From Dirigisme to Realism: Chinese Industrial Policy in the Era of Globalisation

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The 2012 "Fortune 500" classification of the world's largest companies includes 73 Chinese firms (32 for France and 68 for Japan), whereas there were none only 15 years ago.[1] Meanwhile, Chinese firms are increasing their overseas operations with nearly $60 billion of foreign direct investment per year, on average since 2008, compared to less than $1 billion annually before 2000. Fifteen years ago, Chinese exports were mainly composed of primary products and goods with a low technological content. Today they are rapidly concentrating on products in the information industry. Research and development (R & D), which was totally lifeless in the early 1980s, has also experienced brisk development since the late 1990s: China is now the world's second largest publisher of scientific journals and ninth in the number of patents filed in the United States in 2009.[2]

These signs of the emergence of China's industrial power raise a number of questions in the fields of economics and industrial policy, as well as in growth theory (Huchet 2010). After the Japanese and Korean miracles, the temptation is indeed very strong to apply to China – the civilisation at the origin of the Confucian political and cultural basis of Asia – explanations related to the omnipotence of the State and the effectiveness of industrial policy (Johnson 1982). What is really the truth? Has China followed the virtuous industrial policy footsteps of its Asian neighbours? What have been the terms of the industrial policy since 1978 and what effect has it had on China's economic takeoff? What directions might industrial policy take in the coming years, given the context of the increasing openness of China's economy? This paper aims to provide some answers to these questions.

[1] http://money.cnn.com/magazines/fortune/global500/2012/countries/China.html?iid=smlrr, consulted 31 August 2012.

[2] Royal Society, Knowledge, Networks and Nations: Global scientific collaboration in the 21st century, Royal Society Policy document, March 2011, 114 pp.

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Section 4.1 recalls some aspects of the historical legacy of the period before 1978, as well as some features of the first steps to economic reform in the late 1970s and early 1980s. These had a major influence on the objectives, the strategy and the efficiency of Chinese industrial policy. The second section presents the main outlines of China's industrial policy until the late 1990s, focusing primarily on the policy of creating "national champions", and the rationalisation of industrial structures, as well as on the development of the technological capabilities of firms. Industrial policy during this period was often characterised by excessive ambitions, given the mode of socialist institutions and businesses, along with the chronic underdevelopment of human and financial resources that plagued China until the mid-1990s. Policies launched during this period were largely imbued with socialist planning. They led to mixed results depending on the sector, but were often disappointing in terms of objectives. Other elements of the reform policy during this period which were not, strictly speaking, industrial policy, did in fact help transform corporate behaviour and the functioning of institutions, to increase the financial and human resources available. Finally, Sect. 4.3 looks at the transition from dirigisme to realism in the second half of the 1990s. This development occurred within an economic context that was generally much more favourable than in the 1980s. The improved tax situation allowed the Chinese government to have the financial means to launch credible and ambitious industrial policies. Institutions, including ministries, commissions, and agencies were restructured, while the vestiges of planning were cleared away. The State industrial sector was also significantly restructured, through privatisations, mergers, layoffs and employment along with social protection reforms which shattered the "iron rice bowl" that the socialist leaders had not dared to attack in the 1980s.[3] Finally, the massive investments made in the 1990s in the educational system of large cities and in infrastructure also contributed to improving the design and conduct of industrial policy. The less proactive industrial policy of the 2000s also diversified, both in terms of means and targets, aiming to provide support to the private sector and small- and medium-sized enterprises (SMEs). These businesses had been totally ignored during the first period.

4.1 The Historical Legacy of Industrial Policy

Despite the profound break in the economic development strategy that occurred when Deng Xiaoping seized power in December 1978, Chinese policy-makers remained firmly focussed into the mid-1990s on a vision of industrial development policy that was inward and planned. It is useful to recall some historical facts and aspects of the early stages of economic reform, which had a major influence on the content and evolution of Chinese industrial policy during the 1980s and 1990s.

[3] The "iron rice bowl" refers to a system of lifetime employment, free housing and basic social protection which prevailed in State enterprises and municipalities.

4.1.1 The Weight of *History*

Generally speaking, China's industrial policy has been influenced by four major events in the history of modern and contemporary China:

- A sense of humiliation and theft of its rank as a great millennial power in the face of Europe, the United States, and Japan which all forced China to sign unequal treaties. This has led to a strong will to find a prominent place on the world stage.
- The observation made in the late 1970s by Chinese leaders of its growing economic and technological backwardness with respect to China's Asian neighbours. Economic success is analysed as the result of proactive action by the State, within a capitalist system.
- A deeply rooted belief in the omnipotence of the State and its capacity to intervene following the combined influence of the "celestial bureaucracy" of imperial China and the assimilation of the Soviet planning model.
- Management of the policy favouring population growth promoted by Mao Zedong in the late 1950s. Despite a slowdown in the birth rate in the early 1970s, this policy resulted in a doubling of the population between 1958 and 1980 (when China's population exceeded one billion individuals) and the influx of young people (near 15 million per year) on the labour market in the late 1970s. The spectre of widespread unemployment that could undermine social stability and thus the communist regime has strongly guided the choice of the Chinese leadership, both at central and local levels. The communist State adopted a *laissez-faire* approach and tolerance for the proliferation of public and private companies which are under-capitalised and poorly innovative, but able to absorb this huge "industrial reserve army".

