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System fragility, industrial policy and China's international relations, with special reference to strategic industries

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1. Introduction.

This paper examines the motivation for, and the outcome of China's industrial policies in key strategic industries and considers the consequences for China's relationship with the high income countries, especially the USA.

For almost two decades China has implemented a wide range of industrial policies, with the stated aim of nurturing indigenous 'national champions' (as well as local ones). Despite these policies, China has been unsuccessful in producing a group of globally competitive large firms. At a comparable stage in its development, Japan's industrial policies had nurtured a large troupe of several dozen giant, globally competitive firms, with global markets, global brands, and leaders of global technology in their field. They were also in the forefront of global management systems, having developed an immensely effective structure consisting of an extended supply chain around the core companies.

China is in the remarkable position of becoming the 'workshop of the world', but in a quite different sense from that of Britain in the nineteenth century. British firms were uniquely powerful in the world's most advanced technologies, exporting their high technology products across the world. China has become the home to most of the world's giant corporations, either producing directly in the country, or using it as a source of procurement. These firms' investments have contributed enormously to the progress of production systems within China. However, among successful late-comer countries China has become uniquely dependent on global capital and technology, and production within the production systems of foreign firms. This new phenomenon is a challenge for policy makers in both China and the high income countries, especially the USA.

The analysis contained in this paper raises some obvious questions: Should China abandon industrial policy, or should it pursue it with renewed vigour and in new, creative ways to meet the unprecedented competitive challenge that face large indigenous firms on the global level playing field within the WTO? Is it possible for global giant firms to build their production systems in China while China itself simultaneously nurtures a group of globally competitive large indigenously owned firms?

The dimensions of the policy challenge for both China and the USA are even greater if we recognise the fragility of China's political economy within which the explosive growth of these production systems is taking place. Section 2 of this paper outlines some of the key aspects of these challenges. The rationality of international pressure to force China's compliance with its WTO obligations, to abandon industrial policy, to fully open itself to multinational direct investment, to allow market forces to determine the exchange rate and permit free movement of capital into and out of the country, must be considered in relation to this wider environment of political economy and the possibility of system collapse.

Section 3 summarises the evidence concerning the competitive capabilities of China's large firms today, shortly after China's entry to the WTO. It concludes that in the

markets for high value-added goods and services, China does not yet possess any globally competitive large firms. This is partly due to the internal difficulties that China faces in implementing industrial policy. However, even more important is the fact that the competitive environment internationally is quite different from that which faced previous late-comer countries. China is rapidly integrating with the global economy at a time when the concentration of business power among firms based in the high-income economies has never been greater.

The intense international pressure upon China, especially from the USA, to abandon industrial policy needs to be considered in relation to a realistic appraisal of the dimensions of this challenge and the likely outcome of abandoning industrial policy. In order to provide a more realistic evaluation of these potential consequences, the Appendix analyses in closer detail the challenges facing China's national champions in the critical strategic sectors of aerospace and oil and petrochemicals, which have themselves formed the object of sustained industrial policy in the USA.

2. China at the crossroads.¹

China has achieved remarkable results in its social and economic development since the process of 'reform and opening up' was initiated by Deng Xiaoping over two decades ago. However, that same process has produced a series of formidable challenges for the entire system of political economy. One of these is the challenge of the Global Business Revolution, which is analysed in Section 3. The other principle challenges are outlined in this section.

Poverty, inequality and social tension.

Behind almost every aspect of China's development process in the early 21st century lies the harsh reality of the 'Lewis model' of 'economic development with unlimited supplies of labour' (Lewis, 1954).

China has a huge population of almost 1.3 billion, increasing by over 15 million each year (SSB, ZTN, 2002). Almost 70 per cent of the Chinese population still lives in the countryside. Employment in agriculture is stagnant, and there are estimated to be as many 150 million 'surplus' farm workers. As the impact of the WTO on Chinese agriculture (and on rural township and village enterprises) increases, pressures on rural employment will intensify. The unavoidable reality is that the level of rural underemployment will continue to rise rapidly in the early years of the 21st century. Since the late 1990s, rural real incomes have fallen year upon year.

Despite the decline in absolute poverty in the early years of China's rural reforms (Nolan, 1988), there still are huge numbers of people who are absolutely poor in terms of international poverty lines. The average per capita income of China's 800 million rural residents is just US\$290 (RMB 2,366), or 80 cents per day (SSB, ZTN, 2002: 343). The massive growth of rural underemployment provides intense incentives for rural-urban migration, and great downward pressure on non-farm wages in unskilled and low-skilled occupations. By 2002, there were around 150 million rural residents who worked in the urban areas without permanent urban residence qualifications. These were predominantly 'lumpen' labour, with limited skills. The rate of pay is the

¹ For a fuller treatment of the issues analysed in this section, see Nolan, 2003.

equivalent of roughly US\$ 1-2 per day, which is the price of ‘lumpen’ migrant labour throughout human history (at today’s prices).

There are estimated to be as many as 48 million people who are without work as a result of reform in state-owned enterprises. The explosive increase in unemployment has become the ‘most challenging issue in China’s economic and social development’ (UNDP, 2000: 58).

Privatisation in China has been characterised by widespread insider dealing and corruption. A very narrow group of just two to three million people has been able to ‘get rich quickly’. It is estimated that that just 0.16 per cent of the population controls 65 per cent of the nation’s US\$ 1.5 trillion liquid assets in Mainland bank deposits (SCMP, 29 March 2003).

By 2002, China’s accumulated stock of FDI had reached around US\$ 450 billion. This investment is creating clusters of modern businesses in relatively isolated areas within China’s major cities. These virtual ‘Treaty Ports’ are emerging as areas with a relatively high degree of *de facto* autonomy, and form a nucleus of high income employment for both Chinese and foreigners, isolated from the surrounding society. A rapidly-growing group of China’s highest income earners live in isolated, protected compounds.

There has been much discussion about the growth of the Chinese urban ‘middle class’. However, the average per capita income of China’s total of 480 million officially registered urban residents in 2001 was just US\$ 830. If we included the unofficial urban population of around 150 million migrant workers, then the figure would be even lower. One recent study estimates that among China’s urban households, the income of only around 20 million has caught up with the average of the urban households in East Asia’s newly industrialised countries (Qu Hongbin, 2002). In other words, China’s emerging middle class, those who can afford, for example, to buy automobiles, is a ‘besieged’ minority among a sea of urban poor people, who vastly outnumber them. The 21st century meets the eighteenth century at the window of Starbucks. The vast majority of the urban population are excluded by their low incomes from Starbucks or Walmart and excluded by armed guards from the apartment blocks of the new middle class, except where they are employed for domestic service.

Official data show that the Gini coefficient of the urban distribution of income rose from 0.25 in 1992 to 0.34 in 2001 (SSB, ZTN, 1993 and 2002). However, the official data do not include most of the 150 million migrants who are not registered as part of the urban population. The data also greatly underestimate the income of the highest segments of the native Chinese urban population. Nor do they include the high incomes of the fast-growing population of foreign employees of the multinationals. If all these factors are taken into consideration, the distribution of China’s urban incomes is likely to be among the most unequal in the world.

The reform process has entered a period in which there is an increased danger of social instability compared with the past twenty years of reform. There has been extensive discussion among policy-makers about how to ensure that during this tense period, China is sustained as a ‘steady and harmonious society’. China’s leaders have

a declared vision of an ‘everlasting and peaceful nation’. There has been intense debate about how to build a dynamic economy, while ‘laying the groundwork for a market that is moral and fair’.

The environment.

China’s environmental deterioration reflects the intense pressure of a huge and growing population upon China’s already fragile natural environment, with the impact hugely reinforced by high-speed industrial growth in a poor country with limited resources at the disposal of the state.

Around 38 per cent of the entire country is affected by serious soil erosion (UNDP, 2000: 70). The area of desert is increasing at around 2,500 square kilometres per year, equivalent to the area of a medium-sized country. In the past four decades, almost one-half of China’s forests have been destroyed. There is a serious and worsening shortage of fresh water. ‘Rampant water pollution’ is making the situation worse. The flow of the Yellow River has reduced to a mere trickle for long periods of the year (see Wang Xiaoqiang, et al, 1999). China is experiencing the ‘most severe, large-scale and profound ecological destruction in [its] history’ (UNDP, 2000: 70).

China’s explosive industrial growth has led to high-speed expansion of energy-intensive industries. By the late 1990s, these accounted for around 36 per cent of the country’s manufacturing value-added, compared with just 23 per cent in Japan and 21 per cent in the USA (Nolan, 2001a: 700). China has a relatively limited amount of oil and gas, but has huge reserves of coal. By the mid-1990s, China had overtaken the USA as the world’s biggest coal producer, accounting for almost thirty per cent of global output. Coal provides a low-cost way to meet a large fraction of China’s booming demands, accounting for around 70 per cent of the country’s primary energy used in electricity generation (Nolan, 2001a: 699). The ways in which coal is mined, transported and used as a fuel approximates that of the advanced economies before the 1950s. This has caused a huge burden of air pollution.

The implications of China’s mode of industrialisation are of the greatest importance for the physical sustainability of life across the whole planet. China already is the world’s second largest producer of ‘greenhouse gases’ after the USA (World Bank, 2001: 292-3). If it follows the US free market approach to industrialisation, allowing, for example, complete dominance to the automobile, then the prospects for the world are terrifying. If China’s 1.4 billion people were to sustain their current growth path and at some point catch up with today’s USA level of per capita income, and were to use similar technologies, China’s use of commercial energy and emission of carbon dioxide would be one-fifth greater than those of the entire world today – a terrifying prospect.

Party and state.

Party. The Chinese Communist Party, with 64 million members, is at the heart of the Chinese state. Leadership by the Communist Party is the foundation of Chinese modernization. However, the Party faces a rising tide of corruption.

In his speech on 1 July 2001 to celebrate the 80th anniversary of the founding of the Chinese Communist Party Zemin emphasized the possibility of complete system

disintegration: ‘To rally the 1.2 billion and more people behind the socialist modernization drive in a large and multi-ethnic developing country like China, it is a must to have the strong leadership of the Communist Party of China. Otherwise, the country will ...not only fail to realize its modernization but also sink into a chaotic abyss.’ He pointed out the serious danger of loss of power by the Party if the corrosive trends were not checked: ‘[W]e must be strict in Party discipline. We should have a deeper understanding of the loss of political power by some Communist Parties in the world that had long been ruling parties and learn a lesson from them’. He emphasised that combating corruption and building clean government was vital for the survival of the Party. The level at which Party members were investigated and brought to trial for corruption rose to include many in high positions, some of whom were sentenced to death.

The reason that so many cases of corruption have come to light, and been written about in the Chinese press, is precisely the fact that the Chinese leadership is fully aware of the deep threat that it poses, and is trying hard to do something about it. Official reports to the National People’s Congress in early 2003 declared that in the previous five years, the war against corruption had been substantially stepped up, with a total of almost 13,000 prosecutions of government officials (SCMP, 11 March 2003).

Reforming the Party itself is a massive task. ‘Regime improvement’ rather than ‘regime change’ is the only logical way to proceed in order to meet the needs of China’s vast population. The massive effort to try to clean up the country’s financial institutions after the Asian Financial Crisis demonstrated the continued and improved effectiveness of this mighty apparatus. In Guangdong province alone, a vast clean-up operation involved thousands of Party cadres at every level. They closed hundreds of local financial institutions, and ensured that their massive obligations were dealt with in a way that preserved social stability. Such tasks are vital for the Chinese development effort in the period ahead.

State. China is a vast, poor country with urgent development needs, many of which can only be met by state action of one sort or another. Huge advances have been in the technical competence of the Chinese bureaucracy. However, during the reform period, the state’s budgetary revenue fell from over 31 per cent of GDP in 1979 to just 14 per cent in 1999 (SSB, ZTN, 2001: 256). This was not only below that of many developing countries, such as Indonesia and Malaysia, but also below that of Russia, which is perceived as having experienced ‘state desertion’ during the reform period. In this sense, China’s level of ‘state desertion’ during the ‘transition’ period outstripped even that of Russia, which has ‘gravely undermined the [Chinese] government’s capacity to promote economic development’ (UNDP, 2000: 41).

The state’s greatly weakened fiscal capability has serious implications for social stability. In order to dampen the impact of large-scale lay-offs, the Chinese government has been trying for many years to develop a comprehensive social security system. However, such programmes had made very limited progress by the end of the 1990s. While they are being established they require a large infusion of government funds, but the state’s fiscal weakness made this impossible (UNDP, 2000: 76).

A high degree of responsibility for public action has been devolved to localities, which now account for around two-thirds of total budgetary expenditure (World Bank, 2002: 31). They now have responsibility for almost nine-tenths of total budgetary expenditure on culture, education and health (World Bank, 2002: 31). Local governments have increasingly turned to the market to fund welfare provision.

By the end of the 1990s, state budgetary allocations covered just 46 per cent of actual expenditures on education.² The increasing use of individual payments to acquire educational services has resulted in a substantial deterioration in the educational status of the poor. Under the rural people's communes in the 1970s, around 85 per cent of villages had a co-operative medical system, albeit often rudimentary, but this structure was largely dismantled after de-collectivisation in the early 1980s. When the agricultural collectives were disbanded in the early 1980s, the financial basis for risk-sharing was largely eliminated. Today, more than 90 per cent of the rural population are without any coverage from collective risk-pooling schemes. In 1999, the government budget funded just eleven per cent of total health expenditure, while 59 per cent came from out-of-pocket payments. These changes have resulted in highly unequal access to health services.

Finance.

China's participation in the international financial system has been compared to a boat setting out to sea. What are the prospects for the 'weather'? How well constructed is the 'boat'?

