Global Trade Analysis Project
https://www.gtap.agecon.purdue.edu/

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

DRAFT ONLY

EU-China: Win-Win Trade Liberalization and Stimulus Scenarios?

by:

Dr David Evans (Sussex)

and

Dr Willem van der Geest (Geneva).[1]

For the GTAP 2009 conference

Santiago de Chile, June 10-12, 2009

[1] Note: David Evans is a Senior Research Associate, University of Sussex. Willem van der Geest is Officer-in-Charge, Division of Market Development and Chief Economist, International Trade Centre, Geneva. David Evans developed and implemented the modeling analysis for the study, while Willem van der Geest worked on the design and interpretation of the policy scenarios. This paper is an extended and revised version of chapter 4 of the *EU-China Trade Sustainability Impact Assessment*. The authors are solely responsible for any views expressed in this paper. Any inaccuracies or errors in the paper too remain the sole responsibility of the authors. The authors would like to acknowledge the research support of Brian Jackson and Jairo Isaya Castro.

Abstract

This paper presents three clusters of original simulation exercises, dealing respectively with:

i. modest and ambitious bilateral and multi-lateral trade liberalization and its impact on the EU-China trade relation;
ii. global current account adjustment scenarios, where China sharply reduces it current account surplus, necessitating symmetric adjustments elsewhere, in particular in the deficit regions such as the North American Free Trade Area (NAFTA); and
iii. stimulus of the domestic Chinese economy through implementing a huge stimulus package in the context of rapidly falling global demand brought about by the global financial crisis and its severe demand implosion. One scenario super-imposes on the crisis context a sharp reduction of China's accumulated capital reserves in an attempt to escape the 'dollar trap'.

The EU-China Partnership Cooperation Agreement (PCA) negotiations presently do not include a focus on a free trade agreement between the EU and China. In this sense, the EU-China PCA is distinctly different from e.g. the 2002 EU-Chile agreement, as well as the ongoing negotiations between the EU and ASEAN, India, Korea and the Economic Partnership Agreements between the ACP countries and the EU. One of the key reasons for this is that the EU's trade deficit with China has been growing very fast, in particular since WTO accession in 2001and it has reached historically unprecedented levels in absolute and relative terms. It is widely held that a free trade agreement between the EU and China would further accelerate the growth of the deficit, and that such a growth in the bilateral EU-China trade deficit is undesirable.

However, amongst trade economists, it is the over-all impact of trade policy reform on economic welfare in the EU and China that matters, and changes in the bilateral trade balances that result from such policy changes are of importance in relation to trade adjustment costs and benefits. In the case of a free trade agreement between the EU and China, the core of the economic analysis of the impact on economic welfare follows well known lines from Customs Union theory. In the empirical analysis of a free trade agreement between the EU and China, conducted for this paper, trade policy reform includes both tariff and non-tariff trade policy instruments. The application of Customs Union theory is complicated but not superseded by the more complex empirical reality than originally considered by Viner.

Section 2 of the paper provides an overview of the GLOBE model: a regional Computable General Equilibrium model in which China and the EU are identified as separate regions (countries). This paper uses an updated version of GLOBE (Evans et al (2008). The section describes the modelling approach, the structural characteristics of China and its place in the global economy and presents the baseline-scenario, against which the three clusters of counter-factual scenarios are compared.

Section 3 presents the 17 scenarios which analyze key issues of i) EU-China trade liberalization scenarios, ii) Chinese current account reforms; and iii) the impact of crisis and stimulus. Section 4 present the empirical results at the macro-level, while Annex I provides details at the sector level for imports and exports for the trade liberalization scenarios.

The paper argues that for EU-China trade to achieve win-win outcomes in terms of economic welfare, a substantial and asymmetric reduction of non-tariff barriers (NTBs) in the Chinese economy may be necessary. Fresh estimates of the levels of Chinese NTBs are included in the paper and used in the simulations, drawing on research undertaken by Evans et al. (2006) as well as for van der Geest, Evans et al. (2008).

The impact of current account adjustments in the Chinese economy on the macroeconomic and trade balances of partner countries and regions is analyzed.

Crisis and stimulus – both in OECD and China – are simulated in the context of the global financial crisis and demand contraction. A sharp and sudden reduction of primary factor incomes in OECD economies is analyzed, which reverberates throughout the global economy with a multitude of consequences for the Chinese economy.

The conclusions draw out the tentative policy implications for EU-China trade relations in terms of economic welfare and trade adjustment impacts. Liberalization scenarios with a strong focus on the reduction of NTBs in China as well as standard tariff reduction may be the best option towards the much desired win-win scenarios for EU-China trade. However, growth and absorption losses due to the crisis are much larger than any potential gains from trade-liberalization.

The current global stimuli do not change that result, indeed it is crucial that the Chinese stimulus package is 'trade-neutral' and avoids a bias towards import substitution as well as export subsidization measures. The huge stimulus package implemented within the Chinese economy is part of a win-win scenario, including GDP gains in China and other regions. Preliminary remarks on an emerging research agenda are included.

'

EU-China Trade Sustainability Impact Assessment Trade Sustainability Impact Assessment of the Negotiations of a Partnership and Cooperation Agreement between the EU and China, Parts 1-3, 2008'. See the study website www.euchina-sia.com.

Table of Contents

Abbreviations

aveNTB	Ad Valorem Equivalent Non-tariff Barrier
CES	Constant elasticity of substitution
CET	Constant elasticity of transformation
CGE	computable general equilibrium
DDA	Doha Development Agenda
EU	European Union
FAO	Food and Agriculture Organisation
GAMS	General Algebraic Modelling System
GATS	General Agreement on Trade and Services
GDP	Gross Domestic Product
GPA	Agreement on Government Procurement
GTAP	Global Trade Analysis Project
IFC	International Finance Corporation
IMF	International Monetary Fund
IPR	Intellectual Property Rights
ITC	International Trade Centre
MERCOSUR	
MFN	Most Favoured Nation
MOFCOM	China's Ministry of Commerce
NAFTA	North American Free Trade Agreement
NTB	Non-tariff Barriers
OECD	Organisation for Economic Co-operation and Development
PBOC	People's Bank of China
PCA	Partnership and Cooperation Agreement
R&D	Research and Development
REACH	Registration, Evaluation Authorisation and Restriction of Chemical Substances
RMB	Ren Min Bi
ROW	Rest of the world
SAFE	State Administration of Foreign Exchange
SAM	Social Accounting Matrix
SEPA	State Environmental Protection Administration
SIA	Sustainability Impact Assessment
SME	Small and Medium-sized Enterprises
SOEs	State-owned Enterprises
TAPES/PE Model	Partial Equilibrium Model
TECA	Trade and Economic Agreement
TFP	Total Factor Productivity
UNCTAD	United Nations Conference for Trade and Development
WB	World Bank
WITS	World Integrated Trade Solution
WTO	World Trade Organisation

1. The GLOBE Model

1.1. Overview of the GLOBE Model and Results

The GLOBE regional CGE model is designed to assist in the analysis of economy wide and global issues. The focus is strongly on the economy wide and global issues, leaving sector issues largely to the analysis with Partial Equilibrium models. The Globe model is used to analyze the impact of further trade liberalisation in China, the impact on China of involvement in multilateral trade policy liberalisation and reductions in China's current account surplus. As evidenced from the height of tariff and NTB protection in China and the EU, low average levels of tariff and NTB protection conceal a number of sectors with high ordinary and NTB protection. [2]

The presentation of the Globe model is provided in Section 2. The modelling approach is outlined (2.1) as well as the structural characteristics of China and its place in the global economy (2.2). The base line scenario is described in 2.3.

In section 3 it is described how a set of hypothesised exogenous trade and macro-economic reforms in China impact on the exogenously specified current account balances in the model and key endogenously specified variables such as the real exchange rates, the terms of trade etc. Three sets of scenarios are also developed - trade policy reform; current account reform and crisis and stimulus policy responses are described - together with their interaction.

Section 4.1 discusses key aspects of the macro and sector results from the first cluster of nine experiments focusing on various scenarios of trade liberalization. Section 4.2 analyzes this in the context of Chinese current account adjustments. Section 4.3 presents tentative and preliminary results of global macro-economic general equilibrium simulations of the present impact of global financial crisis. It also presents an analysis of the anticipated impact of a large scale stimulus in the Chinese economy on other regions, including NAFTA, the EU, advanced East Asia and India.

Concluding remarks, including the emerging research agenda, are presented in Section 5.

2 The GLOBE Application to EU-China Trade Policy

2.1 Modelling Trade Policy Reform with the GLOBE Model

The GLOBE multi-country CGE (Computable General Equilibrium) model is described in McDonald, Robinson and Thierfelder (2005).[3] and the model has the following key characteristics: GLOBE

[2] Of the five sector studies where sector models were used to assist in the quantitative analysis, four coincide with areas of moderate to high protection in China, namely Agriculture, Chemicals, Machinery and Financial Services. In the fifth case, Environmental Goods and Services, there is rapid structural change as well as intensive policy reform.

3 McDonald, S., Robinson, S. and Thierfelder, K., (2005). 'A SAM Based Global CGE Model using GTAP Data', Sheffield Economics Research Paper 2005:001. The University of Sheffield.

models agents' micro economic behaviour in consumption and production in the economy, treating tradable goods as imperfect substitutes for domestic production. GLOBE allows for a choice of how key markets operate (closure rules), allowing for different assumptions about the behaviour of markets and actors to be examined. Given base data, key parameters and policy variables such as tariffs, GLOBE provides for real values of production, consumption, economic welfare, real exchange rates and changes in the employment of unskilled labour; a good indicator of the poverty impact of the various scenarios.

The GLOBE model is a member of the class of multi-country, computable general equilibrium (CGE) models that are descendants of the approach to CGE modelling described by Dervis *et al*., (1982). The model is a SAM-based CGE model, wherein the SAM serves to identify the agents in the economy and provides the database with which the model is calibrated. The SAM also serves an important organisational role since the groups of agents identified in the SAM structure are also used to define sub-matrices of the SAM for which behavioural relationships need to be defined (Pyatt, 1987). The implementation of this model, using the GAMS (General Algebraic Modelling System) software, is a direct descendant and extension of the single-country and multi-country CGE models developed in the late 1980s and early 1990s (see McDonald *et al.* 2007 for a more detailed description of the GLOBE model).

International Trade

Trade is modelled using a treatment derived from the Armington "insight"; namely domestically produced commodities are assumed to be imperfect substitutes for traded goods, both imports and exports. Import demand is modelled via a series of nested constant elasticity of substitution (CES) functions; imported commodities from different source regions to a destination region are assumed to be imperfect substitutes for each other and are aggregated to form composite import commodities that are assumed to be imperfect substitutes for their counterpart domestic commodities. The composite imported commodities and their counterpart domestic commodities are then combined to produce composite consumption commodities, which are the commodities demanded by domestic agents as intermediate inputs and final demand (private consumption, government and investment). The presumption of imperfect substitutability between imports from different sources is relaxed where the imports of a commodity from a source region accounts for a 'small' (value) share of imports of that commodity by the destination region. In such cases the destination region is assumed to import the commodity from the source region in fixed shares: this is a novel feature of the model introduced to ameliorate the terms of trade effects associated with small trade shares.