These four major factors in the history of modern and contemporary China have strongly conditioned the ambitions, the nature, objectives and results of the industrial policy pursued by the State over the last 30 years.

4.1.2 The Maoist Legacy

China took a great step in 1978 in terms of re-designing its industrial development strategy. Few countries, even in the communist camp, had been so cut off from the rest of the world, having experienced political movements such as the "Great Leap Forward" (1958–1961) and the Cultural Revolution (1966–1976), which were devastating to its economic organisation.

The industrial development strategy in the Maoist era was based on an essentially functionalist view of the economic system. Unlike the Soviet model, which favoured large production units, China's strategy was also concerned with local autonomy in production. Each government department had its own companies, each province, even each municipality had to adopt as complete a production system as possible. The period during which so-called "Third Front" companies were set up in interior provinces (1964 and 1973) only reinforced this dispersion phenomenon and the duplication of investments. Political movements orchestrated by Mao's Great

Leap Forward and the Cultural Revolution deeply destabilised the Soviet-style system of central planning China introduced between 1953 and 1958. The implementation of such Soviet planning was stopped at the institutional level between 1958 and 1978: no 5-year plan reached its objectives during this period (Riskin 1987). In 1990, just months after the Berlin Wall had fallen, 52,000 products were still being managed by central planning in Moscow, at the USSR's Gosplan. In China, in 1978, only 700 products were managed centrally, by the State Planning Commission in Beijing (Naughton 1995).

The Maoist strategy led to a prioritisation of industry subject to the planning level of production. Production units existed that were directly supervised by central government (*Zhongyang shu*), while other units were dependent on provincial or municipal governments (*Difang shu*). Naturally, companies that were under direct management by central government benefited from its logistical support. These large state-owned enterprises (SOEs) were considered as China's "industrial backbone" (*Gugan qiye*), while the projects they developed were the so-called "key points" (*zhongdian*) of the 5-year and annual plans. They received priority support financially and materially (access to raw materials and procurement) from central government. For these companies, planning was also developed in the USSR. Their numbers grew throughout the 1960s, then levelled off during the 1970s and 1980s at around 10,000. But they never dominated the entire economy, as in the USSR.

Planning did not play such an important role for businesses managed at the provincial level. The allocation of inputs was not organised centrally. At most, planning was undertaken in aggregate terms, province by province, with industrial provincial offices subsequently taking responsibility for ensuring a more precise allocation for each company. Most often this allocation of resources was organised at the provincial or municipal level. However, planning was far from covering all the activities conducted by firms in this category. Companies in search of inputs, and marketing their outputs were taken to develop horizontal relationships with other companies. These horizontal relations were in barter, not monetary form (Granick 1990). The majority of these companies were taxed as "3/80" (San Ba): the provincial government allocated 80 % of the necessary inputs, 80 % of specified material, and 80 % of the resources needed to purchase equipment. Mao bequeathed an industrial organisation which superimposed two systems: a planned and centralised Soviet-style system for a few large companies that provided only 30 % of total industrial output (compared to 74 % in the USSR), and a myriad of economic systems compartmentalised at the local level and characterised by a "semi-planning and semi-anarchy" (Granick 1990).

4.1.3 Change and Continuity Until the Mid-1990s

Until the mid-1980s, the communist leaders tried repair the aberrations in the management of the economic system put in place under the influence of Mao between 1958 and 1976, instead of introducing a market economy. Policies aimed to depoliticise economic life, to demilitarise company management and

management by ministries, and to restore central planning, which had been largely discontinued. The authorities were locked in a dialectic process they could not get out of: they had to pursue reform both to correct the contradictions of existing reforms which could destabilise them, but which also held out the promise of generating growth to maintain a minimum of political legitimacy among the population. With each wave of reforms, the deregulation of the economy (and thus the parallel freedom of individuals and firms in the economy) gained increasing scope. But it was not until the bloody episode of Tiananmen in 1989 and the attempts to return to economic socialism by the conservative wing of the CCP were overcome, that the 14th Congress of the CCP in October 1992 was able to set aside the political, intellectual, economic barriers for lack of a possible alternative, and that the market economy was clearly adopted in the policy reforms of the economic system.

There was therefore a clear turning-point in the late 1970s, which was primarily aimed at a return to socialist normality, and peripherally, elements of reforms to make the socialist system more flexible, such as the opening of Special Economic Zones (SEZ) in southern China, the dismantling of People's Communes, and the opportunity to develop collective enterprises in rural areas. These 'peripheral' reforms proved to be the essential dynamics of the revival of Chinese industry. Yet they took place in indirect ways and often in a manner not anticipated by the regime.

A chronological analysis of Chinese industrial policy makes it possible to distinguish two periods clearly enough. The first lasted nearly 20 years, from 1978 to mid-1990. This period was marked by strong interventionism and inordinate ambitions in terms of the financial and human resources which China had. Furthermore, objectives were carried out in the framework of an economy still largely operating within a planned system. The second period began in the mid-1990s and was marked by greater realism, as well as an improvement in the design and implementation of industrial policy in China.