What are the prospects for the weather? The concept of free movements of capital is fundamentally different from that of free trade in goods. Capital flows are particularly subject to asymmetric information, agency problems, adverse selection and moral hazard. Keynes (1936: chapter 12) provides the foundation of the modern critiques of the potentially de-stabilising effects of uncontrolled financial markets. He strongly attacked the idea that stock markets and currency markets are efficient, and based on rational expectations. He famously warned of the negative impact of speculation, which he likens to gambling: 'Speculators may do no harm as bubbles on a steady stream of enterprise. But the position is serious when enterprise becomes the bubble on a whirlpool of speculation. When the capital development of a country becomes a by-product of the activities of a casino, the job is likely to be ill-done' (Keynes, 1936: 159).

Keynes' fears have been amply realised since the 1980s, as controls on capital movements were liberalised across the developing world. The period has seen an unprecedented number and intensity of financial crises, affecting radically different types of economy. These ranged from 'small, well-regulated and open' Hong Kong at one end to huge, state-interventionist, Indonesia at the other. The common factor was financial liberalisation and asset bubbles provoked by a huge inflow of speculative capital relative to the size of the economy. The bursting of the bubble in each case had massive social and economic consequences. In the case of Indonesia, this resulted in 'regime-change'. One of the most successful 'developmental states' in the Third World was overthrown in a matter of months from the onset of the Asian Financial Crisis. China and India, each of which had only limited convertibility of the national

² The information in the paragraph is all from World Bank, 2002.

currency, were almost alone among Asian countries in escaping the worst effects of the Asian Financial Crisis.

China has been well-served by the pragmatic reform philosophy of ‘groping for stones to cross the river’. At the end of the 1980s there was intense pressure for high-speed political reform to precede deepening of economic reform. The USSR’s collapse provided an object lesson for China. It showed that there were huge dangers in pursuing extensive political reform prior to economic system reform. This reality was quickly understood by everyone in China, and people across the world (Nolan, 1995). The Asian Financial Crisis provided another deep lesson to China’s policy-makers – the ‘Financial 4 June’. Financial system reform is the most sensitive and difficult part of the whole process of system change. If mistakes are made in this area, with its deep roots in everyday lives of the whole population, it threatens the whole socio-political fabric. The Asian Financial Crisis reinforced the need for China’s policy-makers to be incredibly cautious in liberalising capital flows and moving towards full convertibility of the *renminbi*.

How strong is the boat? Despite implementing important changes, China’s big four banks continue to be heavily influenced by government institutions in their lending decisions. Much of the pressure to continue to make policy loans results from the intense competitive environment that confronts China’s indigenous large firms with China’s entry to the WTO (see below). The big four banks continue to generate huge amounts of non-performing loans (NPLs). Many international experts believe that the conditions are ‘ripe for a financial crisis’.

The big four banks face immense difficulties in changing corporate governance practices. In the late 1990s, the impact of the Asian Financial Crisis on Hong Kong and neighbouring Guangdong Province helped to bring about the collapse of two giant local financial institutions, Guangdong International Trust and Investment Corporation (GITIC) and Guangdong Enterprises (GDE), the flagships of the province. The subsequent bankruptcy and restructuring respectively revealed the shockingly inadequate nature of corporate governance within these two institutions, which only a few months previously had been held up in international financial analysts as paragons of financial management. The shock of these events helped to stimulate a widespread cleanup of both central and local financial institutions. The ‘clean-up’ itself exposed the depth of the problems that the government faced.

In early 2002, it was revealed that the five bank officials at the BOC branch in Kaiping city (Guangdong) had stolen the equivalent of around US\$ 500 million. In its report on the Kaiping scandal, the Chinese financial journal *Caijing* (5 May 2002) concluded that the Kaiping scandal illuminated the ‘terrifying complexity and scale of the challenge facing China’: ‘Only by drawing a lesson from this bitter experience and facing reality bravely will the Chinese banking industry be able to make up for lost time’.

In the past two years, banking officials at the apex of the country’s banking system have encountered serious difficulties. Most notable were three of the four ‘can-do commanders’ hand-picked by Premier Zhu Rongji to lead the country towards modern, well-run financial institutions. Zhu Xiaohua, former deputy governor of the People’s Bank of China and head of management of China’s foreign exchange

reserves, was arrested and sentenced to fifteen years in prison. Wang Xuebing, formerly head, successively, of the China Construction Bank and the Bank of China, was arrested and dismissed from the Party. He is awaiting trial. Li Fuxiang, also a former head of the management of the country's foreign exchange reserves, committed suicide while under official investigation.

Reform of the country's financial institutions is being carried out in challenging circumstances. China's large financial firms face the prospect of an intense escalation of competition from global financial institutions. Leading financial services firms, all from the high income economies, recently have been through a period of unprecedented merger and acquisition, to take advantage of global markets, and of economies of scale and scope in respect to research and development, branding, human resource acquisition, and central procurement (eg IT systems). Super-giant financial services firms, predominantly American, such as Fidelity, Citigroup, JP Morgan Chase, GE Capital, Morgan Stanley Dean Witter, Merrill Lynch and AIG, have emerged. Citigroup alone has annual revenues of US\$ 112 billion and profits of around US\$ 14 billion, many times greater than the entire group of China's 'four big banks'. They have rapidly acquired dominant positions in the financial markets of most of Latin America and Eastern Europe. When Citigroup acquired Banamex, Mexico's 'national champion' in financial services, the *Financial Times* commented: 'The acquisition of Banamex underscored the rapacious appetite of Citigroup for assets in the developing world'. Citigroup immediately stated: 'China is top of our radar screen'. Experienced US bankers in China believe that is only a matter of time before the leading global financial institutions take the 'cream' of the Chinese market.

The less that China's indigenous large financial firms are able to achieve their own self-reform, the stronger will be the argument made by the global giants to allow them to 'take command of the boat', as experienced 'sailors' who can run the country's financial institutions well. Citigroup argues that the big four banks in China should be 'torn apart into small units in order to avoid a financial crisis'. Undoubtedly this would make it far easier for the global giants to 'rout the enemy one by one' (*gege jipo*).

International relations.

Maoism comprehensively stressed social equality and the importance of 'positive' freedoms for all social strata. The Communist Party has moved away from the inward-looking anti-capitalist ideology of the Maoist period. However, it is unimaginable that it will embrace a pure free market philosophy, with comprehensive emphasis on Hayekian individual 'negative' freedoms and a minimal role for the state. This philosophy achieved a high point in political influence in the USA in the late nineteenth and early twentieth century. However, since the 1960s it has once again emerged to dominate the US political mainstream. By contrast, China's leaders are groping their way towards an ideological 'Third Way' between state and market, which is based on China's rich historical experience, 'using the past to serve the present' (*gu wei jin yong*) (Nolan, 2003). In this sense, namely, struggling for the dominant ideology of the epoch of globalisation, China poses a threat to the current mainstream of US political thinking. However, it is on common ground with a long tradition of US political thinking which has emphasised the importance of the state in enabling the realisation of 'positive freedom' for all segments of society (Foner, 1998).

China's development policies since the late 1970s have produced a powerful economy, that is viewed as becoming a serious potential rival for the dominant world power, the USA, within a relatively short period of time. As we will see in the following sections, China's industrial firms are still technologically far behind US-based firms. Those who wish to emphasise the size of the Chinese 'challenge' point to the fact that measured in 'purchasing power parity' (PPP) dollars (essentially using the prices of the USA), China is already the world's second largest economy, 36 per cent larger than Japan, and over one-half the size of the USA (World Bank, 2001: 230-1). However, the PPP figures are highly suspect as a true measure of China's economic might. Using the PPP figures, China uses the same amount of energy per unit of GDP as the USA itself (Nolan, 2001a: 914), hardly a plausible proposition. Even if one disregards the PPP figures, it is indisputable that, if China maintains its high growth rate, at some point will, indeed, become a serious challenger to the USA's dominant position. China's massive economic potential means that it will increasingly be a competitor with the USA for access to the world's major sources of primary energy and raw materials.

In the above senses, China is viewed by many Americans as a 'strategic competitor'. 'China's rise' and its consequences for the USA is the central issue for US foreign policy in the twenty-first century. China will be in an immensely vulnerable position in this relationship for a long time to come.

The USA is the world's comprehensively dominant military power. The first Gulf War demonstrated vividly that the USA stood at the centre of the 'Revolution in Military Affairs', both in terms of the production of the relevant technologies and the assembly of arms to deliver these technologies in battle. It emphasised the growing gap between the US and Europe. Successive wars in the former Yugoslavia, Afghanistan and Iraq have demonstrated that the gap is growing even wider and will continue to do so as the US military budget rises while that in Europe shrinks.

The USA has made clear its nervousness about China's growing military capability. President George W. Bush's policy statement, 'America's Security Strategy' (quoted in full in the FT 21 September 2002) warns China: '[A] quarter century after beginning the process of shedding the worst features of the Communist legacy, China's leaders have not yet made the next series of fundamental choices about the character of their state. *In pursuing advanced military capabilities that can threaten its neighbors in the Asia Pacific region, China is following an outdated path that, in the end, will hamper its own pursuit of greatness. It is time to reaffirm the essential role of American military strength. We must build and maintain our defenses beyond challenge...* Our forces will be strong enough to dissuade potential adversaries from pursuing a military build-up in hopes of surpassing, or equaling, the power of the US' (emphasis added). As the war against Iraq demonstrates, the USA's friends of today can become their enemies tomorrow. The current international situations is one of the most unstable for a long time. China's military strategists cannot rule out the possibility that at some point, the object of 'regime change' may even include China.

In the year 2000, the US Congress established the Congressional-Executive Commission on China (CECC) to 'monitor China's compliance with international human rights standards, encourage the development of the rule of law, establish and

maintain a list of victims of human rights abuses, and promote bilateral co-operation' (CECC, 2002). The CECC's first annual report, in September 2002, was extremely critical of alleged human rights abuses in China. It made a number of recommendations to the US Government to expand its activities to identify Chinese human rights abuses and support the redress of those abuses, especially among migrant workers and women. Such activities would contribute to increased social and political instability at a critical stage in China's system evolution.

In sum, China faces a fundamentally different position in its international relations than that which faced Japan, Korea or Taiwan at comparable stages in their development. Each of these achieved their modern 'take-off' as close allies of the USA in the international struggle against communism, especially the People's Republic of China. The USA tolerated a 'developmental state' in each case, which heavily protected the economy, kept global financial institutions at arms length, and strongly controlled international financial flows.

The final shape of the USA's view of how best to 'engage' with China is still unclear. However, there is a powerful set of interests that believes serious conflict with China is unavoidable. Henry Kissinger has warned that the hawks in the US government see China as '*a morally flawed inevitable adversary*' and believe that the US should act 'not as a strategic partner, but as it treated the Soviet Union during the cold war, as a rival and a challenge' (quoted in *FT* 20 August 2001)(emphasis added). By distancing itself from the moderating influence of international institutions, including the cautious voices of 'Old Europe', the US constitutes an unpredictable force at the heart of international relations. The increased unpredictability in the foreign policy of the world's hegemonic power constitutes a formidable challenge for China's own foreign policy.

Conclusion.

As China enters the twenty-first century it faces a wide-ranging series of deep challenges that threaten the entire social, economic and political system. These challenges arise from both inside and outside the country. It is a period of high-speed economic and social change. During such periods the potential for political instability is acute. The Chinese government is working hard to try to increase its risk management capabilities to meet this challenge.

Due to the number and intensity of the challenges that China faces, there is a high possibility that at some point a 'fire' will break out. It cannot be predicted where, when, or how. It is highly likely that it will be connected with the financial system. We have seen that China faces a massive challenge in the financial sector. During the Asian Financial Crisis, China came close to a major financial and, by implications, a social and political crisis. Only by bold and effective policy measures was the country able to survive. With full convertibility of the national currency it would be far harder to survive a collapse of confidence by global financial markets of the kind that has regularly occurred in other developing countries under financial liberalisation. If the 'fire' does not begin with the financial system then it likely that it will quickly spread into the financial system. If China were to face a financial crisis of the dimensions of those that have regularly attacked other developing countries during the epoch of globalisation and liberalisation since the 1980s, it would be immensely difficult to maintain system stability. The relationship of political instability with financial crisis

is long-standing. As Karl Marx pointed out in 1853: ‘Since the commencement of the eighteenth century there has been no serious revolution in Europe which has not been preceded by a commercial and financial crisis’ (Marx, 1853: 9).

3. China and the global business revolution.

China’s ambitions.

China began liberalizing the post-Mao economy in the late 1970s. A consistently stated goal of China’s industrial policy has been to construct globally powerful companies that can compete on the global level playing field:

In our world today economic competition between nations is in fact between each nation’s large enterprises and enterprise groups. A nation’s economic might is concentrated and manifested in the economic power and international competitiveness of its large enterprises and groups....*Our nation’s position in the international economic order will be to a large extent determined by the position of our nation’s large enterprises and groups.*

(Wu Banguo, Chinese State Council, August 1998.)

China’s chosen global giant corporations have been supported through a wide range of national industrial industrial policies, which include: tariffs, which were gradually reduced during the reform years; non-tariff barriers, including limitations on access to domestic marketing channels, requirements for technology transfer and to subcontract to selected domestic firms as the price for market access; government procurement policy; government selection of the partners for major international joint ventures; preferential loans from state banks; privileged access to listings on national and international stock markets; tax relief; privileged access to land; direct support from R&D from the government budget; government procurement policy; and government mediated mergers and acquisitions.