Export supply is modelled via a series of nested constant elasticity of transformation (CET) functions; the composite export commodities are assumed to be imperfect substitutes for domestically consumed commodities, while the exported commodities from a source region to different destination regions are assumed to be imperfect substitutes for each other. The composite exported commodities and their counterpart domestic commodities are then combined as composite production commodities; properties of models using the Armington insight are well known. (de Melo and Robinson 1989, Devarajan *et al*., 1990). The use of nested CET functions for export supply implies that domestic producers adjust their export supply decisions in response to changes in the relative prices of exports and domestic commodities. This specification is desirable in a global model with a mix of developing and developed countries that produce different kinds of traded goods with the same aggregate commodity classification, and yields more realistic behaviour of international prices than models assuming perfect substitution on the export side.

Agents are assumed to determine their optimal demand and supply commodities as functions of relative prices, and the model simulates the operation of national commodity and factor markets and international commodity markets. Each source region exports commodities to destination regions at prices that are valued free-on-board (*fob*). Fixed quantities of trade services are incurred for each unit of a commodity exported between each and every source and destination, yielding import prices at each destination that include carriage, insurance and freight charges (*cif*). The *cif* prices are the 'landed' prices expressed in global currency units. To these are added any import duties and other taxes, and the resultant price converted into domestic currency units using the exchange rate to get the source region specific import price. The price of the composite import commodity is a weighted aggregate of the region-specific import prices, while the domestic supply price of the composite commodity is a weighted aggregate of the import commodity price and the price of domestically produced commodities sold on the domestic market.

The prices received by domestic producers for their output are weighted aggregates of the domestic price and the aggregate export prices, which are themselves weighted aggregates of the prices received for exports to each region in domestic currency units. The *fob* export prices are then determined by the subtraction of any export taxes and converted into global currency units using the regional exchange rate.

There are two important features of the price system in this model that deserve special mention. First, each region has its own numéraire such that all prices within a region are defined relative to the region's numéraire. A fixed aggregate consumer price index is specified to define the regional numéraire. For each region, the real exchange rate variable ensures that the regional trade-balance constraint is satisfied when the regional trade balances are fixed. Secondly, in addition, there is a global numéraire such that all exchange rates are expressed relative to this numéraire. The global numéraire is defined as a weighted average of the exchange rates for a user defined region or group of regions. In this implementation of GLOBE the basket of regions approximates the OECD economies.

Fixed country trade balances are specified in "real" terms defined by the global numéraire. If the global numéraire is the US exchange rate and it is fixed to one, then the trade balances are "real" variables defined in terms of the value of US exports. If global numéraire is a weighted exchange rate for a group of regions, as in this case, and it is fixed to one, then the trade balances are "claims" against the weighted average of exports by the group of regions in the numéraire.

Production and Demand

The production structure is a two-stage nest. Intermediate inputs are used in fixed proportions per unit of output—Leontief technology. Primary inputs are combined as imperfect substitutes, according to a CES function, to produce value-added. Producers are assumed to maximise profits, which determines product supply and factor demand. Product markets are assumed to be competitive, and the model solves for equilibrium prices that clear the markets. Factor markets in developed countries are also assumed to have fixed labour supplies, and the model solves for equilibrium wages that clear the markets. In developing countries, however, we assume that the real wage of unskilled labour is fixed and that the supply of unskilled labour is infinitely elastic at that wage. So, labour supply clears the market, and aggregate unskilled employment is endogenous rather than the real wage. In this specification, any shock that would otherwise increase the equilibrium wage will instead lead to increased employment.

Final demand by the government and for investment is modelled under the assumption that the relative quantities of each commodity demand by these two institutions is fixed—this treatment reflects the absence of a clear theory that defines an appropriate behavioural response by these agents to changes in relative prices. For the household there is a well developed behavioural theory; and the model contains the assumption that households are utility maximisers who respond to changes in relative prices and incomes. In this version of the model, the utility functions for private households are assumed to be Stone Geary functions; for the OECD countries they are parameterised as Cobb Douglas functions, i.e., there are no subsistence expenditures.

Macro Closure

All economy-wide models must incorporate the standard three macro balances: current account balance, savings-investment balance and the government deficit/surplus. How equilibrium is achieved across these macro balances depends on the choice of macro "closure" of the model. The scenarios report this exercise as "neutral" or "balanced" set of macro closure rules. This macro closure ensures the model is focused on the effects of changes in relative prices on the structure of production, employment and trade. Analysis of the impact of trade liberalisation on, for example, asset markets and macro flows is better studied using macro-econometric models which incorporate asset markets rather than using a CGE model which focuses on changes in equilibrium relative prices in factor and product markets. The strength of the multi-country CGE model is that it incorporates the features of neoclassical general equilibrium and real international trade models in an empirical framework, but also abstracts from macro impacts working through the operation of asset markets.

Current account balances are assumed to be fixed for each region (and must sum to zero for the world). Regional real exchange rates adjust to achieve equilibrium, as discussed earlier. The underlying assumption is that any changes in aggregate trade balances are determined by macroeconomic forces working mostly in asset markets, which are not included in the model, and these balances are treated as exogenous. This assumption ensures that there are no changes in future 'claims' on exports across the regions in the model, i.e., the net asset positions are fixed.

In the scenarios reported, changes in aggregate absorption (imports and domestic production used in household consumption, government and investment expenditure) are assumed to be shared equally (to maintain the shares evident in the base data) among private consumption, government and investment demands. The underlying assumption is that there is some mix of macro policies that ensures an equal sharing of the benefits of any increase in absorption or the burden of any decrease among the major macro "actors": households, government and investment, i.e. final demand allocations are distributionally neutral. To satisfy the savings-investment balance, the household savings rate adjusts to match changes in investment. Government savings are held constant; direct income tax rates on households adjust to ensure that government revenue equals government spending plus government savings. The tax replacement instrument e.g. when import tariffs are lowered, direct taxes on households, is likely to be less distorting than the trade taxes that it replaces but there are reasons to be sceptical about its appropriateness in the context of many least developed economies (see Greenaway and Milner, 1991). One potential consequence of this assumption is that the results for the least developed economies may be more positive than otherwise.

Factor Market Clearing

The implications of two alternative factor market clearing conditions were investigated. In the first, the assumption of full employment and full factor mobility in all factor markets can be viewed as an

archetypal free market model; but the presumption of full employment in all economies, used in the baseline scenario, is questionable. Hence a structuralist alternative is used in the comparative static scenarios where there are excess supplies of unskilled labour at a fixed baseline wage in developing regions (China, India, Other East Asia, Rest of South Asia, SACU, and Rest of sub-Saharan Africa). When there is unemployment, the real wage is held constant and the supply of unskilled labour adjusts following a policy shock. In the case of the current account balances, allowance was made for China to alter exogenously given current account surplus whilst maintaining a global current account balance. The reason for doing this and the way in which this was done is described below.

Exogenous Macro Policy Reform: Impact on Current Account and Real Exchange Rates

Economists agree that it is macro-economic preferences and policy, not trade policy that influences the pattern of global current account surpluses and deficits. The latter are determined by preferences for savings and investment over current spending, foreign capital flows and other macro policies.[4] Since any changes in aggregate trade balances are determined by macroeconomic forces working mostly in asset markets which are not included in the GLOBE model, the question arises as to how best to introduce exogenous changes in current account balances into the GLOBE model that proxy exogenous changes in macro economic policies so that their impacts on the endogenous variables of the GLOBE model such as real exchange rates and trade flows can be analysed, and how the changes in current account balances impact on trade policy reform.

One route developed by Liu, Robinson, Wang, and Noland (1998) used in an earlier version of the EU-China GLOBE modelling supposed China had an exogenous current account balance and an endogenous real exchange rate. On the other hand, China's trading partners were assumed to maintain exogenous real exchange rates vs. each other and endogenous current account balances. With this closure rule for the foreign exchange constraint, an exogenous lowering of China's current account surplus lead to an appreciation of China's real exchange rate against all of her trading partners. China's trading partners' endogenous current account balances adjusted mainly according to the size of their bilateral trade flows with China and the GLOBE model constraint that total current account changes sum to zero was maintained.

In the foreign exchange closure used here, the real exchange rates for all countries and regions were set endogenously, and the current account balances were set exogenously. For any exogenous change in China's current account balance, base year trade weights were used to estimate a vector of changes in current account balances of China's trading partners of equal to but of opposite sign to the change in China's current account balance thus maintaining the GLOBE model constraint that total current account changes sum to zero. The use of base year trade-weights to adjust current account balances in China's trading partners to exogenous changes in China's current account balances provides a simple but effective framework for the analysis of the impact of hypothesised macro economic reform in China on trade policy reform. Thus the strategy used in the GLOBE model to reflect the real world effect of China's policy of linking the RMB to an (unknown) bundle is to exogenously change China's current account balance. The size of this exogenous change is chosen so that the endogenous changes in China's real exchange rate in the GLOBE model mirror the size of changes in China's exchange rate observed in the real world over the medium run.

4 For a dynamic model with endogenous macro policies see **McKibbin, W. J. and P. J. Wilcoxen (1999)**. "The theoretical and empirical structure of the G-Cubed model." Economic Modelling **16**: 123-148.

Regions, sectors, factors and households in the GLOBE Model

For its base data the GLOBE model uses a global SAM derived from the GTAP 2001 dataset which contains 87 countries or regions, 57 sectors, five factors of production and one household. Each country or region is linked by bilateral trade flows. Regions and sectors can be aggregated in GLOBE as desired. For the EU-China Trade SIA GLOBE model there are 14 regions and 22 sectors, and a dummy regions globe that is the global supplier of trade and transport services for international trade.

The GLOBE CGE model is based on country and regional models connected by bilateral trade flows. It can model Shallow Integration on a global scale; that is the reduction of barriers to trade without institutional change. It can also model some structural change such as bringing unemployed unskilled labour into employment. Suitable datasets and econometric evidence to model, for example trade induced technical change, is not widely available.[5] GLOBE model however is not suited to modelling the effects of Deep Integration e.g. FDI induced productivity change, service regulation, SPS and TBT measures. The GLOBE model dataset is very large, and is re-estimated on a three year cycle. This tends to make GLOBE model applications inflexible.

Table 1: Sectors, Factors and Regions in the GLOBE model

Sectors		Regions
Crop agriculture	Electronic equipment	China
Animal agriculture	Machinery and equipment	European Union -27
Coal	Other manufacturing	NAFTA
Oil and gas	Utilities	Advanced East Asia
Other minerals	Construction	India
Meat products	Trade and transport	MERCOSUR
Other foods	Business services	X-Rest of the World
Textiles	Other services	(includes: Rest of the Americas,
Wearing apparel		Middle East and North Africa (MENA)
Wood and paper products	**Factors**	Southern Africa Customs Union (SACU)
Petroleum and coal products	Land	Rest of sub-Saharan Africa,
Chemical rubber and plastic products	Unskilled labour	Other Rest of the World)
Basic metal and mineral products	Skilled labour	
Motor vehicles and parts	Capital	
Other transport equipment	Natural resources	

Model dataset, based on GTAP v.7.

