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## Decentralisation, autonomy and efficiency: Inconsistent reforms and enterprise performance in China

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# Kiel Working Papers

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Decentralisation, Autonomy and Efficiency:

Inconsistent Reforms and  
Enterprise Performance in China

by

Martin Raiser

June 1995



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## **Decentralisation, Autonomy and Efficiency: Inconsistent Reforms and Enterprise Performance in China\***

### **I. Introduction**

One of the distinctive characteristics of China's socialist economy from as early as the 1950s has been its decentralised administrative and economic structure (Riskin, 1987; Granick, 1990). Followingly, in contrast to the top-down process of economic reforms in Central and Eastern Europe, largely orchestrated by a small number of newly elected liberal politicians and their Western economic advisers, reforms in China have proceeded in a decentralised and incremental fashion (Fan, 1994; Ma, 1994). It was a conscious strategy of China's leader Deng Xiaoping to let the more advanced coastal regions "grow rich first" and use the resources thus mobilised as an engine of modernisation in the underdeveloped interior. By the early 1990s, the process of decentralisation had transferred over 80 per cent of China's state-owned enterprises (SOEs) to the hands of local governments at the provincial, country and municipal level. Moreover, local governments retained over 60 per cent of national fiscal revenues and, via their control over the local branches of China's state-owned commercial banks, critically influenced the allocation of investment (Ma, 1994).

The extent of China's decentralisation, particularly in the area of resource mobilisation and allocation, has given new flavour to an old debate about the economic benefits of China's fragmented administrative structure (Dennithorne, 1972; Lardy, 1978). While most observers would agree that ultimately the decentralisation of decision making from central government officials to independent market participants is an essential component of even a "socialist market economy", the current intermediate stage where local governments retain substantial discretion is viewed by some as a hindrance rather than a help in the structural change of the Chinese economy (Wong, 1988; Ma, 1994). Thus, it is argued that as local rates of return diverge from shadow prices at the national level, resources are misallocated and the central government comes to bear an increasing burden of national development expenditures while foregoing a growing share of tax revenue. In consequence, not only are structural distortions

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preserved or even exacerbated but national resource mobilisation increasingly has to rely on the inflation tax. Against this pessimistic view, others have highlighted the impressive success of enterprises under lower level governments in China, the township and village enterprises (TVEs) in particular (Byrd and Lin, 1990; Yusuf, 1994) and argued that fiscal decentralisation and increased autonomy at the local government level were instrumental in bringing about the success of industrial reforms in China (Granick, 1990). This view contends that budget constraints on local governments are typically much harder than on the central government, because local governments do not have independent access to seignorage. Moreover, competition for mobile national capital creates strong incentives for local governments to create a hospitable investment environment, for instance by expanding local infrastructure. Hence the opportunity cost of using local fiscal revenues to subsidise loss-makers is high once central investment grants are phased out. As a result, the incentives at the local level to encourage profit maximisation by SOEs are large (Qiang and Roland, 1994).<sup>1</sup> One means at the disposition of local governments is, of course, to increase the autonomy and profit retention rights of "their" SOEs (see e.g. Groves et al., 1994), thereby voluntarily foregoing their discretionary rights.

This paper argues that the above sketched debate may largely be understood in terms of a fundamental inconsistency in China's economic reform process: while fiscal decentralisation may have hardened budget constraints for state-owned enterprises, the accompanying process of monetary decentralisation has counteracted such positive incentive effects (Ma, 1994). Thus the central government has been acutely aware of the potential for invigorating the economy through the promotion of local initiative. Fiscal decentralisation has been the means by which this potential has traditionally been tapped in China (Riskin, 1987; Naughton, 1986). On the other hand, Beijing has never resigned its control over resource allocation completely. As the central government's ability to tax high profit sectors was reduced, the credit plan has become the major vehicle for the realisation of national development aims. In consequence, the burden of previous fiscal subsidies has shifted to the banking system, driving the quasi fiscal deficit up to an estimated 7-9 per cent of GDP by 1993 (World Bank, 1994a). Moreover, because of their influence over the local branches of China's state banks, local governments have progressively gained control over monetary policy too, without concurrent responsibilities for macro-economic

<sup>1</sup> An interesting parallel seems to be emerging in Russia, where some oblasts like Nishni Novogorod are spearheading the reform process, largely in view of increasing local government revenues (see "Moskau ist weit", Die Zeit, 4 May, 1995).

management (Herrmann-Pillath, 1991). The opportunity costs of bank funds are thus substantially lower than of fiscal revenues and a misallocation of resources is likely. The consequences in recent times have been growing inflationary pressure and significant doubts over the true incentives facing China's SOEs and their resulting economic performance (e.g. Woo et al., 1994).

Dynamic growth and growing macroeconomic instability are thus intertwined in China's decentralised economic reforms. Which of the two will prevail is largely an empirical matter. Fortunately, the regionally differentiated impact of China's economic reforms allows one to test for the consequences of reforms inconsistency on the micro-economic behaviour of enterprises and thus to gauge whether budget constraints have been hardened or softened in the course of reform. This paper takes a first attempt in this direction. Using enterprise survey data from four coastal cities in China, we show that industrial total factor productivity has grown more rapidly in those cities which have accorded higher autonomy to the enterprises under their jurisdiction. Not surprisingly, these cities are located in Guangdong and Fujian provinces which have in turn had the highest fiscal autonomy since the beginning of reforms (Ferdinand, 1989; Wu, 1993). In a second step, we investigate the determinants of the allocation of financial funds, among the sampled enterprises. Dividing these funds according to their sources yields the remarkable finding that allocative inefficiencies are greatest in the distribution of bank loans for investment and working capital. Moreover, enterprise autonomy improves capital allocation and is related to a pattern of investment demand at the enterprise level consistent with profit maximisation. These results exemplify the mentioned inconsistency in China's decentralised reforms and raise the hypothesis that resource allocation is least efficient in those areas, such as the Western and Northern provinces where only little autonomy has been granted to enterprises so far and investment depends largely on resources provided under the credit plan. This contention cannot be proved with our micro-economic data and is left for further investigation.

The remainder of the paper is structured as follows. Section II documents the process of fiscal decentralisation, price liberalisation and the shifts in investment financing since the beginning of economic reforms. Section III presents the estimates of total factor and labour productivity growth in our enterprise survey and relates them to qualitative data on regional and enterprise autonomy. Section IV turns to the determinants of financial resource allocation and Section V concludes.

## II. The Emergence of Dukedoms: The impact of decentralised reforms in China

Since the end of the first five year plan and the break with the Soviet Union in 1958, China has seen several episodes of decentralisation. Interestingly, while the motivation behind such developments before 1978 was largely political and dictated by Mao's distaste for national bureaucracies, the instruments of decentralisation were the same during the pre-reform and reform periods. Already in the 1950s, local governments were made responsible for part of investment financing in SOEs under their jurisdictional control and gained retention rights over the enterprises' depreciation funds (Granick, 1990). In 1970, local revenue retention was further increased and 30 per cent of fixed capital investment put under local government control (Riskin, 1987, p. 217). "Non-budgetary" investment in fixed capital formation, including depreciation funds and all retained earnings by local governments and enterprises themselves, increased from 16 per cent in 1966 to 35 per cent in 1975 and in 1981 exceeded central budgetary investment for the first time (Naughton, 1986). It is arguable that such early reforms left local governments with substantial experience in managing SOEs and may have introduced de facto property rights of government officials in public enterprises at the local level (Granick, 1990).

Nonetheless, before 1978 the central government continued to interfere with local government decisions and most profit tax revenues had to be transferred to the central budget (Ferdinand, 1989). This changed decisively with the introduction of revenue sharing contracts in the late 1970s. These contracts have seen substantial alterations over time and have typically been negotiated individually for each province (Agarwala, 1992). Their principle, however, is simple. The central government fixes a share of current revenue in nominal terms and establishes a constant rate of increase over a fixed number of years. All or most excess revenue accruing to the provincial government may be retained by the latter. Regional differentiation is introduced by the percentage share that is originally retained at the province. Table 1 shows how this system has led to an increasing share of fiscal revenues at the disposition of provincial governments.<sup>2</sup> Note that this is expressed as a decrease in the difference between

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<sup>2</sup> These in turn were free to pass on their retention rights to sub-provincial levels of administration. Particularly favourable conditions were established in the special economic zones (see IMF, 1993) but occasionally also other municipalities.

