box from a micro-dynamic perspective. Is TFP growth indicative of what is happening to incumbent firms or regarding the impact of entry and exit? As we shall see, this question is particularly important given the high rates of "movement" of enterprises and small enterprises in particular. An alternative approach to the assessment of the reforms is therefore to consider these processes explicitly and to gauge the extent to which the competitive selection process has improved as a result of the latest bout of reform. Below we get some handle on the effectiveness of the competitive process by examining
measurable characteristics of the processes of entry, exit and growth and how
they have changed with reform.

5.3.1 Rationale for Considering the Electrical Engineering Industry

The dataset we use in this chapter covers an almost complete sample of Chinese
firms in the electrical engineering industry in a Northern Chinese Province – Liao
Ning over a ten-year period starting from 1987 to 1996. Liao Ning province used
to be the centre of China’s manufacturing Industry, and is the area where the
central planning system was most deeply rooted. The electrical engineering
industry is the sector where traditionally SOEs dominated, and currently the new
entry of non-SOEs is relatively easy, therefore the selection of this sector is to
some extent representative of the current reform situation, with a clear probability
that competition has worked over the reform period. The electrical engineering
industry accounts for about 5% of the province’s gross industrial output, and it
accounts for about 5-6% of the gross output of the Chinese electrical engineering
industry. This dataset contains 3992 firms, of which 1996 firms exited in the 10-
year period. Some simple statistics of the dataset are shown in Table 5.1 below:

Table 5.1 Numbers of Enterprises (1987-1996)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>By Size</th>
<th>By Ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Large</td>
<td>Medium</td>
</tr>
<tr>
<td>1987</td>
<td>1092</td>
<td>17</td>
<td>23</td>
</tr>
<tr>
<td>1988</td>
<td>1170</td>
<td>19</td>
<td>26</td>
</tr>
<tr>
<td>1989</td>
<td>1246</td>
<td>22</td>
<td>28</td>
</tr>
<tr>
<td>1990</td>
<td>1309</td>
<td>22</td>
<td>29</td>
</tr>
<tr>
<td>1991</td>
<td>1292</td>
<td>26</td>
<td>33</td>
</tr>
<tr>
<td>1992</td>
<td>1418</td>
<td>24</td>
<td>41</td>
</tr>
<tr>
<td>1993</td>
<td>1514</td>
<td>26</td>
<td>49</td>
</tr>
<tr>
<td>1994</td>
<td>1335</td>
<td>28</td>
<td>43</td>
</tr>
<tr>
<td>1995</td>
<td>1334</td>
<td>31</td>
<td>43</td>
</tr>
<tr>
<td>1996</td>
<td>1632</td>
<td>32</td>
<td>51</td>
</tr>
</tbody>
</table>

Note: Others includes domestic private firms (including share holding companies) and state
and/or collective and private cooperative firms.

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Over the ten-year period, the number of firms increased by 540 units, 500 of them being small firms, with 400 of them being COEs. The number of firms with foreign participation, including joint ventures and wholly foreign-owned firms, increased from 0 in 1987 to 74 in 1996. The growth of both gross industrial output and labour productivity have been positive except in 1988 and 1990, the employment in this sector has declined from its peak of 268,000 in 1989 to 245,000 in 1995, but in 1996 it increased again to the level of 1989 (See Figure 5.1).

In order to estimate whether firms' efficiency determines firms' propensity to exit, we quantify firms' efficiency by applying the same technique we used in chapter 4, DEA. The average and output weighted average efficiency indices are shown in Figure 5.2. This result has also confirmed what we found in chapter 4, that there is a tendency of divergence in firms' efficiency. The average efficiency score decreased from around 60% in 1987 to 30% in 1996.
5.3.2 The Contribution of Different Types of Firms to Output Growth

This section first considers some simple decompositions of output change by firm size, and by firms' ownership, and it then looks into the contribution of young firms, defined as less than 5 years of age.

Figure 5.3 depicts some snapshots of how the various size classes contributed to output growth over the period 1987-1996. Two sub-periods, 1987-1992 and 1992-1996 are considered, corresponding to periods before and after the most recent set of reforms.
Note that the contribution of small enterprises, while considerable, actually falls somewhat between the two sub-periods. This might indicate the survival and growth of small firms into medium firms, the more successful small firms developing into medium firms; actually we do observe the relatively bigger contribution of medium firms in the second period.

Figure 5.4 examines the contribution of output growth by ownership type. The main point to note is that that there was a big fall in the contribution of SOEs in the later sub-period. In fact SOEs' contribution to output growth has been negative for the period between 1992 and 1996. This is mainly accounted for by the sharp rise in the contribution of foreign-related ownership including investment from Hong Kong, Macau and Taiwan in the most recent period.

As it is observed in Figure 5.3 that small firms accounting for a significant bulk of output growth, Figure 5.5 focuses on the small firms themselves. It is suggested that output growth by small enterprises is generally coming from COEs, and that the contribution from foreign firm participation and other types has become more noticeable only since 1992.
We also summarize the importance of new firms (see Table 5.2). For the period between 1987 and 1996, firms under 5 years old accounted for around a third of the number of the firms, yet they accounted for less than 13% of employment. The larger contribution of younger firms in terms of numbers of firms and the relative smaller contribution to employment indicate that those firms are usually small ones. Their contribution to output was less than 10% before 1992, but since then their contributions seem to be increasing. Compared with the average, they are more productive but less efficient; this could be due to higher capital intensity within young firms.

Table 5.2 Performance of Young Firms (Age <5 years)

<table>
<thead>
<tr>
<th>Year</th>
<th>Share of Firm Number</th>
<th>Share of Employment</th>
<th>Share of Output</th>
<th>Labour Productivity Relative to Average</th>
<th>Efficiency Relative to Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987</td>
<td>39.8</td>
<td>10.5</td>
<td>8.1</td>
<td>77.0</td>
<td>96.4</td>
</tr>
<tr>
<td>1988</td>
<td>33.7</td>
<td>7.4</td>
<td>7.6</td>
<td>101.7</td>
<td>100.8</td>
</tr>
<tr>
<td>1989</td>
<td>30.2</td>
<td>6.3</td>
<td>6.2</td>
<td>98.9</td>
<td>99.8</td>
</tr>
<tr>
<td>1990</td>
<td>29.3</td>
<td>5.6</td>
<td>7.1</td>
<td>127.8</td>
<td>88.0</td>
</tr>
<tr>
<td>1991</td>
<td>26.3</td>
<td>6.3</td>
<td>9.8</td>
<td>157.5</td>
<td>88.6</td>
</tr>
<tr>
<td>1992</td>
<td>26.4</td>
<td>5.0</td>
<td>6.6</td>
<td>132.3</td>
<td>89.1</td>
</tr>
<tr>
<td>1993</td>
<td>33.3</td>
<td>8.9</td>
<td>11.2</td>
<td>125.6</td>
<td>98.6</td>
</tr>
<tr>
<td>1994</td>
<td>35.0</td>
<td>11.1</td>
<td>15.6</td>
<td>140.4</td>
<td>103.0</td>
</tr>
<tr>
<td>1995</td>
<td>23.3</td>
<td>8.2</td>
<td>15.7</td>
<td>191.7</td>
<td>95.2</td>
</tr>
<tr>
<td>1996</td>
<td>33.9</td>
<td>12.9</td>
<td>17.9</td>
<td>138.5</td>
<td>98.8</td>
</tr>
</tbody>
</table>
The importance of young firms can be compared with the evidence from other countries. Aw et al. (1997) reports, after examining nine manufacturing industries in Taiwan, that one to five year-old firms account for approximately two-thirds of the number of firms in operation and between one-third and one-half of each industry’s production in 1991. Using data for Colombian manufacturing plants, Roberts (1996) finds that the combined market share of one to five year-old plants varied between 18.3 and 20.8 per cent depending on the year. With similar data for Chile, Tybout (1996) finds one to five year-old plants account for 15.0 to 15.7 percent of manufacturing output. Using data for US manufacturing firms, Dunne, Roberts, and Samuelson (1988) find the market share of one to five-year old firms varies from 13.6 to 18.5 depending on the year. Hahn (2000) finds in the context of the Korean manufacturing industry, that one to five year old plants accounted for around 40% of the plant number, and 15% of output during the period between 1995 and 1998. Thus, the importance of new firms in China seems to be less pronounced than that in both advanced economies and newly developed economies, such as Taiwan and Korea.

5.3.3 The Pattern of Entry and Exit of Firms

Utilizing the longitudinal aspect of our dataset, we can define surviving firms, entrants, and exiting firms. Here we adopted the definition of surviving firm, entrant, and exiting firm developed by Dunne et al. (1988). For the period between year \( t - k \) and year \( t \), an entrant is defined as the firm that appears in the last year \( (t) \), but not in the first year \((t - k)\). An exit is defined as the firm that appears in the first year \((t - k)\), but not in the last year \((t)\). A surviving firm is defined as the one that appears both in the first year \((t - k)\) and the last year \((t)\) of the period. Under such definitions, all firms that entered before the last year of the given period are regarded as entrants and all firms that exited after the first year are regarded as ones that exited. We define the following variables:

\[ NE_t = \text{number of firms that enter the industry between years } t - k \text{ and } t; \]
$NT_t =$ total number of firms in the industry in the year $t$.

$NX_{t-k} =$ number of firms that exit the industry between the years $t - k$ and $t$

$QE_t =$ total output of firms that enter the industry between the years $t - k$ and $t$

$QT_t =$ total output of all firms in the industry in year $t$

$QX_{t-k} =$ total year $t - k$ output of firms that exit the industry between years $t - k$ and $t$

Using the above variables, the entry and exit rate for the industry between years $t - k$ and $t$ are defined as:

$$ER_t = \frac{NE_t}{NT_{t-k}}$$

$$XR_{t-k} = \frac{NX_{t-k}}{NT_{t-k}}$$

where $ER_t$ is the entry rate and $XR_{t-k}$ is the exit rate between years $t - k$ and $t$.

In order to look at the contributions of new entrants and exits to industry output, we define the market shares of firms that enter or exit between the years $t - k$ and $t$ as:

$$ESH_t = \frac{QE_t}{QT_t}$$

$$XSH_{t-k} = \frac{QX_{t-k}}{QT_{t-k}}$$

where $ESH_t$ is the market share of new entries and $XSH_{t-k}$ is the market share of exiting firms. They measure the contribution of new firms in the first year in which they were observed and of the exiting firms in the last year in which they were observed.

As we have presented in chapter 3, the entry of new firms in China takes various forms, such as the entry of both domestic private and foreign-owned firms, the entry of new COEs including TVEs, and the entry of new SOEs. In addition to these, some established firms might enter the electrical engineering sector by switching from other manufacturing sectors; however as we focus on this single electrical engineering industry, we do not distinguish between the switches and
the new entries. The number of new entries and entry rates in each year are presented in Table 5.4 and Table 5.5 respectively:

**Table 5.4 The Number of Entries and The Entry Share in the Electrical Engineering Industry Between 1988 and 1996**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Number of New Entries</th>
<th>Share of New Entries (%)</th>
<th>Entry Share of Industrial Output (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Small Firms</td>
<td>SOEs</td>
</tr>
<tr>
<td>1988</td>
<td>195</td>
<td>99.5</td>
<td>3.1</td>
</tr>
<tr>
<td>1989</td>
<td>205</td>
<td>99.5</td>
<td>6.3</td>
</tr>
<tr>
<td>1990</td>
<td>213</td>
<td>99.5</td>
<td>10.8</td>
</tr>
<tr>
<td>1991</td>
<td>170</td>
<td>99.4</td>
<td>8.8</td>
</tr>
<tr>
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<td>99.7</td>
<td>8.7</td>
</tr>
<tr>
<td>1993</td>
<td>536</td>
<td>98.3</td>
<td>5.2</td>
</tr>
<tr>
<td>1994</td>
<td>320</td>
<td>98.4</td>
<td>3.4</td>
</tr>
<tr>
<td>1995</td>
<td>472</td>
<td>97.7</td>
<td>5.9</td>
</tr>
<tr>
<td>1996</td>
<td>634</td>
<td>97.8</td>
<td>9.8</td>
</tr>
</tbody>
</table>

As shown in the above table, there is a significant increase in both the number of new entries and the entry share of industrial output. Between 1988 and 1996, the number of new entries in each year increased from 195 in 1988 to 634 in 1996. For the same period, the entry share increased from 4.1% in 1988 to 14.7% in 1996. Most of the new entries were small firms and COEs, accounting for more than 97%, and 80% of new entries respectively.

Table 5.5 below has shown an increasing entry rate after 1992. For example, between 1988 and 1991, the entry rates ranged between 13.2% and 16.7%; between 1992 and 1996, the entry rates ranged between 23.5% and 38.8%. Most notably, the entry of non-public ownership (Others) has become much more significant after 1992, with its entry rates ranging between 28% and 51.7%.
Table 5.5 The Entry Rate (%) in the Electrical Engineering Industry Between 1988 and 1996

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Small Firms</th>
<th>SOEs</th>
<th>COEs</th>
<th>Others</th>
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<tbody>
<tr>
<td>1988</td>
<td>16.7</td>
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<tr>
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<td>8.9</td>
<td>13.5</td>
<td>16.7</td>
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<tr>
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<td>36.6</td>
<td>15.3</td>
<td>39.4</td>
<td>51.7</td>
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<td>24.9</td>
<td>6.5</td>
<td>20.7</td>
<td>48.9</td>
</tr>
<tr>
<td>1995</td>
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<td>36.6</td>
<td>21.5</td>
<td>36.9</td>
<td>45.7</td>
</tr>
<tr>
<td>1996</td>
<td>38.8</td>
<td>40.0</td>
<td>36.9</td>
<td>38.5</td>
<td>45.5</td>
</tr>
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</table>

As far as the exits are concerned, there are many reasons for firms to exit from this particular electrical engineering sector as well. Firstly, the owner(s), either government department in terms of SOEs, the community in terms of COEs or private persons in term of both foreign and domestic privately-owned enterprises, may decide to close down an under-performing enterprise. Firms exiting in this form ceased to operate completely. Secondly, firms exit due to merger and acquisition, by which the government aims to restructure and regroup SOEs. The bureaucratic overseer of the enterprises may decide to merge a poor-performing enterprise with a successful one aiming to save the poorly performing enterprise from bankruptcy. The mergers may also happen voluntarily without the interference of the government. A third reason is privatisation. Privatisation takes various forms: firms being sold out to the public, firms being sold out to individuals, firms being sold out to employees and management. Although privatization often involves substantial changes to the operations of firms, due to specific characteristics of a transition economy, it is not considered a form of exit in this study; privatized firms are matched with their predecessors. The fourth reason is that firms switch to another manufacturing industry. The number of exits and the exit rate in each year for the period between 1988 and 1996 are presented in Table 5.6 and Table 5.7:
Table 5.6 The Number of Exits and Exit Shares in the Electronic Engineering Industry Between 1988 and 1996

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Number of Exits</th>
<th>Share of Exits (%)</th>
<th>Exit Share of Industrial Output (%)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td>117</td>
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<td>5.1</td>
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<td>100.0</td>
<td>6.7</td>
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<td>1991</td>
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</tr>
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<td>9.3</td>
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<td>5.8</td>
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<tr>
<td>1996</td>
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<td>7.6</td>
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</table>

There are significant increases in both the numbers of exits and exit shares during 1988 and 1996 as well. The numbers of exits increased from 117 in 1988 to 502 in 1994, and the exit share of industrial output increased from 2.5% in 1988 to 14.7% in 1995. Again, most of the exits are small firms and COEs, accounting for more than 97% and 84% of exits respectively.