As the reforms have progressed, the Chinese government has made it increasingly clear that the country intends not only to establish a group of globally competitive large firms in the manufacturing sector, but also in financial services and telecommunications. China Mobile and China Unicom, with massive international flotations, as well as China Telecom and China Netcom, were at the forefront of this process. International flotations of the mainland business of the three leading commercial banks are under intense discussion. The Bank of China’s Hong Kong operations were floated in 2002. As China entered the WTO, the country’s commitment to building globally competitive large firms remained undiminished:

The state will encourage big state-owned businesses to become internationally competitive corporations by listing on domestic and overseas stock market, increasing research and development expenditure, and acquiring other businesses. *The country will develop thirty to fifty large state-owned enterprises in the next five years through public offerings, mergers and acquisitions, restructuring and co-operation.*

(Bai Rongchun, Director General, Industrial Planning Department, State Economic and Trade Commission, July 2001.)

China's planners carefully studied the industrial policies used by the high income economies in their early stages of development. From Britain during the Industrial Revolution, the US and Continental Europe in the nineteenth century, through to the East Asian 'Tiger' economies of the late twentieth century, almost without exception, late-industrializing countries used some form of industrial policy to nurture 'national champions' (Nolan, 1995; Chang, 2002). Each of these late-industrialising countries was able through different methods to nurture a group of globally competitive large firms.

However, the most powerful influence on the thinking of China's policy makers was the Japanese experience. During a similar period in Japan's development, from the 1950s to the 1970s, Japan's industrial planners supported the growth of a series of giant companies that developed into globally powerful firms. In many sectors the state nurtured just two or three dominant firms that were in an oligopolistic position in the domestic market. After two decades of industrial policy, there was a whole corps of globally competitive Japanese companies. By the late 1980s, it had twenty of the largest one hundred corporations in the *Fortune* 500 list. These companies developed through extensive support from state industrial policies, similar to those adopted by China forty years later.

As well as continued support for the construction of a 'national team' of internationally competitive firms, local governments at both the provincial and the city level also are determined to make use of industrial policies to nurture a local 'team'. The best-known Chinese firm internationally is, probably, the consumer electronics firm, Haier. Apart from the high entrepreneurial capabilities of its CEO, Zhang Ruiming, its growth owes much to the support given by both the Shandong provincial government and the Qingdao city government. Shanghai intends that large local firms such as Shanghai Auto, Shanghai Aerospace, Jinshan Petrochemical Company and Baoshan Steel Company, will become global industry leaders. The fact that China has joined the WTO has not dimmed the ambition of local provincial and city governments to use industrial policy to nurture local champions. The population of China's provinces is mostly as large as substantial countries and the population of most large cities is bigger than city-states such as Singapore or Hong Kong. The growth of autonomy in devising industrial policies at the level of the province and the city is a reflection of the weakening capabilities of the central government and advance in fissiparous tendencies in the Chinese state structure.

China's success.

In the course of two decades, China's large enterprises advanced their business capabilities, undertaking evolutionary institutional changes in key aspects of their business organisation (Nolan and Wang, 1998). China's large, state-owned enterprises have grown rapidly in terms of value of sales. A group of them has floated on international stock markets. They have absorbed a great deal of modern technology. They have learned how to compete in the marketplace. They have substantially upgraded the technical level of their employees. They have learned wide-ranging new managerial skills and gained substantial understanding of international financial markets. They have become sought-after partners for multinational companies. China's large state owned enterprises avoided the industrial collapse of the former USSR. China has become the fastest-growing part of the global industrial economy.

Under the policies of reform and opening up, China has attracted huge amounts of foreign direct investment. A ‘herd’ mentality to participate in the ‘Chinese miracle’ developed among global giant corporations. By the year 2002, China had overtaken the USA as the world’s largest recipient of FDI, with the stock of FDI reaching around US\$ 450 billion. Global corporations now view China as central to their long-term strategy.

However, despite the evidence of remarkable progress, it is crucially important for proper policy formulation in the USA to evaluate carefully the extent and nature of progress in large Chinese firms compared with that of the global leaders.

Benchmarking the Chinese ‘national team’.

How capable are China’s ‘national champions’ to compete on the ‘global level playing field’ within the WTO? In the course of the *China Big Business Programme*, since the mid-1990s we have tried to answer this question, using detailed case studies from China’s ‘national team’ in several different sectors, benchmarking them against the global leaders in the respective sector (Nolan, 2001a and 2001b). So far these studies have included aerospace, pharmaceuticals, oil and petrochemicals, power equipment, automobiles and components, steel, consumer electronics, telecommunications, mining, IT hardware, soft drinks, beer, retail and financial services. In each case we have found evidence of intense efforts by Chinese industrial entrepreneurs and government departments, and highly significant progress in business capability. However, in every case we found that deep problems remained. The micro-level evidence from our case studies suggests that in most key respects, China’s industrial policies have not yet succeeded in building globally competitive large firms.

At the start of the 21st century, not one of China’s leading enterprises had become a globally competitive giant corporation, with a global market, a global brand, and a global procurement system. The Chinese companies included in the *Fortune 500* mostly faced huge problems of downsizing. China had no less than five of the top eleven companies in the *Fortune 500* in terms of numbers of employees, a dubious achievement. All of China’s eleven *Fortune 500* companies were either wholly or predominantly state-owned firms, operating with a high degree of state protection from international competition. China has just two companies in the *FT 500* which ranks firms by market capitalization. These are CNOOC (China National Offshore Oil Company), and China Mobile, each of which operates in a protected domestic environment. Moreover, the vast bulk of the high technology IT hardware equipment for China’s telecoms companies is purchased from the global giants.³ China has only one company in the world’s top 600 companies by R&D expenditure. China does not have any representatives in Morgan Stanley Dean Witter’s list of the world’s top 250 ‘competitive edge’ companies. China does not have a single company in *Business Week’s* list of the world’s top 100 brands.

³ The commoditised, low value-added part of the mobile phone market is being increasingly penetrated by Chinese consumer electronics firms. However, the global giants (including Nokia, Motorola, Ericsson, Cisco, Siemens, Alcatel, and Lucent) either through imports or their large production networks of within China comprehensively dominate the supply of high technology IT equipment to the Chinese telecoms service industry.

The brutal reality is that after two decades of reform China's large firms mostly are still far from being able to compete with the global giants. The gap is especially marked in the high-technology sectors, including semi-conductors, aerospace, large-scale power equipment (over 600 MW), IT hardware (especially the high technology networking equipment sector), and patented pharmaceuticals. For example, in the critically important high technology sector of semi-conductors, which supplies the 'food' for all other advanced technology industries, China has only negligible capability. It is estimated that around eighty per cent of China's total consumption of semi-conductors are imported, and the 'domestic' production of semi-conductors is totally dominated by the local subsidiaries of the global giants. Among the top thirty suppliers of microchips to the mainland market, there is not one indigenous Chinese firm (SCMP, 9 September 2003). Moreover, despite intense Chinese government efforts to attract the world's leading semi-conductor makers to China, most of the world leaders in the sector are content to export these exceptionally high value products to China rather than produce within the country.

The gap is marked even in 'mid-technology' sectors such as oil and petrochemicals, auto assembly and auto components, large-scale construction and mining equipment, and elevators for tall buildings. Even in sectors with apparently less advanced technology, such as steel, beverages, coal, and domestic electrical equipment, there is a wide gap with leading global companies in the highly branded and/or high technology, high value-added segments of the market. The challenge is not confined to the manufacturing sector. China's four main commercial banks, large accountants and insurance companies lag far behind the global giants in almost all respects. The global giants are already well on their way to constructing oligopolistic industrial structures in the highly branded and high technology parts of the Chinese market in a wide range of goods and services.

In the two strategic industries of oil and aerospace (see Appendix), China's national champions lag behind the world's leading firms. Despite success in completing restructuring and flotation within just over one year, PetroChina and Sinopec are at a disadvantage in terms of the global distribution and quality of reserves, technology, and financial strength. There remains a deep internal struggle to establish a cohesive corporate culture to integrate their powerful subordinate companies and establish a truly unified company. In simple measures of revenue and profit, China's aerospace companies AVIC 1 and 2 are far behind leading aerospace sub-systems suppliers such as Honeywell, Pratt & Whitney, and GE engines. Even taken together, they are minnows compared with system integrators Boeing and Lockheed Martin. Moreover, they remain highly diversified companies with a high proportion of revenues coming from non-aviation production.

Why has the result of industrial policy in China been so different from that in post-war Europe, Korea, Taiwan, or Japan? This was partly due to internal and partly to external difficulties that were peculiar to China.

Internal difficulties.

Policy inconsistency. As we shall see in the oil and petrochemical industry, within the same industry, radically different reform policies were pursued at different times. At

the same time, completely different policies were pursued in different sectors such as the aerospace, oil and petrochemical industry. For example, while control was being centralised in the oil and petrochemical industry, AVIC was being broken up into two separate entities, each of which was even less able than before to compete with the global giants.

Where is the firm? The foundation of China's economic reform was to increase 'enterprise' autonomy. The core of most large 'enterprises' was a single large production unit. This had many benefits, including the development of a strong sense of corporate ambition at the enterprise level. However, it caused difficulties in the subsequent attempts to build multi-plant firms with unified central control over individual production units. For example, it involved huge struggle to centralise control over powerful companies such as Daqing under CNPC and Shanghai Petrochemical Corporation under Sinopec.

Impoverished economy. China is still a poor country, with a relatively small global middle class. In almost all sectors, from power plants to beverages, markets are highly segmented. Alongside the modern, high value-added, globalized sector, there is typically a huge, low value-added, commoditized segment, which supplies goods and services for poor people. A large fraction of domestic demand is for low price, low value-added products for over one billion peasants, internal migrants and poor urban residents. Here is a different world of ferocious competition between myriads of anonymous 'perfectly competitive' indigenous firms. Indigenous firms have to fight a battle on two fronts, one the one hand with global giants in high value-added products, and on the other hand, with domestic small and medium enterprises (SMEs) in low value-added products.

Local protectionism. China has a strong tradition of relatively autonomous local government. There has been persistent local resistance to cross-regional mergers, due to fears of downsizing and/or loss of control of a 'local asset'.

Inheritance from the planned economy. Unlike the other 'late-comer' countries, China's large enterprises inherited huge manning levels, which are extremely hard to reduce without causing social instability. In 2002, CNPC and Sinopec each still employed around one million people. AVIC 1 and AVIC 2 together employ over 400,000 people, more than twice as many as Boeing and Lockheed Martin do. This will remain a deep problem for many years.

Incentive to diversify. The inability of China's emerging large firms to compete on international markets, plus the fact that they each have a huge workforce, produced a high incentive for the individual enterprise to diversify. A single large enterprise could easily have hundreds of 'children' and 'grandchildren' subsidiaries and related companies. For example, AVIC has 116 subordinate enterprises grouped under 56 'children' enterprises. This gives the 'illusion of scale', but beneath an apparently large firm there are typically hundreds of uneconomically small firms and immense problems of corporate governance.

Problems for China's bureaucracy. China's bureaucracy lacked the intense nationalist incentive to build large firms successfully that drove Japanese (and Korean) policy makers. Also, China's leaders are engaged in an intense drive to root

out corruption from the country's huge bureaucracy. Corruption undermines the bureaucracy's ability to lead industrial policy effectively.

Ideological commitment to state ownership. China remained for most of the reform period committed to state ownership as a goal in its own right, rather than building powerful corporations by whatever means was suitable. It proved hard to achieve the separation of government and enterprise that has been advocated for many years. Even today, the internationally floated former Chinese state-owned enterprises are still majority state-owned in all cases, and most domestically listed firms are still majority state owned. Even the most famous 'non-state' firms, such as Haier in consumer electronics and Legend in computers, have extremely complex ownership structures, with a substantial degree of state ownership and control.

External difficulties.

China's attempt to build large globally competitive firms coincided with the most revolutionary epoch in the world business history, possibly even including the Industrial Revolution. The transformation of global business structures since the 1980s amounted to noting less than a 'business revolution'. This presents a fundamental challenge for China's industrial policy, and amounts to a very different policy environment from that which faced other late-comer countries in their attempt to 'catch-up'.⁴

Liberalization of world trade and capital markets. The period since the late 1980s witnessed for the first time the opening up of a truly global market place in goods, services, capital and skilled labour. The only market which still remains bound firmly by nationality is the vast sea of unskilled labour. The total stock of FDI in developing countries rose from \$ 344 billion in 1985 to \$2,181 billion in 2001 (UNCTAD, 2002). China was the main single focus of attention.⁵ The struggle among the world's leading firms has deeply penetrated the most developed parts of the low and middle-income countries. China is at the centre of this battle.

Explosive M&A and concentration. The period since the 1980s witnessed by the world's most explosive period of mergers and acquisitions (M&A). The size of the merger boom of the 1990s eclipses that of any previous epoch. It will leave a long-lasting imprint on the global business structure. The process of concentration was most visible at the level of the global system integrators. In sectors as diverse as large civilian aircraft, integrated oil and petrochemicals, automobiles, pharmaceuticals, power equipment, computer systems, mobile phones, lifts, camera film, electronic games, tobacco, ice cream and soft drinks, a small number of focused global producers dominates the world market (Nolan, 2001a, p. 40-42). Competitive capitalism's inbuilt tendency to concentration and oligopoly has flowered on a global scale. There appears to be a universal rule of concentration, namely, that a small number of firms, around three to six, control around fifty to seventy per cent of the

⁴ For a detailed analysis, see Nolan (2001a), chapter 2, 'The challenge of the global business revolution'.

⁵ Despite the rapid growth, in 2001, China still accounted for only 18 per cent of the total stock of FDI in developing countries (UNCTAD, 2002), significantly below its share of population. Latin America's total stock of FDI in 2001 stood at \$ 693 billion, 75 per cent greater than that of China. Latin America's population (509 million) is only 41 per cent of that of China.

total world market, concentrating on high value-added products in any given sector, while hundreds or thousands of anonymous, local small and medium-sized firm battle for the remaining part of the market.