4.2 The Era of Dirigisme

During the first period from 1978 to the mid-1990s, industrial policy focused on three main priorities: (i) the creation of large national industrial groups; (ii) the assimilation of imported technology from abroad, and; (iii) reform of the national system of research and development (R & D). The general principles underlying this policy, the strategy to achieve the objectives, the types of companies covered by the industrial policy, and the means implemented were still largely rooted in socialism and the functioning of a planned economy:

- During this period, the principles were still based on a functional, productivist and centralised vision of the economy.
- The strategy adopted by the Chinese government was very proactive. The State was the centre of all decisions and directly intervened in companies via the transmission belt of public ownership and planning.

- Firms receiving state aid were all large SOEs, the so-called "backbone" of the industrial system (*gugan qiye*). Small and medium enterprises, let alone those that would grow out of the state sector, were completely ignored by industrial policy.
- Industrial policy was largely controlled by the powerful the State Planning Commission and central ministries that oversaw various industrial sectors. They determined the priority sectors and firms, and the volume of investments within the framework of 5-year plans.
- The financial, administrative and human resources used to carry out policies were both weak and disassociated from planning.
- Finally, the objectives put forward by the Chinese government in the context of industrial policy were quite ambitious: technological catch-up in areas in which China had lagged for decades behind the technological frontier; the creation of large industrial groups capable of entering the small world of the "Fortune 500" classification; strong integration of industrial production throughout the country to reduce imports; and the autonomy and empowerment of scientific and technological production (Conroy 1992).

4.2.1 The Ambitions of China's Planners

The Policy of Creating Industrial Groups and the Rationalisation of China's Industrial Structure

Chinese leaders have been strongly influenced by the experiences of Japan (with its *Kereitsu*), France (nationalisation and national champions) and Korea (*Chaebols*), countries in which the State has played a more or less direct, but no less important role in the formation of major national industrial groups capable of generating cutting-edge technologies, and projecting economic power beyond their borders. In the detailed analysis of the late industrialisation of Japan, South Korea, and Singapore, the presence of large industrial groups with a multinational vocation has been viewed by Chinese leaders as the main reason for the speed of development and of the industrial dynamism of their virtuous Asian neighbours. In Chinese rhetoric, such groups were then exhorted to become the "national army" (*guojia dui*) representing China abroad, while being industry leaders at the national level (*zhuli jun*). These enterprises appeared as the key to solving all problems and structural deficiencies of Chinese industry. Their role was to break down barriers both geographically (business combines in different regions), but also in terms of ministerial dependencies (business combines linked to different government entities).

Consolidation was to occur around a few large state enterprises and progressively lead to the creation of increasingly important financial and technological synergies. The context in which these national experiences took place (a market economy that was competitive at the national level, the decision-making autonomy of companies) was largely concealed by the designers of China's industrial policy.

Only the very proactive and interventionist dimension of government policy was put forward, which overestimated the ability of the State to create industrial groups able to withstand international competition.

The Chinese authorities have sought to rationalise the industrial structure of the country. The policy of regional self-sufficiency, along with Mao's dictum of "relying on one's own strength", which he promoted from late 1950s until his death, resulted in the duplication of investments in thousands of small production units. These were under-capitalised and incapable of generating economies of scale. The proliferation of small SOEs was most widespread in the cement, fertiliser, steel, and electricity generation industries. For example, it is estimated that there were nearly 500 companies producing steel in the late 1970s (Perkins 1991). The policy of decentralizing investment authorisations, taxation and bank finance launched by Deng Xiaoping in the early reforms further aggravated this fragmentation of industrial structures. The negative impact of such fragmentation of industrial structures became apparent: over-production in virtually all sectors of the industry (hence low capacity utilisation), very low, or even with no returns on investment, the waste of savings, and initial signs of negative consequences for the banking in terms of bad loans.

The Management of Technology Transfers

As for technological progress, the strategy of self-sufficiency (*zili gengsheng*) remained the rule. The decision to allow foreign direct investment (FDI) in four "special economic zones" (SEZs) in southern China, quickly spread to 14 large cities and 256 districts. But it did not call into question the principle of "import substitution", which remained at the heart of the Chinese State's technology policy. The FDI Act in 1979 was a turning point, compared to the previous period when some "turnkey" plants were imported without foreign capital. For the first time since 1949, the FDI Act allowed foreign capital to enter Chinese soil. Such foreign capital was only allowed into re-export activities and into some key sectors (the automotive, nuclear, telephone and integrated circuit industries) that Chinese companies were unable to master. FDI had to be in joint ventures, in which the foreign partner could not hold a majority stake.

Re-export activities, by foreign-owned companies producing in China, mainly in SEZs and coastal towns, were not in direct competition with the large state enterprises, as they did not have the right to sell into the domestic market. For investments in the so-called priority sectors (the list was changed periodically), the FDI Act was designed to ensure a maximum transfer of foreign technology to ensure import substitution. Joint ventures (JVs) were subject to a set of rules on the degree of foreign technological innovation transferred, and the rate of local integration into production. This had to rise over time to help create Chinese suppliers of components and spare parts. Furthermore, the Act required joint ventures to transfer (after several years) their knowledge to their Chinese partners in the JV (generally, large SOEs), so the latter could become more independent in terms of technology.

Reform of the National R & D System

The national R & D system before 1978 was largely modelled along Soviet lines until the Cultural Revolution, and practically disintegrated for nearly 10 years thereafter. The system suffered the weaknesses of the Soviet model: a partitioning of R & D performed in public laboratories (many of which were for military purposes) *vis-à-vis* industry, the waste of scarce human and financial resources, bureaucratic excesses in the planning of innovation, very low efficiency in its contribution to the production of cost-effective technologies.