Table 5.7 The Exit Rate (%) in the Electronic Engineering Industry Between 1988 and 1996

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Small Firms</th>
<th>SOEs</th>
<th>COEs</th>
<th>Others</th>
<th>New Entries</th>
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</thead>
<tbody>
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<td>11.0</td>
<td>4.5</td>
<td>11.7</td>
<td>0.0</td>
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<td>1989</td>
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<td>11.9</td>
<td>2.2</td>
<td>12.8</td>
<td>0.0</td>
<td>22.4</td>
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<tr>
<td>1990</td>
<td>12.0</td>
<td>12.5</td>
<td>6.7</td>
<td>12.9</td>
<td>0.0</td>
<td>25.8</td>
</tr>
<tr>
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<td>14.8</td>
<td>13.1</td>
<td>14.6</td>
<td>0.0</td>
<td>20.6</td>
</tr>
<tr>
<td>1992</td>
<td>16.0</td>
<td>16.8</td>
<td>6.7</td>
<td>17.6</td>
<td>0.0</td>
<td>39.0</td>
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<tr>
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<td>23.0</td>
<td>33.3</td>
<td>20.0</td>
<td>43.3</td>
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<tr>
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<td>34.3</td>
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<td>34.4</td>
<td>25.0</td>
<td>53.1</td>
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<td>1995</td>
<td>24.6</td>
<td>25.7</td>
<td>14.6</td>
<td>24.9</td>
<td>31.8</td>
<td>28.2</td>
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<tr>
<td>1996</td>
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<td>26.5</td>
<td>20.2</td>
<td>26.5</td>
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</table>

Similarly, we also observe an increasing exit rate after 1992. In 1988, only 10.7% of firms exited, but in 1994 around a third of the firms in the sector exited. The firm exit rate among new entries is even higher, which will be discussed in the following section. However, the pace of exit among SOEs is 6%-11%, below that of the population average (except in 1991).
As in developed economies, the entry rate and exit rate, and the entry share and exit share seem to be highly correlated in this specific Chinese manufacturing sector (See Fig 5.6). However, both entry rates and entry share are higher than exit rates and exit shares in general. This is consistent with the growing feature of the electrical engineering sector and the whole Chinese economy. The fact that the pace of both entry and exit has accelerated since 1992 corresponds to the positive effects of the accelerating pace of economic reform since 1992.

![Fig 5.6 Entry Rate, Exit Rate, Entry Share, and Exit Share Between 1988 and 1996 (%)](image)

In order to quantify the contribution of entrants and exits to output growth, we conduct some simple decompositions of output change by firm types and in terms of survival. The results are shown in Figure 5.7 and Figure 5.8, which show the contribution of entry, exit, and surviving firms to the growth of output for the whole period and the two sub-periods.

Figure 5.7 suggests that there was a big increase in the importance of “movement” of enterprises between the two sub-periods, with both the positive contribution of entry and the negative contribution of “exit” increasing...
substantially. Indeed, in the period since the reforms, the net impact of entry and exit is clearly more important than the growth of surviving firms.

![Fig 5.7 The Contributions of Entry, Exit and Survival to Output Growth (%)](image)

Figure 5.7 The Contributions of Entry, Exit and Survival to Output Growth (%)

Figure 5.8 concentrates on the small firm sector. It shows that a similar phenomenon was also occurring here, with big increases in the role of both entry and exit.

![Fig 5.8 The Contribution of Entry, Exit, and Survival Among Small Firms](image)

The data analysis in this section therefore suggests that entry and exit are gradually playing an increasing role in the sectoral studies and in the course of
China’s economic reform, and it also suggests the existence of the increasing movement of primarily small firms.

5.3.4 Productivity and Efficiency Differential Among Entering, Exiting and Continuing Firms

In order to identify the relationship between firm productivity, firm efficiency and firm turnover patterns, we compare efficiency and productivity levels of continuing firms, entrants, and exiting plants at the time of entry and exit. Table 5.7 shows the relative productivity and efficiency levels of entrants, surviving and exiting firms (relative to the average productivity and efficiency levels of the sector) in electrical engineering industry at a given year.

Table 5.7 Average Productivity and Efficiency Index of Entrants, Exits and Surviving Firms Relative to Population Average (%)

<table>
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<tr>
<th></th>
<th>Entry</th>
<th>Exit</th>
<th>Survival</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Labour Productivity</td>
<td>Efficiency</td>
<td>Labour Productivity</td>
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</tr>
<tr>
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<td>50.3</td>
<td>105.8</td>
<td>51.1</td>
</tr>
<tr>
<td>1989</td>
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<td>105.6</td>
<td>55.5</td>
</tr>
<tr>
<td>1990</td>
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<td>101.6</td>
<td>45.2</td>
</tr>
<tr>
<td>1991</td>
<td>90.8</td>
<td>100.9</td>
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<td>1992</td>
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<tr>
<td>1996</td>
<td>81.2</td>
<td>101.7</td>
<td></td>
</tr>
</tbody>
</table>

The main features of Table 5.7 could be summarized as follows. First, exiting firms in a given year are, on average, less productive and less efficient than both continuing firms and new entrants in that year. Exiting firms are generally more than 20% less productive than continuing firms. This result is consistent with the prediction by models of firms’ heterogeneity that market selection forces sort out low-productivity plants from high-productivity firms. Second, new entrants are on
average less productive than continuing firms in the first year they are observed, although there were exceptions in 1989, 1994 and 1995. However, of all the new entrants in these three years (1989, 1984, and 1995), only around 10% of them have above-average labour productivity. But, new entrants are generally the most efficient. Initial low productivity of new firms relative to continuing firms is not consistent with the presence of the simple vintage effect that new firms are more productive than older firms. However, as they are the most efficient, it is not contradictory to the prediction of several recent models of firm dynamics, such as Jovanovic (1982) and Hopenhayn (1992). Potential entrants who are uncertain about their productivity but hold a positive outlook on their post-entry productivity performance - i.e., who expect they could catch up with the incumbents in terms of productivity sooner or later - might enter despite their initially low productivity. Of course, new firms themselves are also heterogeneous in terms of productivity, as will be discussed later. Initial low productivity of new firms relative to incumbents is also documented by other studies, such as Aw et al., (1997)\(^1\) for the Taiwanese manufacturing industry, and Foster et al., (1998)\(^2\) for the US manufacturing industry.

Furthermore, from the above table we can see that the productivity gap between new entrants and continuing firms has narrowed. On the one hand, this fact conforms well to the assumption of recent R&D-based endogenous growth models, such as that of Grossman and Helpman (1991), that potential entrants receive externality from previous innovation; on the other hand it reflects the fact that many new entrants are actually privatised continuing firms.

\(^{1}\) Aw et al., (1997) reported that entrants in Taiwanese manufacturing sector in 1986 are, depending on industry, between 0.6 per cent and 6.9 per cent less productive than incumbent firms in the same year.

\(^{2}\) Foster et al., (1998) report that in terms of labour productivity, entering plants have lower productivity than continuing plants even at ten year intervals.
The above discussion suggests that observed patterns of the turnover of firms in the electrical engineering sector reflect the underlying productivity and efficiency differential between new entrants, continuing firms, and exiting firms in the short term. Lower productivity and efficiency of exiting firms relative to continuing firms and new firms is consistent with the prediction of theoretical models. Yet, the relative lower productivity of new entrants relative to continuing firms casts doubt on the aggregate productivity gain from new entrants.

5.4 Market Selection Process: Longitudinal Performance of Surviving and Exiting Firms

In the above section, firm dynamics is studied from a short-term perspective. In this section, we examine whether the firms’ performance gaps persist, and whether the market selection forces in this sector have in fact sorted out low productivity and inefficient firms among the new entrants, and promotes the growth of successful new entrants from longitudinal perspective. By focusing on the behaviour of both entry cohorts and exit cohorts, we first examine the post-entry performance of new firms, secondly we examine the pre-exit performance of exiting firms, and finally we examine the performance of surviving firms.

5.4.1 Post Entry Performance of New Firms

In our sample, there are nine cohorts of new firms according to birth years, 1988 to 1996. Focusing on a particular birth-year cohort has the advantage that possible age effects and reform effects on survival are accounted for. Table 5.8 presents the market shares, average sizes of surviving firms, relative labour productivity and efficiency, and failure rate for each entry cohort in each year.
Table 5.8 Market Shares, Average Firm Sizes, Productivity and Exit Rates of Entry Cohorts

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<tr>
<th></th>
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3 Market share is defined as the share of firms' sale to aggregate sale.
4 Average Size is calculated as the average employment.
Table 5.8 (Continued)

Average Efficiency Index Relative to all Firms in the Industry

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Entry Cohort Exit Rates (%)

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From the above table we should note the significant role played by firms set up before 1987: in 1988 they accounted for 95.9% of the sales industry output in this sector, by 1994 they still accounted for 59% of the sales in this sector. In fact, it is only since 1995 that the contribution of these firms reduced to less than 50%. This suggests that firms set up before 1987 had been an important stabilizing factor in the Chinese economy before 1993, the time when China started its second stage of economic reform, at least in Chinese manufacturing industries.

Another feature is that the market share of each entry cohort following entry tends to decline as the cohort ages, on average. For example, the market share of the 1988 entry cohort was 4.1% in 1988; this figure was only 1.1% in 1996. This decline in market share is the result of two processes: the change in the size of surviving firms in the cohort, and the exit of firms from this cohort. In order to examine the former, we summarize the average size of the surviving firms.
Typically, the average firm size within each cohort increases relative to the industry average as the cohort ages. For example, the average size of the 1988 entry cohort was only 49.4% of industry average in 1988; by 1996 it was 10.6% bigger than the industry average. So survivors have grown and gained in size relative to incumbent firms in the competitive selection process.

The third feature that needs to be noted is that each entry cohort shows very rapid productivity improvement following entry, and catches up with continuing firms in productivity level after several years. For example, the productivity disadvantage of the 1988 entry cohort relative to the 1987 survival cohort is about 50%; by 1996 this figure narrowed to 20%, and for some other entry cohorts, their productivity even surpassed that of 1987 survival cohort in 1996. Thus, the results are supportive of the presence of rapid learning by surviving members of births, especially during the first few years after entry.

In terms of efficiency, on average the entry cohort tends to be more efficient than the 1987 survival cohort. However, the efficiency of entry cohorts tends to decrease as entry cohorts age, which is probably due to the entry of newer firms, and newer technologies. The entry cohort tends to have a higher failure rate in the first few years after entry; the failure rates for all entry cohorts increased after 1993.

5.4.2 Pre-Exit Performance of Exit Firms

In the last section, firms' post-entry performance is examined. In this section, we examine the pre-exit performance of exiting firms in order to understand another dynamic aspect of the market selection process: exit. Table 5.9 presents the average performance (productivity, efficiency and firm size) for each exit cohort in each year before their exits.
Table 5.9 shows clearly that, for each exit cohort reported here, exiting firms are both less productive and less efficient than surviving firms at the time of exit, and they are much smaller in firm size. In fact, the performance differences between exiting firms and surviving firms are highly significant in terms of labour productivity and firms size. For example, the surviving firms are 50% to 100% more productive than exiting firms depending on exit year, and the average firm size of surviving firms is between 1.5-5 times bigger than that of exiting firms, depending on exit year. However, the efficiency gap between surviving firms and exiting firms is not as significant as the labour productivity gap between surviving firms and exiting firms.

Moreover, the productivity differences occur not just at the time of exit, in fact these differences exist for years before exits. This suggests that firm exits reflect underlying productivity differences that have existed for quite a period of time. For example, for the 1996 exit cohort, the productivity disadvantage relative to the surviving group was about 25 per cent in 1995. However, the productivity differential goes back as far as 1990, when the productivity disadvantage was already 10 per cent. Similar results hold for other death cohorts.
Table 5.9 Productivity, Efficiency and Firm Size of Exit Cohorts By Year

### Average Labour Productivity Pre-Exit Relative to All Firms

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*Survivors: Firms surviving up until 1996*
Another feature demonstrated by Table 5.9 is that the relative size of pre-exit firms tends to decrease compared with the average size of the whole sample as they come to the point of exit. For example, the average firm size of the 1996 exit cohort was 81% of that of the industrial average in 1987, and by 1995, a year before their exits, their average size was only 47% of the population average. Similar patterns are found for other death-year cohorts as well.

In terms of pre-exit efficiency, it is observed that exiting firms are generally less efficient than surviving firms. For example, the efficiency index of the 1992 exit cohort was nearly 10% less efficient than surviving firms in 1991, a year before their exit, and this efficiency gap can be tracked right back to 1987. Furthermore, exiting firms are less efficient than the industry average immediately before exit.

Thus, firms’ exit seems to reflect not only point-in-time performance disadvantage around exit but also persistent bad performance. These results strengthen the conclusion we drew earlier that markets sort out firms on the basis of firm performance. Both labour productivity and the efficiency index seem to be good indicators of firm exiting, but it is not known which indicator better predicts the probability of firms’ exit.

5.4.3 Performance of Surviving Firms: A Transition Matrix Analysis

Until now, we have been examining firms’ post-entry and pre-exit performance by focusing on the average productivity and efficiency differentials among various entry and exit cohorts. In this section, we focus on the long-term performance of surviving firms by analysing the movement of firms across productivity and efficiency distribution over time. One way of summarizing the above features of our data and complementing our previous analysis is to rely on transition matrix analysis. Following Baily et al., (1992), we set up transition matrices for two time intervals: 1987-1992 and 1992-1996. In order to do this, the efficiency score and labour productivity of surviving firms within the industry were compared to the
industrial average in the beginning and end years of each period, and firms were divided accordingly into 5 quintiles. For example, in terms of productivity, firms were divided according to the following:

Quintile 1: \((P_t - \bar{P})/\bar{P} \geq 60\%\)

Quintile 2: \(60\% > (P_t - \bar{P})/\bar{P} \geq 20\%\)

Quintile 3: \(20\% > (P_t - \bar{P})/\bar{P} \geq -20\%\)

Quintile 4: \(-20\% > (P_t - \bar{P})/\bar{P} \geq -60\%\)

Quintile 5: \(-60\% > (P_t - \bar{P})/\bar{P}\)

Then, for each quintile in 1987 and 1992, we calculate what fractions of those firms were in each quintile in 1992 and 1995 respectively, and what fractions have exited. The transition matrix for productivity and efficiency for each period is shown in the following tables:

Table 5.10 Transition Matrix of Surviving Firms


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### Table 5.10 Transition Matrix of Surviving Firms (Continued)

#### Relative Efficiency Rankings (1987-1992)

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<table>
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<th>1987</th>
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<td>61</td>
<td>58</td>
<td>101</td>
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Starting from the first row of the table, of the firms that were in the top quintile in 1987, about 38 percent of them were again in the top quintile in 1992, and 53.7% of firms experienced downward movement in relative productivity ranking, of which only 19% of firms moved down to the bottom two quintiles in 1992. Among the firms that were in the second quintile in 1987, 18.4 per cent of them stayed in the second quintile and 14.5% of them moved up to the first quintile in 1992, and again more than 50% of firms moved downwards in relative productivity rankings. In total 16.3% of firms moved upwards in relative ranking, 24.7% stayed in the same quintile, and 26.8% of firms moved downwards. The high percentage of upward and stable movements of firms (about 41% of firms moved upwards and stayed in the same quintile) indicates the persistence of productivity. As expected, the percentage of exits conditional on the 1987 productivity quintile

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gets higher as we go down the productivity quintiles. In the top quintile about 8.3 per cent of the firms exited within five years, while as much as 62.6 per cent exited in the bottom quintile during the same period. One interesting observation here is that there are many high productivity exits. For the period 1992 to 1996, less than 12% of firms moved upward or stayed in the same quintile, 22.7% of firms moved downward, and 65.5% of firms exited. The percentage of exits conditional on the 1992 productivity quintile becomes higher as well when we go down the productivity quintiles, but it is higher than that for the period between 1987 and 1992.