'Cascade effect'. Not only have the core 'systems integrators' experienced an explosive process of concentration. The deepening interaction between core companies and supplier companies has created an explosive 'cascade' effect that is rapidly leading to concentration and focus among the first tier suppliers and spilling over even into second and third tier suppliers. In sector after sector, the 'first tier' suppliers are themselves multi-billion dollar companies with 'global reach'. For example, in the aerospace industry, just three firms produce large jet engines. In the auto industry, just three firms account for around three-fifths of the entire global market for tires, and just two firms account for over one-half of the world's entire supply of brake systems. In the mining industry, just three firms account for almost the entire international coal trade, while just two firms account for over one-half of the global market for large excavation equipment. In the industrial gas industry, just five firms account for around three-fifths of the global market. In the accountancy industry, just four firms account for almost all audits conducted among *Fortune 500* companies. In banking, just four firms account for almost all investment banking services for large corporations. In advertising, just three firms account for almost all advertising services for large corporations. This makes the competitive landscape even more challenging for firms from developing countries. If they can't compete as 'systems integrators', how can they compete with the established giant firms in the first tier of the global supply chain, or even at lower tiers, where concentration is also progressing at high speed?

The 'external firm'. Through the hugely increased planning function undertaken by systems integrators, facilitated by recent developments in information technology, the boundaries of the large corporation have become blurred. Competitive advantage for the systems integrator requires that it must consider the interests of the whole value chain in order to minimize costs across the whole system. Far from becoming 'hollowed out' and much smaller in scope, the extent of control exercised by the large firm has enormously increased during the global business revolution. Indeed, one can speak of a new form of 'separation of ownership and control'. In the epoch of the global business revolution, facilitated by advances in IT, core firms within the value chain exercise tight control over firms across the whole value chain. Firms that wish to be selected as 'aligned' or 'partner' suppliers to the leading systems integrators, must agree to co-operate with the core firms within the sector in opening their books, planning their new plants, organising their R&D, planning their production schedules and delivering their products to the core firms. This is a new form of industrial planning which extends across the boundaries of formal ownership structures and radically undermines old ideas of the size and nature of the firm.

Dominance of firms based in advanced economies. Firms headquartered in regions containing a small fraction of the world's population have comprehensively dominated the global business revolution (Table 1). The high-income economies contain just 16 per cent of the world's total population. They account for 93 per cent of the world's total stock market capitalization, 93 per cent of *Fortune 500* companies, 95 per cent of the FT 500 companies, 98 per cent of the world's top 600 companies by value of R&D spending and 99 per cent of the world's top brands and.

North America is by far, the world leader in this process, with 192 of the Fortune 500 companies, 241 of the *FT 500* companies and 275 of the top 600 companies in terms of R&D expenditure.

Developing countries are massively disadvantaged in the race to compete on the global level playing field of international big business (Table 1). The whole of the developing world, containing 84 per cent of the world's population, contains just 37 *Fortune 500* companies, 27 *FT 500* companies, 15 of Morgan Stanley's list of the 250 leading 'competitive edge' companies, one of the world's top 100 brands, and just ten of the world's top 600 companies by R&D expenditure, of which seven are in Korean Taiwan. Across the whole of the rest of the developing world, there are just three firms in the world's top 600 firms by R&D spending. There is just one each in China and Brazil. Most dramatically, there is also just one in Russia, which built a vast storehouse of high technology under the Soviet Communism. These data vividly illustrates the fantastic inequality in the global distribution of technological prowess: 'Large MNCs are the chief repositories of the world's stock of knowledge, and all the screaming in the world will not change this' (Martin Wolf, *FT* 17 November 1999).

Table 1. Dominance of firms based in high income countries of the global big business revolution

	Population		GNP, 1999 (a)		GNP, 1999 (b)		Fortune 500 companies (2003) (c)		<i>FT 500</i> companies (2003) (d)		Top 600 companies by R&D spend (2002)		Stock market capitalization (1999)	
	billion	%	\$b.	%	\$b.	%	No.	%	No.	%	No.	%	\$b.	%
HIEs	926	16	22,921	78	21,763	56	463	93	473	95	590	98	33,603	93
L/MIEs	4,903	84	6,311	22	17,324	44	37 (e)	7	27 (f)	5	10 (g)	2	2,427	7

Sources: *FT*, 28 May 2003; World Bank, 2001: 274-5, and 304-5; *Fortune*, 28 June 2003; DTI, 2002.

Notes: (a) at prevailing rate of exchange

(b) at PPP dollars

(c) ranked by sales revenue

(d) ranked by market capitalization

(e) of which: Korea = 13, China = 11, Brazil = 4, Russia = 3, Mexico = 2, Taiwan = 1, Singapore = 1, India = 1, Malaysia = 1

(f) of which: Hong Kong = 9 (of which, Mainland Chinese companies = 2, Brazil = 2, Taiwan = 3, Singapore = 2, Mexico = 1, India = 1, Korea = 4, Saudi Arabia = 3, Russia = 2)

(g) of which: Korea = 4, Taiwan = 3, China = 1, Brazil = 1, and Russia = 1.

HIEs = High Income Economies

L/MIEs = Low/Middle Income Economies

Paradox of the big business revolution. The past fifteen years or so has witnessed an unprecedented increase in the degree of global concentration of business power. However, alongside this has emerged a result that is extremely problematic from the perspective of traditional mainstream economics. Far from the intensity of competition weakening as almost all mainstream economists would have predicted, the period has seen a greatly increased intensity of oligopolistic competition between giant firms, alongside an increase in the extent of concentration within each sector and sub-sector. This period saw unprecedented concentrations of expenditure by giant firms on technical progress through R&D spending, global procurement, marketing,

human resource development and on spreading best practice techniques across the whole value chain. In sector after sector the period witnessed the paradox of falling prices and improved product quality to meet consumer wants alongside the intense growth of oligopoly.

Conclusion.

China's rapid move towards 'close' integration with the world economy is occurring at a time of revolutionary change in the global business system. Large Chinese firms are far from ready to compete on the 'global level playing field'. This presents an extreme challenge for China's industrial strategy. Privatisation of China's large enterprises will not be sufficient to make them globally competitive. If China's firms cannot generally compete at the level of 'system integrator', it is hard to see either how in most industries they will be able to compete at the level of first tier supplier. China's entry to the WTO greatly reduces the scope for industrial policy. Strict application of the rules of the WTO Agreement at every level of Chinese business and government would drastically limit the state's actions to support indigenous firms in their efforts to 'catch-up'. For a substantial period ahead, China would have to accept that, under the terms of the WTO Agreement, its best hope would be to be a workshop 'for' the rest of the world, housing the production facilities for global giant firms and the leading parts of their supply chain, headquartered in the high income countries, rather than a workshop 'of' the world as Britain was in the mid-nineteenth century.

To devise a strategy to deal with the today's overwhelming imbalance in business power requires great skill and leadership ability. China's leaders at both the national and local level are trying simultaneously to juggle two contradictory forms of 'industrial policy'. On the one hand, they are trying to encourage multinational investment by offering a wide range of incentives to produce a 'good investment environment'. On the other hand, they are trying to nurture local and national 'industrial champions'.

China is becoming increasingly 'dependent' in the classical sense used by the Latin American economists in the 1950s (Frank, 1967). In every case, successful late-comer industrialising countries, from the USA in the late nineteenth century to South Korea in the late twentieth century, have produced a group of globally competitive firms. China is the first successful latecomer not to have done so. It is remarkable that China reached a position in which it had the world's sixth largest economy⁶ and was the seventh largest exporter without having a group of internationally competitive large firms. This is highly significant in the history of economic development. Already, over 30 per cent of industrial profits, and one-half of China's export earnings are generated by foreign-invested firms.⁷ If the 'bubble' of foreign direct investment in China were to burst, it would have serious consequences for the growth path and for the country's socio-political stability. There is intense debate at all levels of Chinese society about the significance of this phenomenon. Many popular books and articles draw comparisons with the dependent nature of Chinese economic development from the mid-nineteenth century until 1949.

⁶ It is the second largest measured in terms of PPP dollars (World Bank, 2001), but as discussed elsewhere, this greatly overstates the true size of China's national product.

⁷ In addition, a substantial fraction of China's huge exports of electrical goods (\$85 billion in 2001) were produced by indigenous Chinese firms acting as 'Original Equipment Manufacturer' suppliers to the global giants.

This presents a big challenge for China's policy-makers. China faces far greater global industrial concentration and competition than any previous late-comer country. Given the drastic inequality in competitive power between its own firms and the global leaders, China has to find a different strategy from that adopted by other latecomer countries, if it is to build a substantial group of large globally competitive firms.

4. Conclusion.

US foreign policy played an important role in the collapse of the USSR. Through the instrument of the international institutions, especially the IMF,⁸ the USA also played an important role in the disastrous choice of policies which plunged post-communist Russia into prolonged economic crisis, which has been only partially alleviated by the current high price of oil (Nolan, 1995). Through intense efforts within the IMF, US foreign policy played a central role in pushing developing countries to liberalise the flow of short-term capital. It is now widely recognised, even within the IMF itself,⁹ that premature liberalisation of financial flows in developing countries has been extremely harmful to developing countries. In extreme cases, such as Indonesia, the consequential financial crisis helped precipitate 'regime change', and socio-economic chaos. Even the paragon of the free market and well-regulated banking, Hong Kong, was deeply affected by the crisis. It is still far from a full recovery.

The unfolding disaster in Iraq serves as a salutary reminder of the dangers for US foreign policy of 'state collapse', from whatever cause, in geopolitically significant countries.

Despite many appearances to the contrary, China's political economy is at a critical and fragile stage in its evolution from the planned economy (Nolan, 2003). Its own leaders have warned of the dangers of system collapse. This is not an idle warning to justify continued one-party rule. It reflects a realistic evaluation of the magnitude development challenge that confronts the new leadership. Collapse of the former USSR was a disaster for the Soviet people, and was harmful to global prosperity and stability, not least through the effect on terrorism. Financial instability across wide swathes of Latin America, East and Southeast Asia, has also harmed the prospects for global economic progress and stability. The consequences of the disintegration of China's political economy would dwarf these. This outcome would be disastrous, not just for China, but for the USA also.

There are numerous channels through which such an outcome could be triggered, most obviously through the financial sector. Intense international pressure in respect to industrial policy is another possible (and closely related) channel. China's large firms face a severe challenge in competing on the 'global level playing field' with the world's leading system integrators in manufacturing, as well as with the leaders in the first tier of suppliers. The gap in competitive capability is at least as wide in that part of the service sector which meets the needs of global firms and the global middle

⁸ 'The International Monetary Fund (IMF) and the World Trade Organisation can be said to represent "global" interests, and their constituency may be construed as the world. In reality, however, they are heavily American dominated.' (Brzezinski, 1997: 27).

⁹ See, for example, Prasad, et al., 2003.

class. Strict application of the WTO rules, enforcing the ‘global level playing field’, would make it impossible for most large Chinese firms to compete with the global leaders.

All of the group of large Chinese firms which are groping their way towards becoming globally competitive, such as CNPC, Sinopec, CNOOC, Baoshan Steel, China Telecom, China Netcom, China Unicom, China Mobile, Haier, Huawei, and Legend, owe a great deal to state industrial policy. Even for these firms, and even with continued state industrial policy, the long-term outlook is far from certain. The challenges facing China’s aspiring global giants are far greater than those that faced any previous latecomer country. Without sustained industrial policy large Chinese firms will mainly fail in their efforts to catch up with the world’s leading firms. The example of Brazil, which has a per capita income far above China’s, illustrates vividly the likely outcome in the absence of state industrial policy.¹⁰ Over one-half of Brazil’s leading firms (by sales revenue) are global giants.¹¹

In almost every case, successful late-comer countries, from Britain and the US in the eighteenth and nineteenth centuries, to Korea and Japan in the late twentieth centuries, used one form or another of industrial policy to nurture their own ‘national team’ of large, globally competitive firms. China’s ambitions are no less intense. To deny China the chance to use the same mechanisms that they themselves used is tantamount to ‘pulling up the ladder’ through which they themselves developed globally competitive firms (Chang, 2002). Indeed, the attempt by high-income countries to pressurise poor countries, such as China, to give up national industrial policy, is itself a form of industrial policy, since it amounts to clearing the ground for competitive success for the dominant firms headquartered in the high income countries.

It may be argued that it no longer matters that a firm is ‘American’ or ‘Chinese’, because production systems are global. It may be argued that in the long-run large global firms will become ‘Sinicised’ due to the growing role of Chinese institutional and individual shareholders and Chinese people working within the global corporation. It may be argued that in the long-run there is a powerful incentive for high technology activities to be increasingly located in China, close to the world’s greatest concentrations of highly qualified, relatively low-paid employees.

However, these are speculations about the long run. Today, under the WTO rules of the ‘global level playing field’, China’s large firms face an intense threat. That competitive threat had already become clear well before China was admitted to the WTO, since it had already relaxed numerous constraints on FDI in the preceding years. However, the terms of China’s admission to the WTO, if fully applied, amount to a comprehensive dismantling of Chinese industrial policy, which greatly intensifies

¹⁰ In fact, Brazil has not totally abandoned industrial policy. Some of its most successful firms, such as Embraer, CVRD Ambev, and Petrobras, only exist due to past and present actions by the Brazilian state to nurture ‘national champions’. Without such policies, the degree of dominance by global giants in Brazil would be even greater than it is.

¹¹ Among the top 25 ‘Brazilian’ firms in 2001, fourteen are global giants, including (in descending order of revenue within Brazil in 2001) Volkswagen (2), GM (3), Fiat (5), Unilever (7), Bunge Foods (9), Phillip Morris (10), Nestle (11), Ford (12), Cargill (13), Daimler Chrysler (16), Siemens (20), Ericsson (21), BASF (22), and Motorola (24).

that threat. The pace of growth of FDI by global giant firms in China is accelerating sharply.

