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**“The Razor's Edge: Distortions,
Incremental Reform and the Theory
of the Second Best in the People's
Republic of China”**

Alwyn Young

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The Razor's Edge:
Distortions, Incremental Reform
and the Theory of the Second Best
in the People's Republic of China

"Sages say the path [to salvation]
is narrow and difficult to tread,
narrow as the edge of a razor."*

Alwyn Young**
Preliminary Draft: October 1996

(*) From the Katha-Upanishad, as translated by Mascaro (1965). A similar message appears in the New Testament: "Enter ye in at the strait gate: for wide is the gate, and broad is the way, that leadeth to destruction, and many there be which go in thereat: Because strait is the gate, and narrow is the way, which leadeth unto life, and few there be that find it." St. Matthew, 7, 13-14.

(**) Department of Economics, Boston University. This research was supported by the Canadian Institute for Advanced Research and a Sloan Foundation Fellowship. I am grateful for the helpful comments of my present and former colleagues at BU, the CIAR and MIT, and to Mary Ann Connolly and Him Chung, who provided long suffering research assistance. As always, my greatest debt is to Ho Veng-Si, whose comments and criticism shaped this project from its inception.

I Introduction

Between 1978 and 1994 GDP per capita in the People's Republic of China grew 8.0% per annum.¹ This extraordinary growth, coinciding, as it did, with the gradual elimination of central government controls over output, prices and factor supplies, is easily taken as evidence of a successful transition from "plan" to "market". However, ever since Lipsey and Lancaster's (1956) seminal contribution, the economics profession has been well aware that, starting from a position away from the Pareto optimum, increases in output and welfare are not necessarily associated, one for one, with the removal of distortions. Rapid growth, in a distorted economy, might just as easily reflect the impact of an increase in the range and severity of distortions. Thus, while the growth of the Chinese economy over the past 15 years suggests that the reforms have been eminently welfare enhancing,² it does not, per se, provide any evidence as to whether these reforms have allowed the economy to move from a situation where allocations are determined by government fiat to one where they are determined by atomistic economic agents responding to price signals that reflect true marginal costs and benefits.

As early as 1986, the government of Zhejiang province began to restrict the sale of silk cocoons to other parts of China. Each harvest season the government bureaucracy, from the provincial level all the way down to village units, and including police and militia forces, was mobilized to ensure that Zhejiang's silk farmers sold their silk cocoons locally, for local processing or direct export. Under the plan, the prices of raw materials, such as silk, were kept artificially low

¹ China Statistical Yearbook (hereafter, CSY) 1995, tables 2-10 & 3-1. All growth rates reported in this paper, when computed from primary statistical sources, are logarithmic growth rates. Growth figures drawn from secondary source materials are cited in their original form.

² One might argue that the demise of the security of employment and income delivered by the plan, and its replacement with the uncertain outcomes of the market place, has lowered the welfare of workers. This loss, due to the increased variability of income, is probably of small order relative to the gain due to the overall quadrupling of the level of income per capita. In any case, as I shall argue further below, the reforms have not really compromised income and employment security in the industrial sectors of the economy.

while the prices of final goods, such as silk fabric, were kept high. During the 1980s, with the relaxation of central controls on rural industry, locally controlled silk processing industries developed rapidly in Zhejiang, a traditional producer of silk cocoons, to capture the rents implied by the artificial price wedge. The trade embargos of the mid 1980s onwards appeared as other provinces tried to purchase silk cocoons, at above planned procurement prices, directly from Zhejiang farmers, bidding away the rents the Zhejiang government could acquire from local processing or direct export.³ Meanwhile, in the first half of 1988 silk factories in Shanghai, located next door to Zhejiang and Jiangsu,⁴ the principal domestic producers of silk, received only 40 tonnes of their planned allocation of 2000 tonnes of raw silk. In a country which, all by itself, accounted for 60% of world production and 90% of world exports of raw silk, Shanghai found itself in the surprising position of using valuable foreign exchange to import silk for its factories.⁵

In 1988, Hunan and Guangxi were reported to be patrolling their border with Guangdong province, restricting the movement of goods to their neighbour. Senior officials in both provinces complained that goods shipped to Guangdong for subsequent export as "Guangdong" goods robbed them of valuable foreign exchange. Furthermore, Guangdong purchases of grain in Hunan and Guangxi drove up grain prices in those provinces, benefitting local farmers but raising the cost to the provincial governments of maintaining low grain prices for urban consumers. While most provinces were only able to keep 20% of the foreign exchange generated by their exports, Guangdong enjoyed an 80% foreign exchange retention ratio. Not surprisingly, goods were transhipped from other parts of China for export as Guangdong products. Shenzhen,

³ See Chen (1994), preface pp. 1-2 and text pp. 7-8.

⁴ Shanghai is located, geographically, in Jiangsu province, but, along with the cities of Beijing and Tianjin, has the administrative status of a province. In referring to locations, and analyzing data, I follow the People's Republic's administrative divisions.

⁵ Far Eastern Economic Review (hereafter, FEER), "In a spin" (23 March 1989).

a "Special Economic Zone" located in Guangdong, was a showcase for China's experimentation in market reforms and enjoyed even more preferential policies, such as a 100% foreign exchange retention ratio and the right to import raw materials and components free of duty. Of the total cumulative foreign investment in Shenzhen between 1979 and 1987, only 1.1% was characterized as being "export oriented" (exporting more than 50% of its output and maintaining a positive foreign exchange balance), the lowest ratio reported for any city or province in China.⁶ In 1985, less than 20% of Shenzhen's industrial output was reputed to have been exported, the rest being destined for the internal market in China. By assembling duty free components, as well as illegally transshipping duty free imports, Shenzhen was able to arbitrage international and domestic prices. Other provinces and regions, arguing that Guangdong and Shenzhen's trading activities were disrupting their economies,⁷ erected trade barriers and lobbied for similar privileges. In 1989 Hunan was given the right to create two of its own special economic zones, so that it might better "compete" with Guangdong.⁸

The trade conflicts noted above are just two of the many internal trade wars reported in the 1980s and 1990s.⁹ Figure 1.1 below presents time series data on the merchandise trade to GDP ratio of the People's Republic of China, compared with similar data for a few other countries at the end of the sample period.¹⁰ The growth of Chinese trade is truly spectacular. Starting at

⁶Hu (1991), table 4.2.

⁷The purchases of grain seem to have been driven less by entrepot considerations and more by the fact that, with farmers increasingly moving into more lucrative non-agricultural activities, Guangdong was increasingly short of foodstuffs.

⁸For coverage of the above, see FEER: "Into the red zone" (19 September 1985), "The envy of China" (8 December 1988), and "Beggar thy neighbour" (12 January 1989), as well as "The grain drain" (3 November 1988).

⁹Additional references are given later in the paper.

¹⁰The data, drawn from the IMF's International Financial Statistics Yearbook 1995, concern merchandise trade only. In the case of China, I have double checked the IMF data against national sources (i.e. the CSY) and found that they duplicate these accurately.

Figure 1.1: Merchandise Trade/GNP
 (Calculated from Customs Statistics in Units of Domestic Currency)

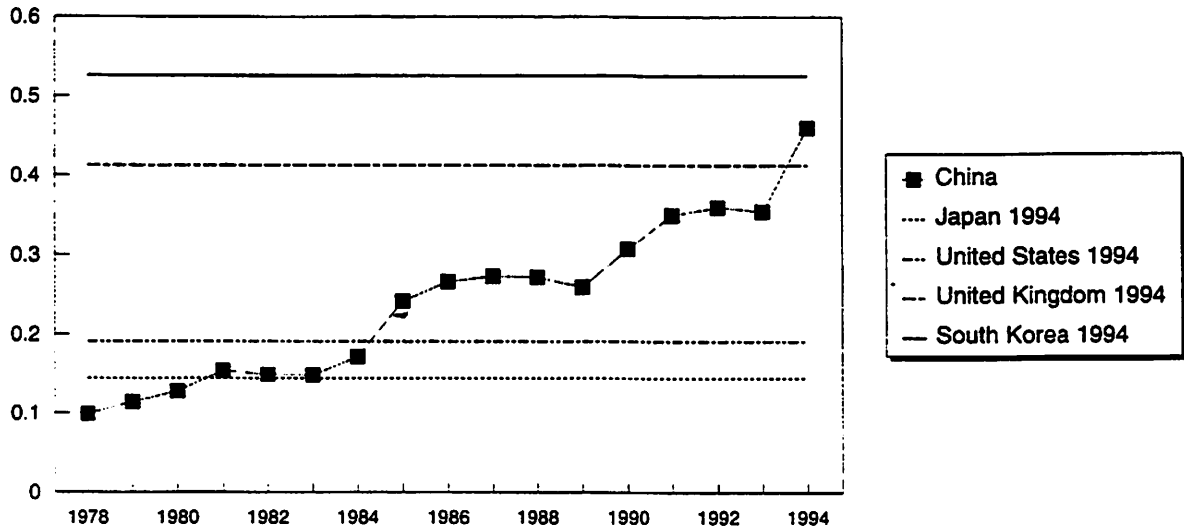
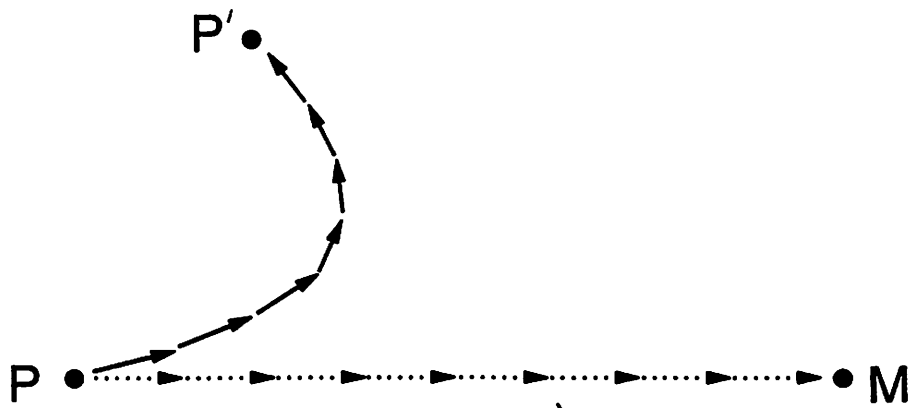


Figure 1.2: A Notional Space of Distortions



10%, China's trade to GDP ratio had reached the level of Japan (14%) by 1981, surpassed that of the United States (19%) in 1985 and eclipsed the level of the United Kingdom (41%) in 1994.

By 1994 China's trade to GDP ratio was approaching that of South Korea, a small trade oriented economy. Typically, such statistics are viewed as evidence of economic vigour. I would argue, however, that in the context of a continental land mass with a poor, predominantly agrarian, population of 1.2 billion people, they are more appropriately viewed as evidence of disease. Internationally, trade ratios tend to rise with the level of income and fall with the size of territory and population.¹¹ Consequently, it is extraordinarily surprising to find that continental China has developed a trade to GDP ratio similar to that of small peninsular South Korea. Unless, of course, one thinks of China not as a unified economy, but as a series of small provincial and sub-provincial economies, which have weakened trade relations with each other, while (perhaps perforce) developing stronger and stronger ties with the international market.¹²

¹¹ See, for examples, Frankel (1992) and Frankel & Romer (1995).

¹² The World Bank recently revised its figures for China's GDP upward by 34%, on the grounds that the published Chinese data misses much of national output. This still leaves China with an unusually high trade ratio. There is also the issue of purchasing power parity adjustments. However, as noted in Summers & Heston Mk 5.6, there has actually never been an ICP study of Chinese prices. Thus, the PPP estimates which do exist are extremely partial and vary enormously in their results. Furthermore, PPP adjustments would tend to lower the trade to GDP ratios of all lesser developed economies (not just China). According to Frankel & Romer's (1996) estimates, China's trade to GDP ratio, based upon gravity model considerations (area, population, distance from others and income) should be about 4.5%. It is hard to see how any adjustment, even for purchasing power parities, will get one anywhere near this number.

Figure 1.2 summarizes the conceptual theme of this paper. The process of gradual economic reform is typically viewed as a step-by-step movement along the dashed arrows from point P ("plan") to point M ("market"). Gradual liberalization in a planned economy introduces opportunities for arbitrage which contain both welfare enhancing and welfare detracting elements, hence the familiar second best result. A good example is provided by China's special economic zones, which, in their trade arbitrage role, brought world prices to the Chinese economy while, simultaneously, leading to the wasteful diversion of goods away from other export locations.¹³ The gradual nature of incremental reform means that the rents which appear are fairly long lasting. This allows for a prolonged battle to capture, and then protect, these rents, leading to the creation of new, permanent, distortions. In the case of China, this has manifested itself in a variety of tariff and non-tariff barriers to interregional trade as local governments have tried to arbitrage planning induced gaps between raw material and final goods prices and capture the rents associated with regionally based policies on foreign exchange, import duties and taxes. In the end, instead of moving from P to M, in figure 1.2, the economy ultimately transits to P', never making it to the free market. Prices and allocations are never determined, even remotely, by true marginal valuations.

Fundamentally, this paper argues that the so-called "liberalization" and "transformation" of the People's Republic over the past 20 years is best characterized as a process of devolution. Although the central government has released control over prices, outputs, factor allocations, and enterprise budgets, these functions have been taken up by local governments. Thus, China has moved from having one central plan to having many, mutually competitive, central plans. It is

¹³ Goods, which might have been more cheaply shipped out through other ports, would have been diverted to the zones. In addition, raw materials of greater value to other locales might have been diverted to the zones for processing or direct export in order to gain the shadow rent associated with foreign exchange retention unavailable to other, potentially more productive, locations. Murphy, Shleifer and Vishny (1992) provide an elegant analysis of how supply diversion, in a partially reformed centrally planned economy, can lead to welfare losses.

not hard to believe that the control and incentive problems that plague planning are more easily managed at the provincial and county level than they are at the continental level.¹⁴ Consequently, it is not surprising that on net this devolution of power has greatly increased welfare, as witnessed by the extraordinary growth of the past two decades. An economic system characterized by government control, even local government control, over prices, output and investment is not, however, typically viewed as being conducive to long term prosperity. In this regard, I would argue that China today most resembles the Latin America of 30 years ago: a continent of small, recently prosperous, countries, dominated by governments which control prices and investment, preferentially protect "state" (local) industry, and maintain the prosperity and employment of urban elites at the expense of rural farmers.

Section II below begins the analysis by providing a short history of the devolution of economic power in the People's Republic, outlining how incremental reforms led to the development of competitive industrial policies amongst provinces and regions. Section III moves beyond narrative description to the presentation of production data, showing how China's different provinces duplicated each other's production structure during the reform period. This convergence in structure does not seem to be associated with convergence in incomes, i.e. it is not the case that the faster a province grew the faster it converged to the average national structure. In fact, in some comparisons I find the opposite, the more a province resisted trends and diverged from the average national structure, the faster it grew. I also find that the duplication of production moves against the pattern of comparative advantage, i.e. the regional correlation

¹⁴To quote the old Polish joke: "Under the plan they pretended to pay us and we pretended to work." Just the fact that workers and farmers can now keep a substantial portion of the fruits of their labour, either directly or indirectly (in the form of government provided local public goods), allows for an enormous incentive based increase in productivity.

between relative resource allocations and relative productivities has actually deteriorated during the reform period's movement to "market." Section IV concludes the paper. A number of appendices, available upon request from the author, provide additional supporting evidence.¹⁵

¹⁵In one, I present quantity (tonnage) and value data which, while problematic, suggest a substantial decline in the ratio of interprovincial trade to GDP. Given the growth of international trade, simple "trade diversion" effects would have led one to expect some decline in interprovincial trade. Nevertheless, these data are also consistent with the notion that interprovincial trading relations have broken down, lending support to the picture painted by the data, presented in this paper, on the regional distribution of production. While this paper takes as given the enormous success of the reforms in raising the level of GDP, no analysis of the reform period would be complete without at least some examination of the record of growth and productivity. I do this in another appendix, where I find that Chinese data suffer from serious problems of deflation, with the growth of nominal output frequently taken as the index of the growth of real output. After making some adjustments using national price statistics, I estimate GDP growth during the reform period to be about 2.1% less per annum than that reported in official statistics. Over the past two decades China has also experienced a rise in investment rates, labour force participation and levels of educational attainment. Accounting for these factors, as well as the transfer of labour out of agriculture, I find that aggregate productivity growth in the non-agricultural economy during the reform period has averaged about 1.1% per annum; only slightly higher than the 0.7% per annum experienced during the pre-reform (1965-1978) period.

II Stories

Any review of the reform period must, perforce, take as its starting point the legacies of 30 years of central planning. Three aspects of the planning system, in particular, had a profound influence on the development of local policy during the 1980s. First, as shown in table 2.1, revenue collection under the plan was concentrated in the industrial sector which, by the mid-1960s, accounted for three quarters of the consolidated budgetary revenue of the central and local governments. With the prices of raw materials kept artificially low relative to the prices of final industrial goods, industrial processing enterprises reaped unusually high returns, which were then handed over to the government, either in the form of turnover (indirect) taxes or through the direct remittance of profits. Wong (1992) explains that this system was patterned after the Soviet model of the 1920s, in which "price scissors" generated large industrial surpluses which could then be used to fund the development of industry. In the context of government control of most economic sectors, this motivation is peculiar, since, presumably, profits could just as easily have been concentrated in raw material sectors such as agriculture or final sales sectors such as commerce,¹⁶ and then be used to finance the development of industry.¹⁷ It could be the case that these rents and price wedges simply represented the combination of ideological bias (e.g. frivolous consumer goods such as watches and fans should be expensive while valuable raw materials such as coal should be available to all at low cost; industry is important and hence

¹⁶For example, the large turnover (indirect) taxes, which were included in the factory sales price of manufactures and, thereby, collected from industry, could just as easily have been levied after goods were shipped to distributors, and hence collected from the commercial sector.

¹⁷This wouldn't work, of course, if the transfer system was imperfect, necessitating that a substantial portion of the rents generated by price distortions remain in the sectors where they were collected (whether, in such a case, rents would be converted into investment goods or simply be consumed, is, of course, another matter altogether). Certainly, the complaints of major processing centres, such as Shanghai, which until 1985 kept only 10% to 15% of the revenue it collected, indicate that substantial intersectoral and interregional transfers did take place. On Shanghai, see FEER: "The urban dilemma" (12 December 1985), "The long march back" (11 December 1986), and "Red light, green light" (21 April 1988).

industry, and not agriculture or commerce, should generate revenue) and practical expediency (e.g., it is easier to collect the revenues of a few silk processing centres than to tax the incomes of thousands of silk growing collectives). For whatever reason, industry was paramount as a source of revenue, a role that, with the losses of commercial enterprises,¹⁸ grew during the early years of the reform, with industry accounting for a dominant 86% of total revenue in 1983.¹⁹ Despite its subsequent decline, industry still accounted for almost half of all budgetary revenue in 1994.²⁰

¹⁸ Under Chinese accounting procedures, revenue is computed net of enterprise losses. The negative net commercial revenue of the early 1980s probably reflects the enormous losses of the foreign trade corporations during that period (see Lardy 1992, p. 101).

¹⁹ As noted in the table, until 1994 Chinese accounting practices included borrowing as a source of revenue. Subtracting "debts revenue" (CSY 1995, table 7-5) from total revenue raises the share of industry in 1983 to 92%.

²⁰ An important issue is the treatment of "extra-budgetary" revenue, which grew from 31.0% of total revenue in 1978 to 97.7% in 1993. Until 1992 the definition of extra-budgetary revenue included the various surcharges and levies raised by governmental departments as well as the many funds retained by enterprises but earmarked for specific use, e.g. welfare, bonus, and capital construction and technical updating funds. While it is true that local governments tax the extra-budgetary funds of enterprises and exert substantial influence over their use (Wong 1991), it seems excessive to consider the full value of these funds as being under government budgetary control (this is almost equivalent to considering the depreciation allowances or investment tax credits of U.S. firms as being part of the U.S. government budget). In 1993 Chinese statistics stopped counting the funds of state-owned enterprises and agencies as part of extra-budgetary funds, lowering extra-budgetary funds to 30.3% of the value of budgetary revenue in that year. If one similarly excludes state enterprises from the 1978 data, the value of extra-budgetary funds as a percent of budgetary revenue falls to 8.4%. Returning to table 2.1, if one includes non-state enterprise extra-budgetary revenue in total revenue and assumes that absolutely none of the extra-budgetary levies were drawn on industry, then the share of industry in total revenue was 70% in 1978, falling to 37% in 1993. Data drawn from CSY 1995, tables 7-3 & 7-14.

	1952	1965	1978	1983	1994
Light Industry	0.23	0.30	0.30	0.34	0.23
Heavy Industry	0.11	0.43	0.45	0.52	0.24
Agriculture	0.20	0.07	0.03	0.05	0.06
Commerce	0.23	0.07	0.12	-0.08	0.31
Transportation	0.05	0.09	0.07	0.06	0.04
Construction	0.00	0.00	0.00	0.01	0.02
Other*	0.18	0.04	0.02	0.10	0.10

(*) With the exception of 1994, includes borrowing. Source: CSY 1995, table 7-3.