In term of efficiency ranking, for the period between 1987 and 1992, 13.9% of firms moved upwards in relative efficiency ranking, 33.5% of firms stayed in the same quintile, and 20.5 % moved downwards. For the period between 1992 and 1996, only 5.6% of firms moved upwards, and 12.1% stayed in the same quintile. In terms of the percentage of firm exits conditional on the1987 efficiency quintile, there is no significant difference among different quintiles. However, for the period between 1992 and 1996, the percentage of exits for firms in quintiles 2,3 and 4, accounting for 95% of the firm population in 1992, tends to get higher as we go, down the efficiency quintiles. Although firms in quintiles 1 and 5 are exceptions, they only accounted for less than 5% of the firm population in 1992.

These findings may suggest that labour productivity is a better indicator of firms' exit probability than the efficiency index over a relatively longer time period, while the efficiency index is a better indicator of firms' exit probability in a relatively short time period. Also, it suggests that as China's economic reform proceeds, the efficiency index has gradually become a better indicator in predicting firms' exit.
5.5 Entry, Exit and Aggregate Productivity Growth

Superficially, the evidence from the above sections suggests a sharpening of the competitive process over the period under investigation. More correctly, however, establishing the result depends upon both the risk represented by exit, which we will discuss in the next chapter, and the competitiveness of new entrants. In this section, we evaluate the competitiveness of new entrants by examining the contributions of the entry and exit firms, and that of continuing firms among all firms. Ideally we would want to examine either total factor productivity, or the efficiency index and Malmquist Productivity index. However, calculating TFP requires the specification of production function assuming profit-maximizing enterprise behaviours and competitive product and factor markets, which are not compatible with the transition nature of the Chinese economy. As for the efficiency index and the Malmquist productivity index, the aggregation of the firm-level efficiency index to the aggregate efficiency index needs theoretical underpinning, and the calculation of the Malmquist productivity index is confined to continuing firms only. Furthermore, there are currently no such studies using the efficiency index, making it difficult to make international comparisons. We suspect that within a specific sector, movements in labour productivity may represent a reasonable proxy for movements of total factor productivity and the efficiency index. We have already noticed in Chapter 4 that labour productivity is closely related with the efficiency index. This section first examines the methods for productivity decomposition, and then deconstructs the growth of labour productivity in the electrical engineering industry in Liao Ning province.

5.5.1 Productivity decomposition Methods

There exist several alternative decomposition methods, and the decomposition results are sensitive to decomposition methods (see Foster et al., (1998), Bartelsman and Doms (2000), Ahn (2001) for a general review). Aggregate
productivity in a given sector is generally represented by a weighted average of each individual firm's productivity in the sector in the following form:

\[ P_t = \sum_i \theta_{it} p_i \]

where \( P_t \) is an aggregate productivity measure (either labour productivity or total factor productivity) for the sector at time \( t \); \( \theta_{it} \) is the share of firm \( i \) in the given sector at time \( t \); and \( p_i \) is a productivity measure of an individual firm \( i \) at time \( t \). Usually, employment (or the staff-hour) share is used in weighting labour productivity, and the output share is used for weighting TFP. Aggregate productivity changes are generally deconstructed into factors including:

i) Within-firm effect: within-firm productivity changes in continuing firms;

ii) Productivity changes resulting from changes in market shares of high-productivity firms and low-productivity firms;

iii) Productivity changes resulting from the process of entry and exit.

Baily et al., (1992) used the following decomposition:

\[ \Delta P_t = \sum_{i \in C} \theta_{it-k} \Delta p_i + \sum_{i \in C} p_i \Delta \theta_{it} + \sum_{i \in E} \theta_{it} p_i - \sum_{i \in X} \theta_{it-k} p_{it-k} \]

where \( \theta_{it} \) is the output share of firm \( i \) in the given sector at time \( t \); productivity growth (\( \Delta P_t \)) is measured between the base year \( t-k \) and the end year \( t \); and \( C, E \) and \( X \) are sets of continuing, entering, and exiting firms, respectively.

Using the Longitudinal Research Database of the United States, Baily et al., (1992) found that the within-firm effect was very important in aggregate productivity growth in manufacturing for the three periods considered (1972-1977, 1977-1982, and 1982-1987), determining the trend of TFP growth. The effect of increasing the output shares of high-productivity plants and the decreasing output shares of low-productivity plants, are also important, having a positive effect on aggregate productivity growth in all the 23 examined
manufacturing industries in all three periods (1972-1977, 1977-1982, and 1982-1987). However, the net contribution of entry and exit turned out to be very small and sometimes even negative.

Haltiwanger (1997) pointed out that the problem with the above decomposition method is that if the market share of entrants is very low and if the market share of exiting firms is very high, the net entry effect will be negative even when entrants are more productive than exiting firms. Furthermore, it does not account for the cathartic effect of exiting which sorts out the low-productivity firms. To overcome these problems, Haltiwanger (1997) modified the above decomposition as follows:

\[
\Delta P_t = \sum_{i \in C} \theta_{i,t-k} \Delta P_{it} + \sum_{i \in E} \Delta \theta_{i,t}(p_{it,k} - P_{t-k}) + \sum_{i \in E} \Delta \theta_{i,t} \Delta P_{it} + \sum_{i \in X} \theta_{i,t} (P_{i,t-k} - P_{t-k})
\]

where $\Delta$ refers to changes over the $k$-year interval between the first year $(t-k)$ and the last year $(t)$; $\theta_{i,t}$ is the share of firm $i$ in the given sector at time $t$; $C, E, X$ are sets of continuing, entering, and exiting firms, respectively; and $P_{t-k}$ is the aggregate (i.e. weighted average) productivity level of the sector as of the first year $t-k$. Under this decomposition method, an entrant or exiting firm will contribute positively to productivity growth when it has higher or lower productivity than the initial industry average. This method further deconstructs Baily et al., (1992)'s three factors into five components:

i) Within-firm effect, firm-level productivity change weighted by initial shares in the industry.

ii) Between-firm effect: change of market share weighted by the difference between initial firm-level productivity and initial industry average.

iii) Cross effect: product of market share change and productivity change at firm level

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iv) Entry effect: productivity gains (loss) coming from a new entrant having higher (lower) than initial industry average weighted by the market share of the new entrant.

v) Exit effects: the productivity gains (loss) coming from an exiting firm having lower (higher) than initial average productivity weighted by the initial market share of an exiting firm.

Using the same dataset as Baily et al. (1992), and employing the improved decomposition methodology of Haltiwanger (1997), Foster et al. (1998) showed that the contribution of net entry to aggregate productivity growth is also substantial, especially over a longer period. While the “exit effect” is usually positive reflecting the fact that exiting firms are less productive than the industry average, the “entry effect” is often negative especially when measured over a shorter time horizon. In other words, new entrants tend to be less productive than incumbents, but surviving entrants’ average productivity grows fast, reflecting selection and learning effects. In the UK, using a panel of manufacturing establishments drawn from the Census of Production, Disney et al. (2003) found that the sum of “between”, “cross”, “entry”, and “exit” effects accounted for 50% of labour productivity growth and 90% of total factor productivity growth in the total manufacturing sector over 1980-1992.

OECD (2003) adopted another decomposition method suggested by Griliches and Regev (1995) to make an international comparison of firm dynamics and their contribution to aggregate productivity for ten OECD countries (United States, Germany, France, Italy, United Kingdom, Canada, Denmark, Finland, Netherlands and Portugal). This decomposition method is as follow:

\[
\Delta P_t = \sum_{i \in C} \bar{\theta}_i \Delta p_{it} + \sum_{i \in C} \Delta \theta_{it} (\bar{p}_i - \bar{P}) \\
+ \sum_{i \in N} \theta_{it} (p_{it} - \bar{P}) - \sum_{i \in X} \theta_{it-k} (p_{it-k} - \bar{P})
\]
where a bar over a variable indicates the average of the variable over the base and end year. While the previous method uses the first year’s values for a continuing firm’s share (\( \theta_{n-k} \)), its productivity level (\( p_{n-k} \)) and the sector-wide average productivity level (\( P_{n-k} \)), this method uses the time averages of the first and last years for them (\( \bar{\theta}_i \), \( \bar{p}_i \), and \( \bar{P} \)). This method deconstructs aggregate productivity growth into four components: within effect, between effect, entry effect, and exit effect. As a result of this time averaging, cross effect disappears. OECD (2003) suggested that within-firm productivity growth accounts for a substantial share of overall labour productivity growth, and the net contribution of new entrants and exits is positive, accounting for between 20% and 40% of total productivity growth.

5.5.2 Decomposition of Labour Productivity in the Electrical Engineering Industry

We have discussed, the methods of productivity decomposition and the result of productivity decomposition in some advanced economies in the above section. Here we turn to the decomposition of aggregate productivity growth in the Chinese economy, in particular in the electrical engineering industry in Liao Ning Province. We focus on decomposing the labour productivity growth.

As we are more concerned with the contribution of new entrants, exits, and surviving firms to productivity growth than with the output reallocation among surviving firms, we simply deconstruct the aggregate productivity growth into the productivity growth from new entrant, exiting and surviving firms rather than deconstruct the contribution of surviving firms into within-firm effect, between-firm effect, and cross effect. We modify Haltiwanger (1997)’s method as follows by combining the first three components of Haltiwanger (1997)’s decomposition method and making it easy to calculate:
\[ \Delta P_t = \left( \sum_{i \in C} \theta_{it} (p_{it} - \bar{P}) - \sum_{i \in C} \theta_{it-k} (p_{it-k} - \bar{P}) \right) \\
+ \sum_{i \in E} \theta_{it} (p_{it} - \bar{P}) - \sum_{i \in E} \theta_{it-k} (p_{it-k} - \bar{P}) \]

where \( \sum_{i \in C} \theta_{it} (p_{it} - \bar{P}) - \sum_{i \in C} \theta_{it-k} (p_{it-k} - \bar{P}) \) represents the change of aggregate labour productivity attributed to surviving firms (including both within-effect and between-effect), including two components, surviving firms' current productivity growth over base year average productivity, and surviving firms' productivity in base year higher than the sample average productivity in base year. \( \sum_{i \in E} \theta_{it} (p_{it} - \bar{P}) \) represents the change of aggregate labour productivity attributed to new entry, and \( \sum_{i \in X} \theta_{it-k} (p_{it-k} - \bar{P}) \) represents the change of aggregate labour productivity due to firms' exit.

In practice, we divided the 10-year period between 1987 and 1996 into two sub-periods, 1987-1992, and 1992-1996. We first deconstruct labour productivity growth for the two sub-periods, and then deconstruct labour productivity growth for the whole period between 1987 and 1996. The decomposition results are shown in Fig 5.9 and Fig 5.10.

**Fig 5.9 The Contribution Of Entry, Exit, and Survival to Productivity Growth (%) (all enterprises)**

<table>
<thead>
<tr>
<th>Entry</th>
<th>Exit</th>
<th>Survival</th>
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Fig 5.9 shows the contribution of entry, exit, and surviving firms to the sector's productivity growth. It suggests that all three (on average) made positive contributions to productivity growth over both periods. However, the major impact came from entrants, accounting for around 51% and 72% of labour productivity growth in the two sub-periods respectively, while both exiting and surviving firms played only a limited part. For the two sub-periods, surviving firms accounted for only 35% and 7% of labour productivity growth respectively, and their contribution seemed to be declining. This contrasts with the fact that surviving firms played a dominant role in advanced economies. Exiting firms do appear to have increased their role a little over the sub-periods; their contribution to labour productivity growth increased from 13% to 21%.

Looking solely at the contribution of small enterprises to overall productivity growth, Figure 5.10 suggests that survival is even less important among small firms, while exit is considerably more important.
5.6 Conclusions

In this chapter we have attempted to examine aspects of the competitive selection process in an important sector of Chinese manufacturing, looking in particular for changes resulting from the latest stage of reform, dubbed the transition to the "socialist market economy". These dynamic processes may be becoming increasingly important for the continuing growth of manufacturing as the agricultural sector as a source of surplus labour begins to decline.

Our analysis suggests that the competitive selection process is taking shape in China, with new firm entries contributing substantially to both output growth and productivity growth; however, old firms are still an important stabilizing element in determining the trend of the economy. Our analysis also suggests that it is insufficient to analyse the competitive process from the point of view of new firm entry and incumbent firm growth alone. Indeed the substantial rate of movement of enterprises that we observe in this sector means that a study of exit is just as important as that of entry. Moreover, this rate of movement appears to have increased substantially in the latest phase of reform. In fact, our productivity decomposition suggests that exits do contribute to productivity improvement especially within the small firm. Our analysis suggests that for small firms and COEs, the competitive selection process operates much as we would expect it to in a private market economy. However, for SOEs the rate of exit is much slower, and compared with new entry the contribution of exit to productivity growth is trivial; this will be the subject of analysis in the next chapter.
Chapter 6: A Hazard Model Analysis of the Impacts of Enterprise Reforms upon Firms’ Exit Behavior

In the previous chapter, we found that new entrants contributed the most to the growth of both industrial output and labour productivity, with only a limited part played by surviving and exiting firms. This contrasts distinctly with the conclusions drawn from studies of advanced market economies, in which the entry and exit flows are found to be positively correlated, and are described as a revolving door at the bottom of the industry size distribution (Geroski, 1991a, b; Shapiro and Khemani, 1987). Why is the exit behaviour of Chinese firms different? In this chapter we examine directly firms’ exit behaviours and quantify the significance of a range of factors influencing firms’ closure behaviours in the context of Chinese firms, using the same panel of Chinese electrical engineering firms from 1987 to 1996 that we used in Chapter 5.

The continuous and simultaneous entry, growth and survival, decline and eventual exit, or what Schumpeter referred to as “creative destruction”, characterises capitalism and may be thought of as a hallmark of a market economy. Such a competitive selection process is based on an exit mechanism for individual enterprises, allowing unprofitable firms to decline and fail. Through such a selection process, Alchian (1950) argued that profit-maximising behaviour in a market economy is ensured, since a lack of profits threatens a firm’s survival. Poznanski (1993) argued that the substandard dynamic efficiency of Eastern European economies could be attributed to the substitution of an easy exit and easy entry mechanism with one that precludes the timely termination and formation of enterprises. In fact, Kornai (1995) points out that the soft budget constraint is basically a problem of exit. In the context of transition economies, while the role of the entry of newly-established firms and the restructuring of large state-owned enterprises has been a focus of attention for academics and policy-makers (for example Qian (1999), and EBRD (1995)), the role played by the exit of old inefficient firms has been largely ignored. We are unaware of the studies examining firm’s exit behaviour and their determinants in the context of transition economies,
although there are a number of similar works in the context of advanced economies, e.g., Lieberman's [1990] work on American firms. Arguably both the entry and exit of firms should be emphasized equally, as they are two sides of "creative destruction" (Stiglitz, 1999).

Investigating the process governing the process of enterprises' closure in the Chinese economy is important for a number of reasons. Firstly, China's idea of gradual reform aims to encourage the entry of new firms and phase out the old inefficient SOEs through bankruptcy and restructuring. Therefore, a study of firms' exit and survival behaviour can shed light on how gradual reform works. Secondly, exits have played and are playing an important economic role in the transition to a market economy. On one hand, the exit of inefficient firms releases scarce resources, reduces social wastage and mobilises social resources, facilitates the prospects for new firms entering the industry and structural adjustment, and promotes entrepreneurship (Aghion and Howitt, 1997). On the other hand it provides credible threats to incumbent firms (Jensen, 1988; Hart, 1995), which may then hasten governance restructuring. However, exits involve costs (Ericsson, 1994), and in special circumstance exits may lead to the disorganisation of the entire economy. Thirdly, by studying the firms' exit behaviour and its determinants and comparing it with its counterparts in advanced economies, we can estimate to what extent the market mechanism is functioning and to what extent the old legacy is still working, and shed light on China's 'gradualism'.