5 In the work reported in the Sussex report on regional integration the presence of suitable datasets and econometric evidence on trade induced technical change made it possible to incorporate trade induced technical change in a GLOBE model focussing on MENA countries. The presence of trade induced technical change in the GLOBE model based on econometric evidence greatly increased the quantitative estimates of the welfare effects of trade policy reform and added a new dimension to the policy environment within which the reforms took place. See Evans, H.D., Gasiorek, M., McDonald, S., Robinson, S. (2006) *"Trade Liberalisation with Trade Induced Technical Change in Morocco and Egypt,"* in Topics in Middle Eastern and North African Economies, Volume 8, September. www.sba.luc.edu/orgs/meea/volume8/

2.2 Structural Characteristics of China's Place in the Global Economy

Some aspects of China's place in the global economy and the importance of China's trade are shown in Table 2. below:

Table 2: Structure of Trade and GDP base year 2008

	Imports	Exports	GDPexp	Trade Dependence
chna	7.28	8.13	5.40	0.61
eu27	36.88	37.40	32.06	0.49
naft	19.44	15.00	29.72	0.25
easadv	11.66	13.39	14.72	0.36
ind	1.40	1.08	1.62	0.33
merc	1.52	1.97	2.21	0.34
xrow	21.82	23.03	14.26	0.67
Total	100	100	100	0.43

Trade dependence = (imports + exports)/GDPexp; Model dataset, based on GTAP v.7.

As can be seen from this table, China has one the highest trade dependence ratios. Although China's share of global GDP was over 5%, the fact that its GDP growth is so high (until recently, about 10% pa) combined with a high trade dependence ratio means that China's impact on the global economy is very large. Equally, China's high trade dependence ratio and rapid growth means that the trade also interacts strongly within the Chinese economy. This paper draws out some of the important aspects of this two-way interaction in the discussion of trade policy reform and the impact of lowering China's current account surplus.

The Globe model can be thought of as a multi sector multi commodity and multi region version of the standard Heckscher-Ohlin trade model. It is therefore important to see how well the GTAP dataset reflects the underlying factor endowments of the regional trading partners. In the GTAP dataset, factors are measured in constant US$ 2004 prices using the Atlas method so that factor shares across different countries and regions reflect the underlying measurement of factor endowments. As expected, China shows a higher share of unskilled labour compared with other Asian economies and NAFTA and the EU. Since the informal sector is not captured in the GTAP dataset, the shares of unskilled labour in China and India are lower than they would be if a more adequate measure of unskilled labour were available. More generally, the lack of differentiation of the countries/regions shown by factor endowments should be borne in mind when interpreting the reported results of experiments.

Table 3: Factor Shares in Selected World Regions

	chna	eu27	naft	easadv	ind	merc	xrow	world
Land	0.031	0.007	0.004	0.005	0.084	0.017	0.021	0.010
UnSkLab	0.406	0.295	0.390	0.346	0.369	0.337	0.293	0.343
SkLab	0.116	0.214	0.296	0.213	0.107	0.173	0.128	0.222
Capital	0.426	0.482	0.306	0.434	0.428	0.459	0.510	0.414
NatRes	0.022	0.003	0.005	0.003	0.012	0.014	0.047	0.011
Total	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Model dataset, based on GTAP v.7.

Table 4 and **Table 5** show the regional shares of total output for six world regions as defined in the GTAPv7 dataset; the remaining regions are aggregated into xrow for presentation purposes. China's high share of output and value-added is no surprise, but the high shares of output and value-added in traditional sectors such as textiles and apparel, and in heavy industry sectors such as basic metals and machinery, when combined with a low shares of services, reflects in part the heritage of state planning.

Table 4: Value-Added Shares by Sector for Selected World Regions

	chna	eu27	naft	easadv	ind	merc	xrow	world
acrop	9.10	1.71	1.16	1.53	18.75	6.03	6.74	3.01
aanim	4.51	0.91	0.44	0.51	3.23	2.14	2.46	1.17
Acoa	1.88	0.10	0.18	0.15	0.54	0.20	0.37	0.28
aolgas	1.41	0.34	0.92	0.14	1.73	2.49	11.88	2.20
aomn	1.39	0.22	0.18	0.34	0.85	1.32	0.93	0.42
amtprod	0.18	0.74	0.59	0.38	1.41	1.09	0.90	0.64
Aofd	2.20	2.12	1.59	1.88	5.92	2.54	2.63	2.06
Atext	2.09	0.44	0.47	0.37	2.15	0.46	1.05	0.64
awap	2.07	0.64	0.22	0.36	0.70	0.82	1.01	0.59
awpap	2.16	2.22	2.66	1.88	0.90	1.80	1.67	2.20
apetc	0.36	0.09	0.08	0.14	0.29	0.87	0.49	0.19
achem	3.81	2.84	2.65	2.62	2.22	2.77	2.26	2.70
absprd	4.55	1.65	1.27	2.14	1.78	2.11	2.32	1.86
aomanu	3.22	2.25	1.45	1.84	2.33	1.68	1.65	1.88
amvh	1.27	1.48	1.17	1.69	0.76	0.82	0.84	1.28
Aotn	0.58	0.39	0.76	0.40	0.70	0.68	0.36	0.53
Aele	3.21	0.93	0.86	3.20	0.35	0.59	1.62	1.48
amach	4.93	3.30	3.41	3.32	1.58	1.92	1.79	3.15
Autil	2.45	2.04	2.11	2.30	3.73	3.63	3.33	2.37
Acns	6.05	5.65	6.24	6.38	5.74	8.57	5.69	6.06
Atrdt	19.75	21.16	18.12	21.72	19.85	13.92	20.00	19.81
abserv	9.07	25.40	18.80	15.87	7.37	17.27	10.72	18.22
aoserv	13.78	23.42	34.65	30.84	17.13	26.31	19.30	27.25
Total	100	100	100	100	100	100	100	100

Model dataset, based on GTAP v.7.

Table 5: Output Shares by Sector for Selected World Regions

	chna	eu27	naft	easadv	ind	merc	xrow	world
acrop	4.33	1.17	0.91	0.99	11.65	4.85	4.61	1.98
aanim	3.02	0.74	0.60	0.60	2.76	1.83	2.38	1.11
Acoa	1.03	0.06	0.18	0.09	0.39	0.13	0.30	0.21
aolgas	0.78	0.18	0.79	0.09	1.00	2.12	7.49	1.37
aomn	1.26	0.28	0.19	0.32	0.61	1.49	0.89	0.44
amtprod	0.43	1.36	1.24	0.71	1.37	2.57	1.90	1.25
Aofd	3.39	4.18	2.32	3.14	6.55	5.66	4.91	3.56
Atext	3.40	0.94	0.64	0.63	3.86	1.01	1.82	1.14
awap	2.90	1.45	0.50	0.57	1.13	1.24	1.75	1.16
awpap	2.82	3.23	3.16	2.34	1.37	2.81	2.25	2.88
apetc	2.52	1.22	1.51	1.63	3.92	3.42	3.68	1.87
achem	6.23	5.60	3.76	4.83	5.66	4.73	4.29	4.79
absprd	7.04	3.03	2.01	3.90	4.37	4.48	4.15	3.35
aomanu	3.74	3.40	1.88	2.39	4.27	2.44	2.36	2.67
amvh	2.19	3.95	2.73	3.86	1.34	1.80	1.48	3.04
Aotn	0.86	0.84	1.04	0.62	1.04	1.20	0.64	0.85
Aele	5.88	2.16	2.35	5.70	0.78	0.91	2.52	3.04
amach	7.27	5.27	4.07	4.82	3.38	2.45	2.79	4.57
Autil	2.43	1.71	2.36	2.06	4.60	3.05	3.85	2.36
Acns	8.66	5.42	6.47	7.07	7.17	7.28	6.35	6.42
Atrdt	16.17	18.48	17.06	19.01	17.47	14.03	17.33	17.71
abserv	5.49	19.27	16.06	14.15	5.12	13.53	8.79	14.80
aoserv	8.16	16.06	28.16	20.46	10.20	16.97	13.47	19.41
Total	100	100	100	100	100	100	100	100

Model dataset, based on GTAP v7.

China's accession to the WTO has meant that trade policy has been a major area of economic policy reform. This can be seen in **Table 6** for China.

Table 6: China Tariffs and Non-Tariff Barriers by Sector

	GTAPv.6 2001 Tariffs	GTAPv.7 2004 Tariffs	Non-tariff Barriers
Crop agriculture	43.50%	2.40%	14.20%
Animal agriculture	4.10%	10.10%	15.00%
Coal	0.90%	2.50%	83.70%
Oil and gas	0.00%	0.10%	0.00%
Other minerals	0.60%	0.60%	20.30%
Meat products	8.50%	5.80%	0.10%
Other foods	10.50%	5.80%	16.40%
Textiles	15.00%	9.40%	14.80%
Wearing apparel	3.90%	10.10%	0.50%

Wood and paper products	6.90%	3.60%	17.50%
Petroleum and coal products	6.20%	5.40%	8.80%
Chemicals, rubber and plastics	11.00%	8.80%	6.80%
Basic metal and mineral products	6.30%	4.50%	26.80%
Motor vehicles and parts	11.00%	6.40%	4.30%
Other transport equipment	30.20%	20.10%	0.30%
Electronic equipment	4.70%	2.90%	3.30%
Machinery and equipment	7.30%	1.70%	3.80%
Other manufacturing	8.70%	6.40%	1.00%
Total excluding services	**8.90%**	**4.70%**	**8.16%**

Model dataset, GTAP v6 and v7

Overall levels of China's import-weighted tariffs have fallen by nearly half over a three year period. The remaining sectors with modestly high tariffs are in agriculture, food products and motor vehicles. The frequent observation that **NTBs remain high** is also borne out for China. Here, the ad valorem equivalents measured by Kee et al 2004 at the World Bank at the HS 6 digit level centred around 2002 were aggregated to the GLOBE sectors using 2004 trade weights. The average height of the NTBs at 7.8% for agriculture and industry is similar to the average height of the tariffs in 2001. Interestingly, the peaks of the NTBs do not generally coincide with the tariff peaks in 2006.