The pressure from within China to continue with industrial policies arises from at least three directions. In part it arises due to nationalist feelings. This is far from unique to China. In the USA in the 1970s and 1980s national sensibilities were inflamed by the rapid penetration of Japanese firms. Similar sensibilities are aroused in China at the explosive intrusion of global giant firms, often US-based, in that country. It would be naïve not to draw attention to the surge of anti-American feeling in developing countries associated with the US-led globalisation process. Such feelings erupted in China after the bombing of the Chinese embassy in Belgrade.

The incentive to continue with industrial policy arises also due to concern at the ferocious pressure that unconstrained opening up to global giant firms would exert upon employment in the Chinese state-owned sector. Explosive growth and domination of large segments of the modern economy by global giants is already helping to press forward high-speed downsizing of employment in Chinese state-owned firms, providing fuel to the fire of social discontent.

The attempt to nurture indigenous national champions is also perceived as important by Chinese policy makers because of the implications for national security. The US government has long supported the US aerospace industry through industrial policies for precisely the reason that it is a key to the generation of a wide network of new technologies. The oil and petrochemical industry has long been regarded as a ‘strategic industry’ in the USA, with intimate inter-twining of business interests and international relations in a form of industrial policy the goal of which is to secure primary energy supplies to the USA.¹² In industries such as these, which it considers are of special strategic significance, it is to be expected that Chinese policy makers will continue to try hard to nurture indigenous national champions.

China’s high-speed move towards becoming the world’s largest manufacturing base is giving rise to understandable anxiety not only in the USA, but across all the high income countries, not least among China’s immediate Far Eastern neighbours, including Taiwan. This has caused ferocious domestic debate about ‘hollowing out’ of these economies.

In order that there is a balanced policy response towards China’s industrial policies to nurture its indigenous firms, it is necessary to appreciate the intensity of the competitive threat that confronts large Chinese firms on the global level playing field of the WTO. At a meeting in Beijing in the Great Hall of the People in 2001, one US representative said: ‘Competition from abroad will help the Chinese to raise their level of efficiency, just as the US car industry did in the 1980s in the face of Japanese competition’. To compare the indigenous Chinese auto industry today with Chrysler, Ford and GM in the 1980s shows little appreciation of the true nature of the competitive structure of global big business and the magnitude of the inequality between large firms from the high income countries and those from developing countries.

¹² See, for example, the discussions of oil, US energy security and US foreign policy in Brzezinski, 1997, and Yergin, 1991.

In order to produce a balanced policy response it is also vital to appreciate the wider setting of the fragility of the entire system of Chinese political economy. Excessive pressure upon China to capitulate to US demands to enforce in the strictest terms the WTO regulations and essentially abandon industrial policy could make a serious contribution to de-stabilising the entire system of political economy. This result would ultimately be in no-one's best interests, either in China or in the USA.

In sum, given the immense imbalance in global business power, especially in high technology sectors, it is easy to understand why China might wish to continue to support indigenous firms through various measures of industrial policy at both the national and the local level. If these measures were, indeed, to be implemented successfully, then they might contribute to global peace and prosperity by helping to stabilise China's political economy.

APPENDIX: CATCH-UP IN CHINA'S STRATEGIC INDUSTRIES.

A1. Oil and petrochemicals

The global setting

Crude oil and natural gas remain central to global political economy. However, the regional distribution of world oil and gas reserves, production and consumption are highly uneven. This is of special importance for global political economy. China is poorly endowed with oil and gas. Its share of the world oil and gas reserves amount to only 2.3 per cent and 0.9 per cent respectively (BP, 2001). In 2000, China was the third largest oil consuming country after the United States and Japan. After 1993, China became a net crude oil importer. Oil imports in 2000 was equivalent to 31 per cent of China's total oil consumption.

At the end of the 1990s, among the world top 25 oil companies ranked by operating performance, fourteen (fifteen if Petrobras is included)¹³ were state-owned national oil companies (NOCs), all based in developing countries (*Petroleum Intelligence Weekly*, 18 December, 2000). These NOCs own the majority of the world oil and gas reserves and are the world's largest oil producers. However, they are relatively weak in downstream refining and marketing. There have been no cross-border mergers among the NOCs.

(i) Mergers and acquisitions

Extensive privatisation of the oil and petrochemical industry opened up new opportunities for mergers and acquisitions in both the advanced and developing countries. In the late 1990s, a frenzy of consolidation began to sweep through the global oil majors. This fundamentally changed the competitive landscape in the industry. The mergers and acquisitions include BP's trans-Atlantic merger with Amoco and its take-over of Atlantic Richfield Company (Arco), securing BP's position as one of the top 'big three' western oil companies; Exxon's merger with Mobile, the new company created overtaking Royal Dutch/Shell as the largest western oil company; the merger between TotalFina, created through French Total's take-over of the Belgian PetroFina, and Elf Aquitaine; the merger between Chevron and Texaco. The consolidation process accelerated among the mid-sized integrated oil and petrochemical companies. The merger between Conoco and Phillips in 2001 created the world's sixth largest energy company in terms of reserves and production. In February 2003, BP combined its Sidanco holdings with Tyumen Oil (TNK) for \$6.75 billion, creating Russia's third largest oil and gas company, together with Alfa Group and Access-Renova (AAR). Only two months later, Russia's largest oil producer, the Yukos Oil Company, took over Sibneft, the fifth Russian oil company for \$13 billion. The new company YukosSibneft became the world's fifth largest publicly traded oil company in terms of production. At 2.4 million barrels of oil a day, the new company ranks behind Exxon Mobil, Royal Dutch/Shell, BP and Chevron Texaco. In August 2003, BP agreed to purchase a quarter of Slavneft for \$1.35 billion. If realised, the

¹³ Petrobras (Brazil) is partially privatized.

deal will position BP as the world's second largest publicly traded oil and gas producer, ahead of Royal Dutch/Shell (*FT*, 2 August 2003).

The Middle East, the Caspian Region, and the West Africa are the terrain to battle for hydrocarbon resources. In March 2003, the Saddam Hussein regime was overthrown and the world embarked on a post Iraq War era. Before the War, global majors called for a 'level playing field' for all oil companies in the post-Saddam Iraq. The Russian, Italian, French and Chinese oil companies have made deals with Saddam Hussein's government, amounting to \$38 billion.¹⁴

(ii) The 'cascade' effect

The consolidation of the global large oil companies promoted the 'cascade' effect in each sector from upstream to downstream: Halliburton and Schlumberger in oil-field service; ABB Lummus and Amec in petrochemical process technologies and construction; GE and Rolls-Royce in pipeline pumps; Acelor and POSCO in pipeline steel. The consolidation of the big oil companies also helped to promote the oil shipping companies to consolidate.

(iii) Repsol-YPF

During the period of large-scale mergers among the western major oil companies, Spain's Repsol successfully launched a hostile bid for Argentina's YPF in 1999. YPF, Argentina's 'national champion', was privatised, restructured, and subsequently listed in the stock exchanges in Buenos Aires and New York in 1993. It was then the largest publicly traded oil company in Latin America. The deal is highly significant in that it is the first time that a large privatised western oil company has taken over a major, formerly state-owned oil and petrochemical company from a developing country.

(iv) Competitive obstacles for firms based in developing countries

The mergers in the world's oil and petrochemical industry during the global business revolution have created a group of new super-giants that stand in a position of greatly enhanced competitive advantage compared to potential competitors from developing countries. These new super-giants greatly increased their size and their assets base. They have constructed a portfolio of high quality oil and gas reserves distributed around the world. They are able to invest large amounts in R&D to sustain and extend their technical lead over other companies. They have the resources to invest in large-scale information technology systems that can better integrate their extended internal value chain, stretching from exploration to the petrol station. They have developed marketing systems with immensely powerful global brands. They have built massive multi-billion dollar central procurement capabilities with large consequent cost-savings. MSDW estimates that the super-majors, namely Exxon Mobil, Shell and BP, have a capability to sustain their competitive edge in the industry for at least fifteen years (MSDW, 1998). Not one integrated oil and petrochemical firm based in a developing country has been able to challenge the global giants in this sector. By far the most successful example was YPF. However, as that case vividly illustrated, privatisation, liberalization and high quality management, are far from a guarantee of independent survival.

¹⁴ *FT*, 25 February 2003.

China's response

In the same period that the merger frenzy swept through the global major oil companies, China's oil and petrochemical industry underwent massive restructuring. After an intense debate on how to reform the oil and petrochemical industry, the Chinese government created two large integrated oil companies through administrative measures.

(i) The 2000/1 flotations of PetroChina, Sinopec and CNOOC

In April 2000, PetroChina, created on the basis of the core businesses of CNPC, listed in New York and Hong Kong (China) Stock Exchange. The parent company CNPC held a 90 per cent of PetroChina's total equity. BP became PetroChina's strategic investor. In October 2000, Sinopec, established on the core businesses of the oil Sinopec (now known as Sinopec Group) listed in the stock exchanges in New York, Hong Kong and London. Sinopec Group controlled 56 per cent of Sinopec's equity. Exxon Mobile, BP, Shell and ABB Lummus became Sinopec's strategic investors. Equity involvement by the global super-majors was crucial to their successful listing of PetroChina and Sinopec. After the failure in international flotation in 1999, CNOOC Ltd., China's small/medium-sized offshore producer, was eventually listed in New York and Hong Kong in February 2001.

(ii) Business capabilities

- ***Reserves and output.***

PetroChina's oil reserves and production were close to the level of the world's leading companies. Sinopec is similar to ENI in terms of oil reserves and oil production. In terms of gas, PetroChina follows behind the 'big three' and Sinopec lags considerably behind the global majors (Table A1). However, the two leading Chinese oil companies have a crucial difference with the global giants in terms of global distribution and the quality of the portfolio of oil and gas assets. PetroChina and Sinopec produce entirely within China.¹⁵ Daqing, at which 50 per cent of PetroChina's oil reserves are located, is declining seriously. About one-third of PetroChina's gas reserves are in the Tarim Basin in Xinjiang. It will require advanced technology and involve high transportation costs to produce and transport the gas from Tarim to the main consuming areas in the eastern part of the country (*xi qi dong shu*). Less than five of PetroChina's oil fields can make a profit when the oil price is at \$10-15 per barrel, the benchmark price at which the global giants can still make a profit.

- ***Refining***

China's refining sector needs revamping, upgrading and expanding. PetroChina and Sinopec between them only have four refineries with capacities greater than 10 million tons. With more than half of the oil imports from the Middle East, most of China's refineries need to add capabilities to process sour crude oil. In addition, more stringent environmental regulations for refined products calls for high-conversion refineries. With tariff reduction due to China's terms of admission to the WTO, few of PetroChina's refineries can survive in near-open competition with imported refined products.

- ***Marketing petroleum products.***

¹⁵ In January 2003, PetroChina expressed its intention to make overseas acquisitions to meet the company's oil and gas production targets at an annual rate of 5 per cent for three years to 2005.

Only around one quarter of the service stations owned by each of PetroChina and Sinopec (Table A1) were franchised retail outlets bearing the companies' brands, 'PetroChina' and 'Sinopec' respectively. Neither refined products supplies nor the price of refined products are centrally controlled, nor are accounts centrally consolidated, even for the network of service stations owned and operated by the two companies themselves. The two companies' wholesale entities have no effective co-ordination of supply, price or customers. PetroChina and Sinopec still have a long way to go before they develop the logistics expertise of the global giants or possess a comparable brand based on the safe and low-cost operation of a huge logistics system. This is a crucial part of the development of the brand for globally competitive oil and petrochemical company. Moreover, the Chinese companies still must face the challenge of rationalising the market. It is estimated that in 2001 the average annual throughput per service station in China was 750 tonnes/year, only 27 percent of the average for other ten countries¹⁶ (Yin and Dong, 2002). However, the number of service station per hundred kilometres in China was 5.7, compared with the average 2.8 for the other ten countries. In 2002, Sinopec reported the annual throughput for its service stations was 1,560 tonnes per station, compared with approximately 2,400 tonnes for ENI's service stations.

- ***Petrochemicals***

The average annual capacity of petrochemical sites is just 400,000 tonnes, only half of that of the global majors. Instead of having a small number of giant, low-cost integrated sites situated in a few concentrated areas, as the global giants do, these 18 ethylene crackers are located at 16 sites in 15 cities. For petrochemical production, high-value added products only account for 30 per cent of China's total production. Imports of petrochemicals account for up to 50 per cent of the Chinese market (Sinopec, 2001). With further reductions in import tariffs since China's entry to WTO, even these low-value added petrochemical products face intense competition not only from global majors but also from low-cost producers in the Middle East and the South East Asia. China's downstream sector will experience severe impact after 2006 when China's phase-out period for WTO finishes.

- ***R&D***

The technological capabilities of PetroChina and Sinopec both upstream and downstream are relatively backward. A Chinese industry expert pointed out that the country's low level of technological innovation upstream would pose 'a great constraint on the industry's competitiveness and efficiency' (*China Petroleum*, January 1999). In petrochemical production, backward technology resulted in a high level of energy consumption and a low percentage of chemicals for further processing and utilisation (Chen, 1998: 29). In terms of R&D spending, the global majors are able to spend more in absolute terms due to the sheer size of their sales revenue (Table A2). Moreover, they are able to purchase greater amounts of the R&D 'embedded' in the products of specialist suppliers to the oil and petrochemical industry¹⁷.

¹⁶ They are the USA, UK, Germany, France, Italy, Switzerland, Japan, Canada, Mexico, and Singapore.

¹⁷ For example, Schlumberger spends more on R&D than Shell (£324 million compared with £313 million), while Haliburton spends more than ENI (£160 million compared with £146 million) (DTI, 2000: 54).