As the objectives of the transition are to restructure state-owned enterprises and to reallocate its resources to their best use, the idea that the old state-owned enterprises (SOEs) - which are designed for the old central planning system and where inefficiency is allegedly pervasive - are less likely to survive in the face of competition from new innovative non-state firms seems to be a logical assumption. However, in the Chinese case we suspect that the high economic and social costs associated with the closure of state-owned enterprises, such as the possible increase in unemployment and the social unrest associated with it, the possible waste and loss of the capital invested in the past due to the underdeveloped capital market, the potential financial
crisis that might be triggered by the closure of SOEs, the possible output decline and disruption of production, and possible political opposition to transition, etc., create strong barriers to exit, which prevent old inefficient state-owned enterprises from closing down. Furthermore, in order to support those inefficient firms, subsidies and preferential loans have to be provided, which means efficient firms find it more difficult to get external funding to finance their investments, and heavy taxes have to be imposed upon efficient firms, which in turn could crowd out efficient firms. Also, the subsidies to inefficient firms distort market signals, which make efficient firms more likely to exit. In this chapter, we are particularly concerned with the questions of what determines the exit of Chinese firms in the process of China's transition to a market economy, what constitute the barriers to firms' exit, and whether these barriers have changed to any great extent as a result of the reforms taking place under the Socialist Market Economy.

This chapter analyses the determination of Chinese firms' exit behaviour since the endorsement of China's Bankruptcy Law in 1986, and makes three contributions to this literature. Firstly, it examines firms' exit behaviour in the context of transition economies. Although there are some studies examining the entry of de nova firms and the bankruptcy and privatisation of old state-owned firms, previous studies have not examined the lifecycle aspects of firms' behaviour in transition economies. Secondly, it uses survival analysis, especially a hazard model, to examine the survival function and hazard dependence. This allows for the examination of the influence of firm-specific, industry-specific and macroeconomic factors upon firms' survival probabilities. Most of the earlier similar studies focus on the effect of industry-level factors. Thirdly, most of the studies of firms' behaviour in transition economies are based on survey data rather than on a complete population. Because of the rapid changes experienced in transition economies, it is almost impossible to find a complete and consistent sample spanning 10 years. My dataset is a complete census of one industry sector in a province of China.
The chapter is organised as follows. Section 6.1 provides an overview of the firm exit determinants in both developed and transition economies. Section 6.2 looks in particular at firm exits and exit determinants in the Chinese context. Section 6.3 sets up an empirical analysis to clarify these results in relation to the specific hazard posed for an individual enterprise by industry exit, and discusses the empirical implementation results, while the final section concludes.

6.1 Empirical Studies of Firms’ Exit in Developed and Transition Economies

A number of studies have examined the dynamic aspects of firms' behaviour in the context of advanced economies, in which firms' entry and survival are emphasized and exit behaviours are only studied as a by-product, such as Audretsch's (1990, 1995) and Dunne et al. (1988, 1989)'s work on U.S manufacturing, Baldwin and Gorecki's (1989)'s work on Canadian manufacturing, Goreski's (1991a, 1991b)'s work on British manufacturing, Mata's (1993a, 1993b) work on Portuguese manufacturing, and Schwalbach (1991) on German manufacturing.

Empirical studies of the processes of entry and exit for developed economies tend to indicate that industry characteristics explain a large amount of the variation observed not only between industries but also within industries over time (See Caves (1998) for a review). Variables associated with observed differences across industries include entry barriers such as sunk costs, absolute capital requirements, minimum efficient scale, and market concentration (Bain, 1956; von Weizsacker, 1980). Caves and Porter (1976) and Eaton and Lipsey (1980, 1981) first noticed the symmetrical relationship between entry and exit. Caves and Porter suggested that each source of entry barriers identified by Bain could also erect a barrier to exit. Empirically, Shapiro and Khemani (1987) showed in a study of 143 four-digit Canadian manufacturing industries, over 1972-76, that these variables tend to be associated with both barriers to entry and barriers to exit. A number of other
studies have confirmed the correlation between entries and exits (e.g., Dunne et al., (1988) for US manufacturing industries, Schwalbach (1991) on German manufacturing industries, and Geroski's (1991a, 1991b) study of British firms). The positive correlation between entry and exit flows, especially among small firms, has been described as a revolving door at the bottom of the industry size distribution. Other studies indicate that entry rates tend to be positively influenced by both expected rates of return in the industry and by its growth rate (Geroski, 1990; Schwallbach, 1991), which asymmetrically have a positive effect on exit rates as well. Macroeconomic conditions are also found to be important for exit rates (van Ewijk, 1997). Over the business cycle, exit rates increase during downturn (Caballero and Hammour, 1994, 1996; Audretsch and Mahmood, 1995).

Most of the above studies have been conducted at industry level, concentrating on industry characteristics that determine firms' survival and closure. Yet, firm-specific effects are also important. For example, small firm size is generally thought to be more likely to indicate higher rates of closure (e.g., Lieberman, 1990), and young firms tend to have higher exit rates (e.g., Audretsch and Mahmood, 1995; Dunne et al., 1989). However, in most of the previous studies some of the important features of firms pre-exit, which have a significant effect upon firms' closure decisions, have not been considered, such as firms' profitability, productivity, R&D activities, marketing strategies, financial leverage, governance structure, etc.

In the process of transition from centrally planned economies to market economies, the closure and exit of value-destroying firms\(^1\) or inefficient firms

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\(^1\) A firm is defined as value-destroying when the value of inputs it purchases from other firms exceeds the value of the output that is produced. Thus, a value-destroying enterprise is in worse financial straits than a loss-making one. The former’s output is worth less than the inputs before labor and capital costs are added in, while the latter’s revenues are less than its costs (including labor and capital costs).
are important aspects of market dynamics, which both limits the wastage of social resources and enables the inflow of new and more productive enterprises. However, the above studies cannot be readily applied to transition economies, as all of them are conducted in advanced economies, such as the US, UK, Germany, Portugal, Japan, etc., and they all assume that firms are profit-maximizing and markets are competitive, therefore firms respond in the same way to the same market signals apart from the difference caused by their scale advantage or disadvantage. These assumptions might be quite appropriate in advanced economies, but may not be appropriate for economies in transition and China in particular, where the new market economic institutions are in the making, and the old central planning legacies still remain.

In transition economies, the “destruction” of old inefficient firms, involves a substantial and complicated change in the structure of production, employment and factor use, as much of the physical and organisational capital is not viable in a market economy. Furthermore, the undeveloped capital and financial markets in most transition economies make much of the resources currently employed by the incumbent enterprises, especially those employed by state-owned enterprises, virtually immobile. This immobility of resources may be compounded by the weakness or by the absence of well-defined and protected property rights that facilitate the reallocation and transfer of real assets. Therefore, the closure of unviable enterprises may be associated with substantial social as well as economic costs, such as the loss of net product and the disruption of economic ties, which are increasing with the scale of firms exiting. The costs are shown to an extreme degree in the early stage of transition in Eastern and Central Europe and Former Soviet Union Countries, such as the sharp decline in output, increasing unemployment, falling investment, the disruption of production organisation, the opposition of transition, even the reversal of transition path, etc. These may consequently hinder non-viable firms from exiting.

As transition goes on, the commitment not to bail out failing firms may still not be credible. In 1998, of CEE and FSU transition countries, bankruptcy
proceedings seemed to be efficient only in Poland, Hungary, and Estonia, with the Czech Republic lagging behind Poland and Hungary (Roland, 2000). The loss-making firms seemed readily to get subsidies and to be rescued (Schaffer, 1998; Li and Liang, 1998). In Russia, bankruptcy law does not put pressure on managers to restructure; on the contrary, managers of large regional enterprises may cooperate with regional government to use bankruptcy to expropriate the federal government and outside investors. Instead of encouraging restructuring, it may even prevent restructuring (Lambert-Mogiliansky et al., 2000).

Hence, when we look into firms' closure behaviour in the context of transition economies, apart from the factors that are common to all economies, such as sunk cost, economies of scale and the cost advantages of incumbent firms, the peculiar institutional settings in transition economies, such as the lack of a social security system, undeveloped factor markets, and ambiguous property rights, the potential social and economic costs should also be taken into account,

6.2 Firms' Exit and Determinants in China

China's enterprise reform has been the focus of China's economic reform, which is characterised by its gradualism. However, in my study of the technical efficiency of Chinese firms under restructuring in chapter 4, I found a significant divergence in technical efficiency rather than convergence in technical efficiency, as I expected, as the result of improved market environment. Through a detailed study of the dynamics of firms' entry, exit and productivity growth, we found that the roles played by firms' exiting are still trivial. We suspect that the competitive selection process has not yet been set up effectively even 20 years into reform. In fact, it is still the case that inefficient and even value-destroying state-owned enterprises are still being supported in various forms out of concern for the potential high economic and social costs associated with firm closure. Those failing state-owned enterprises are supported in the form of subsidies, credits, tax holidays, and
growing payments, tax and wage arrears. For example, although the state's subsidies to loss-making SOEs have been declining since 1989, they still amounted to more than 10% of state revenue between 1989 and 1992.

6.2.1 Firms' Exit In China

While failing firms are still supported, the exit of firms has gradually become a real threat in China. Firms exit generally in the form of closing down, bankruptcy, mergers and acquisition, and partial or complete privatisation.

**Closing Down**

This is the most common type of firm exit in China; it occurs when the owners (either a government department in the case of SOEs, the “community” in the case of COEs, or private individuals in the case of both foreign and domestic privately-owned enterprises) have been unable to secure a sufficient return, and may decide to close down an under-performing enterprise. As I am concentrating on the electrical engineering industry, I am sensible to the fact that firms may exit through switching to some other industries.
Bankruptcy

China's first bankruptcy law was enacted in 1986. For years, it was rarely applied. From 1988 to 1991, there were less than 300 cases of bankruptcy, and all of them were small firms. The first bankruptcy case of large and medium SOEs occurred in 1992, six years after the enactment of the bankruptcy law, and it encountered enormous opposition from workers. In 1996, a new bankruptcy law, largely resembling those in market economies, was enacted. Currently, bankruptcy has become a realistic threat. The number of bankruptcies rose sharply from 98 in 1989 to 5048 in 1997 (World Bank, 2000). From 1998 to 2000 the figure became stable at around 5,000 per year, partly due to the control by central government of the scale of bankruptcies in order to maintain social stability and avoid financial crisis. In fact, 1.5% of total SOEs went into bankruptcy proceedings in 1999-2000 (Wang, 2001).

![Fig 6.2 Bankruptcy Cases Heard by Chinese Court](source: World Bank (2000))

However, barriers hindering the bankruptcy of SOEs and the laying-off of SOEs employees remain. The exit barriers for SOEs generally include the
ambiguity of ownership of state assets, as the ownership of a SOE's state assets is complicated, for example, part of the state assets may be controlled by central government, and some other parts may be controlled by local government or SOEs themselves, which makes it difficult to distinguish who owns what; underdeveloped secondary markets for assets, complicated inter-enterprises arrears and debts, and the substantial entitlements of labour affected by SOE bankruptcy (Zhou and Zhang, 1997; Jefferson and Rawski, 2002). Currently, the bankruptcy of SOEs, especially the bankruptcy of large and medium SOEs, is normally the result of government intervention rather than the market mechanism, and must be endorsed and administered by the government. Creditors have little influence on the process, and creditor banks, which were considered the biggest losers in the bankruptcy proceedings, commonly recovered only 3-10% of their claims (Wang, 2001; Zhou and Zhang, 1997; ICBC, 1997).

**Merger and Takeover**

In order to avoid these problems facing bankruptcy, the merger of a financially sound firm with a financially distressed firm is favoured and in fact encouraged by the government, being regarded as an alternative to bankruptcy. Under such a merger, the workers of financially distressed firms are submerged into the better firms, which avoids the cost of unemployment. The merger can also take place voluntarily without the interference of the government. Merger and acquisition mainly occurs in large and medium enterprises. While in Western economies, merger and takeover also include 'successful' exits - firms being sold out or merged for high profits, in China, before 1996 when secondary markets for assets were still underdeveloped, firms being sold or merged did so mainly because of poor market performance and financial difficulties.

**Privatisation**

A third reason for a firm to exit is privatisation. Privatisation takes various forms such as joint ventures where foreign capital dominates, firms being sold to the public, firms being sold to individuals, and firms being sold to
employees and management. However, privatisation, either partial or complete, is a sensitive issue in China. Before 1995, privatisation mainly took the form of joint venture. Since 1995, as private ownership has acquired a more legitimate status, privatisation is more likely to be in the form of selling out to private owners, to employees and management, or to the public. In general, there are three concerns around ownership changes: the fear of loss of government control over enterprises, the loss of state-owned assets, and the realignment of redundant employees.

It is important to note that we cannot distinguish the forms of exit in our dataset. However, for Chinese firms, before 1996, informal bankruptcy (closing down) was the most usual form of exit. Regarding firms being merged or acquired, they were generally operating as financially independent firms, submitting financial reports independently, and therefore they are not counted as exits. As for privatisation, large-scale privatisation had not been implemented before 1996, at least in Liao Ning Province. Therefore, exiting firms in my dataset largely refers to firms closing down.

6.2.2 Determinants of Firms’ Exit in China

However, exactly what factors determine firms’ exit in the context of the Chinese manufacturing sector during the process of transition? It is clear that, in addition to the factors generally found to be important in advanced economies, a number of additional factors need to be considered in the context of transitional economies in general and the Chinese economy in particular. With the ensuing econometric analysis in mind, we need to consider here the following factors at firm level, industry level, and macroeconomic level.

**Firm-level factors:**

Ownership. Our data allows us to classify enterprises into 4 groups, State-Owned Enterprises (SOEs), Collectively-Owned Enterprises (COEs), Foreign-Invested Firms, and firms categorised as Others including Domestic Privately-
Owned Enterprises, and Shareholding Companies, etc. The ownership form is likely to be an important determinant of exit in the Chinese context, though the relationship may be complex. While, for example, SOEs may be inefficient, the probability of their exit may be influenced by a consideration of the social costs and resistance associated with their closure. Moreover, the differential fiscal and legal treatment of enterprises according to ownership form (and for which we cannot adequately account) may also be important.

Enterprise age. Those enterprises that have survived the longest have established themselves in the market, and may be better able to survive an adverse shock of given size (e.g., through trademarks, "goodwill" and established links to suppliers or to the capital market). In the context of transition economies, the effect may be strengthened since established firms are frequently the place where traditional planning mechanisms and vested interests are most deeply rooted. However, old firms burdened with established organisation-specific knowledge (Hayek, 1935; Murrell, 1992, 1993) acquired during the socialist era might be slower in acquiring organisation-specific knowledge adaptable in a market economy, and therefore be slower in learning to survive in a market economy.

Enterprise size. The bigger a firm is, the more likely it is to enjoy economy of scale, and the more likely it is to invest in R&D, marketing strategies and information gathering. They have also survived and grown throughout various internal and external shocks, and have accumulated competitive assets and skills as well, therefore, they are more likely to survive. In China, for administrative purposes, China’s State Planning Committee classifies a firm as large, medium, or small according to its productive capital and its production capacity, and makes policies according to this classification. Therefore firm size captures not just the advantages of large firms over small firms in economies of scale but also control for differential effects of government policies with regard to enterprises of different size. We expect to see a negative effect of firm size upon firms’ closure probability. We measure firms’ size by employment, and firms’ scale advantage by the derivation of the size of capital stock from the minimum efficient scale (MES). MES is defined
as the average size of the largest plants accounting for 50% of industry employment. It should be noted that size variables may also capture the characteristics of the sunk cost of firms in an imperfect market environment, which is especially important in transition economies where capital markets and labour markets are underdeveloped. An additional control for sunk costs is a measure of capital intensity. This may also be important for another reason. In the 1980s, the government targeted the electrical engineering industry in ways that may well have encouraged entry by enterprises with less than optimal capital intensity.