Table 1 — Differences Between Revenues and Expenditures of Chinese Provinces as a Share of Total Revenues<sup>a</sup>, 1978-1991

	1978	1983	1985	Ma (1983)	Ma (1991)
<b>North</b>					
Beijing	59.6	50.8	37.0	51	10
Tianjin	—	—	44.1	47	18
Hebei	28.1	22.3	33.2	22	2
Shanxi	-7.0	0.6	-30.6	1	-6
Inner Mongolia	-63.1	-69.4	—	-227	-69
<b>North East</b>					
Liaoning	68.0	56.5	28.3	50	6
Jilin	3.4	-27.3	-32.7	-37	-27
Heilongjiang	50.0	-41.3	-16.1	-42	-16
<b>East</b>					
Shanghai	84.6	85.7	76.9	88	47
Jiangsu	53.5	56.0	42.5	57	11
Zhejiang	35.4	46.1	38.4	47	20
Anhui	19.1	8.8	-4.1	9	-57
Fujian	-0.1	-28.3	-18.1	-42	-12
Jiangxi	-24.5	-22.9	-30.4	-28	-28
Shandong	10.5	15.7	23.7	37	1
<b>Central-South</b>					
Henan	—	17.8	-1.3	18	-3
Hubei	4.4	30.0	13.3	30	-5
Hunan	12.6	22.1	-2.3	14	-6
Guangdong	31.3	16.8	3.7	-4	5
Guangxi	-28.3	-27.9	-32.2	-36	-23
<b>South-West</b>					
Sichuan	4.3	9.1	-8.9	11	-10
Guizhou	-49.2	-45.0	-39.3	-88	-22
Yunnan	-35.7	-29.1	-25.3	-40	-11
Tibet	—	—	—	-29	—
<b>North West</b>					
Shaanxi	7.4	-22.7	-26.5	-42	-24
Gansu	30.2	-9.7	-31.8	-380	-28
Qinghai	-60.1	-79.2	-76.1	-290	-107
Ningxia	-45.2	-74.5	-69.6	-231	-107
Xinjiang	—	-68.7	-70.4	-37	-98
<b>MEMO:</b>					
All local budgets weighted average <sup>b</sup>	33.7	7.9	13.0	—	3.7
Three municipalities + Liaoning	70.7	64.3	46.6	50.9	20.3
East + Central South without Shanghai	11.4	12.2	3.0	10.9	-8.8
South West + North West	-21.2	-40.0	-69.6	-125.1	-50.9

<sup>a</sup> A negative number indicates a subsidy. — <sup>b</sup> From IMF (1993).



local expenditures and revenues as a share of total revenues collected at the province. The higher are local expenditures, the higher are retention rights. The regional pattern of autonomy in Table 1 follows the fiscal significance of a particular province for the central government. In general, by 1978 the Southern coastal provinces contributed to or gained little from the central government budget. They were thus granted autonomy earliest and most extensively. At the other end of the spectrum are the three municipalities of Shanghai, Beijing, and Tianjin and traditionally rich coastal provinces, in particular the old industrial heartland of Lianoning. Here fiscal autonomy has been granted far more gradually. Finally, the provinces along China's Western border have remained substantially dependent on net subsidies, the burden of which has progressively shifted to central outlays.<sup>3</sup>

It may be useful to spell out again the incentives embedded in this system of fiscal decentralisation. Clearly, the higher the marginal retention rate at the provincial level, the higher the incentives to maximise revenue collection. This can be done either by maximising profits in existing enterprises or investing in new, more profitable activities. In the first case, there may be a contradiction in the short run between enhancing managerial and worker effort by raising incomes and extracting a high profit tax. However, most empirical studies for the 1980s including the present one (see section III) show a clear link between managerial and worker incentives (e.g. profit retention and bonus payments) and enterprise efficiency (Groves et al., 1994; Hay et al., 1994; Raiser, 1995). It is likely that local governments have over time come to realise this connection and have passed on their autonomy to SOEs and collective enterprises under their jurisdiction. Although there was nothing in the fiscal contracts demanding such an outcome, it has arguably been one of the central forces behind both the reform of state-enterprises and the dynamism of the non-state, collective sector (Yusuf, 1994). From this perspective, fiscal decentralisation creates positive incentives for improving enterprise performance.<sup>4</sup>

The second means to maximise revenue, namely new investments in profitable activities, has caused much concern during the late 1980s in the context of local protectionism (Wong, 1988). Price distortions led to the multiplication of productive capacity across regions and the erections of trade barriers, arguably

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<sup>3</sup> The data in Table 1 are not fully consistent between 1991 and earlier years. According to Ma (1994), fiscal subsidies to the interior have fallen dramatically since 1983. Nonetheless they were still high in 1991 according to his figures given in the table.

<sup>4</sup> See Qiang and Roland (1994) for a formal model.

further exacerbating China's domestic market fragmentation (World Bank, 1994b). As Su (1992) shows, regional industrial structures in China have tended to converge over the 1980s, contradicting the expected pattern of regional specialisation following comparative advantage.<sup>5</sup> The emergence of "dukedom" was thus seen by many as presenting the biggest obstacle against the necessary structural change (Rothenberg, 1987). Against this view, we argue that the substantial liberalisation of prices achieved by 1992 (Table 2) has greatly improved the integration of China's national goods market and served to reduce inherited distortions.<sup>6</sup> More importantly, the dynamic development of township and village enterprises has created an alternative source of fiscal revenues and introduced competition for limited budgetary outlays (Yusuf, 1994). In some coastal provinces such as Zhejiang, TVEs are by now so important to the local budget that fiscal support has shifted away from the traditional SOE sectors to non-state enterprises, including TVEs.<sup>7</sup> In a sense thus, here again incentives have gone in the direction of enhancing competition and improving enterprise performance, at least in those regions where a basis for non-state led growth already existed (see also Jefferson and Rawski, 1994).<sup>8</sup>

In our view, the major element of decentralised reform contradicting the positive incentives emanating from fiscal decentralisation lies in the effective decentralisation of monetary policy. The second largest component of investment after retained earnings since the mid-1980s has been the provision of long-term bank loans through China's state-owned banking system. As Table 3 reveals, by the early 1990s, bank loans had replaced most central budgetary investment grants. This substitution followed the principle that depreciation funds and locally retained profits should be used for repairs and replacement of

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<sup>5</sup> As the World Bank (1994b) points out, regional specialisation and interregional trade would be expected from the unequal distribution of natural resources but, apart from local protectionism, is also significantly hindered by high transport costs.

<sup>6</sup> Indeed, since 1992 further liberalisation has eliminated price controls on agricultural products in many provinces. Planned energy prices have also been raised substantially.

<sup>7</sup> In 1992, collectively owned enterprises (COEs) and TVEs together in this province accounted for 62 per cent of industrial output against 26 per cent for SOEs (SSB, 1993).

<sup>8</sup> It is also important to remember that most Chinese provinces are comparable to European countries in size and population. On the other hand transport costs are still extremely high. There is thus substantial scope for developing regional economies.

Table 2 — Price Liberalisation in China 1978-92;  
Proportion of Output at Fixed, Guided and Market Prices (in per cent)

	1978	1987	1990	1992
<b>Agriculture</b>				
Fixed	92.6	29.4	22.2	17.0
Guided	1.8	16.8	20.0	—
Market	5.6	53.8	57.8	68.0
<b>Industry</b>				
Fixed	97.0	—	44.6	20.0
Guided	—	—	19.0	15.0
Market	3.0	—	36.4	65.0
<b>Retail Sales</b>				
Fixed	97.0	33.7	29.7	10.0
Guided	—	28.0	17.2	10.0
Market	3.0	38.3	53.1	80.0
<b>MEMO:</b>	1983	1986	1991	
<b>Ratio of market to state prices</b>				
Overall	1.48	1.19	1.05	
Coal	—	1.45	1.70	
Steel		1.48	1.11	
Cement		1.35	1.11	

Source: IMF (1993), p. 27; World Bank (1994b), p. 34.

