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China's WTO Accession and Its Effect on State-Owned Enterprises

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Introduction

China, after 15 years of strenuous negotiation, formally became the 143rd member of the World Trade Organization in December 2001. WTO membership is generally perceived as beneficial by the Chinese society, given the aggregate welfare gains from a more open economy predicted by economic theory. However, some objections to WTO membership were raised by sectors of the society directly involved with import competing industries, which will be negatively affected by the increase in competition derived from WTO accession. In particular, state-owned enterprises (SOE) which are very inefficient and rely heavily on government support will be considerably affected by China's accession to the WTO.

China's SOE sector is large. In 2000, the SOE sector produced 24% of industrial output, and accounted for 42% of urban employment[1]. The SOE sector is also very inefficient, with half of all firms making losses.[2] Given the size and inefficiency of the SOE, the Chinese economy would substantially benefit from any reforms that reallocated resources

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[1] Data source: China Statistical Yearbook 2002.
[2] World Bank "China's Management of Enterprise Assets: The State as Shareholder", 1997.

away from the SOE sector. Restructuring the SOE sector should be a priority if China is to sustain high rates of economic growth. The policies agreed upon accession to the WTO, which call for increased competition and a more open economy, represent an excellent channel for restructuring the SOE.

The SOE sector is highly subsidized. SOE essentially receive two types of subsidies: direct government subsidies from the state and local governments, and indirect subsidies from state-owned banks through preferential loans. Both types of subsidies will be substantially reduced under WTO membership. Regarding direct subsidies, China signed the *Agreement on Subsidies and Countervailing Measures (SCM)*, according to which China will substantially reduce state level subsidies to the SOE sector. China also agreed to gradually open up its financial service sector, which will expose state-owned banks to foreign competition. In a more competitive environment state banks will have to become more profit-oriented and limit their implicit financial subsidies to the SOE sector. Provisions from WTO accession will, thus, significantly reduce subsidies to the SOE sector, forcing the restructuring of some SOE and causing bankruptcies and massive layoffs.

Studying in what manner and to what extent the SOE sector will be affected by WTO membership, an important issue often left out of general studies of China and the WTO, is the focus of this paper. We argue that WTO accession is a major step toward further economic reform in China, of which restructuring the SOE is an integral part. We first show that, even though the SOE sector has long been a major target of economic reform,

substantial improvement in the SOE sector has yet to be achieved. We present evidence

of the poor economic performance of SOE and of the burden they represent to Chinese

economic growth. Finally, we use economic theory developed in Bajona and Chu (2003)

to quantitatively analyze the economic effects of both direct subsidies and indirect

financial subsidies to the SOE sector. We obtain that subsidies to the SOE sector have

important effects on output, productivity, and welfare. The economic gains of

restructuring the SOE sector derived from WTO accession may be substantial and should

be added to the conventional gains derived from tariff reduction. Once the effect of WTO

membership on SOE is taken into account, the overall benefits of trade liberalization are

much higher than what traditional studies suggest.

A Brief History of China's SOE reform

China started its economic reforms in 1979 with the introduction of structural changes in

the agricultural sector. In its first stages, the economic reform did not include the

industrial sector (composed mainly by SOE), which was still recovering from the damage

suffered during the Cultural Revolution[3]. Regarding SOE, the main focus of the

government was on microeconomic management: improving quality controls, accounting,

training and management. The management of the SOE operated as an administrative

unit, not a market entity. Executives were promoted as government officials. The SOE

submitted an annual budget. Decisions on hiring, investment, and wage compensation

had to be approved by several levels of government. Moreover, the government, not the

markets, determined the prices charged and the quantities produced. The SOE turned over

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[3] The Cultural Revolution covered the period from 1966-76. It caused anarchy and disorder throughout the nation, disrupting economic activity in the industrial and service sectors.

all the revenue to the administration, which then made the decision on how much to give back to the SOE. Under such a system, it is evident that the SOE sector did not have the incentives, or the ability, to be efficient (autonomy in decision making).

Starting in 1981, reforming the SOE sector became a priority. The central government began to promote the *responsibility system* in the SOE sector, by introducing limited incentives and autonomy. Under the responsibility system, the management of the SOE was allowed to keep the profits from any production that exceeded the required annual production quota submitted by the government. At this time, the government also encouraged self-employment and collectively-owned enterprises. This was the first attempt to diversify the ownership structure of industries.

In 1983, following a general fiscal reform, the government changed the way in which the SOE paid their proceeds to the government. Instead of submitting their profits, the SOE were required under the new fiscal scheme to pay taxes to the government. The new payment structure increased the autonomy of the SOE. In 1984, the government formally announced the decision to deepen the responsibility system by linking workers' compensation with their contribution to production.[4] At the same time, China started to aggressively deregulate price controls. China continued to encourage the establishment of collective enterprises and jointly-established private enterprises. The non-SOE sector continued to increase at a rapid rate, becoming a direct market competitor to the SOE

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[4] The Central Committee of CCP's Decision on Economic Institutional Reform, 1984, the third meeting of the 12th National Convention of CCP.

sector in some areas of the economy where the SOE had previously enjoyed monopoly power.

In 1993 the reform of the SOE sector entered a new era. For the first time, the reform agenda called for the privatization and diversification of ownership for the small to mid-sized SOE. Furthermore, SOE that were incurring big losses were allowed to merge or go bankrupt. This stage of the reform was completed rather satisfactorily for small enterprises, but it was implemented in much less extent for the mid to large-sized SOE. As a result, the majority of mid and large size SOE did not improve their efficiency or profitability.

In summary, through different stages the SOE reform went from microeconomic adjustment, to limited autonomy, to privatization; and from giving no economic incentive to workers and managers, to giving partial incentives, to full incentive in the case of privatized SOE. However, in spite of the wide reach of the SOE reform, it failed to improve the efficiency of the SOE sector as a whole. A proof of this is the fact that in 1996 the SOE sector suffered a net loss for the first time. All attempts to reform the SOE sector without privatization have been unsuccessful. Even though privatization is still limited to small and medium SOE, the government has come to the realization of its necessity for good economic performance, and the trend is expected to continue in the future.

In the next section, we discuss the SOE performance throughout these stages of reform in more detail to illustrate this point.