Table 7: EU-25 Tariffs GTAP 2001 and Non-Tariff Barriers by Sector

	2001 GTAP Tariffs	2004 GTAP Tariffs	Non-tariff Barriers
Crop agriculture	21.70%	5.20%	28.60%
Animal agriculture	3.00%	1.10%	25.30%
Coal	0.00%		1.20%
Oil and gas	0.10%		0.90%
Other minerals	54.10%	0.01%	0.00%
Meat products	22.20%	5.40%	44.10%
Other foods	8.90%	4.20%	40.10%
Textiles	9.80%	1.90%	21.50%
Wearing apparel	0.50%	3.20%	9.70%
Wood and paper products	0.20%	0.08%	0.10%
Petroleum and coal products	1.80%	0.60%	0.10%
Chemicals, rubber and plastics	4.60%	0.40%	0.50%
Basic metal and mineral products	0.90%	0.30%	0.10%
Motor vehicles and parts	0.50%	0.60%	0.70%
Other transport equipment	1.30%	0.90%	0.90%
Electronic equipment	0.80%	0.60%	0.00%
Machinery and equipment	3.70%	0.70%	0.20%
Other manufacturing	21.70%	0.40%	0.20%
Total excluding services	**9.80%**	**1.00%**	**8.16%**

Model dataset, GTAP v6 and v.7.

In **Table 7** above the 2001and 2004 GTAPv7 tariffs on EU imports from China used in the present scenarios are shown. The associated estimates of the EU NTBs against imports from China are also shown. These comparisons have not previously been presented.

It is well known that using ad valorem equivalents of NTBs is not independent of the structure of output and trade at the time of estimation. In the case of China, it was found that some of the World Bank NTB estimates were at variance with observations of sector experts. The use of the ad valorem equivalents of the NTBs in this study is not meant to be definitive, but providing a useful first estimate of the height of NTBs. For this reason, the application of the estimates of the NTBs are only suggestive and scenarios in which they are involved should be interpreted with caution.

Note that the Globe model uses trade-weighted average tariffs whereas wheras other international bodies such ast the WTO use simple average tariffs. For example, the Table on **Structure of MFN tariff in China, 2001-05** of the TPR uses a simple average of the tariffs, which is roughly double the all-China trade-weighted tariff reported in this paper. There is a powerful accounting reason why the weighted average applied tariffs are used by modellers: it is the applied weighted average tariff that generates customs revenue, and the accounting relationships in CGE models requires the weighted average of applied tariffs generating observed customs revenue. The same rule also applies to the PE models, but the data base and accounting relationships are not quite so strictly applied in these models because they are sector rather than economy wide models. Since trade-weighted applied tariffs are much lower than the simple average tariffs, modellers tend to use lower Armington elasticities in their models as a counter-balance. There are very few examples in the literature where marginal tariff rates have been used that are different from the average rates. The rule is that modellers use the weighted average tariffs which, in the case of China, are about half of the rate of tariffs measured by simple averages.

Measuring NTBs and distinguishing them from indicators of Deep Integration

The World Bank methodology used in constructing the ad valorem equivalents of NTBs is based on a trade restrictiveness index constructed from TRAINS which includes the presence of price and quantity control measures, technical regulations, as well as monopolistic measures, such as a single channel for imports. The trade restrictiveness index is then used in a comparative advantage regression equation to estimate trade flows and the elasticity of demand for imports. The predicted trade flows are then compared with actual trade flows, and the difference attributed to NTBs. The ad valorem equivalent estimated from such residuals using the estimated price elasticity of demand for imports. The NTB estimates based on the World Bank study are only used as a first indicator of the presence of NTBs. As far as possible the sector specialists were asked to verify the size of these indicative measures.

A standard objection to the use of the World Bank indicators of NTBs is that they are dependent on the particular equilibrium prices and outputs observed at the time of estimation. More generally the components of the TRAINS indicator of the presence or absence of NTBs cannot be easily distinguished from indicators of deep integration discussed in the sub-section on the domain of applicability of the models.

2.3 The Baseline Scenario

The baseline scenario is designed to update the model base year from 2004 to 2008. This was done by first projecting GDP and factor growth over this period and estimating Total Factor Productivity (TFP) growth as the difference between GDP growth and factor growth. The second step entailed

combining the TFP and factor growth projections with an estimate of tariffs on traded goods in 2008 and running the model with the Baseline Scenario for the year 2008. The model solution for 2008 was then used as a new base for the subsequent scenarios. Total factor productivity or TFP is estimated for each region by first estimating a weighted average of the annual factor growth and subtracting this from the estimated average growth rate of GDP over the period 2001-6. The annual average estimates of factor growth and TFP are then used to update the 2004 base factor supply and TFP to 2008, the new base year for the GLOBE model. The final step in the baseline scenario is to apply the tariffs for from the GTAPv7 dataset for 2004 to the new base year 2008. The methodology behind the baseline scenario extends the analysis of growth differences between rapidly growing South and East Asian countries and their trading partners in the global economy used by McDonald *et al.* 2007. The results of GDP, factor and TFP estimates used in the baseline scenario 2001-2008 are shown in **Table 8** below.

Table 8: Baseline Projections GDP, Factors and TFP 2001-8

	Average Growth GDP % pa	Average Growth Factor Supply % pa	Average Growth Total Factor Productivity % pa
China	8.89	4.38	4.51
Adv East Asia	2.38	1.57	0.81
Middle East Asia	4.83	3.64	1.19
Other East Asia	5.08	3.63	1.45
India	6.70	4.06	2.65
Rest of S Asia	5.04	3.33	1.70
NAFTA	2.25	1.83	0.42
MERCOSUR	3.44	2.53	0.90
Rest of the Americas	4.10	3.13	0.98
EU	1.90	1.39	0.51
MENA	4.71	3.73	0.98
SACU	3.78	5.05	-1.27
Rest of SSA	4.71	3.60	1.11
RoW	5.97	2.51	3.46

The baseline growth projections used are the average growth for the period 2002-2006 from the IMF World Economic Outlook, where the country estimates of GDP growth in current $US PPP are deflated using a $US GDP deflator. The advantage of using the $USPPP data is that aggregation into regional groups is much easier. A slight inconsistency is involved in the $US GDP deflator used for constant price estimates is based on the Atlas method. Also, the PPP estimates have a higher weight for non-traded goods, but these should not matter significantly over a four-year time period. In all, the disadvantages of using the PPP data were judged to be of lesser importance than the accessibility of the PPP data. Ordinary tariffs can be readily modelled in the baseline because they are recorded in the national accounts that form the basis of the measurement of the difference between domestic and world prices. **Table 6** shows the measure of the rate of the NTBs for China and the European Union but there is no corresponding accounting entry of the rents generated so the NTBs are not included in the baseline scenario. Rather, in the trade policy scenarios described below, lowering of NTBs are modelled directly as a lowering of rents that are hidden from the accounting data on which the model is based. The details of the model closures used in the baseline scenario are set out in **Table 9** below.

Table 9: GLOBE Baseline Scenarios

Exogenous Variables and Policy Variables	**Baseline 2008 Scenario**	**Baseline Sensitivity Tests**
Model Specification	*Update in long-run mode 2001-2008*	*Possible sensitivity tests of experiments based on 2008 to:*
Model Closure		
Factor Markets	Update in long-run mode 2001-2008	size of non-tariff relative to tariff barriers
	all factors supply fixed returns endogenous, mobile between sectors	elasticities of substitution used in GLOBE model
		estimates of aggregate factor growth and GDP projections
Macro closure		
-private consumption	balanced and investment led closure for China, other countries/regions balanced closure	balanced and investment led closure for China, other countries/regions balanced closure
-govt consumption	balanced and investment led closure for China, other countries/regions balanced closure	balanced and investment led closure for China, other countries/regions balanced closure
- investment	balanced and investment led closure for China, rest balanced closure	balanced and investment led closure for China, rest balanced closure
Foreign exchange		
- current account	current account exogenous	current account exogenous
- real exchange rate	real exchange rate endogenous	real exchange rate endogenous
Tariffs		
Effective Tariffs on Trade (overall)	TRAINS effectively applied tariffs 2006 applied to 2008	
Non tariff barriers	Included in baseline scenario from World Bank estimates at HS6 level centred on 2002 and applied to baseline 2008	
Technical change assumptions	GDP projected for all regions for 2001 to 2008 together with total factor supply. TFP estimated as a residual from GDP growth less factor supply growth	GDP projections simulated as neutral technical change with no factor change. Factor growth estimated and residual neutral TFP estimated.

3 Scenario Analyses

Three sets of scenarios were run, starting from the baseline scenario which was used to update the base year of the model from 2004 to 2008. On this new base year, the three sets of scenarios are covering respectively trade policy issues, global current account adjustments and global crisis scenarios run. These sets of scenarios are described in the the following sections.

3.1 Trade Liberalisation Scenarios

Within this trade sustainability impact assessment a number of scenarios have been formulated and analysed to simulate probable scenarios of trade liberalisation under the potential PCA. Within the

global analysis, using GLOBE, 9 scenarios of liberalisation have been provided, simulating the successful completion of varying configurations of tariff cuts or tariff cuts equivalent through the reduction of non-tariff barriers (as within a PCA), as well as the effects of multilateral tariff cuts as had been offered within the scope of the July 2008 package of the Doha Development Agenda (DDA), although these are unlikely to be realised in the near future given the impasse at the 2008 Geneva WTO Ministerial meeting. Additional scenarios have been also formed which include significant reductions of China's current account surplus which has increasingly been noted as unsustainable. Finally, a set of trade policy scenarios designed to simulate the impacts of trade policy liberalisation between the EU and China suggested under the PCA were carried out.

The medium run context for trade policy reform was modelled by making capital sector specific and immobile, and in the long run fully capital mobility was assumed. As with the currency scenarios, the unskilled wage was fixed and the employment of unskilled labour was endogenous in the developing countries including China. Alternative tariff cuts of a "modest" 25% and "ambitious" 75% in China were considered. The same was done for experiments with cuts to China's NTBs. An experiment where China's current account surplus is reduced is carried out with no trade policy changes, and in conjunction with trade policy changes. The final experiment combines elements of a global DDA tariff cut of 25% with a PCA inspired 50% tariff cut on bilateral trade between China and the EU, that is, a total of 75% tariff cut over baseline 2008 for bilateral trade between China and the EU.

3.2 Current Account Reform and Trade Liberalisation Scenarios

In CGE models, it is normal for trade policy analysis is carried out with a fixed current account balance. Capturing the effects of changes in China's current account surplus incorporates an exogenous macro economic shock into the real economy structural analysis captured by the globe model. Historically, China's trading partners have complained that China has deliberately undervalued her currency and in the process accumulated foreign exchange reserves. Some of the scenarios where the current account surplus is exogenously lowered lead to an appreciating RMB, coupled with rising imports in a large number of commodity goods sectors, is expected to benefit both European exporters as well as European terms of trade. Notably, service sectors in China are shown to be highly sensitive to exchange rate appreciation. Modelling scenarios using a China current account surplus reduction reflect growth in service imports into China. Across all sectors besides agriculture, multilateral liberalisation results in the strongest export growth for Europe as well as the sharpest balancing of China's current account surplus. These scenarios powerfully illustrate the point that exogenous changes in the current account surplus or deficit can only be achieved by the exogenous shift in macro policy, creating a trade adjustment problem. Addressing a perceived bilateral surplus of deficit policy problem cannot be achieved through trade policy reform, unilateral, multilateral or preferential.