Table 3 — The Financing of Fixed Asset Investment of State-Owned Enterprises, 1985-1991

Sources (per cent of total)	1985	1987	1989	1991
State budget	24.0	20.5	13.4	10.2
Domestic loans	23.0	24.5	20.9	28.1
Foreign investment	5.3	7.3	10.1	8.4
Retained funds	47.7	47.6	55.6	53.4

Source: IMF (1993), p. 12.

the current capital stock and the provision of welfare services for employees (including bonus payments), while the banking system would take over the role of financing new capital construction and providing short term liquidity to SOEs (Sicular, 1992). For the central government this subdivision was important as it allowed it to retain national control over the volume and direction of investment, by constraining bank lending under the credit plan.

In practise, the single instrument of the credit plan proved far too weak to ensure the realisation of Beijing's structural and industrial policies, while maintaining macro-economic stability at the same time (Bowles and White, 1993). As investment loans in particular were typically provided at negative real interest rates, rent-seeking by local governments was prone to become a serious problem.<sup>9</sup> In addition, funds were fungible between intended uses and the central bank repeatedly had to make up for leakages by providing additional credit quotas if investment targets were to be fulfilled. Institutionally, the structure of China's monetary system ensured that local governments would gain substantial control over the credit plan both at the formulation and implementation stage (Agarwala, 1992; Ma, 1994). China's central bank has a local branch in every province and often even below at the county level. Government officials significantly interfere in personnel decisions in these branches, leading to divided loyalties of local bankers. Table 4 reveals how, in response to local government lobbying, during inflationary episodes actual credit expansion has widely exceeded projections under the credit plan. Lack of expertise merely exacerbated the problems of capital misallocation.

Table 4 — Ratio of Actual to Planned Monetary Aggregates, 1983-1992 (per cent)

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Total credit	1.07	2.34	2.09	1.77	1.17	—	—	1.60	1.37	1.38
Issued currency	1.51	3.28	1.30	1.15	1.03	3.40	0.33	0.75	1.07	1.93
Retail price inflation	1.5	2.8	8.8	6.0	7.3	18.6	17.8	2.1	2.7	5.3

Source: Ma (1994), p. 46; IMF (1993), p. 7.

<sup>9</sup> For an estimate of the total weight of interest rate subsidies in the national economy see Perkins and Raiser (1994).

The foregoing discussion suggests that there might be an empirical difference at the enterprise level between the use of funds provided through retained earnings or local budgets and funds provided by the state-owned banking system, reflecting the fact that the opportunity costs of the latter are perceived to be substantially lower. Further, where autonomy over investment is delegated to the enterprises, the allocation of financial funds overall should improve. In particular, competition from non-state enterprises raises the costs of misallocating resources and spending effort on rent-seeking in the bureaucratic market (Scott, 1990). Non-state firms could also compete for financial resources in the capital market directly or offer an outlet for re-lending credit quotas at higher rates of interest. Thus, those provinces benefiting from a high degree of fiscal autonomy may also suffer less from the distortions in capital markets if they use their authority to delegate management responsibilities to the enterprise level and encourage the growth of non-state enterprises.

In sum, China's decentralised reforms have created incentives for revenue maximisation at the local government level which may have translated into profit maximising behaviour at the enterprise level, whereby the local government acts as the effective principal of the SOEs under its jurisdiction. At the same time, however, decentralisation has also led to a loss of monetary control as local government rent-seeking has effectively emasculated the allocative role of the credit plan. Which of the two effects has been dominant is an empirical matter. The following section investigates whether increased enterprise autonomy has led to improved economic performance. Thereby, we contend that enterprise autonomy is a direct consequence of the process of fiscal decentralisation. The subsequent section turns to the issue of capital allocation.

### **III. Autonomy and Efficiency in Chinese Enterprises**

In the neoclassical theory of the firm, an optimal allocation of factor inputs is achieved by postulating the goal of profit maximisation. This goal is to drive decision making by enterprise managers. Under state ownership and restricted manager autonomy, other goals may come to interfere with profit maximisation and distort the allocation of resources. We follow the thrust of the recent literature on enterprise reform in transition economies in consequently hypothesising a positive link between increased management autonomy and enterprise performance.

The data used in this and the subsequent section are from a survey of 300 enterprises in the 4 cities of Guangzhou, Shenzhen, Xiamen and Shanghai

conducted in 1993.<sup>10</sup> Of these four cities, Guangzhou and Shenzhen lie in Guangdong province, the area that has spearheaded the reform process in the 1980s. Shenzhen and Xiamen are also special economic zones and therefore are expected to have granted higher autonomy to their enterprises. As mentioned above, Shanghai has received less autonomy recently. The survey includes enterprises in various ownership forms; SOEs, COEs, TVEs, joint ventures (JVs) and wholly foreign owned firms (WFOs) and six industrial sub-sectors; garments, textiles, electrical appliances, machine tools, iron and steel and heavy metal products. Enterprise managers were asked quantitative questions about the firm's production, inputs, costs, and financing for the years 1980, 1982, and 1984 through 1992. For most of our analysis, we only use data for the five years of 1980, 1985 and 1990-1992. In addition, managers completed a qualitative questionnaire asking about their current (1992) level of autonomy and perceived causes of economic difficulties. This section uses these qualitative data for 183 of these firms to characterise their operating environment in the four different locations and study their relative economic performance. In this sense, it is a sequel to Raiser (1995), where ownership differences were used as a criteria for analysing enterprise performance.

The distribution of enterprises by sector and ownership in the four cities is shown in Table 5. We can see that the garments sector has by far the largest weight in our sample. Shenzhen stands out for having a significantly larger proportion of electrical appliances firms which recorded the highest output and total factor productivity growth in our sample (see Perkins and Zheng, 1994). Apart from that, however, the sub-sectoral distribution is relatively equal across locations. With respect to ownership, the differences are more pronounced. Shenzhen and Xiamen, the two special economic zones, host most of the JVs and WFOs. This introduces a bias as these firms have been reportedly outperforming domestic enterprises (Perkins and Zheng, 1994). Because of the small sample sizes we cannot control for this factor and suggest to concentrate on matching enterprise performance in Guangzhou to that in Shanghai and comparing Shenzhen to Xiamen.

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<sup>10</sup> I am grateful to Dr. Frances Perkins of the Australian National University for allowing me to use their data.

Table 5 — Ownership and Industrial Structure in Four Coastal Cities, number of firms

	Guangzhou	Shenzhen	Xiamen	Shanghai
<b>Ownership</b>				
SOEs	30	14	9	24
COEs	13	9	12	1
TVEs	1	-	2	6
JVs	4	34	8	2
WFOs	-	1	12	-
<b>Sector</b>				
Textiles	11	8	11	3
Garments	14	24	21	19
Electrical appliances	9	23	4	5
Machine tools	3	-	2	2
Iron + Steel	10	1	2	2
Heavy metal products	1	1	3	2
Total	48	57	43	33

The first task is to contrast enterprise autonomy in the four cities. This is done in Table 6 which shows the distribution of decision making authority in several fields crucial to enterprise management across locations. It emerges quite clearly from Table 6 that enterprises in Shanghai have been subject to a higher degree of government intervention (expressed by a high proportion of decisions made either jointly by supervisory authorities and the firm or by the former alone). These restrictions are most important in the area of investment decisions but also significant in exports and pricing of products produced outside the plan. Guangzhou firms also face substantial intervention in investment decisions, exports and the labour market. Interestingly, Xiamen enterprises report much higher restrictions on investment than their counterparts in Shenzhen and also seem to be less autonomous in the labour market. The overall pattern in Table 6 confirms to the general development sketched in the previous section. In line with the tighter degree of central government control on the local economy, Shanghai authorities have been more reluctant to pass on autonomy to the enterprises under their jurisdiction.

