

The State, Finance, and High-tech Industrialization: Lessons from the Chinese Experience

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The content of parts of this paper draws on two previous, related papers: Lo, Li and Jiang (2011) and Lo and Wu (2012).

1. Introduction

China's sustained rapid economic growth over the past three decades, i.e., the era of increasing market reforms and integration into the world market, has been accompanied by an even faster pace of progress in industrialization. In terms of the character of structural change, it can be observed that the era is equally divided into two periods. In the first half of the era, circa 1978-1992, economic growth was accompanied by a process of labor-intensive, consumption-led industrialization. In the second half, from 1993 to the present time, it has been a process of capital-deepening, investment-led industrialization (Lo and Li 2011). And there was an acceleration of the growth of labor productivity from the first period to the second period, from an average of around 6% per annum to 10%. No doubt, faster technological progress and the development of high-tech industries have been the main driving force behind this acceleration of productivity growth (Lo and Wu 2012).

It is of widespread interest, in this connection, as to what has been the role of the state in this process of structural change and productivity growth. In particular, in the context of a financializing world and therefore the increasing influence of short-termism, has the prevalence of the capital-deepening industrialization path since the early 1990s been at least partly ascribable to the working of the state? And has state industrial policy been effective, and efficient, in utilizing the potential of this path for productivity growth? These are the main questions which this paper dwells on and seeks to work out an answer that is at least consistent with empirical stylized facts.

Foreshadowing, it will be suggested in the analysis below that the nexus of state actions and the broader institutional framework has indeed been of fundamental importance in shaping the evolution of the industrialization path. And the appropriate match, or otherwise, between the state actions and the institutional framework has largely determined the efficiency of the actual process of industrialization. There are thus both experiences of success and failure in this process, which provide useful policy lessons both for China itself and for other late developing economies.

The paper is organized in five sections. Following this introduction, section two seeks to characterize the nature of state actions in Chinese industrialization. This will be done by identifying a couple of empirical stylized facts that are posited to form the basis for any plausible inquiry into the role of the state in the development process. The discussion then turns to the implications of, and relationships between, the stylized facts, with reference to the industrial policy literature and broader theories of state and economic development. Section three analyzes the nature and role of finance – or more precisely, the state-finance relationship – in this process of development. As an attempt to put the preceding discussion in more concrete forms, section four analyzes the design and implementation of state industrial policy, with respect to the development experience of three high-tech industries, namely, automobile, semiconductor, and high-speed rail. Section five concludes the paper.

2. The Nature of State Actions in Chinese Industrialization

Industrial policy, and state economic actions in general, can have positive, neutral or negative effects on economic development depending on the nature of the overall process of structural transformation. In the Chinese case, any analysis of the role of the state and state industrial policy in the development process of the past three decades must take into consideration the following four important stylized facts (Lo and Li 2011, Lo and Wu 2012, Lo and Zhang 2011).

The first concerns structural change. It is observable that Chinese economic development has undergone a transition from labor-intensive industrialization in the first half of the reform era, circa 1978-1992, to capital-deepening industrialization in the second half. Figure 1 charts out the evolution of the incremental capital-output ratio (ICOR) of the Chinese economy. It is apparent that the economic growth path was characterized by the substitution of labor for capital in production in the first half of the reform era, but has shifted to rely on capital deepening from the early 1990s onward.

[Figure 1]

The second stylized fact concerns state ownership and control over economic activities. State ownership was predominant in the first half of the reform era, and has remained a significant part of the economy in the second half. For industry alone, the value-added share accounted for by state-owned enterprises (SOEs) underwent a secular decline from 78% in 1978 to 32% in 1998. Thereafter, the share has stabilized – it has increased steadily, reaching a level of 38% by 2010 (Figure 2). And what has remained of state industry is mostly large-scale, capital-intensive SOES, as is indicated by that fact that the capital share of SOEs has significantly exceeded the output share whereas the employment share has been far less, i.e., SOEs are with a much higher capital-labor ratio than other enterprises. SOEs have continued to control the “commanding heights” of Chinese industry.

[Figure 2]

The third stylized fact concerns state capacity. On the whole, decentralization of state power has been characteristic of Chinese economic transformation. Local governments of different levels have been powerful players in economic decision-making. The interaction between the central and local governments – sometimes synergic, sometimes mutually defeating – has had strong influences over the direction and pace of economic development. And these influences should be seen in the broader context of continuous market liberalization. State firms, and to some extent local governments as well, have become increasingly profit-oriented over the reform era. This has proceeded amid the continuous expansion of non-state firms, as well as the increase in competition in the market environment due to both internal and external liberalization.

Finally, the fourth stylized fact concerns the evolution of the demand regimes. It is well known that Chinese economic development in the first half of the reform era was mainly consumption-led, but it has become mainly investment-led (and, to a much lesser extent, export-led) since the early 1990s. The share of aggregate expenditures accounted for by final consumption decreased by more than ten percentage points from the first period to the second period. Nevertheless, in both periods, the reformed economic system has been able to provide the necessary demand conditions for industrialization – for promoting productive investment and for underpinning the increasing returns of the established industries. It should be noted that China started its reform era with one of the highest industry-to-GDP ratios in the world in the late 1970s, and has witnessed a process of sustained rapid industrialization throughout the three decades that followed.

What are the implications of these stylized facts for verifying the role of the state, and of state industrial policy, in Chinese economic development? In the first place, the stylized fact concerning structural change is immediately relevant to the literature on East Asian-type industrial policy, which has been dominated by the debate over comparative advantage-following (CAF) versus comparative advantage-defying (CAD) strategies (see the exchange in Lin and Chang 2009). It seems reasonable to judge that Chinese industrialization in the first half of the reform era was of a CAF path, whilst that in the second half has been a CAD path. But, even if this judgment is valid, analyzing the CAF-CAD characteristics of structural change might be insufficient for establishing the role of industrial policy. Theoretically, it could be argued that a CAF path of structural change is in line with principles of the market (although it begs the question as to whether the market in reality can actually produce such outcome). Even so, it does not follow that a CAD path of structural change must be the product of state intervention, or, more specifically, of state industrial policy. In a world of increasing returns and demand-led productivity growth, the demand regimes matter in shaping the path of structural change. There is thus the question as to, in the Chinese experience, what has been the role of state actions in shaping the evolution of the demand regimes as characterized in the fourth stylized fact.