Second, as shown in figure 2.1, historically most of government revenue was nominally "local revenue" collected by local government authorities and then handed over to the central government. In the early 1970s, just prior to the reforms, local revenue amounted to almost six times central revenue. As the figure shows, during the 1980s the ratio of local to central government revenue collection declined rapidly as the central government increased its share of revenue collection (figure 2.2).²¹ These figures, however, conceal the fact that, with the exception of some centrally-controlled enterprises, most of so-called "central" revenue has actually always been collected by local authorities, simply because the central government has never possessed a

²¹ Because data on non-state enterprise extra-budgetary revenue broken down into local vs. central are not available prior to 1993, I exclude extra-budgetary revenue, with its broad pre-1993 definition, from figures 2.1 and 2.2 (including all extra-budgetary revenue, the ratio of local to central government revenue falls from 2.6 in 1982 to 1.4 in 1992, as compared to the decline from 3.3 to 1.5 recorded in figure 2.1). Nevertheless, from the available data one can easily deduce that figure 2.2 overstates the decline in total revenue collection as a share of national income. In 1981 local budgetary revenue collection (including borrowing) equaled 21.9% of national income, central budgetary revenue collection equaled 5.7% of national income, and non-state enterprise extra-budgetary revenue (undifferentiated by local or central collection) amounted to another 3.2% of national income. In 1993 the share of total local revenue (budgetary and non-state enterprise extra-budgetary) in national income was 18.4%, while the share of total central revenue was 7.8%. CSY 1993 (tables 2-13 & 6-17), 1994 (table 2-11), 1995 (tables 7-12, 7-13).

Figure 2.1: Ratio of Local to Central Revenue & Expenditure

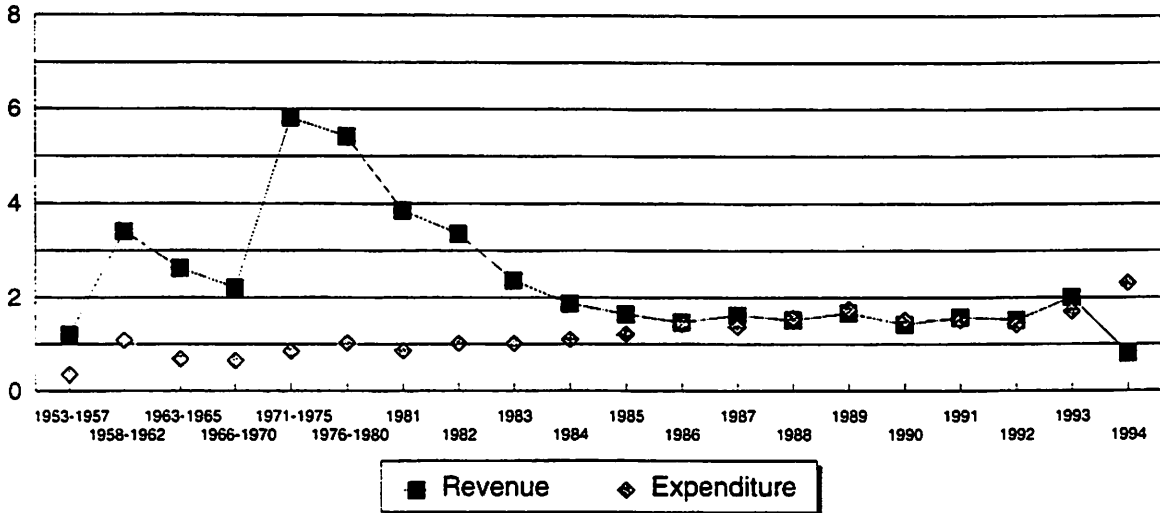
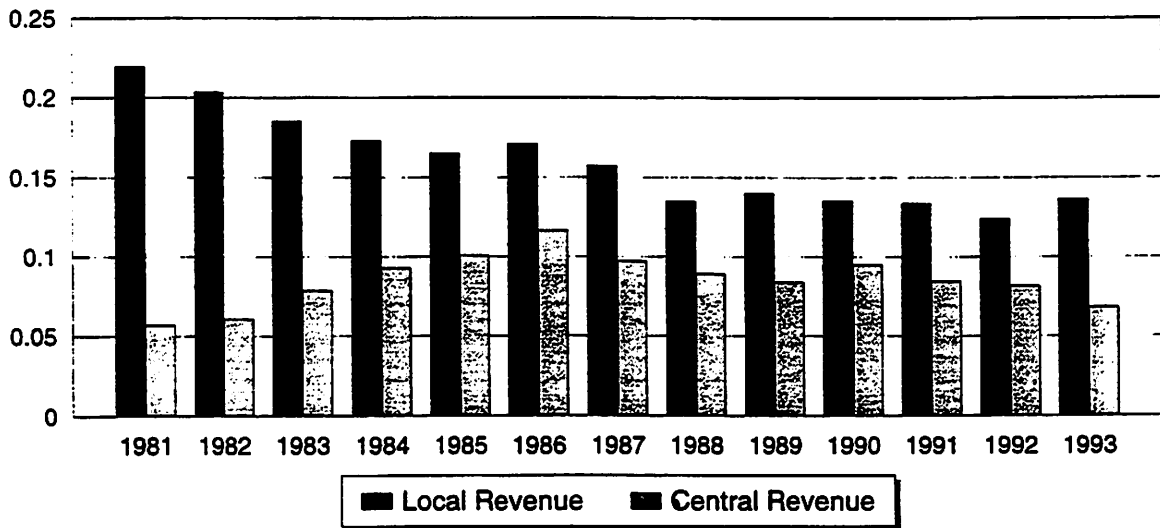


Figure 2.2: Budgetary Revenue as Share of National Income



nationwide tax bureaucracy.²² In sum, under the plan, and even during the reform period, most revenue was collected by local governments, designated as "local" or "central", and then transferred from local coffers to central coffers and vice-versa. The obfuscation inherent in the bilateral transfers of this system should not blind one, however, to the crucial fact that it was local governments, and not the central government, that had the long standing fiscal ties with enterprises throughout the economy.

A third, and important, legacy of the pre-reform era was the duplication of industries across provinces and the active involvement of provincial and local authorities in economic planning. Enjoying, at one time or another, hostile relations with its neighbours in almost every direction, the People's Republic sought to develop duplicate sets of industries in each region and province, so as to be better able to sustain economic activity in the event of a foreign invasion. This policy extended beyond the duplication of key military industries to a general programme of promoting local self-sufficiency in most areas of industrial and agricultural production. Pressed by the complexity of directing the growing number of small local enterprises, and probably dislocated by the political events of the time, the central planning apparatus during the Cultural Revolution increasingly relinquished control of detailed planning to provincial authorities,

²²Wong (1991a). In 1989 China's State Tax Administration had a total staff of 450 persons in Beijing and another 150 persons nationwide. The remaining half a million tax collection officials were appointed by local governments (FEER, "Fiscal feudalism", 6 April 1989). In 1994 separate central tax bureaus were established, with some fanfare, in the various provinces (see, for examples, *Shaanxi Ribao*, 19 August, 1994, p. 1; *Xinhua Ribao* (Nanjing) 27 July, 1994, p. 1; *Hunan Ribao*, 16 August 1994, p. 1; *China Daily* 25 Sep. - 1 Oct, 1994, p. 2; and *Heilongjiang Ribao*, 18 Sept, 1994, p. 1, as reported and translated in Foreign Broadcasting Information Service, hereafter FBIS). Early foreign press reports, however, indicated that these new bureaus possessed "two name plates but one staff," i.e. were still part of the local bureaucracy (FEER, "The Grip Slips", May 11, 1995).

focusing, instead, on managing the interprovincial transfer of key materials and products.²³ With material supplies only ensured when one actually produced them oneself, and with the central regime actively encouraging and funding the local development of industries, each province, country, city and locality tried to develop its own duplicate set of industries.²⁴ As first noted by Wong (1988), the annual growth of the output of rural industry in the 1971-1978 period (27%) actually equals that sustained during the early part of the reform era (1978-1986).²⁵ In sum, as a result of a programme aimed at industrial duplication, combined with the gradual dissolution of central control over planning, the early 1970s witnessed the growing presence and power of provincial and local authorities in the management and development of industrial activity.

With this background in mind, I now turn to a review of developments during the reform period. One of the earliest reform initiatives of the central government was to push, beginning in 1980, for the separation of central and local budgets (*fenzao chifan* - eating in different kitchens). By establishing revenue contracts between the central and local authorities, this policy aimed to

²³ See the articles by Riskin (1991), Naughton (1991) and Wong (1985, 1987, and 1991b). The above description sounds more coherent than the system actually was. For example, almost all enterprises were decentralized to local control but, when their management proved too complex for provincial authorities, put under the planning of central ministries (while remaining locally "controlled" enterprises). At the same time, the staff of the central planning agencies (material supply, statistics, etc.) was liquidated, falling to a total of 610 employees in 1970. In the words of no less an expert than Perkins (1988): "By some mechanism, inputs and outputs and their allocation between enterprises were coordinated in a way that avoided the chaos of the Great Leap Forward, and this coordination was in no sense achieved through a revived market mechanism...It is not clear just who in the bureaucracy did much of the planning and control of enterprises, but planning and control through the bureaucracy did take place."

²⁴ Wong (1985) recounts how in Huangshi city (Hubei) there were four iron and steel mills: one setup by and beholden to the central government, one established by the provincial authorities to meet their needs, one setup (near the other two mills) by the municipal government to meet its requirements, and one established by the suburban county, which, needing only 3000 tons of pig iron a year, could not get its requirements satisfied by allocations from other producers.

²⁵ And, that, during a period of much lower inflation. Updating Wong's figures, the annual (geometric) growth of the gross output value of township and village enterprises between 1978 and 1994 was 32% (CSY 1995, table 11-30).

make local governments responsible for any imbalances in their net of contract budget, thereby improving the efficiency of both revenue collection and fiscal expenditure.²⁶ On net, this policy seems to have been quite successful. As shown in figure 2.1 above, by the mid-1980s the correlation between the ratio of revenues designated as "local" vs. "central" (albeit, almost all collected by local authorities) and the ratio of local vs. central expenditure had become fairly tight. Bilateral transfers continued, but these were, on net and in the aggregate, offsetting. In 1992 the central government transferred 55.8 billion yuan to local governments and received 59.7 billion yuan in return, while in 1993 central to local transfers amounted to 60.0 billion yuan, with 54.5 billion returned.²⁷

²⁶ This policy, like most during the reform period, was implemented differently in different regions and went through various permutations and reincarnations. Some provinces remitted a lump sum tax, others remitted a proportion of total revenue, while, in still other cases, revenue sources were divided between central, local, shared and "adjustment" (subject to yet another formula for sharing). Wong (1992) provides an excellent review.

²⁷ Of course, in 1994, when the revision of the financial system redesignated much of local revenues as central, substantial net central to local transfers appeared. To genuinely establish a weakening of the bonds between central and local finance, one needs to get beyond aggregate data to evidence on the value of bilateral transfers by province. If the correlation between net transfers and provincial expenditure weakened over time (allowing for a year by year "constant term" representing the nominal designation of revenue as either "local" or "central"), this would constitute evidence of a hardening of local budget constraints. I am currently trying to compile a consistent series on provincial finance. This is not particularly easy, however, given differences in central and local accounting procedures and changes over time in the definition of what constitutes revenue and expenditure.

As indicated in figure 2.1, during the 1980s the ratio of local to central expenditures increased substantially, principally because central expenditure items such as national defence were cut, while (predominantly) local expenditure on social services, education and other matters of local administration rose rapidly. Wong (1991a) interprets evidence of this type as indicating that, relative to the central government, local governments faced increasing financial pressures during the reform period. The more standard interpretation (e.g. Shirk 1993) is that, despite the redesignation of some profitable revenues as "central" during the early parts of the reform, the creation of contracts and reduction of substantial local to central transfers (recall the high ratio of nominally local to central revenue of the 1970s) benefitted local governments. In other words, the rise in local to central expenditures might reflect pressures induced by (a) an asymmetry in demands for public services (placing pressure on local governments) or (b) an asymmetry in the supply of revenue (placing pressure on the central government, while allowing local authorities to comfortably provide additional services to their constituents). The evidence appears to be in favour of the more standard interpretation. In 1992 and 1993 net central government borrowing amounted to 18% and 23%, respectively, of total expenditure (inclusive of transfers and debt and interest repayment; exclusive of debt and interest repayment, the percentages were 22% and

Along with its campaign to induce provincial fiscal responsibility, during the reform period the central government moved to harden state enterprise budget constraints. Beginning in 1979, the historical system of full remission of enterprise surpluses (and central coverage of losses) was replaced with contracts specifying the division of profits between the government and enterprises, with incentives for exceeding historical values. Unfortunately, each enterprise, in each locality, operated under unique historical circumstances. Some enterprises had unusually large or small capital stocks, others produced goods where profits were high or low because of distortions in state prices, whereas still others were engaged in the difficult production of goods in unusual locations (as mandated by the pre-reform policy of industrial diversification). Consequently, contracts had to be negotiated on an enterprise by enterprise basis, with opportunities for renegotiation and renege (by both sides). The *li gai shui* (tax-for-profit) system, introduced in 1982-1985,²⁸ sought to remedy this problem, introducing a complex set of interlocking and compensating tax rates, varying by product, assets, etc., designed to compensate for all of the pre and post-plan distortions, limiting, in the process, the need for enterprise by enterprise bargaining. The *li gai shui* initiative met strong opposition and by 1986 was abandoned in favour of a return to enterprise by enterprise contracting, which persists to this day.

The contracting system fundamentally shifted power from the centre to local authorities, who, with their historical tax and administrative ties with enterprises and detailed knowledge of

27%, respectively). In those years, net local borrowing amounted to 1% and -.1% (a surplus) of expenditure. Of course, the 1994 revision of the financial system, which raised local to central expenditure, lowered local to central revenue and led to the reemergence of large intergovernmental transfers, completely confuses the picture. Figures cited above are drawn from China (Public) Finance Yearbook (*Zhongguo Caizheng Nianjian*) 1993 (pp. 591-596) and 1994 (pp. 349-354).

²⁸ During any given period, different tax systems, and all their many permutations, coexisted side by side, with different enterprises using different systems. Consequently, one cannot really associate any particular period with any particular tax system or policy. The best one can do is identify the period in which a policy was actively promoted and its use expanded. This observation applies to all other dimensions of government policy as well.

local circumstances, were best positioned to negotiate and monitor contracts for themselves and the central government. Furthermore, local governments could also control input prices and costs, minimizing reported "profits" (which might have to be shared with the centre), while still maximizing the surpluses available for local coffers.²⁹ While local governments could draw revenue from enterprises, their broader interest centred around the financial well-being of state enterprises as these traditionally provided housing and a wide variety of social services (e.g. health, retirement, disability, burial, recreation, etc) to their workers. In sum, in attempting to harden enterprise budget constraints, the central government merely transferred enterprise control, and the responsibility for sustaining enterprise well-being, down to the local level.³⁰

The factors enumerated above (alone), virtually guaranteed that economic reform during the 1980s and 1990s would lead to the development of locally enforced interregional barriers to trade. Under the plan production was excessively diversified, as regions developed whole sets of industries in areas in which they had no particular comparative advantage. Conflicts between regions were minimized, however, as interregional trade, to the degree it was allowed to occur, took place through state organs. As the planned requisition of output at fixed prices declined and firms were allowed to sell their production at market prices, the development of free market sales networks inevitably threatened the existing division of production. During the Cultural Revolution, under the policy of *gaojin gaochu* (high-in high-out), regions which produced products in a

²⁹Under the pre-reform system, in which local governments could count on central subsidies, there was less of an incentive to engage in accounting transfers of this type. Nevertheless, when local governments wanted to fund expenditures not directly sanctioned in the budget, they manipulated enterprise profits to find the necessary funds (for some examples, concerning the funding of rural industry, see Wong 1991b).

³⁰For a history of reforms in enterprise taxation and how they enlarged local power, see Naughton (1985) and Wong (1987, 1992). *FEER*, "The Grip Slips" (May 11, 1995) provides a recent review of the degree to which central government control over finance has devolved into the hands of local authorities. Byrd and Tydrick (1992) provide a detailed case study of how one enterprise, a clock and watch factory, manipulated centrally mandated rules on taxation, loans, pricing, etc. with the support of local officials, thereby maintaining an (effectively) soft budget constraint.

costly manner were allowed to maintain their own, higher, prices (Wong 1987). Such price differentials, easily maintained when the state controlled the interregional movement of goods, were threatened by the development of free enterprise marketing. Local governments, faced with increasingly hard budget constraints and drawing most of their revenue from industry, were bound to use administrative measures to protect financially and socially³¹ important industrial enterprises.

The existing "contradictions" in the movement to market were, unfortunately, exacerbated by further central government initiatives. Beginning in 1977, the introduction of the household responsibility system in agriculture (de-collectivization) and the decline in central procurement of capital equipment and agricultural and industrial raw materials freed labour, capital and material resources for use by rural enterprises. While rural industry had developed rapidly during the Cultural Revolution, it was generally restricted to sectors, such as agricultural machinery repair and farm tools, with relatively small margins. These restrictions were now removed. Further, the central government actively encouraged the development of rural industry by instructing the Agricultural Bank of China to provide low-interest loans, requiring that half of state budgetary allocations to communes be used for rural enterprise development, and instructing central and local authorities to incorporate the supply of rural enterprises into their plans. Most importantly, three year tax holidays were granted to particular industries (e.g. cement plants) and to all enterprises which might have some initial difficulty in paying taxes, which, in practice, ended up granting exemption, on all income and turnover taxes, to all new enterprises.³² With turnover/indirect taxes as high as 66% in some sectors, tax exemptions were crucial, allowing

³¹ In the case of large state enterprises, but not so much so in the case of collective industry.

³² As with all Chinese policies, there were zigs and zags. In 1981-1982 rural entry into some sectors was restricted and some rural enterprises were forcibly shut down. By 1984, however, these policies had been reversed in favour of further bank lending and the removal of most restrictions on entry.

rural enterprises, even inefficient rural enterprises, to capture the rents implicit in the margins enjoyed by firms in the urban processing centres. While rural output of low margin traditional products such as farm tools stagnated, production of high margin industrial goods such as liquors, cigarettes and fans expanded at a blinding rate. Local authorities naturally supported this shifting of rents, undertaken mostly by collective organizations which, in the absence of a well developed private capital market, were best equipped to engage in industrial arbitrage. While tax exemptions denied the central government any share of the captured rents, informal local levies could determine their distribution between the collective organizations and local government coffers. In 1984 contributions for local social expenditure and other levies amounted to 44% of the nationwide after-tax profits of rural enterprises.³³

The growth of rural industry as the arbitrager of artificial price wedges inevitably led to the development of interregional trade barriers. Regions moving downstream into the processing of agricultural raw materials diverted raw material shipments, at low planned prices, to their own factories. With the introduction of two-tier (above quota) pricing and the decline of central requisitioning, secondary markets developed, with prices reflecting true scarcities, and raw material producers tried to bypass local procurement and privately market their output. Since their financial interests were linked to processing, and not raw material production, local governments moved to prevent these sales, using trade barriers to turn themselves into monopsony buyers of raw materials.³⁴ In the area of finished goods, such as light industrial consumer goods, the

³³The information in the above paragraph is drawn from Wong (1988).

³⁴Hence, the genesis of the "jute war", the "cotton war", the "tea war" and the "silkworm cocoon war." In the Chinese press, coverage of the battles to control resources, the diversion of planned allocations to local industry, the interpretation of local motivations as an attempt to capture the rents implicit in price wedges, and the role the hardening of local budget constraints played in spurring official intervention can be found in: *Jingjixue Zhubao*, 30 April 1989, p. 1; *Zhongguo Tongxun She* broadcast, 355 GMT 11 Aug. 1989; *Jingji Ribao* (Beijing) 11 Nov. 1989, p. 2; *Jingji Guanli* (Beijing) No. 12, Dec. 1989, pp. 18-21; *Renmin Ribao* 11 June 1990, p. 6; *Jingji Cankao* (Beijing) 4 June 1990 p. 1, 27 April 1990 p. 1, 24 June 1990 p. 1, 20 July 1990 p.1; and *China Daily* (Beijing, Business Weekly) 10 Dec. 1990, p. 4, all as reported and translated by FBIS. For this draft of the paper, I have focused on citations for the 1989-1991 period.

decline of planned procurement and the creation of private marketing channels allowed the older, frequently more efficient producers, to lower their prices in competition with rural industry. Local governments, with their financial interests now tied to the production of high margin goods, in which there was (reportedly) growing overcapacity, found it expedient to create barriers to trade so as to maintain local price wedges. Barriers against imports of goods appeared at the provincial, county and city levels.³⁵ While the central regime railed, in a number of

I have also found (but not yet organized) numerous additional Chinese articles from the early 1980s and mid-1990s on the issues discussed above (and further below). The citations will be provided in a later draft.