Table 6 — Autonomy and Location in 1992: percentage distribution of firms by decision making authority<sup>a</sup>

0 = Guangzhou 1 = Shenzhen 2 = Xiamen 3 = Shanghai

Decision about	Location	Decision Making Authority					Workers council (other)
		Firm	Supervisory authority	Joint authority	Director or board of directors		
1) New investment	0	28	13	43	15	2	
	1	15	3	15	64	1 (1)	
	2	14	14	32	36	2 (2)	
	3	18	6	52	21	(3)	
2) New product	0	68	-	10	21	2	
	1	47	1	4	34	(3)	
	2	56	2	6	34	2	
	3	64	-	15	21	-	
3) Abandon old product	0	60	-	15	22	3	
	1	45	2	3	47	(3)	
	2	56	2	8	31	2	
	3	63	-	16	22	-	
4) Sale outside plan	0	69	-	5	22	2 (2)	
	1	60	2	-	35	2 (2)	
	2	61	-	-	39	-	
	3	56	3	9	31	-	
5) Price of outside plan products	0	68	2	8	20	2	
	1	57	-	3	36	(3)	
	2	66	-	-	34	-	
	3	38	6	19	31	(6)	
6) Export	0	53	2	22	18	(6)	
	1	59	2	3	33	(2)	
	2	46	3	8	42	(3)	
	3	36	9	42	6	(6)	
7) Total labour force	0	57	6	18	14	3 (2)	
	1	44	-	8	46	1	
	2	40	4	10	42	4	
	3	42	3	21	24	6 (3)	
8) Source of employment	0	52	6	26	12	2 (2)	
	1	43	3	10	43	1	
	2	38	6	16	36	(4)	
	3	48	3	27	15	6	
9) Internal assignment	0	37	2	14	43	5	
	1	24	-	8	65	1 (1)	
	2	20	4	10	61	4	
	3	30	-	9	52	9	



contin. Table 6

Decision about	Location	Decision Making Authority					Workers council (other)
		Firm	Supervisory authority	Joint authority	Director or board of directors		
10) Total wages	0	38	12	20	18	11	
	1	33	3	6	56	3	
	2	19	13	6	46	15 (1)	
	3	27	-	21	24	27	
11) Total bonus	0	56	5	6	23	11	
	1	34	-	4	59	3	
	2	37	2	4	47	7 (2)	
	3	33	3	18	33	12	
12) Dismiss workers	0	44	2	16	25	13	
	1	40	-	-	58	1	
	2	20	4	11	40	20 (4)	
	3	30	3	9	33	24	

<sup>a</sup> Figures in brackets in the last column are the residual category.

A first indication of the impact that different degrees of autonomy may have had on enterprise performance can be glanced from Table 7. Asked for the three major reasons why their enterprises had experienced declining profitability in the past years, managers in Shanghai quoted price restrictions more than three times as much as managers in the other three cities. Interestingly, Shanghai enterprises do not report to have been restricted in their access to investment funds and seem to have suffered less from changes in market demand and structure. This is indicative of preferential treatment under the credit plan and a lesser degree of market competition. As a consequence of these qualitative results, we would henceforth expect enterprise performance in Shanghai to be worse than in the other locations. The differences in autonomy between Xiamen and Shenzhen are also confirmed by Table 7 and would indicate diverging performance in these two special economic zones.

Table 7 — Reasons given by Enterprises for Decline in Profits

0 = Guangzhou 1 = Shenzhen 2 = Xiamen 3 = Shanghai

Location	Most important				Second				Third			
	0	1	2	3	0	1	2	3	0	1	2	3
1) Change in level of market demand	40	49	36	28	10	10	12	6	7	12	6	-
2) Change in structure of market demand	5	4	2	13	10	11	8	9	4	4	6	-
3) Autonomy in production	1	-	2	-	1	1	-	-	1	3	-	-
4) Autonomy to set prices	1	-	2	3	7	1	4	22	8	4	14	6
5) Information on markets	10	6	18	6	5	6	4	3	6	6	4	9
6) Foreign exchange and import license	2	-	2	6	1	1	-	-	1	-	-	3
7) Access to export markets	6	4	2	16	1	-	2	-	1	1	-	3
8) Input costs	5	6	4	3	9	7	4	22	5	4	4	6
9) Investment funds	1	-	4	-	7	13	4	-	5	7	4	-
10) Working capital	9	11	4	9	9	7	8	16	6	4	4	13
11) Quality of products	7	6	6	9	18	23	14	13	12	12	14	9
12) Capacity	3	1	4	3	5	7	4	3	10	14	6	6
13) Technology employed	1	-	2	3	2	1	4	-	3	1	4	6
14) Availability of skilled workers	2	4	-	-	4	-	12	-	7	3	10	13
15) Sufficient raw materials	6	9	6	-	10	9	14	6	14	17	12	9
16) Sufficient energy	1	-	2	-	1	-	2	-	6	4	8	6
17) Others	2	-	4	-	2	1	4	-	3	1	2	9

Source: Sample survey data, own calculations.

The main indicator we use to estimate enterprise performance is total factor productivity growth. This is computed as follows:<sup>11</sup>

$$1) \quad \ln Q_t - \ln Q_{1990} - \alpha(\ln L_t - \ln L_{1990}) - \beta(\ln K_t - \ln K_{1990}) = TFP,$$

where:  $Q$  = real net value of output

$L$  = number of workers

$K$  = real value of fixed capital.

Measured in this way, TFP indicates the level of output that can be achieved with a given level of inputs. It is equivalent to Farrell's (1957) well known

<sup>11</sup> See Perkins and Zheng (1994) for a similar application and Morrison (1993) for a survey of micro-economic productivity measures.

concept of output based efficiency. A higher level of TFP indicates either a technical superiority or a better allocation of resources. Here we posit that economic reforms have led to an increase in TFP, primarily by improving the allocation of resources rather than by pure technical upgrading. Note that we use 1990 as our base year, as around half of all enterprises only came into existence after 1985 or refused to supply data for earlier years. One implication is that TFP growth estimates for the period 1980 to 1990 are significantly affected by only a small number of firms, particularly in the case of Shenzhen and Xiamen. The available literature on the economic performance of these four locations does, however, broadly confirm the direction of the results presented below.<sup>12</sup>

Assuming perfect competition, the weights used to calculate the efficiency residual in equation 1) are equal to the factor shares. However, in line with previous studies we prefer to estimate the implicit factor shares from a Cobb Douglas production function directly. This was run for the case of two factor inputs and the net value of output as the measure of production. A three input specification was rejected on two main grounds. First, estimated factor shares may be biased due to the high correlation of material and capital inputs. Second, the available material price deflators have been questioned and shown to significantly affect estimates of total factor productivity growth in Chinese industry (Woo et al., 1994). While the exclusion of materials may lead to a downward bias in our estimates (see Jefferson, Rawski and Zheng, 1992), it should not affect the results of our cross-locational comparison. Tests for constant returns to scale were conducted on the cross-sectional data for all years and failed to reject the restriction that the factor elasticities sum to unity. Chow-tests also indicated that data could be pooled over the five years 1980, 1985 and 1990-92. Finally, a more general translog specification did not yield significant higher order terms and could thus be disregarded (see also Raiser, 1995). The final specification yielded the following output elasticities for labour and capital inputs<sup>13</sup>:

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<sup>12</sup> For a comparison of the performance of special economic zones see IMF (1993) and Spinanger (1994). On cross-provincial growth comparisons see Hsueh, Rawski and Tsui (1993).