Meanwhile, the industrial policy literature is also about the conditions for the working of alternative strategies. In particular, there is the further debate on the developmental state versus crony capitalism. Stylized facts two and three, concerning the position of the state in the economic system, must be taken into account in a coherent framework of analysis. Whereas the existence of a sizeable state sector provides a powerful means for state intervention in shaping the directions of economic development, the economic agents in question – the enterprises, state banks, and local governments of different levels – might not necessarily work in line with the character of the developmental state. It is evident that, in the context of a mixed system associated with stylized facts two and three, these agents have from time to time fluctuated between characteristics of short-term profit orientation, long-term developmental concerns, as well as rent-seeking and crony capitalism. The analysis of the

conditions within which one set of characteristics dominate the others, is necessary for establishing the role of the state and state industrial policy in the transformation process.

The preceding discussion can be related to the literature of competing policy doctrines and theoretical positions concerning late industrialization. A convenient way to reviewing this hotly contested literature is to start with the “orthodox” position, known as the Washington Consensus. Its canonical policy doctrine in this particular area, of “trade regime neutrality as an industrialization strategy”, hinges on the assumption that technological transfer and thereby economic development is an automatic outcome of the market (Lo 2012, ch.2). This doctrine is consistent with standard neoclassical growth theory. But, even within neoclassical economics, the mainstream of theories of endogenous technological change suggests that technology is mainly the product of investment, and business investment typically premises on some degree of exclusive rights over the utilization of the product (Romer 1994). Hence, technological development necessarily requires the existence of a policy-institutional environment that is not confined to the market.

More recently, a modified position from the Washington institutions has been advocated by World Bank chief economist Justin Yifu Lin, and shared by economists like Dani Rodrik and Joseph Stiglitz. The central proposition is that structural change in line with the principle of comparative advantage (i.e., CAF) might not always materialize, because of market failures in delivering the necessary technological development. There thus follow the need for some forms of market-friendly government intervention to foster industrialization (Lin 2010). It requires government actions to overcome the failures of the market, as an entity, in realizing the principle of the market – the principle of comparative advantage, and of relative scarcities in general.

Yet another position that distances further from the orthodoxy is the theories of industrial policy, associated with the work of economists including Alice Amsden, Ha-Joon Chang, Ajit Singh and Robert Wade. The central proposition is that industrialization is more than realizing the principle of comparative advantage, given the importance of dynamic increasing returns and economies of scale and scope in economic development. Hence, there is the need for market-supplanting government intervention to foster industrialization, i.e., to deliberately distort the market in order to promote technological development (Chang 2009). The precise means can vary, but the general point is for the government to create “economic rents” (in a clearly-defined duration) which are awarded to firms with good performance in technological and economic development.

Finally, the position of theories of the “national innovation system”, most clearly framed by William Lazonick (2004, 2009), puts technological development at the centre of industrialization. The central proposition is that, in the era of information revolution, the precondition for late development is the building up of not just production capacity as such but rather the innovation capability for

absorbing, assimilating, and improving upon imported technology. This requires the existence of a range of long-term oriented business institutions, in addition to government promotion.

It is of note that, for the various positions summarized above, there is a progressive shift from pure theory to realism. The Washington Consensus and the modified positions from the Washington institutions implicitly assume a pure market within which productivity-improving structural change takes place. The theories of industrial policy and the “national innovation system”, in contrast, are more aware of the complex and shifting nature of the world market in reality. In particular, in recent years, there has emerged an influential contention that the process of globalization, including North-South economic relations, has been increasingly shaped by financialization (Wade 2006, 2008). The rising predominance of speculative financial activities implies a tendency of short-termism, i.e., capital is increasingly forced to minimize fixed investment and demand “flexibility” in the productive sector (especially in labor employment). From the perspective of developing economies, therefore, solely relying on the working of the market might make it difficult for their industries to move out of the assembling stage, and to move up the value-added ladder. More important, in the context of financialization and the associated pressing demand for flexibility, developing economies need to find the appropriate ways to raise their productivity sufficient fast in order to avoid being stuck in the “race to the bottom” type competition in the world market (Lo 2012, ch.2).

3. The Role of the State-Finance Relationship

The market reforms of the Chinese financial system since the late 1970s have been mainly a process of increasing liberalization, commercialization, and internationalization. Market liberalization up until the mid-1990s resulted in the formation of a multi-tier banking system, comprising of the central bank (the People’s Bank of China), the “Big Four” state-owned commercial banks (the Industrial and Commercial Bank of China, the Construction Bank of China, the Agricultural Bank of China, and the Bank of China), and a large number of national and regional banks of varied ownership types and non-bank financial institutions, together with the gradual development of the stock market and other financial activities. The commercialization of state banks accelerated in the mid-1990s, following the establishment of three policy banks to take away the non-commercial activities of the “Big Four.” This commercialization process was basically completed in the period 1998-2003, when, in the face of the East Asian financial crisis, the Chinese government strove to recapitalize and restructure state banks with a view of improving their asset quality. The “Big Four” were subsequently transformed into shareholding ownership and were allowed to list part of their shares in the domestic and overseas markets. Meanwhile, along with the liberalization of its structure and commercialization of its institutions, the Chinese banking sector has also become increasingly internationalized particularly since the admission of the country into the World Trade Organization in late 2001. By 2007, foreign

banks were free to conduct all kinds of banking business in the country. This has largely reinforced competition in the sector.

The Chinese financial system has remained a mixed system, however. Today, there still exist strong market-supplanting elements in the system. These include discretionary government intervention, the predominance of state banks in the sector, and the behavioral inclination of the banks towards causing excessive fluctuations. All these are well known and, as a result, the system has been subject to contrasting assessments concerning its efficiency attributes (see Lo, Li and Jiang 2011, for a review of the relevant studies on Chinese finance).

Put in an extreme form, and from the perspectives of the Washington Consensus, there is a recurrent claim over China's looming financial collapse. Its premise is that because of soft budget constraints, state-owned or state-controlled banks have an expansionary instinct. A tendency of excessive credit expansion, speculative bubbles, and financial crashes is the normal state of Chinese finance. It follows the policy prescription of wholesale and immediate liberalization and privatization of the sector – so that Chinese banks can be converted into truly market entities in line with the practices of prudent, resilient.