Performance of China's SOE sector during the reform era

State-owned enterprises (SOE) had been the backbone of the pre-reform Chinese economy. SOE produced 78% of total industrial output at their peak in 1978, with collectively-owned enterprises accounting for the rest of industrial output. No other type of ownership was allowed at that time. Before economic reform the government set prices charged, quantities produced, and redistributed revenues. China suffered the economic inefficiencies associated with such a centrally planned system: stagnant economic growth and overall scarcity of consumption and capital goods. Rationing was prevailing in China through the 1980s.

Since the beginning of the reforms, China has experienced gradual but significant economic changes that have transformed it from a commanding economy to a market-oriented economy. The degree of success of the reforms is reflected in the near double-digit annual growth in GDP that China has experienced in the past twenty-five years. Underlying the rapid GDP growth are many far-reaching institutional and structural reforms that include allowing private ownership, the reform of SOE, the liberalization of international trade and foreign direct investment, the abolition of price controls, and the establishment of many markets such as capital markets, labor markets, and stock markets. All these reforms directly or indirectly have substantially weakened the role of the SOE as sources of industrial production. In particular, the economic performance of the SOE has deteriorated due to increasing competition from other forms of ownership.

Table 1 presents data on gross industrial output by ownership starting in 1978, as well as the share of industrial output produced by SOE and non-state and non-collective ownerships. The share of output produced by SOE gradually decreased (from 78% in 1978 to 28% in 1999) as industrial enterprises of other forms of ownership were created as a result of economic reform. The lower share of SOE output reflects the highest growth rate of production by the other forms of ownership. In fact, the SOE's output expanded over the periods, as financial and other resources continued to flow into the state sector. Even though the SOE produced only 28% of industrial output in 1999, they received half of the investment (table 2). Despite of this continuing investment by the state on the SOE, growth in the SOE sector was low. The share of output produced by non-state and non-collective ownerships increased rapidly after the approval in 1979 of these forms of ownership, reaching 44% of total output in 1999.

The Chinese overall employment expanded rapidly but unevenly across sectors during the period of study. In particular, the farming sector decreased substantially following economic reforms, which implies that non-farm and urban employment grew at much faster rates than total employment. Since the SOE are mainly in the industrial sector, computing the SOE shares of non-farm and urban employment gives a more accurate view of the importance of the SOE as providers of employment. Table 3 presents data on employment levels as well as SOE shares of employment for each of the three categories described above. The table shows that the SOE's share of total employment experienced a more gradual decline that its output share, decreasing only 8 percentage points from

18.6% in 1978 to 10.5% in 2001. It is worth noticing that most of this decline was experienced in the period 1996-2001, when the SOE's employment share dropped 6 percentage points. From this data, we are tempted to conclude that SOE have preserved their role as providers of employment through the reform process, keeping up with employment growth. The SOE shares of urban and non-farm employment present a different picture, however. In terms of urban employment, the SOE share decreased much faster, from 78% in 1971 to 31% in 2001. Taking only into account non-farm employment, the SOE share decreased form 60.4% in 1978 to 18.7% in 2001. These numbers reflect the fact that the SOE were not able to keep up with the rapid increase in urban and non-farm employment over the period of study, which was mainly driven by the non-state sector. Regarding absolute employment levels, total SOE employment consistently expanded until 1995. The year 1996 marks the first actual decrease in the level of SOE employment, which indicates that the SOE reform took a turning point in 1995 when the speed of privatization and bankruptcy was accelerated. Therefore, the reduction in the SOE employment shares prior to 1995 is only showing the inability of the SOE sector to create employment at the same speed as the non-state sectors.

Data on SOE employment are, in general, a good indicator of the changes prompted by the SOE reform. One key justification for the existence of the state-owned sector is to provide employment. According to the communism ideal, the great advantage of a socialist or a communist society is to remove the unemployment that plagues capitalist economies. Following this view, government officials determine the hiring and firing decisions in the SOE. Therefore, any decline in employment should be interpreted as a

sign that the government priorities have shifted to efficiency instead of employment creation. Figure 1 plots SOE employment as a share of urban, non-farm and total employment from 1977 to 2001. All three shares of SOE employment followed a similar pattern: they gradually decreased until 1990 when the decrease slowed down or even stalled. The slowdown in 1990 coincides with the slowdown of the reforms that occurred after the Tiananmen Square student movement. In 1998 the shares decrease sharply, as the reform of the SOE sector resumed. From 1997 to 2001 the relative reduction of the SOE employment is higher than in the previous 20-year period, reflecting the strong determination and enforcement of SOE reform since the mid 1990s.

Since the early 1990s the performance of the SOE sector has continuously deteriorated to the point that the sector as a whole is making net losses since the late 1990s. Loss-making SOE cannot operate without government support. Yet not only do the loss-making firms survive, but their workers also receive wage increases similar to those received by workers in profitable firms. Given their low productivity, this is only possible thanks to external support from the government and the financial sector (World Bank, 1996). Indeed, as shown in Table 4, the magnitude of direct subsidies from the government to SOE is very large. In 1990, direct subsidies to SOE represented 4.5% of total SOE output, gradually dropping to 1% by 1998, when the last step of the SOE reforms was implemented. However, the decrease in direct subsidies did not translate into a decrease in total subsidies. As the government reduced direct subsidies, they were replaced by loans from state banks, which register around 30-50% of non-performing loans, most of them to inefficient SOE. In order to correctly assess the inefficiencies of the SOE, theses

loans should be counted as net SOE losses. It is estimated that the total value of non-performing loans has already reached 40% of GDP. When including losses through rural credit cooperatives, not considered in these estimates, the total loss can amount to 45-50% of GDP (Bottelier 2001). Under the conservative assumption that 20% of these non-performing loans can be recovered, adding the value of non-performing loans to the direct subsidies we obtain average SOE annual losses of 6% of GDP for the past decade.[5] Given that the SOE sector accounted for only 36 % of GDP in 1999 (dropping from 50% from 1980, Wang 2003), the explicit and implicit subsidies to SOE have reached an annual rate of 12-16% of SOE. This number illustrates the high degree of government subsidies to the SOE sector in China.

Moreover, the high non-performing loans ratio in state banks poses a serious challenge to the financial stability of the Chinese economy. This precarious level of non-performing loans substantially weakens the Chinese financial system, making the possibility of a financial crisis a tangible threat.