Table A1. Operating data compared: global majors versus PetroChina and Sinopec, 2002

Company	Proved reserves		Production		Refinery throughput (mmb/d)	Oil product sales (mmb/d)	Petrochemical production (mmt)	Service station number
	Oil (bb)	Gas (bcf)	Oil (mmboe/d)	Gas (bcf/d)				
Exxon Mobil	12.6	55,718	2.5	10.5	5.5	7.8	26.9*	42,000
Royal Dutch/Shell	10.1	53,438	2.4	9.4	4.1	7.4	21.4*	46,000
BP	7.8	45,844	2.0	8.7	3.1	6.6	27.0	30,000
TotalFinaElf	7.2	21,575	1.6	4.5	2.3	3.2	16.4†	16,600
Chevron Texaco	8.7	19,335	1.9	4.4	2.1	3.9	-	20,400
ENI	3.8	18,629	0.9	3.1	0.65	1.0	-	10,700
Repsol YPF	2.0	18,205	0.58	2.6	1.2	1.0	3.5	6,600
PetroChina	11.0	38,817	2.1	1.7	1.6	1.1	3.5	13,000
Sinopec	3.3	3,329	0.74	0.49	2.1	1.4	10.5	28,000
CNOOC Ltd.	1.4	3,548	0.3	0.27	-	-	-	-

Note: * Sales † Capacity

bb = billion barrels, bcf = billion cubic metres, mmboe/d = million barrels of oil equivalent per day, bcf/d = billion cubic feet per day, mmb/d = million barrels per day, mmt/y = million barrels per year, mmt = million tonnes

Sources: Compiled from company reports

(iii) Financial performance.

- **Revenue.** Their sales revenue places PetroChina and Sinopec alongside the leading second tier of global oil and petrochemical companies, but far short of the industry leaders, Exxon Mobil, Shell and BP. Even the combined revenue of PetroChina, Sinopec and CNOOC at \$71.9 billion is less than that of Chevron Texaco (Table A2).
- **Profit.** In 2002, the combined net profits of PetroChina and Sinopec were \$7.6 billion, just 36 percent of the combined net profits of the top two global giants, Exxon Mobil and Shell (Table A2). Profits per worker at PetroChina and Sinopec are minuscule compared to those at the global oil giants. CNOOC is a ‘lean’ company and its profit per employee significantly exceeds even that of the industry leader Exxon Mobil. However, the Chinese companies are still operating in a protected situation. Moreover, the Chinese companies have huge demands on their profits. For example, they have to finance their own downsizing but also that of their parent companies, which still have huge workforces (Table A2).
- **Market Capitalisation.** If one assumed that the whole company was floated, then at the share price as of 4 January 2001, the market capitalisation of PetroChina and Sinopec would be \$47 billion and \$19 billion respectively, only a fraction of the \$251 billion for Exxon Mobil, \$166 billion for Royal Dutch/Shell and \$160 billion for BP (Table A2). Of course this greatly overstates the true market capitalisation of Chinese floated companies, since the value of the non-traded shares is typically considerably below that of the

traded shares.¹⁸ The low level of operational efficiency and the high level of uncertainty in their performance after China's accession to the WTO are serious concerns among industry experts and analysts.

Table A2. Financial indicators compared: global majors vs PetroChina and Sinopec, 2002

Company	Revenue (\$billion)	Net profit (\$billion)	R&D spending (\$million)	Market Cap§ (\$billion)	Employee numbers (thousand)	Profit/ revenue (%)	Profit/ Employee (\$)
Exxon Mobil	204.5	11.5	631	251	92	5.6	125,000
Royal Dutch/Shell	179.4	9.4	472	166	116	5.2	81,034
BP	178.7	6.9	373	160	115	3.9	60,000
TotalFinaElf	107.7	6.2	695	106	121	5.8	51,240
Chevron Texaco	98.7	1.1	221	79	53	1.1	20,755
ENI	50.3	4.8	315.3	64	80.6	9.5	59,553
Repsol YPF	33.8	1.9	132 ♦	20	30.6	5.6	62,092
CNPC of which: PetroChina	42.1	6.4	-	-	1,100	15.2	5818
PetroChina	29.5	5.7	218	4.7†	419.5	19.3	13,588
Sinopec Group of which: Sinopec	41.6*	1.5*	-	-	960	3.6	1,563
Sinopec	39.2	1.9	182	3.8‡	418.8	4.8	4,537
CNOOC Ltd.	3.2	1.1	13.3	11	2	34.4	550,000

Notes: * Figures are company estimates.

♦ Figure in 2001

§ Market capitalisation on 10 June 2003

† Flotation 10% of company value

‡ Flotation of 20% of company value

Sources: Company reports, CBSMarketWatch.com

(iv) organisational structure

Although the organisational structure of PetroChina and Sinopec is superficially similar to that at an international integrated oil company, the superficial similarity conceals important differences. The global giants have a strong 'one company' corporate identity and culture. Within PetroChina and Sinopec there exist powerful entities that over the years developed strong independent corporate identities and ambitions. Both PetroChina and Sinopec are integrating these powerful subordinate companies by centralising control over planning, personnel, investment and finance. Nevertheless, establishing a unified corporate identity and culture remains a formidable challenge.

The relationship between the two listed companies and their parent companies remains ambiguous. The bulk of the income of CNPC and Sinopec Group is from the dividend payment of the two listed companies. In 2002, CNPC received an approximate \$3.1 billion dividend payment from PetroChina,¹⁹ accounting for 53 per cent of its net profit. In 2002, the non-core businesses of CNPC and Sinopec Group still employed more than 680,000 people and 540,000, respectively. A large fraction

¹⁸ This can be observed through the price at which 'non-traded' shares are exchanged among state-owned companies.

¹⁹ Based on PetroChina's dividend payment of \$0.02 per share and the weighted average number of 171,630 million shares issued and outstanding in 2000.

of these activities are loss-making. To what extent PetroChina and Sinopec have autonomy in making decisions with respect to business strategy, dividend payments and appointment of senior management remain unclear. Such a structure has caused concern to be expressed about the respective companies' commitment to creating shareholder value and protecting the rights of minority shareholders²⁰.

(v) Complex penetration.

The global giants are deeply interested to develop their business in China from upstream to downstream. According to the State Economic and Trade Commission, in upstream exploration and development, by 1999, total foreign investment reached \$1.1 billion in onshore upstream and \$6.45 billion in offshore upstream. In petrochemicals, global petrochemical giants will set up six joint ventures petrochemical complexes by 2005, each of the projects involving \$2.5-4.5 billion investment and located in the coastal regions, which have the highest average income level in China. If we assume all the joint venture projects start production in 2005, they would account for 42 per cent of total projected ethylene demand in China at 10 million tons (*Oil and Gas Journal*, 10 January 2000). The global giants are in most areas technologically far ahead of their Chinese counterparts in these joint ventures. From the perspective of the foreign partner in the joint venture, they each form a part of the respective global business system, typically a single business unit. In this sense, they represent an important growth of the multinational giants within the 'body' of the indigenous Chinese firm.

As discussed above, the global majors have become strategic investors in PetroChina and Sinopec. In April 2001, PetroChina and BP established a marketing joint venture in Guangdong, aiming for 500 service stations by 2001. Each of the global majors, Exxon Mobil, Shell and BP, are setting up joint ventures with Sinopec for 500 service stations in Guangdong, Jiangsu and Zhejiang, respectively. For the three companies, this was '*but the beginning of their attempts to capture a share of the world's largest retail market*' (*Petroleum Economist*, October 2000)(emphasis added). The strategy of the global giants to expand their downstream, high-margin business, each in a different part of China's high-income coastal markets, is clear. In the middle of 2003, Shell's joint venture with Sinopec was approved.

(vi) Overseas expansion.

China stepped up its acquisition of overseas oil and gas assets in the late 1990s (Andrew-Speed, 2002: 33-36). CNPC was the sole entity to invest in overseas oil and gas assets before 2002, the year in which Sinopec and CNOOC started their overseas expansion. Currently, CNPC has relatively large investments in Sudan and Kazakhstan and a presence in Syria, Venezuela, Peru, Canada, Myanmar, Thailand and Indonesia. In 2002, CNPC obtained 10.2 million tons of oil from its overseas assets. However, this accounted for less than 10 percent of CNPC's total production. Sinopec has assets in Algeria, Yemen and Indonesia. CNOOC acquired assets in Australia and Indonesia. It is notable that Sinochem, approved by the State Council in 2001, joined the three Chinese oil majors for overseas acquisition. In February 2003, Sinochem acquired the Atlantis project from the Norwegian oil-field service company

²⁰ The issues of creating shareholder value and protecting minority shareholders are discussed in *China Petroleum*, April 2000, p. 18-29 and an article 'Oil industry: choices after flotation' by Zhang Jiwei in *Finance (Caijing)*, November 2000.

PGS. Sinochem aims to become ‘a vertically-integrated state-owned oil company’ (Wang, 2003).

The Chinese oil major’s overseas investment programme has had serious setbacks. At the end of 2002, CNPC made a bid for the Russian government’s 74 percent holding in Slavneft, the eighth largest oil company in Russia. However, just two days before the bidding date, the Russian Duma passed a resolution, forbidding any entity controlled by foreign governments to bid for Slavneft. CNPC withdrew from the bidding process. In early 2003, the proposed oil pipeline from Angarsk in eastern Siberia to Daqing was held up due to a rival proposal supported by Japan to construct the oil pipeline to the Russian port of Nakhodka on the Sea of Japan. In May 2003, CNOOC and Sinopec’s purchase of an 8.3 percent stake from BG in the North Caspian Sea oil and gas project in Kazakhstan was blocked by the other partners (Shell, Exxon Mobil, TotalFinaElf, Conoco Philips and ENI), exercising their pre-emption rights. The project was considered to be ‘the largest oil field discovered in the last half century’. Commentators regarded the pre-emption as ‘[flying] in the face of the traditional practice among Western businesses to court Chinese interests at all costs’ (*SCMP*, 3 June 2003).

(vii) Summary.

The process of restructuring and flotation of PetroChina and Sinopec was achieved through administrative measures within just one year. Despite this achievement, substantial question marks remain. Across the whole value chain from upstream to downstream, PetroChina, Sinopec and CNOOC are at disadvantage in terms of the quantity of oil and gas reserves compared with the national oil companies, and in terms of global distribution and quality of reserves compared with the super-majors. They are at disadvantage in technology and financial strength compared with the global majors. There remains a deep internal battle to establish a cohesive corporate culture to integrate their powerful subordinate companies and establish a truly unified company. The relationship of the floated companies with the parent remains unresolved. Across the value chain, PetroChina, Sinopec and CNOOC have been actively forming ‘strategic alliances’ and establishing joint ventures with global oil and petrochemical companies. Their future relationship with each other and with the global giants remains highly uncertain, and strongly depends on the path taken towards them by their majority owner, the Chinese state. On the verge of China’s entry to the WTO, a meeting convened by the State Planning and Development Commission reported China’s petrochemical industry ‘faces severe challenges’ (Xinhuanet, 2001). It remains an open question whether PetroChina, Sinopec and CNOOC will succeed where YPF failed.

A2. Aerospace

Global Trends.

(i) Consolidation.

The dramatic change in the demand side of the world’s aerospace industry in the 1990s has been a powerful force to drive forward consolidation. After the Cold War, both the USA and Europe drastically reduced their defence spending (IISS, 1999, 37). Procurement techniques rapidly moved towards those of the civil aerospace world as governments push contractors to lower costs. Alongside the decline in defence

procurement, European and US military aircraft manufacturers have been able to sell to markets that were inaccessible during the Cold War (IISS, 1999, 283).

Since the 1980s, privatisation as well as international alliances among the world's airlines placed great pressure on aircraft suppliers to reduce cost. Following the events of 11 September 2001, a decline in commercial aircraft purchase will be partially compensated by increased purchase of military aircraft (including large transport planes) and other military equipment. In May 2003, the US Congress approved a \$400 billion defence budget for the year 2004, \$20 billion more than the Pentagon requested and a \$45 billion increase over the budget for this year. Defence observers comment that even though the actual funding for 2004 would scale back to the levels initially requested by the Pentagon, 'the US would spend more on its military next year than the next 10 largest-spending nations combined' (*FT*, 13 June 2003). Moreover, the Pentagon's five-year defence plan forecasts increases of \$20 billion per year through to the end of the decade.

USA. Initiated by the Pentagon over the 'Last Supper', over \$62 billion-worth of mergers and acquisitions occurred between 1994 and 1998 in the USA (*FT*, 3 September 1998). Between 1990 and 1998, the number of prime contractors for fixed-wing aircraft fell from 8 to 3; rotary wing aircraft 4 to 3; tactical missiles 13 to 4; expendable launch vehicles 6 to 2; satellites 8 to 5; and, strategic missiles 3 to 2 (James, 1998). During the 1990s, more than 50 companies were compelled to consolidate into today's "Big 5": Boeing, Lockheed Martin, Northrop Grumman, Raytheon and General Dynamics. The most significant event in this process was the merger between Boeing and McDonnell-Douglas. The resulting extraordinarily high level of industrial concentration received 'strong support from the USA administration' (*FT*, 23 September 1997). The merger resulted in Boeing being the only producer of jet airliners in the USA and accounting for no less than 84 per cent of the world's total commercial aircraft in service (*FT*, 23 September 1997). After the merger, Boeing and Lockheed Martin completely dominated military aircraft sales to the US government (*FT*, 3 September 1998). On 26 October 2001, the Pentagon awarded the \$200 billion Joint Strike Fighter (JSF) programme, the biggest defence procurement, to Lockheed Martin. The procurement decision 'catapults Lockheed into an unassailable position as the world's top builder of fighter aircraft' (*FT*, 29 October 2001). Moreover, it is expected that over the lifetime of a given plane, the final cost will be several times of the initial procurement, which will amount up to \$1 trillion at today's prices.