This claim was widely circulated in 1997-98, the time of the East Asian financial crisis. That was also the time when China's financial sector was in its historically worst shape, with a huge amount of non-performing loans. The same claim has arisen again in 2008-2011, now at the time of the financial crisis in advanced countries. What seems alarming with Chinese finance is a credit expansion of unprecedented scale, and with it serious speculative bubbles. Predictions have been widespread that a financial crash is imminent, leaving state banks with enormous bad loans.

Nevertheless, in view of the reality, there are three complexities that have been overlooked in the afore-mentioned claim and policy prescription. First, expansionary behavior is not necessarily always predominant with Chinese state banks. They actually exhibited seriously contractionary behavior in 1995-2000, following financial liberalization and commercialization in the early years of that period. This led to several years of deflation at the macro level. Second, the massive shrinkage of the size of non-performing loans, from more than 40% of GDP in 1998 down to less than 10% by 2004 year-end and further down to less than 5% subsequently, was achieved mainly through a strategy of “growing out of debts” rather than through the orthodox prescription of liberalization and privatization. State injection of capital, together with expansionary fiscal policies that promoted economic growth, were the main forces behind the achievement. Third, liberalization and significant part-privatization did take place after 2004, but that has not fundamentally reversed the expansionary instinct of state banks – as was especially evident in their behavior in 2008-2011.

These complexities imply that the economic model behind the afore-mentioned claim pertaining to the Washington Consensus – i.e., the Anglo-Saxon model of the financial system, which is ostensibly claimed to be embodiment of financial prudence/resilience – is not appropriate for assessing the Chinese experience. Nor is it appropriate for deriving policy prescriptions for future reforms. The excessive oscillation between expansionary and contractionary behavior of Chinese financial institutions appears to be in some way conforming to Hyman Minsky’s financial instability hypothesis. It is market reforms – or, more precisely, the uni-directional pursuit of convergence to the Anglo-Saxon model of the financial system – that has resulted in this excessive oscillation.

For the latest, 2008-2011 cyclical turn, the inclination of the sector toward asset price inflation might indeed risk a crash in the future. The state’s corrective action suggests that it is aware of such danger. Nevertheless, the state has had to balance this concern with its broader consideration of sustaining economic growth, particularly over the recession-hit years. This explains why its corrective policy has emphasized prudent banking and the rational allocation of financial resources, rather than curbing credit expansion altogether. In the event, at least in the crisis-prone years of 2008-2011, it appears that the Chinese financial sector has done a reasonably good job in fostering economic growth. Financial resources have been mainly channeled to productive uses, particularly in the form of infrastructural investment. What seems of general concern, however, is whether economic growth on the back of less-than-prudent credit expansion is sustainable. Conversely, there is a formidable task for the state of maintaining a fine balance between the multiple objectives which it has assigned to the financial sector: to promote macroeconomic stability and long-term economic development (as well as social responsibility), in addition to the standard emphasis on financial resilience or profit-making *cum* risk-control of the banks.

Long term, the emphasis on resilience so defined does not mean that a financial system single-mindedly pursuing this objective must serve well economic development. Schumpeterian and Minskyan theories both suggest that the single-minded pursuit of financial resilience might hinder productive investment. More broadly, according to Post-Keynesian theories, the market economy is characterized by chronic demand deficiency. And the nature of the banks (and the financial sector in general) is such that it has dual functions, namely, resources allocation and money creation. Hence, the single-minded emphasis on resilience with an objective of achieving allocative efficiency is most likely acting to the detriment of long-term economic development (Arestis, 2004; Dullien, 2009; Kregel and Burlamaqui 2005; Palley, 2010).

The Chinese reality has clearly defied the Washington Consensus. A salient feature of its financial system is the continuous predominance of state banks. This is the case despite the progress in market reforms over the past three decades, i.e. the increasing commercialization and part-privatization of these institutions and the liberalization of the sector as a whole. In 2010 directly state-

controlled banks – the “Big Four” plus the Bank of Communication (which is the fifth largest bank, majority-owned by state agents), state-owned policy banks, and the Postal Savings Bank – accounted for 55% of the total outstanding bank loans, and 61% of the total assets of the banking sector as a whole. A further share of up to 25% of outstanding loans, and 16% of assets, was accounted for by a variety of joint-stock banks, of which state institutions might own up to a half of the shares. And the banking sector has continued to account for a main part of Chinese finance. In 1995 bank loans accounted for 82% of the total sources of funds in the economy. By 2010 the ratio still remained at close to 60% (Lo, Li, Jiang 2011).

And this financial system has actually done a reasonable job in terms of promoting financial deepening of the economy. Indeed, the importance of finance in the economy has expanded enormously over the reform era. Measured by the standard indicator of domestic credit provided by banks as a ratio to GDP, in 2009, the Chinese figure was 145%, which far exceeded that of India (69%), Russia (34%), Brazil (98%), and South Korea (112%). And the comparison had been basically the same ever since the mid-1990s (figures from World Bank, *World Development Indicators*). Clearly, and to say the least, the fact that the sector (and Chinese finance as a whole) has been dominated by state banks does not hinder the process of financial deepening of the economy.

The specific form of financial deepening has actually seemed to be conducive to promoting long-term economic development. Although speculative bubbles have occurred from time to time over the reform era, bank credits have been mostly channeled to productive investment. Figure 3 shows the annual growth of fixed-asset investment and total outstanding loans from state banks and from the banking sector as a whole. Two important characteristics of the working of the banks, and state banks in particular, are discernible. First, they have exhibited an inclination towards severe fluctuations between expansion and contraction – an amplified phenomenon of Minskyan-type financial instability that characterizes the market system. Second, they have been strongly supportive of productive investment over the long term. The two curves representing the growth rates of bank loans tend to move *in tandem* with the growth rates of gross fixed capital formation. This must be of importance in explaining the performance of fast economic growth and modest inflation, on average more than 9% and less than 5% per annum respectively, over the reform era.

