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GTAP Annual Conference on Global Economic Analysis
https://www.gtap.agecon.purdue.edu/events/conferences/default.asp

Assessing the Impact of China's WTO Accession on Foreign Ownership

Terrie L. Walmsley, Thomas W. Hertel and Elena Ianchovichina[1]

Abstract

During the 1990s, rapid growth in China was accompanied by strong growth in foreign direct investment (FDI). FDI continued to grow until 1997 when it leveled off. Overall total investment fell as direct investment leveled off and portfolio investment fell after 1997. In terms of total foreign investment, it is clear that in 1998, under the shadow of the East Asian Crisis, China fell out of favour.

Attempts by China to join the World Trade Organisation (WTO) have recently progressed to the final stages with the signing of agreements with the United States, Europe and Japan. It is hoped that China's accession to the WTO will accelerate changes in China towards a market economy and attract foreign investment back to China.

In this paper we explore the implications of WTO accession for market rates of return and hence on investment in China using the dynamic GTAP model. The dynamic GTAP model is applied to an 11-region by 13-commodity aggregation of the GTAP database, supplemented with foreign income data. The paper also takes into account duty drawbacks and examines the effect of replacing lost tariff revenue resulting from the reduction of tariffs. Data suggest that duty drawbacks apply to approximately 60% of goods imported by China. This effectively reduces the average tariff rate applied to imported commodities and hence, if not taken into account, the effects of reducing the tariff rates under the WTO agreement may be significantly overestimated. Moreover, in countries in which the tax systems are not highly developed, tariffs are an important source of government revenue. In China accession to the WTO, and the reduction in tariffs which accompanies it, will have an important affect on the Governments tax receipts. As a result this tariff revenue may have to be replaced with other alternative taxes. The affects of this on China and on investment are investigated in this paper.

It is found that the effect of accession on interest rates can play an important role in enhancing China's attractiveness as a destination for foreign investment. This increase in the attractiveness of China as a destination for foreign capital can, however, be severely curtailed if China chooses to follow a policy of replacing lost tariff revenue with additional income taxes.

1. Introduction

Since the late 1970's the Chinese economy has undergone rapid changes. Between 1978 and 1995, per capita growth in real GDP averaged 6.04 percent (Maddison, 1998). This rapid growth has been fuelled by the major reforms taking place in China since the early 1980s. These reforms have included changes relating to the structure of the economy and to opening up China to foreign trade and investment.

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[1] Paper prepared for the 4th Global Economic Analysis Conference, Global Trade nalysis Project, Purdue University, June 2001. Walmsley is a lecturer in the Department of Economics, Sheffield University, 9 Mappin St, Sheffield, S1 4DT, UK. Email: T.Walmsley@sheffield.ac.uk. Hertel is a professor and the Director of the Center of Global Trade Analysis, 1145 Krannert Building, Purdue University, West Lafayette, IN 47907-1145, USA. Email: hertel@agecon.purdue.edu. Ianchovichina is an economist at the World Bank, 1818 H Street, N.W., Washington, USA. Email: eianchovichina@worldbank.org. The authors would like to thank Peter Dixon from the Centre of Policy Studies at Monash University and the other participants of the First Dynamic GTAP Course for their comments.

Despite the rapid changes occurring in China since the 1970s, growth in foreign direct investment has been, at least until the early 1990s, very slow. This is illustrated in Figure 1. Reforms to foreign investment have been much slower to materialize, with joint ventures continuing to be the best option for foreign investors. In the early 1990's foreign investment rose dramatically. By 1994 China accounted 20 percent of all foreign direct investment in developing countries (Garbaccio, 1995). FDI continued to grow until 1997 when it leveled off. This coincides with the East Asian crisis. The East Asian crisis affected many of the South-east and East Asian economies. Although, for China, the contagion effects of the East Asian crisis were not as severe as those experienced by many of the other, notably South-East, Asian economies, there has been a distinct slow down in growth of foreign investment since 1997. In 1999 FDI fell from $US43 billion to $US38b. Figure 1 also reports the broader – and more volatile – foreign investment figures for China. These include portfolio investment. Here it is clear that China fell out of favor in 1998, under the shadow of the East Asian Crisis. While forecasts of investment depicted a slow recovery from the Asian crisis, recent estimates of actual foreign investment show that foreign investors are beginning to return to China. In 1999 portfolio investment and total investment rose again and in 2000 foreign direct investment also improved.

In a recent survey of China's economy, *The Economist* (2000) explores some of the reasons behind the slowdown in FDI in China. In many cases investor's high hopes for this market have been slow to materialize, with the absence of a rules-based economy making it difficult for outsiders to operate effectively in China. Informal relationships and corruption still hinder many business transactions by foreigners. In addition, inefficient state enterprises still dominate many key sectors of the economy. Another article, also by *The Economist* (1999), suggests that the 1999 downturn in FDI may have been an over-reaction to the failed over-optimism of the early 1990's. Investors were failing to consider the benefits of the extensive reforms currently taking place in China.

China is eager to attract foreign investors to China. The Chinese government currently offer a number of incentives to foreign investors, including duty drawbacks on intermediate inputs used by joint ventures and a three year period of reduced income tax.

Quantitative analysis of these institutional problems is beyond the scope of this paper. However, we do explore the implications of WTO accession for market rates of return to investment in China. We find that accession can play an important role in enhancing China's attractiveness as a destination for foreign investment.

The model used in this paper, the Dynamic GTAP model (Ianchovichina and McDougall, 2001), places international mobility of capital at the forefront, thereby providing a useful vehicle for exploring the impact of China's WTO accession on foreign investment and economic growth in China.

China's system of protection is very complex. In particular, there are a number of tariff exemptions on imported inputs used in the production of exportables; and imported inputs used in the production of investment or capital goods. These exemptions are referred to as duty drawbacks and are of particularly importance in the context of China. Duty drawbacks on intermediate inputs to the export industry were incorporated into the model using the method developed by Ianchovichina et al. (2000). Since the model used in this analysis is dynamic, it was also judged appropriate that duty drawbacks on intermediate inputs used for investment should also be incorporated. This was done using a similar method to that developed by Ianchovichina et al. (2000) for export industries.

In addition, in countries where the tax collection systems are poorly developed, tariff revenue is often the primary source of income. In 1998, tariff revenue accounted for 6% of all government revenue in China (Table 1), having fallen from 14% in 1990. This fall in tariff revenue has been accompanied by a significant rise in the importance of taxes on goods and services as a source of revenue (up from 18% to 79% of government revenue). This suggests that as China have introduced reforms and reduced tariff's they have replaced lost tariff revenues and other revenues with increased

consumption taxes. With further reductions in tariff revenue expected to occur with WTO accession, the Chinese government may be forced to continue this trend or find alternative sources of revenue, such as income taxes.