³⁵ Aside from tariff barriers (i.e. special charges levied at road blocks), non-tariff methods such as physical barriers, outright prohibition, low interest loans and other financial benefits for commercial establishments marketing local goods and fines for commercial establishments marketing non-local goods, restrictions on price differences between local and non-local goods sold in commercial establishments, local purchasing quotas, and administrative trivia (e.g. medical, sanitation, epidemic prevention, product quality, measurement and other such licences and certificates) were all used to hamper trade in textiles, automobiles and trucks, perfumes, beverages, plastics, matches, household electrical appliances, electrical machinery, bicycles, pens, alcohol, washing powders and soaps, tires, tractors, engines, processed foods, and food flavourings, among other products. The legal system was also subverted, with local enterprises encouraged not to pay non-local bills, the judicial system ignoring non-local pleas, frequent rulings and fines issued against non-local producers, and punishment of judges whenever they ruled in favour of non-local firms. For a coverage of the trade barriers and how they appeared at various levels of local government throughout the country, reference to the growing overcapacity of a number of industries brought about by excessive duplication, and interpretation of the interventions of local governments as stemming from their financial relations with industrial enterprises, see *Liaowang* (Beijing) No. 45, 6 Nov. 1989, pp. 18-20; *Wen Wei Po* (Hong Kong) 24 Jan. 1991, p. 6; Hangzhou-Zhejiang Provincial Broadcast Service 1000 GMT 21 Dec. 1990; *Guangming Ribao* 3 Nov. 1990, p. 3; *Tangtai* (Hong Kong) No. 41, 8 Sep. 1990, pp. 13-14; *Jingji Ribao* (Beijing) 14 July 1990, p. 2; *Renmin Ribao* 30 July 1990 p. 2, 5 June 1990 p. 5; *Jingji Cankao* (Beijing) 24 June 1990 p. 1, 4 June 1990 p. 1; *Ta Kung Pao* (Hong Kong) 22 June 1990, p. 2; *China Daily* (Beijing) 9 June 1990, p. 1; *Xinhua Domestic Service* 0815 GMT 8 May 1990, 1031 GMT 10 April 1990; *Ching Chi Tao Pao* (Hong Kong) No. 9, 5 March 1990, pp. 8-9; *Zhongguo Tongxun She* (Hong Kong) 0909 GMT 11 Feb. 1990; Harbin Heilongjiang Provincial Service 2100 GMT 31 May 1990, and *Qunyan* (Beijing) No. 2, 7 Feb. 1991, pp. 22-23 as reported and translated by FBIS. On the use of the legal system, see *Tangtai* (Hong Kong) No. 41, 8 Sep. 1990, pp. 13-14; *Renmin Ribao* 10 Dec. 1991, p. 5; Shanghai City Service 2300 GMT 5 Dec. 1990; and *Jingji Cankao* (Beijing) 1 April 1990, p. 4 as reported and translated by FBIS. For a recent foreign press article on overcapacity in textiles and diversion of raw material supplies to less efficient firms, see FEER, "Protection Has a Price" (29 August 1996).

circulars,³⁶ against interprovincial trade wars, it inadvertently encouraged them.³⁷ With each round of price liberalization, the central government reduced the number of centrally mandated price controls, while, at the same time, explicitly allowing, or acquiescing to, the local maintenance of price controls.³⁸ In a market economy, however, large interregional differentials in the prices of traded goods can only be maintained with trade barriers. A World Bank study, under

³⁶ Chen (1994, p. 33-36) reports circulars and directives against interregional trade barriers being issued by the State Council, Party Congress, People's Congress, etc. in 1980, 1981, 1982, 1984, 1985, 1987, 1988, 1989, and 1990. The FBIS translates *Xinhua* Domestic Service (Beijing) broadcasts on 0601 GMT 22 Nov. 1990 and 2149 GMT 13 Nov. 1991 reporting on two different State Council circulars.

³⁷ In some instances, the central regime consciously supported the creation of non-tariff trade barriers. For example, Shirk (1985) reports how, at the request of the Anhui provincial government, the State Economic Commission required that a Shanghai exhibit in Anhui only present products that were not identical to those produced locally. Similarly, in 1988 the central government temporarily banned all (unapproved) interprovincial purchases of rice (Hong Kong Standard, 31 Dec. 1988, p. 6 as reported in FBIS).

³⁸ The nationwide decontrol of grain prices in 1992-1993 provides a wonderful example of policies working at cross purposes. While the price of grain was supposed to move to market levels, government pronouncements, at both the national and local level, stressed the importance of provinces, prefectures and even localities keeping adequate grain reserves so as to manage the price of grain in their jurisdiction. Similarly, localities were urged to improve "price inspection" (for what purpose?) and to switch from mandatory grain procurement "quotas" to voluntary purchase "contracts", which would ensure that prices did not rise too high or fall too low. One wonders how any of this could be accomplished without barriers to trade. See *Liaowang* Overseas Edition (Chinese, Beijing), No. 51, 21 Dec. 1992, p. 2; *Xinhua* Domestic Service, 0734 GMT 2 April 1993, 2102 GMT 22 April 1993; Jiangsu People's Radio Network, 1015 GMT 23 March 1993; and *Zhongguo Xinwen She* (in English) 0844 GMT 3 Oct. 1992.

Explicit reference to the rights of local authorities (even below the provincial level) to set their own prices is made in *Xinhua* (in English), 1435 GMT 2 Sep. 1989; *Zhongguo Xinwen She* 0915 GMT 4 Sep. 1993; *Jingji Ribao* (Beijing) 8 June 1990, p. 3; and *Xinhua* Domestic Service, 0830 GMT 24 Feb. 1993. General reports on provincial price controls and subsidies are given in Changsha Hunan Provincial Service, 2300 GMT 24 Jan 1990; *Renmin Ribao* 6 Oct. 1990, pp. 1 & 4; *Xinhua* (in English), 1103 GMT 30 Dec. 1988, 1507 GMT 20 Jan. 1990, 1039 GMT 2 Nov. 1992, 0755 GMT 14 Nov. 1992, 0946 GMT 30 Nov. 1992; Shanghai City Service, 0900 GMT 13 Sep. 1989; Hefei Anhui Provincial Service, 1100 GMT 30 Dec. 1988; *Nanfang Ribao* (Guangzhou), 19 March 1991, p. 1; Jinan Shandong People's Radio Network (Mandarin), 2300 GMT 9 Jan. 1993; China Daily (Business Weekly), 10 Jan. 1993, p. 3; and Jiangsu People's Radio Network, 2300 GMT 23 July 1993. The FEER ("The power of the purse," 18 June 1987) reports that central attempts to free (and rationalize) the prices faced by industrial enterprises were often undermined by localities and government departments, which simply imposed new controls. All Chinese press articles as reported and translated in FBIS.

the direction of Kumar (1994), found that the interregional variation in the prices of consumer goods actually *increased* during the late 1980s.

The opportunities for arbitrage and tax evasion implicit in the central government's preferential policies toward Special Economic Zones served to further fragment China's industrial economy. As noted in the introduction, the opportunity to retain full use of their foreign exchange and import raw materials and capital goods free of duty allowed the SEZs, particularly Shenzhen, to function as entrepot and assembly centres, collecting the rents on scarce foreign exchange and arbitrating discrepancies between the relative price of raw materials and final goods on the domestic and international markets. On the one hand, the arbitrage performed by the SEZs expanded interregional trade and, even without full trade liberalization, pushed relative domestic prices toward international levels. On the other hand, it led to the creation of trade barriers as local governments in other regions found it expedient to prevent the outward movement of goods to the SEZs (which robbed them of control over foreign exchange),³⁹ protect against the movement of SEZ goods into their economy (which threatened the margins of collective and state industry),⁴⁰ and lobby the central government for the privilege of creating

³⁹ Many of the firms and individuals operating in Shenzhen were representatives of enterprises whose home office was located in other provinces (FEER, "Into the red zone", 19 September 1985). Nevertheless, other provinces, as in the case of Hunan and Guangxi mentioned in the introduction, did restrict their trade with Guangdong province and lobby for their own SEZ. Presumably, local governments could extract a greater share of the rents when arbitrage activity was moved to their locality, both because they would be better able to monitor their enterprises and because the rents would not have to be shared with the rentiers of Guangdong and Shenzhen.

⁴⁰ References to specific embargos against Guangdong products, aside from those already noted in the introduction, appear in China Daily 4 April 1989, p. 4 and *Zhongguo Tongxun She* 0909 GMT 11 Feb. 1990, as reported and translated in FBIS.

their own special zones.⁴¹

Since the origins of much of the interprovincial trade conflict lay in distortions introduced by the central government, the gradual elimination of centralized control over the economy during the late 1980s and early 1990s ironically lessened the divisive pressures in the economy. Bit by bit, the central government released control over the prices of most materials and goods, giving up the defence of artificial price wedges. As central procurement diminished, producers no longer faced a conflict between delivering materials at state plan prices, diverting them to free markets, or processing them themselves. In response to criticism and competition from other regions, the special privileges enjoyed by the SEZs were somewhat diminished and, more importantly, extended to other regions of the economy. The four original economic zones (Shenzhen, Shantou, Xiamen and Zhuhai) were joined by a fifth (Hainan) in 1985 and then by the 14 "open cities", with somewhat lesser privileges, in 1988. In the early 1990s the government began to sanction the opening of dozens of technology development and foreign investment zones, a move it came to regret as thousands of localities independently established such zones.⁴²

⁴¹ The benefits of being a special zone actually went beyond the power of arbitrage and foreign exchange retention, including items such as tax breaks and an allowance for freer foreign banking activities. Perhaps most valuable, at least in the case of the four original economic zones, as well as Hainan and Shanghai's Pudong zone, was the billions of yuan the central government poured into infrastructure development. See *FEER*, "Into the red zone" (19 September 1985), "An idea whose time has gone" (20 March 1986), "Waiting for Taiwan" (1 October 1987), "Models in a muddle" (1 October 1987), "No plan for an island" (26 May or 2 June 1988), and "The east is ready" (31 May 1990).

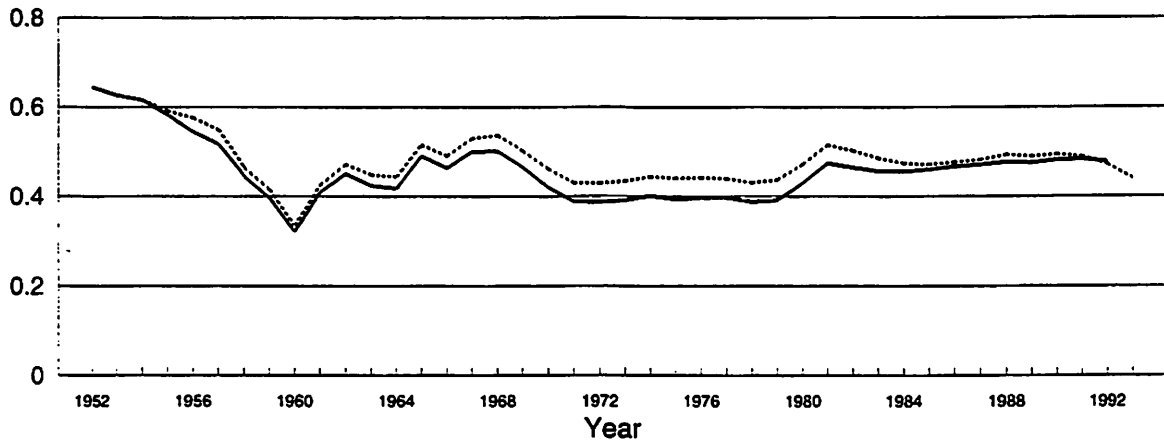
⁴² According to press reports, by the end of 1992 there were 1951 development zones, of which only 37 had State Council approval and 176 had provincial approval (counties and even townships and villages were establishing their own zones). By October 1993, the number of zones at the county level and above was estimated to be about 8700. In direct violation of central mandates, these zones granted tax concessions, to both foreign *and* domestic investors. While some articles reported that central government housecleaning had eliminated 1000 of 1200 unauthorized coastal zones in 1993 (leaving 200 with implicit authorization), others suggested that many zones had changed their names, but continued in operation. See Kumar (1994), as well as *Liaowang Overseas Edition* (Chinese), No. 51, 21 Dec. 1992, pp. 16-17; *Jingji Guanli* No. 4, 5 April 1993, p. 11-14; *China Business Daily*, 7-13 Feb. 1993, p. 1; *Xinhua Domestic Service*, 0822 GMT 11 Aug. 1993; and *Wen Wei Po* (Hong Kong), 27 May 1993, p. 2, as reported and translated in *FBIS*.

While the rights and privileges enjoyed by the zones varied from location to location, their enormous proliferation must have led to a substantial decline in the shadow value of foreign exchange and tariff reduction rights.

Once centrally mandated distortions disappeared, what force, one might ask, would serve to prevent local governments from reverting to free market principles? With the opportunities for arbitrage gone, why don't local governments allow their economies to revert to comparative advantage? The answer to this question is two fold. To begin, one can argue that all controls are not gone and that the central government continues to create opportunities for arbitrage and conflict. A more satisfying answer, however, is as old as the history of protectionism itself. Local governments now find their financial and political interests embedded in a particular industrial structure. In raw material producing areas, local governments can use export barriers to convert themselves into monopsony buyers and maintain the price distortions of the pre-reform era. Elsewhere, import barriers, while impoverishing the local economy as a whole, can induce artificially high returns in particular industrial sectors (just as in the import substitution industries of so many other countries). Finally, when all else fails, and trade barriers cannot be fruitfully enforced, there always exists the central banking system which can be repeatedly pressured into extending additional credit to enterprises, providing local revenue and employment at the expense of national inflation.

Figure 2.3 below presents data on the historical share of light industry in total industrial output. While the share of light industry fluctuated substantially under the plan and rose rapidly, as part of a centrally directed emphasis, during 1980-1981, it is striking how little the share of this sector has changed during the reform period. This stasis in industrial structure is confirmed in table 2.2, which presents the distribution of employment and output across 40 industrial sec-

Figure 2.3: Share of Light Industry in Total Industrial Output



..... Current Prices — Constant 1952 Prices

tors for independent accounting enterprises at the township level and above.⁴³ Despite the presumed movement to market and competition from rural industry, at the township level and above the share of each industrial sector in output and employment is virtually the same as it was prior to the reforms.⁴⁴ The lack of industrial change is further confirmed by aggregate data on the movement of goods by national railways and state operated shipping corporations (table 2.3) which indicate fairly small changes in the share of total tonne-kilometres accounted for by differ-

⁴³ These enterprises accounted for 91% and 75% of the gross value of industrial output in 1980 and 1992, respectively. Total employment in these firms rose 47% between 1980 and 1992, increasing their share of total employment in excavation, manufacturing and utilities from 75% to 78% (CSY 1995, table 4-3). Clearly, the lack of transformation indicated in the table is not due to stagnation in the output and employment of these firms. In general, it is surprising how well state firms (which account for most of the employment of the enterprises in table 2.2) have been able to maintain their share of total employment. Between 1985 and 1994 the total number of industrial staff & workers employed in cities and towns rose 17%, while industrial staff & workers in state firms located in cities and towns rose 14% (CSY, 1994 & 1995, table 12-2). Given the low, and declining, profitability of state firms (FEER, "Trials by fire," 12 September 1996), these data constitute strong evidence against the proposition that these firms face hard budget constraints.

⁴⁴ In Young (1992, table 4) I computed average rates of structural transformation in manufacturing employment (broken down into nine sectors) for 38 economies during the 1967-1986 period. To control for measurement error, I broke the data set down into four non-overlapping 5 year periods, computing the average share of manufacturing employment accounted for by each sector in each of the 5 year periods. As my measure of structural change, I took the sum of the absolute values of the changes in sectoral shares between each of the four consecutive time periods. I then reported the average of the three periods of structural change (the table mistakenly reports that the data are the sum of three periods of structural change, they are not). For a rough comparison with the Chinese data, I first combine the manufacturing sectors listed in table 2.2. above into 9 aggregate sectors (counting from the top, sectors 10-13, 14-16, 17-18, 19-22, 24-28, 29-31, 32-34, 35-38, and 39-40 - the remaining sectors do not apply to manufacturing as it is usually defined in other economies) and compute the average employment share of each sector in the three periods 1980, 1984-1987, and 1988-1992 (the choice of time periods is driven by the availability of data). The average sum of share shifts across these three periods is .075 (.10 between 1980 and 1984-1987 and .05 between 1984-1987 and 1988-1992). In my 38 country sample, the average rate of change was .095. China's rate of transformation would place her 18th from the bottom of the 38 country sample. I should note that the surprisingly slow rate of transformation in the structure of industrial production, employment and, even, investment during the reform period is well known and is commented upon in a number of papers. For an example, see Singh (1992).

ent products.⁴⁵ One is driven to conclude that either (a) the structure of production under the plan was exactly "right" or (b) forces are intervening to prevent transformation. I would argue the latter. By placing local governments on hard budget constraints at the very beginning of the reform process, the central government inadvertently induced local authorities to internalize all of the historical distortions of the plan, leading them to take up the reins of planning as fast as the central government released them.⁴⁶

⁴⁵ Together these enterprises accounted for 83% and 79% of total tonne-kilometres of transport in 1984 and 1994, respectively. It is interesting to note that there was far more change in the composition of the cargo carried individually by railways and waterways, than there was in the sum total of cargo carried by the two means of transport put together. Thus, while the way goods were shipped changed somewhat, the total quantity-distance of different types of goods shipped did not. I should note that data on tonnes shipped (as opposed to tonne-kilometres) show slightly larger changes in the structure of freight. Data on tonnes shipped are more easily distorted by the way in which freight is measured (if a tonne is unloaded and then reloaded, it becomes two tonnes of freight transport) and, hence, I do not report them.

⁴⁶ Put differently, allowing anybody to earn income by arbitraging the distortions in a plan ensures that they will internalize (i.e. come to support) those distortions. The local governments, however, were the best equipped to engage in arbitrage and the best equipped to defend their interests as the system evolved.

Table 2.2: Distribution of the Output and Employment of Township and Above Independent Accounting Enterprises across 40 Industrial Sectors

	Output		Employment	
	1980	1992	1980	1992
Coal mining and dressing	0.029	0.022	0.086	0.076
Petroleum and natural gas extraction	0.026	0.022	0.008	0.009
Ferrous metals mining and dressing	0.002	0.002	0.005	0.004
Non-ferrous mining and dressing	0.005	0.005	0.010	0.009
Mining and dressing of building materials and other non-metal minerals	0.004	0.005	0.013	0.012
Salt mining	0.004	0.002	0.004	0.003
Other mining and dressing	0.000	0.000	0.000	0.000
Transport and logging of timber and bamboo	0.008	0.004	0.020	0.014
Production and supply of running water	0.002	0.003	0.003	0.004
Food manufacture	0.084	0.060	0.043	0.045
Beverage manufacture	0.014	0.021	0.011	0.017
Tobacco processing	0.018	0.023	0.003	0.004
Forage manufacture	0.000	0.007	0.000	0.003
Textile industry	0.149	0.105	0.095	0.117
Sewing industry	0.023	0.025	0.027	0.031
Leather, furs and manufactured goods	0.011	0.012	0.012	0.014
Timber processing, bamboo, cane, palm fibre and straw products	0.007	0.006	0.011	0.011
Furniture manufacture	0.005	0.004	0.012	0.007
Paper-making and paperboard industry	0.019	0.018	0.019	0.022
Printing industry	0.010	0.009	0.014	0.013
Cultural, educational and sports articles	0.005	0.005	0.005	0.007
Arts and crafts	0.008	0.010	0.013	0.017
Power generation, steam and hot water production and supply	0.041	0.037	0.019	0.023
Petroleum industry	0.036	0.032	0.005	0.007
Coking, gas and coal related products	0.003	0.003	0.002	0.004
Chemical industry	0.075	0.069	0.055	0.057
Medical and pharmaceutical products	0.015	0.021	0.009	0.012
Chemical fibre industry	0.007	0.013	0.004	0.006
Rubber manufactured goods	0.019	0.014	0.011	0.012
Plastic manufactured goods	0.014	0.020	0.016	0.019
Building materials and other non-metal mineral products	0.043	0.051	0.091	0.090
Smelting and pressing of ferrous metals	0.067	0.075	0.044	0.043
Smelting and pressing of non-ferrous metals	0.026	0.026	0.012	0.013
Metal products	0.027	0.029	0.043	0.036
Machine building industry	0.099	0.096	0.156	0.125
Transport equipment	0.037	0.056	0.048	0.042
Electrical equipment and machinery	0.032	0.045	0.034	0.036
Electronic and telecommunications equipment	0.016	0.033	0.022	0.022
Instruments, meters and other measuring apparatus	0.009	0.007	0.013	0.010
Other industry	0.002	0.004	0.005	0.005

Note: The 1980 data are drawn from that year's Industrial Census. The sectoral definitions used that year are not completely consistent with those used in 1992.

Source: China Industrial Economics Statistics Yearbook 1993.

**Table 2.3: Distribution of Tonne-kilometres
of Freight Traffic by Category of Cargo**

	Railways [*]		Waterway [#]		Total	
	1984	1994	1984	1994	1984	1994
Coal & Coke	0.333	0.308	0.107	0.182	0.233	0.243
Petroleum	0.043	0.041	0.130	0.103	0.081	0.073
Steel & Iron	0.079	0.078	0.096	0.085	0.086	0.082
Metal Ores	0.029	0.038	0.121	0.126	0.070	0.084
Nonmetal Ores	0.043	0.043	0.048	0.053	0.045	0.048
Mineral Building Materials	0.058	0.046	0.015	0.006	0.039	0.025
Cement	0.016	0.019	0.006	0.007	0.011	0.013
Timber	0.079	0.044	0.007	0.008	0.048	0.025
Chemical Fertilizers & Pesticides	0.027	0.029	0.090	0.049	0.055	0.039
Grain	0.039	0.080	0.185	0.153	0.104	0.118
Salt	0.009	0.006	0.003	0.002	0.007	0.004
Other	0.243	0.268	0.193	0.225	0.221	0.246

Note: (*) National railroads only. (#) Enterprises under the Ministry of Communications.

Sources: CSY 1986 (pp. 390 & 398) and 1995 (tables 14-17 & 14-29).

III Data

While anecdotes about interregional trade wars and complex descriptions of the precise pattern of arbitrage opportunities created by central policies make for interesting reading, in the context of China's economy, where policy switches back and forth, where contradictory policies coexist side-by-side as they are announced, modified and then finally implemented or implemented, modified and then finally announced, and where, to confound everything, almost every policy is "adjusted" to suit local circumstances, these cannot be compelling. For every anecdote on interregional conflict, one can bring out five on growing interregional cooperation, and, of course, vice versa. For every example of the distorted objectives and motivations of local governments, one can trot out five examples of beneficial local intervention, helping entrepreneurial collective enterprises use their innate skills and resources to develop efficient and competitive industrial enterprises.⁴⁷ In this section of the paper I move beyond anecdotes and stories to the analysis of aggregate data, looking for evidence of the appearance during the reform era of new distortions in the economy. I focus on the interregional diversity of production.⁴⁸ My intent is to show that the structure of production during the so-called "movement to market" has evolved in a manner completely out of keeping with one's priors of what such a movement would entail.