[Figure 3]

In this connection, the character of the Chinese system of government controls and regulations over the banks is of note. In a nutshell, the system has been excessively tough by international standards. The exercise of administrative controls has persisted. The use of the credit plan was frequent in the first half of the reform era. This practice formally stopped in 1998, but the government still has administrative means to control the total credit volumes. Meanwhile, the regulatory framework (which has focused on applying versions of Basel) was first established in the

1994-1995 banking reform, but it has become functional only gradually after 1998. After a transitional period for commercializing state banks and replenishing their capital, by around 2007, the regulatory framework became fully functional. The regulations over the banks (especially state banks) have been tougher than Basel, e.g., they mostly needed to maintain a capital adequacy ratio of more than 12% even in the years 2008-2010, when the government tried hard to encourage credit expansion and other expansionary practices. There have also been severe restrictions on financial innovations, especially with respect to the securitization of bank assets and the involvement of banks in derivatives issuing and trading.

The significance of the tougher-than-usual system of bank controls and regulations is that it appears to be in match with the unstable conduct of the banks. The excessive fluctuations caused by the banks have to be curbed by tough government measures. Unless the banks can exercise sufficient self-restraints to avoid excessive expansions and contractions, a direction which they seem to have been heading towards thanks to the reforms, the government regulations and even outright administrative controls need to be in place. This combination of the peculiar behaviour of the government and the banks has formed the famous “stop-go cycles” of the Chinese economy over the reform era, which have often been alluded to as evidence of the inefficiencies of the reformed financial system. Yet, this negative view has to be balanced by the positive performance of the system in promoting productive investment and thereby long-term economic development.

4. Lessons from Three High-Tech Industries

The preceding discussion on the nature of state economic interventions and the role of the state-finance relationship can be combined to form a broader, integrated analytical framework for studying Chinese industrialization. Put schematically, the efficacy of state economic interventions can be inferred from the state’s action/inaction in two different respects. The first concerns its role in the creation of an appropriate condition (i.e., enabling environment), or otherwise, for industrialization. The second concerns its direct intervention in the process of industrialization.

In the first half of the reform era, state action in the first respect and inaction in the second respect were the norm. Based on the capital accumulation of the pre-reform era, i.e., the building up of a vast capital goods sector in the 1950s-1970s, it was possible to let economic development follow a path of consumption-led, labour-intensive industrialization. This path broadly accorded with the principle of comparative advantage. It arose mainly through the market-directed explosive expansion of collectively-owned rural (township and village) enterprises. The action of the state rather focused on fostering market reforms, with SOEs being designated to take up the burden of the adjustment cost associated with the reforms. SOEs together with state banks were responsible for sustaining the

existing pattern of egalitarian income distribution. They provided job security and social services for virtually the entire urban population, thus fostering the “consumption revolution” which was essential to the industrialization drive of that period.

In the second half of the reform era, state activism was evident in both of the two respects – after a painful, neoliberal process of restructuring public finance, SOEs and state banks in the mid-1990s. Public finance took the lead in massive infrastructural investment, and investment in industrial upgrading. This gave rise to the path of capital-deepening, investment-led industrialization, carried out mainly by SOEs in upstream materials industries and transnational corporations (TNCs) in high-tech industries. What remained of SOEs were mostly big firms with profit orientation, and these characteristics fitted well with the prevailing path of industrialization. Commercialized state banks, whilst for a time becoming reluctant to lend to productive activities, had to get back to industry because of severe state restrictions over the scope of speculative activities and capital flights.

The strength and limitation, and success or failure, of China’s state industrial policy can be assessed in this context. In the first half of the reform era, the broad state policy of promoting manufacturing exports (to substitute for primary commodities) was evidently a success. The specific, Japanese-Korean-type policy of promoting the development of some particular sectors or projects, meanwhile, was evidently a failure. Entering the second half of the reform era, both broad and specific state policies have seemed to be successful in promoting industrialization. Market-based incentives together with fast productivity growth have been sufficient in promoting manufacturing exports. And state industrial policy targeting at the development of particular industries has also appeared to largely achieve its objectives. It can be judged that, for the reform era as a whole, the sufficiency or otherwise of the enabling environment together with the nature of the economic agents carrying out the development (SOEs, private firms, TNCs, etc.) determine the success or failure, and strength and limitation, of state industrial policy. The development experiences of the following three industries which will be analyzed in some details – automobile, semiconductor, and high-speed railway – appear to substantiate this judgement.

As forerunners of the practice of state industrial policy in China, the development experiences of the automobile industry and semiconductor industries are revealing. The automobile industry had its industrial policy as early as 1987, which was refined subsequently to come out with a fully-fledged version in 1994. The main thrust of the policy was the strategy of “market protection in exchange for technology transfer”. Protection from imports, and from the pressure of market entry, was granted to six designated car-makers which were all Sino-foreign joint ventures: the “Big Three” composed of Shanghai Volkswagen, First Auto Work Volkswagen, and Second Auto Work Citroën, and the “Small Three” composed of Beijing Chrysler Jeep, Guangzhou Peugeot and Tianjin Daihatsu. Meanwhile, the semiconductor industry also had its industrial policy first worked out in 1986, and then revised to

come out with a fully-fledged version in 1992. The main thrust of the policy was the strategy of “concentrating investment in key enterprises for technological development”. The key enterprises in question were all SOEs (and their subsidiaries in partnership with TNCs in various forms including joint ventures): Wuxi Huajing, Shouxing Huayue, Beijing Shougang NEC, Shanghai Beiling, and Shanghai Philips. Again, protection from the competition of imports was an important ingredient of the policy.

In terms of actual development, a clear pattern is observable for both the TNCs-led automobile industry and the SOEs-led semiconductor industry. In the first half of reform era, both failed to develop. In the second half of reform era, the two industries, like other high-tech industries, finally took off, with explosive output expansion and fast technological progress (Figure 4). Lack of investment was the immediate cause of development failures in the former period, against the background of massive investment and very fast technological progress of the two industries in the world. In the case of the automobile industry, the strategy of “market protection in exchange for technology transfer” did not work: the TNCs did not have sufficient incentives to invest in technological upgrading. In the case of the semiconductor industry, the designated SOEs did not receive the investment funding as promised/envisaged in the industrial policy. Insufficiency in (domestic) demand further reinforced the insufficient incentives to invest, both for the TNCs and the domestic agents (SOEs, state banks, local governments, and even the central government itself).