The choice between tax instruments is not straightforward. While consumption taxes raise revenue with little distortion of production, the system required to collect consumption taxes can be very costly to put into operation, in terms of both time and money (Dahl, Devarajan and Wijinbergen, 1994). The significant rise in importance of consumption taxes (shown in Table 1), however, indicates that consumption taxes may be a viable option for China. The alternatives, output or income taxes, often distort production incentives. Income taxes currently account for only 7% of government revenue (down from 31% in 1990). The benefits of income taxes are that income re-distribution issues can also be incorporated – this is a current concern for China. Recent evidence into optimal tax structures suggests that it may be better to apply revenue-neutral tariff reform which minimizes distortions, rather than reduce tariffs uniformly and replace lost tariff revenue with a more costly alternative tax system (see Dahl, Devarajan and Wijinbergen (1994) and Hatta (1994)). Implementing a uniform tariff, however, is unlikely to be an option for China, as they are somewhat restricted by their agreements with the rest of the World. In this paper we examine how the gains to real GDP and foreign investment, from China's accession, are distorted as a result of a tax revenue replacement policy. In this case we examine the case where income taxes are used to replace lost tariff revenue.

The results confirm the finding of earlier studies that China and Taiwan are expected to gain the most from China's accession to the WTO. Foreign ownership in China increases substantially as a result of China's accession. In addition it is found that tariff revenue does fall as a result of China's accession to the WTO. Further simulations, to examine the policy of increasing other taxes to replace this lost tariff revenue, showed that rates of return in China could be adversely affected and hence the benefits of China's accession, in terms of both real GDP and foreign ownership, could be severely reduced; although this depended fundamentally on the tax used to replace the lost tariff revenue.

The paper is divided into six sections. Section 2 provides an overview of China's economy and its accession to the WTO. Section 3 briefly reviews the model and data used to examine the effects of China's accession. In section 4 the base case scenario and policy simulations undertaken in this paper are outlined. Then in section 5 the results are examined. Section 6 summarises and concludes the paper.

2. China and The World Economy

Since the early 1980s, China has undertaken significant reforms to restructure its economy and open up to foreign trade and investment, in the hope of securing the benefits of improved technology and higher growth and welfare. These reforms have been very successful. In 1995, China's growth in real GDP exceeded 10 percent, and according to World Bank forecasts, (Global Economic Prospects Data Base, 1999) high growth rates are expected to continue to at least 2007. Between 1978 and 1995 per capita growth has averaged 6.04 percent (Maddison, 1998).

Exports and imports have also increased significantly over this period. Since 1972 exports have been growing at an average rate of 22 percent per year (Gelhar, 1998). This contrasts with the previous decade of the 60's when growth averaged only 10 percent per year. Fan and Zheng (2000) also report that between 1992 and 1998, tariffs were reduced from an average of 42 percent to 17 percent. These tariff reductions and the other reforms have had a profound effect on trade. Like other growing economies, China has also experienced a shift away from agricultural production towards more labor intensive manufactures such as wearing apparel and toys. In 1952, agriculture accounted for approximately 58 percent of GDP, but by 1995 this figure had dropped to just over 23 percent. Likewise manufacturing has risen from 8.1 percent of GDP to 41 percent over the same period (Maddison, 1998). However, competition in the market for labor-intensive manufacturing has

increased dramatically in recent years with the shift of other economies, notably South Asia, towards export-oriented strategies and production of labor-intensive commodities.

In 1986, China notified GATT/WTO members of its wish to resume membership in that organization. China's bid for WTO accession has involved negotiation of individual agreements with key WTO members. Upon accession these bilateral agreements will then be extended to all WTO members. This long process of negotiation began in 1987. In November 1999, an agreement was reached between China and the United States and in May 2000 a similar agreement was reached between China and the European Union. These agreements have gone a long way towards removing remaining obstacles to China's membership in the WTO.

The main concern of WTO member states has been to secure greater access, in terms of investment and trade, to the growing Chinese market. The issues addressed during these negotiations provide for further market access for foreign companies and foreign investment, the reduction of tariffs and the implementation of bindings, elimination of quantitative restrictions, and the participation of China in other multilateral agreements relating to information technology, telecommunications and financial services (USITC, 1999). Also WTO accession will lead to the removal of many restrictions on domestic industries, such as the removal of domestic content requirements which currently restrict sourcing of intermediates for companies selling locally (this is a particular problem for the automobile industry).

It is possible that the measures implemented as part of China's WTO accession agreement, such as those aimed at increasing market access for foreign investors, or the very existence of the agreement itself might also reduce the perceived risk associated with investing in China and hence cause foreign investment to increase further, however this is not examined in this paper.

The agreement between China and the WTO has been obtained from the August 1999 offer agreed between China and the United States. The agreement involves the gradual reduction of tariffs on various commodities by China. The August offer was obtained from Martin et al. (2001). The elimination of tariffs was believed to commence in 2000 however as details have not yet been finalized this paper assumes that the agreement commences in 2002 and is completed 5 years later by the end of 2007.

China is not a party to the Uruguay Round's ATC agreement. Upon accession to the WTO China will also become eligible for the benefits obtained under this agreement, in particular the elimination of quotas on textiles and wearing apparel imported by North America and Europe from China. Quotas on textiles and wearing apparel are also removed over the 5-year period, 2002 to 2007.

China's WTO accession therefore involves both increasing access to Chinese markets through the reduction of trade barriers, as well as the removal of quotas on textiles by North America and Europe. Taiwan's liberalization is also included in this analysis as it is expected that once China's accession has been agreed upon, Taiwan's will automatically follow. While both the trade liberalization of China and Taiwan are included, the results focus on the effects of this liberalization on China. We examine the effects of China's accession over the period 1995 to 2020.

China's accession to the WTO has generated an extensive amount of research. This paper is one of many GTAP-based analyses of China's accession. Anderson et al. (2000) began by using the GTAP model to determine some early estimates of the effects of China's accession. Martin et al. (2000) then updated these estimates by incorporating the current offer and distinguish between ordinary and export processing trade in China. Wang has also undertaken a number of studies examining the effects of China's WTO accession using the GTAP model (Wang, 1996a and 1996b). In general, the results show that world trade increases substantially as a result of China's accession. The main winners from China's accession are China and Taiwan themselves. Wang (1997a) also found that North America and many of the other developed nations also gain as a result of increased exports, particularly of agricultural products. The removal of quotas under the ATC agreement appears to be a significant contributor to the benefits accruing to North America and China.

Walmsley and Hertel (forthcoming) then examined the effects on China and USA of the USA implementing safeguards on the removal of quotas on wearing apparel[2]. Ianchovichina et al. (2000) then incorporated duty drawbacks into the analysis[3]. This allowed them to separate out imported inputs into production for export, which are generally not subject to import tariffs in China. This paper uses the research previously undertaken and the method for incorporating duty drawback, proposed by Ianchovichina et al. (2000), to examine the effects of China's accession on foreign investment.

3. The Model

The Dynamic GTAP model (GTAP-Dyn) developed by Ianchovichina and McDougall (2001) is used to analyze the effects of China's accession. GTAP-Dyn is a recursive-dynamic extension of the standard GTAP model (Hertel, 1997), which is a multi-region applied general equilibrium model. The dynamic model preserves all the features of standard GTAP, while enhancing the investment theory to incorporate international capital mobility and ownership.

The model is applied to a 11-region by 13-sector aggregation of the version 4 GTAP data base (McDougall et al., 1998). A list of these regions and sectors is provided in Table 2. The GTAP data base is supplemented with foreign income data from the IMF Balances of Payments statistics in order to track international capital mobility and foreign wealth.