<sup>13</sup> Several tests were conducted to establish the robustness of this result. Estimates using current prices and 1992 data yielded an alpha of 0.67. When the capital stock was endogenised in a separate investment demand equation (see Morris and Liu, 1994; Murakami, Liu and Otsuka, 1994), the estimate for alpha dropped somewhat to 0.57. Nonetheless, these results suggest that the weights we use are in a realistic range. In Raiser (1995) we also compute output elasticities for four of the six industrial sub-sectors

$$2) \ln Q_{it} = \text{Const.} + 0.71 \ln L_{it} + 0.29 \ln K_{it} + eD_t,$$

where  $D_t$  are year dummies and "e" is a vector of efficiency parameters not reported here.

Table 8 presents total factor productivity indices for the four cities. The hypothesis of worsening economic performance in Shanghai is strongly confirmed, as indeed total factor productivity declined by almost one half between 1985 and 1990 in this city. Guangzhou and Xiamen also experienced a decline in efficiency, reflecting primarily the fact that 1985 was a peak year while 1990 was a trough in the substantial amplitude of the Chinese business cycle.<sup>14</sup> In the following recovery, Shanghai recorded a growth of total factor productivity of 13 per cent against 34 per cent in Guangzhou and 51 per cent in Shenzhen. The worsening economic performance of Shanghai also stands out as being far more significant than differences across ownership categories. Table 9 displays total factor productivity indices for the five different ownership types. While SOEs clearly grew slowest, COEs performed not much better. Moreover, since 1990, average productivity growth of SOEs and non-state firms was virtually the same. Hence, even controlling for differences in ownership distribution, Shanghai experienced a substantially worse growth performance.<sup>15</sup>

Table 8 — Total Factor Productivity Indices by Location, 1980-1992

Location	1980	1985	1990	1991	1992
Guangzhou	0.89	1.13	1	1.08	1.34
Shenzhen	0.14	0.70	1	1.22	1.51
Xiamen	0.86	1.17	1	1.06	0.97
Shanghai	1.92	1.87	1	0.91	1.13

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seperately. The direction of the results in this paper are not affected by the use of separate sectoral weights.

<sup>14</sup> See Lau and Brada (1990) for the effects of cyclical fluctuations on measured industrial efficiency in China.

<sup>15</sup> This result was finally checked by calculating TFP growth for SOEs and COEs only in all four cities. The small sample sizes make interpretation difficult but the general trend of declining TFP in Shanghai against growth in Guangzhou is confirmed.

Table 9 — Total Factor Productivity Indices by Ownership

Ownership	1980	1985	1990	1991	1992
SOEs	1.03	1.30	1	1.03	1.27
COEs	0.91	1.09	1	1.14	1.29
TVEs	—	0.63	1	0.98	1.07
JVs	0.20	0.82	1	1.19	1.31
WFOs	—	—	1	0.94	1.08
NSFs <sup>a</sup>	0.70	0.98	1	1.13	1.26

<sup>a</sup> NSFs = all non-SOEs.

It is important to note that lower productivity growth in Shanghai has not yet led to lower absolute levels of efficiency.<sup>16</sup> Rather, the older and more capital intensive industrial structure in Shanghai has come under increasing competitive pressure from the Southern coastal provinces. Hsue, Rawski and Tsui (1993) also find negative total factor productivity growth (minus 1 per cent per annum) for Shanghai in the period of 1980 to 1989, in contrast to a cross-provincial average of roughly 1 plus 2 per cent. Arguably in response to such developments, Shanghai has received reform priority since 1992. Unfortunately, our data do not extend far enough to check for significant changes in the operating environment and economic performance of the Shanghai firms. Finally, the disappointing performance of Xiamen confirms the hypothesised link between autonomy and performance, particularly when compared to Shenzhen. This result is borne out by an IMF (1993, p.34) study which finds that average industrial output growth in Xiamen was lowest among the four original special economic zones. It is also indicative of the fact that not all special economic zones have yielded net benefits to China (see Spinanger, 1994).

We now further investigate the relationship between autonomy and performance by introducing autonomy and incentive variables directly into the production

<sup>16</sup> This can easily be checked by introducing location dummies in a cross-sectional estimation of the production function for 1992. The following results confirm that growth differentials have narrowed an existing productivity gap over time:

$$\ln Q_i = -0.41 + 0.24 \ln K + 0.76 \ln L + 0.50LOC1 - 0.49LOC2 + 0.13LOC3,$$

whereby Guangzhou was chosen as a base and  $LOC1$ =Shenzhen,  $LOC2$ =Xiamen,  $LOC3$ =Shanghai.

function. For this purpose, we rewrite the Cobb-Douglas production function in terms of production per capita and pool data across all four cities from 1985 to 1992. We also allow for fixed technological effects by introducing intercept dummies for five industrial sub-sectors. Autonomy and incentive variables are embodied in the vector  $X_{it}$  which is expected to have positive coefficients.<sup>17</sup>

$$3) \quad \ln(Q/L)_{it} = \text{Const.} + \beta \ln(K/L)_{it} + \alpha X_{it} + \delta D_j + \mu_{it},$$

where  $\beta$  is the output elasticity of capital,  $\alpha$  and  $\delta$  are parameters to be estimated,  $D_j$  is the vector of sub-sector dummies,  $\mu_{it}$  is an error term, and  $i$  and  $t$  are individual and time subscripts respectively.

In choosing the variables representing the vector  $X_{it}$ , we face the problem that the qualitative survey data presented above applies only to the year 1992 and cannot be used to predict the impact that a change in autonomy has on the performance of a specific firm. In the case that autonomy was granted primarily to firms that had already proven to be successful, we would be facing a problem of reverse causality. Fortunately, the qualitative questionnaire also asked for the specific management form of enterprises in each year of the survey. We can thus identify firms that have changed from one regime to another and test for the effects this had on their performance. The following five forms were distinguished: share-holding, contract responsibility system, leasing, director responsibility system and asset management. Of these five forms, the contract responsibility and director responsibility systems were dominant among SOEs during the mid-1980s.<sup>18</sup> Although both forms clearly did increase profit incentives of managers, it is generally acknowledged that the room left for discretionary intervention by supervisory authorities remained large (e.g. Hay et al., 1994). By contrast, firms practising any of the other three management forms are expected to have higher degrees of autonomy. Table 10 verifies the link

<sup>17</sup> Equation 3) is estimated by OLS. The unbalanced structure of the panel data makes this preferable to specifying a fixed or random effects model. The results are, however, robust to panel estimation. As Greene (1993) points out, OLS leads to unbiased estimates of all coefficients, although it does not allow one to retrieve individual firm effects.

<sup>18</sup> The director responsibility system allowed the firm manager to decide about the use of a proportion of above quota profit and linked his remuneration to enterprise performance. In the contract responsibility system, these incentives were formalised in a fixed contract resembling the tax sharing contract between the central and provincial governments discussed above. In our sample the proportion of firms under the director responsibility system declined from 80.5 per cent in 1985 to 57.3 per cent in 1992. The share of firms on the contract responsibility system increased from 6 per cent in 1985 to 14 per cent in 1992, while the proportion of firms operating any of the other three management systems increased from 13.6 per cent in 1985 to 28.7 per cent in 1992.

between management forms and autonomy for the year 1992, putting all firms on share-holding, leasing and asset management responsibility systems into one group (DMA3). DMA1 represents the director responsibility system and DMA2 contract responsibility. The results of Table 10 show that DMA3 firms are far less restricted in their management decision than DMA1 firms. DMA2 firms are also somewhat more autonomous. We would therefore expect DMA3 firms to display higher economic efficiency.

Additional variables included in the vector  $X_{it}$  are the share of profit retained by the enterprise (PROPRE) and the share of bonuses in the total wage bill (STW). These variables have been used extensively in the literature on enterprise performance in China (Chetty, Ratha and Singh, 1994; Groves et al., 1994; Hay et al., 1994; Raiser, 1995) and need no further elaboration. It is hypothesised that the higher the share of profits retained, the higher the incentives to improve productive efficiency and the higher bonus payments, the higher workers' effort. Both variables should thus be signed positively. In the final specification, all three components of  $X_{it}$  were instrumented by their one year lags to overcome the obvious problem of two way causation.