I begin my statistical analysis by examining interregional convergence in the structure of national income. Figure 3.1 below presents the sum of the deviations of the share of national income accounted for by five economic sectors in each of 28 provinces from the share of the

⁴⁷ Citations in a later draft. In particular, there are many examples of different provinces and cities sending trade delegations to each other. Of course, one could interpret these as constituting further evidence of how deep barriers to trade are, i.e. so much so that cities and provinces have to literally engage in trade liberalization talks. The interpretation of each story is in the eye of the beholder.

⁴⁸ As noted earlier, an appendix, available upon request from the author, provides corroborating evidence on the value of interregional trade.

corresponding sector in total national output.⁴⁹ As the figure shows, between 1976 and 1992 the sum of absolute deviations fell some 31%, from 9.1 to 6.3. If one weights the deviations by the share of each province in total output (i.e. by the size of the province), convergence is even more dramatic, with the sum of weighted deviations falling by 40%, from 9.4 to 5.6.⁵⁰ I bring to the reader's attention the fact that the convergence process appears to have reached a steady state

⁴⁹ Specifically, the absolute deviation equals:

$$\sum_i \sum_j |S_{ij} - \bar{S}_j|$$

where S_{ij} denotes the share of sector j in province i 's output and \bar{S}_j denotes the share of sector j in national output, while the "weighted" deviation equals:

$$\sum_i \sum_j W_i * |S_{ij} - \bar{S}_j|$$

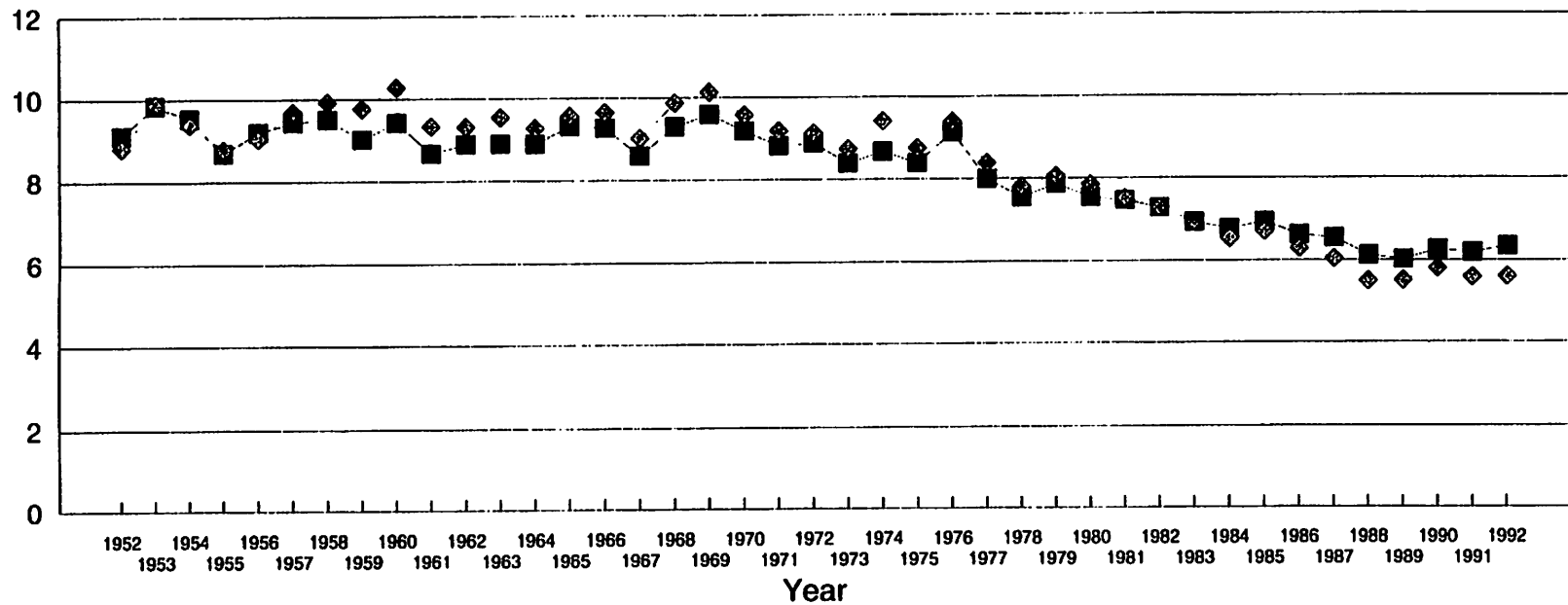
where W_i denotes the share of province i in national output. The five sectors are agriculture, industry, construction, transport and commerce. China is divided administratively into 30 provinces and provincial level cities and autonomous territories. I exclude Tibet and Hainan, however, because data on these two provinces does not extend back before 1979. Together these two provinces accounted for only 0.7% of national income in 1992 (CSY 1994, tables 2-11 & 2-15). I take as my measure of "national" output the sum of the output of the remaining 28 provinces. While the figures present the results using current price national income, I have also computed the same measures using provincial income in constant 1952 prices. The results are very similar.

I use the Chinese measure of national income, rather than GDP, because a longer and more comprehensive time series is available on the former. Chinese "national income" follows socialist economic precepts, excluding any measurement of the output of "non-material sectors" such as passenger transport, finance, insurance, government administration, and social and personal services (Hsueh, Li, & Liu 1993). Until only very recently, China's measures of GDP growth followed the growth of national income quite closely (even in sectors such as transport & commerce), suggesting that these were largely based upon the older, and more established, data collection system used in the estimation of national income.

The data used in this analysis were drawn from A Compilation of Historical Statistical Material for the Provinces, Autonomous Territories and Directly Administered Cities 1949-1989 (hereafter, Historical Statistics), from Hsueh, Li and Liu (1993), and from annual issues of the CSY.

⁵⁰ While 1978 is usually taken as the starting date for the reforms, as noted by Perkins (1988), significant reforms in material incentives and trade policy were already taking place in 1977. Since 1976 marks the beginning of a downward trend, I use it in the presentation above. Obviously, even if one takes 1978 as the starting point, there is still significant convergence in the structure of production.

Figure 3.1: Convergence in the Structure of National Income
 (28 Provinces - Five sectors - Current Prices)



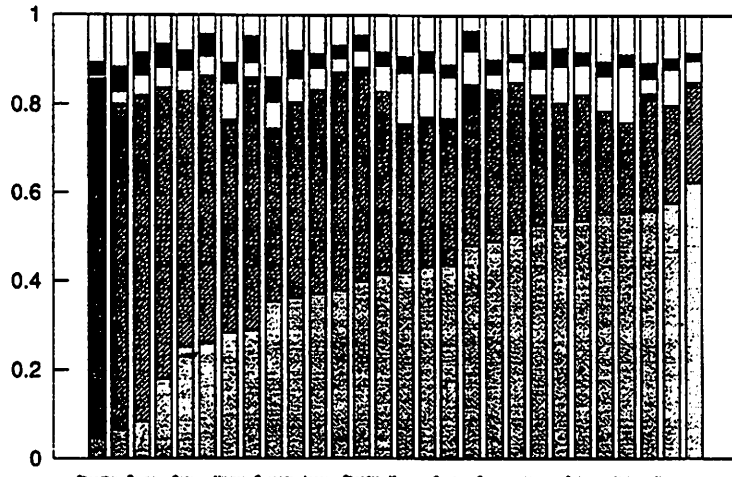
■ Absolute Deviation ◆ Weighted Deviation

around 1988, after which the interprovincial variation in structure remains roughly constant. This pattern is repeated in other measures and will be discussed, and interpreted, in the conclusion of this paper.

Figures 3.2 and 3.3 show the share of each sector in total provincial output, providing a more immediate visual illustration of the convergence in the structure of production during the reform period. In figure 3.2 the provinces are ordered according to the share of agriculture in total production in 1976, with the province with the smallest share (Shanghai) on the far left. Figure 3.3 maintains the same provincial ordering, but shows the sectoral shares in 1992. It is readily apparent that provinces that had little industry in 1976 vastly increased the share of that sector at the expense of agriculture, while some provinces with low initial agricultural shares actually slightly increased the share of that sector in total production. Although these sectors have the largest output shares, and hence are most easily examined visually, the convergence pattern was not one of industry vs. agriculture alone. If one excludes agriculture, the sum of deviations still falls by 38% between 1976 and 1992, while if one excludes both agriculture and industry, the sum of deviations (of the shares of the three remaining sectors in their combined output) falls by 31% during this period.

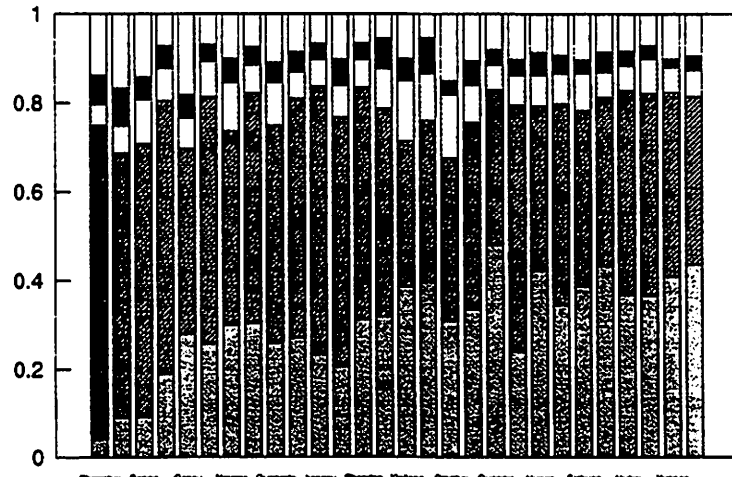
One might argue that the convergence in structure chronicled in figure 3.1 is simply a manifestation of convergence in income levels: as income levels in the poorer provinces have caught up with those of their richer compatriots, their production structure has, similarly, come to approximate that of their wealthier neighbours. While this effect is present in the People's Republic, it does not explain the patterns observed in figure 3.1. To begin, figure 3.4 below shows that the change in a province's deviation from the average structure was not significantly correlated with its growth rate during the post-1976 period. Along similar lines, figure 3.5 shows that initial income was not significantly correlated with subsequent convergence to the national

Figure 3.2: Structure of National Income (1976)



Agriculture
 Industry
 Construction
 Transport
 Commerce

Figure 3.3: Structure of National Income (1992)



Agriculture
 Industry
 Construction
 Transport
 Commerce

Figure 3.4: Growth & Convergence in Structure
(Average Rates, 1976-1992)

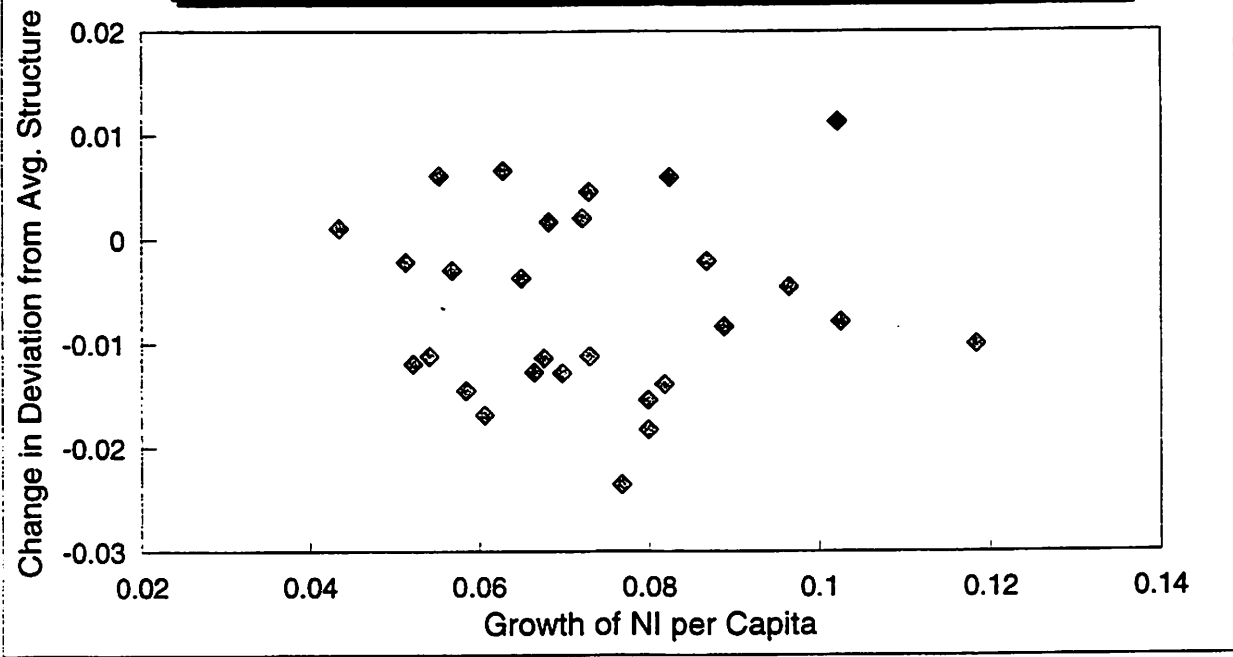
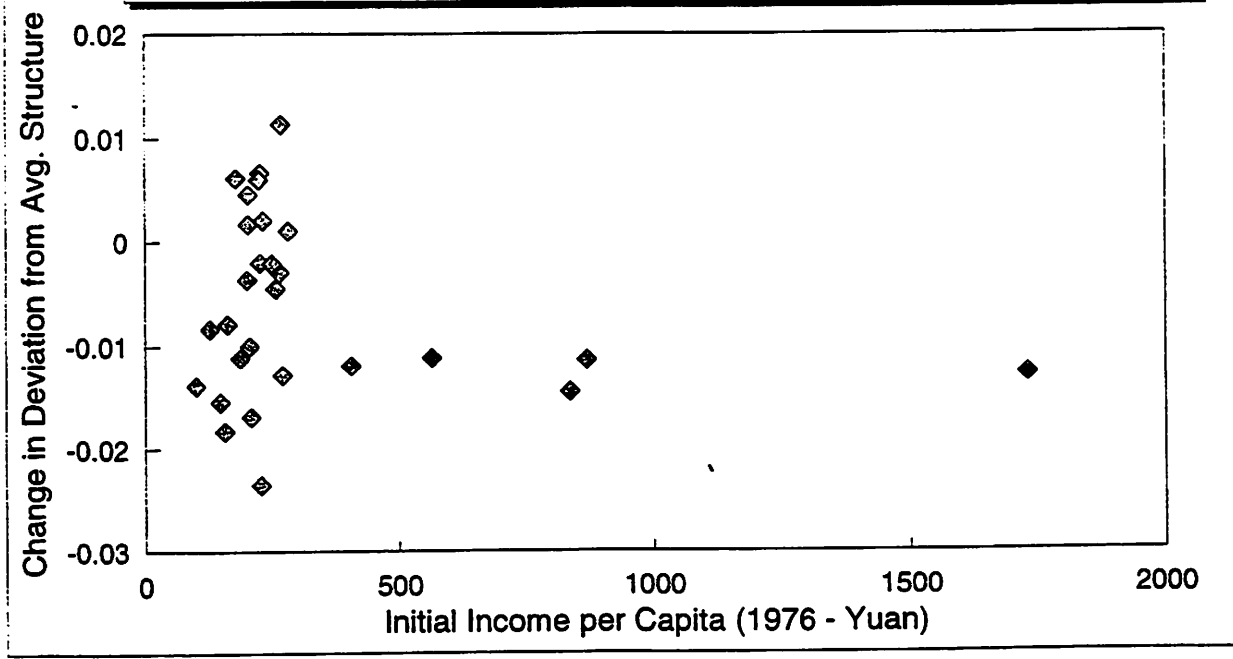


Figure 3.5: Initial Income & Convergence in Structure
(Average Rates, 1976-1992)



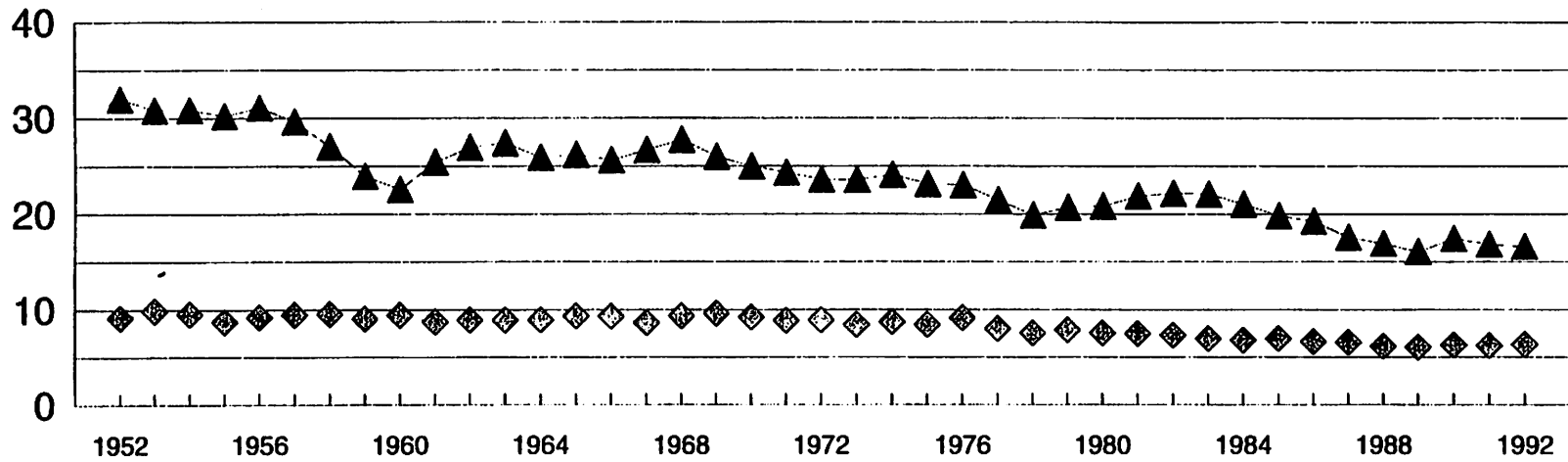
average.⁵¹ If one is thinking of convergence in structure as being driven by catchup in income levels, it is natural to take the richest economy as one's benchmark. In the case of China's provinces, this role is played by Shanghai, which has always had the highest level of income per capita. Figure 3.6 plots the sum of the absolute deviations of the other provinces from the structure of production of Shanghai. As the figure shows, convergence to Shanghai has been an ongoing process throughout the post-war period, i.e. unlike convergence to the average structure it does not simply begin with the reform period. Figure 3.7 shows that convergence to Shanghai is indeed part of the catchup process, the faster an economy grew, the more its structure converged to that of Shanghai. Finally, figure 3.8 shows that convergence to the average national structure is not significantly correlated with convergence to Shanghai.⁵² These figures suggest that the convergence in structure initially shown in figure 3.1 above is not the outcome of a convergence in levels of income, but is instead a separately identifiable process of interprovincial duplication of the structure of output.⁵³

⁵¹ A regression of the change in the deviation from the national average on the growth of NI per capita (figure 3.4) yields a t-statistic of .28. A regression of the change in the deviation from the national average on initial income (figure 3.5) yields a t-statistic of -1.2.

⁵² A regression of the change in the deviation from Shanghai on the growth rate yields a t-statistic of -4.1 (figure 3.7). A regression of the change in the deviation from the national average on the change in the deviation from Shanghai yields a t-statistic of 1.55, which is not significant at the 10% level with 25 degrees of freedom (figure 3.8). Using annual data for the entire 1952-1992 period, I find that the change in the deviation from the national average is significantly related to the change in the deviation from Shanghai (t-stat. = 11.3). However, while the change in the deviation from Shanghai is significantly related to the growth rate (t-stat. = -11.9), the change in the deviation from the national average remains uncorrelated with growth rates (t-stat. = -.6).