[Figure 4]

The successful development of the two industries in second half of reform era has been, discernibly, accounted for by three factors: state creation of demand, state action to foster investment in technological upgrading, and the formation of innovation-based market competition. Demand creation has been achieved by state infrastructural investment: the building up of the highway system (Figure 5) which boosted the demand for cars, and of the telecom infrastructure (Figure 6) which boosted the demand for semiconductors. Massive state investment in infrastructure was initially implemented as an anti-crisis policy in response to the East Asian financial crisis, but has seemed to become a long-term strategy. Also note this is a complete reversal of the policy doctrine of the 1990s – precisely, the neoliberalization period of 1993-1997 – where the overarching objective was to balance the state budget via austerity measures (for more details about the political economy of the policy reversal, see Lo and Zhang 2011).

[Figure 5], [Figure 6]

Put in the broader context, the successful development of the two industries since the late 1990s can be said to be accounted for by both market responses to the favorable investment-led demand condition, and state activism in investing in the industries and/or creating the necessary

conditions for their development. State activism was not confined to the central government. There were also prominent cases of success at the provincial level, the Guangdong provincial government's automobile industrial policy being a case in point. The policy lesson which the provincial government derived from the failure of Guangzhou Peugeot in the 1990s was that government investment and market competition are both necessary for the development of the industry. It has thus restructured the industry by means of itself taking the lead in the formation of several joint venture companies with TNCs including Honda and Toyota. Meanwhile, back to the broader national picture, state action to foster technological progress manifests itself in the form of massive increases in R&D expenditures. This has been a general policy, not confined to particular industrial sectors. R&D expenditures as a ratio to GDP increased from 0.64 in 1997 to 1.44 in 2007, compared with the figures of 0.56 and 0.98, respectively, for all low- and middle-income economies combined (data from World Bank, *World Development Indicators*).

The nature of the immediate carriers of industrialization has also changed, amid the formation of an environment of basically innovation-based market competition. For both the semiconductor and auto industries, the model that has emerged is characterized by the predominance of joint-ventures, and increased competition among these companies. The semiconductor industry used to be dominated by SOEs up until the late 1990s, but it has since been dominated by joint-ventures. The automobile industry has always been dominated by joint-ventures, but the number of players has increased to involve virtually all the main car-making TNCs of the world – over and above the protected “Big Three, Small Three” before the turn of the century. There have also emerged some purely indigenous car-makers (notably Geely, Qirui, and Jianghuai), which by 2010 have successfully entered the rank of top ten car-makers in China. The predominance of local production by joint-ventures in the two industries, rather than by wholly TNCs-owned enterprises or imports, reflects the intention of state industrial policy and the action of domestic economic agents – in particular, local governments – which are the main domestic decision-makers in forming the joint ventures.

Besides output expansion, the fact that local producers have been able to keep up with the pace of TNCs in the world market of turning out the latest models is an indication of the production capacity – and innovation capability – that has been built up. Another important indication is the rapid export expansion of the two industries in recent years, although from a modest base (Figure 7). But note that, whereas exports and imports have been basically in balance for automobile, very large and rapidly expanding trade deficits have been the case for integrated circuits. It might thus be possible to infer that there is a serious limitation with this model of industrial development, i.e., joint ventures as the main carriers of the development of high-tech industries. This, namely, is the difficulty for the acquisition and development of frontier technology as is in the case of semiconductors – rather than mature technology as is in the case of car-making.

Put differently, a serious limitation with the prevailing nexus of state industrial policy and industrialization, especially where local governments being the main policy-maker, might arise from the predominance of TNCs as the main carrier of development. TNCs might be instrumental to industrialization in the stage, or areas, of technological catching-up. But, when it comes to the development of frontier technology, there could be serious constraints due to possible mismatch between the strategies of the headquarters of TNCs and the objectives of the Chinese government. The fact that there has been virtually no exporting of the cars produced by subsidiaries of TNCs (quite in contrast to indigenous Chinese car-makers) might not necessarily be a symptom of such mismatch, but neither does it support the view that the industry has become internationally competitive.

In this connection, a new model has emerged in recent years, where the main carrier of the development of frontier technology being SOEs. The development of high-speed railway technology is a prominent case. And the state plan to develop large-scale civilian aircraft manufacturing is in line with this new model. China started to import world-frontier technology in high-speed rail in 2004, with the targets of building up 200km/h trains in the first stage and 250km/h trains by 2009 (Renner and Gardner 2010). The targets were more than achieved. Not only did domestic firms fully assimilate the imported technology, but they also managed to largely improve upon it. By 2010, quite a number of railways had put into full operation of trains with speeds ranging from 250km/h to 350km/h. By 2011, an entirely domestically-produced train even managed to test the speed of 500 km/h.

Within a short period of time, between 2008 and 2011, China built up the largest network of high-speed rail in the world, in conjunction with massive government investment as a response to the worsening world economic environment emanating from the outbreak of financial crises in the advanced countries. And it has started to compete in the world market with world-frontier TNCs. This development has been characterized by: (a) a state industrial policy that is based on the anticipation of an enormous demand, i.e., high-speed rail as a more cost-efficient and environment-friendly substitute for domestic flights, (b) ample supply of funding from state-controlled finance, (c) oligopolistic, large-scale SOEs as the immediate carriers, i.e., the two designated companies of China Northern Railways (CNR) and China Southern Railways (CSR), and (d) well-defined targets of technology transfer and business operations in dealing with TNCs.

In terms of technological development, the emerging new model is clearly a success in promoting the development of high-speed railways. This experience offers important lessons for the development of other frontier-technology industries. But there are potential dangers associated with the new model, as have been raised by the debate on crony capitalism. Already, there were symptoms of bureaucratic excess and corruption in the development. It remains a challenge for the further development of the model in the face of the question as to when and where the relevant agents – SOEs,

state banks, and government bodies – will behave in an entrepreneurial way, rather than indulging in unproductive rent-seeking or inefficient monopolistic practices.

5. Conclusion

Throughout the reform era, the state has played a significantly positive role in Chinese economic development – in the form of shaping the condition for industrialization, and direct intervention via industrial policy in the development process. There have been both cases of success and failure. With hindsight, it can be inferred that successes have been achieved out of an appropriate match between state policy, the market condition, the demand regime, and the actions of the business entities. Conversely, failures have been due to mismatch.