As of 1985, the central planners sought to boost the R & D system through a series of reforms. These are aimed at selecting public research institutions according to their excellence and opening up the R & D system by bringing together the productive sphere of the research. With the exception of laboratories of excellence, research institutions have been gradually led out of dependency on state subsidies, which previously funded the entire R & D system.

Despite the existence of a strong commitment in central government, the establishment of industrial policy very quickly ran into the practical functioning of the Chinese economy. In the late 1990s, nearly two decades after the launch of these three priority programs, the results were fairly mixed, even disappointing in terms of objectives. However, some more general reforms related to deregulation of the economy did have a positive impact on the operation of Chinese enterprises.

4.2.2 Failures and Surprises in the Policy of Creating Industrial Groups and the Rationalisation of Industrial Structure

The Failure of Administrative Logic in the Creation of "National Champions"

At the end of 1989, Chinese industry had 1,630 industrial groups that had been set up following authorisation by central and local government.[4] The industrial groups formed during the 1980s existed only on paper. They had no internal structure likely to lead to technical and financial complementarities following from concentration. Analyses very quickly pointed to three operating characteristics of the socialist Chinese economy as the main sources of problems in the creation of industrial groups: (i) the system of public ownership, (ii) the administrative dependency of companies *vis-à-vis* local governments, and (iii) the fiscal and monetary systems. The majority of consolidations into groups were conducted in an authoritarian manner by municipal governments, through administrative edicts forcing local companies in the same industry to merge. These mergers were often obtained to hide losses in some firms by linking them to other businesses in better financial health. An inter-sectoral coordination effort was made in the early 1990s (again at the municipal level), with local boards of management of State assets being set up

[4] In *Zhongguo Qiye Guanli Nianjian*, (Directory of management of Chinese companies), Zhongguo Qiye Guanli Xiehui, Beijing, 1990, p. 305.

in haste in major Chinese cities which were meant to conduct the local industrial policy. Despite this, the groups did not reflect the needs or strategies of their component businesses, which had to comply with the orders of the local authorities. It was also difficult, if not impossible, to create groups which crossed the territorial jurisdiction of a municipality or province. The payment of taxes, the management of earnings, the authorisation of investment finance, the appointment of directors and company management, all depended on local government, which exercised the right of ownership delegated to it by the central government in Beijing. As the groups were sources of tax revenue, patronage, and political prestige, no local government wanted to forego the benefits which ownership of such public companies provided. However, the vast majority of these groups were unable to deploy the financial, technological and business synergies for which they had been created, so that they remained mostly a collection of independent production units (Jian 1990).

Concerning the rationalisation of industrial structures, the policies launched by the central government produced meagre results. Thousands of under-sized producers, making the same products, were spread across the country: there were 8,000 independent producers of cement, compared to an estimated 1,500 worldwide; 123 automobile producers; 1,500 steel plants. An analysis of concentration ratios based on the census of industrial enterprises (conducted in 1995) showed there had been no positive developments in this area. Among the 25 major industrial sectors (despite contrasting trends by industry), the market shares of the top eight companies increased only in very small proportions, from 11.7 % to 12.2 % between 1990 and 1996. The 1995 census of industrial companies also showed an extremely low production utilisation rate in the 43 sectors surveyed: only four sectors recorded a capacity utilisation rate of 60 %. In 1994, 500 Chinese groups accounted for only 16 % of GDP, much lower than in industrialised countries, where the top-500 companies generally represent at least 30 % of GDP.

Decentralisation: An Engine of Growth and a Brake on Concentration

The difficulties encountered by the central government in streamlining industrial structures were largely due to the significant level of decentralisation of decision-making within the administration concerning investment.

This decentralisation took place with the background of the Maoist legacy that, for ideological and military reasons, had sought the fragmentation of the production. The political and economic environment in which decentralisation took place in the 1980s had evolved. On the one hand, large state enterprises remained within the system of centralised socialist planning at the national level, albeit with some management autonomy relating to daily business. They continued to have priority support from the central government for their financial needs, as well as access to raw materials and human resources, while representing the main source of tax revenue of the central government. On the other hand, for small and medium-sized SOEs controlled by central government or local authorities, China's leadership felt it was unrealistic to integrate them into a centrally-managed apparatus. Subsequently, decentralisation has profoundly changed the incentive system of

local management, given changes in the business environment, including the increasing monetisation of the economy, particularly through the development of bank financing, the growth of tax revenues of local governments and a liberal political environment conducive to growth and personal enrichment which was advocated by Deng Xiaoping (Shirk 1993). Local officials could henceforth participate actively in local economic development, accelerate their careers in the hierarchy of the Communist Party of China (CPC) on the basis of purely economic criteria, develop local patronage, and enrich themselves by marketing their decision-making authority and by participating indirectly in the creation of new businesses.