Europe. The European military aerospace industry with much smaller and fragmented government procurement than their counterparts in the USA realised that it must unify or perish before the US challenge. In October 1999, Dasa of Germany and Aerospatiale-Matra of France and Spain merged into a new giant company called the European Aircraft, Defence and Space Company (EADS). However, EADS now has serious problems with its management structure leadership (*FT*, 16 November 2001). Moreover, BAe Systems, EADS's partner in Airbus and Eurofighter, now is a full partner with Lockheed Martin in the JSF programme. France is committed to its own Rafale fighter through Dassault and competes for export orders with EADS's Eurofighter. Italy has decided to quit the European programme to build a large military transport aircraft, the A400M. In addition, the events of 11 September will put severe pressure on Airbus, especially given the large outlays already undertaken on the super-large aircraft A380, for which the market now looks much less

optimistic. In sum, the final shape of the European aerospace industry is far from certain.

Transatlantic option. The USA has the world's largest arms market by far. In an effort to prevent the emergence of a 'Fortress Europe' in the arms industry, the US government has been moving towards relaxing its controls on foreign investment in the industry and greater technology sharing with European-based defence firms. Jacques Gansler (the then Head of Procurement, Pentagon) announced that the Pentagon was willing to allow European or Asian companies to 'buy major US defence companies under certain conditions', one of which was that other countries must reciprocate, allowing similar access to their own markets (*International Herald Tribune*, 8 July 1999). The 1990s saw increases in programme-level collaborative arrangements between industrial firms. The JSF programme is by far the most significant one. The UK is the sole Level 1 partner that commits \$3.3billion to the development costs and 'will be given a deeper insight into the workings of the F-35 [JSF] programme'. The Netherlands and Italy are the level 2 partners, which will allow them to 'influence the aspects of the F-35's design'. The Level 3 partners include Canada, Denmark, Norway and Australia, with Singapore, Turkey and Israel expected to follow before the end of 2003. Level 3 partners will be given 'access to technical, cost and schedule data' so that 'they can shape their requirements around the aircraft' (*FT*, 22 July 2002). However, as a Level 1 partner, BAe System's demand for the source codes for the F-35 caused anger in the US administration. Without the source codes, Britain would have no autonomy to adapt the aircraft for operational requirements or perform important upgrades: 'Reprogramming the aircraft to face any future threats, ... could be done only once the US had given its permission' (*FT*, 14 July 2003).

(ii) Systems integration.

Integrating the supply chain. Modern aircraft and engines have become so complex that a major aspect of competitive advantage has become the ability to integrate the whole system of supply to produce the final product. The supply base of the aerospace industry cuts across many industries: 'As much as 60-80 percent of the end-product value of aerospace products derives from this supply base' (Murman *et al.*, 2002, p. 18). The system integrators – the designer and assembler of the civilian aircraft or the prime contractors for defence industry contracts – make large investments in IT systems to integrate the supplier networks tightly with the core design and assembly location, and involves increasingly detailed, instantaneous exchange of information. The surrounding system of suppliers today constitutes a veritable 'external firm', whose activities are closely co-ordinated and planned by the core systems integrators. For example, Airbus has more than 1,500 suppliers in 27 countries, including over 500 US companies, and suppliers in Singapore, India, Australia, Indonesia, Korea, Japan and China. The size of the 'external firm' can greatly exceed that of the core companies. Rolls-Royce has around 20,000 people in its aerospace division in the UK, and estimates that around 40,000 people work full-time to supply the company with goods and services.

Building internal systems integration capabilities. Alongside the trend towards concentration among component and sub-system suppliers, the leading systems integrators are themselves tending to become more vertically integrated. This enables them to perform the increasingly complicated tasks involved in integrating complex sub-systems with multiple interfaces. For example, Raytheon bought a succession of military businesses in the 1990s, including the military electronics company, E-

Systems, the military systems and electronics business of Texas instruments, and the Hughes military electronics business from General Motors. By the late 1990s, Raytheon had become a huge company with a \$20 billion annual turnover, and a wide range of systems integration capabilities in missiles and torpedoes. For the defence aircraft producers, the emphasis has changed to 'the integrations of systems rather than the production of individual combat platforms' (*FT*, 13 April 2003). In April 2003, EADS announced that it would integrate its defence electronics, military fighter aircraft and telecommunications activities into one division. The division will have annual revenue of \$5.4 billion and 24,000 employees in nine countries.

(iii) The 'cascade' effect.

In order to meet the demands of the systems integrators, the major components suppliers themselves needed to invest heavily in R&D and to grow in order to benefit from cost reduction through economies of scale. A powerful merger movement is taking place among first tier suppliers to the systems integrators. In the crucial aircraft engine sector, there are now only three engine makers left that have the capability to produce large modern jet aircraft engines, namely Rolls-Royce, Pratt & Whitney of United Technology and GE Engine of GE. Between them, they formed the joint ventures IAE (Pratt & Whitney and Rolls-Royce), Engine alliance (GE and Pratt & Whitney), and CFMI (GE and Snecma). By 2000, the market share of installed jet engine in the world airline fleet between them was 36 percent for Pratt & Whitney, 20 percent for CFMI, 14 percent for GE, 10 percent for Rolls-Royce and 3 percent for IAE (AECMA, 2002). The Allied Signal/Honeywell merger in 1999 created a company that has 'a strong position in everything from manufacturing cockpit controls to handling aircraft service and maintenance' (*FT*, 8 June 1999). Smiths Industries Aerospace has built a leading position in the control and management of aircraft utilities, and in the electrical, mechanical and hydraulic systems through a series of acquisitions in the 2000, including the aerospace division of Invensys, the actuation division of BAe Systems. Through the merger with the TI Group in the same year, Smiths strengthened its first-tier aerospace supplier status by integrating Dowty of the TI group. The trend towards concentration is also affecting smaller companies within the industry as exemplified in Meggitt's take-over of Whittaker Corporation. The new company supplies valves, ground fuelling products and fire and smoke detectors to 'virtually every aircraft maker in the West' (*FT*, 10 June 1999). The merger was explicitly driven by the assemblers' push to reduce the number of parts suppliers.

(v) Competitive obstacles for firms based in developing countries.

The aerospace industry is a capital-intensive high-technology industry with high barriers to entry. The profound transformation of the leading aerospace companies based in the US and Europe in the 1990s created even higher barriers to entry than existed before. Today, major aerospace companies in developing countries face greater obstacles than ever in their attempt to catch up with the world leaders. Aerospace companies based in Europe and the US benefit from vast military procurement, which together account for around 60 per cent of the world total military procurement. They have massive economies of scale in assembly with long production runs for each aircraft type. They have huge R & D spending and large R & D support from their respective government (Fransman, 1995, 107), especially in the capitalisations, access to export credit guarantees supported by the government US, which has enabled them to sustain their technological lead: '*The development of the*

US aerospace industry was largely government-funded. As late as 1986, close to 80 per cent of all R&D in this industry was Federally-supported. Today this is a large employer (480,000 in 1994) and one of the largest exporters (\$30 billion per year in 1980-94) in the nation' (White House, 2000)(emphasis added). They have huge financial strength and resources reflected in large market and often have the benefit of co-finance of industrial development with the government. They have high capabilities in system integration in both the internal and external firms on a global scale. They have established globally recognised brands both for aircraft and for key sub-systems.

Not one firm from a developing country has succeeded in challenging the aerospace giants of the developed countries either as a systems integrator or a major first tier supplier. Embraer represents the highest achievements so far for developing countries in the field of commercial aerospace. However, it is far from certain that in the foreseeable future it will be able to compete successfully with the established giants in even the regional jet market, let alone in the market for larger aircraft. It is best regarded as a substantial player in the ferociously competitive niche market for regional jets,²¹ rather than a competitor to the global giants.

China's Response

The restructuring of China's aerospace industry started at the same time that the world's leading aerospace companies entered a period of profound change. In 1993, Aviation Industries of China (AVIC) was established, assuming responsibility for the management of all the aviation industry assets formerly under the Ministry of Aviation Industry. It was formally turned into an experimental state holding company in 1996. The goal of the holding company was to transform the nation-wide collection of enterprises into an internationally competitive aviation company 'with world-wide fame and influence' (AVIC, 1998: 2-4).

(i) The year 1999 Restructuring: splitting into two

By early 1999, debate over how to restructure it in the light of its own internal problems and the explosive changes going on in the world industry outside became increasingly intense. In early 1999, the Chinese government decided to split AVIC into two fully integrated parts, AVIC 1 and AVIC 2. The stated goal of the reform was the 'break up of monopoly and the fostering of fair market economy mechanism' (*China Daily Business Weekly*, 31 January 1999). While the world's leading aerospace corporations were in the midst of an unprecedented epoch of consolidation, the Chinese aerospace industry was being divided into smaller segments. After the restructuring, the new AVIC 1 took over businesses in manufacturing interceptors, interceptor-bombers, tankers, transporters, trainers, and reconnaissance airplanes while the new AVIC 2 focused on helicopters, transporters, trainers, and general aircraft.

(ii) AVIC's businesses.

Size. In 2002, the combined total sales of AVIC 1 and AVIC 2 are less than one-tenth of Boeing's and one-fifth of Lockheed Martin's, and, as we shall see, a large fraction of their revenues is now from diverse non-aerospace products. Their

²¹ In recent years, Fokker, BAe and Faicchild Dornier have all exited this sector due to the intense competition and low profits.

combined total revenues are only about one-fifth of the revenue of aerospace suppliers United Technologies and Honeywell, respectively (Table A3). However, AVIC 1 and AVIC 2 together employs over 400,000 people, more than twice as many as Boeing and Lockheed Martin do. If AVIC's aerospace division adopted Western manning levels, ... then the entire aerospace division would employ only around 5,000 people. If AVIC's entire engine division were a separate company, and adopted Rolls-Royce's manning levels, it would employ only around 1,200 people (Nolan, 2001a: 227). Moreover, the world leading aerospace companies have multi-billion dollar market capitalisations. This enables them to finance M&A through the stock market even if they have negative profits (Table A3).

Non-aviation production. In line with the policy of 'military to civilian conversion' and the strategy of 'civilian supports military', AVIC had been turned into a vast empire of diversified businesses. By 1997, AVIC manufactured more than 5,000 types of non-aviation products. In real terms, the sales of non-aerospace products rose by around 23 per cent per annum from 1979 to 1997. Automobiles, auto components and motorcycles together accounted for 62 per cent of the total value of AVIC's revenue in 1997. Sales revenue of motor vehicles accounted for 72% of the total sales revenue of AVIC 2 (AVIC Economic Research Centre, 2000, p. 9).

Sub-contract/Sub-system Joint ventures. AVIC had progressed from purely compensation trade to becoming a competitive global supplier of components, including being the sole suppliers of some items (B-747 wing rear ribs, B-737 maintenance doors, BAe 146 doors, Dash-8 cargo doors and LM2500 turbine disks). Following the collapse of the proposed joint production plans for the AE-100 and the MD-90, Airbus and Boeing both responded with offers of considerably enhanced participation by AVIC in the production of sub-systems. Boeing is leading in that strategy with 74 per cent of all parts built in China going to Boeing (*Aviation Week & Space Technology*, 8 May 2000: 63). Airbus agreed that AVIC could 'participate in the development' of its 107-seat A318 programme, but, to date this remains very limited in scope. In the foreseeable future China's sub-contracting industry seems likely to lag far behind the level of sales and technological sophistication achieved by the sub-contracting industry in Japan and South Korea. Despite AVIC's intense efforts to win contracts and their substantial growth, China's sub-contracts with the global giants are small-scale. In 2001, AVIC 1's total subcontract sales were around a mere \$120 million, the size of a small-scale engineering company in the West. In the aero-engine sector, the total output value of the joint venture between Xian Aero-engine Company and Rolls-Royce to manufacture turbine blades will be only around \$30 million at full production in the early 21st century (*China Daily Business Weekly*, 11 October 1998).

AVIC does not participate in the decisions over aircraft purchase in China. This limits its ability to place leverage on the global aircraft makers to sub-contract within China. Moreover, the main Chinese aircraft manufacturers are competing with each other to obtain sub-contract work, which weakens the overall industry's bargaining power in obtaining sub-contracts, and in settling the terms for the sub-contracts. In addition, China's sub-contractors lack ability to co-finance on a large scale. In the meantime, China's leading sub-contractors face intense international competition from Israel in military sub-contracting, and from Japan and South Korea in civil sub-contracting. China's sub-contractors are generally only able to contract for 'Level 3' contracts, compared to the sub-contract of Japan and South Korea usually at Levels 4 or 5. The latter usually involves co-financing and co-designing.

Table A3. Relative size of selected aerospace companies, 2002

Company	Assets (\$b)	Revenue (\$b)	Profit (\$m)	Market Cap.* (\$b)	Employees (000s)
Boeing	52.3	54.1	492	20.9	165
EADS	49.7	28.3	-283	-	103
Lockheed Martin	25.8	28.2	500	21.9	125
Northrop Grumman	42.3	17.8	64	15.8	117
Raytheon	23.9	17.0	-640	11.8	76
General Dynamics	11.7	13.9	917	12.3	54
BAe Systems	25.1	12.1	-1,030	3.7	68
Rolls-Royce	4.8	9.2	84	1.2	39
United Technologies of which:	29.1	28.2	2,200	27.6	155
Pratt & Whitney	6.1	7.6	1,300	-	-
Honeywell	27.6	22.3	-220	17.9	108
GE Of which: GE Engine	575.2	131.7	14,100	259.6	315
AVIC 1	4.2	2.6	18.1	-	280
AVIC 2	3.8	2.4	2.4	-	210

Notes: Market capitalisation

Sources: *Fortune Global 500*, 2003, *FT Global 500*, 2003, companies' reports, research

(iii) AVIC's organisational structure.