Two modifications were made to the Dynamic GTAP model in order to undertake this analysis.

1. Duty drawbacks were incorporated into the Dynamic GTAP model using the method outlined in Ianchovichina et al. (2000). This involved dividing each of the 13 GTAP sectors into two sectors, the first producing for domestic consumption and the second for export. Equations were modified to incorporate the two new sub-sectors. In addition the database was altered using an Altertax experiment (Malcolm, 1998) to remove all tariffs on intermediate imports used in the production of goods for export by China. The Altertax experiment removed tariffs using a special parameter file, which reduced the effects on the trade balance and other macro variables. These modifications take account of duty drawbacks on imported intermediate imports used in the production of exports.

   In addition, here we incorporate duty drawbacks on imported intermediate inputs in investment. According to Chinese customs data, taken from Ianchovichina et al. (2000), 60% of all imports are subject to duty drawbacks. 10% of these total imports are used in the production of investment goods. According to the GTAP database, 13% of duty-free imports are used in the production of capital goods, therefore approximately 56% of imports purchased for the production of capital goods are subject to duty drawbacks. Again the capital goods industry was divided into two (the first consisting of 56% of the industry which did not have to pay tariffs and the second consisting of the other 44%). Altertax was then used to eliminate the tariffs in the first capital goods industry. The regional price of capital goods, used in determining the rate of return in China, was then equal to the weighted average of the prices determined in the two industries.

   In the China accession experiments, China's tariffs on imported intermediate goods for production of commodities for domestic consumption, as well as on other imports for final household and government consumption, were then reduced according to China's accession

[2] Yang (1996) also examined the effect of alternative timing using the GTAP model.
[3] Lejour (2000) also examined the effect of duty drawbacks on China's accession using the GTAP. Other GTAP applications of China's accession have included Fan and Zheng (2000), Yang and Tyers (2000) and Zhai and Li (2000).

agreement. China's tariffs on imported intermediate goods for production of export goods and investment were already zero as a result of the Altertax experiment.

2. Modifications were made to the Dynamic GTAP model which allow income and consumption taxes to be endogenously determined to ensure that the ratio of tax revenue to income remained unchanged.

4. The Base Case and the Policy Scenarios

The effects of China's accession offer are examined over the period 1995 to 2020. This time frame is divided into a number of unequal periods: 1995-2000[4], 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010-2015, 2015-2020. Three simulations are undertaken.

The first simulation is the base case scenario. The base case scenario provides a picture of what we expect the world economy to look like without China's accession to the WTO[5]. This is discussed below in greater detail in Section 4.1.

The second simulation involves using the Dynamic GTAP model, adjusted to include duty drawbacks, to examine the effect of China's accession.

The third simulation examines the effects of China's accession (as in the second simulation) but with a policy of tax revenue replacement. The alternative tax instrument used to replace the lost tariff revenue is a uniform percentage increase in the tax on household income from all factors of production (skilled and unskilled labour, capital, land and natural resources).

4.1 The Base Case Scenario

As mentioned above the base case scenario is meant to provide a picture of what we expect the World economy to look like if China's accession did not occur. To obtain the base case scenario, forecasts of key macroeconomic variables and any anticipated policy changes are required. Forecasts of the growth rates of gross domestic product, skilled labor, unskilled labor and population for each region were originally obtained from the World Bank (Global Economic Prospects Data Base, 1999), Ahuja and Filmer (1995) and the CPB (1999). These were then extrapolated[6] and adjusted to obtain yearly growth rates for the period 1995 to 2020. These forecasts were then aggregated to obtain the shocks for the each of the periods and the 11 regions used in the simulation.

The base case scenario also includes some policy shocks which have already occurred, or which are expected to occur, during the period 1995 to 2020. These policy shocks include the implementation of the Uruguay Round, including the Agreement on Textiles and Clothing. The UR shocks were calculated from post-UR tariff rates compiled by Francois and Strutt (1999). The reduction in tariffs as a result of the UR and the enlargement of quotas resulting from the ATC are assumed to occur over the period 1995 to 2005. A number of assumptions are made and in some cases the post-UR tariff rates adjusted:

i. China continues to be granted Normal Trading Relations (NTR) status under this base case scenario. Therefore tariffs on goods imported from China by WTO members are reduced in line with the UR commitments.

[4] Beginning of 1995 to the beginning of 2000.
[5] Note this base case scenario uses the Dynamic model adjusted to take account of duty drawback in China.
[6] Extrapolation leads to a growth rate for China of approximately 7 percent per year in the years (2007-2020). Maddison (1998) estimates the growth rate between 1995 and 2015 at 4.5 percent per year, suggesting that 7 percent may be an overestimation.

ii. Effective tariffs on agricultural commodities worldwide do not fall further during the 1995-2000 period owing to the fact that UR implementation is not expected to lead to further reductions in agricultural protection.[7]

iii. With the exception of beverages and tobacco, Singapore's tariffs are reduced to zero.

iv. The elimination of quotas on WTO exporters of textiles and clothing under the ATC are incorporated into the simulation as reductions in export tax equivalents obtained from the GTAP database. These export tax equivalents have been reduced gradually over the period 1995 to 2005 to simulate the effects of gradual elimination of the quotas and the associated rents (which are assumed to accrue to exporters). Because these quota liberalization commitments have been heavily back-loaded, the shocks are implemented as follows: only 1 percent of the initial quotas are eliminated in each of the first five years, then 2, 8, 16, 32, 37 percent are eliminated in each of the remaining five years. So that by the year 2000 quotas have been eliminated by 5 percent, 2001 by 7 percent, 2002 by 15 percent and so on. This time path for liberalization of textiles and apparel quotas is the same as that used in Walmsley and Hertel (forthcoming). Note that in the base case, quotas on imports of textiles and wearing apparel from China are not eliminated.

v. In addition to the usual UR and ATC shocks, the base case also takes into account some of the trade liberalization undertaken by China prior to the year 2000. China has already made significant progress in reducing tariffs. Failure to include these reforms in the base case scenario could lead to an overestimation of the effects of China's accession[8]. Estimates of these tariff cuts were calculated from the difference between the tariff rates in the GTAP database and the current rates supplied by China as part of the WTO negotiation.

Technological change in the base case is calibrated using forecasts for real GDP. An initial simulation is undertaken in which all the macro variables, including real GDP, and the policy changes listed above are shocked by the amounts forecasted. In this simulation technology is permitted to respond endogenously to ensure that real GDP tracks the forecast. The resulting values for the technological change variable provide an estimate of how technology is expected to change over the period, if these forecasts for real GDP are to be achieved. Having obtained these values, the base case scenario is again simulated with real GDP determined endogenously and technology exogenously shocked by the value determined in the first simulation. The purpose of this calibration procedure is to ensure that GDP increases as predicted, and to establish a baseline for subsequent comparison with policy scenarios wherein GDP responds to China's WTO accession. The shocks to technology in China, which relate to non-accumulable resources. Further details on the base case scenario and the procedures used to obtain these shocks are available in Walmsley, Dimaranan and McDougall (2000).