3.3 Current Crisis Scenarios

The global financial crisis as well as the stimulus response packages provide the motivation for the third cluster of scenarios. A demand implosion is modelled through an unanticipated reduction of factor supply by 5 per cent, across the board (labour, capital, natural resources, etc.). The impact of this exogenous shock is followed in its global macro-economic impact on growth and trade across the regions **(scenario 13).**

A further scenario depicts the Chinese stimulus package response policy through an asymmetric positive shock in factor supplies with plus 5 per cent **(scenario 14).** The impact of stimulus measures in the EU, NAFTA and Advanced East Asia (Japan and Korea) is analysed by assuming the unanticipated shock is halved to -2.5 per cent **(scenario 15).**

Scenarios 16 and 17 depict some possible global trade adjustments in the context of the crisis. Scenario 16 imposes a reduction of the Chinese current account with 50 per cent, while scenario 17 imposes an increase of the Chinese current account with 50 per cent. The results are contrasted with the impact of current account reform without a context of crisis.

3.4 The Scenarios Summarised

In all, 17 trade policy, current account and crisis scenarios were run. The closure rules follow those set out in Table 9 for the baseline scenario except that the unskilled wage was fixed for developing countries and for one of the unilateral trade policy reforms for China, capital was immobile between sectors. The scenarios are set out in Table 10 below.

Table 10: GLOBE Scenarios Summarized

Scenario	SCENARIO DESCRIPTIONS	model sim
	I Tariff and Non-tariff Barrier Scenarios with % change on baseline.	
1	- Modest Trade Liberalisation Scenario: China tariffs reduced 25% capital immobile but other factors mobile.	sim01
2	- Modest Trade Liberalisation Scenario: China tariffs reduced 25%.	sim02
3	- Modest Trade Liberalisation Scenario: China tariffs and non-tariff barriers are reduced 25%.	sim03
4	- Ambitious Trade Liberalisation Scenario: China tariffs reduced 75%.	sim04
5	- Ambitious Trade Liberalisation Scenario : China tariffs and non-tariff barriers reduced 75%.	sim05
6	- Modest Trade Liberalisation Scenario: Global tariffs reduced 25%.	sim06
7	- Ambitious Trade Liberalisation Scenario: Global tariffs reduced 75%	sim07
8	- Ambitious EU-China trade liberalisation 75% tariffs only	sim08
9	- Ambitious EU-China trade liberalisation 75% tariffs and non-tariff barriers	sim09
	II Current Account Reform and Interaction with Trade Policy Scenarios % change on baseline.	
10	- Current account surplus China reduced $60B. Trading partners adjust current account in proportion to bilateral trade flows in opposite direction.	sim10A
11	- Scenarios 7 and 10 combined: Global tariffs reduced 75% and Current Account surplus cut 50%.	sim10B
12	- Scenarios 9 and 10 combined: EU-China trade liberalisation 75% and Current Account surplus cut 50%.	sim10C
	III Financial Crisis Scenarios and Current Account Reform % change on baseline.	
13	- Financial Crisis: Factor Supply Advanced East Asia, NAFTA, European Union cut 5%.	sim11A
14	- Financial Crisis: Factor Supply Advanced East Asia, NAFTA, European Union cut 5%, China +5%.	sim11B
15	- Financial Crisis: Factor Supply Advanced East Asia, NAFTA, European Union cut 2.5%, China +5%.	sim11C
16	- Financial Crisis: Factor Supply Advanced East Asia, NAFTA, European Union cut 2.5%, China +5%, China Current Account surplus cut 50 per cent.	sim11D
17	- Financial Crisis: Factor Supply Advanced East Asia, NAFTA, European Union cut 2.5%, China +5%, China's Current Account surplus increases 50 %	sim 11E

4. Empirical Results

4.1. Tariff and non-Tariff Barrier Reductions - Scenarios 1-9

Scenarios 1- 5 are for unilateral trade policy reform in China with and without immobile capital, for 25% and 75% cuts, and for tariff and NTB cuts of 25% and 75%. Scenarios 6 and 7 are for multilateral DOHA cuts of 25% and 75%, whilst scenarios 8 and 9 are for bilateral trade policy reform between the EU and China of 75% for tariffs only and with NTBs included. The full set of macro results for the scenarios 1-9 are shown in Tables 11- 18 below, including the changes of factor prices WF. Related disaggregated changes in imports and exports are shown in Annex I.

Table 11: GLOBE Macro Results for China

% change wrt Baseline2008 – Scenarios 1-9

		China Unilateral Trade Lib.					DDA Multilateral Trade Lib.		EU-China Bilateral Trade Lib	
Scenario	**base**	**sim01**	**sim02**	**Sim03**	**sim04**	**sim05**	**sim06**	**sim07**	**sim08**	**sim09**
Absorption	2952	0.121	0.081	0.174	0.230	0.347	0.481	1.500	0.108	0.761
Imports	881	0.861	0.611	1.567	1.888	5.106	1.259	3.961	0.264	1.762
Exports	952	1.341	1.048	2.760	3.276	9.442	1.165	3.650	0.212	1.377
Consumption	951	-0.157	-0.157	-0.447	-0.510	-1.747	0.134	0.406	0.029	0.311
Government	249	-0.285	-0.281	-0.778	-0.892	-2.816	-0.093	-0.304	-0.008	0.000
Investment	870	-0.207	-0.093	-0.287	-0.321	-1.279	0.238	0.719	0.069	0.457
GDPexp	3023	0.290	0.231	0.582	0.706	1.825	0.470	1.459	0.095	0.663
Real_ER	1.025	0.807	0.640	1.604	1.994	5.450	-0.095	-0.340	-0.067	-0.506
WF_Land	1.235	-0.119	0.079	-0.150	0.217	-0.697	1.040	3.408	0.241	2.967
WF_UnSkLab										
WF_SkLab	1.208	0.300	0.250	0.604	0.760	1.849	0.538	1.664	0.088	0.685
WF_Capital	1.242	-19.493	0.459	1.163	1.423	3.885	0.679	2.114	0.115	0.837
WF_NatRes	1.256	-0.872	0.435	0.149	1.349	-0.258	0.499	1.566	0.071	0.508
Terms_of_Trade	1.000	-0.620	-0.565	-1.441	-1.728	-4.596	-0.193	-0.585	-0.014	-0.057

Table 12: GLOBE Macro Results for European Union

% change wrt Baseline2008 – Scenarios 1-9

		China Unilateral Trade Lib					DDA Multilateral Trade Lib		EU-China Bilateral Trade Lib	
Scenario	**base**	**sim01**	**sim02**	**sim03**	**sim04**	**sim05**	**sim06**	**sim07**	**Sim08**	**sim09**
Absorption	18014	0.104	0.014	0.030	0.044	0.099	0.094	0.290	0.013	0.075
Imports	4464	0.176	0.031	0.065	0.096	0.214	0.266	0.843	0.042	0.279
Exports	4380	0.031	0.006	0.009	0.020	0.029	0.182	0.601	0.039	0.300
Consumption	8035	0.148	0.008	0.018	0.026	0.058	0.062	0.189	0.005	0.027
Government	2840	-0.034	0.002	0.006	0.007	0.020	-0.032	-0.112	-0.008	-0.066
Investment	2675	-0.005	0.015	0.035	0.046	0.114	0.037	0.097	0.009	0.026
GDPexp	17930	0.068	0.008	0.016	0.025	0.053	0.072	0.228	0.012	0.079
Real_ER	1.001	0.096	0.020	0.048	0.062	0.157	0.054	0.182	-0.005	-0.008
WF_Land	1.043	0.210	0.012	0.065	0.036	0.226	-0.586	-1.845	-0.047	-0.496
WF_UnSkLab	1.054	0.248	0.008	0.014	0.025	0.045	0.118	0.378	0.018	0.127
WF_SkLab	1.033	0.265	0.010	0.018	0.030	0.059	0.122	0.387	0.017	0.119

WF_Capital	1.060	-5.703	0.009	0.019	0.027	0.064	0.144	0.462	0.018	0.139
WF_NatRes	1.013	1.023	0.027	0.114	0.084	0.358	0.062	0.271	0.007	0.248
Terms_of_Trade	1.000	0.142	0.022	0.051	0.069	0.163	0.058	0.177	0.001	0.004

Table 13: GLOBE Macro Results for NAFTA

% change wrt Baseline2008 – Scenarios 1-9

		China Unilateral Trade Lib.					DDA Multilateral Trade Lib.		EU-China Bilateral Trade Lib	
Scenario	base	sim01	sim02	sim03	sim04	sim05	sim06	sim07	sim08	sim09
Absorption	17219	0.067	0.018	0.045	0.056	0.152	0.062	0.194	0.000	-0.003
Imports	2354	0.196	0.066	0.171	0.206	0.571	0.370	1.168	-0.001	-0.013
Exports	1757	-0.080	0.005	0.018	0.017	0.061	0.389	1.221	-0.003	-0.010
Consumption	9909	0.070	0.010	0.024	0.031	0.081	0.023	0.073	0.000	0.001
Government	2234	0.053	0.003	0.008	0.010	0.027	-0.039	-0.124	0.000	-0.001
Investment	2723	-0.049	0.017	0.045	0.053	0.151	0.020	0.056	-0.001	-0.010
GDPexp	16623	0.033	0.010	0.025	0.030	0.083	0.053	0.165	0.000	-0.002
Real_ER	1.013	0.137	0.026	0.044	0.081	0.147	0.109	0.284	0.001	-0.012
WF_Land	1.083	-0.004	0.014	0.235	0.039	0.752	1.064	3.623	0.006	0.029
WF_UnSkLab	1.051	0.094	0.008	0.021	0.026	0.069	0.084	0.265	0.000	0.001
WF_SkLab	1.046	0.135	0.012	0.026	0.037	0.085	0.081	0.247	0.000	0.004
WF_Capital	1.086	-7.936	0.009	0.023	0.028	0.076	0.089	0.281	0.000	0.002
WF_NatRes	1.071	-1.497	0.031	0.141	0.095	0.554	0.108	0.386	0.006	0.007
Terms_of_Trade	1.000	0.235	0.055	0.143	0.168	0.461	0.073	0.235	0.000	-0.004