Enterprise performance. In a market economy, this is the key to the competitive selection process, with poor performance punished by exit. In the context of transition economies, however, the relationship may not be so straightforward, as efficient firms may be punished by higher taxation, and inefficient firms may be encouraged by state subsidies. We include three types of performance measures: profitability measured by the ratio, labour productivity, efficiency index we estimated by using Data Envelopment Analysis (DEA). As suggested by the literature that the closure of inefficient firms is a market selection process, we expect to see that more productive and more efficient firms survive and grow, and less productive and less efficient firms decline and close down (Jovanovic, 1982; Hopenhayn, 1992), and a firm’s closure decision is based on the comparison of expected profit staying in the market and the expected cost of staying in (Dixit, 1989). Therefore, firms’ current profitability should have negative effects upon firms’ closure. In China, as well as in other transition economies, firms’ profitability may be only a poor signal of the potential viability of a firm. As not all firms are profit- maximising oriented, both SOEs and COEs have to take on social responsibilities apart from their economic objectives. Firms’ efficiency index is included for two reasons: firstly, firms’ survival ability is a test of firms’ efficiency in a competitive market (Bain, 1969), and the exit of less efficient firms is normal in a market economy; secondly, productivity might not be a good indicator of enterprises’ performance in the context of transition economies, and higher productivity might actually lead to greater allocative distortion, lower profits, and lower efficiency as suggested by Bai et al. (1997).
We have shown in chapter 5 that there is a tendency of divergence in firms' efficiency, which is supposed to be associated with increased firm turnover (Caves, 1998).

The hardening of financial constraints. The hardening of financial constraints will eliminate support to under-performing firms, therefore it will increase the probability of firms' closure. In this study, we use individual firms' ratio of interest payment to fixed capital as an indicator of the degree of financial constraint faced by individual firms.

Firms' social burden. In China, where the social security system is just beginning to be set up, SOEs, which had been designed to satisfy both economic and social duties, have heavy social security and social welfare responsibilities. Those social responsibilities take the forms of in-house schools, hospitals, employees' housing, health care and pension schemes for employees, etc., and are represented by unproductive capital. In this chapter, the share of productive fixed capital is used to capture the effect of social burdens upon firms' closure. The potential social burdens are also captured by the numbers of employees. On one hand, higher unproductive capital ratio decreases the level of return, which in turn increases the closure probability; on the other hand, in transition economies with a poor social security system, those social obligations imply strong opposition against firms' closure.

**Industrial and Macroeconomic Factors**

Industry-level and macroeconomic factors play an important role in determining firms' exit probability as well; here we consider the following factors:

Market competition. In a more concentrated market, the existence of monopoly makes smaller firms more prone to failure. In order to allow for differences in the market environment, we also include indicators of the degree of market competition. We use the four largest firms' output ratio as an indicator of the degree of market competition.
The growth of the industry and the expected profit rate at industry level. In a fast-growing industry, as Bradburd and Caves (1982) found, price-cost margins tend to be high, and market penetration can be achieved without causing much harm to competitors, therefore firms tend to live longer. The higher expected profit rate of an industry will tend to attract more firms to enter the industry and increase the market competition. In this study, we use the percentage of industrial output in the electrical engineering industry as a proxy for the growth of the electrical engineering industry. As a measure of the expected return level within the electrical engineering industry, we use the one year lagged profit margin at industry level.

Reform stages. The Fourteenth Party Congress held in September 1992 marked a rough two-stage process of economic reform. While before 1992, the official ideology lingered between “planning supplemented by market” and “planned commodity economy”, since 1992 setting up a “socialist market economy” has been endorsed as the primary objective of China’s economic reform, and the reform of enterprises has begun to focus more on organisational and ownership change. We use a dummy variable to incorporate the impact of the post-1992 reforms.
6.3 Modelling The Exit Hazard of Chinese Enterprises

This section sets up the empirical methodology for analysing the determination of Chinese firms’ exit behaviour, and reports the results of the estimates. To analyze firms’ exit behaviour and to account for the right censoring nature of the dataset, we utilized methods from the literature on economic duration data (see, e.g., Kalbfleisch and Prentice, 1980; Kiefer, 1988; Lancaster, 1979), to model firms’ exit as a hazard rate, which is defined as the conditional probability that an enterprise exits in a small interval of time. Hazard rate (or event history) analysis has been used extensively in the study of organizational mortality (Hannan and Carroll, 1992) and new firm survival (Audretsch and Mahmood, 1995). Theoretically, the hazard analysis can be described as follows:

Let $T$ be a random variable measuring the duration of a particular firm during 1987-1996 with a continuous probability distribution $f(t)$, where $t$ is a realization of $T$. The cumulative probability is:

$$F(t) = \int_0^t f(s)ds = \text{Prob}(T \leq t).$$

The survival function defining the probability that a firm survives at least $t$ is given by:

$$S(t) = 1 - F(t) = \text{Pr}(T > t)$$

Hazard rate $\lambda(t)$ can then be derived as follows:

$$\lambda(t) = \lim_{dt \to 0} \frac{P(t \leq T < t + dt \mid T \geq t)}{dt}$$

$$\lambda(t) = \lim_{dt \to 0} \frac{F(t + dt) - F(t)}{dtS(t)}$$

$$\lambda(t) = \frac{f(t)}{S(t)}$$

hence, the hazard rate is the rate at which a firm exits, given that the firm has not failed up a certain point in time.

The distributions of hazard rate can take various forms. The exponential distribution is a widely-used model for durations that do not exhibit much
variation, which defines the hazard rate as $\lambda(t) = \gamma$ with parameter $\gamma > 0$. The exponential distribution is sometimes termed memory-less, as the hazard function is constant and reflects no duration-dependence. Another popular choice is the Weibull model, the hazard function of which is defined as $\lambda(t) = \gamma \alpha t^{\alpha-1}$, where $\gamma > 0$ and $\alpha > 0$. In this specification, the hazard function is monotonically increasing in duration (positive duration dependence) if the scale parameter $\alpha > 1$, and monotonically decreasing if $\alpha < 1$, and constant if $\alpha = 1$, which is exactly the exponential model. The log-logistic model is another choice, the hazard rate of which is defined as $\lambda(t) = \frac{\gamma \alpha t^{\alpha-1}}{1 + t^\alpha}$. While the Weibull model exhibits a monotonic hazard, the log-logistic specification, has a non-monotonic hazard. For $\alpha > 1$ the hazard first increases with duration then decreases. If $0 < \alpha \leq 1$, the hazard function decreases with duration.

The hazard function or hazard rate can be estimated through univariate descriptive methods such as Kaplan-Meier, and multivariate regression methods. While the univariate analysis displays a general trend of firms’ survival or hazard rate, and provides information for model specification for multivariate analysis, the multivariate regression can then look at what determines firms’ survival or hazard rate. Initially, we use a typical univariate technique - the Kaplan-Meier estimators - to estimate the hazard functions non-parametrically, then we use multivariate regression methods to estimate the hazard functions and to look at what determines firms’ hazard rate.

6.3.1 Nonparametric Estimation of the Hazard Function: Kaplan-Meier Estimator

The Kaplan-Meier Estimator is a strictly empirical approach to survival and hazard function estimation. Assume $t_1, t_2, ..., t_i, ..., t_n$ denote the exit times of the firms in my dataset, and $t_i < t_2 < ... < t_i < ... < t_n$. Let $h_j$ be the number of firms that exit after $t_j$, and $n_j$ is the number of firms at time $t_j$, then the estimator of
the hazard rate at is \( \hat{\lambda}(t_i) = \frac{h_j}{n_j} \), and the corresponding estimator for the survival function is:

\[ S(t_i) = \prod_{j=1}^{n} \left( \frac{n_i - h_j}{n_j} \right) = \prod_{j=1}^{n} \left( 1 - \hat{\lambda}(t_i) \right) \]

We only present in this section the smoothed Kaplan-Meier estimation of firms' hazard function. First, a Kaplan-Meier estimation of hazard function including all firms is presented. Then, the estimated hazard functions for firms stratified by ownership, size, and age are presented. The results are presented in Fig 6.4 to Fig 6.6. Meanwhile, the Mantel-Cox log-rank test, and the Wilcoxon-Breslow-Gehan test are conducted to check whether the difference in survival patterns among stratified firms are significant.

Fig 6.3 shows the cumulative survival function for all the firms in the sector during the period between 1987 and 1996, 95% confidence band are shown in fainted lines.

The hazard rate increases between 1987 and 1993, peaks in 1993, and decreases rapidly thereafter.
Fig 6.4 shows the cumulative survival of the firms stratified by ownership. It indicates that significant differences of survival probability exist between state-owned enterprises firms and collectively-owned firms. The probability of a state-owned firm surviving in the near future is higher than that of a collectively-owned firm.

Fig 6.4 Smoothed Hazard Estimates, by Ownership

Fig 6.5 shows the smoothed hazard estimates stratified by firm size. Firms are divided into three categories: large, medium and small firms.
Fig 6.5 suggests that the survival probability of small firms is significantly higher than that of medium firms and large firms over the 10-year period, and as we approach the end of the sample period, the exit behaviours of medium firms and large firms begin to show differences. The pace of exit of medium firms is accelerated. Large and medium firms are more likely to survive; the small firms are the most likely to exit. This result is consistent with the literatures that firm size matters in determining firms’ exit decisions.

Firms that have been founded in different time periods also display different survival and exit behaviours. Fig 6.6 shows the smoothed hazard estimates stratified by founding periods. We divide firms into three groups according to when they were established: firms established between 1987-1996, firms established between 1977-1986, and firms established before 1977. The first two groups are firms founded after the start of economic reform, and the third group were founded before reform. Those three groups display different survival and exit behaviours. Firms that were established before reform have the lowest hazard rates, while the newly-entered firms have the highest hazard rates.
For the above estimations, both the Mantel-Cox log-rank test and the Wilcoxon-Breslow-Gehan test have been conducted. They all suggested that the differences in survival and exit patterns among different types of firms are statistically significant.

6.3.2 Semiparametric Estimation of the Hazard Function: Cox Proportional Hazard Model

Through the non-parametric estimations, we have already found that firms displayed different survival and exit patterns; in this section we will analyse the underlying causes for the different survival and exit patterns through multivariate regressions. As was discussed in section 6.1 and 6.2, both firm-specific characteristics, such as firm size, age, and performance, and industry-specific characteristics, such as competition, entry and exit barriers, have effects upon firms' exit behaviour. Furthermore, during the process of China's transition, various economic reform policies also have effects upon firms' exit behaviour. To account for such effects, we allow the firm hazard
rate at a particular point in time to depend on the realization of a set of industry and firm-specific time-varying covariates.

There are two popular methods of analysing the effect of explanatory variables on the hazard rate. One is the proportional hazard model: in this model the hazard function depends on a vector of explanatory variables $x$ with unknown coefficients $\beta$ and $\lambda_0$, and the hazard function of which takes the form of $\lambda(t, x, \beta, \lambda_0) = \phi(x, \beta)\lambda_0(t)$, where $\lambda_0$ is a "baseline hazard", which is unknown and needs to be estimated. The effect of explanatory covariates is to multiply the baseline hazard $\lambda_0(t)$, which is an individual specific constant, by a factor $\phi$, which does not depend on duration $t$ and is generally defined as $\phi(x, \beta) = \exp(x^T \beta)$. The other method is the accelerated failure time model, in which the effect of covariates is incorporated by specifying the hazard function as $\lambda(t, x, \beta) = \lambda_0(t)\phi(x, \beta)$. This specification allows the regressors to rescale the duration time directly. The proportional hazard model has seen the most wide usage in industrial organization literature, for example Audretsch and Mahmood (1995) on new firm survival, Bandopadhyaya (1994) on US firm bankruptcy, Karshenas and Stoneman (1993) on new technology diffusion, and Disney et al. (2003) on firm survival in the UK manufacturing sector, etc.

In this chapter, we adopt the proportional hazard model as well. Following Kiefer (1988), and Kalbfleisch and Prentice (1980), we allow the firm hazard rate at a particular time to depend on the realization of a set of common and firm-specific time-varying covariates, with $X_i(t)$ denoting the $i$th firm's covariates at time $t$, therefore we construct our model as follows:

$$\hat{\lambda}_i(t) = e^{\theta^T X_i(t)}\lambda_0(t).$$

In estimating the proportional hazard model, Cox (1972) suggested a semi-parametric estimation in which the proportional hazard model could be estimated in a two-step procedure, where $\beta$ is first estimated through a partial likelihood approach without specifying the form of the baseline hazard function $\lambda_0$, and then $\lambda_0(t)$ is estimated non-parametrically. The relevant likelihood in
estimating $\beta$, due to the proportionality of $\lambda_i(t)$ and $\lambda_0(t)$, as was shown in Kalbfleisch and Prentice (1980), can be given by:

$$L(\beta) = \prod_{i \in D_j} \frac{\exp(\beta' X_i(t_j))}{\sum_{k \in R_j} \exp(\beta' X_k(t_j))}$$

where $t_j$ are the ordered failure times, $D_j$ is the set of observations fail at $t_j$, $R_j$ is the set of observations that are at hazard at time $t_j$.

and the parameter $\beta$ is estimated by maximising the partial log-likelihood function:

$$LnL(\beta) = \sum_{i \in D_j} \delta_i \{\beta' x_i(t_j) - \log \sum_{k \in R_j} \exp(\beta' x_k(t_j))\}.$$ 

The most important assumption of the Cox proportional hazard model is that the hazard ratio is proportional over time. The test of the proportional hazard assumption is based on the assumption restricts $\beta_j(t) = \beta$. Grambsch and Therneau (1994) showed that many of the tests for proportional hazards are in fact a test of non-zero slop in a generalised linear regression of the scaled Schoenfeld residuals on functions of time. This test also assumes homogeneity of variance across hazard sets.

In our study of the influence of a set of industry-specific-and firm specific time variant covariates upon firms' exit behaviour, we do not have any strong a priori reasons for imposing a particular functional form for the dependence of a firm's hazard rate on its survival time, and we are more concerned about the effect of various industry-specific and firm-specific factors upon firms' hazard rate than the actual hazard rate. Therefore, we choose to use semi-parametric estimation rather than parametric estimation. However we experimented with a variety of functional forms of hazard function, such as Weibull, Lognormal, and Exponential distribution (see appendix), and differences were not found to be significant. This finding is in keeping with other econometric studies of hazard rates (e.g., Karshenas and Stoneman, 1993).
Following our discussion of firms' exit determinations in the previous section, in our analysis we include the following covariates, which are shown in Table 6.1.