4.2 The Policy Scenarios

Two alternative policy scenarios are examined in detail in this paper. Each of these involves the implementation of all the shocks from the base case scenario plus the policy simulation. In each of the policy scenario's China's accession is assumed to commence in 2002[9]. It is still assumed that China will have 5 years to implement the agreement; hence accession is expected finish by the beginning of 2007. The examination of the results, in section 5, will therefore concentrate on the period 2002 to 2020. The policy simulations are:

[7] This decision was taken in light of the very high pre-UR tariffs, relative to measured protection in the 1995 data base.

[8] Using the dynamic GTAP model it was found that the cumulative difference in real GDP, resulting from China's accession, was approximately 1 percentage point higher if these pre-accession tariff cuts were not taken into account.

[9] This delay from 2000 is due to the fact that it is currently 2001 and implementation has not yet commenced.

1. ***NOTR:*** The first policy scenario involves examining the effect of China's accession on foreign investment using the Dynamic GTAP model adjusted for duty drawbacks. It is also assumed that tariff revenue, lost from the reduction in tariffs, is not replaced by increases in other taxes, nut instead there is simply a lump-sum transfer from households to the Government[10]. This scenario is referred to as NOTR.

2. ***TRINC:*** In this scenario lost tariff revenues is replaced with a tax on household incomes. These taxes respond endogenously in order to cover any lost tariff revenue. The household income taxes on all factors adjust by the same percentage to ensure that the ratio of tax revenue to income remains unchanged. This scenario is referred to as TRINC.

China's accession offer was obtained from Martin et al. (2000) and is based on China's offer as of August, 1999. This offer is compared to their original tariffs for 1997, and where the binding is lower, the offer is taken as a change in policy. In the case of Taiwan, the cuts are based on their announced target of 4 percent average tariffs for manufactures. Tariffs on agriculture are assumed to be reduced by China in accordance with the accession offer, however no data were available on Taiwan's offer for agriculture and therefore no shocks could be applied. In both scenarios, the reduction in tariffs is assumed to occur in equal installments over the entire period.

In addition to tariffs, we also assume the quotas on China's textiles and clothing exports to North America and Europe will also be removed by the beginning of 2007. Quotas on imports from China and Taiwan are assumed to be eliminated at a rate of 7, 8, 16, 32 and 37 percent over the five-year period 2002 to 2007.

In the tax revenue replacement policy simulations it is assumed that tax revenue replacement only occurs during the period, 2002 to 2007, when the trade liberalization is taking place. This means that any further effects on tax collection, resulting from China's accession but occurring after 2007, are not taken into account under the tax revenue replacement policy. We believe this to be the most likely scenario, since it would become impossible for the Chinese government to estimate how much tariff revenue had been lost after 2007. The tax revenue replacement policy allows the output tax to respond endogenously in order to ensure that the ratio of tax revenue to income remains equal to the ratio of tax revenue to income in the base case scenario.

5. Results of China's WTO Accession Simulations

In this section the results of China's accession are discussed. In the first section we look at how China's accession to the WTO affects rates of return, foreign investment, capital and real GDP. In this section there is no policy of tax revenue replacement and hence we investigate the results from the first simulation (NOTR). In the second section we examine the effect of the tax revenue replacement policy. In this section we compare the lump-sum replacement policy (NOTR) with the raising of household income taxes to replace lost tariff revenue.

5.1 The Base Case

As can be seen from examining the base case in Figure 3, foreign ownership in China is expected to continue to decrease to 2005, well after the Asian crisis has finished. This is also true for the South East Asian countries, however the Newly Industrialised economies tend to recover more quickly, with foreign investment returning in 2002. The continued decline in foreign ownership is due to the increases in risk premium occurring in the base case. In the base case capital stocks are exogenous and risk premiums are endogenous. With the East Asian crisis the forecasted increase in investment is very low and hence risk premiums required by investors are increasing. The rise in risk premiums are therefore calibrated from the capital stock forecasts obtained from the Global Economic

[10] This is due to the fact that the Dynamic GTAP model has a single regional household, which allocates total income across private household consumption, government consumption and saving.

Prospects Data Base (1999). The increased risk premiums cause total investment and foreign investment to fall. In China and South East Asia, the increase in risk premiums is much larger than the increase in risk premiums in the Newly Industrialised economies, thus investment declines further and for longer. Over this period foreign investment moves away from Asia and towards the other regions, including South Asia, Africa and the Middle East, North America and Europe, where risk premiums fall relative to Asia. After 2005, risk premiums start to fall slightly and investment and foreign ownership in China begins to recover, however as can be seen in Figure 4, the recovery is slow[11].

5.2 China's Accession to the WTO (NOTR)

A comprehensive picture of the global impact of China's accession is given in Table 3. The results report the cumulative differences between the base case and policy scenario at the beginning of 2020, thus highlighting the long-run effects of China's accession. Here, we trace through the major mechanisms determining the changes in real GDP, capital stocks and foreign ownership of China's capital.

As a result of China's trade liberalization efforts the rental price of capital rises gradually by 1.935% in 2007. The increase in the rental price of capital is the result of increased demand for capital primarily in the wearing apparel sector, however other sectors such as livestock, electronics and trade and transport also increase demand for capital as demand for their goods increases. In addition the price of capital goods in China gradually declines over the period 2002 to 2020, resulting in an overall decline of –0.724 percent[12].

Rates of return increase by approximately 1.8% over the liberalisation period (Table 3 and Figure 2). Capital stocks increase in response to the higher rates of return in China, gradually causing the rate of return to decline towards the global target rate. This decline in the rates of return is particularly noticeable after 2007, when China's liberalization is completed and is a result of the accumulation mechanisms described in section 3 above. The higher capital stocks then lead to increased production and real GDP. The accumulation of capital stocks and the increase in real GDP are illustrated in Figure 3. Capital stocks increase by 6.078 percent by 2020 and Real GDP by 4.25 percent relative to the base case scenario as a result of the higher rates of return in China (Table 3). Figure 3 also illustrates the effects on real GDP of increased efficiency. The initial increase in real GDP exceeds the increase in capital stocks; this initial increase is the result of improved efficiency due to the reduction of tariffs.

With rates of return increasing considerably as a result of China's accession it is expected that foreign investment in China will also increase. The results in Table 3 concur with this expectation, foreign wealth located in Chinese assets increases by 23.11 percent relative to base case by 2020. Figure 4 illustrates the cumulative percentage changes in foreign wealth located in Chinese firms in the base case and after China's accession to the WTO.

When China joins the WTO rates of return increase, covering the increase in risk premium, foreign investment increases and over time foreign ownership recovers much more quickly. China's

[11] Recent data on foreign investment in China indicate that, in 2000, foreign investment in China began to improve. This suggests that either the recovery from the crisis has been quicker than forecasters expected in 1999 or alternatively the risk premia expected by foreign investors investing in China is already falling in response to China's impending accession to the WTO. We hope that in the near future we can incorporate this new information into the base case scenario.

[12] This is compared to a decline of 1.38%, if duty drawbacks on the production of capital goods were not incorporated. Note the decline in the price of capital goods will be much less under this scenario, where duty drawbacks are included, than if tariffs had been reduced on all goods, including imported intermediates. This explains why the scenarios including duty drawbacks lead to a much smaller increases in China's rate of return, capital and real GDP.

accession to the WTO has provided an additional incentive, in the form of higher rates of return, to foreign investors.