Finally, the SOE's management structure, with managers having increased autonomy to manipulate the assets but not increased personal stake for mishandling of assets has promoted on-the-job-consumption and embezzlement. These have become prevalent in China. Since the government has always subsidized inefficient SOE, any losses from misused funds or wasted resources are covered by the government. In the early 1980s, managers did not have much room to manipulate the system because of their extremely

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[5] A 20% recovery rate is conservative if we compare it to the 9% recovery rate for 2001 estimated by Bottelier (2001).

limited autonomy. As reforms deepened, managers obtained control over an increasing amounts of funds, which gave them the ability to fulfill their own interests at the cost of the public interest. As long as the government continues to subsidize the inefficient SOE, this sort of behavior is deemed to continue, if not worsen.

In summary, the importance of the SOE sector has declined in terms of its contribution to output and employment since the beginning of the economic reform. The poor economic performance of the SOE has significantly dragged the entire country's economic growth. The SOE sector absorbs a big proportion of households' savings while the growing private sector is short of funds for expansion. The SOE enjoy administrative monopoly in many sectors of the economy (Chen 2000), prohibiting the development of private businesses in those sectors. As a result, not only the SOE are no longer the backbone of the Chinese economy, they have become the drain of economic resources, an impediment toward economic growth, and an important factor that may destabilize the country's financial sector. Therefore, deeper fundamental reforms on SOE are crucial for China's continuing growth. Unsuccessful reforms can well render the country into economic turmoil. It was precisely after realizing the need of these deeper economic reforms that China started pursuing membership in the WTO with unprecedented efforts and determination.

WTO as an Instrument to Promote Domestic Reform: A Hypothesis

In order to solve the existing problems in the SOE sector outlined above, China has to further implement deeper reforms which include further privatization and deregulation.

Clearly, returning to the old regime is not desirable. China has, thus, to push forward reforms that are more fundamental than the reforms undergone during the 1990s. As the government realized that further reforms in the SOE sector were needed it increased the political priority of accessing the WTO. The extent to which WTO accession has become a priority was documented when Premier Zhu himself attended the China-US bilateral negotiations in person and made several major concessions that broke the negotiations' deadlock, allowing China to continue pursuing WTO membership[6]. Furthermore, many Chinese economists and the government itself claim that accession to the WTO was not pursued for the benefit of businesses, but rather to regulate the government's behavior. Therefore, WTO accession for China is the accession for the government; it is a channel through which the government will transform its governance. [7] [8] The former Premier Zhu Rongji stated explicitly that WTO accession was a decision made by the government to promote further reforms and open up the economy.[9] Yining Li considered WTO as a tool to force the difficult reform agenda. [10] Wen Hai (2000) explicitly state that one important

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[6] Asiaweek Magazine ("The Return of Zhu Rongji," November 26, 1999 Vol. 25 No. 47) reported: "In a pivotal eleventh-hour move last week, just when the talks seemed about to collapse, the premier met with Barshefsky for 90 minutes in Zhongnanhai. The negotiations took on new life. Two days later, Zhu reportedly met again with the U.S. team. The agreement was signed within hours." Similarly, People's Daily ("Premier Zhu Meets Lee Kuan Yew," June 14, 2000): "Premier Zhu Rongji, in a meeting with Singaporean Senior Minister Lee Kuan Yew Tuesday, said that China's entry into the World Trade Organization (WTO) is necessary for speeding up the country's reform and opening-up drive."

[7] Guangxi, Liu, November 13, 2001, Jiefang Daily.

[8] Guangxi, Liu, "China's WTO commitments as a lever can be used to complete the transition to a more market-oriented economy as soon as practicable". DR. Guangxi Liu is Executive Vice-Chairman of Shanghai WTO Research Centre and Vice President of Shanghai Institute of Foreign Trade. Dr. Liu served as Special Assistant to Vice Minister Long Yongtu, Chief Trade Representative (CTR), Ministry of Foreign Trade and Economic Cooperation (Moftec).

[9] Xinhua News Dec. 9, 2001, reported that Zhu Rongji talked at a WTO workshop for provincial and ministerial officials.

[10] Famous Chinese Economist Yining Li said in "http://finance.sina.com.cn Oct. 9, 2000, http://www.takungpao.com/"(Chinese), that WTO accession will force China SOE to reform.

implication of China's WTO accession is to "accelerate the reforms in state-owned enterprises and to help to develop private enterprises in the Chinese economy." [11]

WTO is a multilateral trading system. By having its rules and agreements signed by the member governments and ratified by their parliaments, WTO agreements "are the legal ground-rules for international commerce".[12] By signing an international treaty, and specifying the removal of subsidies and the introduction of foreign competition, WTO accession becomes a strategic maneuver that changes the perception of the role of the central government on the reform of the SOE. Now the government actions are seen as the fulfillment of an international obligation. Given China's tendency to recognize the legitimacy of international law, the enforcement of reforms is much easier through the WTO than through the domestic bureaucracy.

In fact, WTO accession played a key role in pivoting domestic reforms even before the formal accession in December 2001. Prior to accession, the Chinese government made the decision to allow private ownership in all sectors that China was to open to foreign business upon becoming a member of the WTO. In this manner, WTO accession easily solved issues related to the status of domestic private firms: if national treatment was to be granted to foreign companies there was no excuse not to grant national treatment to domestic private enterprises. Through WTO accession domestic private sectors, despite

[11] Wen Hai, 2000. "China's Wto Membership: Significance And Implications," China Center for Economic Research (CCER), Peking University, China, NO. E2000007, September 9, 2000
[12] World Trade Organization (WTO) official website:
http://www.wto.org/english/thewto_e/whatis_e/inbrief_e/inbr00_e.htm

of their weak political voice, were able to wrench away the monopoly rights of the SOE and become a growing part of the Chinese economy.

Summarizing, in light of China's pressing need for further reform (especially in the SOE sector), WTO accession is viewed as a useful instrument to lay down a framework for economic reform and to bring external forces toward implementation of the reforms. In the next section we enumerate the main provisions of China's accession documents that are relevant for the reform of the SOE sector. These provisions give an idea of the type of reforms that the Chinese government needs to implement under the umbrella of the WTO.