Changes in the incentive system for managers, their grip on local bank financing channels (mainly through the appointment of branch managers in state commercial banks) led to fast growth in start-ups and investments. Entrepreneurship not only affected the collective and private sectors. In rural areas, start-ups were carried out under the status of collective ownership (more flexible and vague to the point of being qualified as hybrid).[5] In cities, the state sector continued to grow rapidly (from 65,000 to nearly 126,000 industrial enterprises in 1996) and remained by far the largest employer in industry, in the mid-1990s.[6] This movement to create state-owned enterprises in the industrial sector took place at a time when bankruptcies were non-existent and when the constraints to repay bank loans for public firms were almost zero. It is easy to understand why the policy of creating groups and rationalising industry largely failed. Paradoxically, this sustained creation of companies along with its attendant chronic over-production would lead to the emergence of competition in some industries and produce unexpected results regarding the emergence of China's industrial groups.

Competition and the Emergence of New "National Champions"

In this context of the proliferation of companies and overproduction, competition gradually developed in the late 1980s in several sectors, such as light industry, building materials, the automotive industry, textiles and chemicals. The downturns in the economy between 1989 and 1991, and between 1994 and 1998 heightened competition between firms, within an environment of chronic overproduction. With the exception of a few areas that were still monopolistic or regulated (like the electricity and oil industries), companies had to fight to win customers and market share, from this time onwards.

One of the paradoxical and unexpected effects of decentralisation for Chinese industrial policy-makers was the advent of large industrial dynamic firms of a new type, controlled by the State, and which were able to use the competition to their advantage. As of the early 1990s, some companies which had not been among the best-known and most-favoured by the State during the 1980s, launched price wars,

[5] Local governments were owners of companies in towns and counties, so their management was very largely privatised (Nee 1992).

[6] *Zhongguo tongji nianjian* (China Statistical Abstract), 1997.

improvements in product quality and after-sales services. They also aggressively development of their distribution networks across the country. This strategy triggered a virtuous cycle as they increased their market share, and economies of scale, helping to raise profits, which were then assigned to new investment in new products or to improve quality. These firms have built up their reputations on strategies that do not differ from those of large firms in capitalist economies. It should be emphasised that these firms were not included in the list of "national champions" identified by those responsible for industrial policy in the 1980s, though they were not deliberately discriminated against by central or local government. These groups include firms such as: Changcheng (Great Wall) in IT; Mudan in Beijing, or Panda in the province of Jiangsu; TV Plant No. 1 for electrical appliances in Shanghai; Haier, Changhong, Konka in electrical appliances (Richet and Huchet 2005); Stone and Legend (now Lenovo) in IT (Kennedy 1997); Baosteel in steel (Steinfeld 1998) or ZTE and Huawei in telecommunications. But, these groups were also far from being supported financially and logistically in the same way as large state enterprises considered as a priority, and which dominated their sectors during the 1980s. The very strong personalities of the leaders of these firms and the results obtained also led to a *de facto* privatisation of the management of these companies. Several case studies (Richet and Huchet 2005) have shown that the leaders have gained their independence over almost all management decisions of the company (except for the sale or purchase of assets, for which regulators still retain a degree of control). Their independence also comes from their funding strategy. Having not benefited from the generosity of the State in the 1980s, the initial financing received from banks was used efficiently and the profits generated by business reinvested in relatively well-planned new investments, plus avoiding too great a dependency *vis-à-vis* the state banking sector.

The results, however, were devastating for the companies that failed to adapt to competition, including large groups which were the priorities of industrial policy during the 1980s. With funding primarily based on bank lending, businesses that were unable to increase their market share very quickly found themselves unable to meet their repayments and had to borrow even more to continue to survive. In 1994, when the major reforms of the public sector were launched, these SOEs constituted a cohort of loss-making companies which were carried by the public banking sector and which the government was obliged to restructure or close in the second half of the 1990s. This shift from a market dominated by supply in the 1980s, to a market dominated by the demand in the early 1990s, with the introduction of competitive strategies by some companies, has been a very powerful factor in pushing forward the concentration of industry since 1997.

4.2.3 The Accumulation of Technological Capabilities

The targets set by the Chinese government were to make up for the technological backwardness of Chinese firms relative to their foreign counterparts; to establish

"national champions" capable of innovation and able to compete with foreign firms and to achieve maximum technological autonomy in all branches of industry in order to reduce foreign dependence (and China's import bill). In the late 1990s, nearly 20 years after the launch of this policy, these objectives were still far from being achieved, despite some successes in some areas. China's failures, however, were not all useless. They were extensively analysed by the Chinese authorities, and helped modify the government's policy in the late 1990s.

Concerning technology imports (excluding FDI), state enterprises have mostly focused on conventional technology transfers: licence purchases, purchases of production equipment with assistance from suppliers, purchases of turnkey factories and procurement of "turnkey-type" products. Without these imports of foreign technology, Chinese companies could not have overcome the many technological bottlenecks due to the isolation of the Maoist period.

These imports were made at the cost of a huge waste of money and have been a means of survival and sustainability of largely inefficient firms in the public sector. Even though the size of the domestic market was propitious for the imperatives of economies of scale and scope, that are crucial in industry, it was not possible to achieve these because of the regional (or municipal) compartmentalisation of the administrative apparatus managing of public enterprises (Chen 1990).

State-owned enterprises suffered badly from very rigidities of the socialist system: lack of decision-making autonomy in relation to the supervisory bureaucracies, foreign exchange rationing, inadequate incentive systems for managers and employees, serious deficiencies in the management and organisation (Simon 1991), the allocation of own resources of companies for the benefit of firms' social services (the "iron rice bowl" in housing, hospitals, schools, health and retirement benefits) to the detriment of innovation (Geng 1991), weak linkages with public R & D institutes and rigidities arising out of the administrative control of investment decisions.