Children and grandchildren. The business structure of AVIC is extremely complex. The function of the headquarters in monitoring, control, co-ordination and unifying the whole company to utilise resources and maximise returns is extremely weak.

AVIC had 116 subordinate plants grouped under 56 'children' enterprises. There was a cascade of businesses each with investments in subordinate companies, from 'children', through 'grandchildren', 'great grandchildren', 'great-great-grandchildren' and 'great-great-great grandchildren'. The result was a typical East Asian diversified conglomerate, investing in any activity that brings some short-term profit, but without a common focus. This structure raises deep problems for corporate governance and central control over the operations of subsidiaries and related companies. After the 1999 restructuring, each of AVIC 1 and AVIC 2 inherited this hugely unwieldy and unfocussed business structure.

Flotation of subsidiaries. The institutional structure of AVIC has changed gradually since the mid-1990s through the flotation of different parts of the Company. By 1998, seven subsidiaries had floated. The typical flotation is of a minority share in the floated company, with the majority shareholding still held by AVIC through its subsidiary company. For example, in the case of XAC International, XAC held 64.71 per cent of XAC International.

Flotation of AVIC 2. At the beginning of 2003, AVIC 2 was awaiting State Council approval of its international flotation. AVIC 2 undertook restructuring in late 2002 and merged four of its subsidiaries into a new company for flotation. The proceeds from the international listing would be used to fund businesses such as aircraft and helicopter manufacturing and mini-van production (*China Daily*, 13 January, 2003). If

AVIC 2 succeeds in the flotation, it will be the first time that part of China's defence industry has been listed overseas.

(iv) Comprehensive penetration.

In military aircraft, it is likely that there was a real fall in the amount of resources allocated to modernisation of China's indigenous industry during the economic reform period. The number of military aircraft produced is reported to have fallen significantly (Nolan, 2001). In the mid-1990s, China had 'a fleet of 5000 obsolete combat aircraft, most of them based on old Soviet designs such as the MiG-21 and MiG-19 fighter aircraft, and the Tu-16 bomber' (Sergounin and Subbotin, 1999: 74). During the 1990s, Chinese fighter aircraft production facilities have produced no more than 36 planes a year (Kondapalli, 1999: 171). By 2002, China has about 1,000 fighter aircraft, among which over 650 are J-7 (MiG-21) series, 200 J-8 (Finback) series, and 90 Su-27s. The country's airforce is hugely reliant on the Russian Su-27s for their most advanced fighters. It is estimated that China has 513 military transporters (IISS, 2002: 147-148). The technical capabilities of the much-anticipated J-10 (produced by AVIC 1) are no rivals to the world's advanced fighter aircraft. Although it has a 'secure' internal market for upgrading the PLA Air Force, it only has a tiny niche export market and has political constraints in selling into those markets. This will greatly limit the economies of scale that can be achieved in producing the J-10.

In civilian aircraft, a total of only 130 Y-7s, a small turboprop aircraft, had been produced by the late 1990s, and new orders had dried up completely. To compound matters, a Y-7 exploded in mid-air in 2000. Following the conclusion of the crash investigation, all 64 Y-7s were taken out of service in June 2001. By the end of 2002, of the 561 large jetliners (above 100 seats) operating in the mainland of China, Boeing had 406 airplanes and Airbus had 124. Together they accounted for 95 percent of the unit market share in the country.

China's attempt to build its own indigenous large passenger aircraft, the Y-10, ultimately failed. China's domestic airlines refused to buy the plane. It was extremely heavy compared to the Boeing 707, with high fuel consumption and a very limited range. After the conclusion of the Y-10 programme in 1985, the Ministry of Aviation devised a 'three-step take-off plan', from the MD-90 assembly MD-90 to jointly design and manufacturing the AE-100 with Airbus to the ultimate goal of self-design and building a 180-seater plane by 2010. One by one each of these objectives fell by the wayside. The termination of the MD-90 programme and the AE-100 programme were perceived outside China to 'deal a severe blow to China's nascent aviation industry' and 'throw into doubt its plans to become a substantial aircraft manufacturer' (FT, 5 August 1998 and 6 October 1998). Many people in the Chinese aircraft industry felt that it had been let down not only by Boeing and Airbus, but also by the Civil Aviation Administration of China (CAAC), which had refused to order either the MD-90 or the planned AE-100.

(v) Development plans.

- *New regional jet programme.*

At the end of 2000, it was apparent that China had abandoned the ambition to build a medium-capacity, single-aisle airliner. 'We cannot compete with aviation giants such as Boeing and Airbus in financial clout and market share' (Zhang

Hongbiao, Vice Minister of the Commission of Science, Technology & Industries of National Defence (COSTIND), quoted in *China daily*, 6 November 2000).

China's 'best bet' would be producing regional airliners. COSTIND will invest \$600-\$725 million in R&D for the new regional jet programme aiming to build a new 50-70-seat turbofan aircraft to international standards. AVIC 1 has since established AVIC 1 Commercial Aircraft Company (ACAC) to oversee resources, production, certification and marketing of ARJ21, the new 79-99-seat regional jet. AVIC 1 hopes to sell 300 ARJ21s to the domestic market and export 200 in twenty years. GE has been chosen to supply the CF34-10A engine and the Honeywell and Parker Hannifin team is to develop, produce and support the ARJ21's flight control system. However, the future AVIC 1's reported joint venture with Bombardier is uncertain. In the meantime, AVIC 2 has devised a three-step plan for developing regional aircraft: establishing a joint venture for final assembly, producing components locally and developing by-products and new products. AVIC 2's joint venture with Embraer to produce a 30-50-seat regional plane in Harbin has been approved.

The market prospect for regional jets in China is promising even after the events of 11 September 2001. Boeing has predicted that around 70 per cent of the total of the 1800 new medium and large-sized commercial aircraft purchased by China over the next twenty years would be single-aisle regional jets (Keck, 2001). The competition for selling regional jets to China is intense. Bombardier and Embraer are racing each other for selling into the Chinese airliners. Boeing and Airbus continue to actively market their smallest aircraft to Chinese airlines in an effort to capture the growing regional jet market. Price competition in all aircraft categories can be expected to intensify following the collapse in the world aircraft market after 11 September 2001. This is good news for Chinese airlines, but bad news for a potential regional jet produced in China. If China is, indeed, successful in designing and building its own regional jet, it will be far behind in the race for its own national market by the time that the first deliveries begin. This will be a huge disadvantage in an already intensely competitive segment of the world aircraft market.

(vi) Summary.

The aerospace industry's supply chain incorporates a large fraction of the world's most advanced technologies. These technologies are almost entirely embedded in firms headquartered in the high income countries, especially the USA. Since the early 1990s, the world's leading aerospace companies (including the systems integrators and the main participants in the supply chain) based in the high income countries, especially those in the USA, have achieved massive competitive advantage through high-speed consolidation and through achieving great progress in their systems integration capabilities, hugely strengthening their already immensely powerful competitive position. Moreover, this period witnessed the near-disintegration of the former Soviet Union's civilian aerospace industry, which had the potential to seriously challenge the dominant position of US and European civilian aircraft makers. In this period there also took place a drastic weakening of Russia's military aircraft industry.

In this period, despite intense efforts, AVIC has failed to make any inroads on the dominant position of the world's leading corporations from the high income countries, especially the USA.

Abbreviations.

- FEER Far East Economic Review.
 FT Financial Times
 SCMP South China Morning Post

References

- Andrew-Speed, Philip, Xuanli Liao and Roland Dannreuther (2002), *The Strategic Implications of China's Energy Needs*, Adelphi Paper 346, the International Institute of Strategic Studies.
- AVIC (1998), *Aviation Industries of China*, Beijing: AVIC.
- AVIC Economic Research Centre (2000), *Research on Economic Topics of the Aerospace Industry*, Beijing: AVIC Economic Research Centre.
- BP (2001), *BP Statistical Review of World Energy 2000*, London: BP.
- Brzezinski, Z., 1997, *The grand chessboard*, New York, Basic Books
- Chen Huai (et al) (1998), *Assets Restructuring of the Chinese Oil and Petrochemical industry*, Beijing: Economic Science Press.
- Chang, H.J., 2002, *Kicking away the ladder*, London, Anthem Press
- Congressional-Executive Commission on China, 2002, *Annual Report*, Washington DC, US Government Printing Office.
- Department of Trade and Industry (DTI), 2002, *The 2002 R&D Scoreboard*, London, DTI
- Foner, E., 1998, *The Story of American Freedom*, New York, W.W.Norton
- Fransman, M (1995), 'Is industrial policy obsolete?', *Cambridge Journal of Economics*, Vol. 19.
- Harvard Business School (HBS) Case, 'Embraer: the global leader in regional jets', 20 October 2000.
- International Institute for Strategic Studies (IISS) (1999), *Military Balance, 1999/2000*, London: IISS.
- International Institute for Strategic Studies (IISS) (2002), *Military Balance, 2002/2003*, London: IISS
- James, Andrew D. (1998), *Post-merger Strategies of the Leading US Defence Aerospace Companies*, Stockholm: Defence Research Establishment, FOA-R-98-00941-170-SE.
- Keck, Elizabeth (2001), 'Commercial aviation Takes Off', *The China Business Review*, March-April 2001.
- Keynes, J.M., 1936, *The General Theory of Employment, Interest and Money*, London, Macmillan
- Kondapalli, Srikanth (1999), *China's Military: the PLA in Transition*, New Delhi: Institute for Defence Studies and Analyses.
- Lewis, A., 1954, 'Economic development with unlimited supplies of labour', Manchester School, May
- Marx, K., 1853, 'Revolution in China and Europe', in Marx, 1968
- Marx, K., 1968, *Marx on China*, London, Lawrence and Wishart
- Morgan Stanley Dean Witter, (1998, 1999, 2000), *The Competitive Edge*, New York.
- Murman, Earll (et al) (2002), *Lean Enterprise Value: Insights from MIT's Lean Aerospace Initiative*, New York: Palgrave.
- Nolan, P., 1988, *The Political Economy of Collective Farms*, Cambridge, Polity Press

- Nolan, P., 1995, *China's Rise, Russia's Fall*, Macmillan, Basingstoke
- Nolan, P., 2001a, *China and the Global Business Revolution*, Basingstoke, Palgrave
- Nolan, P., 2001b, *China and the Global Economy*, Basingstoke, PalgraveNorth, D.C., and R.P.Thomas, 1973, *The rise of the western world*, Cambridge, Cambridge University Press
- Qu, Hongbin, 2002, 'China Economics: The emerging nouveau riches', HSBC, *China Monthly*
- Morgan Stanley Dean Witter (MSDW) (various years) *The Competitive Edge*, New York: MSDW.
- Nolan, P., 1988, *The political economy of collective farms*, Cambridge, Polity Press
- Nolan, Peter (1999) *Coca Cola and the Global Business Revolution: A Study with Special Reference to the EU*, Cambridge: Polity Press.
- Nolan, Peter (2001a) *China and the Global Business Revolution*, England: Palgrave.
- Nolan, Peter (2001b) *China and the Global Economy*, England: Palgrave.
- Nolan, P., 2003, *China at the crossroads*, Cambridge, Polity Press
- Nolan, P., Sutherland, D. and Zhang, J (2002) 'The challenge of global business revolution', *Contributions to Political Economy*, 21, 91-110.
- Nolan, Peter and Wang Xiaoqiang (1998), Beyond privatization: institutional innovation and growth in China's large state-owned enterprises', *World Development*, 27 (1), 169-200.
- Prasad, E., K.Rogoff, S.J. Wei and M.A.Khan, 2003, 'Effects of financial globalisation on developing countries: Some empirical evidence', *International Monetary Fund*, March.
- Sergounin, A.A., and S.V.Subbotin (1999), *Russian Arms Transfers to East Asia in the 1990s*, Oxford, Oxford University Press.
- Sinopec, 2001, *Annual Results Presentation*, Hong Kong, April.
- Smil, V., 1993, *China's environmental crisis*, London, M.E.Sharpe
- Sinopec, Annual Results Presentation, Hong Kong: April 2001.
- State Statistical Bureau (ZTNJ) various years, *Chinese Statistical Yearbook (Zhongguo tongji nianjian)*, Beijing, Zhongguo tongji chubanshe
- The European Association of Aerospace Industries (AECMA) (2002), *The European Aerospace Industry, Facts & Figures 2001*, Brussels: AECMA.
- UNDP, various years, *Human Development Report (HDR)*, New York, Oxford University Press
- Wang Xiaoqiang, Deng Yingtao, Yang Shuang, and Cui Heming, 1999, *Rebuilding China*, Wenhui Publishers, Shanghai
- Wang Yichao, 'Sinochem' self-salvation' (*zhonghua ziji quze*), *Caijing*, 5 June 2003.
- World Bank, various years, *World Development Report*, (WDR), Washington, DC, Oxford University Press
- World Bank, 2002, *China: National development and sub-national finances*, Washington DC, World Bank
- White House (2000), 'Supporting R&D to promote economic growth', White House website.
- World Bank, 2001, *World Development Report*, New York, Oxford University Press.
- Xinhuanet (2001), 'Our national petrochemical industry faces a severe situation', <http://www.xinhuanet.com.cn>, 27 September.
- Yergin, D., 1991, b*The Prize*, New York, Simon and Schuster
- Yin Qiang and Dong Liming (2002), 'Comparison and analysis of service station data between China and foreign countries' (*guoneiwai jiayouzhan shuju duibi yu fenxi*), *International Petroleum Economy (guoji shiyou jinji)*, 12.