The relevant accession documents that affect the SOE sector

The document of China's accession to the WTO consists of more than 900 pages with many provisions that, directly or indirectly, affect the SOE. We discuss such provisions in this section. [13]

China fully signed the "*Agreement on Subsidies and Countervailing Measures*" (SCM). The SCM Agreement specifically deals with government subsidies to the SOE sector. In particular, according to article 1 of the SCM Agreement, SOE subsides are considered "specific subsidies", which are actionable under the agreement. According to Article 6.1 (b) (c) (d) of the SCM agreement, "subsidies to cover operating losses sustained by an industry" or the forgiveness of debts to a loss-making enterprise are considered a serious

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[13] The official accession documents for China's accession can be found at WTO official website: http://www.wto.org/english/thewto_e/acc_e/completeacc_e.htm

prejudice. The Chinese subsidies to loss-making SOE meet these criteria and are, thus, vulnerable to disputes and potential countervailing measures by the disputing WTO members.

Chinese subsidies to loss-making SOE are explicitly mentioned in Appendices 5A and 5B of China's WTO agreement. Appendix 5A gives notification of existing government subsidies and Appendix 5B gives a list of subsidies that need to be phased out starting in 2001, which includes a list of "Subsidies Provided To Certain State-Owned Enterprises Which Are Running at a Loss". A comparison of the two documents reveals that China has committed to remove all central government subsidies listed in Appendix 5A, but there is no provision that requires the removal of subsidies given by local governments. According to the monetary values of the subsidies listed in Appendix 5A, the subsidies given by the central government (which are to be phased out) represent 24% of all explicit subsidies.

China not only did allow subsidies to SOE to be covered under the SCM agreement, but it also agreed to terms that make invoking countervailing measures by a disputing party rather easy. Specifically, China agreed not to request the disputing member to show positive evidence of economic injury as a result of the disputed subsidies, as indicated in paragraph 171 of the *Report From The Working Party On The Accession Of China*.[14] Article 27.8 explicitly requires the disputing party to show positive evidence of injury. Therefore, revoking article 27.8 implies that any WTO member can lodge complaints

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[14] According to paragraph 171, "China would not seek to invoke Articles 27.8, 27.9 and 27.13 of the SCM Agreement."

over Chinese subsidies to SOE without actually showing that it has produced actual injury. This greatly reduces the cost of filing such a complaint against China. Nevertheless, China does not seem to plan to eliminate the SOE sector entirely. As indicated in the same 171st paragraph of the Report, China will "reserve the right to benefit from the provisions of Articles 27.10, 27.11, 27.12 and 27.15 of the SCM Agreement". These provisions require the disputing member to drop the investigation if the subsidy does not exceed 2% per unit (3% for the initial eight years of accession). The fact that China agreed to such terms can be interpreted as China's being prepared to give up the majority of its subsidies to the SOE sector.

SOE are explicitly mentioned in paragraphs 172 and 173 of the Report, where China pledges that "China's objective is that state-owned enterprises, including banks, should be run on a commercial basis and be responsible for their own profits and losses." We read this pledge as a commitment to eliminate all forms of subsidies to the SOE sector. According to paragraph 1.2 of the Accession Protocol, these commitments represent an integral part of the WTO agreement. Therefore, even though an official time table for the elimination of SOE subsidies is not set (which may question its eventual enforcement) the commitment is explicitly made in the documents of WTO accession.

In the WTO accession agreement, China committed to largely open up its financial sector. As the government gradually reduced the direct subsidies to the SOE sectors, financial support from state-owned banks played an increasingly important role in sustaining loss-making SOE. A more open financial sector will force the state banks to be

more profit oriented and, as a result, to substantially reduce financial support to SOE in the form of low interest rates, automatic rollover of interests and principals, and preferred access to credit.

Finally, the WTO accession package allows market access to many service sectors in which the SOE originally had monopoly status, like the distribution services sector. These sectors were previously closed to both domestic private firms as well as foreign firms. Under the WTO agreement, as private firms enter the market, the SOE will face increasing competition which will force them to restructure.

In summary, the WTO agreement makes direct subsidies to SOE more difficult to implement. Furthermore, by requiring a more open financial sector, WTO membership forces banks to be more profit-oriented and to reduce lending to non-performing SOE. Both factors combined will promote the restructuring of the SOE sector and the closing of inefficient SOE.

We take China's signing on all these provisions affecting the SOE sector as evidence that the Chinese government is using WTO membership as an instrument to promote unpopular SOE reforms. At the time of accession SOE still represented 60% of fiscal revenue, and were deeply vested into the various ministries. Confronting all these vested interests directly would encounter strong resistance. By bundling the domestic reforms together with the provisions in the WTO agreement, the SOE reforms become a duty to fulfill an international commitment and can be introduced without the consent of the

ministries. As a result, fundamental reform of the SOE sector becomes much easier to implement after China's WTO accession.

In the next section we use economic modeling to study the long run effects of government subsidies to SOE in an economy's production, productivity and welfare.

Economic Analysis

In this section we present an economic exercise designed to study the long run effects of the SOE reforms induced by WTO membership on China's GDP and welfare. As mentioned in the previous sections, the principal effects of WTO accession on the SOE sector will be on direct government subsidies to the SOE and on subsidized loans from state banks to the SOE. These provisions will significantly reduce most of the SOE financial support from the government and, therefore, the SOE will have to compete in more equalitarian grounds with private enterprises.

In our theoretical framework SOE differ from private firms in three key aspects: their technology level, their ability to decide the amount of labor to hire, and their costs of capital. In line with the SOE's role as promoters of employment, we assume that the SOE have to keep a minimum level of employment designated by the government. If the minimum level of employment is set above its optimal level the SOE incurs in a loss, which is paid by the government in the form of a direct subsidy. All direct subsidies in our model are derived from this minimum labor restriction. We model the preferential treatment by state banks as a subsidy to the cost of capital, which translates into lower

effective rental rates of capital for the SOE sector. In order to isolate the effects of the
SOE reforms, we keep the tariff rates constant over time and we assume that international
capital markets are closed, so that China has to balance trade every period.[15]

The framework used in our analysis is adopted from Bajona and Chu (2003). Bajona and
Chu (2003) develop a dynamic general equilibrium model with perfect foresight, where
consumers make consumption and saving decisions with the objective of maximizing
their intertemporal utility of consumption. There are two sectors in the model: a traded
sector and a non-traded sector. In each sector, two types of firms co-exist: private firms,
which maximize profits, and SOE, which also maximize profits given the restrictions on
minimum employment levels imposed by the government. Output is produced using
capital and labor in a constant returns to scale technology. Technologies are potentially
different across sectors and across forms of ownership. The specific functional forms
used in the model can be found in the appendix.