In addition, China's accession also increases the wealth of Chinese households. Figure 5 shows the increase in Chinese households wealth and the allocation of this wealth across domestic and foreign assets. As can be seen from Figure 5, Chinese households choose to divert their saving from foreign to domestic assets.

The increase in capital flows into China have a direct impact on the trade balance. The increase in capital flows causes the trade balance to initially decline. Later when foreign capital flows level off the trade balance improve. This is shown in Figure 6.

The reduction in tariff rates as a result of China's accession leads to an overall reduction in tax revenue collected by the Chinese government of 6.11% by 2007. This is due to the fact that the increase in import volumes[13] does not outweigh the fall in tariff rates and hence overall tariff revenue falls[14].

Determining the overall effect of China's accession on China's welfare and comparing this to the effect on welfare of China's accession with tax revenue replacement is a difficult task as welfare results cannot simply be aggregated over time and are highly path dependent[15]. In this paper we use a comparative static simulation to show how different welfare would be, with the policy in place, in a particular year[16]. In this case we examine the difference in welfare between the base case and the policy scenario in 2020. The results show a considerable increase in China's welfare from accession to the WTO. This increase in China's welfare is a result of improved allocative efficiency and a positive equity effect due to the increase in capital ownership of Chinese households. The positive welfare effect is offset to a certain extent by the negative terms of trade effect.

5.2. Tax Revenue Replacement

In this section we review how a policy to replace lost tariff revenue would affect the results of China's accession to the WTO. The results of the first simulation (NOTR), where tariff revenue is not replaced, are compared with those where lost tariff revenue is replaced by increasing output taxes (TRINC). The results of the tax revenue replacement policy are summarised in Table 4.

A comparison of Tables 3 and 4 show that replacing tariff revenue by increasing household income taxes can have a dramatic effect on China's benefits from WTO accession. Figure 7 compares the cumulative percentage differences from the base case in Real GDP and capital for both the tax revenue replacement (TOINC) and the lump-sum replacement (NOTR) scenarios. Although the initial (2003-04) increase in real GDP, resulting from increased efficiency, are similar for both scenarios, capital stocks fail to accumulate to the same extent when tariff revenues are replaced (TOINC) and hence real GDP does not increase further in later years. This is evidenced by the fact that capital barely increases as a result of China's accession under tax revenue replacement (TOINC)

[13] The Armington elasticities used in this analysis are the standard GTAP elasticities multiplied by two. This is done to more closely reflect empirical evidence (see Hertel, Anderson, Francois and Martin, 2001).

[14] Note the model assumes that duty drawbacks on imported intermediate inputs for production of goods for export continue and are not removed as a result of China's accession. If these were removed and exporters were assumed to pay tariffs on intermediate inputs then this would have other significant effects.

[15] This means that the welfare results are dependent on the shares or weight in the initial data base. In a dynamic model the data base is updated each period and therefore the shares will depend on the policy shock or path taken. As a result the welfare results of two experiments are not directly comparable as they have been skewed by the differences in the shares or weights which are applied to them. By using a comparative static simulation and the same initial data base (i.e. the 2020 base case data) for both policy experiments, the same weights are now used to calculate the welfare changes and thus the results can be compared directly.

[16] This comparative static simulation includes the cumulative policy shocks to tariffs and quotas plus shocks to capital stocks and wealth to incorporate the accumulation effects from the Dynamic GTAP model into the comparative static model.

and real GDP increases initially but then the curve flattens out. By 2020, Real GDP has increased by only 1.565% (TOINC), as compared to 4.25% in the case of lump-sum replacement (NOTR).

So why do capital stocks fail to increase as a result of China's accession when tariff revenue is replaced with a household income tax (TOINC)? Capital accumulation is the result of high rates of return, which are gradually driven to equality over time. When tariff revenue was not replaced (NOTR), rates of return increased substantially as the rental price of capital rose relative to the price of capital goods. This occurred because the rental price of capital increased with higher demand for domestic production and the price of capital goods fell with the lower cost of imported inputs. When tariff revenue is replaced the additional tax on household income reduces the extent to which the rental price of capital rises. As a result the rate of return on capital in China fails to rise to the same extent. This is shown in Figure 8 where the increase in China's rates of return resulting from China's accession is insignificant (TOINC) when compared to the case where tax revenue is not replaced (NOTR).

The percentage change in the rate of return is decomposed into the percentage change in the rental price and price of capital goods (Figures 9 and 10 respectively). Examination of Figures 9 and 10, illustrate that the small change in the rate of return under the policy of tax revenue replacement is due primarily to a fall in the rental price of capital. While the percentage changes in the price of capital goods do differ between the two scenarios, this difference does not explain the fall in the rate of return under the tax revenue replacement scenario. In fact the fall in the price of capital goods under the tax revenue replacement scenario is larger than under the Lump-sum replacement scenario[17]. This fall would offset the fall in the rental price of capital, causing the rate of return to increase slightly, although not enough to cause the rate of return to increase substantially. Overall the increase in household income taxes, used to replace lost tariff revenue, reduces the incentive to invest in China.

The poor rates of return in China and low accumulation of capital provide no incentives to foreign investors to return to China. As a result foreign investment increases very slowly, as it did in the base case scenario (Figure 11), barely increasing relative to the base case scenario. The tax revenue replacement policy has had the effect of mitigating all the benefits that were previously gained from China's accession to the WTO and as a result foreigners choose not to invest in China.

These results do not bode well for the Chinese government seeking to retain its current rate of revenue. Care needs to be taken to examine the effect on incentives of the tax revenue replacement policy chosen. In this case income taxes were examined as an income tax system is currently being developed in China, however it would be wise for the Chinese Government to consider the effects of other less distortionary tax revenue replacement policies, such as a consumption tax.

Tables 3 and 4 also show the welfare effects of China's accession to the WTO with a Lump-sum replacement and a tax revenue replacement. The welfare of Chinese households is reduced considerably as a result of the tax revenue replacement policy. This decline is due to both a reduction in allocative efficiency and equity effects. The negative terms of trade effect is also slightly less under the tax revenue replacement policy.

6. Conclusion

Foreign investment has been a focal point in China's negotiations for accession to the WTO. Increasing access for foreign investors has been of paramount importance to the US and European negotiators in their dealings with China. In the aftermath of the Asian crisis and the downturn in

[17] The change in the price of capital goods is the result of two affects: firstly, the reductio in tariffs reduces the cost of imported inputs causing the price of capital goods to fall; and secondly, increased investment and hence demand for capital goods increases their price. In the no tax replacement their is greater demand for capital goods and hence the price rises relative to the price of capital goods in the tax replacement scenario.

foreign investment, there has also been growing concerns regarding why foreign investors have not returned to China and how this situation could be reversed. It is generally believed that China's accession to the WTO would assist in the return of foreign investors to China.