Table 6.1 Hazard Model Covariates

<table>
<thead>
<tr>
<th>Variables</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Firm Level Factors</strong></td>
<td></td>
</tr>
<tr>
<td>DEA</td>
<td>DEA efficiency Index</td>
</tr>
<tr>
<td>COE</td>
<td>Collective Owned Enterprises</td>
</tr>
<tr>
<td>Foreign</td>
<td>Foreign Funded Enterprises (joint ventures and private owned)</td>
</tr>
<tr>
<td>Other</td>
<td>Firms other than SOEs, COEs and Foreign</td>
</tr>
<tr>
<td>Prof</td>
<td>The ratio of profit to sale revenue</td>
</tr>
<tr>
<td>Prof92</td>
<td>The interaction of Prof and P92</td>
</tr>
<tr>
<td>Prod</td>
<td>Productivity, defined as the ratio of output to employment</td>
</tr>
<tr>
<td>Lncape</td>
<td>Logarithm of firm's fixed capital</td>
</tr>
<tr>
<td>Lnemp</td>
<td>Logarithm of the number of employee</td>
</tr>
<tr>
<td>Inrate</td>
<td>The ratio of interest payment to fixed capital</td>
</tr>
<tr>
<td>Inrate92</td>
<td>The interaction of INRATE and P92</td>
</tr>
<tr>
<td>Capinte</td>
<td>Capital intensity, defined as the ratio of capital to employment</td>
</tr>
<tr>
<td>Capint92</td>
<td>The interaction of capital intensity and P92</td>
</tr>
<tr>
<td>Salerate</td>
<td>The ratio of sale revenue to gross output value</td>
</tr>
<tr>
<td><strong>Industry Level Factors</strong></td>
<td></td>
</tr>
<tr>
<td>Exprofit</td>
<td>One year lagged industry profit rate</td>
</tr>
<tr>
<td>Ratio</td>
<td>Share of the electrical engineering industry to Manufacturing Industry</td>
</tr>
<tr>
<td>Conc</td>
<td>Regional Concentration ratio, defined as the output ratio of the four largest enterprises in the region in electrical engineering</td>
</tr>
<tr>
<td>Conc2</td>
<td>The square of concentration ratio</td>
</tr>
<tr>
<td><strong>Macroeconomic Environment</strong></td>
<td></td>
</tr>
<tr>
<td>Growth</td>
<td>The growth rate of GDP</td>
</tr>
<tr>
<td>P92</td>
<td>Dummy variable, P92=1 if year&gt;1992, P92=0 if year&lt;=1992</td>
</tr>
</tbody>
</table>

In this chapter, we try to analyse the specific impact of the latest batch of reforms on the competitive process; our approach is to consider the reform as
a specific covariate, included as a straight dummy variable (P92 = 1 if t>1992). It represents the impact on the hazard rate facing all enterprises in the sample. However, our experiments also allowed for the reforms to impact differentially according to ownership type, firm size, measures of profitability, and capital intensity. We estimated this possibility by interacting these variables with our reform dummy. We also try to test whether firms' performance measures, especially firms' efficiency, are good indicators of firms' exit or survival propensity. Finally, we allow for entirely different hazard functions, by estimating different equations by ownership type, for small firms, and for new firms established between 1986 and 1996. A separate estimation for larger firm sizes was precluded by the limited numbers of observations.

Table 6.2 presents the results from semi-parametric estimation.
Table 6.2 Estimated Hazard Functions for Enterprises in Liao Ning Province 1987-96: Semi-Parametric Estimation

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>COE</td>
<td>0.215**</td>
<td>0.02</td>
<td>0.188**</td>
<td>0.04</td>
<td>0.194**</td>
<td>0.04</td>
<td>0.216**</td>
<td>0.02</td>
</tr>
<tr>
<td>foreign</td>
<td>-0.231</td>
<td>0.27</td>
<td>-0.268</td>
<td>0.20</td>
<td>-0.224</td>
<td>0.28</td>
<td>-0.209</td>
<td>0.32</td>
</tr>
<tr>
<td>other</td>
<td>0.274</td>
<td>0.17</td>
<td>0.262</td>
<td>0.19</td>
<td>0.265</td>
<td>0.18</td>
<td>0.279</td>
<td>0.16</td>
</tr>
<tr>
<td>age</td>
<td>-0.161***</td>
<td>0.00</td>
<td>-0.151***</td>
<td>0.00</td>
<td>-0.153***</td>
<td>0.00</td>
<td>-0.163***</td>
<td>0.00</td>
</tr>
<tr>
<td>Efficiency Index</td>
<td>-0.517***</td>
<td>0.00</td>
<td>-0.475***</td>
<td>0.00</td>
<td>-0.173</td>
<td>0.78</td>
<td>-0.472***</td>
<td>0.00</td>
</tr>
<tr>
<td>Profit Margin</td>
<td>-0.018***</td>
<td>0.00</td>
<td>-0.016***</td>
<td>0.01</td>
<td>-0.044</td>
<td>0.51</td>
<td>-0.015***</td>
<td>0.01</td>
</tr>
<tr>
<td>Ln(Labour Productivity)</td>
<td>-0.001**</td>
<td>0.04</td>
<td>-0.001</td>
<td>0.19</td>
<td>-0.012**</td>
<td>0.02</td>
<td>-0.001</td>
<td>0.18</td>
</tr>
<tr>
<td>Ln(CAPITAL/MES)</td>
<td>-0.079***</td>
<td>0.00</td>
<td>-0.075***</td>
<td>0.00</td>
<td>-0.068***</td>
<td>0.00</td>
<td>-0.076***</td>
<td>0.00</td>
</tr>
<tr>
<td>LN(EMPLOYMENT)</td>
<td>-0.106***</td>
<td>0.00</td>
<td>-0.132***</td>
<td>0.00</td>
<td>-0.138***</td>
<td>0.00</td>
<td>-0.111***</td>
<td>0.00</td>
</tr>
<tr>
<td>Unproductive</td>
<td>-0.189***</td>
<td>0.00</td>
<td>-0.180***</td>
<td>0.00</td>
<td>-0.181***</td>
<td>0.00</td>
<td>-0.263***</td>
<td>0.00</td>
</tr>
<tr>
<td>Capital Ratio</td>
<td>-0.131*</td>
<td>0.09</td>
<td>0.003</td>
<td>0.96</td>
<td>0.008</td>
<td>0.91</td>
<td>0.123</td>
<td>0.11</td>
</tr>
<tr>
<td>Interest</td>
<td>0.046*</td>
<td>0.07</td>
<td>0.026</td>
<td>0.30</td>
<td>0.032</td>
<td>0.20</td>
<td>0.049*</td>
<td>0.06</td>
</tr>
<tr>
<td>Capital Intensity</td>
<td>0.023</td>
<td>0.55</td>
<td>0.019</td>
<td>0.66</td>
<td>0.027</td>
<td>0.42</td>
<td>0.027</td>
<td>0.43</td>
</tr>
<tr>
<td>Expected Profit</td>
<td>-0.181***</td>
<td>0.00</td>
<td>-0.180***</td>
<td>0.00</td>
<td>-0.181***</td>
<td>0.00</td>
<td>-0.263***</td>
<td>0.00</td>
</tr>
<tr>
<td>Industry Growth</td>
<td>-3.179***</td>
<td>0.00</td>
<td>-3.041***</td>
<td>0.00</td>
<td>-2.932***</td>
<td>0.00</td>
<td>-3.159***</td>
<td>0.00</td>
</tr>
<tr>
<td>Concentration</td>
<td>0.433***</td>
<td>0.00</td>
<td>0.428***</td>
<td>0.00</td>
<td>0.428***</td>
<td>0.00</td>
<td>0.431***</td>
<td>0.00</td>
</tr>
<tr>
<td>GDP Growth</td>
<td>0.102***</td>
<td>0.00</td>
<td>0.100***</td>
<td>0.00</td>
<td>0.100***</td>
<td>0.00</td>
<td>0.102***</td>
<td>0.00</td>
</tr>
<tr>
<td>P92</td>
<td>0.049</td>
<td>0.71</td>
<td>0.052</td>
<td>0.69</td>
<td>0.052</td>
<td>0.69</td>
<td>0.045</td>
<td>0.73</td>
</tr>
</tbody>
</table>

Note: *** Significant at the 1 per cent level. ** Significant at the 5 per cent level. *Significant at the 10 per cent level.
Column (1), column (2), and column (3) of Table 6.2 take DEA efficiency index, profitability, and labour productivity as measures of firms’ performance respectively. Column (4) includes all three performance measures as covariates. It can be seen that a number of co-variants have significant and correctly signed influences on the hazard rate. Note that the SOE form of ownership is the benchmark ownership type. Significant positive impacts on the hazard rate result from collective ownership (COE), while the effect of domestic private ownership is only marginal significant. By way of example, the hazard rate facing a COE was nearly 21% above that for a SOE. Industrial concentration ratios and national GDP growth exert positive influences as well.

Negative impacts are coming conversely from foreign ownership, although not statistically significant, the age of the enterprise, capital as a measure of firm size and scale advantage, employment and unproductive capital ratio as measures of the enterprise’s social burden and socialist legacy, and from the relative weakness of the electrical engineering industry in the Chinese economy as a whole. Note all three performance measures, efficiency, labour productivity, and profitability have exerted significant negative effects upon an enterprise’s hazard rate, yet efficiency index and profitability are better indicators to predict firms’ exit.

Column (5) examines SOEs only. Note first that while we observe a positive and potentially large impact coming from the reforms (P92), this is determined very imprecisely. Secondly, it may be observed that neither efficiency index nor profitability appear to be significant, either pre- or post-reform. However, firms’ productivity is a significant factor in determining firms’ hazard rate.
Column (6) offers a contrast by considering only COEs. Here we obtain results that are more consistent with a competitive selection process. Unlike SOEs, the efficiency index and profitability are important influences on exit rates, as is the new regime itself for all COEs. However, the effect of productivity is not significant. This pattern is largely replicated in column (7) for small firms; this is not surprising since the samples are largely coextensive.

Column (8) examines new enterprises established between 1986 and 1996. While the regression results are largely similar to those in column (4), column (6) and column (7), we should note that the coefficients for COE and for Other are higher, and that the effects of Other become significant at 1% level. This might indicate that newly-established non-state enterprises are exposed to a higher exit hazard than newly-established SOEs.

Through all regressions presented in Table 6.2, the impact of the reforms, which we proxied using variable P92, while correctly signed, is not particularly large (effectively increasing the baseline hazard by about 5%), and is statistically insignificant. We suspect that the other industry-level and macroeconomic factors might have captured the impact of the reforms. Hence, in order to estimate directly whether the acceleration of economic reform since 1992 has any impact upon firms' exit behaviours, we interact all our firm-level variables with P92, and the regression results are presented in Table 6.3. Column (1) of Table 6.3 applies to all samples, and column (2) and column (3) apply to SOE and COEs respectively, while column (4) and column (5) apply to small enterprises and newly-established enterprises during the period between 1986 and 1996.
Table 6.3 Estimated Hazard Functions for Enterprises in Liao Ning Province 1987-96: Semi-Parametric Estimation with Interactive Terms

<table>
<thead>
<tr>
<th></th>
<th>(1) All Sample</th>
<th>(2) SOE</th>
<th>(3) COE</th>
<th>(4) Small Enterprises</th>
<th>(5) New Enterprises</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COE</strong></td>
<td>0.221** 0.02</td>
<td>0.212** 0.03</td>
<td>0.302* 0.07</td>
<td>0.198 0.36</td>
<td>-0.099 0.69</td>
</tr>
<tr>
<td>foreign</td>
<td>-0.239 0.25</td>
<td>0.097 0.38</td>
<td>-0.183*** 0.00</td>
<td>0.309*** 0.01</td>
<td>0.212 0.02</td>
</tr>
<tr>
<td>other</td>
<td>0.262 0.19</td>
<td>-0.15*** 0.00</td>
<td>-0.31*** 0.00</td>
<td>-0.66*** 0.00</td>
<td>-0.61*** 0.00</td>
</tr>
<tr>
<td><strong>AGE</strong></td>
<td>-0.157*** 0.00</td>
<td>0.097 0.38</td>
<td>-0.183*** 0.00</td>
<td>0.309*** 0.01</td>
<td>0.212 0.02</td>
</tr>
<tr>
<td>Efficiency Index</td>
<td>-0.619*** 0.00</td>
<td>-0.509 0.68</td>
<td>-0.647*** 0.00</td>
<td>-0.619*** 0.00</td>
<td>-1.37*** 0.00</td>
</tr>
<tr>
<td>Efficiency Index*P</td>
<td>0.02</td>
<td>0.63</td>
<td>0.356 0.78</td>
<td>0.152 0.48</td>
<td>0.109 0.61</td>
</tr>
<tr>
<td>Profit Margin</td>
<td>-0.048*** 0.00</td>
<td>-0.365 0.57</td>
<td>-0.047*** 0.00</td>
<td>-0.048*** 0.00</td>
<td>-0.038* 0.02</td>
</tr>
<tr>
<td>Profit Margin*P92</td>
<td>0.02</td>
<td>0.356 0.62</td>
<td>0.035** 0.03</td>
<td>0.036*** 0.02</td>
<td>0.032* 0.08</td>
</tr>
<tr>
<td>Ln(Labour Productivity)</td>
<td>0.005 0.17</td>
<td>-0.059 0.11</td>
<td>-0.003 0.29</td>
<td>-0.004 0.25</td>
<td>0.002 0.46</td>
</tr>
<tr>
<td>Ln(Labour Productivity)*P92</td>
<td>0.21</td>
<td>0.308 0.19</td>
<td>0.003 0.35</td>
<td>0.003 0.31</td>
<td>-0.002 0.44</td>
</tr>
<tr>
<td>Ln(Capital/MES)</td>
<td>-0.106*** 0.01</td>
<td>-0.160 0.47</td>
<td>-0.096** 0.02</td>
<td>-0.100*** 0.01</td>
<td>-0.069 0.25</td>
</tr>
<tr>
<td>Ln(Capital/MES)*P92</td>
<td>0.036 0.40</td>
<td>0.011 0.96</td>
<td>0.037 0.41</td>
<td>0.030 0.49</td>
<td>0.002 0.97</td>
</tr>
<tr>
<td>Ln(Employment)</td>
<td>-0.159*** 0.00</td>
<td>-0.147 0.61</td>
<td>-0.145*** 0.01</td>
<td>-0.151*** 0.00</td>
<td>-0.212*** 0.01</td>
</tr>
<tr>
<td>Ln(Employment)*P92</td>
<td>0.058 0.31</td>
<td>0.038 0.90</td>
<td>0.041 0.49</td>
<td>0.055 0.34</td>
<td>0.120 0.14</td>
</tr>
<tr>
<td>Unproductive Capital Ratio</td>
<td>0.61*** 0.00</td>
<td>0.511 0.52</td>
<td>-0.487*** 0.00</td>
<td>-0.545*** 0.00</td>
<td>-0.745*** 0.00</td>
</tr>
<tr>
<td>Unproductive Capital Ratio*P92</td>
<td>0.588*** 0.00</td>
<td>0.496 0.53</td>
<td>0.474*** 0.01</td>
<td>0.539*** 0.00</td>
<td>0.622*** 0.02</td>
</tr>
<tr>
<td>Interest Ratio</td>
<td>0.013 0.85</td>
<td>0.015 0.95</td>
<td>0.019 0.78</td>
<td>0.014 0.84</td>
<td>-0.003 0.97</td>
</tr>
<tr>
<td>Interest Ratio*P92</td>
<td>0.044 0.55</td>
<td>-0.216 0.68</td>
<td>0.043 0.55</td>
<td>0.043 0.55</td>
<td>0.058 0.54</td>
</tr>
<tr>
<td>Capital Intensity</td>
<td>1.271*** 0.00</td>
<td>1.600** 0.04</td>
<td>1.758*** 0.00</td>
<td>1.237*** 0.00</td>
<td>0.466 0.49</td>
</tr>
<tr>
<td>Capital Intensity*P92</td>
<td>0.183*** 0.00</td>
<td>-1.031 0.27</td>
<td>-1.660*** 0.00</td>
<td>-1.214*** 0.00</td>
<td>-0.465 0.50</td>
</tr>
<tr>
<td>Expected Profit</td>
<td>-0.177*** 0.00</td>
<td>-0.263*** 0.00</td>
<td>-0.170*** 0.00</td>
<td>-0.177*** 0.00</td>
<td>-0.159*** 0.00</td>
</tr>
<tr>
<td>Industry Growth</td>
<td>-3.163*** 0.00</td>
<td>-4.059** 0.03</td>
<td>-3.175*** 0.00</td>
<td>-3.207*** 0.00</td>
<td>-3.856*** 0.00</td>
</tr>
<tr>
<td>Concentration</td>
<td>0.431*** 0.00</td>
<td>0.555*** 0.00</td>
<td>0.413*** 0.00</td>
<td>0.431*** 0.00</td>
<td>0.412*** 0.00</td>
</tr>
<tr>
<td>GDP Growth</td>
<td>0.099*** 0.00</td>
<td>0.170*** 0.00</td>
<td>0.096*** 0.00</td>
<td>0.099*** 0.00</td>
<td>0.103*** 0.00</td>
</tr>
<tr>
<td>No. of Obs</td>
<td>13259</td>
<td>1527</td>
<td>11307</td>
<td>13245</td>
<td>5059</td>
</tr>
<tr>
<td>Log-Likelihood</td>
<td>-14470.18</td>
<td>-608.75</td>
<td>-12841.07</td>
<td>-12474.97</td>
<td>-7685.05</td>
</tr>
<tr>
<td>LR Chi(2)</td>
<td>1275.51</td>
<td>169.55</td>
<td>1007.14</td>
<td>1185.71</td>
<td>583.28</td>
</tr>
</tbody>
</table>

Note: *** Significant at the 1 per cent level. ** Significant at the 5 per cent level. *Significant at the 10 per cent level.
The additions of interactions between profit margin, unproductive capital ratio, capital intensity and P92 not only are significant but also appear to sharpen the estimates. While profitability now exerts a larger negative impact on the probability of exit, the interactive term is both significant and positive. We believe that this may reflect a higher propensity under the new regime for the more profitable firms to exit through restructuring, such as acquisition. We also now observe that the effects of capital intensity and unproductive capital ratio exist only prior 1992. All these seem to suggest that reform since 1992 has changed firms' exit behaviour. However, the additions of interactions between the efficiency index, labour productivity, capital, employment, interest and P92 are not statistically significant. It should be noted here that for newly-established enterprises, the efficiency index is a less quantitatively significant indicator of exit probability after 1992; and for SOEs, the negative effect of interest upon exit probability is larger in the post 1992 period, indicating a lock-in effect between SOES and state banks.