In this context, the relationship between the state and the financial sector has been a key determinant of the successes and failures of economic development, particularly with respect to high-tech industrialization. Despite fundamental market reforms, the Chinese financial system has remained a mixed system. Today, there still exist strong market-supplanting elements in the system. These include discretionary government intervention, the predominance of state banks in the sector, and the behavioral inclination of the banks towards causing excessive fluctuations. From the perspectives of the mainstream doctrines of financial liberalization, this system is easily judged to be entailing serious allocative inefficiencies. Nevertheless, such views might be partial. The system can be viewed favorably from alternative theoretical perspectives, in terms of promoting productive efficiency. This paper argues that the actual experience does seem to indicate that, hitherto, the gains in productive efficiency have more than compensated for the losses in allocative efficiency. This judgement helps to make sense of the Chinese anomaly that a seemingly inefficient financial system has co-existed with the outstanding performance of financial deepening and economic development over the reform era.

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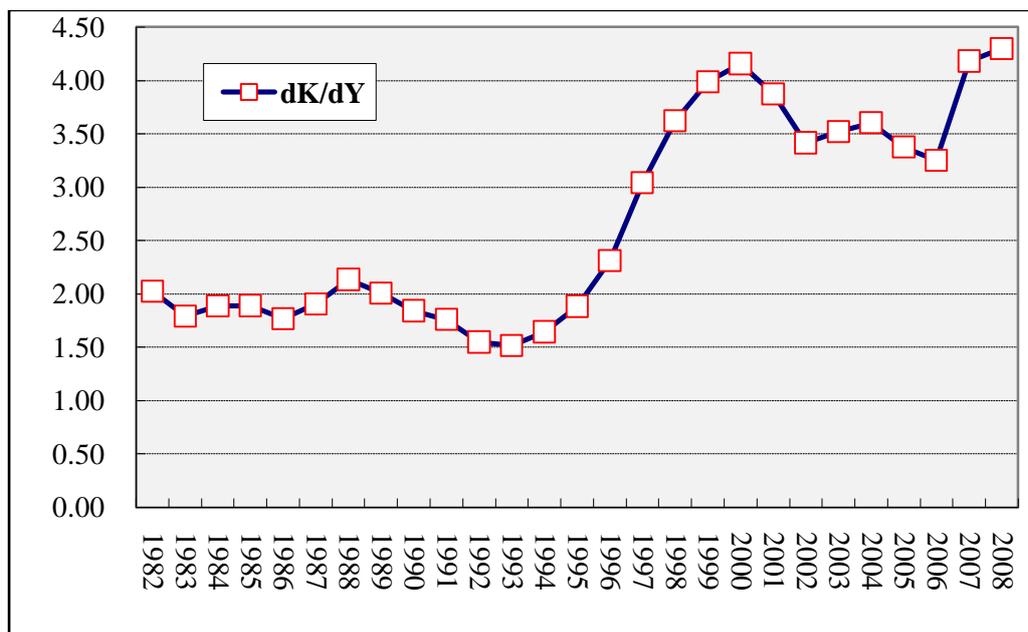
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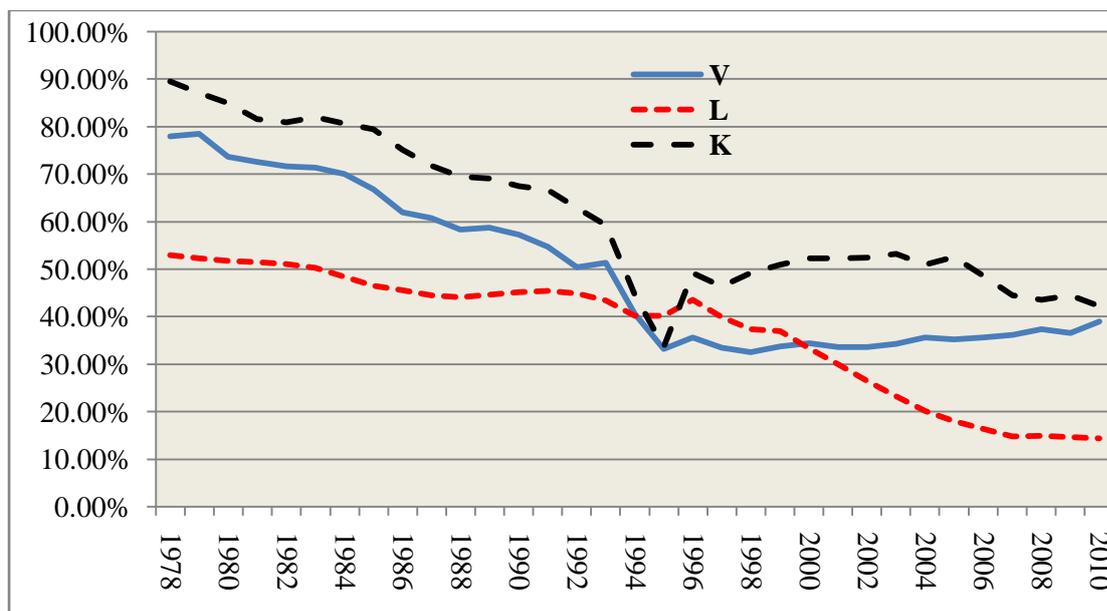
Figure 1. Incremental capital-output ratio (five-year moving averages)



Sources: *China Statistical Yearbook*, various years.

Note: $ICOR = dK/dY$, where $dK = I =$ total fixed asset investment, $dY =$ GDP of current year minus GDP of previous year.