This paper explores how China's accession to the WTO might reverse or exacerbate the current trend of foreign investment in China. To examine this issue we use a dynamic global applied general equilibrium model, Dynamic GTAP. The Dynamic GTAP model is ideal for this purpose as capital accumulation and foreign ownership of that capital are explicitly modelled. It should be noted however that this paper does not attempt to estimate how WTO accession may impact on the risk premia associated with foreign investment in China, instead the analysis concentrates on how changes in rates of return in China will impact on foreign investment. Thus assuming, as is generally done, that China's accession to the WTO will reduce the level of risk perceived by foreign investors, the results reported here can be thought of as representing lower bounds for changes in foreign investment resulting from China's accession.

After the East Asian crisis foreign investment has been slow to return to China. The results of the base case experiment suggest that foreign investment in China will continue to stagnate until 2005, following this foreign investment will return, however, only very slowly. When China joins the WTO the boost to the Chinese economy and to rates of return provides increased incentives for foreign investors to return. Foreign investment begins to increase again as early as 2003 and continues to grow at a much faster pace. Overall China's accession to the WTO helps to improve foreign investment. In addition China's accession is likely to reduce the risk premium required by investors which may further increase foreign investment in China.

The Dynamic GTAP model was also altered to enable us to examine the effects of a tax revenue replacement policy. The reduction in tariff revenue caused by China's accession to the WTO is likely to have a significant impact on the revenue of the Chinese government. As a result the Chinese government is likely to be forced to find alternative sources of revenue by raising other taxes, such as income or consumption taxes. In this paper we examine how the expected benefits of China's accession to the WTO are likely to be affected by such a tax revenue replacement policy. In this case we allowed household income taxes on all factors of production to increase, by the same proportion, to replace lost tariff revenue.

It was found that replacing lost tariff revenue by raising household income taxes could significantly reduce the benefits obtained from China's accession to the WTO. Increasing household income taxes reduced incentives for capital accumulation and for foreign investments in China. Overall it was concluded that if the Chinese government is to consider a policy of tax revenue replacement it needs to examine how such a tax will affect incentives for investment, as well as the cost of implementing the tax system.

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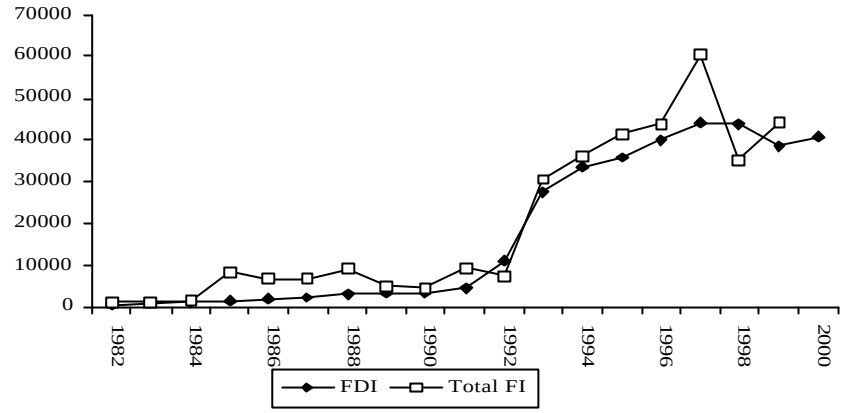
Figure 1: Foreign Investment in China



Source: IMF Balance of Payments Statistics, 1999.

Figure 2: Cumulative Percentage Differences from Base Case in China's Actual Rate of Return

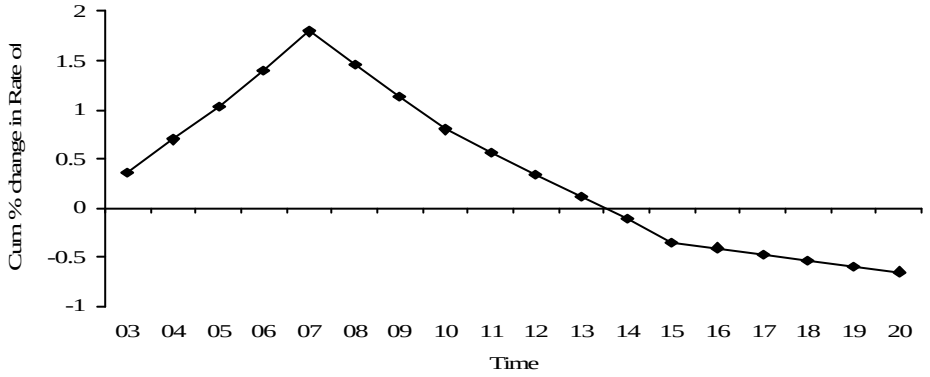


Figure 3: Cumulative Percentage differences from, Base Case in China's Capital and Real GDP

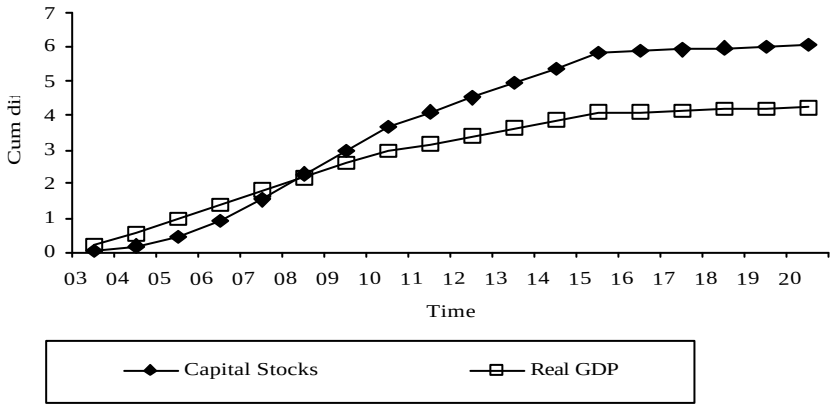


Figure 4: Foreign Ownership of Chinese Assets

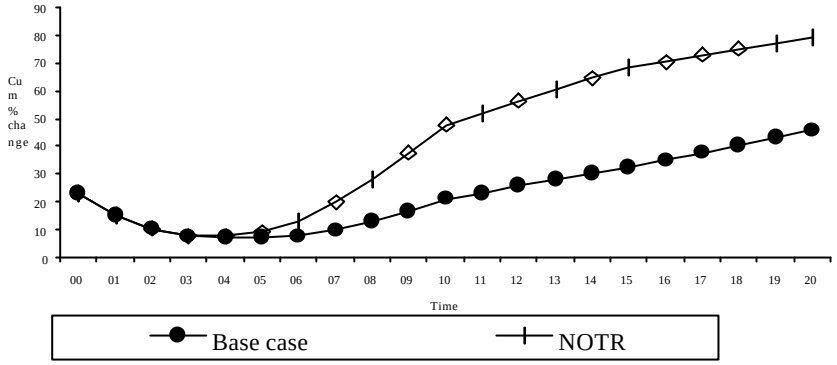


Figure 5: Cumulative Percentage Differences from Base Case in the Wealth of Chinese Households