⁵³ Jian, Sachs and Warner (1996) find evidence of convergence in levels of income (i.e. poorer provinces tended to grow faster) during the reform period using retail price indices to deflate provincial output. In contrast, Makino (1996) shows that the growth of provincial income deflated by the individual provincial output deflators is uncorrelated with initial levels of income. She finds, however, that the growth of provincial output deflated by common national output deflators is correlated with the initial level of income. Thus, convergence in income levels during the reform period appears to be purely a terms of trade effect, specifically, the rise in the relative price of goods produced in poorer provinces (Thus, Jian, Sachs and Warner find that putting the initial share of agriculture on the right-hand side eliminates their convergence effect). With regards to this paper, I compute the growth rates shown in the figures above using the indi-

Figure 3.6: Sum of Absolute Deviations in Structure
(National Income, 5 sectors, Current Prices)



▲ Deviation from Shanghai

◆ Deviation from National Average

Figure 3.7: Growth & Convergence to Shanghai
(Average Rates, 1976-1992)

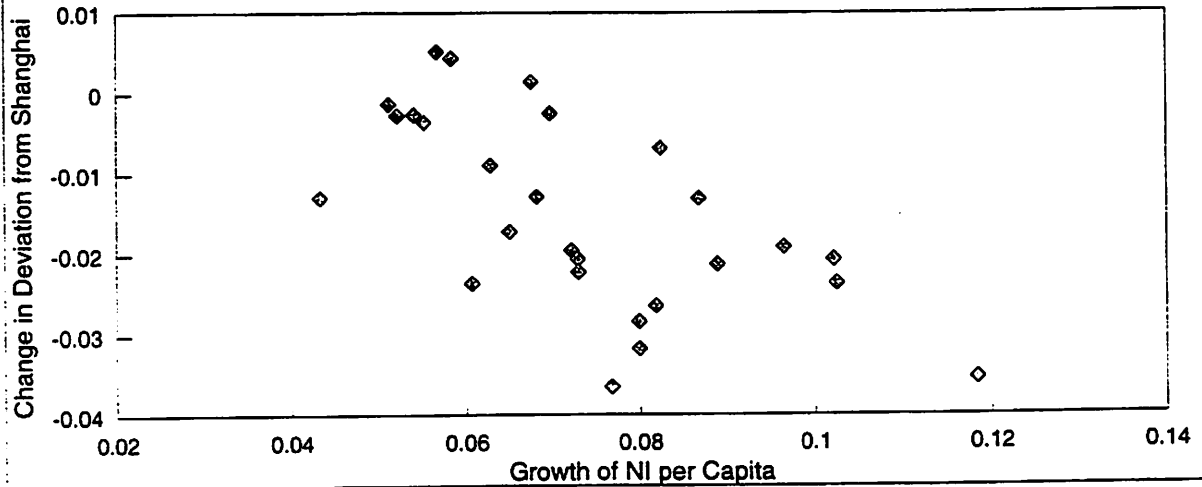
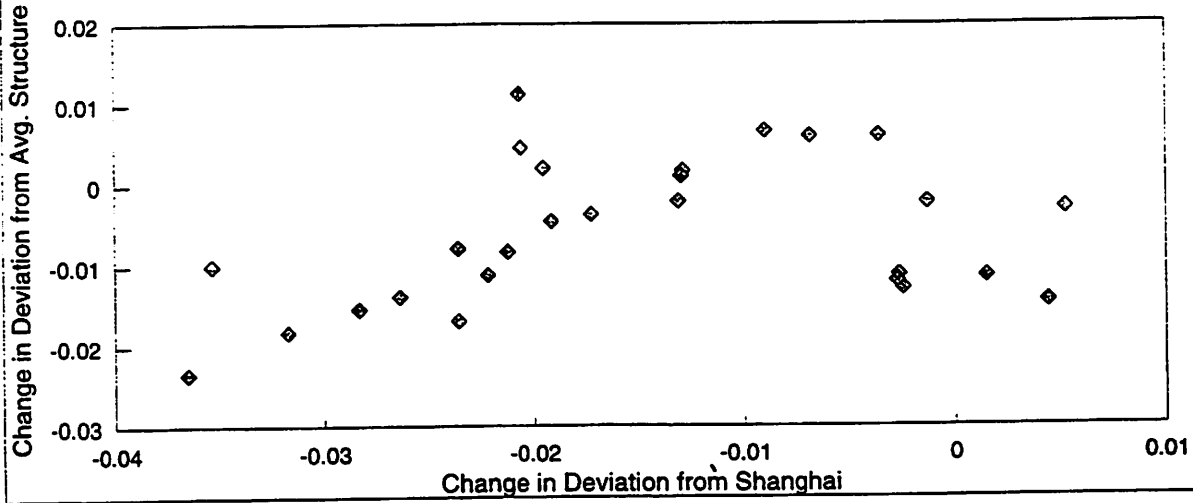


Figure 3.8: Convergence to Shanghai & Convergence to the Average
(Average Rates, 1976-1992)



A simple variance decomposition provides further insight into the factors driving convergence in the structure of national income across the various provinces of the People's Republic. Consider the variation in the log of the ratio of the output of agricultural to non-agricultural output. This variation can naturally be decomposed into the variance of relative productivities, the variance of relative labour allocations, and the covariance between the two, i.e.:

$$\begin{aligned} \text{Var}\left[\ln\left(\frac{Q_A}{Q_{NA}}\right)\right] &= \text{Var}\left[\ln\left(\frac{Q_A/L_A}{Q_{NA}/L_{NA}}\right) + \ln\left(\frac{L_A}{L_{NA}}\right)\right] \\ &= \text{Var}\left[\ln\left(\frac{Q_A/L_A}{Q_{NA}/L_{NA}}\right)\right] + \text{Var}\left[\ln\left(\frac{L_A}{L_{NA}}\right)\right] + 2 \text{Cov}\left[\ln\left(\frac{Q_A/L_A}{Q_{NA}/L_{NA}}\right), \ln\left(\frac{L_A}{L_{NA}}\right)\right] \end{aligned}$$

where Q_i and L_i denote output and employment in industry i , respectively. Table 3.1 below performs this decomposition for 1985 and 1992.⁵⁴ As the table shows, between 1985 and 1992 the

vidual provincial output deflators. I have double-checked, however, and the results (including the convergence to Shanghai and its association with growth rates) are much the same using the national output deflators (by product). Until recently, Chinese practice was to report output growth indices in 1952 prices and I follow this practice in computing the provincial growth rates shown in the figures above. Since this procedure is sensitive to the price weights of the base year, I recomputed the provincial growth rates as the annual chain weighted sum of the growth of each industry, i.e. a log growth divisia index with weights equal to the average (across each two year period) of each industry's share of total national income. The results, again, are basically unchanged.

⁵⁴ Of China's 30 provinces, I exclude Tibet from the analysis, because its statistics indicate negative national income in some sectors, which makes computation of some of the log ratios used in table 3.1 problematic. Since Hainan's output prior to 1988 (when it became a separate province) is included under Guangdong, I add its output to that of Guangdong in 1992 and perform the comparison across the remaining 28 provincial units.

I should note some of the differences between the variance of the log ratio of output listed in table 3.1 and the measures of structural convergence illustrated in figure 3.1. First, of course, variances relate to squared deviations while my measure of structural convergence uses linear deviations. Second, in computing measures of structural convergence I use the deviation from the national share, while variances are computed using the average of the provincial shares. Since the average of the provincial shares tends to be driven by the shares of the numerous small provinces, I believe that the national share is more reflective of the structure of the national economy as a whole and is better used in measuring convergence to a common structure. In essence, in taking the deviation from the national share I am taking the deviation from the *weighted* average of the provincial shares. I should note, however, that I have done some spot checks and found that both the convergence and variance results are approximately the same whether one uses national shares or the average of provincial shares. When measuring the sum of absolute deviations I use the national share, whereas when presenting standard measures, such as variances and coefficients of variation, I follow the standard procedure of computing the deviations

variance of the log ratio of agricultural to non-agricultural output across 28 provinces fell from .57 to .46. This decline was not due to convergence in relative productivities or relative labour allocations, both of which actually showed increasing dispersion.⁵⁵ The fall in output dispersion was in fact entirely due to a decline in the covariance between relative productivities and relative labour allocations. In the case of the production of tradeable goods across small open economies, one would expect to find a positive covariance between relative productivities and relative factor allocations.⁵⁶ With barriers to trade, or in the case of non-traded goods generally, this covariance, now dominated by the effects of income elasticities, might turn negative. As noted earlier in section II, historically, for reasons of national security, the central planners of the People's Republic tried to make the various provinces and regions of the economy as autarkic and economically independent as possible. Thus, it is not surprising to find a negative correlation between relative productivities and relative labour allocations in 1985. What is surprising, however, is that this correlation becomes more negative during the reform period.⁵⁷ The bottom half of table 3.1 performs the same variance decomposition for a binary comparison of each of the

around the average of the provincial shares.

⁵⁵The growth of output per worker in agriculture actually shows significant divergence, the higher the initial level of productivity in agriculture the faster the subsequent growth of output per worker. The growth of output per worker in non-agricultural sectors was negatively, but insignificantly, related to initial productivity levels.

⁵⁶This conclusion does not depend upon the assumption of a Ricardian production structure. As shown by Ford (1967) and Falvey (1981), even in a multifactor world comparative advantage and labour productivities are positively correlated, provided the elasticity of substitution does not covary (too much) with the factor intensity of industries.

⁵⁷Despite the fact that the relative structure of the provinces, as measured by broad shares of national income, was not converging prior to 1976, the programme of economic self-sufficiency might still have led to a deterioration of the covariance between productivities and factor allocations. For example, while keeping the relative shares of each sector in provincial output constant (i.e. not converging), it still could have been the case that provinces that experienced a productivity increase in a sector would have the labour allocation to that sector reduced. I am in the process of collecting the data necessary to perform the variance decomposition in earlier time periods, so as to allow for a more illuminating time series comparison.

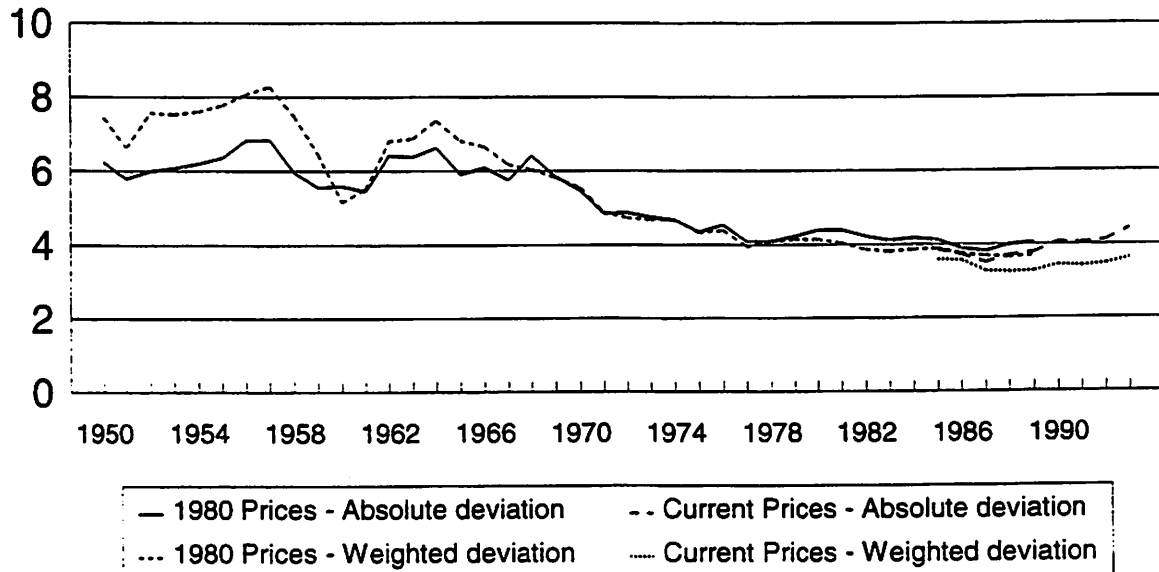
Table 3.1: Analysis of Variance											
28 Provinces - Agriculture vs. Non-Agriculture											
		Variance						2*Covariance			
		$\ln\left(\frac{Q_A}{Q_{NA}}\right)$		$\ln\left(\frac{Q_A/L_A}{Q_{NA}/L_{NA}}\right)$		$\ln\left(\frac{L_A}{L_{NA}}\right)$		$\ln\left(\frac{Q_A/L_A}{Q_{NA}/L_{NA}}\right), \ln\left(\frac{L_A}{L_{NA}}\right)$			
1985		.57		.09		.67		-.18			
1992		.46		.11		.77		-.43			
Covariance of relative productivities and relative labour allocations											
		Agriculture		Industry		Construction		Transport		Commerce	
		1985	1992	1985	1992	1985	1992	1985	1992	1985	1992
Agriculture				-.12	-.27	-.10	-.19	-.03	-.07	-.11	-.22
Industry						+.01	-.04	-.03	-.07	-.02	-.03
Construction								-.01	-.03	-.03	-.06
Transport										-.04	-.06
Commerce											

five sectors delineated in national income statistics. As the table shows, regardless of which two sectors one chooses to compare, one finds that during the reform period the covariance between relative productivities and relative factor allocations deteriorated. It is this deterioration in covariances that drives the convergence in the structure of national income.

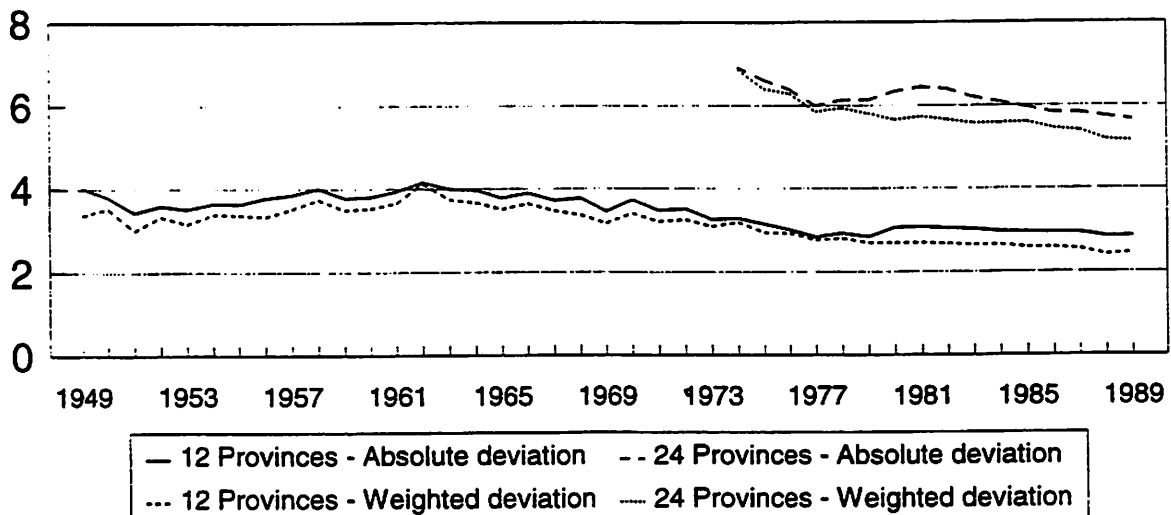
Figures 3.9 and 3.10 below illustrate post-war patterns of convergence within the manufacturing sector. Figure 3.9 shows the variation across 25 provinces in the shares of light and heavy industry.⁵⁸ The impact of the historical policy of industrial duplication is clearly seen in figure 3.9, which shows the tremendous convergence in the industrial structure, differentiated between light and heavy industry, of the various provinces between the early 1950s and the late 1970s.

⁵⁸ The current price data in figure 3.9 is drawn from the CSY, while the remaining data in the two figures comes from Historical Statistics. Figure 3.9 covers all provinces except Inner Mongolia, Guangdong, Hainan, Guizhou and Tibet.

**Figure 3.9: Variation in Industrial Structure
(Light vs. Heavy Industry - 25 Provinces)**



**Figure 3.10: Variation in Industrial Structure
(5 industrial categories - Constant 1980 Prices)**



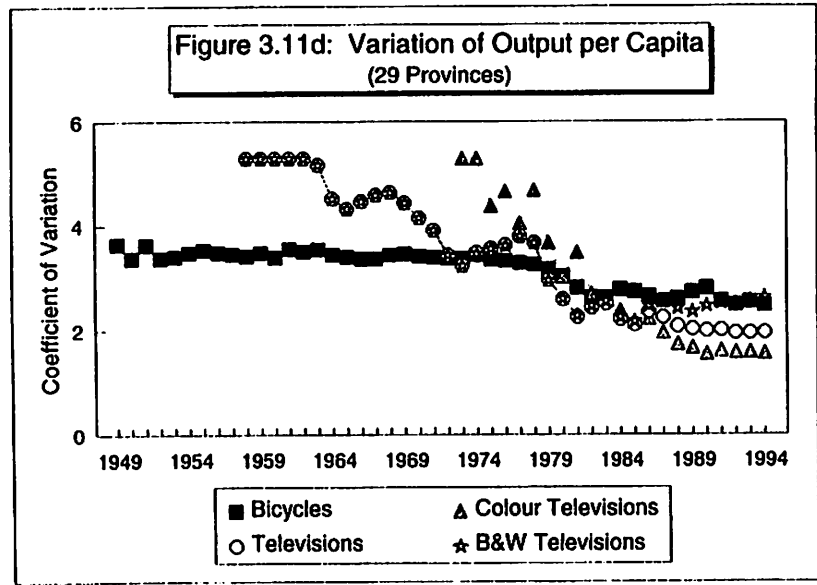
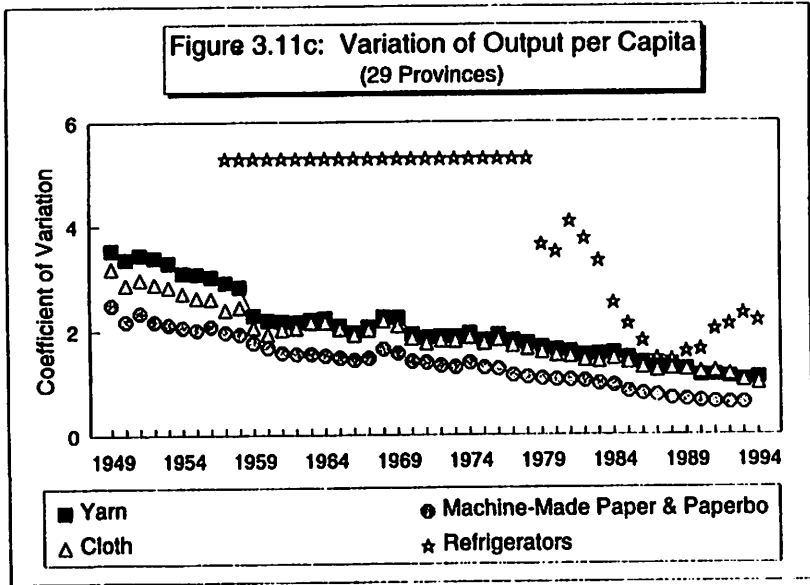
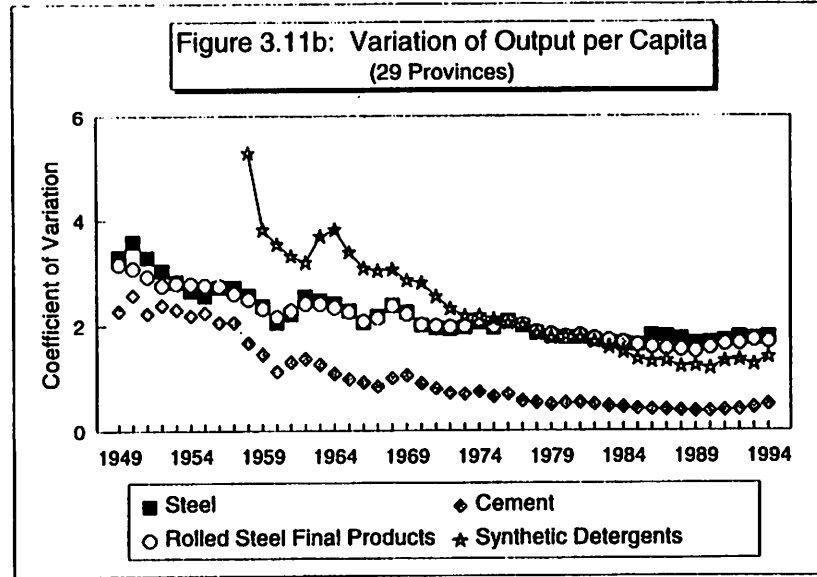
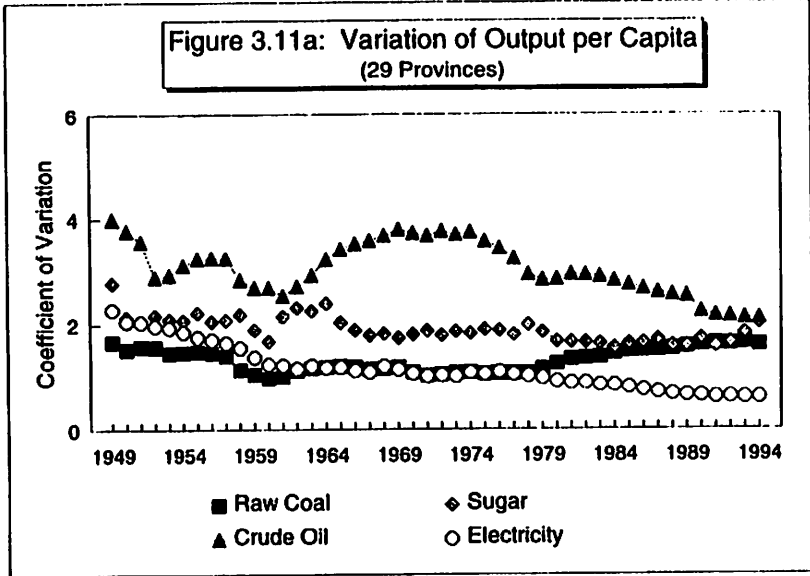
12 provinces = Tianjin, Hebei, Shanxi, Jilin, Heilongjiang, Shanghai, Jiangsu, Zhejiang, Hubei, Hunan, Sichuan, & Xinjiang.
 24 provinces = All but Inner Mongolia, Guangdong, Hainan, Yunnan, Tibet & Qinghai.

During the reform period there is no discernible trend, with variation across provinces falling slightly during the 1980s, but rising back up during during the early 1990s. Figure 3.10 shows the variation in industrial structure divided into five industrial categories: light industries using agricultural raw materials, light industries using non-agricultural raw materials, excavation heavy industries, raw material heavy industries, and value added heavy industries. Once again, there appears to have been substantial convergence in the pre-reform period, followed by weaker convergence during the 1980s. Unfortunately, I have not been able to extend this series into the early 1990s.⁵⁹

Figure 3.11 below takes the analysis to a more detailed level, presenting historical data on the variation across China's 29 provinces of the output per capita of major industrial products.⁶⁰ As the figure clearly shows, in the decades preceeding the reforms there was widespread convergence in industrial structure. Running each product's coefficient of variation during the

⁵⁹ In an appendix, available upon request from the author, I estimate the degree of convergence in the structure of manufacturing output divided into 36 or 40 sectors. I find slight convergence in the structure of industrial production during the early 1980s, followed by an offsetting divergence in the late 1980s and early 1990s, i.e. results similar to those shown in figures 3.9 and 3.10. These estimates, as well as all of the constant price series depicted in figures 3.9 and 3.10, are derived using data on the output of independent accounting enterprises at the township level and above (only). Thus, these data exclude the fastest growing sector of the economy, e.g. rural industry. Accounting for 91% of gross manufacturing output in 1980, the share of independent accounting enterprises at the township level and above had fallen to 75% by 1992. I should note, however, that the current price series in figure 3.9 cover the entire manufacturing sector and that these parallel the results drawn from independent accounting enterprises alone, showing a slight tendency toward divergence during the early 1990s.