These results suggest that the probability of enterprises to exit during 1986-1996 tends to be higher in COEs and firms categorized as Others compared with SOEs, suggesting that SOEs do enjoy some advantages in regard to exit hazard exposure arising from their unique features in the transition. On the contrast, foreign-funded enterprises tend to have the highest survival probability even after controlling for other variables. The firms categorised as Others, which can be regarded as China's de novo firms, are the least likely to survive during the sample period. This may be due to the fact that most of the firms categorized as Others are private or partially private firms, and it was not until 1996 that they acquired their legitimate status, hence before 1996 they
were discriminated against in accessing bank loans and applying for investment quotas, etc.

Looking at the effect of firms' performance measures on firms' exit probability, we find that the efficiency index is negative for all regression and is statistically significant at 1% except for SOEs. Similarly, the effect of firms' profitability upon exit probability is also negative through all regressions, and is statistically significant at 1% except for SOEs. The effect of labour productivity is only significant when labour productivity is taken as the sole performance measure or for SOEs. In general, we find that firms' efficiency index is a far better indicator of firms' exit probability; this is true even when all three performance measures are included. Our results suggest that a doubling of firms' efficiency tends to reduce firms' hazard rate by around 40%, while a doubling of productivity or profitability can only reduce firms' hazard rate by less than 2%.

In estimating the effect of firms' size on their exit hazard, our analysis suggests a significantly negative effect of firms' employment size and capital stock upon their hazard rate. On one hand, this indicates that firms' scale advantage and sunk costs play an important role in determining firms' exit hazard, on the other hand it also captures the effect of resource reallocation costs associated with firms' exit in China where the capital market and labour market are underdeveloped, and the social security system has just begun to emerge. Capital intensity shows a positive effect upon firms' hazard rate in our regression, indicating that the higher the capital intensity the higher the closure probability; however, this effect largely exists prior to 1992. This may be due to the fact that in the 1980s, the electrical engineering industry was targeted by the government as an engine for economic growth, which has
encouraged entry by enterprises with more advanced technology but less than optimal scale. By way of example, in 1990 60% of the enterprises in electrical engineering industry were founded in the 1980s, and around 60% of them had fixed capital less than 100,000 Chinese Yuan. We also observed that firms’ unproductive capital, a proxy for firms’ social burden, exerts a negative effect on firms’ exit hazard only prior to 1992.

In estimating the impacts of firms’ financial constraints upon their exit probability, our proxies for liquidity and gearing, and interest ratio, appear to have different effects upon SOEs and non-SOEs. While for COEs, small enterprises and newly-established enterprises, this effect is positive and significant at 10% level for COEs, for SOEs it is negative though not statistically significant, and this negative effect seems to have increased since 1992. This suggests that SOEs are still facing soft budget constraints.

As for whether the acceleration of reform pace since 1992 has had any impacts upon firms’ exit hazard, by interacting firm-level factors with P92, our analysis suggests that reform since 1992 has changed firms’ exit behaviour, as the signs of coefficients for firm-level variables and the signs of coefficients for the corresponding interactive terms are opposite in general except for firms’ profit margin. However, this seems to be significant only for non-SOEs.

Other industrial factors and macroeconomic factors have also played an important role in determining firms’ exit hazard in China. Our analysis suggests that expected profit margin at industrial level (EXPROFIT) and industry growth have a significant negative effect on firms’ exit hazard, while concentration ratio and GDP growth have a significant positive effect upon firms’ exit hazard.
Our results therefore largely confirm the discussion and the evidence presented in chapter 4. The reforms have considerably increased rates of movement in this key sector of manufacturing, a process which affects small firms and COEs in particular. On the other hand, we find little evidence that the reforms have impacted upon the SOE sector, and that in neither sub-period do conventional indicators of enterprise performance nor the efficiency index appear to have much influence on the probability of exit.

6.4 Conclusion

In this chapter, we specifically investigated an important aspect of the market selection process, firms' exit and its determinants in China's manufacturing industry. Our estimation of a hazard model for firms’ exit probabilities suggests that the exit behaviour of COEs and small firms are increasingly subjected to the discipline of market forces, especially after 1992.

However, our analysis suggests an entirely different role for SOEs. Conventional enterprise performance indicators are not good predictors of their demise and we can find no evidence that things have changed since 1992. While their role in the economy is declining as other sectors have established faster growth rates, their continuing privileged status does not yet appear to have come under serious threat and we do not as yet find convincing evidence that competitive selection is actually providing a sufficiently important substitute for corporate governance mechanisms based on ownership. This may represent a considerable challenge for the future.
## Appendix 6.1: Semi-Parametric Vs. Parametric Estimation of Proportional Hazard Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cox</th>
<th>Weibull</th>
<th>Exponential</th>
<th>Gompertz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coef.</td>
<td>P&gt;</td>
<td>z</td>
<td></td>
<td>Coef.</td>
</tr>
<tr>
<td>COE</td>
<td>0.216**</td>
<td>0.02</td>
<td>0.255***</td>
<td>0.01</td>
</tr>
<tr>
<td>foreign</td>
<td>-0.209</td>
<td>0.32</td>
<td>-0.049</td>
<td>0.81</td>
</tr>
<tr>
<td>other</td>
<td>0.279</td>
<td>0.16</td>
<td>0.565***</td>
<td>0.00</td>
</tr>
<tr>
<td>age</td>
<td>-0.163***</td>
<td>0.00</td>
<td>-0.451***</td>
<td>0.00</td>
</tr>
<tr>
<td>Efficiency Index</td>
<td>-0.475***</td>
<td>0.00</td>
<td>-0.549***</td>
<td>0.00</td>
</tr>
<tr>
<td>Profit Margin</td>
<td>-0.016***</td>
<td>0.01</td>
<td>-0.021***</td>
<td>0.00</td>
</tr>
<tr>
<td>Ln(Labour Productivity)</td>
<td>-0.001</td>
<td>0.19</td>
<td>0.000</td>
<td>0.57</td>
</tr>
<tr>
<td>Ln(CAPITAL/MES)</td>
<td>-0.076***</td>
<td>0.00</td>
<td>-0.092***</td>
<td>0.00</td>
</tr>
<tr>
<td>LN(EMPLOYMENT)</td>
<td>-0.111***</td>
<td>0.00</td>
<td>-0.100***</td>
<td>0.00</td>
</tr>
<tr>
<td>Unproductive</td>
<td>-0.123</td>
<td>0.11</td>
<td>-0.119</td>
<td>0.13</td>
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<tr>
<td>Capital Ratio</td>
<td>0.049*</td>
<td>0.06</td>
<td>0.061**</td>
<td>0.02</td>
</tr>
<tr>
<td>Interest</td>
<td>0.027</td>
<td>0.43</td>
<td>0.023</td>
<td>0.45</td>
</tr>
<tr>
<td>Capital Intensity</td>
<td>-0.181***</td>
<td>0.00</td>
<td>-0.146***</td>
<td>0.00</td>
</tr>
<tr>
<td>Expected Profit</td>
<td>-3.159***</td>
<td>0.00</td>
<td>-3.558***</td>
<td>0.00</td>
</tr>
<tr>
<td>Industry Growth</td>
<td>0.431***</td>
<td>0.00</td>
<td>0.374***</td>
<td>0.00</td>
</tr>
<tr>
<td>Concentration</td>
<td>0.102***</td>
<td>0.00</td>
<td>0.105***</td>
<td>0.00</td>
</tr>
<tr>
<td>GDP Growth</td>
<td>0.045</td>
<td>0.73</td>
<td>0.146</td>
<td>0.23</td>
</tr>
<tr>
<td>P92</td>
<td>-2.083*</td>
<td>0.06</td>
<td>-2.007*</td>
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<tr>
<td>Log Likelihood</td>
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<td>-3235.02</td>
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<td>LR Chi2</td>
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<td>No. of Obs.</td>
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</tbody>
</table>

Note: *** Significant at the 1 per cent level. ** Significant at the 5 per cent level. *Significant at the 10 per cent level.
Appendix 6.2: Semi-Parametric Vs. Parametric Estimation of Proportional Hazard Model with Interactive Terms

<table>
<thead>
<tr>
<th></th>
<th>Cox</th>
<th>Weibull</th>
<th>Exponential</th>
<th>Gompertz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coef. P&gt;z</td>
<td>Coef. P&gt;z</td>
<td>Coef. P&gt;z</td>
<td>Coef. P&gt;z</td>
</tr>
<tr>
<td>COE</td>
<td>0.221** 0.02</td>
<td>0.258*** 0.01</td>
<td>0.229*** 0.01</td>
<td>0.250*** 0.01</td>
</tr>
<tr>
<td>foreign</td>
<td>-0.239 0.25</td>
<td>-0.079 0.71</td>
<td>-0.221 0.29</td>
<td>-0.141 0.50</td>
</tr>
<tr>
<td>other</td>
<td>0.262 0.19</td>
<td>0.546*** 0.01</td>
<td>0.311 0.12</td>
<td>0.396** 0.05</td>
</tr>
<tr>
<td>AGE</td>
<td>-0.157*** 0.00</td>
<td>-0.447*** 0.00</td>
<td>-0.179*** 0.00</td>
<td>-0.317*** 0.00</td>
</tr>
<tr>
<td>Efficiency Index</td>
<td>-0.619*** 0.00</td>
<td>-0.708*** 0.00</td>
<td>-0.618*** 0.00</td>
<td>-0.541*** 0.01</td>
</tr>
<tr>
<td>Efficiency Index * P92</td>
<td>0.103 0.63</td>
<td>0.108 0.59</td>
<td>0.098 0.63</td>
<td>0.014 0.95</td>
</tr>
<tr>
<td>Profit Margin</td>
<td>-0.048*** 0.00</td>
<td>-0.043*** 0.00</td>
<td>-0.048*** 0.00</td>
<td>-0.047*** 0.00</td>
</tr>
<tr>
<td>Profit Margin * P92</td>
<td>0.035** 0.02</td>
<td>0.024 0.12</td>
<td>0.035** 0.02</td>
<td>0.031** 0.05</td>
</tr>
<tr>
<td>Ln(Labour Productivity)</td>
<td>-0.005 0.17</td>
<td>-0.007** 0.05</td>
<td>-0.005 0.15</td>
<td>-0.006* 0.10</td>
</tr>
<tr>
<td>Ln(Labour Productivity)*P92</td>
<td>0.004 0.21</td>
<td>0.007** 0.05</td>
<td>0.004 0.19</td>
<td>0.006 0.11</td>
</tr>
<tr>
<td>Ln(Capital/MES)</td>
<td>-0.106*** 0.01</td>
<td>-0.107*** 0.01</td>
<td>-0.106*** 0.01</td>
<td>-0.095*** 0.02</td>
</tr>
<tr>
<td>Ln(Capital/MES) *P92</td>
<td>0.036 0.40</td>
<td>0.018 0.66</td>
<td>0.035 0.41</td>
<td>0.006 0.89</td>
</tr>
<tr>
<td>Ln(Employment)</td>
<td>-0.159*** 0.00</td>
<td>-0.128*** 0.01</td>
<td>-0.156*** 0.00</td>
<td>-0.153*** 0.00</td>
</tr>
<tr>
<td>Ln(Employment) *P92</td>
<td>0.058 0.31</td>
<td>0.024 0.67</td>
<td>0.056 0.33</td>
<td>0.046 0.42</td>
</tr>
<tr>
<td>Unproductive Capital Ratio</td>
<td>-0.601*** 0.00</td>
<td>-0.559*** 0.00</td>
<td>-0.600*** 0.00</td>
<td>-0.525*** 0.00</td>
</tr>
<tr>
<td>Productive Capital Ratio *P92</td>
<td>0.588*** 0.00</td>
<td>0.547*** 0.00</td>
<td>0.585*** 0.00</td>
<td>0.493*** 0.00</td>
</tr>
<tr>
<td>inrate</td>
<td>0.013 0.85</td>
<td>0.014 0.86</td>
<td>0.012 0.86</td>
<td>0.016 0.82</td>
</tr>
<tr>
<td>inrate92</td>
<td>0.044 0.55</td>
<td>0.058 0.48</td>
<td>0.048 0.52</td>
<td>0.052 0.48</td>
</tr>
<tr>
<td>Capital Intensity</td>
<td>1.271*** 0.00</td>
<td>1.389*** 0.00</td>
<td>1.280*** 0.00</td>
<td>1.310*** 0.00</td>
</tr>
<tr>
<td>Capital Intensity *P92</td>
<td>-1.253*** 0.00</td>
<td>-1.372*** 0.00</td>
<td>-1.262*** 0.00</td>
<td>-1.289*** 0.00</td>
</tr>
<tr>
<td>Expected Profit</td>
<td>-0.177*** 0.00</td>
<td>-0.144*** 0.00</td>
<td>-0.178*** 0.00</td>
<td>-0.160*** 0.00</td>
</tr>
<tr>
<td>Industry Growth</td>
<td>-3.163*** 0.00</td>
<td>-3.569*** 0.00</td>
<td>-3.641*** 0.00</td>
<td>-3.633*** 0.00</td>
</tr>
<tr>
<td>Concentration</td>
<td>0.431*** 0.00</td>
<td>0.377*** 0.00</td>
<td>0.420*** 0.00</td>
<td>0.394*** 0.00</td>
</tr>
<tr>
<td>GDP Growth</td>
<td>0.099*** 0.00</td>
<td>0.104*** 0.00</td>
<td>0.105*** 0.00</td>
<td>0.102*** 0.00</td>
</tr>
<tr>
<td>Cons</td>
<td>-2.031* 0.06</td>
<td>-1.966* 0.08</td>
<td>-1.979* 0.10</td>
<td>-1.791* 0.10</td>
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Log Likelihood: -14470.18, -3203.31, -3400.72, -3350.33
LR Chi2: 1275.51, 1689.41, 1434.26, 1518.07
No. of Obs.: 13259

Note: *** Significant at the 1 per cent level. ** Significant at the 5 per cent level. * Significant at the 10 per cent level.
CHAPTER 7 CONCLUSIONS

This thesis has studied the experience of China’s transition at enterprise level, examining whether China’s gradual and experimental economic reform has set up an effective competitive market selection process. It thereby aims to enrich our understanding of the transition from a centrally planned socialist economy to a market economy. This chapter summarizes the main findings of this study and draws out its implications for further enterprise reform in the wake of China’s WTO entry.