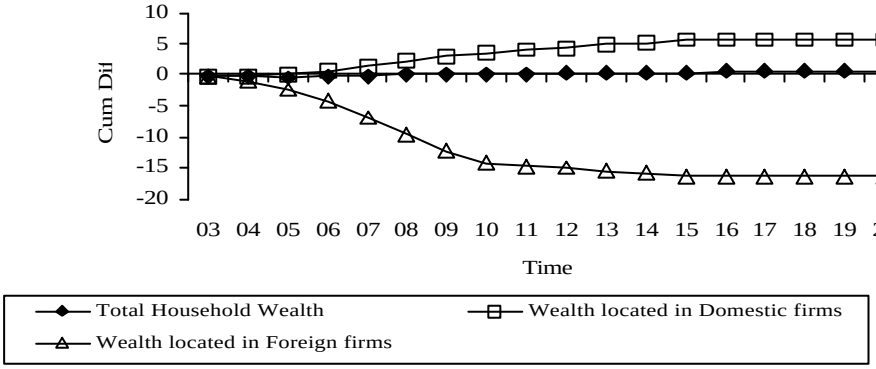


Figure 6: Change in China's Trade Balance

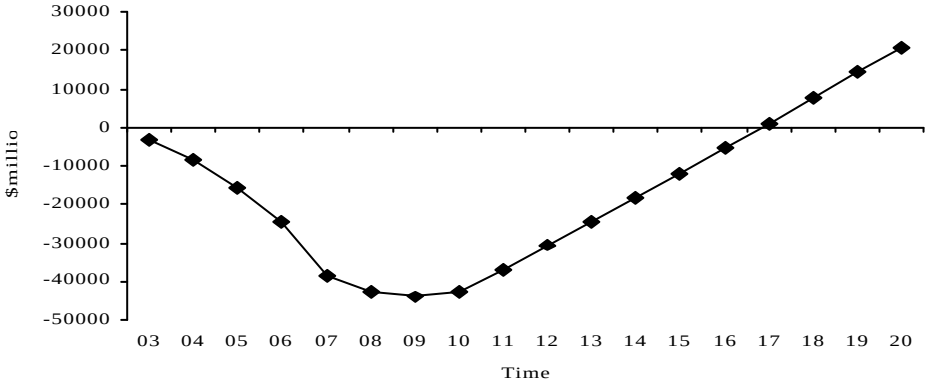


Figure 7: Cumulative Percentage Differences in China's Real GDP and Capital Stocks: Comparison of Lump-sum and Tax revenue replacement

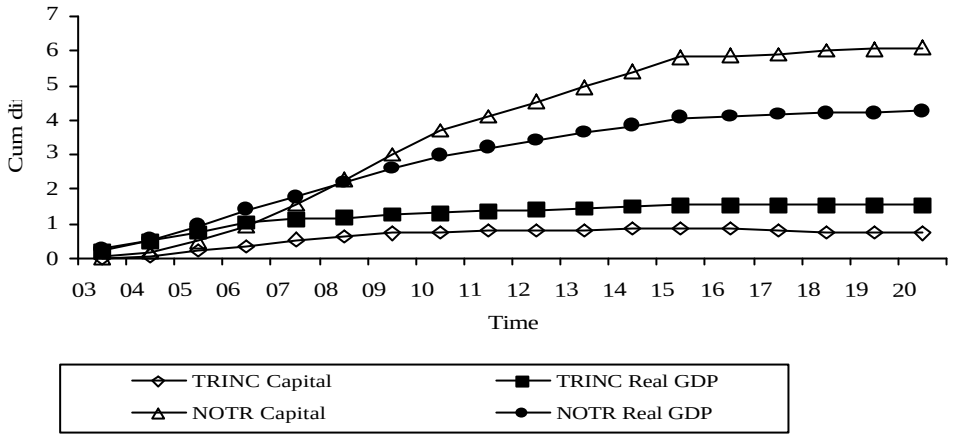


Figure 8: Cumulative Percentage Differences in China's Rates of Return: Comparison of Lump-sum and Tax revenue replacement

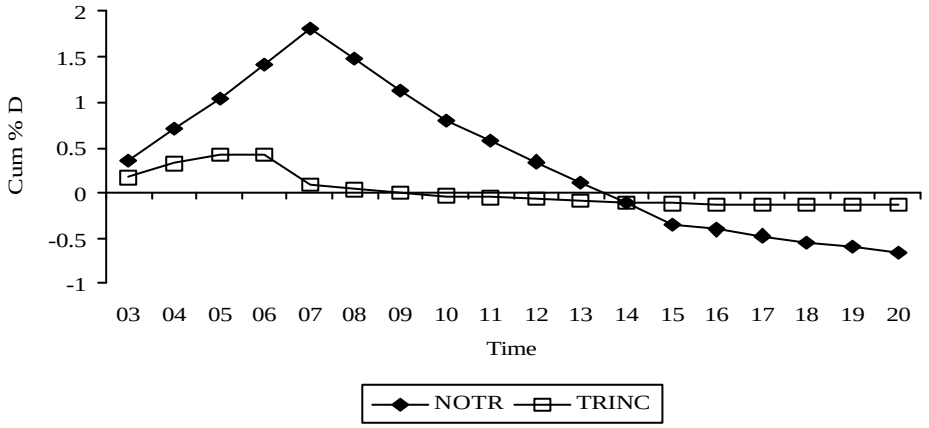


Figure 9: Cumulative Percentage Changes in China's Rental Price of Capital: Comparison of Lump-sum and Tax revenue replacement

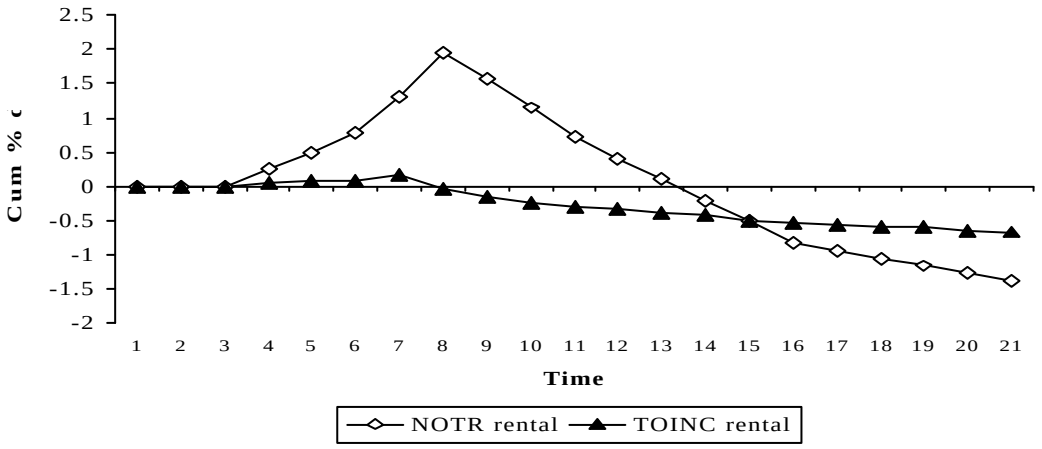


Figure 10: Cumulative Percentage Changes in China's Price of Capital Goods: Comparison of Lump-sum and Tax revenue replacement