Table 14: GLOBE Macro Results for Advanced East Asia

% change wrt Baseline2008 – Scenarios 1-9

		China Unilateral Trade Lib.					DDA Multilateral Trade Lib.		EU-China Bilateral Trade Lib	
Scenario	base	sim01	sim02	sim03	sim04	sim05	sim06	sim07	sim08	sim09
Absorption	8076	0.176	0.058	0.135	0.180	0.449	0.255	0.789	-0.002	-0.009
Imports	1411	0.465	0.177	0.410	0.552	1.362	1.099	3.486	-0.008	-0.040
Exports	1568	0.019	0.029	0.060	0.092	0.189	0.716	2.311	-0.004	-0.026
Consumption	3860	0.163	0.033	0.075	0.102	0.245	0.119	0.360	0.000	0.005
Government	1155	-0.123	0.012	0.029	0.038	0.099	-0.087	-0.295	0.000	-0.001
Investment	1651	0.167	0.047	0.117	0.144	0.389	0.090	0.242	-0.003	-0.022
GDPexp	8234	0.096	0.032	0.074	0.100	0.243	0.198	0.616	-0.002	-0.007
Real_ER	0.984	-0.424	-0.086	-0.183	-0.266	-0.607	-0.274	-0.830	0.012	0.037
WF_Land	1.042	0.106	0.014	0.065	0.054	0.224	-1.382	-4.350	0.014	0.050
WF_UnSkLab	1.053	0.207	0.031	0.062	0.097	0.192	0.273	0.857	-0.001	0.001
WF_SkLab	1.034	0.216	0.033	0.066	0.102	0.204	0.301	0.940	0.000	0.007
WF_Capital	1.067	-6.239	0.029	0.073	0.091	0.241	0.266	0.835	0.000	0.006
WF_NatRes	1.005	0.638	-0.055	0.421	-0.155	3.069	-0.135	-0.228	0.033	0.119
Terms_of_Trade	1.000	0.425	0.128	0.302	0.392	0.961	0.124	0.356	-0.003	-0.012

Table 15: GLOBE Macro Results for India

% change wrt Baseline2008 – Scenarios 1-9

Scenario	base	sim01	sim02	sim03	sim04	sim05	sim06	sim07	sim08	sim09
Absorption	952	0.18	0.00	0.03	0.00	0.10	0.37	1.16	0.00	-0.04
Imports	170	0.29	0.00	0.10	0.00	0.33	1.76	5.86	-0.01	-0.11
Exports	126	-0.21	-0.01	0.01	-0.04	0.05	2.77	9.32	-0.01	-0.09
Consumption	511	0.27	0.00	0.00	0.00	0.01	0.04	0.07	0.00	-0.02
Government	87	0.34	0.00	0.01	0.00	0.04	-0.21	-0.79	0.00	-0.01
Investment	184	-0.24	0.00	0.05	0.01	0.17	0.29	0.74	0.00	-0.03
GDPexp	908	0.11	0.00	0.01	-0.01	0.05	0.45	1.41	0.00	-0.03
Real_ER	1.042	1.07	0.05	-0.03	0.16	-0.09	1.24	4.17	0.01	0.11
WF_Land	1.204	0.59	0.00	-0.03	-0.01	-0.09	0.32	0.88	-0.01	-0.09
WF_UnSkLab	1.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WF_SkLab	1.175	0.47	0.00	-0.02	-0.01	-0.06	0.63	1.95	0.00	-0.04
WF_Capital	1.226	-18.46	0.00	0.01	-0.01	0.03	0.80	2.62	0.00	-0.02
WF_NatRes	1.266	-1.73	0.01	0.36	0.04	1.13	-0.47	-1.15	0.02	0.06
Terms_of_Trade	1.000	0.45	0.01	0.09	0.02	0.28	-0.84	-2.70	0.00	-0.05

Table 16: GLOBE Macro Results for Mercosur

% change wrt Baseline 2008 – Scenarios 1-9

Scenario	base	sim01	sim02	sim03	sim04	sim05	sim06	sim07	sim08	sim09
Absorption	1186	0.006	0.004	0.050	0.012	0.168	0.230	0.776	-0.001	-0.014
Imports	184	0.143	0.018	0.178	0.055	0.597	1.198	3.958	-0.003	-0.049
Exports	231	0.290	0.008	0.029	0.024	0.095	0.756	2.293	-0.002	-0.013
Consumption	612	0.092	0.002	0.024	0.006	0.082	0.071	0.264	0.000	-0.007
Government	181	-0.280	-0.001	0.011	-0.004	0.037	-0.129	-0.387	0.000	-0.003
Investment	210	-0.117	0.002	0.046	0.007	0.157	0.152	0.481	0.000	-0.010
GDPexp	1233	0.039	0.003	0.027	0.008	0.090	0.184	0.585	-0.001	-0.008
Real_ER	0.999	0.055	0.042	-0.093	0.132	-0.309	0.008	-0.252	0.001	0.037
WF_Land	1.092	0.189	0.028	0.117	0.083	0.344	2.683	9.465	-0.002	-0.020
WF_UnSkLab	1.066	0.150	0.002	0.009	0.007	0.031	0.294	0.958	-0.001	-0.008
WF_SkLab	1.082	0.102	0.004	0.018	0.012	0.064	0.112	0.338	0.000	0.000
WF_Capital	1.111	-9.989	0.005	0.024	0.016	0.083	0.336	1.098	-0.001	-0.007
WF_NatRes	1.083	-1.097	0.019	0.077	0.061	0.242	0.230	0.470	0.011	0.066
Terms_of_Trade	1.000	-0.120	0.017	0.104	0.052	0.333	-0.021	-0.005	-0.001	-0.022

Table 17: GLOBE Macro Results for Rest of World

% change wrt Baseline 2008 – Scenarios 1-9

Scenario	base	sim01	sim02	sim03	sim04	sim05	sim06	sim07	sim08	sim09
Absorption	7920	-0.197	0.031	0.095	0.098	0.335	0.358	1.123	0.000	0.001
Imports	2641	-0.067	0.059	0.175	0.184	0.611	1.025	3.268	0.001	0.010
Exports	2697	0.416	0.027	0.073	0.085	0.231	1.056	3.361	0.001	0.010
Consumption	3264	-0.237	0.018	0.054	0.057	0.191	0.064	0.189	0.000	-0.003
Government	852	-0.333	0.008	0.029	0.025	0.107	-0.286	-0.922	0.001	0.004
Investment	1162	-0.278	0.022	0.077	0.069	0.281	0.138	0.375	0.000	-0.009
GDPexp	7976	-0.032	0.021	0.061	0.065	0.209	0.373	1.170	0.000	0.001
Real_ER	1.010	0.387	0.012	-0.009	0.036	-0.074	0.499	1.551	0.003	0.027
WF_Land	1.162	-0.318	0.046	0.176	0.144	0.483	1.117	3.951	-0.004	-0.067
WF_UnSkLab	1.073	-0.063	0.006	0.018	0.019	0.056	0.350	1.118	-0.003	-0.023

WF_SkLab	1.117	-0.183	0.019	0.044	0.061	0.139	0.391	1.206	0.000	0.005
WF_Capital	1.132	-11.672	0.018	0.050	0.057	0.170	0.760	2.409	0.000	0.001
WF_NatRes	1.094	-0.586	0.041	0.164	0.128	0.851	1.229	3.903	0.018	0.142
Terms_of_Trade	1.000	-0.445	0.029	0.089	0.088	0.305	-0.186	-0.564	0.001	-0.001

Tariff reductions and equivalent non-tariff barrier reductions in China are shown in scenarios 1-5. Taking the long-run results in experiments 2-5 for tariff or NTB cuts of 75%, it is striking that the impact on absorption in China is at most around 0.35%. This makes the point, that by 2008, the average rate of China's tariffs were a little less than 5% and estimated NTBs was a little less than 8% and the overall impact on the economy of further trade policy reduction is minimal, even for 75% tariff reductions. Where there are substantial effects on GDP as in scenario 5 when NTB reductions of 75% are included, these benefits are lost in welfare terms by the adverse terms of trade response of over nearly 5% from the expansion of exports and imports. The strong adverse terms of trade effects in scenario 5 are a reminder that China is big enough to affect its own terms of trade and therefore limit the benefits of Chinese trade policy reform.

The results of experiment 1 aimed to capture short to medium run impacts of trade policy reform where Chinese tariffs are cut by 25% but capital is fixed in each sector. In this case, the impact on absorption is nearly 50% higher than in the long run experiment 2. The reason for this apparent paradox is that the lack of capital mobility is highly constraining when tariffs are cut. But the tariff cut induces an increase in imports that has to be financed by export expansion requiring much larger real exchange rate depreciation than in the long run cases and a strong increase in the employment of unskilled labour (result on increased unskilled labour employment not reported but can be obtained from the authors on request).

The importance of multilateral vs. unilateral tariff reduction for China is illustrated in scenarios 4 and 6. When China joins the multilateral trade round, here a "super" Doha Round or DDA round with global tariff cuts of 25% and 75% respectively, the welfare response in China is strong because of improved market access for Chinese exports into partner markets. There are no adverse terms of trade effects and a real exchange rate appreciation. Multilateral trade policy reform is good for China. For the EU, the overall effects on absorption of the multilateral trade policy reforms in scenarios 7 and 8 are very low.

Experience in many developing countries with bilateral trade policy liberalisation, for example under EU Economic Partnership Agreements (EPAs), is that the gains to the EU are often very small and the developing country partners have small or even negative welfare benefits as in the case of EU-Egypt. This arises because the adjustment costs are usually on the import side for the developing country, and there may be considerable trade diversion at least initially (see for example Evans et al 2006 for EU-Egypt and EU-Morocco trade policy liberalisation).

Scenarios 8 and 9 reported for China and the EU are shown in Tables 12 and 13 above, describing a 75% cut in EU-China tariffs **(scenario 8**) and a cut of 75% in EU-China tariffs and estimated non tariff barriers (**scenario 9)**. It can be seen that the welfare effects (changes in absorption) for lowering EU-China tariffs by 75% lead to an estimated welfare gain for China of about .1% and close to 0% for the EU. When EU-China NTBs are also cut by 75%, China's welfare gains increase to .over .75% in scenario 9, but for the EU estimated welfare change is still very small.

In comparison, the results for a Doha-type multilateral round of trade liberalisation estimated in scenario 7 and 8 in Tables 11 and 12 for tariffs only, China's estimated welfare gain is 1.5% and for the EU .29%.

The reason why the multilateral trade policy reform has higher welfare benefits for both China and the EU (scenario 7 compared with scenario 8) is that under scenario 8, there is trade diversion. Whereas overall imports into China increase by nearly 4% under the multilateral trade policy scenario 7, they only increase by .25% for China under scenario 8. Similarly for the EU, multilateral trade policy reform leads to a .84% increase in imports but only .04 under scenario 8. The same point can be made with reference to the bilateral trade flows (not reported). Thus, a classic case of trade diversion results in a much lower welfare gains from the EU-China trade policy liberalisation under the PCA compared with a multilateral Doha-type liberalisation.

Key Findings from the Trade Liberalization Scenarios above

- Ordinary tariffs in China have fallen by over 50% from 2001 to 2008.
- The average rate of NTBs that apply to the early 2000's are estimated to be approximately the same as average tariffs in 2001.
- Further potential Chinese tariff reforms have small efficiency impacts. Potential DDA multilateral reforms have much greater effects, particularly through the lowering of barriers to China's exports.