The results in Table 11 reveal that a high degree of autonomy through share-holding leasing and asset management (DMA3) has a weakly significant positive impact on labour productivity. However, this result only holds for the case of excluding PROPRE which substantially increases the number of observations. PROPRE itself is insignificant, a result that contradicts findings by other authors. In our case, it may be due to underreporting of profits for purposes of tax evasion (Perkins and Zheng, 1994). The differences between enterprises in the other two management groups are not significant. It would seem from this result that the substantial locational differences identified above go beyond difference in the management form. One of these differences clearly is the degree of competition. The most significant contribution to labour productivity emanates from worker bonuses. Every increase in the share of bonuses in total wages by one percentage point, increases labour productivity by almost 0.75 per cent. There is very strong indication from our sample that Chinese enterprises had substantial scope for increasing the productivity of their workers merely by improving shop floor morale.

Table 10 — Autonomy by DMA Dummies - Share of Enterprises Where Decisions were Made by (per cent)<sup>a</sup>

Decision about	Management form	Decision making authority					Workers council (other)
		Firm	Supervisor y authority	Joint authority	Director or board of directors		
1) New investment	DMA1	21	7	51	17	2	(1)
	DMA2	32	8	28	32	-	
	DMA3	6	6	8	78		(2)
2) New product	DMA1	62	1	11	26	-	
	DMA2	70	-	4	26	-	
	DMA3	44	-	6	46		(4)
3) Abandon old product	DMA1	59	1	10	29	-	
	DMA2	58	-	17	25	-	
	DMA3	44	-	6	46	-	
4) Sale outside plan	DMA1	62	1	6	30	1	
	DMA2	82	-	-	18		
	DMA3	51	2	2	44		(2)
5) Price of outside plan products	DMA1	57	2	8	32		(1)
	DMA2	80	5	-	15	-	
	DMA3	47	-	9	37		(7)
6) Export	DMA1	52	4	25	18		(1)
	DMA2	68	-	11	21	-	
	DMA3	37	4	7	46		(7)
7) Total labour force	DMA1	45	4	21	25	5	(1)
	DMA2	48	4	12	36	-	
	DMA3	45	-	4	49	2	
8) Source of employment	DMA1	47	6	26	19	2	
	DMA2	44	4	-	44	-	
	DMA3	45	2	8	37	2	
9) Internal assignment	DMA1	26	2	15	51	6	
	DMA2	28	4	8	56	4	
	DMA3	24	2	-	71	2	(2)
10) Total wages	DMA1	26	11	15	29	20	
	DMA2	28	8	16	44	4	
	DMA3	31	-	2	59	6	(2)
11) Total bonus	DMA1	41	5	13	30	11	
	DMA2	28	-	8	52	12	
	DMA3	27	-	1	67	2	(2)
12) Dismiss workers	DMA1	32	4	16	29	19	
	DMA2	44	-	4	44	8	
	DMA3	28	-	-	64	6	(2)

<sup>a</sup> Figures in brackets in the last column are the residual category.



Table 11 — The Impact of Management Forms and Incentives on Labour Productivity, 1985-92<sup>a</sup>

*Dependent Variable Q/L*

Regressors	1	2
Constant	-0.59 (-6.66)	-0.73 (-11.23)
DTextiles	0.13 (1.37)	0.07 (0.73)
DElectrical	0.40 (4.63)	0.48 (5.93)
DIron + steel	-0.43 (-4.18)	-0.37 (-3.43)
DMachine tools	-0.02 (-0.16)	0.18 (1.50)
DHeavy metal products	0.14 (0.61)	-0.46 (-2.60)
K/L	0.35 (9.56)	0.37 (10.86)
DMA2	0.09 (0.92)	0.00 (0.01)
DMA3	0.04 (0.52)	0.11 (1.47)
PROPRE	-0.03 (-0.36)	—
STW	0.67 (3.82)	0.74 (4.37)
R <sup>2</sup>	0.33	0.31
No Obs.	373	581
<sup>a</sup> T-statistics in parentheses.		

#### IV. Autonomy and Investment Allocation

Although the previous section has found strong support for a positive association between autonomy and improved enterprise performance, this link may be broken by a softening of budget constraints in the capital market. As noted above, the decentralisation of China's monetary system may counteract the beneficial effects of fiscal decentralisation on resource allocation. Only if enterprise autonomy is also related to improvements in the use of outside financial resources can decentralisation be said to have been fully effective in raising the efficiency of Chinese enterprises. This section proceeds to an analysis of capital allocation among the enterprises in our sample. We first seek to identify differences in the distribution of bank credit and other financial funds. We also investigate whether such differences may be related to the locational differences in total factor productivity growth and autonomy identified above. Then, we analyse the impact of autonomy on the distribution of financial funds. Finally, we specify and estimate a neo-classical investment function to determine behavioural differences according to the degree of autonomy.

In the quantitative questionnaire, enterprises were asked about the total value of investment funds (TINVS), working capital funds (WKQ) and the value of investment financed through bank credit (CINV). Subtracting CINV from TINVS one obtains the value of investment funds provided by retained earnings, budgetary grants and in JVs and WFOs from foreign direct investment (NCINV). Unfortunately, a further subdivision was not possible. All four variables were divided by the gross value of output and form our set of dependent variables. As determinants of capital allocation the following variables were selected;

- PROM, the profit margin, computed as gross profit over gross value of output. We use this variable as an indicator of creditworthiness in which case it should positively influence the allocation of investment funds (see also Pinto and v. Wijnbergen, 1994). While it may be argued that retained earnings may serve as a substitute for outside investment finance, they only become available in the next period. Hence, a negative relationship of PROM to any of the financial funds variables is likely to indicate perverse credit allocation.<sup>19</sup>

- STOCKS, the ratio of output inventories to the gross value of output. Under efficiency criteria, this variable should not be associated with the provision of

<sup>19</sup> As retained profits are included in NCINV this introduces a bias into the correlation. However, depreciation funds are a much larger proportion of retained earnings and too few firms reported separate data to subtract retained profits from the NCINV series.

investment funds. In the same vein, there should also not be a positive association to working capital funds, even if individual firms use working capital to bridge a liquidity gap. If such a positive association can be established this is evidence that banks are keeping inefficient enterprises afloat.

- ALEFF, a variable capturing allocative inefficiency, calculated as difference between the output elasticity of labour ( $\alpha = 0.71$ ) and the share of total labour incomes in the net value of output. ALEFF will be negative in the case of overemployment or excess worker remuneration. Hence, if its coefficient in any of the three regressions is negative, this indicate the use of outside finance by enterprises to prevent employment restructuring.

Each of the four dependent variables was regressed against all three regressors, a constant and a dummy for SOEs using first differences and pooling data from 1985-1992. The SOE dummy is expected to be positively signed if SOEs had preferential access to financial funds. Table 12 reports the results for all four locations. The most interesting finding is that there are clear differences in the results for CINV and NCINV. For instance, in Guangzhou, there is a significant negative relationship between PROM and CINV but a positive association in the case of NCINV. In Xiamen, the coefficient on PROM and STOCKS change their sign, becoming significantly positive and negative respectively in the NCINV equation while being insignificant for CINV. Only in Shanghai there is little evidence that non-bank credit is allocated more efficiently. Note, however, that the small number of observations makes interpretation difficult in the latter case.

Turning to some locational differences, STOCKS in Shanghai have a significant positive impact on total investment funds and working capital allocations. The share of working capital in total output is also higher in those Shanghai firms suffering from allocative inefficiency. This is clear indication that both directed credit and budgetary resources are used to prop up ailing enterprises in this city. In Xiamen, working capital funds are also positively associated with STOCKS, confirming the concerns about the operating environment in this location. Such concerns are further supported by the high and significantly negative coefficient on ALEFF in the total investment fund equation for Xiamen. A labour share 10 percentage points above 0.71 triggers additional investment funds in the order of 5.7 per cent of gross output value in this city.