⁶⁰ The outputs are measured in natural units, i.e. kilowatt hours for electricity, metres for cloth, units for refrigerators, bicycles, and televisions, and tonnes for the remaining products. Hainan did not become a separate province until 1988. Hence, the variation across only 29 provinces. For post-1988 data I include Hainan production under Guangdong. With 29 provinces, the coefficient of variation attains a maximum at 5.3 (the square root of 28) when only one province produces the product.



1949-1978 period on a linear time trend, I find that 12 of the 15 products⁶¹ show a statistically significant negative coefficient.⁶² The remaining three products (crude oil, refrigerators and, in the last 6 years of the 1949-1978 time period, colour televisions) show no statistically significant trend, although their coefficient of variation does fall during the sample period. Despite the tremendous strides toward industrial duplication made under the plan, convergence continued during the transition to "market". During the 1978-1989 period, 13 of the 15 products evince statistically significant negative time trends, while only 1 (raw coal) shows a significantly positive trend. As in the earlier figures, the post-1989 period appears to have witnessed a weakening of the forces towards convergence, with the number of products showing significantly negative time trends (6) only slightly exceeding the number showing positive trends (5). Over the reform period as a whole, i.e. 1978-1994, convergence is overwhelmingly dominant, with 11 products showing significantly negative time trends and only 1 product (again, raw coal) displaying a significantly positive trend.

Table 3.2 below expands the sample to include every single industrial product for which I have been able to collect data for at least three years. There are 152 such industrial products in total, including the 15 that were presented earlier above.⁶³ Running time trends through the

⁶¹ The 16th product, televisions, is, of course, the sum of colour and black & white televisions. It is shown simply for reference. In this figure, and the table below, I push for maximum disaggregation, dividing individual products into separate subcategories wherever the data will allow.

⁶² Significant at the 10% level in a two-tailed test.

⁶³ These data are drawn from the CSY and the China Industrial Economic Statistics Yearbook (*Zhongguo Gongye Jingji Tongji Nianjian*). I tried to collect data on as many products as possible, accepting the Chinese definition of what constitutes an industrial product, i.e. including artwork and sculpture. In a few cases multiple, differentiated, time series are presented on one product (e.g. phosphate rock "produced" vs. "shipped", power generating equipment measured in "kw" vs. "sets"). In these cases I make use of the longest time series available. Some products in the table appear to be repetitive, e.g. raw coal vs. washed coal. I have checked technical dictionaries to ensure that they represent genuinely differentiated output. For example, washed coal (*xijingmei*) is a type of processed coal meeting minimum standards concerning size and ash content.

Table 3.2: Coefficients of Variation across 29 Provinces of the Output per Capita of Major Industrial Products

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Product	Raw Coal*	Washed Coal	Crude Oil*	Natural Gas	Iron Ore (Raw)	Iron Ore (Processed)	Refractory Clay	Sulfured Iron Ore	Phosphate Rock	Crude Salt	Timber	Tap Water (supplied)	Husked Rice
Units	tn.	tn.	tn.	cu.m.	tn.	tn.	tn.	tn.	tn.	tn.	cu.m.	tn.	tn.
1981	1.37	NA	2.63	2.19	NA	NA	NA	NA	NA	2.43	1.73	NA	NA
1982	1.39	NA	2.62	2.12	NA	NA	NA	NA	NA	2.18	1.76	NA	NA
1983	1.41	NA	2.58	2.09	NA	NA	NA	NA	NA	2.16	1.74	NA	NA
1984	1.48	NA	2.53	2.04	NA	NA	NA	NA	NA	2.07	1.56	NA	NA
1985	1.52	NA	2.45	1.98	NA	NA	NA	NA	NA	2.07	1.51	NA	NA
1986	1.54	NA	2.37	1.89	NA	NA	NA	NA	NA	2.00	1.59	NA	NA
1987	1.55	1.34	2.29	1.84	2.00	1.52	1.45	1.41	2.49	2.32	1.65	NA	NA
1988	1.56	1.65	2.26	1.82	2.00	1.51	2.17	1.22	NA	1.93	1.68	1.01	1.05
1989	1.60	1.74	2.23	1.78	1.99	1.54	2.78	1.25	NA	1.87	1.74	1.01	1.13
1990	1.61	1.62	2.24	1.78	1.93	1.47	2.22	1.28	2.54	1.93	1.55	0.98	1.01
1991	1.63	1.60	2.17	1.76	1.92	1.49	2.36	1.30	2.49	2.00	1.42	0.95	1.12
1992	1.62	1.73	2.15	1.74	1.94	1.53	2.56	1.15	2.46	1.77	1.31	0.85	1.02
1993	1.64	2.07	2.12	1.76	1.93	1.53	2.30	1.24	2.35	1.80	1.28	0.98	1.24
1994	1.60	NA	2.11	1.73	NA	NA	NA	NA	NA	1.79	1.35	NA	NA
78-89	Positive		Negative	Negative			Positive		NA	Negative		NA	NA
89-94			Negative	Negative					Negative		Negative		
78-94	Positive	Positive	Negative	Negative	Negative					Negative	Negative		
	(14)	(15)	(16)	(17)	(18)	(19)		(20)	(21)	(22)	(23)	(24)	(25)
Product	Flour	Edible Vegetable Oil	Sweets/Candy	Sugar*	Dairy Products	Canned Foods	Alcoholic Beverages	Beer	Wines & Spirits	Non-Alcohol Beverages	Cigars/Cigarettes	Compound/Mixed Feed	Yam*
Units	tn.	tn.	tn.	tn.	tn.	tn.	tn.	tn.	tn.	tn.	cases	tn.	tn.
1981	NA	NA	NA	1.65	NA	NA	NA	NA	NA	NA	NA	NA	1.59
1982	NA	NA	NA	1.65	NA	1.37	NA	1.39	NA	NA	0.84	NA	1.52
1983	NA	NA	NA	1.62	NA	1.30	NA	1.27	NA	NA	0.86	NA	1.53
1984	NA	NA	NA	1.54	NA	1.29	NA	1.20	NA	NA	0.85	NA	1.56
1985	NA	0.59	NA	1.60	NA	1.22	NA	1.06	NA	NA	0.83	NA	1.46
1986	NA	0.64	NA	1.64	NA	1.13	NA	0.96	NA	NA	0.80	NA	1.37
1987	NA	0.64	NA	1.71	1.31	0.99	0.73	0.90	0.69	1.20	0.82	NA	1.29
1988	1.93	0.65	2.07	1.58	1.44	0.99	0.69	0.85	0.64	1.23	0.83	0.97	1.26
1989	0.75	0.63	1.29	1.59	1.46	0.99	0.70	0.88	0.65	1.22	0.84	1.11	1.24
1990	0.69	0.62	1.26	1.71	1.56	0.96	0.69	0.88	0.64	1.20	0.86	1.09	1.14
1991	0.72	0.65	1.26	1.57	1.60	1.00	0.70	0.90	0.65	1.24	0.87	1.09	1.14
1992	0.70	0.62	1.14	1.64	1.58	1.07	0.74	0.95	0.67	1.28	0.88	1.15	1.12
1993	0.77	1.45	1.12	1.83	1.58	1.09	0.82	1.03	0.78	NA	0.95	3.13	1.06
1994	NA	0.65	NA	2.02	NA	1.25	0.81	1.01	0.65	NA	1.06	NA	1.11
78-89	NA		NA	Negative		Negative		Negative				NA	Negative
89-94			Negative			Positive	Positive	Positive			Positive		Negative
78-94			Negative		Positive	Negative	Positive	Negative			Positive		Negative

Table 3.2 - continued

	(26)	(27)	(28)	(29)	(30)	(31)	(32)		(33)	(34)	(35)	(36)	
Product	Cloth ⁺	Cloth (Chemical Fiber)	Cloth (Natural Fiber)	Knitting Wool	Woolen Piece Goods	Gunnysacks	Silk	Silk Woven Goods	Clothing	Clothing (Leather)	Clothing (Cloth)	Cloth Shoes	Tanned Leather
Units	m.	m.	m.	tn.	m.	units	tn.	m.	tn.	tn.		pairs	cowhide equivalents
1981	1.52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1982	1.44	NA	NA	1.73	2.09	1.03	NA	2.01	NA	NA	NA	NA	NA
1983	1.42	NA	NA	1.72	1.90	0.97	NA	1.93	NA	NA	NA	NA	NA
1984	1.47	NA	NA	1.69	1.77	1.04	NA	1.85	NA	NA	NA	NA	NA
1985	1.40	NA	NA	1.66	1.62	1.06	2.17	NA	NA	NA	NA	NA	NA
1986	1.30	1.63	1.12	1.57	1.54	1.02	2.16	NA	NA	NA	NA	NA	NA
1987	1.25	1.59	1.07	1.39	1.48	1.04	2.12	1.81	NA	NA	NA	NA	NA
1988	1.28	1.86	1.27	1.35	1.46	1.11	2.23	1.79	1.57	1.40	1.57	0.98	0.84
1989	1.28	1.78	1.28	1.30	1.48	1.19	2.23	1.77	1.54	1.51	1.54	1.07	0.83
1990	1.21	1.87	1.22	1.32	1.40	1.19	2.21	1.84	1.48	1.70	1.48	1.09	0.81
1991	1.23	1.89	1.19	1.54	1.34	1.19	2.17	2.56	1.48	1.59	1.49	1.10	NA
1992	1.18	1.91	1.13	1.42	1.36	1.23	2.27	2.71	1.45	1.95	1.45	1.18	NA
1993	1.05	1.88	1.01	1.40	1.58	1.08	2.32	2.84	1.58	2.06	1.59	1.42	1.59
1994	0.99	NA	NA	1.52	1.74	1.24	2.77	NA	NA	NA	NA	NA	NA
78-89	Negative			Negative	Negative	Positive		Negative	NA	NA	NA	NA	NA
89-94	Negative		Negative					Positive		Positive			
78-94	Negative	Positive		Negative	Negative	Positive	Positive			Positive		Positive	
	(37)	(38)	(39)	(40)	(41)		(42)	(43)		(44)	(45)	(46)	(47)
Product	Light Leather	Heavy Leather	Leather Shoes	Milled Lumber	Man-Made Boards	Furniture	Furniture (Wooden)	Furniture (Other)	Machine-Made Paper & Boards	Newsprint	Printing Plate Paper	Paper (Other)	Books & Periodicals Printing
Units	sq.m.	tn.	pairs	cu.m.	cu.m.	pieces	pieces	pieces	tn.	tn.	tn.	tn.	reams
1981	NA	NA	NA	NA	NA	NA	NA	NA	1.06	NA	NA	NA	NA
1982	NA	NA	1.37	NA	NA	NA	NA	NA	1.04	NA	NA	NA	NA
1983	NA	NA	1.44	NA	NA	NA	NA	NA	0.99	NA	NA	NA	NA
1984	NA	NA	1.47	NA	NA	NA	NA	NA	0.96	NA	NA	NA	NA
1985	NA	NA	NA	NA	NA	NA	NA	NA	0.84	NA	NA	NA	NA
1986	NA	NA	NA	NA	NA	NA	NA	NA	0.80	NA	NA	NA	NA
1987	NA	NA	NA	NA	NA	NA	NA	NA	0.76	2.41	0.88	0.79	NA
1988	0.90	1.67	1.54	1.26	1.10	NA	NA	NA	0.70	2.50	0.87	0.73	2.64
1989	0.84	1.13	1.44	1.35	1.11	1.07	1.04	1.46	0.68	2.40	0.80	0.71	2.94
1990	0.83	1.17	1.38	1.36	1.11	1.02	0.93	1.49	0.65	2.36	0.96	0.67	1.60
1991	0.82	1.25	1.43	1.36	1.03	1.41	1.71	1.45	0.63	2.31	0.94	0.65	4.21
1992	1.12	1.27	1.67	1.40	0.99	0.93	0.96	1.30	0.62	2.31	0.89	0.64	1.98
1993	1.20	1.02	2.12	1.24	0.96	1.37	1.19	2.03	0.62	2.23	1.03	0.64	2.75
1994	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
78-89	NA	NA		NA	NA	NA	NA	NA	Negative				NA
89-94					Negative				Negative	Negative		Negative	
78-94					Negative				Negative	Negative		Negative	

Table 3.2 - continued

	(48)	(49)	(50)	(51)	(52)	(53)	(54)	(55)		(56)	(57)		(58)
Product	Offset Printing	Fountain Pens	Ballpoint Pens	Sculpture	Metal Artwork	Artwork Woven of Plant Materials	Paintings	Lacquerware	Drawnwork & Embroidery	Embroidery	Drawnwork	Electricity*	Hydropower
Units	colour folio reams	units	units	yuan	yuan.	yuan	yuan	yuan	yuan	yuan	yuan	kwh.	kwh.
1981	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.88	1.20
1982	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.88	1.23
1983	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.84	1.15
1984	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.84	1.17
1985	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.80	1.12
1986	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.75	1.09
1987	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.70	0.99
1988	3.85	3.14	3.55	1.68	3.10	2.08	1.64	2.27	2.24	2.32	2.21	0.67	1.21
1989	1.31	3.42	3.42	2.39	3.85	2.27	1.44	2.72	2.09	2.11	2.14	0.65	1.45
1990	2.64	3.81	3.63	2.09	4.11	2.01	1.30	3.03	2.22	2.09	2.42	0.63	1.58
1991	2.64	3.92	3.80	1.77	3.92	2.09	1.33	2.97	2.00	NA	NA	0.60	1.37
1992	2.82	3.96	3.80	1.76	3.73	2.20	1.34	2.48	1.68	NA	NA	0.61	1.18
1993	2.51	3.69	4.07	NA	NA	NA	NA	NA	NA	NA	NA	0.60	1.35
1994	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.60	1.37
78-89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Negative	
89-94			Positive							NA	NA	Negative	
78-94			Positive									Negative	
	(59)	(60)	(61)	(62)		(63)	(64)	(65)	(66)	(67)	(68)	(69)	
Product	Fossil Fuel Power	Gasoline	Kerosene	Diesel Oil	Coke	Coke (Machine-Made)	Coke (Other)	Coal Gas	Sulfuric Acid	Soda Ash	Caustic Soda	Synthetic Ammonia	Chemical Fertilizer
Units	kwh.	tn.	tn.	tn.	tn.	tn.	tn.	cu.m.	tn.	tn.	tn.	tn.	tn.
1981	1.14	NA	NA	NA	NA	NA	NA	NA	0.85	3.68	1.86	NA	0.44
1982	1.16	1.38	NA	NA	NA	NA	NA	NA	0.83	3.62	1.87	NA	0.42
1983	1.14	NA	NA	NA	NA	NA	NA	NA	0.75	3.58	1.84	NA	0.41
1984	1.12	NA	NA	NA	NA	NA	NA	NA	0.81	3.55	1.82	NA	0.40
1985	1.06	NA	NA	NA	1.27	1.49	1.79	NA	0.91	3.55	1.81	NA	0.41
1986	0.97	NA	NA	NA	1.33	1.53	2.33	NA	0.76	3.47	1.75	NA	0.41
1987	0.92	1.28	NA	NA	1.30	1.46	2.55	NA	0.65	3.34	1.70	0.44	0.39
1988	0.89	1.27	1.75	1.29	1.33	1.43	2.73	2.03	0.64	3.21	1.59	0.45	0.40
1989	0.86	1.29	1.78	1.29	1.42	1.42	3.04	1.98	0.65	3.03	1.54	0.61	0.52
1990	0.83	1.30	1.77	1.27	1.39	1.36	2.96	1.96	0.62	2.79	1.51	0.68	0.61
1991	0.79	1.22	1.73	1.23	1.35	1.37	2.88	2.17	0.58	2.75	1.55	0.73	0.63
1992	0.80	1.16	1.79	1.18	1.45	1.42	3.33	2.10	0.57	2.60	1.50	0.72	0.62
1993	0.79	1.09	1.77	1.13	1.70	1.38	3.93	2.46	0.57	2.36	1.49	0.69	0.60
1994	0.79	NA	NA	NA	2.04	1.38	4.19	NA	0.58	2.20	1.42	NA	0.69
78-89	Negative		NA	NA			Positive	NA	Negative	Negative	Negative		
89-94	Negative	Negative		Negative	Positive		Positive		Negative	Negative	Negative		
78-94	Negative	Negative		Negative	Positive	Negative	Positive		Negative	Negative	Negative	Positive	Positive

Table 3.2 - continued

	(70)	(71)	(72)	(73)	(74)	(75)	(76)	(77)	(78)	(79)	(80)		(81)
Product	Nitrogenous Fertilizer	Phosphate Fertilizer	Potassium Fertilizer	Chemical Pesticides	Ethylene/Vinyl	Plastics	Calcium Carbide	Paint	Dyes	Western (Chemical) Medicine	Chinese Medicine	Chemical Fibres	Chemical Fibres (Synthetic)
Units	tn.	tn.	tn.	tn.	tn.	tn.	tn.	tn.	tn.	tn.	tn.	tn.	tn.
1981	0.47	0.61	4.97	2.39	3.53	2.84	1.08	NA	NA	1.67	NA	2.68	NA
1982	0.46	0.57	5.06	2.40	3.40	2.79	0.93	NA	NA	1.55	NA	2.72	NA
1983	0.44	0.58	5.02	2.03	3.24	2.69	0.88	NA	NA	1.48	NA	2.61	NA
1984	0.44	0.58	5.09	1.82	3.24	2.59	0.89	NA	NA	1.37	NA	2.29	NA
1985	0.43	0.88	5.19	2.09	3.29	2.57	0.87	NA	NA	NA	0.97	2.31	2.39
1986	0.44	0.74	5.15	2.08	3.06	2.46	0.85	NA	NA	NA	1.08	2.25	2.34
1987	0.44	0.69	5.17	2.09	2.78	2.27	0.84	1.25	2.27	1.07	1.12	2.15	2.21
1988	0.45	0.68	5.21	2.00	2.69	2.20	0.87	1.21	2.17	1.10	1.13	2.08	2.14
1989	0.61	0.69	5.24	1.82	2.57	2.16	0.86	1.23	2.22	1.04	1.03	1.98	2.03
1990	0.72	0.74	5.21	1.83	2.48	2.15	0.97	1.16	2.30	1.24	0.97	1.90	1.93
1991	0.77	0.73	5.26	1.82	2.42	1.95	0.98	1.14	2.20	1.01	1.01	1.82	1.85
1992	0.77	0.74	5.12	1.66	2.39	1.97	1.08	1.19	2.28	1.07	1.02	1.81	1.87
1993	0.73	0.71	5.22	1.90	2.36	1.89	1.26	1.37	3.35	2.35	1.16	1.74	1.80
1994	0.74	0.73	5.09	1.96	NA	1.81	1.47	NA	NA	NA	1.06	1.72	1.79
78-89			Positive	Negative	Negative	Negative	Negative			Negative		Negative	Negative
89-94					Negative	Negative	Positive					Negative	Negative
78-94	Positive		Positive	Negative	Negative	Negative	Positive			Negative		Negative	Negative
	(82)	(83)	(84)		(85)	(86)	(87)	(88)	(89)	(90)	(91)	(92)	(93)
Product	Chemical Fibres (Other)	Outer Tyres (Motor Vehicles)	Outer Tyres (Man-powered Vehicles)	Plastic Products	Plastics (Polyvinyl Chloride)	Plastic Products (Other)	Cement	Plate Glass	Sanitary (Bathroom) Ceramics	Bricks	Tiles	Daily Use Ceramic Utensils	Daily Use Glass Products
Units	tn.	units	units	tn.	tn.	tn.	tn.	weight cases	units	units	units	units	tn.
1981	NA	2.10	NA	NA	NA	NA	0.54	1.25	NA	NA	NA	NA	NA
1982	NA	1.75	NA	NA	NA	NA	0.50	1.13	NA	NA	NA	NA	NA
1983	NA	1.58	NA	NA	NA	NA	0.46	1.11	NA	NA	NA	NA	NA
1984	NA	1.47	NA	NA	NA	NA	0.44	1.01	NA	NA	NA	NA	NA
1985	2.06	1.42	NA	NA	NA	NA	0.41	0.96	NA	NA	NA	NA	NA
1986	1.98	1.50	NA	NA	NA	NA	0.40	0.92	NA	NA	NA	NA	NA
1987	1.97	1.41	NA	1.19	1.18	1.23	0.38	0.90	1.53	0.56	0.90	1.09	0.88
1988	1.93	1.35	1.98	1.11	1.15	1.14	0.37	1.00	1.52	0.56	0.89	0.98	0.89
1989	1.82	1.39	2.07	1.08	1.15	1.11	0.36	1.01	1.44	0.57	0.96	1.06	1.09
1990	1.94	1.39	2.13	1.03	1.16	1.05	0.36	1.08	1.37	0.52	0.96	1.08	0.90
1991	1.79	1.43	1.96	1.04	1.09	1.07	0.38	1.07	1.35	0.51	1.02	1.09	0.83
1992	1.61	1.41	1.81	0.97	1.01	1.00	0.39	1.01	1.46	0.67	1.02	1.10	0.78
1993	1.58	1.41	NA	1.09	NA	NA	0.43	1.01	1.45	0.53	1.18	1.18	1.33
1994	1.52	1.31	NA	NA	NA	NA	0.49	1.08	NA	NA	NA	NA	NA
78-89	Negative	Negative	NA				Negative	Negative					
89-94	Negative						Positive					Positive	
78-94	Negative	Negative			Negative	Negative	Negative				Positive		