7.1 Economic Transition and Transition Performance

China’s significant economic growth since it began the transformation from a centrally planned socialist economy to a market economy in the year 1978 has posed a puzzle for economic theories. For the period between 1978 and 1996, it achieved phenomenal growth rates, with an average growth rate of around 9% in GDP annually. Although the GDP growth rate has slowed down since 1997, it has still achieved an impressive 7.5% annually for the period between 1997 and 2002. However, this impressive economic growth has been achieved with the absence of a number of factors commonly deemed to be essential to a successful transition. These include reasonably complete market liberalization, large-scale privatisation, secure private property rights, and democracy (Chow, 1997). This contrasts distinctively with the transition performance in CEE and FSU countries, who have all undergone a sharp decline in GDP in the initial stage of transition since 1990, ranging from 20% to 60% (World Bank, 2001), and even now many of them have not reached their 1989 GDP levels, despite adopting “Big Bang”-style transition which has at least attempted to put in place all the prerequisites for a successful transition “at one stroke”.

Why has the transition performance in China been so different? The gradualist school gives credit to the evolutionary and experimental nature of China’s reform, suggesting that gradual reform is easy to initiate and flexible to experiment with, and less costly to overcome the status quo, while the “Big Bang” school emphasizes China’s favourable initial conditions, such as a
large agricultural labour force, low subsidies to the population, and a strategy of rapid export growth of labour-intensive manufactures, suggesting that China's rapid economic growth has occurred in spite of the gradualist reform. However, it was argued that neither of these two schools of thought can convincingly explain China's experience. While the gradualist school takes more of a political economy stance, the "Big Bang" school is based in macroeconomics. Neither of them has actually dealt with how firms have responded to the market mechanisms, and how markets have actually evolved through firms' participation. As firms form the real entities in markets, responding to market signals and reform policies, the objective of this thesis is to understand China's gradualist economic reform and its significant economic growth in terms of enterprise performance and the ways in which markets have evolved through firms' participation, especially in relation to entry, exit, and growth.

7.2 China's Enterprise Reform, and Enterprise Performance

7.2.1 China's Economic Reform: A Two-Stage Process

Markedly different from the "Big Bang"-style transition in CEE and FSU countries, China has taken on a gradual transition path. Here the goals of reform are achieved by a "dual-track system", in which the elements of a new system are developed side by side with the old unreformed system, and if things go well, by reforming the old system in line with the positive developments emerging from the new components of the economy. It reduces central planning slowly rather than eliminating it completely, permitting the coexistence of the planning and market mechanisms, and a two-tier price system. This thesis has recorded how this gradual process can be divided into two stages by the some landmark CCP congresses.

The "reform and opening up" policy proposed in The Third Plenum of The Eleventh Chinese Communist Party Congress (CCPC) on December 18-22, 1978 marked the beginning of China's gradualist reform. The reforms have since proceeded by using an experimental method, which established reforms
in a few sectors and cities, before implementing them at a national level. The Fourteenth CCPC held in September 1992 is another landmark in the process of China's transition. In this congress, for the first time, the building of a “socialist market economy” was endorsed as China’s goal of reform. This congress thus established a rather rough division into stages of the reform process as a whole. The initial stage from 1978-1992 was characterised by retaining the dominance of the planning mechanism whilst trying to establish a balance between planning and the market. The second stage, from 1993, involved an explicit goal of establishing a “socialist market economy” to replace the old planning system. The reforms in this stage recognized that the phase of dual track development may have reached its conclusion, and the reforms have comprehensive, coherent and radical features.

7.2.2 Enterprise Reform: Decentralization and Promoting Competition

The thesis has demonstrated the significance - in the Chinese context - of different types of enterprise. SOEs have been the core of China’s economic reform. These enterprises were the foundation of the socialist economy and were at the heart of the heavy industry development strategy. The problem of economic efficiency is most acute in the state sector. Its sheer size - in 1980 it employed 76% of the urban labour force, utilized 82% of aggregate investment in fixed asset, and produced more than 80% of gross industrial output - meant that any reform without improving SOE performance would fail.

At the beginning of reform, tight political control and the consequent lack of managerial and worker incentives were considered responsible for low efficiency in SOEs (CCPC, 1978). Therefore, an early target of SOE reform was to enliven the state sector by separating the state from enterprise management, and to make SOEs become “independent and energetic productive and managerial units” (Xue, 1979). This has been achieved sequentially through the profit-sharing scheme and management responsibility contract system, delegating managerial autonomy to SOEs, and allowing SOEs to share profits with the state (CCPC, 1982, 1987; Wu and
Reynolds, 1988). Since 1993, ambiguous property rights and lack of proper corporate governance have been identified as being responsible for continuing poor SOE performance, hence setting up a modern company system has been established as the goal of enterprise reform, and this has been achieved through corporatization and privatisation.

Another important aspect of China’s enterprise reform is the encouragement of new entries by non-SOEs. Initially, non-SOEs were encouraged to fill the market niches left by central planning and to work as a ‘beneficial complement to SOEs. In effect, they acted as an economic and social ‘cushion’, absorbing workers from the old state sector as it went through the difficult process of restructuring (McMillan and Naughton, 1992; CCPC, 1982, 1987). Gradually, as they grew in size, they began to create competition and drive market development, leading to a decline in state control and monopoly, and have eventually become the engine of China’s economic growth.

7.2.3 Enterprise Performance: Improving Productivity and Falling Profitability

Two decades of efforts to reform China's state-owned enterprises (SOEs) have clearly delivered beneficial results, such as a reduction in the scope of planning, expansion of managerial authority and the role of market forces, improvements in market orientation, efforts to pursue innovation, etc. These changes have enabled China's SOEs to partially overcome the traditional flaws of public enterprises. One indicator of such improvement is total factor productivity (TFP) for state industry. Research has generally found modest long-term improvements (despite lagging behind non-SOEs). However, SOE financial performance has declined dramatically during the reform period. Between 1978 and 1996, the pre-tax profit-asset ratio declined from around 25% in 1978 to 6.5% in 1996, and the share of loss-making SOEs has been rising steadily since 1985, reaching an all-time high in 1996. The decline of profitability has reduced SOEs' fixed asset investment through retained profits, making them more reliant on bank loans. This has led to a continuous
rise in SOE liabilities, indicating that many SOEs operate continuously at a loss. Furthermore, loss-making SOEs are a heavy drain on the economy, and the financial sector in particular. The SOE has therefore been considered by some economists to be a de-stabilizing factor for the whole economy.

However, it was argued that neither productivity nor profitability is a good indicator of enterprise performance, especially in the context of transition economies. For example, declining profitability can be the result of increased competition, which is a desirable outcome of transition economies, and improved productivity could mean greater allocation distortion, when firms are not profit-maximizers, which is common in transition economies. Furthermore, productivity improvement does not distinguish between the improvement due to X-efficiency and improvement due to technology change. While X-efficiency is important for short-term economic growth at the initial stage of transition, technological change is more important for the long-term success of economic reform. Therefore, a proper indicator for enterprise performance is needed.

7.3 Summary of Research Results

7.3.1 Enterprise Efficiency, Ownership, and Competition

As efficiency improvement is a major objective of economic reform, is considered a survival condition for firms in a competitive environment, and further, is central to firm's long-term growth (Bain, 1969), chapter 4 has assessed enterprises' technical efficiency as an indicator of their performance by applying the technique of Data Envelopment Analysis (DEA). DEA is a mathematical programming approach for evaluating firms' efficiency through constructing a non-parametric piece-wise frontier and measuring firms' performance against the constructed frontier. The efficiency index thus calculated captures not only firms' static (short-term) efficiency, but also firms' tendency to catch up with technological advance over time. In addition to calculating enterprise efficiency, the effects of enterprise reform, ownership
type, increased competition, and various other firm-specific, and industry-specific factors were also investigated in chapter 4.

Similar to research carried out by others, we have found that SOEs' performance measured by the efficiency index is generally lower than that of non-SOEs. However, in terms of the effects of economic reform, we have found that there is a general tendency for the divergence of enterprise efficiency from technology frontier rather than a convergence of firms' efficiency to technology frontier which is to be expected from a competitive market. We suspect that there are two factors underlying the divergence of technical efficiency from technology frontier: the entry of more efficient firms, paralleled with the survival of inefficient and value-destroying firms, especially inefficient state-owned firms. However, this can only have been sustained as long as growth remained strong.

By estimating the effects of enterprise reform, ownership, and increased competition on firms' static efficiency, we find that the effect of ownership upon firms' static efficiency is not conclusive. While COEs are generally more efficient and more productive than SOEs, the ownership effect of foreign ownership, and domestic private ownership are not clear. However, the subsequent study of firms' dynamic behaviour to catch up with technology advance suggests that this difference in firm efficiency may have resulted from the differences in their speeds to catch up with the technology advance, with SOEs being the slowest.

One conclusion emanating from the above analysis is that economies is that China's enterprise reform, characterised by profit retention policies, does have a positive effect upon improving a firms' efficiency at the initial stage of reform; however, this positive effect phased out in the later stages of reform. As for performance wages and bonuses, their effects are complicated and need to be designed properly to achieve a positive effect upon efficiency improvement. Meanwhile, the market competitive process seems to be working, but not always effectively. New firm entry pushes out the
technological frontier, but incumbent firms, especially SOEs, are slow to respond, which we suspect that the lower exit rate of SOEs may account for.

7.3.2 Entry, Exit, and the Dynamics of Productivity Growth

In chapter 5, we investigated the micro dynamics of entry, exit, and productivity growth, based upon an examination of aspects of the competitive selection process in an important sector of Chinese manufacturing. An important element of the investigation was to look for changes resulting from the latest stage of reform. These dynamic processes may be becoming increasingly important for the continuing growth of manufacturing as the agricultural sector as a source of surplus labour begins to decline. In particular, this chapter investigated the actual patterns of firms' entry and exit, analysing the post-entry and pre-exit behaviour of Chinese enterprises, as well as decomposing the contribution to aggregate productivity growth of new entry, exits, and surviving firms.

Our analysis suggests that the pattern of entry and exit in this Chinese manufacturing industry is to a large extent consistent with the findings in advanced market economies, indicating that the competitive selection process is taking shape in China. One feature of this process that we need to note is that new firm entries have contributed substantially to both output growth and productivity growth. However, exiting firms, unlike their counterpart in advanced economies, have contributed only slightly to the growth of output and productivity. This is despite the fact that the exit rate is similar to the entry rate, while old firms are still an important stabilizing element in determining the trend of output and productivity growth.

Our analysis also suggests that it is insufficient to analyse the competitive process from the point of view of new firms' entry and incumbent firms' growth alone. Indeed the substantial rate of turnover or 'churning' amongst enterprises that we observe in this sector means that a study of exit is just as important as that of entry. Moreover, the rate of churning appears to have
increased substantially in the latest phase of reform. In fact, our productivity deconstruction suggests that exiting firms do contribute to productivity improvement especially among small firms.

7.3.3 Firm Exit Behaviour and Economic Reform

The analysis in chapter 5 indicated the importance of understanding exit behaviour in more detail. Accordingly, Chapter 6 specifically investigated firms' exit and its determinants in China's manufacturing industry. Exit is as important as entry. On one hand, the exit of inefficient firms will release scarce resources, reduce social wastage and mobilise social resources, facilitate the prospects for new firms entering the industry and structural adjustment, and promote entrepreneurship; on the other hand, it poses a credible threat to incumbent firms, as firms failing to be sufficiently competitive in the market face the threat of bankruptcy-induced market exit.

In Chapter 6, a risk model was developed for firms' exit probabilities in order to investigate the determinants of firms' exit in China's manufacturing industry. Our estimation suggests that the exit behaviour of COEs and small firms has been increasingly subject to the discipline of market forces, especially after 1992. However, our analysis suggests an entirely different role for SOEs. Conventional enterprise performance indicators are not good predictors of their demise and we can find no evidence that things have changed since 1992. While their role in the economy is declining as other sectors have established faster growth rates, SOEs' continuous privileged status does not yet appear to have come under serious threat and we do not as yet find convincing evidence that competitive selection is actually providing a sufficiently important substitute for corporate governance mechanisms based on ownership. This may represent a considerable challenge for the future.
7.4 General Discussion

Over the past two decades, China's gradual enterprise reform has achieved considerable improvements in the state sector, such as a significant reduction in state share, although the state still accounts for more than 25% of gross industrial output and is still dominant in the financial and utility sectors. Furthermore, the gradual reform of SOEs has provided a cushion for reforms in other areas, and has provided an anchor for economic growth, avoiding the result of "disorganisation". However, the effect of enterprise reform on SOE performance is controversial. Turning SOEs into profitable businesses whilst dismantling their non-commercial responsibilities remains an enormous challenge. This thesis investigated first the impact of enterprise reform and increased competition on enterprise efficiency, and then looked beyond the "within-firm" effects of economic reform and market competition, investigating whether economic reform has facilitated a dynamic competitive market selection process. Our analysis suggests that China's SOE reform characterised by gradually expanding managerial autonomy has been relatively successful in providing short-term incentives to improve enterprise performance. However, this positive effect seems to be short-lived. This is related to the fact that expanding managerial autonomy has released the agency problem that the central planning system had managed to constrain. Managers, and decentralised governmental agencies at various levels, are all eager to exert extractive authority over firms' assets but none are willing to be held responsible for firms' financial well-being. Encouraging the entry of non-state firms and the resulting increased market competition, other significant components of China's enterprise reform, have to some extent provided monitoring and long-term incentive for enterprises. However, the functioning of market competition has not always been effective for SOEs. In particular a credible bankruptcy threat has not fully materialised, due to the slower pace of SOE reform, and especially in the pace of ownership-related reform. In other words, unless China's SOE reform is extended to include some serious discussion of constraints, rather than just freedom and autonomy, the institution of the modern corporate system will not, by itself, cause a
fundamental transformation in the economic behaviour of corporatized SOEs, even facing increased competition arising from the entry of new private firms. The problem will thus remain: corporatized SOEs that operate within an environment characterized by the absence of both clearly defined and securely protected property rights and by a truly functional market. Moreover, this will also have a significant impact upon non-SOEs. As in order to support those inefficient SOEs, subsidies and preferential loans have to be provided, which makes efficient non-SOEs subject to heavy taxes and makes it more difficult for them to get external funding to finance their investments, and this in turn could crowd out efficient firms, and distort the effective functioning of markets.

China's WTO entry will make China more integrated into the global economy and bring about new opportunities for China's economic growth, such as improving China's export prospects and increasing foreign direct investment. However, this positive economic prospect is subject to several economic challenges, which have been intensified by the WTO accession. These challenges include: rising unemployment and consequent social instability, the weak financial sector, rising inequality, and the deterioration of SOEs' financial performance. Can China confront these challenges and sustain its rapid economic growth by taking advantage of the WTO accession? Or should we look forward to "the coming collapse of China"? The answer to these two questions actually lies in the present and future of China's enterprises, as the above challenges are directly or indirectly related to the performance of enterprises, especially that of the SOEs. The problem of rising unemployment may worsen, as more SOEs are forced into bankruptcy due to increased foreign competition and the cutting of soft loans to SOEs by the banking sector. The income gap will be widened as workers are laid off. Subjecting domestic banks to foreign competition will put pressure on them to improve efficiency. In order to strengthen the banking sector, the key challenge for the government is to tackle the problem of non-performing loans to SOEs, which will not be solved unless SOEs' performance improves. All this suggests that SOE reform will still be a huge challenge for the Chinese government. As gradual enterprise reform seems to have reached its end, and market
competition does not seem to be substituting corporate governance mechanisms based on ownership, more radical reform based on ownership and property rights is needed.


Reform, Ownership, and Performance in Chinese Industry: Oxford University Press.