In order to analyze the long run effects of SOE subsidies, we take the calibrated model
from Bajona and Chu (2003) and perform comparative statics on the values of the two
policy parameters affecting the SOE: the minimum labor restriction and the subsidies to
capital.[16]

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[15] See Bajona and Chu (2003) for a similar analysis with open international capital markets.
[16] Bajona and Chu (2003) calibrate the parameter values of the model economy to match data on the
National Income and Product Accounts, input-output matrix and SOE sector for the Chinese economy in
1997.

Labor restriction

Figure 2 presents values of the long run level of GDP, welfare improvements (measured in terms of equivalent variation) and SOE shares of output as functions of the degree of reduction of the minimum labor restriction.[17] Specifically, a point $(65, y)$ in the graph for GDP, for instance, means that y is the long run value of GDP in an economy where the minimum labor restriction is 65% lower than its calibrated value, which is taken as a benchmark. From figure 2 we observe that the minimum labor restriction has an almost linear effect on GDP and on welfare, with welfare gains increasing faster than GDP as the minimum labor restriction is gradually reduced. In terms of magnitudes, a 10% reduction in the minimum labor restriction translates into a 1.7% increase in real GDP and a 2.7% increase in welfare. A 90% reduction in the labor restriction delivers a 15% increase in GDP and a 24% increase in welfare. SOE shares also decrease in an almost linear way as the minimum labor restriction is reduced. This linear relationship is not surprising, given the specifications of the model and the fact that the labor restriction is binding in both sectors.

Subsidies to capital

The effects of subsidies to capital on output, welfare and the SOE shares are plotted in figure 3.

Real GDP decreases with the subsidy, since the optimal steady state level of capital stock decreases as the subsidy is reduced. Lower subsidies to capital imply a lower capital stock in steady state since capital becomes more expensive for the SOE, inducing them to

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[17] The equivalent variation measures the percentage increase in consumption that would give a consumer in the benchmark economy the same welfare as a consumer in the economy with the reduced subsidy.

accumulate less of it. Notice that lower GDP in steady state does not need to translate

into lower welfare, since the amount of output that goes to replace depreciated capital

also decreases. In particular, from the graph plotting welfare changes, we see that welfare

gains increase with any reduction of the subsidy. This increase in welfare gains, though,

is not linear with respect to the subsidy reduction as in the case of the minimum labor

restriction. As it is shown in the second graph of figure 3, welfare gains have a hump-

shape. This result is related to the Golden Rule level of capital, that is, the steady state

level of capital that delivers optimal consumption. Given that there is a labor restriction,

the optimal subsidy to capital that delivers the maximum consumption in steady state is

positive. This result suggest that when labor restrictions are in place, in a world where

subsidized firms interact with competitive firms, small positive subsidies to capital may

be welfare improving. In particular, a 10% reduction in capital subsidies increases

welfare by 1.8%, whereas a reduction of the subsidy by 90% increases welfare by only

1.1%. The optimal subsidy, taken as given the calibrated minimum labor restriction, is of

2.3% which is achieved with a 25% reduction in the subsidy to capital.

Regarding SOE shares, reducing subsidies to capital reduces the SOE share in the traded

sector, but the SOE share in the non-traded sector has a hump-like shape: it increases for

small reductions in the subsidy to capital, but it decreases once the subsidy has been

sufficiently reduced. The intuition is simple: in the calibrated model, private firms are

relatively more productive in the traded sector than in the non-traded sector. Furthermore,

SOE that produce traded goods are highly subsidized. As the subsidy to capital is

reduced, differences in productivity become more important in determining the long run

specialization in production and private firms enter the traded sector more aggressively. Once the subsidy to capital is sufficiently reduced, differences in productivity become the dominant effect, and the SOE shares decrease in both industries. The turning point in the share of SOE in the non-traded sector occurs with a 45% reduction in the subsidy. Summarizing, the hump-like shape shows the tradeoff between reallocation of capital within and between industries. This is an interesting result: it suggests that if the government only mildly reduces the subsidies to the SOE, the SOE will see increase in its share in the service sector.

Conclusion

In this paper we examine the impact of China's accession to the WTO on the SOE sector. We document the failure of the different attempts to reform the SOE sector that started in 1979. By the late 1990s, the entire SOE sector was in debt and the state banks were at the verge of insolvency burdened with non-performing loans to the SOE firms. In view of this situation, we hypothesized that an important rationale, among many others, of China's pursue of WTO membership is the ability to use WTO accession to seal the agenda for fundamental reforms, which has been difficult to implement by domestically measures alone, is. To back up our hypothesis, we document various aspects of China's accession agreement that directly affect the SOE sector. Upon accession China committed to partially eliminate sate subsidies and to eventually let all SOE operate on a commercial basis, making them responsible for their own profits and losses. Two other important commitments that affect the SOE sector are the opening of the financial sector, which will substantially undermine the financial backup of the state firms, and the

opening of many sectors that used to be exclusive ground of SOE. Overall, this is clearly a radical reform agenda, and has good perspectives for success. The inefficiency of the SOE sector, when coupled with the potential financial instabilities it causes, is a vital problem that needs to be solved if the Chinese economy is to continue to grow. Therefore, we argue that China's WTO accession has important implications for the Chinese economy that go beyond simple gains from tariff reduction that are usually associated with WTO membership.

In order to quantify the possible gains from SOE reform, we describe the results of a quantitative analysis of the effects of SOE subsidies on GDP and welfare. Keeping tariffs constant, we find that a 10% of reduction in the minimum labor restriction improves long run welfare by 2.7% whereas 10% reduction in the subsidies to capital increases welfare by 1.8%. Given that the subsidy reductions driven by provisions from the WTO are likely to exceed 10%, the welfare effects of SOE reform induced by the WTO agreement are likely to be much bigger and more significant that the direct gains obtained from tariff reduction.

 In view of these results, we conclude the paper by asking the deeper question on which are the most important benefits from trade liberalization. Our results highlight the fact that domestic reforms and trade reforms are interlinked. Trade liberalization promotes domestic reforms, often institutional in nature, which may produce large welfare gains. These benefits should be added to the direct benefits from tariff reduction. As a result, the overall benefits from trade liberalization are significantly larger that the benefits predicted by traditional studies.