4.2. Current Account Reform and Interaction with Trade Policy Scenarios 10-12

Scenarios 10 – 12 explore the consequences of trade policy reform in the context of reform of the current account in China, in this case, the exogenous lowering of China's current account surplus. This is done in scenario 10, but without changing trade policy. China's current account is reduced by about 50% of China's current account surplus (as measured in the GTAPv7 dataset) with compensating trade-weighted current account adjustment by the same amount in China's trading partners. In scenarios 11 and 12, the exogenous lowering of the current account surplus is combined with the multilateral trade policy reform (scenario 7) and the EU-China trade policy liberalisation in scenario 8. These results are reported in Tables 18-24 below.

Table 18: GLOBE Macro Results for China

% change wrt Baseline2008 – Scenarios 10-12

Scenario	base	sim10A	Sim10B	Sim10C
Absorption	2952	2.890	4.343	3.611
Imports	881	2.458	6.384	4.194
Exports	952	-4.547	-0.844	-3.117
Consumption	951	2.942	3.298	3.204
Government	249	2.903	2.538	2.854
Investment	870	3.265	3.933	3.681
GDPexp	3023	0.672	2.113	1.321
Real_ER	1.025	-3.388	-3.543	-3.761
WF_Land	1.235	2.630	5.902	5.429
WF_UnSkLab				
WF_SkLab	1.208	1.262	2.907	1.929
WF_Capital	1.242	-0.521	1.584	0.314
WF_NatRes	1.256	-1.023	0.561	-0.500
Terms_of_Trade	1.000	0.229	-0.357	0.174

Table 19: GLOBE Macro Results for European Union

% change wrt Baseline2008 – Scenarios 10-12

Scenario	base	sim10A	sim10B	sim10C
Absorption	18014	-0.206	0.087	-0.125
Imports	4464	-0.236	0.612	0.051
Exports	4380	0.371	0.969	0.665
Consumption	8035	-0.199	-0.008	-0.168
Government	2840	-0.176	-0.285	-0.238
Investment	2675	-0.209	-0.108	-0.174
GDPexp	17930	-0.058	0.172	0.024
Real_ER	1.001	0.165	0.339	0.138
WF_Land	1.043	-0.139	-1.973	-0.614
WF_UnSkLab	1.054	0.010	0.389	0.139
WF_SkLab	1.033	-0.084	0.303	0.036
WF_Capital	1.060	0.007	0.470	0.146
WF_NatRes	1.013	0.138	0.410	0.368
Terms_of_Trade	1.000	-0.013	0.164	-0.012

Table 20: GLOBE Macro Results for NAFTA

% change wrt Baseline2008 – Scenarios 10-12

Scenario	base	sim10A	sim10B	sim10C
Absorption	17219	-0.148	0.049	-0.149
Imports	2354	-0.387	0.788	-0.393
Exports	1757	0.399	1.616	0.386
Consumption	9909	-0.109	-0.034	-0.106
Government	2234	-0.082	-0.205	-0.082
Investment	2723	-0.141	-0.081	-0.148
GDPexp	16623	-0.057	0.110	-0.058
Real_ER	1.013	0.004	0.291	0.008
WF_Land	1.083	0.294	3.940	0.319
WF_UnSkLab	1.051	-0.022	0.244	-0.021
WF_SkLab	1.046	-0.059	0.190	-0.054
WF_Capital	1.086	-0.022	0.261	-0.019
WF_NatRes	1.071	0.044	0.438	0.056
Terms_of_Trade	1.000	-0.149	0.092	-0.148

Table 21: GLOBE Macro Results for Advanced East Asia

% change wrt Baseline2008 – Scenarios 10-12

Scenario	base	sim10A	sim10B	sim10C
Absorption	8076	-0.128	0.663	-0.139
Imports	1411	-0.155	3.334	-0.200
Exports	1568	0.381	2.689	0.357
Consumption	3860	-0.129	0.233	-0.126
Government	1155	-0.111	-0.404	-0.114
Investment	1651	-0.113	0.132	-0.136
GDPexp	8234	-0.026	0.591	-0.034
Real_ER	0.984	-0.472	-1.282	-0.399
WF_Land	1.042	-0.115	-4.446	-0.061
WF_UnSkLab	1.053	-0.003	0.855	-0.003
WF_SkLab	1.034	-0.040	0.901	-0.033
WF_Capital	1.067	-0.004	0.831	0.001
WF_NatRes	1.005	0.210	-0.012	0.334
Terms_of_Trade	1.000	-0.062	0.295	-0.074

Table 22: GLOBE Macro Results for India

% change wrt Baseline2008 – Scenarios 10-12

Scenario	base	sim10	sim11	sim10C
Absorption	952	-0.10	1.06	-0.14
Imports	170	-0.13	5.75	-0.23
Exports	126	0.43	9.76	0.33
Consumption	511	-0.09	-0.02	-0.11
Government	87	-0.09	-0.88	-0.10
Investment	184	-0.10	0.65	-0.13
GDPexp	908	-0.02	1.39	-0.05
Real_ER	1.042	-0.10	4.05	0.02
WF_Land	1.204	-0.12	0.77	-0.20
WF_UnSkLab	1.000	0.00	0.00	0.00
WF_SkLab	1.175	-0.07	1.88	-0.10

WF_Capital	1.226	0.04	2.66	0.02
WF_NatRes	1.266	0.25	-0.90	0.30
Terms_of_Trade	1.000	0.03	-2.67	-0.02

Table 23: GLOBE Macro Results for Mercosur

% change wrt Baseline 2008 – Scenarios 10-12

Scenario	base	sim10A	Sim10B	sim10C
Absorption	1186	-0.113	0.662	-0.127
Imports	184	-0.146	3.802	-0.198
Exports	231	0.343	2.628	0.331
Consumption	612	-0.108	0.156	-0.116
Government	181	-0.093	-0.479	-0.098
Investment	210	-0.113	0.368	-0.124
GDPexp	1233	-0.022	0.562	-0.031
Real_ER	0.999	-0.017	-0.261	0.036
WF_Land	1.092	0.272	9.730	0.262
WF_UnSkLab	1.066	0.015	0.971	0.007
WF_SkLab	1.082	-0.089	0.250	-0.088
WF_Capital	1.111	0.022	1.117	0.015
WF_NatRes	1.083	0.255	0.724	0.319
Terms_of_Trade	1.000	0.021	0.013	-0.001

Table 24: GLOBE Macro Results for Rest of World

% change wrt Baseline 2008 – Scenarios 10-12

Scenario	base	sim10A	Sim10B	sim10C
Absorption	7920	-0.228	0.896	-0.227
Imports	2641	-0.202	3.065	-0.192
Exports	2697	0.260	3.618	0.272
Consumption	3264	-0.247	-0.057	-0.250
Government	852	-0.202	-1.121	-0.199
Investment	1162	-0.255	0.124	-0.263
GDPexp	7976	-0.072	1.099	-0.070
Real_ER	1.010	-0.018	1.529	0.019
WF_Land	1.162	-0.127	3.830	-0.189
WF_UnSkLab	1.073	-0.027	1.093	-0.048
WF_SkLab	1.117	-0.183	1.025	-0.176
WF_Capital	1.132	0.018	2.430	0.020
WF_NatRes	1.094	0.354	4.261	0.489
Terms_of_Trade	1.000	0.000	-0.565	0.000

The change in absorption in China of over 4% (domestically produced and imported commodities for private and government consumption plus investment) is large for a comparative static calculation (**Scenario 10B**). It has no welfare or efficiency implications because the changes on the capital account that allow for the current account reduction is not included in the welfare function. However, lowering China's current account surplus has major economy wide implications, starting with the appreciation of the real exchange rate (the price of domestic goods over foreign goods) of slightly over 6%. Some of the increase in imports of slightly over 5% and decrease in exports of 6.8% is accounted for by the change in current account surplus itself, and some by the effect of the real exchange rate appreciation on exports and imports. This is the over-all trade adjustment that takes

place when the current account surplus is reduced. The anti-trade bias from the reduction of the current account surplus increases the returns to land and skilled labour increases whilst the returns to capital and natural resources fall. The demand for unskilled labour increases by nearly 0.4%. The terms of trade also improves slightly as a result of the anti-trade bias of the policy change.

The effects on the EU are much smaller but generally of opposite sign. Absorption and imports fall by 0.32%, imports, exports rise by nearly 0.6% and the real exchange rate depreciates by 0.2%. There is little effect on the returns to unskilled and skilled labour and capital, but the returns to land fall by nearly 0.4% and the returns to natural resources rise by just over 0.9%. The change in the pattern of trade requires less adjustment than in the case of China and the rise in exports does not appear to involve agricultural products.

The changes in the overall level of trade for China and the EU hides the effects of lowering China's current account surplus on the composition of bilateral trade. These effects are shown in **Appendix Table 1** below which reveal a number of sectors where the change in imports or exports is over 10%. For example, China's imports from the EU increase by more than 10% in wearing apparel, transport equipment, machinery and equipment and other manufacturing. Conversely, EU imports from China fall by more than 10% in textiles, wearing apparel and electronic equipment. There is no particular trade policy issue involved in these changes in the composition or levels of bilateral trade as a result of the lowering of China's current account surplus, but the changes in sector trade shown suggest that there may be a trade adjustment issue to be monitored.

Multilateral Trade Liberalisation with China's Current Account Surplus Lowered

The traditional comparative static Swan-Solow context for the analysis of unilateral trade policy reform treats the current account surplus or deficit as exogenous and unchanging and the real exchange rate as endogenous. A lowering of tariffs or NTBs generates at the initial set of prices and exchange rate a negative change in the current account balance. The final equilibrium normally includes a devaluation of the real exchange rate. In this story, the devaluation of the real exchange rate is important because it provides a stimulus to exports which, together with the stimulus to import competing production, work together to restore the current account balance. The normal efficiency and welfare implications follow, even if CGE models typically show a small % increase in welfare, but the direction of change of trade flows and real exchange rates is predictable.

As already noted when comparing scenarios 5 and 8, the direction of change of the real exchange rate is influenced not only by the changed access of China's import suppliers into China's markets, but also the improved access of China's exporters into foreign markets. This effect is vividly illustrated by the real exchange rate depreciation of 1.6% in scenario 5 and the real exchange rate appreciation of 1.2% in scenario 8. It was also noted in the discussion of scenarios 10 through to 12 that lowering China's current account surplus by 50 per cent leads to an appreciation of the real exchange rate of slightly over 6%. Thus, the ambitious multilateral trade policy reform combined with a reduction of the current account surplus of 50 per cent bn leads to a real exchange rate appreciation of nearly 7%. The combined scenarios lead to a strong increase of imports of over 8% and an expansion of exports of nearly 4.7%. The increase in absorption in the combined experiment of 5.5% is roughly the same as the changes in absorption from experiments 1 and 8 taken separately. The contradictory effects of the combined multilateral trade policy reform and the reduction of China's current account surplus arises because the benefits to China's exporters from better access to export markets is blunted by the appreciation of China's real exchange rate. On the other hand, the impact of lowering China's tariffs

on China's import is enhanced by the appreciation of China's real exchange rate. For the EU, in the case of the combined lowering of China's current account surplus and multilateral trade policy reform in scenario 9, the welfare effect is in fact negative reflecting the fact that in trade-weighted allocation of a change in current account balances to China's trading partners, there is a small increase in the EU's current account surplus which lowers absorption.