Table 3.2 - continued

	(94)	(95)	(96)	(97)	(98)	(99)	(100)	(101)	(102)	(103)	(104)	(105)	(106)
Product	Steel*	Pig Iron	Rolled Steel Final Products*	Ferroalloys	Daily Use Enamel Products	Enamel Washbowls	Enamel (Gargling) Cups	Daily Use Aluminum Products	Aluminum Pots	Industrial Boilers	Internal Combustion Engines	Metal Cutting Machine Tools	Forging Equipment
Units	tn.	tn.	tn.	tn.	tn.	units	units	tn.	units	units	kwh.	units	units
1981	1.77	1.66	1.80	NA	NA	NA	NA	NA	NA	NA	NA	1.80	NA
1982	1.72	1.68	1.75	1.66	NA	NA	NA	1.57	NA	NA	2.36	1.76	NA
1983	1.68	1.60	1.71	1.54	NA	NA	NA	1.53	NA	NA	2.12	1.60	NA
1984	1.66	1.57	1.67	1.47	NA	NA	NA	1.49	NA	NA	1.87	1.54	NA
1985	1.64	1.50	1.61	1.42	NA	NA	NA	1.43	NA	NA	1.78	1.39	NA
1986	1.81	1.48	1.57	1.32	NA	NA	NA	1.33	NA	NA	2.20	1.33	NA
1987	1.80	1.48	1.53	1.19	2.12	1.24	1.91	1.35	1.44	1.11	2.21	1.37	1.51
1988	1.75	1.47	1.51	1.15	2.03	1.24	1.92	1.25	1.51	1.08	2.11	1.19	1.63
1989	1.66	1.45	1.49	1.25	2.07	1.13	1.82	1.30	1.58	1.07	2.03	1.32	1.60
1990	1.68	1.40	1.58	1.27	2.06	1.14	1.44	1.32	1.57	1.08	2.26	1.38	1.59
1991	1.71	1.47	1.65	1.33	2.28	1.36	1.62	1.24	1.65	1.13	2.13	1.40	1.66
1992	1.78	1.56	1.66	1.30	2.35	NA	NA	1.16	NA	1.25	2.07	1.40	1.63
1993	1.75	1.55	1.72	1.55	2.08	NA	NA	1.18	NA	1.24	1.77	1.47	1.45
1994	1.79	1.56	1.69	1.51	NA	NA	NA	1.32	NA	NA	1.68	1.44	NA
78-89		Negative	Negative	Negative				Negative	Positive			Negative	
89-94	Positive	Positive	Positive	Positive						Positive		Positive	
78-94			Negative					Negative	Positive	Positive		Negative	
	(107)	(108)	(109)	(110)	(111)	(112)	(113)	(114)	(115)	(116)	(117)	(118)	(119)
Product	Cranes	Conveyers	Mining Locomotives	Pumps	Blowers	Gas Compressors	Rolling Bearings (not ball)	Mining Equipment	Smelting Equipment	Metal Rolling Equipment	Petroleum Cobalt Extraction Equipment	Chemical Equipment	Large Tractors
Units	tn.	tn.	units	units	units	units	sets	tn.	tn.	tn.	tn.	tn.	units
1981	NA	NA	NA	NA	NA	NA	NA	1.76	NA	NA	NA	NA	2.78
1982	NA	NA	NA	NA	NA	NA	NA	1.70	NA	NA	NA	NA	3.04
1983	NA	NA	NA	NA	NA	NA	NA	1.65	NA	NA	NA	NA	2.89
1984	NA	NA	NA	NA	NA	NA	NA	1.40	NA	NA	NA	NA	2.94
1985	NA	NA	NA	NA	NA	NA	NA	1.81	NA	NA	NA	NA	2.91
1986	NA	NA	NA	NA	NA	NA	NA	1.69	NA	NA	NA	NA	3.18
1987	1.89	2.09	3.00	0.94	1.69	1.80	1.29	1.48	2.22	1.46	2.19	1.34	2.97
1988	1.89	2.50	2.04	0.97	1.78	2.09	1.25	1.52	1.90	1.57	2.21	1.35	2.71
1989	1.95	2.21	1.67	0.98	1.45	1.82	1.23	1.26	2.10	1.43	1.95	1.56	2.98
1990	1.73	2.52	1.91	1.06	1.45	2.62	1.31	1.52	2.78	1.59	1.67	1.35	2.75
1991	1.75	2.51	2.72	1.09	1.32	2.13	1.36	1.42	2.16	1.62	1.85	1.41	2.73
1992	1.88	2.43	1.97	1.22	1.40	2.01	1.37	1.31	1.92	1.57	1.66	1.20	2.80
1993	1.98	2.30	1.94	1.41	1.19	1.58	1.53	1.18	1.84	1.47	1.24	1.37	2.97
1994	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.88
78-89													
89-94				Positive			Positive						
78-94				Positive	Negative		Positive	Negative			Negative		

Table 3.2 - continued

	(120)	(121)	(122)	(123)	(124)	(125)		(126)	(127)	(128)	(129)	(130)	(131)
Product	Small Tractors	Mechanical Tillage Equipment	Large & Small Farm Tools	Medical Apparatus	Sewing Machines	Bicycles*	Watches	Watches (Wrist)	Watches (Other)	Cameras	Railway Locomotives	Passenger Cars	Freight Cars
Units	units	units	units	yuan	units	units	units	units	units	units	units	units	units
1981	0.93	NA	NA	NA	2.29	2.81	2.77	2.76	4.07	NA	NA	NA	NA
1982	0.84	NA	NA	NA	2.11	2.62	2.73	2.72	5.23	3.47	3.09	4.22	2.60
1983	0.75	NA	NA	NA	2.40	2.62	2.74	2.73	5.29	3.25	2.90	4.21	2.50
1984	0.77	NA	NA	NA	2.76	2.77	2.67	2.66	5.28	2.97	2.80	4.26	2.61
1985	0.79	NA	NA	NA	2.85	2.73	2.30	2.30	3.77	2.66	2.67	4.40	2.67
1986	0.83	NA	NA	NA	2.86	2.65	2.15	2.15	4.48	2.20	2.56	4.29	2.46
1987	0.77	1.03	0.64	2.34	2.95	2.55	2.42	2.42	4.95	2.19	2.49	4.19	2.56
1988	0.73	1.02	0.60	2.30	2.97	2.60	2.40	2.41	3.60	2.26	2.32	4.23	2.41
1989	0.76	0.95	0.73	2.22	3.11	2.72	2.28	2.32	4.56	1.87	2.32	4.20	2.33
1990	0.90	1.07	0.65	2.20	3.63	2.80	2.22	2.25	4.33	1.96	2.36	4.01	2.34
1991	0.85	1.00	0.76	2.07	3.74	2.56	2.19	2.21	4.28	3.25	2.39	3.18	2.20
1992	0.86	1.01	0.86	2.13	3.61	2.48	2.17	2.15	4.91	3.34	2.51	3.89	2.30
1993	0.86	1.34	1.45	NA	3.81	2.54	2.07	2.05	4.04	3.16	NA	NA	NA
1994	0.96	NA	NA	NA	3.83	2.47	3.09	3.12	3.39	3.07	NA	NA	NA
78-89					Positive	Negative	Negative	Negative		Negative	Negative		
89-94						Negative					Positive		
78-94			Positive	Negative	Positive	Negative					Negative	Negative	Negative
		(132)	(133)	(134)	(135)	(136)	(137)	(138)	(139)	(140)	(141)	(142)	(143)
Product	Motor Vehicles	Trucks/Lorries	Motor Vehicles (Other)	Motorcycles	Civilian (Steel) Boats	Motorized Fishing Boats	Power Generating Equipment	Alternating Current Motors	Direct Current Motors	Transformers	Communications Cable	Washing Machines	Refrigerators
Units	units	units	units	units	units	units	kw.	kw.	kw.	kilovolt-amperes	km.	units	units
1981	2.48	NA	NA	NA	NA	NA	2.43	NA	NA	NA	NA	NA	4.08
1982	2.39	NA	NA	NA	NA	NA	2.64	NA	NA	NA	NA	1.83	3.75
1983	2.23	NA	NA	NA	NA	NA	2.83	NA	NA	NA	NA	1.80	3.33
1984	2.09	NA	NA	NA	NA	NA	2.83	NA	NA	NA	NA	1.68	2.52
1985	1.93	1.89	2.34	NA	NA	NA	2.54	1.40	NA	NA	NA	1.71	2.11
1986	2.11	1.97	2.69	NA	NA	NA	NA	1.26	NA	NA	NA	1.87	1.77
1987	2.02	1.94	2.62	2.00	2.01	1.88	2.61	1.31	2.22	1.16	2.05	1.91	1.46
1988	1.93	1.87	2.50	1.72	2.07	1.77	2.54	1.07	2.23	1.23	1.85	1.93	1.44
1989	2.01	1.93	2.94	2.25	1.78	3.35	2.54	1.21	2.47	1.16	2.53	1.90	1.60
1990	2.18	1.92	3.01	2.38	1.59	2.50	2.35	1.20	2.50	1.21	2.72	1.85	1.64
1991	2.04	1.75	2.62	2.21	1.87	2.19	2.52	1.17	2.61	1.25	3.69	1.78	2.02
1992	1.90	1.73	2.18	1.97	1.93	2.17	2.48	1.23	2.41	1.14	1.98	1.93	2.11
1993	1.81	1.81	2.04	1.69	2.31	4.24	2.46	1.24	2.88	NA	2.32	1.92	2.31
1994	1.88	1.93	2.13	NA	NA	NA	NA	1.65	NA	NA	NA	2.09	2.18
78-89	Negative					NA							Negative
89-94			Negative	Negative									Positive
78-94	Negative								Positive			Positive	Negative

Table 3.2 - continued

	(144)		(145)	(146)	(147)	(148)	(149)	(150)	(151)	(152)			
Product	Electric Fans	Televisions*	Televisions (Colour)	Televisions (Black & White)	Tape Recorders	Kilowatt-Hour Meters	Large & Specialized Weighing Apparatus	Lightbulbs	Synthetic Detergents*	Electric Irons			
Units	units	units	units	units	units	units	units	units	In.	units			
1981	NA	2.25	<u>3.33</u>	2.35	NA	NA	NA	1.76	<u>1.67</u>	NA			
1982	2.43	2.42	<u>2.54</u>	2.54	NA	NA	NA	1.78	1.59	NA			
1983	2.39	2.47	2.42	2.62	NA	NA	NA	1.69	1.47	NA			
1984	2.19	2.21	2.22	2.32	NA	NA	NA	1.58	1.40	NA			
1985	2.10	2.10	2.00	2.24	2.12	NA	NA	1.60	1.29	3.16			
1986	2.06	2.35	2.07	2.55	2.32	NA	NA	1.63	1.23	3.33			
1987	2.17	2.26	1.82	2.68	2.45	NA	3.35	1.66	1.23	3.19			
1988	2.35	2.09	1.61	2.56	2.31	2.26	4.43	1.66	1.12	<u>4.46</u>			
1989	2.42	1.99	1.56	2.37	2.14	2.41	3.52	1.56	1.14	NA			
1990	2.49	1.99	1.56	2.47	2.16	1.83	3.03	1.64	1.19	NA			
1991	2.64	2.01	1.62	2.52	2.30	1.56	2.82	1.71	1.33	NA			
1992	2.96	1.95	1.59	2.51	2.67	1.66	3.04	2.04	1.35	NA			
1993	3.34	1.95	1.60	2.57	3.05	1.52	<u>1.39</u>	1.99	1.26	2.58			
1994	3.04	1.96	1.57	2.62	3.85	NA	NA	2.11	1.40	NA			
78-89		Negative	Negative	Negative		NA		Negative	Negative				
89-94	Positive			Positive	Positive			Positive	Positive	NA			
78-94	Positive	Negative	Negative		Positive	Negative		Positive	Negative				

Notes: Positive/Negative - Statistically significant time trend of that sign (10% level, two-tailed test). NA - not available. Asterisk - Product included in figure 3.11. Observations prior to 1981 available for these products and included in the analysis of time trends. Underlined - Data record a dramatic change in the output of a particular province which induces a sudden change in the coefficient of variation. With the exception of silk woven goods, these observations are excluded from the analysis of time trends. Italics - Possibility of some small discrepancies in the coverage of these data and later observations. I am still reviewing this and will update the information in a later draft.

coefficients of variation, I find that of the 120 products for which I have at least three observations in the 1978-1989 period, 38 show statistically significant negative time trends, while only 7 have significantly positive trends.⁶⁴ Once again, there is evidence that the convergence process stabilizes in the post-1989 period. Of the 149 products for which at least three observations are available in the 1989-1994 period, 24 show significantly positive time trends, while 23 evince significantly negative time trends. Across the reform period as a whole, 46 of the 152 products have negative time trends, while 27 have positive time trends.⁶⁵

One could argue that the convergence across provinces in the output of industrial products

⁶⁴ The Chinese data on the output of major industrial products frequently contain what appear to be recording errors or temporary changes in coverage. For example, in 1988 Jilin and Guangdong report heavy leather output of .9 and .52 (in 10,000 tonnes), respectively. This constitutes a substantial fraction of the total national output of 4.30. The following year, these two provinces report outputs of .08 and .04, respectively, the national total falls to 2.3, and the coefficient of variation drops dramatically. In no succeeding year does the output of Jilin exceed .09, while, at peak, the output of Guangdong reached .16. It is highly likely that the high output reported for these two provinces represented the misplacement of a decimal point. Numerous "errors" of this type appear in the data, with the output of a province rising or falling by orders of magnitude in a single year. If I observe a dramatic change in a coefficient of variation that can be directly attributed to a sudden change in the output of an individual province or two, I exclude that observation from the sample (these observations are underlined in the table). The one exception is silk woven goods, where the output of Zhejiang triples in 1990-1991, with more moderate growth (e.g. 10% p.a.) both before and after that date. In computing time trends, I link the pre-1991 series with the post-1991 data by taking the annual absolute increase in the coefficient of variation across the 1991-1993 observations and using that to extrapolate forward the pre-1991 series.

It is, of course, possible that the sudden changes noted in the data represent actual production changes. This, however, has little impact on the results reported above. For instance, for the 1978-1994 period as a whole, if I include the underlined observations in the analysis of time trends, two negative coefficients become insignificant (sweets/candy and western medicine), two positive coefficients become significant (dyes and silk woven goods, where I now make no adjustment for the 1990-1991 transition), one negative coefficient becomes significant (large & specialized weighing apparatus), and the significance of the remaining coefficients is unchanged. Thus, on net, two positive coefficients are added and one negative coefficient is subtracted to and from the totals presented in the text further below.

⁶⁵ These coefficients of variation are computed around the average of the provincial outputs per capita. If the variation is computed around national output per capita (i.e. a population weighted mean of the provincial averages), then, for the 1978-1994 period, 57 of the 152 products show statistically significant negative time trends, as against 22 with positive time trends. As noted earlier above, the precise results vary according to what weighting and method one uses in computing the dispersion of industrial structure, but the broad message remains the same.

depicted in table 3.2 is the natural result of China's opening to world markets. Perhaps when compared to each other, China's provinces appear very different, leading to substantial regional specialization. These differences, however, might pale in comparison with the overall differences between China and the rest of the world. Thus, as China opened to international trade it would be natural that its many provinces all ended up producing the same products, which were their natural comparative advantage vis-a-vis the world trading system. To explore this hypothesis, figures 3.12 and 3.13 graph the annual growth of the output of each product against the time trend of the coefficient of variation divided by the mean level of the coefficient of variation (i.e. the percentage time trend of the coefficient of variation).⁶⁶ In figure 3.12 I restrict the analysis to only those 39 products for which I have data for every year in the 1981-1994 period. At first glance, the comparative advantage hypothesis seems to be supported: the faster the national output of a product grew, the faster its coefficient of variation declined. One quickly sees, however, that this relation is completely driven by the two observations (refrigerators and colour televisions) in the lower right hand corner of the figure. Remove these outliers, and there is no statistically significant relation between the growth of output and the change in the coefficient of variation.⁶⁷ Figure 3.13 expands the sample to include all 151 products.⁶⁸ While two outliers may skew a diagram with only 39 observations, they have no impact with 151. There are

⁶⁶ Put differently, a graph with the time trend of the natural log of the coefficient of variation on the vertical axis looks much the same. I report the ratio, however, because it corresponds to the statistics reported in the preceding paragraph.

⁶⁷ Including all 39 products, the t-statistic on the time trend is -2.71. Removing refrigerators and colour televisions, the t-statistic falls to -0.95. Of the 39 products, 20 have significantly negative time trends during the 1981-1994 period, while 7 have significantly positive time trends.

⁶⁸ I do not include silk woven goods because of the sudden jump in output recorded in 1991 (noted in an earlier footnote), which I am still investigating. For all of the other products, the growth rate is the average from the beginning to the end of the sample period. For products missing observations, I linearly interpolate the missing years in computing the mean of the coefficient of variation.

Figure 3.12: Comparative Advantage & Convergence
(Products with data for all years in 1981-1994)

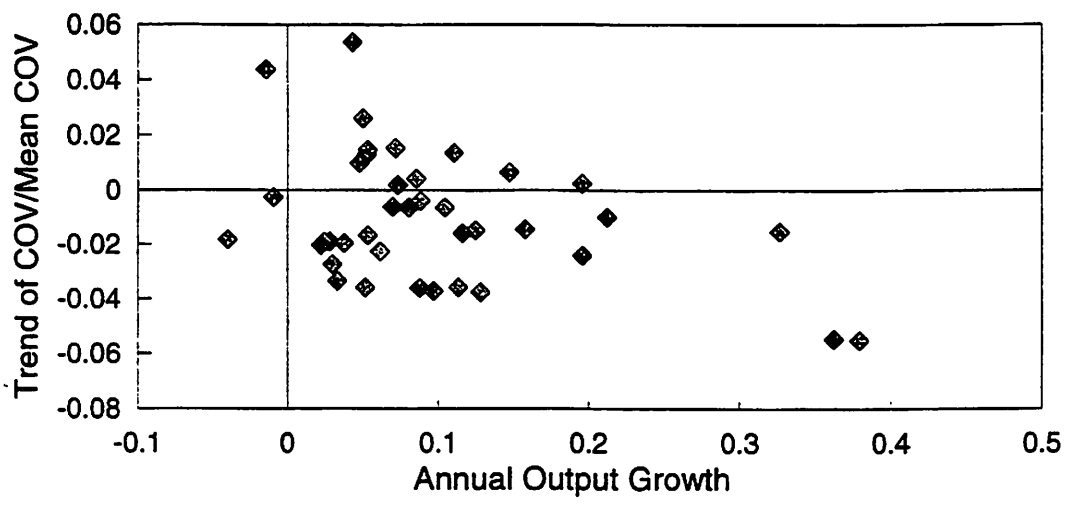
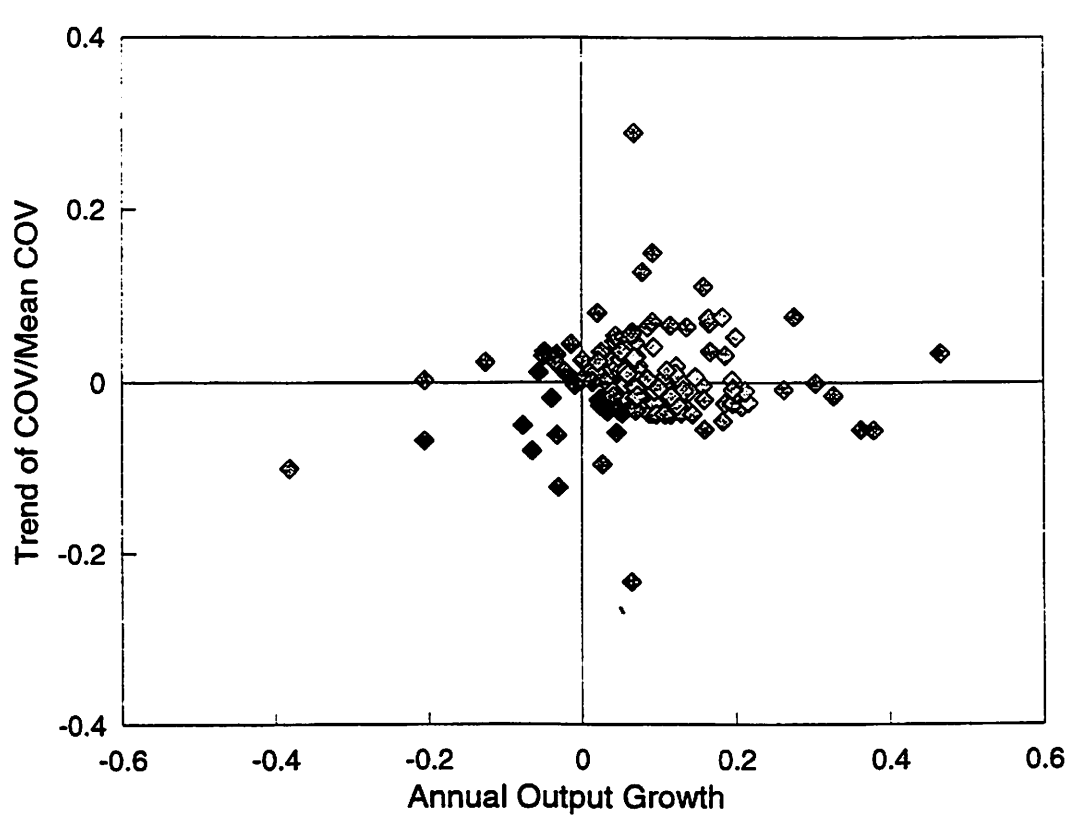


Figure 3.13: Comparative Advantage & Convergence
(All Products)



outliers in every direction and the overall pattern, with or without the outliers, is an amorphous cloud. In the case of some products the coefficient of variation increased, in the case of many more it decreased and, for over half the sample, it basically remained the same. These trends, however, were utterly unrelated to the growth of the total output of each product.