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APPENDIX

The explicit functional forms used in the economic analysis are:

Period utility function:

$$u(c_1, c_2) = \frac{\varepsilon c_1^\rho + (1-\varepsilon)c_2^\rho - 1}{\rho}$$

Production functions:

$$y_{Dsj} = \min\left\{ \frac{z_{sj1}}{za_{sj1}}, \frac{z_{sj2}}{za_{sj2}}, A_{sj}k_{sj}^{\alpha_j} l_{sj}^{1-\alpha_j} \right\}$$

$$y_1 = M\left(\mu x_D^\varsigma + (1-\mu)m^\varsigma \right)^{1/\varsigma}$$

$$i = Gz_{I1}^\gamma z_{I2}^{1-\gamma}$$

Demand for exports:

$$x_F = D\left((1+\tau_F)p_{D1}\right)^{-1/(1-\varsigma)}$$

Notation:

c_1 : consumption of composite traded good

c_2 : consumption of non-traded good

y_{Dsj} : domestic production of good j (traded, non-traded) by ownership s (public, private)

z_{sji} : input of good i (traded, non-traded) by sector j (traded, non-traded) of ownership s

k_{sj} : capital input in sector j by ownership s

l_{sj} : capital input in sector j by ownership s

y_1 : production of the composite traded good (used in consumption and production)

x_D : Domestic demand of the domestically produced traded good

m : imports

i : investment

z_{I1} : input of traded good into the investment sector

z_{I2} : input of non-traded good into the investment sector

x_F : Foreign demand of domestically produced traded good

p_{D1} : price of domestically produced traded good

Tables:

Table 1. Gross Industrial Output Value by Ownership (100 million Renminbi (Chinese Yuan))

Year	Total	State-owned	Collective-owned	Individual Owned	Other Types of Ownership	Share of Total (%)		
						SOE	Collective-owned	Individual and Other
1978	4237	3289	948			78	22	
1980	5154	3916	1213	1	24	76	24	0
1985	9716	6302	3117	180	117	65	32	3
1990	23924	13064	8523	1290	1047	55	36	10
1991	26625	14955	8783	1287	1600	56	33	11
1992	34599	17824	12135	2006	2634	52	35	13
1993	48402	22725	16464	3861	5352	47	34	19
1994	70176	26201	26472	7082	10421	37	38	25
1995	91894	31220	33623	11821	15231	34	37	29
1996	99595	36173	39232	15420	16582	36	39	32
1997	113733	35968	43347	20376	20982	32	38	36
1998	119048	33621	45730	20372	27270	28	38	40
1999	126111	35571	44607	22928	32962	28	35	44

Source: China Statistical Yearbook

Table 2. Investment (billion yuan)

	Total	State-owned	Share of SOE
1980	91	75	82
1985	254	168	66
1986	312	208	67
1987	379	245	65
1988	475	302	64
1989	441	281	64
1990	452	299	66
1991	559	371	66
1992	808	550	68
1993	1307	793	61
1994	1704	962	56
1995	2002	1090	54
1996	2291	1201	52
1997	2494	1309	52
1998	2841	1537	54
1999	2985	1595	53
2000	3292	1650	50
2001	37213	17607	47

Source: China Statistical Yearbook

Table 3. Number of Employed Persons with SOE as a subcategory of urban employment (million persons)

Year	Total	Urban	SOE	Rural Non-farm	Rural Farm	SOE as Share of Urban	SOE as Share of Nonfarm	SOE as Share of Total
1978	401.5	95.1	74.5	28.3	278.1	78.3	60.4	18.6
1980	423.6	105.3	80.2	30.0	288.4	76.2	59.3	18.9
1985	498.7	128.1	89.9	69.8	300.9	70.2	45.4	18.0
1990	647.5	170.4	103.5	108.7	368.4	60.7	37.1	16.0
1991	654.9	174.7	106.6	113.4	366.9	61.1	37.0	16.3
1992	661.5	178.6	108.9	124.9	358.0	61.0	35.9	16.5
1993	668.1	182.6	109.2	145.4	340.0	59.8	33.3	16.3
1994	674.6	186.5	112.1	148.8	339.2	60.1	33.4	16.6
1995	680.7	190.4	112.6	163.9	326.4	59.1	31.8	16.5
1996	689.5	199.2	112.4	173.7	316.6	56.4	30.2	16.3
1997	698.2	207.8	110.4	171.7	318.7	53.1	29.1	15.8
1998	706.4	216.2	90.6	171.3	318.9	41.9	23.4	12.8
1999	713.9	224.1	85.7	175.0	314.8	38.2	21.5	12.0
2000	720.9	231.5	81.0	168.9	320.4	35.0	20.2	11.2
2001	730.3	239.4	76.4	169.0	321.8	31.9	18.7	10.5

Source: China Statistical Yearbook

Table 4. The Subsidies to SOE by the Central and Local Governments
(Unit: 100 million yuan)

	Local	Central	**Total**	Percentage of SOE output
1990	460.87	118.01	578.88	4.4
1991	365.55	144.69	510.24	3.4
1992	290.62	154.34	444.96	2.5
1993	306.76	104.53	411.29	1.8
1994	268.29	97.93	366.22	1.4
1995	281.01	46.76	327.77	1.0
1996	280.20	57.20	337.40	0.9
1997	272.75	95.74	368.49	1.0
1998	258.81	74.69	333.50	1.0

Source: WTO Accession Documents Submitted by China

Figure 1. Relative Change in SOE Employment
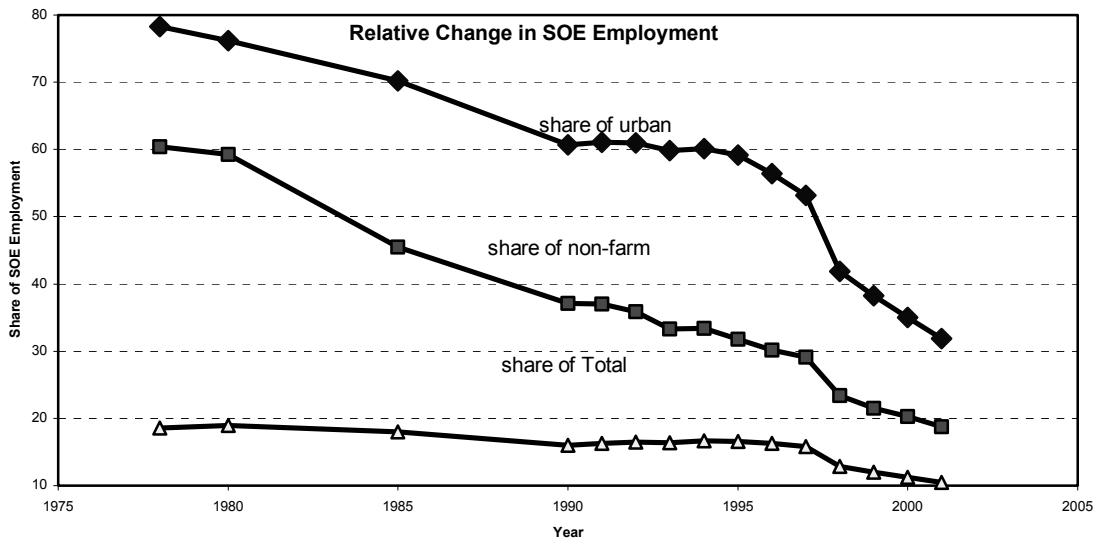
Figure 2. Steady state values as the minimum labor restriction is reduced