Table 12 — Allocation of Financial Funds by Location<sup>a</sup>*Dependent Variable*

0 = Guangzhou 1 = Shenzhen 2 = Xiamen 3 = Shanghai

Location	TINVS				CINV			
	0	1	2	3	0	1	2	3
Constant	-0.01 (-0.24)	-0.01 (-0.25)	-0.20 (-2.12)	-0.06 (-1.87)	0.00 (0.11)	-0.01 (-0.09)	-0.01 (-0.63)	-0.07 (-2.06)
PROM	-0.29 (-0.71)	-0.26 (-0.57)	1.66 (11.25)	0.76 (0.99)	-0.80 (-2.12)	0.67 (0.65)	-0.06 (-0.21)	-0.06 (-0.10)
STOCKS	-0.27 (-1.09)	-0.33 (-1.28)	0.03 (0.04)	0.75 (2.59)	-0.43 (-1.67)	-1.12 (-1.13)	0.28 (0.88)	0.27 (0.85)
ALEFF	-0.07 (-0.96)	-0.30 (-2.21)	-0.57 (-6.83)	0.24 (0.93)	-0.04 (-1.16)	-0.60 (-1.40)	0.01 (0.09)	0.14 (0.93)
DSOE	0.05 (1.12)	-0.11 (-1.20)	0.25 (0.86)	0.04 (0.84)	0.04 (0.91)	0.06 (0.42)	0.05 (1.44)	0.13 (2.42)
R <sup>2</sup>	0.08	0.17	0.89	0.61	0.21	0.11	0.27	0.59
Obs	50	40	31	10	52	25	18	12

  

Location	WKQ				NCINV			
	0	1	2	3	0	1	2	3
Constant	-0.03 (-0.85)	0.01 (0.87)	0.05 (0.99)	-0.02 (-0.25)	0.004 (0.52)	0.23 (1.27)	-0.17 (-1.79)	0.02 (0.62)
PROM	-0.37 (-0.83)	1.88 (0.79)	1.46 (15.10)	2.36 (2.71)	0.14 (1.18)	1.05 (0.63)	6.51 (3.04)	0.41 (0.59)
STOCKS	0.39 (1.83)	0.79 (0.46)	2.15 (4.79)	-0.01 (-0.01)	-0.12 (-1.34)	-0.05 (-0.03)	-2.75 (-1.44)	0.53 (2.09)
ALEFF	0.01 (0.25)	-0.04 (-0.46)	-0.02 (-0.69)	-0.29 (-1.92)	-0.01 (-0.68)	-0.17 (-0.25)	-1.49 (-1.77)	0.07 (0.16)
DSOE	0.09 (1.79)	-0.53 (-1.36)	0.03 (0.26)	0.02 (0.20)	-0.02 (-1.61)	-0.42 (-2.05)	0.09 (0.42)	-0.06 (-1.07)
R <sup>2</sup>	0.09	0.07	0.85	0.38	0.17	0.32	0.50	0.65
Obs	83	46	55	21	39	16	16	8

<sup>a</sup> T-statistics in parentheses.

We do not want to interpret too much into these results. The fit of the estimated regressions is generally poor and the differences between the locations is overall rather small. Table 12 mainly serves to show that the allocation of bank credit has been dominated in all four cities by non-market forces. What locational pattern there is does not contradict the view of higher distortions in those cities where less autonomy has been granted but the evidence is clearly too weak to draw firm conclusions.

Table 13 — Allocation of Financial Funds by Autonomy<sup>a</sup>  
*Dependent Variable*

Autonomy	TINVS		CINV		WKQ		NCINV	
	DAINV	DINV23	DAINV	DINV23	DAINV	DINV23	DAINV	DINV23
Constant	-0.13 (-2.39)	-0.05 (-1.13)	-0.02 (-0.61)	-0.01 (-0.34)	0.003 (0.03)	0.00 (0.07)	-0.05 (-0.71)	0.00 (0.00)
PROM	1.60 (14.31)	-0.01 (-0.01)	-0.52 (-1.37)	-0.36 (-0.83)	1.32 (5.70)	0.18 (0.54)	2.07 (2.32)	0.09 (0.37)
STOCKS	-0.07 (-0.18)	-0.30 (-1.34)	-0.10 (-0.48)	-0.39 (-1.54)	0.93 (0.97)	1.07 (5.04)	0.48 (0.73)	-0.03 (-0.27)
ALEFF	-0.10 (-0.59)	-0.46 (-10.06)	-0.03 (-0.89)	-0.19 (-1.95)	-0.04 (-0.71)	-0.03 (-1.06)	0.03 (0.13)	-0.09 (-1.74)
DSOE	0.02 (0.21)	0.06 (1.02)	0.08 (1.67)	0.06 (1.09)	-0.31 (-1.38)	0.03 (0.82)	-0.15 (-1.08)	-0.04 (-1.80)
R <sup>2</sup>	0.78	0.84	0.13	0.17	0.31	0.29	0.18	0.23
Obs.	62	66	51	48	88	112	38	38

<sup>a</sup> T-values in parentheses.

One reason for the small locational differences may lie in the fact that investment was the one area where enterprises were rather strongly restricted in all four cities (Table 6). If autonomy is the crucial variable in determining capital allocation, subdividing our sample by the degree of autonomy in investment decisions as reported in Table 6 might yield more easily interpretable results. Hence, we reran the set of regression for two subgroups, namely all firms where investment decisions were made jointly with supervisory authorities or by the latter alone (DINV23), and all other firms (DAINV). Table 13 confirms our expectation that a subdivision by autonomy yields much clearer differences between subgroups. Interestingly, this is the case particularly for

TINVS, NCINV, and WKQ but less for CINV. This again stresses the deficiencies in China's banking system. For enterprises in the DAINV subgroup, total financial funds, non-bank funds and working capital are positively associated with profitability, unrelated to inventories and allocative inefficiency and do not respond to ownership differences. By contrast, in DINV23 firms investment funds go primarily to firms struggling with overemployment or excessive wage bills, while working capital funds are used to finance stockbuilding. Surprisingly, as in Table 12, there is little evidence for preferential treatment for SOEs.

On the basis of the above results, we can conclude that government interventions restricting enterprise investment autonomy are one of the main reasons for the inefficient allocation of capital in China. In this sense, the results reflect the priorities of capital suppliers. A different angle to the same question is provided by an analysis of capital demand at the enterprise level. As Kornai (1980) argues, enterprises with soft budget constraints display an unsatiable investment hunger, unconstrained by interest rates or negative supply shocks. An analysis of investment demand, therefore, may help to clarify whether monetary decentralisation has been sufficient to offset the hardening of budget constraints provided for by fiscal decentralisation. Following Morris and Liu (1994), we derive an investment demand equation from the first order condition of profit maximisation:

$$4) \quad K_{it}^* = \beta \frac{Q_{it} P_{jt}}{C_{it}}, \quad \text{where}$$

$K_{it}^*$  = desired optimal capital stock  
 $Q_{it}$  = real net value of output  
 $\beta$  = output elasticity of capital  
 $P_{jt}$  = price index for output, different for each sector  
 $C_{it}$  = user cost of capital.

The effective user cost of capital is defined as:

$$5) \quad C_{it} = P_{jt}^k \frac{[r_{it} + d_{it}]^{\sigma_1}}{[1 - t_i]^{\sigma_2}} \cdot F_{it}^k, \quad \text{where}$$

$P_{jt}^k$  = price index for capital goods for each sector (see Zheng, 1994)  
 $r_{it}$  = effective interest rate, calculated as total interest paid/value of bank loans outstanding  
 $d_{it}$  = depreciation rate, calculated as total depreciation/nominal value of fixed capital stock

$t_i$  = profit tax rate, calculated as the value of tax payments/gross profit for each firm averaged over the 1985-1992 period.<sup>20</sup>

$F$  = retained profits (PROPRE)

$\gamma, \sigma_1, \sigma_2$  = parameters to be estimated.