Figure 2. Shares of SOEs in output, employment and capital of industry total

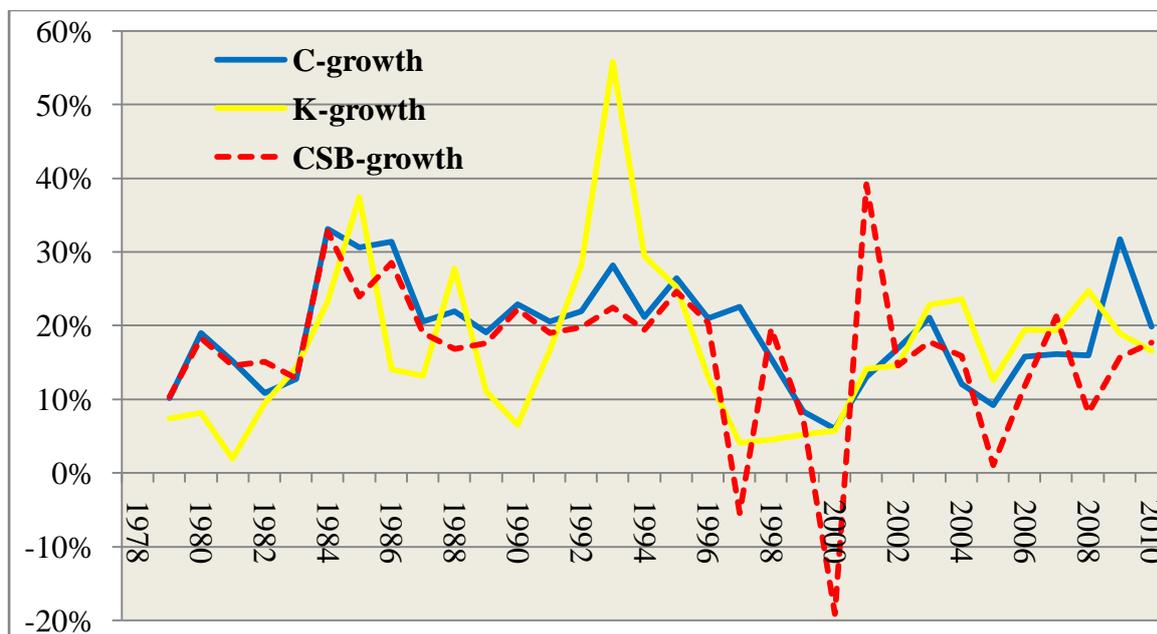


Sources: *China Statistical Yearbook*, various years.

Note: *V* = industrial value-added, *K* = net value of fixed assets, *L* = number of employees.

Note that a significant proportion of non-SOEs are also with state agents as the ultimate owners-controllers.

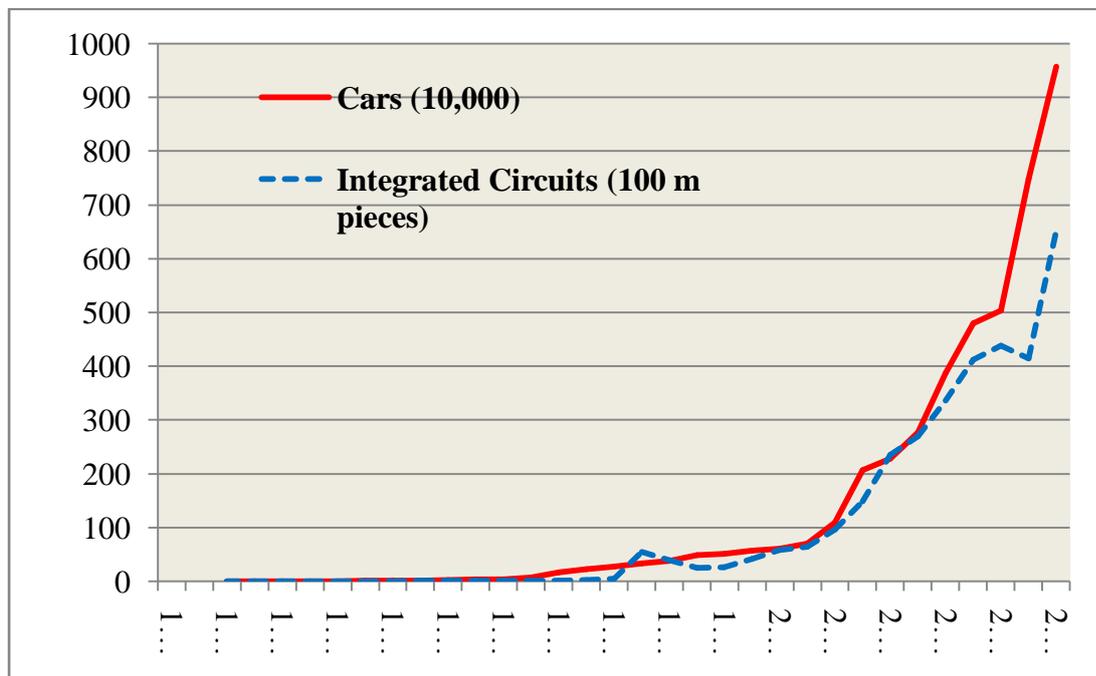
Figure 3. Annual growth of capital formation and bank loans



Sources: *China Statistical Yearbook*, various years.

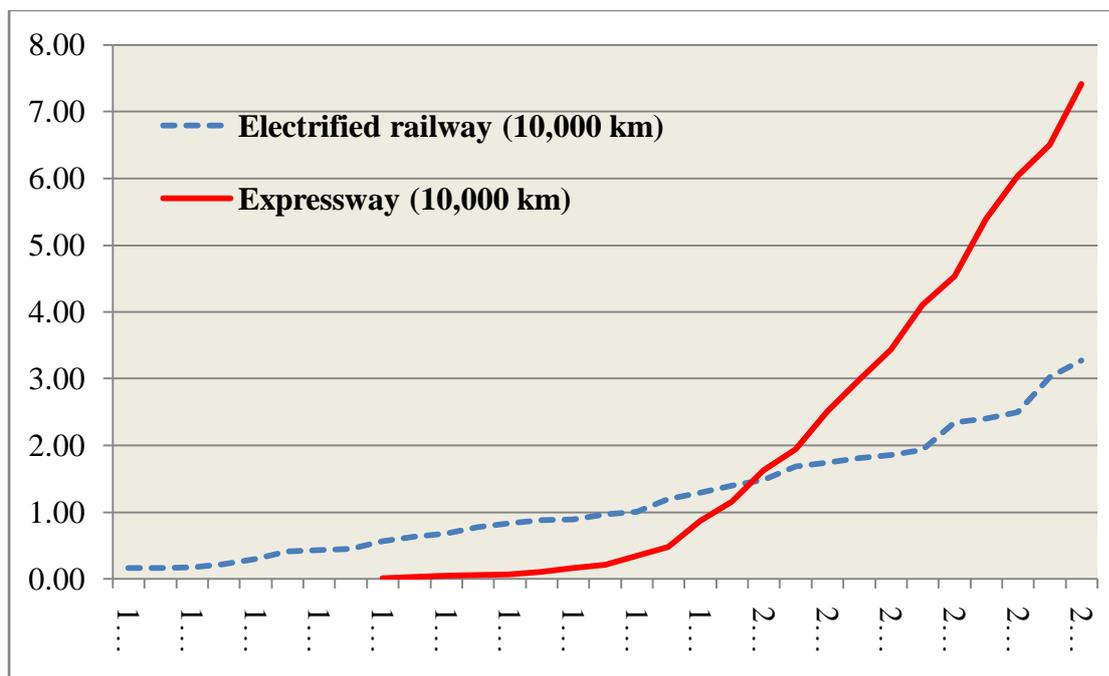
Note: K-growth = growth of gross fixed capital formation, C-growth = growth of year-end outstanding loans of banking sector total, CSB-growth = growth of year-end outstanding loans of state banks