Thus, the assimilative capacity of foreign technology quite quickly became an important feature in discriminating state firms, as competition increased in the early 1990s.

Success in the assimilation of foreign technology was a major element in the emergence of "new national champions". But it was also important in the development of small firms in the collective and private sectors, which worked as subcontractors for leading public enterprises or foreign companies operating in China. Several field studies have shown that these companies have been able to assimilate foreign technologies: not only the hardware but also the *softer* parts of technology such as the organisation of work, the supply of spare parts and equipment repair (Jefferson et al. 1994). This openness and control of the black box of technology, has given them some form of independence from foreign suppliers in a context of shortage of foreign exchange, but also the ability to implement peripheral improvements, and over time to become gradually able to catch up with Western firms (Dalhman et al. 1987). In some industries, it is precisely this type of technological capacity, acquired through the incremental improvement of foreign technology, that allowed Chinese companies to improve their competitiveness or to become world leaders.

It is interesting to note that large parts of the industrial policy of the central government during the 1980s and early 1990s ultimately contributed very little to the technological success of the "new national champions" as well as the more dynamic collective and private firms. These firms were not priority actors supported by the State during the 1980s. The technological dynamism of a large share of these leading firms, which emerged in the mid-1990s in the competitive sectors, did not owe much to aid from central government included in its industrial policy. It was not until the second half of the 1990s and especially the 2000s that these firms were supported, but as part of a different strategic approach from that advocated by the State in the 1980s.

Despite the failures and waste, certain aspects of Chinese government action had a positive effect on technological catch-up by the "new national champions". Drawing on the lessons of centuries of industrial mercantilism, the Chinese authorities have pursued a policy of protecting the domestic market and the selective opening to foreign capital did foster the technological catch-up of a certain class firms. This policy was conducted in parallel with the gradual deregulation of the planned economy.

4.2.4 The Double-Edged Management of Foreign Capital

The impact of the policy of opening the economy to foreign capital has generally been beneficial to Chinese industry. The selective management of foreign investment, with on the one hand, FDI for re-exports only, and on the other hand FDI to produce goods for sale on the domestic market, but supervised by JV contracts for leading technologies, had several positive consequences:

- FDI for re-export, which was dominant until the mid-1990s by the Hong Kong and Taiwanese capital (nearly 3/4 of the total), was mainly located in the provinces of Guangdong, Fujian and Shanghai. Such investment allowed China to earn foreign exchange to finance purchases of foreign technology for Chinese companies. This FDI also contributed to create a set of small sub-contractors from the private and collective sectors. Often specialised by business, these formed a dense network of industrial partners, which were also in competition. Such outsourcing led to geographic specialisation with strong industrial districts that are among the most competitive in the world.
- For FDI authorised to sell on to the domestic market, and which was selected on the basis of technology or type of product manufactured, its presence in China had two important technological consequences (apart from saving foreign exchange). The first, and not least, has been to allow the Chinese economy to benefit from products such as automobiles (the JV with Volkswagen), integrated circuits (the JVs with NEC and Motorola), digital telephone exchanges (the JV with Alcatel), nuclear power (Areva), that Chinese producers were unable to produce. Technology transfers within JVs have generally been quite satisfactory. These product areas have had significant ripple effects via productivity increases and improved infrastructure. The JV also helped train local subcontractors who,

in many cases, after a few years, achieved commercial and technological autonomy to become globally competitive. The second, more indirect, consequence was the catalysing role played in the technological modernisation of Chinese enterprises in some sectors. JVs have been the undisputed technological leaders in many industrial sectors, and have pushed Chinese companies to pick up to speed in appropriating technology (Jefferson et al. 1994). Management by central government has avoided causing immediate, head-on shocks (of the type recorded in the former socialist countries following the sharp drop in tariffs after 1991) with Chinese firms, though the latter have still had to try to approach technological standards of JVs.

In terms of strategic positioning in the value chain, more is known about the effects induced by this policy of openness. Chinese high-technology exports remain largely dominated by foreign-owned companies (nearly 80 % of total) causing some crowding out of national producers in segments with higher value added. But even when Chinese producers dominate the industrial scene, their lack of visibility in terms of brand recognition and overseas marketing confines them to activities with very low profit margins. This hampers their ability to finance technological upgrading. It is not surprising therefore to see that Chinese industrial firms subcontracting for European, American and Japanese multinationals express the desire to move up the value added chain, in order to capture a greater share of profits on sales to consumers in developed countries. To achieve this objective, the control of intermediate companies that operate in the field of distribution is crucial to Chinese firms.

Finally, as far as the negative effects of the FDI strategy are concerned, it is worth mentioning that the best students leaving China's education system are attracted by foreign firms, thus limiting the impact of training on the human resources available to local industries run by large state firms.

4.3 Towards Greater Realism... and Efficiency

The late 1990s and early 2000s was marked by a progressive turnaround in the content and strategy of Chinese industrial policy. In some areas, such as the concentration and rationalisation of industrial structures, reform of national R & D, or the accumulation of technological capabilities, encouraging results emerged quite rapidly within a few years, portending to the greater effectiveness of industrial policy in the coming decades.

4.3.1 A Favourable Economic and Institutional Environment

The recent changes in industrial policy and the more encouraging results that have been recorded since the late 1990s are largely due to the positive results of the general reforms of the economy.