Equation 5) provides a general formulation, allowing for different elasticities of capital costs w.r.t. profit taxes and the interest rate and introducing the availability of internal investment funds (e.g. retained earnings) as a determinant of the user cost. The idea is that if there is an external finance constraint, then the availability of internal funds should lower the effective cost of investment. In market economies where capital is substitutable between different sources, we should obtain an estimate of  $\lambda$  insignificantly different from zero. In China, a negative value for  $\lambda$  is expected because capital markets are segmented. An estimate of  $\lambda$  equal to zero in this case would indicate preferential access to credit markets. Finally, equation 5) includes a relative price of capital goods. In the estimation presented below, this is captured as the ratio of the investment goods deflator to the output price deflator for each of the six sub-sectors in our sample. Substituting 5) into 4) we get:

$$6) \quad K_{it}^* = \beta Q_{it}^{\delta_1} \left[ \frac{P_{it}^K}{P_{it}} [r_{it} + d_{it}]^{\sigma_1} [1 - t_i]^{-\sigma_2} F_{it}^\lambda \right]^{-\delta_2},$$

where  $\delta_1$  and  $\delta_2$  are the elasticities of the desired capital stock with respect to the real net value of output and the real user cost of capital.

Equation 6) gives the desired optimal capital stock in each period. However, it may be more realistic to assume a partial adjustment of the capital stock to the desired level, reflecting adjustment costs and administrative interventions that may overshadow the profit maximisation goal of the enterprise. Thus, for estimation purposes, we adopt the following dynamic formulation from Morris and Liu (1994):

$$7) \quad \ln[I_{it} + [1 - d_{it}]K_{it-1}] = \delta_1 \ln \beta + \delta_1 \ln Q_{it-1} - \delta_2 \ln \frac{PK_{it-1}}{P_{it-1}} - \delta_2 \sigma_1 [r_{it-1} + d_{it-1}] + \delta_2 \sigma_2 [1 - t_i] - \delta_2 \lambda F_{it-1} + \mu_{it},$$

$I_{it}$  = real value of gross fixed capital investment,  $\mu_{it}$  = error term.

<sup>20</sup> Such averaging was necessary as the year-on-year volatility of effective tax rates is extremely high. As explained below our interest is in the cross sectional variation of tax rates.

It is, of course, arguable whether investment demand in Chinese enterprises is really a function of a profit maximisation goal. The extent to which equation 7) provides a satisfactory description of investment demand in the various subsamples we have used in this paper so far may thus yield further insights on the behavioural patterns among them. Specifically, the parameters of interest are the elasticity of investment demand w.r.t. the real rate of interest and the coefficient  $\lambda$  indicating the presence or not of an external finance constraint. Note that the coefficient on the tax rate is expected to be negative. However, as we take an average profit tax rate over several years for each enterprise, the limited variance in this data could make the coefficient insignificant. Following this line of argument, a significant estimate of  $-\delta_2\sigma_2$  is only expected if discretionary taxation introduces large inter-firm variations in tax rates. Such variation, indicative of a soft budget constraint (Kornai, 1986), is likely to be higher in the less autonomous subsample. Equation 7) was estimated for four enterprise subgroups: DAINV, DINV23, DINV2, and DINV3. The latter two subgroups are components of the DINV23 group, DINV2 representing firms where supervisory authorities alone make investment decisions, DINV3 standing for all enterprises where decisions are made jointly. We also attempted estimation by location but could not identify significant differences in the parameters. This suggests that given autonomy even enterprises in Shanghai would behave as profit maximisers.

As Table 14 reveals, groups DAINV and DINV3 (full or partial investment autonomy) show very similar behavioural patterns. All estimated parameters confirm with what would be expected under profit maximisation. The interest rate elasticity is negative, its value being slightly below the output elasticity. This confirms with results for Western economies (see Morris and Liu, 1994).

From the coefficient on  $\frac{Pk_{j-1}}{P_{j-1}}(\delta_2)$  and the coefficient on  $F_{it-1}(-\delta_2\lambda)$ , we can deduct a value of  $\lambda$  of -0.4662 for DAINV and -1.001 for DINV3, indicating a very strong finance constraint. As expected, the cross-sectional variation in average tax rates is too low to yield a significant estimate of  $-\delta_2\sigma_2$ . By contrast, subgroup DINV2 (no investment autonomy) show no significant reaction to interest rates or relative prices. Interestingly, tax rates are a constraining factor on investment demand, while  $-\delta_2\lambda$  is insignificant. This implies that for DINV2 firms, retained earnings are not a preferred means of investment finance. Two main explanations come to mind. On the one hand, in less autonomous firms



Table 14 — Neo-Classical Investment Demand by Autonomy<sup>a</sup>  
 Dependent Variable:  $\ln(I_{it} + (1-d_{it})K_{it-1})$

Coefficients	Autonomy			
	DAINV	DINV2	DINV3	DINV23
Constant	0.27 (0.70)	0.47 (0.62)	1.32 (3.43)	1.47 (3.98)
$-\delta_2\sigma_1$	-0.41 (-3.76)	0.41 (1.83)	-0.49 (-5.02)	-0.42 (-4.57)
$\delta_1$	1.01 (18.76)	0.68 (6.77)	0.88 (17.12)	0.87 (17.38)
$-\delta_2\lambda$	0.21 (3.03)	0.11 (0.62)	0.43 (6.04)	0.44 (5.81)
$-\delta_2\sigma_2$	0.02 (0.27)	-2.79 (-6.00)	0.00 (0.00)	-0.13 (-1.22)
$-\delta_2$	-2.22 (-4.85)	-1.77 (-1.57)	-2.33 (-5.32)	-2.53 (-5.54)
R <sup>2</sup>	0.86	0.79	0.81	0.74
Obs.	106	33	101	134

<sup>a</sup> T-values in parentheses.

retained earnings may be heavily taxed. On the other hand, access to bank credit is ensured at preferential conditions due to the strong government involvement in investment decisions. It is important to note that DINV2 firms represent a minority in our sample, as can easily be seen from Table 6. Nonetheless, Table 14 indicates to what extent enterprise reforms have remained incomplete in China. Just as some provinces so far still await to see the benefits of increased autonomy, enterprises themselves will only adjust to price signals in China's "socialist market economy" if given the chance to do so free of government intervention.

## V. Conclusions

This paper has reviewed the process of decentralisation since the onset of economic reforms in China. Thereby, we have identified two opposing effects of decentralisation on resource allocation and economic efficiency. Fiscal decentralisation was shown to increase the incentives for provincial and local

governments to maximise the tax returns from enterprises within their jurisdiction and may thus lead to hardened budget constraints for SOEs. Monetary decentralisation by contrast creates ample room for rent seeking by local governments, particularly in the context of financial repression. Persistent government intervention in credit markets via the credit plan exacerbates the resulting inefficiencies in the allocation of investment funds and may counteract the beneficial effects of local autonomy on the budget constraints of SOEs.

The policy conclusions that may be derived from this analysis are clear. The central government would be well-advised to abandon its attempt to control investment allocation through the credit plan as soon as possible. Apart from the fact that this tool has become ineffective in controlling the rate of credit expansion in the economy, it is also a major impediment in the improvement of capital allocation at the enterprise level. Only if rents from directed credit at negative real interest rates in the banking sector are abolished will local governments be willing to delegate all responsibilities over investment to enterprises. Our empirical findings show that this would greatly improve investment allocation and is likely to raise productive efficiency. Moreover, it is important to recognise that the beneficial effects of autonomy on enterprise behaviour are to a considerable extent conditioned by the degree of market competition. The experience of Eastern European economies with decentralisation during the 1980s suggests that if the market is dominated by a few large industrial SOEs, autonomy alone does not induce the desired behavioural changes. As China attempts to transfer the reform success from the coastal provinces to the interior, it will have to implement a set of bankruptcy regulations that provide for the exit of perpetual loss-makers. This would allow the central government to relieve the banks from the provision of policy loans to finance a quasi fiscal deficit and to sustain the current rapid growth of the economy.

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