Real GDP

**Welfare gains
(equivalent variation in %)**

SOE shares
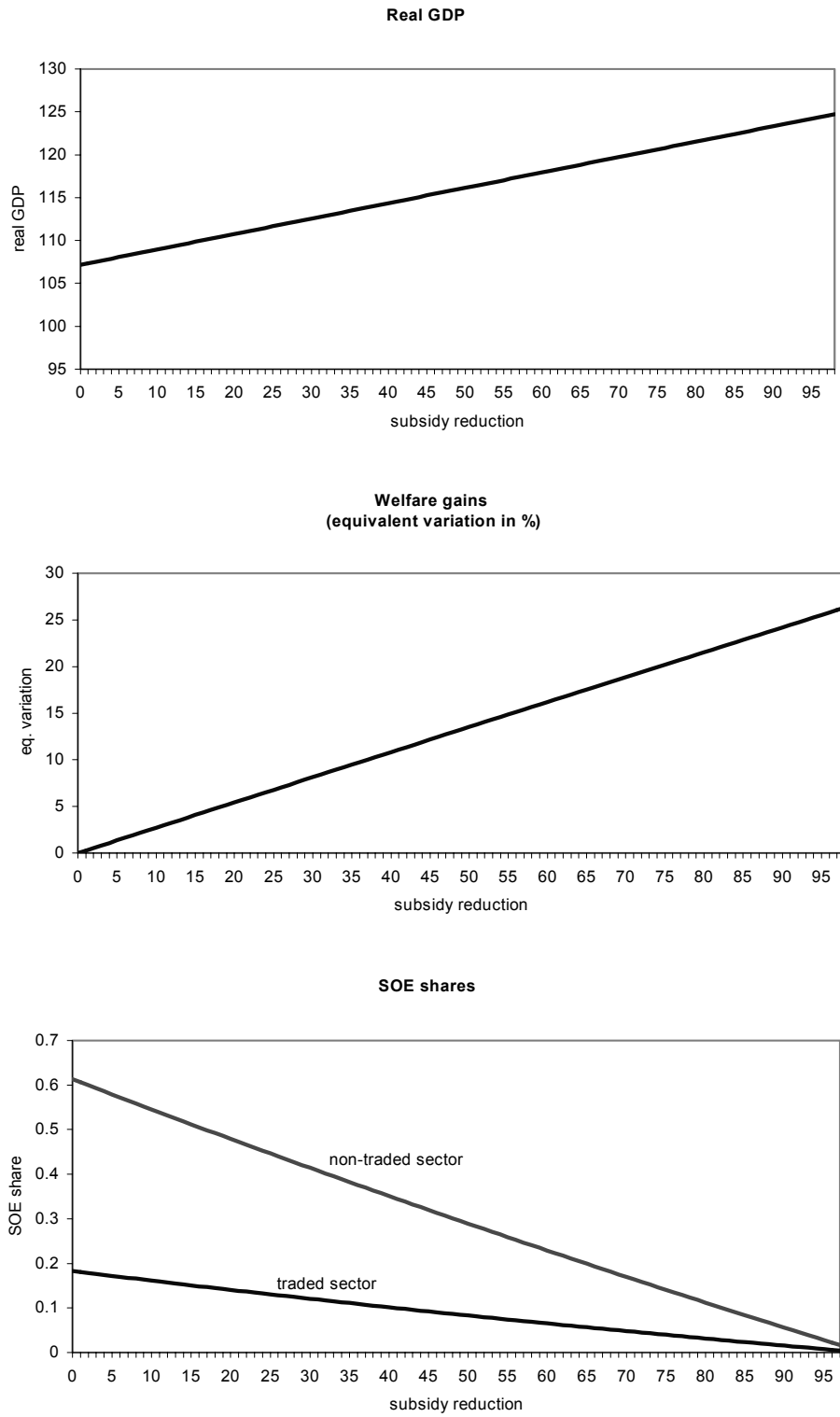
Figure 3. Steady state values as the subsidy to capital is reduced