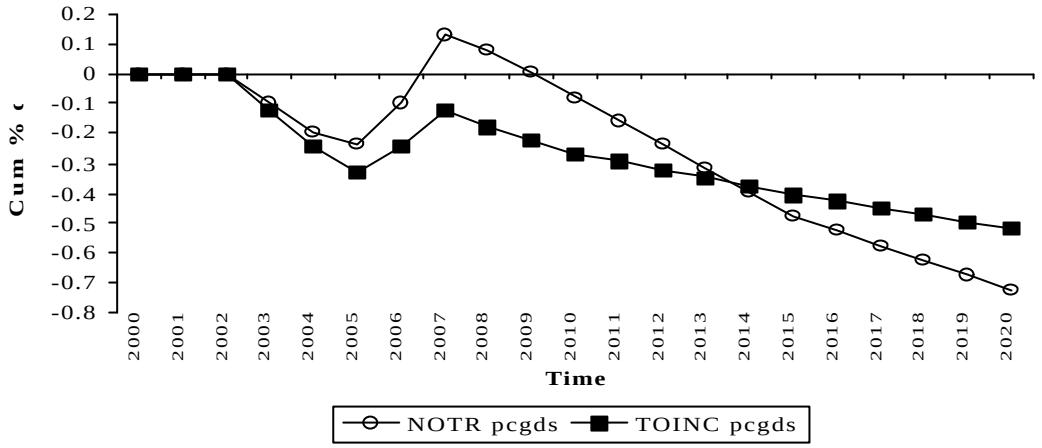


Figure 11: Foreign Ownership of Chinese Assets: Comparison of Lump-sum and tax revenue replacement

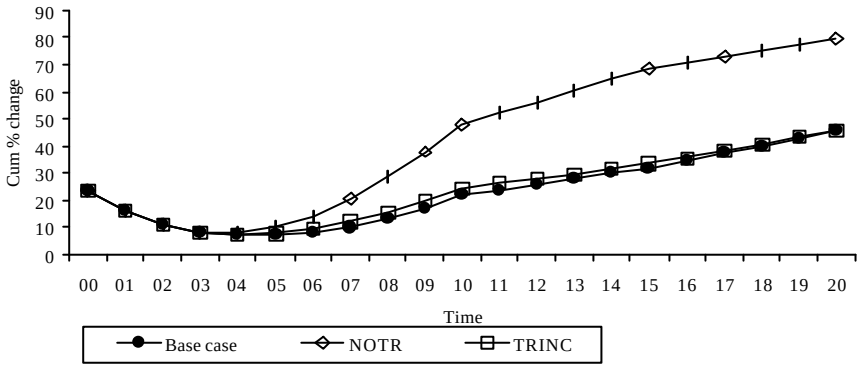


Table 1: Portion of Government Revenue by Source

	1990	1998
Taxes on Income, Profits and Capital Gains	31	7
Social Security	0	0
Taxes on Goods and services	18	79
Taxes on International Trade	14	6
Other Taxes	0	4
Other Revenues	37	4

Source: World Bank

Table 2: List of Countries and Commodities of the Study

Country/Region		Commodity	
NAmerica	North America	crops	Crops
WEurope	Western Europe	Lstk	Livestock
Japan	Japan	foodbev	Processed food and Beverages and Tobacco
China	China	extrprds	Mining, fish, forestry, petroleum,
Taiwan	Taiwan	textiles	Textiles
OthNICs	Newly Industrializing Countries	wearapp	Wearing apparel
SEA	South East Asia	metlchem	Metals and Chemicals
SoAsia	South Asia	autos	Automobiles and parts
LatinAM	Latin America	electronics	Electronics
AfrMidE	Africa and Middle East	othmnfcs	Other Manufactures
ROW	Rest of World	houseutils	Household Utilities
		tradetrans	Trade and Transport
		Othsvces	Other Services

Table 3: China's Accession with Lump-sum Replacement[1].

	I	II	III	IV	V	VI	VII	VIII	IX	X
	Real GDP	**Capital Stocks**	**Real Exports**	**Real Imports**	**Actual Rate of Return**	**Wealth of regional household in Domestic Assets**	**Wealth of regional households in Foreign Assets**	**Foreign Wealth located in regional firms**	**Total wealth of regional Households**	**Welfare**
NAmerica	-0.086	-0.334	0.945	1.911	0.135	-0.040	1.404	-1.63	0.093	7630.672
WEurope	-0.070	-0.323	-0.037	0.227	0.203	-0.003	0.374	-0.43	0.141	3806.634
Japan	-0.135	-0.309	0.780	0.987	0.165	0.054	0.764	-0.83	0.295	1621.029
China	4.256	6.078	17.592	16.717	-0.657	5.232	-13.446	23.11	0.749	10522.7
Taiwan	3.373	8.529	12.925	14.240	-0.814	8.170	-5.945	22.66	2.437	6363.929
OthNICs	0.125	0.245	0.480	0.591	0.073	0.489	-0.388	1.22	0.393	1028.603
SEA	-0.597	-0.921	-0.818	-0.784	0.138	-0.673	1.558	-3.08	0.017	-1608.04
SoAsia	-0.819	-1.921	-3.284	-3.467	0.359	-1.234	7.717	-9.27	-1.209	-2515.28
LatinAM	-0.205	-0.410	-0.597	-0.241	0.111	0.082	1.443	-1.18	0.089	-418.299
AfrMidE	-0.237	-0.476	-0.631	-0.432	0.181	0.027	1.084	-0.99	0.051	-764.427
ROW	-0.131	-0.339	-0.110	0.070	0.161	0.144	0.889	-0.59	0.156	-0.12169

[1] Cumulative differences between Base Case and Policy Shock at the beginning of 2020.

Table 4: China's Accession with Tax Revenue Replacement[2].

	I	II	III	IV	V	VI	VII	VIII	IX	X
	Real GDP	**Capital Stocks**	**Real Exports**	**Real Imports**	**Actual Rate of Return**	**Wealth of regional household in Domestic Assets**	**Wealth of regional households in Foreign Assets**	**Foreign Wealth located in regional firms**	**Total wealth of regional Households**	**Welfare**
NAmerica	-0.006	-0.108	1.083	1.837	0.022	-0.018	0.502	-0.53	0.025	8151
WEurope	0.023	-0.007	0.069	0.236	0.016	0.041	0.053	0.03	0.045	4359.5
Japan	0.012	0.027	0.930	0.866	0.006	0.254	0.094	0.42	0.212	847.25
China	1.565	0.724	13.734	13.407	-0.142	0.201	-0.381	0.79	0.030	3909.25
Taiwan	3.371	8.519	12.757	13.948	-0.887	8.055	-4.826	22.68	2.277	6852.719
OthNICs	0.232	0.467	0.478	0.560	-0.036	0.523	-1.313	2.39	0.281	1036.875
SEA	-0.380	-0.567	-0.559	-0.498	0.067	-0.421	0.885	-1.71	-0.055	-1366.81
SoAsia	-0.726	-1.728	-3.133	-3.319	0.250	-1.252	6.130	-8.12	-1.231	-2493.19
LatinAM	-0.107	-0.209	-0.466	-0.290	0.028	-0.024	0.600	-0.65	-0.021	-367.188
AfrMidE	-0.086	-0.164	-0.513	-0.360	0.032	-0.037	0.302	-0.37	-0.029	-324.875
ROW	-0.030	-0.063	-0.156	-0.051	0.023	0.039	0.164	-0.09	0.041	-72.3125

[2] Cumulative differences between Base Case and Policy Shock at the beginning of 2020.