Figure 4. Output of cars and integrated circuits



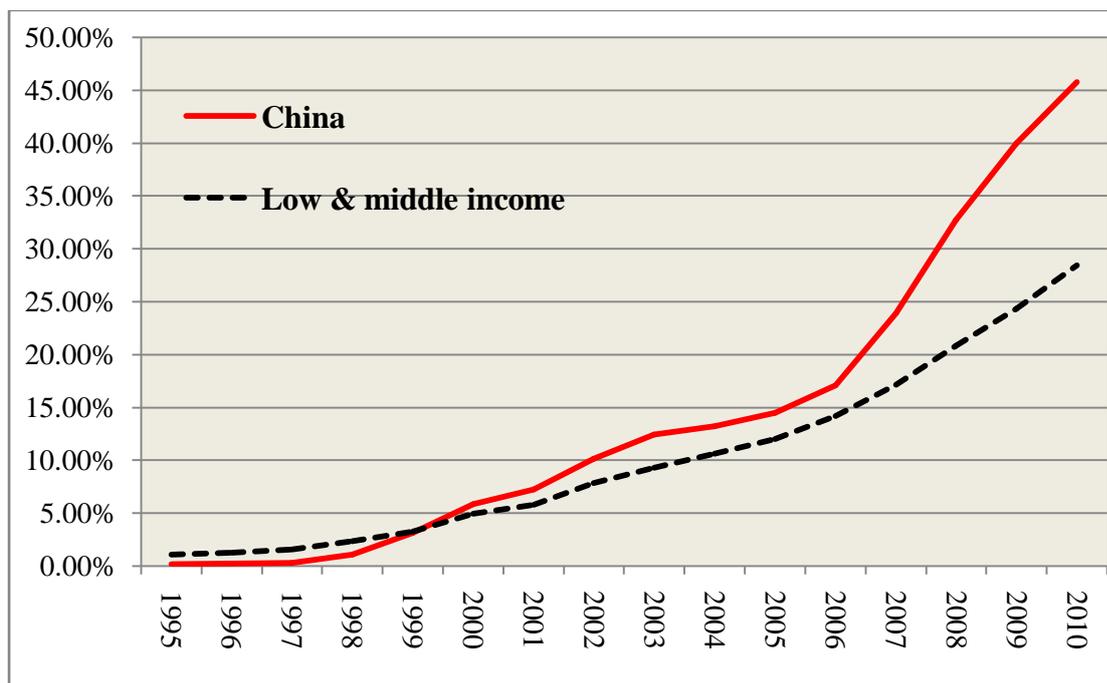
Sources: *China Statistical Yearbook*, various years.

Figure 5. Length of expressways and electrified railways



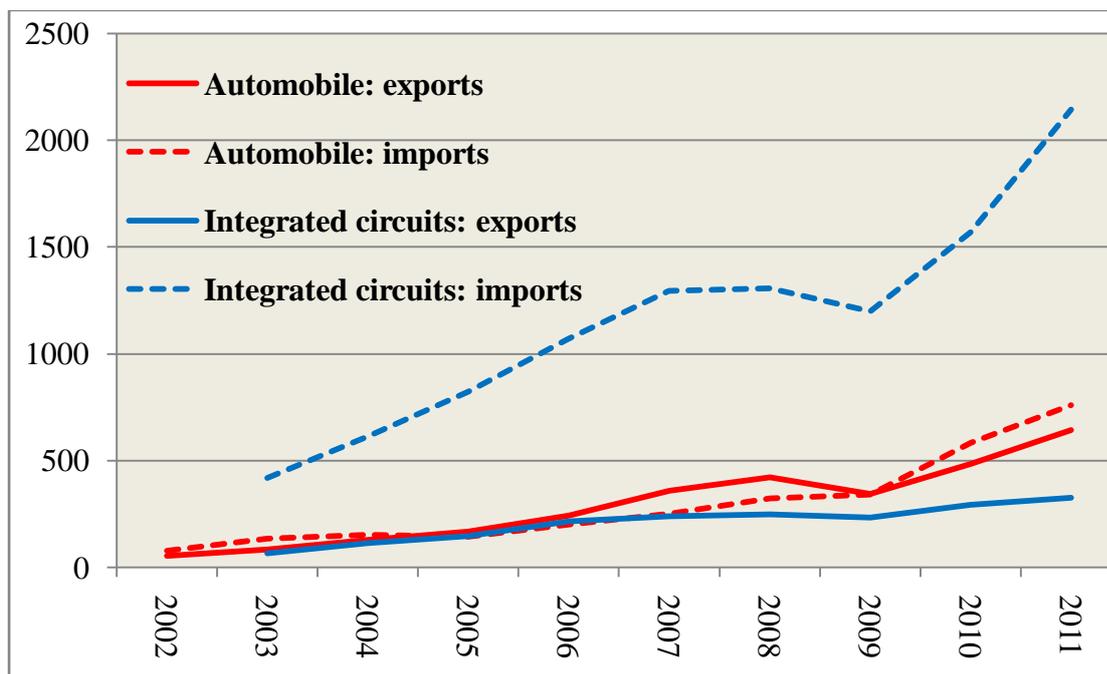
Sources: *China Statistical Yearbook*, various years

Figure 6. Internet users (per 100 people, relative to high-income economies)



Sources: *World Development Indicators* data bank, accessed 26 January 2012.

Figure 7. Exports and imports of automobile and integrated circuits (USD 100 million)



Sources: Ministry of Industry and Information Technology, official website.