To complete this section, I move from provincial level data to the analysis of smaller geographic units, i.e., cities. The 1985 Industrial Census provides data on the gross and net (added) value of output in current and constant prices, differentiated between light vs. heavy industry for 299 of the 324 official "cities" of the People's Republic.⁶⁹ Table 3.3 uses these data to compare the absolute and weighted intercity variation in the structure of output in 1980 and 1985.⁷⁰ Every measure shows some convergence in the structure of production between 1980 and 1985. While the numerical changes in table 3.3 appear small, the tendency for convergence in the structure of output is easily discerned visually. Figure 3.14 orders the 299 cities analyzed in table 3.3 using the share of light industry in each city's industrial output in 1980, with the city with the highest share placed on the far left. Comparing the solid line, depicting the share of light industry in 1980, with the dashed line, depicting the share of light industry in 1985, one can clearly see that cities without much light industry developed that sector at the expense of heavy industry, while cities with an initially large share of light industry generally experienced a decline in the relative role of that sector.

As in the case of the convergence in the structure of national income across provinces examined earlier above, convergence in the production structure of cities does not seem to be the result of convergence in income levels. Regressing the change in the deviation from the average structure of each city on the growth of its gross industrial output, I find that in every case the

⁶⁹ These data are drawn from volume 5 of the census, which does not present disaggregated light vs. heavy industrial output for the 14 open coastal cities, 4 special economic zones and 5 "separate planning" (*jihua danlie shi*) cities. In the case of two cities, industrial output was zero in 1980 (i.e. had no structure). Hence, a reduced sample of 299 out of 324 administratively delineated "cities." The data cover only the city districts, not the counties in which cities reside, and are restricted to independent accounting units. The output of the independent accounting enterprises in the 299 cities I examine accounted for 40% of the current value of national industrial output in 1985. I am currently trying to collect comparable data for the 23 cities excluded from volume 5 of the census.

⁷⁰ As in the case of figure 3.1 above, the measure is the sum of the city deviations from the aggregate production structure (i.e. from the output weighted city means). In the weighted measures, I weight each deviation by the share of the city in total output.

point estimate is positive, significantly so in the case of deviations measured using the structure of current price gross output. In other words, while the nation as a whole was converging to a common structure, the more each individual city resisted this process and diverged from the common structure, the faster its industrial output grew! Table 3.3 also decomposes the variance across cities in the log of the relative output of light and heavy industry.⁷¹ Again, regardless of which measure of output one uses, the basic patterns are the same. In each case, the total variation in the log ratio of the output of light to heavy industry falls. Part of this decline is attributable to a decline in the variance of relative industrial productivities, reflecting the forces of technological convergence. Regressing the growth of output per worker in either light or heavy industry, or the growth of the relative output per worker of light to heavy industry, on their corresponding initial levels, in all cases I find a statistically significant negative coefficient. The principal factor behind convergence, however, was a decline in the covariance between factor allocations and relative productivities, which in each case explains more than half of the total decline in the variance of the log of relative outputs.

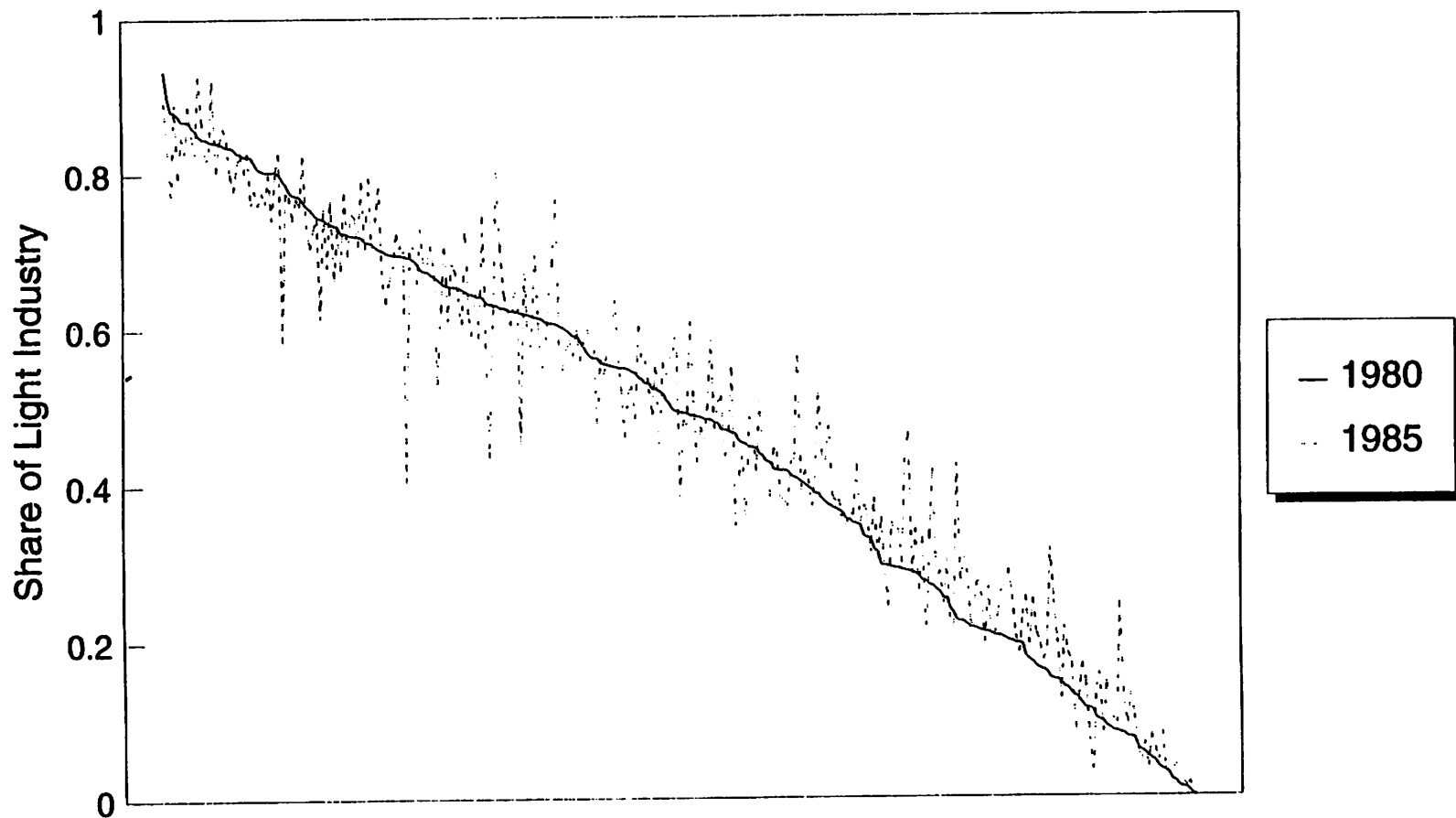
⁷¹The analysis uses only 295 of the 299 cities. In the case of four cities, the output of one or the other industry is zero and, consequently, the log ratios cannot be computed.

**Table 3.3: Convergence of the Industrial Structure of Cities
(Independent Accounting Enterprises only)**

Deviation from National Share of Light and Heavy Industry						
	Gross Output				Net Output	
	Constant Prices		Current Prices		Current Prices	
	Absolute	Weighted	Absolute	Weighted	Absolute	Weighted
1980	136.2	113.5	133.0	112.7	145.4	123.7
1985	126.1	104.9	126.8	105.1	135.2	114.4
Analysis of Variance						
		Variance			2*Covariance	
		$\ln\left(\frac{Q_L}{Q_H}\right)$	$\ln\left(\frac{Q_L/L_L}{Q_H/L_H}\right)$	$\ln\left(\frac{L_L}{L_H}\right)$	$\ln\left(\frac{Q_L/L_L}{Q_H/L_H}\right), \ln\left(\frac{L_L}{L_H}\right)$	
Gross Output (Constant Prices)	1980	1.87	0.32	1.20	0.36	
	1985	1.60	0.26	1.14	0.20	
Gross Output (Current Prices)	1980	1.82	0.30	1.20	0.32	
	1985	1.64	0.27	1.14	0.23	
Net Output (Current Prices)	1980	2.47	0.54	1.20	0.74	
	1985	2.12	0.44	1.14	0.54	

Figure 3.14: Output Share of Light Industry

(Constant 1980 prices: 299 cities, ordered by 1980 share)

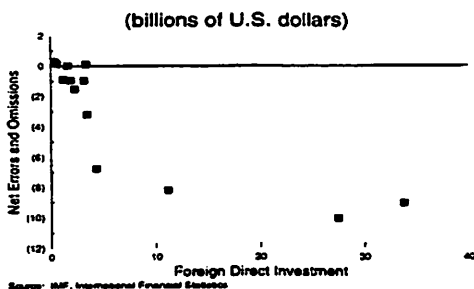


IV Summary and Conclusions

Critics of China's reform experience find no want of ammunition. Anecdotal evidence on the rents created by reform initiatives, in areas as diverse as material supply and foreign investment, abounds.⁷² The entrenched "web of factory interests", which subvert each new central ini-

⁷² On material supply, a nice anecdote is provided by the FEER ("County capitalism", 27 April 1989), which reports on the sudden prosperity of Zhouzi county in Inner Mongolia, ascribed to the county's "big bang" move to market, which involved the freeing of all prices and the rapid privatization of industrial enterprises. In passing, the reader is informed that the county's materials bureau "still receives allocations of steel, chemical fertilizer and other price-controlled goods from provincial agencies at plan prices". On the output side, "there are no industrial enterprises producing under the state plan, so all the county's manufactures are sold at free prices." Following standard Chinese practice, the political leaders of this successful county were celebrated in the national media and rumoured to be destined for "higher level posts."

As one of its most consistent reform initiatives, the People's Republic has progressively improved the institutional environment for foreign investment, promulgating FDI laws and, at various times, providing benefits such as tax holidays and preferential access to raw materials and foreign exchange swap centres. As is well known, about two-thirds of the cumulative foreign direct investment into China originates in Hong Kong. One of the biggest "Hong Kong" investors in Guangdong province is Guangdong Enterprises. Interestingly, Guangdong Enterprises was established by Guangdong government authorities, fully 700 of its 2000 employees in 1991 were actually Guangdong cadres, and its many subsidiaries are divided according to provincial, city and county ownership and remit profits to administrative units in Guangdong precisely on this basis. Guangdong cadres openly ascribe the rapid growth of their province to their ability to make investments through Hong Kong (FEER, "Enterprising cadres," 16 May 1991). The figure below graphs the annual realized FDI into China during the 1982-1994 period against the country's net errors and omissions (i.e. missing foreign exchange) in its accounts with the IMF:



The point estimate of a regression of net errors on FDI is -0.3 ($t = -5.2$), i.e. a dollar of "realized" FDI results in 30 cents of missing foreign exchange. Although it has long been reported in the popular press that a substantial fraction of the FDI into China is done by Chinese authorities themselves (e.g. FEER, "The China syndrome," 23 June 1988, and "Closing the back door," 17 November 1988) in all the vast scholarly literature on China, only Perkins (1994) questions whether the enormous flow of FDI into China (a country with a poor legal tradition) makes sense, noting the possibility of money laundering through Hong Kong.

tiative, transforming incentive bonus schemes into wage increases for all and turning labour market "contracts" into promises of lifetime employment, are well chronicled.⁷³ However, in the face of the thundering 8 percent per annum growth of output per capita, these pathologies are easily dismissed as the inevitable zigs and zags, hiccups and stumbles, of a successful movement to market. To argue that the reform has been derailed by its very own process, one has to present convincing evidence of the appearance, in the aggregate, of a new distortion moving the economy away from market outcomes. In its focus on the interregional distribution of production, this paper has sought such evidence.

Section III of this paper presented a number of measures of the interregional dispersion of production. What is most startling about these results is that, no matter which way one cuts the data, there is not one shred of evidence in favour of *increasing* dispersion during the reform period. Given the historical policy of forced industrial duplication pursued by the People's Republic, an increase in dispersion should have been, one would think, the most likely outcome of the dismantling of the plan and the movement toward free markets. Instead, the data indicate that, despite considerable convergence under the plan, the dominant trend during the reform period was toward further convergence in the interregional pattern of production.⁷⁴ This conver-

⁷³ On bonuses, see Walder (1987). The FEER ("A social contract," 12 May 1988) reports that following the institution of the contract system, designed to break the guarantee of lifetime employment, state firms issued "short term" employment contracts with durations of 30 to 50 years. Fan and Woo (1992) provide a recent (negative) assessment of the behavior of state enterprises.

⁷⁴ In evaluating trends, one is inevitably drawn to the question of levels: Was China's production structure, at the beginning of the reform period, really "overdiversified"? Kumar (1994) compared the degree of industrial dispersion in China, the United States and the European Community, breaking each political unit into 12 regions, and found that China's production structure was substantially more diversified. This, however, might not be a reasonable comparison, given that the average Chinese region would have had a population of 100 million people. In general, with the possible exception of India, it is difficult to think of many comparators on the planet for a poor, predominantly agrarian economy of 1.2 billion people. Rather than seek international comparison, my approach in this paper, as noted above, has been to establish that (i) there was substantial convergence prior to the reforms and (ii) the continued convergence during the reform period moved against the pattern of comparative advantage and was unassociated (or negatively associated) with growth rates.

gence in structure moved against the pattern of comparative advantage, i.e. resulted in a worsening of the regional covariance between relative productivities and relative factor allocations.

Convergence during the reform period was also not associated with convergence in incomes. In fact, in some cases the data indicate quite the opposite: the more a region resisted national trends and diverged from the average structure, the faster it grew! Thus, although during the reform period output per capita in the People's Republic grew faster than in any other economy in the world, the efficiency with which that production was produced, as measured by its interregional distribution, actually appears to have deteriorated.⁷⁵

By 1989 the process of convergence in the structure of regional production in the People's Republic appears to have come to an end, with the data since then showing patterns of convergence in some products and comparisons roughly balanced by patterns of divergence elsewhere. While it is possible to read too much into a few observations, this fact, appearing as it does in a variety of measures, begs for an interpretation. One might argue that it constitutes evidence of how, once centrally mandated distortions were removed, provinces have reverted to comparative advantage and free market behavior. The problem is that the data indicate stasis after 1989, not a return to pre-reform patterns of diversity (which are commonly believed to have had excess duplication to begin with). Perhaps there is hysteresis, because comparative advantage has evolved, say, due to learning, and many provinces which earlier did not have a comparative

⁷⁵ Again, with reference to the theory of the second best, this does not mean that this decreased allocative "efficiency" lowered output. For example, say one takes the Ricardian approach literally (i.e. assumes that labour is the only, constant returns to scale, factor of production). In this case, each region should devote all of its labour to the sector with the highest labour productivity. Away from the optimum, i.e. barring complete regional specialization, worsening the regional correlation between relative productivities and relative labour allocations can actually raise the value of national output. This is precisely what I find in the Chinese data. In other words, for the cases I have examined, assuming a pure Ricardian production structure one finds that actual output in later years (after each deterioration in the covariance of productivities and factor allocations) is actually greater than or equal to the output the economy would have produced with the original (better) covariance between factors and productivities. Naturally, the production structure is unlikely to have been purely Ricardian, but it is gratifying to find such an elegant and practical application of the theory of the second best.

advantage in a particular product or industry now do. Unfortunately, this explanation is belied by my findings, which indicate a deterioration in the covariance of relative productivities and relative factor allocations, i.e. a worsening of the link between specialization and comparative advantage.

Alternatively, one could argue exactly the opposite, that the post-1989 status represents the reassertion of central government control. In 1988-1989, the central government reasserted its control over prices, trade, and bank lending. Subsequently, in the early 1990s, these controls were relaxed.⁷⁶ However, in 1993 the central government established the Ministry of Internal Trade, whose main purpose was to enliven "circulation" and distribution, i.e. break down interregional trade barriers.⁷⁷ In the most positive light, one could argue that China is now developing the equivalent of the interstate commerce clause of the U.S. Constitution, with the central government reserving the right to regulate and maintain interregional commerce and competition, thereby depriving local governments of much of their power to influence market outcomes and helping to ensure the eventual completion of the transition to market. In the most negative light, one would argue that the reform has reached an impasse, with the central government struggling to reestablish control over protectionist local governments and hopelessly distorted

⁷⁶ See, Far Eastern Economic Review, Asia Yearbook, 1989-1993 issues, as well as China Daily, 31 Aug. 1989, p. 1, 26 Nov. 1992, p. 2; *Xinhua* (in English) 1259 GMT 1 Sep. 1992, 0735 GMT 9 Oct. 1992, and *Ching Chi Tao Pao* (Hong Kong), No. 45, 16 Nov. 1992, p. 19, as reported and translated in FBIS.

⁷⁷ See Beijing Central Television Program One Network, 1100 GMT 10 April 1993; *Xinhua* Domestic Service 0339 GMT, 28 July 1993; China Daily 29 July 1993, p. 1; and *Renmin Ribao*, 2 August 1993, p. 2, as reported and translated in FBIS.

enterprise incentives, but making little headway (either forward or backward) on any front.⁷⁸

Finally, in the spirit of this paper, one could simply argue that the post-1989 stasis merely reflects the fact that the process has reached its natural conclusion. In an attempt to arbitrage price wedges the provinces and localities duplicated each other's structure. Centrally mandated price wedges are now basically gone, so the incentive for further duplication is gone. However, as argued in section II, the provinces have internalized a set of distortions, i.e. a particular production structure, and continue to defend that structure. The economy is in a steady state, with no tendency for regions to specialize in their comparative advantage, as the different provinces and localities have simply internalized the distortions and production structure of the historical plan.

When referring to China, both the popular press and formal academic studies seem willing to accept, or even celebrate, the most extraordinary pathologies. A 1995 *Economist* article⁷⁹ described Gau Seui Haang, "Stagnant Water" village, located in Guangdong province. Up until 1986, when a paved road was finally built, the village's sole contact with the outside world was a track across its rice fields, along which provincial grain handouts flowed in and (migrant) workers flowed out. Today, the article notes approvingly, hardly anyone in the village labours. Instead, 18,000 migrant workers from other parts of China work in local factories, assembling

⁷⁸ As strange as it may seem to readers, it is not uncommon for different observers to hold completely opposite views of the meaning of almost any Chinese policy initiative (and even the general thrust of government policy). For example, Jefferson and Rawski (1994) describe the 1992 State Council Regulations on Transforming Economic Mechanisms of State Owned Enterprises as part of "an unprecedented and virtually unrestrained push toward the market" during the 1990s. In contrast, some Chinese economists (anonymous paper) view the 1990-1993 period as one in which government control was reasserted, seeing the Regulations, in particular, as part of a government attempt to "consolidate their strategic rights over enterprises", specifically delineating the government's right to punish and dismiss enterprise managers. As noted earlier in the paper, policies have multiple facets, are implemented differently in different regions, coexist alongside other policies, and are frequently implemented long before or after their official promulgation. Consequently, the interpretation of the precise nature of policy during any short time period is problematic at best.

⁷⁹ "China's most successful village," *The Economist*, November 11 1995.

foreign materials using foreign supplied machinery. The original villagers enjoy the finest of welfare states, with special stipends for the elderly and the young and educational subsidies up to and including overseas university education. A 1996 Economist article explicated the basis for successful joint ventures in the People's Republic, noting the importance of hiring Chinese speaking employees and, incidentally, establishing the joint venture with a provincially supported local company and, when necessary, meeting with local officials over dinner to "lubricate wider relationships", such as ensuring local finance which was (until then) blocked.⁸⁰ One cannot help but wonder whether rents and corruption of this type, if found in the context of an African or Latin American economy, would be viewed in quite so positive a light.

With the exception of its extraordinary openness to international trade, the circumstances of the People's Republic of China today closely resemble the circumstances of many of its less successful brethren LDCs over the past 30 years. Examples of local protectionism, rampant government corruption, and wealth acquired from centrally or locally mandated rents, hovering over all of which lies the spectre of a hyperinflation released by a central bank unable to control provincial lending, are easy to find. In the context of the rapid growth of the past two decades, these problems are all too easily dismissed as of minor consequence or, more surprisingly, even lauded as being the source of rapid growth. However, the "sins" of China's government (central and local) are no different than the sins committed by so many slow growing economies in Africa and Latin America over the past 30 years. As a consequence of the growth experience of these economies, economists have increasingly come to the view that such behavior is anathema to growth.⁸¹ If one is to hold this view, then one must equally conclude that China's recent

⁸⁰"Keeping cool in China," The Economist, April 6 1996.

⁸¹Typically, the static losses associated with these policies (the "Harberger triangles") are not found to be particularly high. Similarly, my own simple (Ricardian) computations show no real loss from declining provincial specialization in China. The argument (albeit not well formalized) that these policies are detrimental to growth usually centres around their presumed impact on long term accumulation and technological change.

growth is, at best, a passing "level" increase in income, a one shot improvement in efficiency brought about by a movement to decentralized planning that will inevitably be followed by economic stagnation.⁸² If China continues to grow at historic rates, its experience will constitute an extraordinary puzzle, challenging the established orthodoxy. If this were to happen, one would have to conclude that either (a) distortions of this type (corruption, infant industry protection, etc.) really do not hamper growth, the failure of the Latin American and African economies lay elsewhere; or (b) foreign trade, the "cold winds" of international competition, erases all sins and this, and only this, was the crucial ingredient missing from the Latin American and African experience.⁸³

⁸² One could even go so far as to argue that improvements in efficiency during the reform period have not been particularly high. My TFP estimates (available upon request) indicate that productivity growth in the 1978-1994 period averaged 1.1% per annum, only slightly better than the 0.7% per annum attained during the Cultural Revolution (1965-1978). Rising participation rates, improving educational levels and the transfer of labour out of agriculture explain most of the pre and post reform growth in the non-agricultural sector. This conclusion, however, requires that the reader accept my adjustment of Chinese output deflators. If one accepts the officially reported deflators, then the post reform TFP growth is truly spectacular, i.e. on the order of 3.7% per annum.

⁸³ Actually, perusing Summers & Heston Mk. 5.6 data on trade to GDP ratios, it is not hard to find levels of 30, 40 or even 50 percent in the Latin American economies of the 1960s. Given the usual covariance between trade ratios and size, however, this would still suggest that these economies were much less open than the increasingly trade dependent economy of continental China.

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