The Exit of Socialism and the Improvement of the Functioning of the Economy

In terms of the functioning of the economic system, China has now largely exited socialism. Since 1994, planning mechanisms have been dismantled, as characterised by the deregulation of prices, supply and distribution. The reform introduced in the early 1980s, and which allowed businesses to sell any production exceeding planned quotas set by the State Planning Commission on the open market, gradually led to the complete disappearance of planning. Today, just over 90 % of the retail prices in the industry and more than 80 % of agricultural prices are set by the market.

The financing channels of business investment have also been completely reformed. State banks benefited from the broad recapitalisation in 1998, at a total cost estimated at nearly $500 billion.

Concerning property rights, the last decade has been marked by a strong diversification of ownership and a significant retreat of the State. For political reasons, the path was more tortuous than in other socialist countries. But since 1997, between 30,000 and 40,000 SMEs have been privatised out of a total of 126,000 state-owned enterprises in the industrial sector in 1996 (Huchet 2006). The domestic private sector generates nearly a third of industrial production, and if foreign companies are included, private ownership in 2010 represented nearly 70 % of the country's industrial production (World Bank 2012). Such a review of all major operating mechanisms of socialist economies can be extended, leading to the conclusion that the Chinese economy exited the system in the early 2000s.

The Exit from of Socialism Has Had a Significant Impact in Terms of Industrial Policy

- The budget constraint on businesses has increased significantly to the point that it is now more and more difficult for companies that are leveraged to obtain bank loans to finance new investments. In parallel, banks have progressively improved their risk assessment of clients. Partial privatisation (stock market listing, capital entry by foreign banks) and the opening of banking to foreign banks since China's accession to the WTO, have increased pressure on both the State and banks, to improve the quality of their loan portfolios. These trends have led to further rationalisation of industries (via bankruptcies and mergers), promoting much faster concentration than existed in the 1980s and 1990s.
- The emergence of new actors in the private sector has led to a diversification of firms assisted by industrial policy. The importance of the private sector in the economy is such that industrial policy no longer focuses exclusively on the public sector. The criteria for awarding aid are more transparent, and less dependent on the status of the property. These changes are more marked at the local levels of government, which seek primarily to promote the development of their local economies.
- Regardless of their ownership status, companies are now subject to much less interference in their decisions about investment, financing, asset management or

the management of their human resources. They are thus able to formulate strategies for developing their activities which are much more independent, and implement incentive policies best suited to their employees. State enterprises no longer have to fund social protection entirely, which means they have more resources for productive activities and innovation in particular. Generally, their capacity to respond to opportunities arising in the business environment has become much faster and wider in scope. In this context, the State has been encouraged to play a more indirect role in its aid to companies.

4.3.2 Taxation Has Given the Central Government New Room for Manoeuvre

One of the most positive aspects of the reforms implemented since 1994 lies in the significant increase in tax revenues of the State, both for central government but also in the richest coastal regions. The decentralisation of the 1980s and the structural decline in the profits of state enterprises, that used to be the only source of income for the State, both lead to a very serious erosion tax revenues for the Chinese State. It also led to an imbalance in favour of the provinces, at the expense of the central government.

The major tax reform of 1994 and the various measures taken in the late 1990s concerning local finances (with control over extra-budgetary funds) have contributed – with the help of growth – to significantly improving the situation. The tax base of the State has been expanded, increasing sources of taxation. A better sharing of revenues between the centre and the provinces has been put in place, and most importantly, the State has managed to develop a tax administration that was largely deficient in the 1980s.

In nearly a decade, the results of this reform have enabled the State to envisage more solid support in some areas of industrial policy. After an annual increase of about nearly 20 %, total tax revenues in 2010 amounted to nearly 22 % of GDP and the share of the central government accounted for just over 55 % of the total, leading to a rapid rebalancing in favour of Beijing. Despite weaknesses (corruption, tax evasion, linkages with the lowest levels of government, regional disparities), the OECD predicts that the situation will continue to improve with the implementation of new reforms and the gradual modernisation the tax administration.

This improvement in the tax situation has also had a major impact since the late 1990s on the financing of infrastructural projects (with expenditures increasing from an annual rate of 3 % of GDP in 1983 to just over 8 % from 1998) and education. Significant improvements in these two areas have in turn had a positive impact on productivity in industry, the industrialisation of inland areas and, to some extent, on the conduct of industrial policy with a better educated elite working in government departments and agencies.

Notable increases have occurred in R & D budgets since 1997: annual growth has been running at 19 % (since 1995), to reach nearly $130 billion in 2011, or 1.83 % of GDP, and the resulting proliferation of targeted programmes with better

finance should continue with this improved tax situation.[7] These developments should be more important in coastal areas, in which the greatest technological capabilities are concentrated.[8]

4.3.3 Institutional Reform

In parallel to the exit from socialism and the improvement of the tax situation of the Chinese State, the last decade has been a period of intense reform of the institutions in charge of the economy. This has had a direct impact on industrial policy. Among the various reforms, we can select three, given their involvement in China's industrial policy:

- Almost all the industrial ministries from the socialist system have been removed since 1997 (with the number of ministries falling from of 40 to 29). State enterprises, especially larger ones, are no longer linked to a particular ministry but instead to the SASAC (State-Owned Asset Supervision Administration), which manages the assets of the State. In addition, the powerful former State Planning Commission has been transformed into a National Commission for Development and Reform (NDRC).
- The reform of the management of public assets led to the creation of the SASAC in June 2003. It is now the only entity within government to oversee and manage the portfolio of assets held by the State. This reform has led to a considerable clarifying of the skills needed in public asset management, not only within the central government, but also between Beijing and the large municipalities (Huchet and Fernandez Stembridge 2006). The SASAC directly manages nearly 130 of the largest public groups, with combined assets of almost $870 billion. Technically, the SASAC is also responsible for the assets of other state enterprises, but it has delegated responsibility for their management to local municipal commissions, which are under the authority of municipal governments. This reform has greatly reduced the sectoral compartmentalisation of the socialist system, which interfered in the conduct of industrial policy.
- In the field of government management of the R & D system, several important changes have occurred since the late 1990s. The Group Leader Affairs Council (CHECK General Affairs Office) of State for Education and Technology was established in 1998. It aims to facilitate the coordination of technology policy throughout the country. Moreover, the former State Commission of Science and Technology was merged with the Ministry of Science and Technology (MOST), which is the main ministerial body in charge of technology policy.

[7] The Ministry of Science and Technology of the P. R. of China.

[8] Beijing, Shanghai and the province of Guangdong account for 40 % of the country's R & D spending.

4.3.4 Towards a New Face of China's Industrial Policy

The industrial policy of the Chinese State has been marked by three major developments since the early 2000s, and which are expected to strengthen in the years to come. We are witnessing a widening of the fields of action of industrial policy. On top of the existing, traditional areas of technological progress and the strengthening of the competitiveness of firms, these include: the decline in the energy intensity of industry; the fight against environmental degradation; and the promotion of industry in the interior regions of the west. These objectives have been presented as new priorities by the Chinese government. Otherwise, the action of the State's industrial policy is less interventionist and less proactive than during the 1980s and 1990s. Finally, industrial policy affects all types of companies and not just public firms, while there is now greater transparency about the criteria for awarding financial aid from the State.

In terms of restructuring and consolidation, the central government remains very active via the SASAC concerning the 150 largest companies in the country, but its action is no longer as dirigiste and proactive as it was in the 1980s and 1990s. Major restructuring in the monopoly sectors (energy, transport, telecommunications) already took place in the late 1990s. These large companies now have a wider range of action. Only large divestments or acquisitions of assets are still tightly controlled by the SASAC.

For state enterprises at the local level, the reforms of the banking sector now limit the State's role in subsidising loss-making SOEs with bank loans, as was the case throughout the 1980s and in the early 1990s. Finally, the demographic situation which was unfavourable in 1978 has now changed considerably. The active population will start to decline in 2015 and while the investment multiplier generates less jobs, and migrant flows to cities of persons looking for work will continue to be significant until 2025, the situation is not as preoccupying as it was in the 1980s. The need to promote an industrial model which is labour intensive but low in profitability (with all the consequences this has in terms of bad debts in the banking sector) is gradually fading away. Even though China is still far from having the levels of the most advanced industrial economies, the concentration ratio is increasing slowly without the State having to intervene in the proactive and interventionist manner of the 1980s and 1990s. A certain form of dirigisme is likely to continue to express itself in the new fields of industrial policy on energy and the environment. After stating in the 11th (2006–2010) and the 12th Plan (2011–2015) that the decline in energy intensity and the fight against environmental degradation are priorities, the State is attempting to foster the closure of obsolete companies and technologies, and promote the concentration of production in larger firms in the name of energy intensity.[9]

Strengthening the technological capacity of firms is also being addressed more indirectly than in the past. The State is focusing on building large research units

[9] Report by the Prime Minister at the opening session of the National People's Congress, 7 March 2008.

working in basic research and leaving companies to be more independent. The latter now account for nearly two-thirds of R & D. Companies have accumulated technological skills that enable them today (unlike the 1980s) to open the "black box" of imported foreign technologies, to select better imports to be more independent of foreign technology. With the exception of monopolistic sectors, in which the Chinese government retains a capacity to intervene directly via public property, and in the setting of norms and standards, its action in other sectors is increasingly focused on improving the environment in which firms carry out their innovation efforts.

Conclusion

Chinese industrial policy has been marked over the past three decades by significant change, both in content and in its results. Until 1997, it was actually in areas in which the State wanted to be the most active and more proactive that it was the least effective in its actions, as evidenced by the rather disappointing results in terms of the rationalisation of industrial structure and the creation of "national champions". The omnipotence of the Chinese State must therefore be qualified. Its ability to create strong firms commercially and technologically speaking was less than what other States were able to do in post-war Japan, or (South) Korea in the early 1960s.

Since the late 1990s, the Chinese State's industrial policy has evolved, and has indeed supported these developments. The State is gradually moving towards a more indirect form of intervention with the introduction today of more incentive policies to improve the environment in which companies operate. The restructuring of the public sector, banking sector reforms, lower trade barriers following the accession to the WTO in 2001, and the rapid development of the private sector have, within the space of a decade, drastically changed the environment of the industrial policy the Chinese authorities are implementing. Not only does the State no longer have all the levers to act proactively as it did during the 1980s and 1990s, but the Chinese government also appears to have largely learned the lessons of excessive dirigisme and proactive intervention.

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