Real GDP

Welfare gains
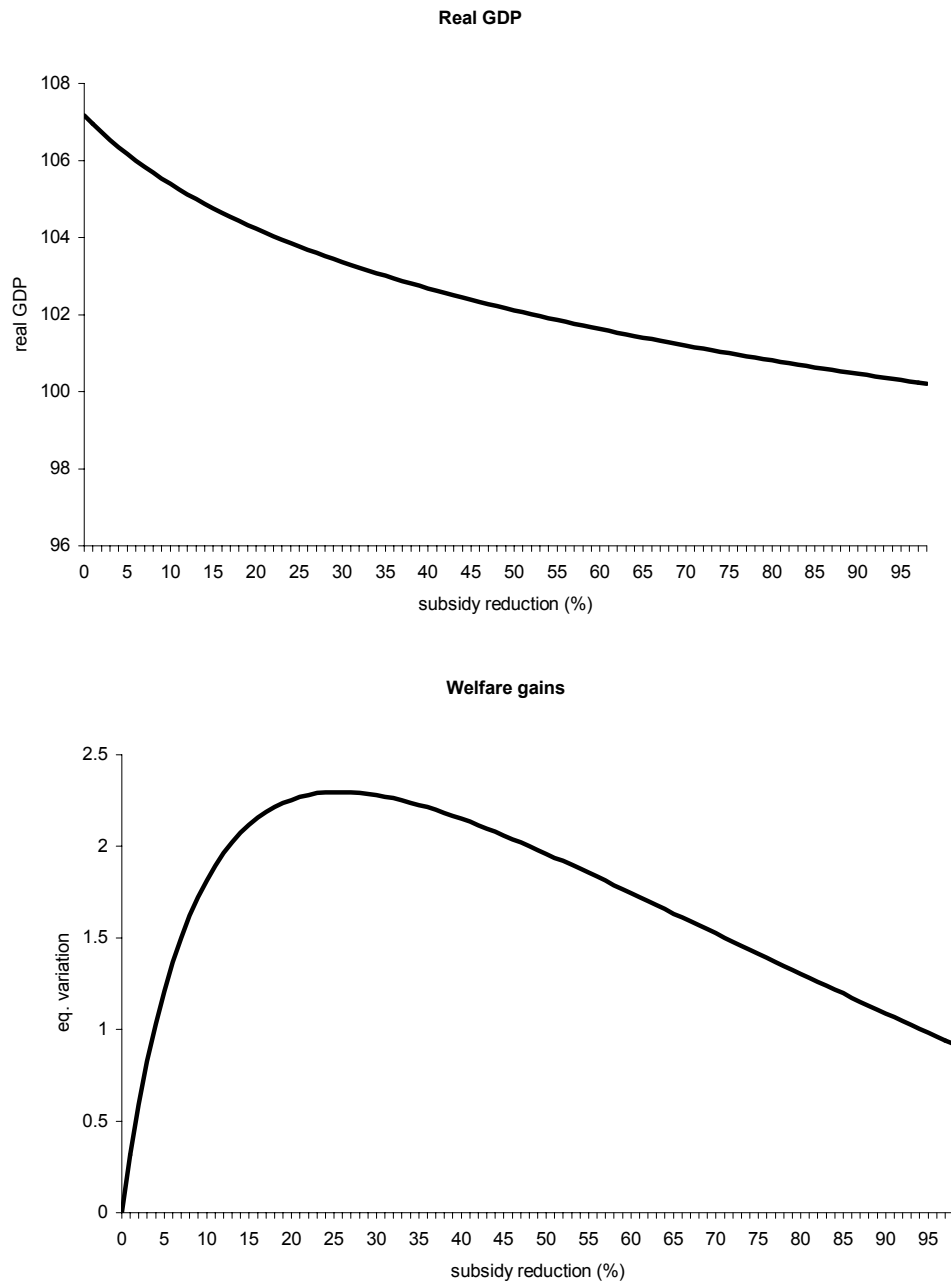
Figure 3 (cont). Steady state values as the subsidy to capital is reduced

SOE share (traded sector)

SOE share (non-traded sector)
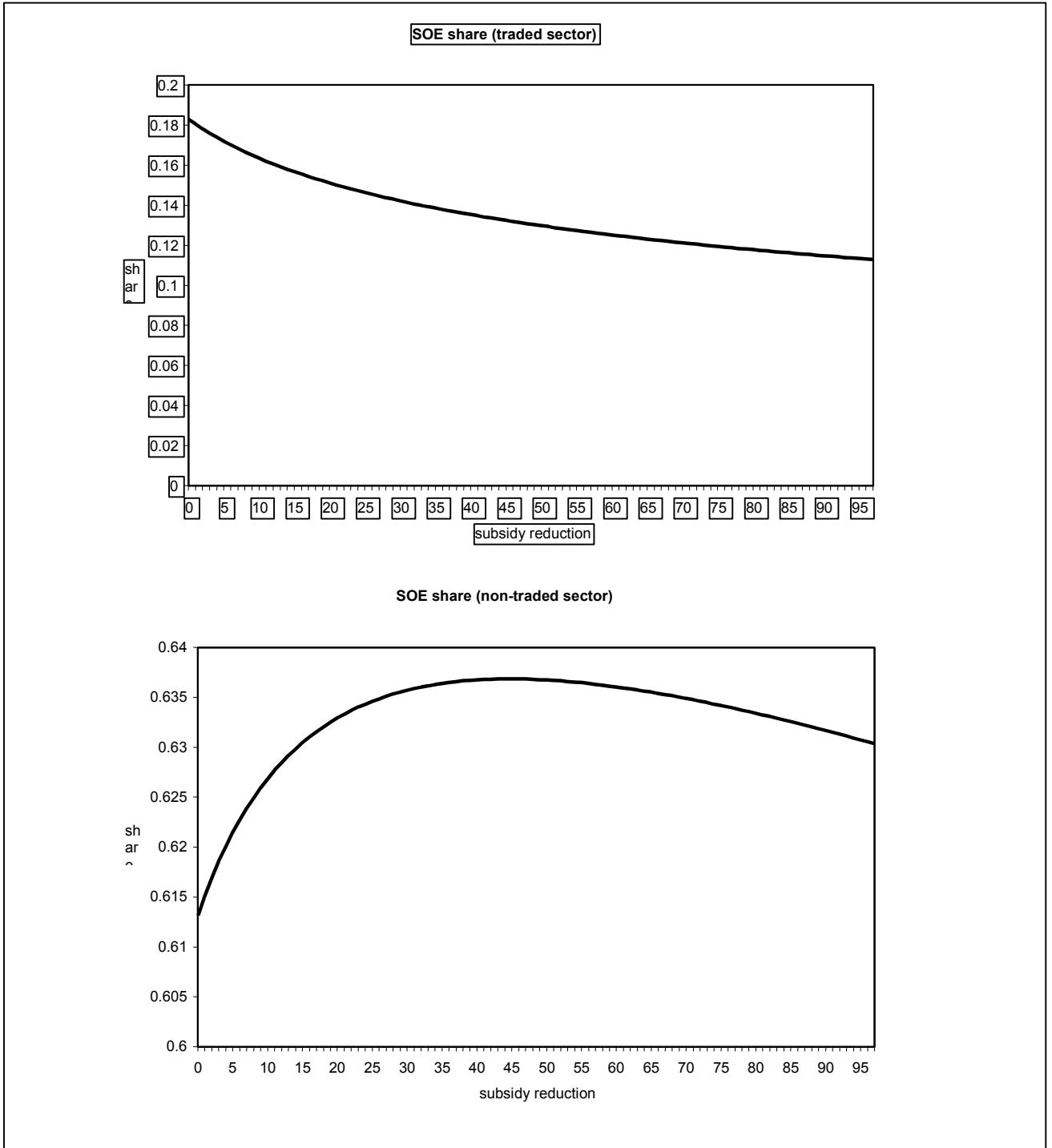
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