Scenario Implications

- Scenarios 10-12 explore the impact of an exogenous macro reform that lowers China's current account surplus. Lowering China's trade policy surplus by fifty per cent leads to a substantial appreciation of the real exchange rate and large trade adjustments both for China and the EU. Scenario 12 combines the lowering of China's current account surplus with the Ambitious multilateral trade policy reform in scenario 7. The resultant combination of large trade adjustments from the reduction of the current account surplus and the responses of imports and exports to the multilateral trade policy reforms leads are blurred by mixed signals. On the side of China's exports, the strong appreciation of the real exchange rate hinders the adjustment of exports to trade policy incentives, particularly those arising from the opening up of export markets. On the import side into China, the appreciation of the real exchange rate sharpens the impact of lower tariffs and enhances the efficiency gains. There is a possible win-win aspect if China embarks on macro reform, linking a lowering of the current account surplus to multilateral trade policy reform, and thus reduces pressures towards the use of *restrictive* trade policy measures to attempt to deal with the perceived bilateral trade deficit between the EU and China.

Key Findings from the Scenarios on Current Account Reform

- Relatively major lowering of the current account balance leads to a substantial appreciation of China's real exchange rate and a potentially large trade adjustment effect on China and China's main trading partners.
- Mixing a multilateral trade policy reform with a lowering of the current account balance shifts the efficiency effects away from the export side to the import side, increasing adjustment problems on China's import side.
- A key idea behind the results is that trade policy is an inappropriate instrument alone for dealing with the perceived problem of bilateral current account imbalances.

4.3 The GLOBE Model - Application to the Global Financial Crisis and Stimulus

The global financial crisis as well as the stimulus response packages adopted in the US, EU and China provide the motivation for the third cluster of scenarios.

During 2008 the world economy revealed that the global imbalances of savings, trade and finance could not be resolved without a global recession, which carries the threat of deepening into a depression to a degree not experienced since 1929.

Underlying these imbalances are the lack of savings in the US and the rapid build-up of surpluses in East Asia. Trade deficits became unsustainable. While the US lives beyond it means, China over invests but under consumes.

Early Warning Signs Ignored

Worrying signs of inflationary expectations were highly visible. Many countries around the world, both within the OECD as well as across developing countries faced inflationary pressures at levels not experienced since the 1980s. The strains on a large number of food and fuel importing countries had become very visible. Soaring food prices sparked riots and unrest across nearly forty countries including LDCs as well as middle income and emerging economies.

Weaknesses within the financial sector were the core of the problem, with serious mismanagement of financial risks in the developed countries provoking an evaporation of global liquidity. Sound banking practices require that leveraging of capital should not exceed a ratio of 1 to 12 – lending at most 12 dollars for every one dollar of paid-up risk bearing capital. However large segments of the financial sectors in US and other OECD countries had engaged in excessive lending at ratios up to 100 times the paid-up capital.

During the second and third quarters of 2008 several high-profile bankruptcies (like Bear Sterns and Lehman Brothers) rocked confidence and threat of a systemic risk to the global financial system necessitated a series of stimulus package and bail-out programmes in the US, EU and East Asia. The downward pressures on the real economy, with liquidity and trade finance drying up, became apparent with negative growth and steeply declining exports

By the last quarter of 2008 several countries were shrinking at annual rates of over 10%. For the year as a whole, global growth declined from a buoyant 3.7% in 2007 to a moderate 1.7%. While during the first half of 2008, trade was growing at an annual rate of 20%, by September growth was negative. The increasingly difficult trade environment began to create major difficulties for industries and exporters around the world including China.

Overall imports in the OECD countries fell during 2008 in volume terms: EU and Japan were negative with –1 per cent, whereas the US was declining by 4.0 percent. Most of these declines took place during the fourth quarter when imports declined by approximately 5 per

cent. The latest WTO assessment alarmingly reports that global trade in 2009 may decline by as much as 9 per cent in volume terms. While the same WTO forecast indicates that developing countries exports may shrink by a lower percentage of 2-3 per cent, this aggregate number masks the problems of countries focused on exports, such as China, whom will be facing much tougher challenges.

Global and Regional Stimulus Responses

The Chinese 4 trillion yuan stimulus package ($ 586 billion) is equivalent to 13.3 per cent of the 2008 GDP of China, whereas the $ 787 billion stimulus package amounts to 5.5 per cent of the GDP of the United States. The EU package, which is the sum of the measures taken at the national levels, amounts to 1.5 per cent of the GDP; however, for some of the individual Member States such as Germany it may be as high as 3.25 per cent.

Assuming that the Chinese stimulus package is strictly additional 'new money' and implemented within a time horizon of 2 years, the implication for the Chinese economy is that consumption will be boosted by approx 10 per cent and in the US by about 3 per cent, taking account of the fact that the consumption-to-GDP ratio in China is much below that of the United States. For the EU, the percentage is in the order of 1 per cent of GDP.

4.4 Model Results of the Crisis and Stimulus Scenarios

The large size financial shock, drastically reducing the utilization of primary factors, and the stimulus response packages have been represented in a number of specific scenarios tested with the GLOBE model. These scenarios focus primarily on the trade impact of the financial sector shocks and the ways in which this trade impact cascades throughout the global economy. For these scenarios, the GLOBE model is used as a series of linked macro-economic regions or countries.

Crisis and Stimulus Scenario Outline

This section introduces the five scenarios which have been designed to develop preliminary and tentative results about the impact of the global financial crisis as well as the responses, in accordance with the G20 meetings held in Washington (November 2008) and London (April 2, 2009). Evidently greater scrutiny of the results will be required through further sensitivity analyses and testing for the robustness of these preliminary results.

The global financial crisis is conceptualized in **scenario 13** as an 'implosion of resource utilization': without any prior warning some 5 per cent of primary factor income vanishes. This reflects the specific failure of risk-management in the financial sector, mainly within the OECD countries, which have meant that expectations of future revenue streams from financial assets have proven unwarranted. In response, factors of production, most notably

skilled labour, are no longer demanded.[6] The geographical regions which are thus affected include the whole of the OECD as well as the EU-25. Hence, this scenario seeks to assess the impact on non-OECD emerging countries, in particular China. However, we also report results for India, as this constitutes an important reference case: less open and export oriented and having a higher degree of geographical diversification. The **scenario 14** introduces a Chinese stimulus response of + 5 %, enabling us to gain a preliminary understanding of the nature and impact of the stimulus effort on China itself as well as the other key players (EU, NAFTA, Advanced East Asia, India, Mercosur and other transition and developing countries). **Scenario 15** also analyzes the impact of simultaneous financial shock and stimulus – but in this scenario, the impact of the stimulus packages within the US, EU and advanced East Asia is anticipated to reduce the impact of the financial shock – hence the implosion is less (-2.5 per cent), while the Chinese stimulus measures remain unchanged. The **scenarios 16 and 17** superimpose upon the stimulus package a sharp reduction of the Chinese current account surplus. As discussed in the context of scenarios 10 to 12 above, such a reduction (or increase) of the surplus realized by China, necessitates adjustments elsewhere in the global levels of deficits elsewhere, most notably for the twin deficits of the United States. (Note: A summary of GLOBE Financial Crisis and Stimulus scenarios has been provided in Table 10 above).

Table 25 reports the results for China as %-change relative to the Base line scenario.

Table 25: GLOBE Macro Results for China

- % change wrt Baseline2008 - Scenarios 13-17

		Crisis		Stimulus	Forced CA Adjustments	
Scenario	base	sim11A	sim11B	sim11C	sim11D	sim11E
Absorption	2952	-0.732	0.229	0.603	0.169	1.031
Imports	881	-1.352	-0.924	-0.238	-1.186	0.701
Exports	952	-0.408	0.309	0.516	-0.148	1.169
Consumption	951	-0.390	0.967	1.169	0.975	1.357
Government	249	-0.294	1.435	1.587	1.555	1.618
Investment	870	-0.602	0.245	0.554	0.263	0.839
GDPexp	3023	-0.449	0.591	0.821	0.464	1.170
Real_ER	1.025	0.796	1.457	1.048	1.472	0.631
FS_Land	50	-	5.0	5.0	5.0	5.0
FS_UnSkLab	603	-	5.0	5.0	5.0	5.0
FS_SkLab	188	-	5.0	5.0	5.0	5.0
FS_Capital	694	-	5.0	5.0	5.0	5.0
FS_NatRes	35	-	5.0	5.0	5.0	5.0
WF_Land	1.235	-0.561	-7.612	-7.344	-7.726	-6.967
WF_UnSkLab						
WF_SkLab	1.208	-0.424	-7.229	-7.026	-7.438	-6.622
WF_Capital	1.242	-0.403	2.213	2.425	1.918	2.924
WF_NatRes	1.256	-0.769	-7.393	-7.025	-7.305	-6.745
Terms_of_Trade	1.000	-0.771	-1.129	-0.738	-1.416	-0.074

[6] Table 3 on 'Factor Shares in Selected World Regions' indicates that skilled labour receives between 21.3 to 29.6 of all factor income for the EU, NAFTA and Advanced East Asia, whereas for China and India these percentages are respectively 11.6 and 10.7.

As to be expected, the implosion of factor incomes in the OECD economies has significant negative absorption and GDP effects for China. The negative impact of the reduced global demand on China's absorption and GDP is greater than the prospective positive gains from modest bilateral EU-China trade-liberalisation, or multi-lateral DDA liberalization. However, ambitious DDA and ambitious bilateral reciprocal liberalization would yield greater gains to China, because of the improved market access (scenarios 1-9 above).

The simulated trade adjustment which takes place within China follows the pattern which has been observed in recent months: that Chinese imports decline faster than the exports. [7] Because import demand and export supply are computed in volume terms, it is particularly important to also observe the terms of trade index. As noted above, the terms of trade index is defined as the ratio between the price of exports divided by the price of imports. Hence, an index value greater than unity means that the export prices have increased more than the import prices, which are in the numéraire. However, an index value below unity means that export prices have fallen, relative to import prices. It is important to note that in the context of the financial crisis, the terms of trade index is systematically downwards for China – export prices are falling faster than import prices, reflecting China's 'export push' strategy in scenarios 14 and 15.

Scenarios 16 and 17 however, reflect a 'forced' global trade adjustment. The rest of the world has to reduce its current account deficits because China is no longer willing or able to run the mirroring current account surpluses. In these scenarios, the nature of trade adjustment follows a different logic: China will be increasing its import demand and reducing its exports – in effect reducing its current account surplus. But adjustments will be needed in the EU and in particular the US.

The preliminary results for factor prices within the Chinese economy paint a picture where returns to capital are positive in the stimulus scenarios, whereas those for all other factors are negative (or at zero, as per model assumption). Hence, the overall factor income distribution moves sharply in favour of capital and against factor earnings from land, natural resources and skilled labour. This must be expected yield a further acceleration of the growing inequality of China's household income distribution, at variance with the policy-objective of creating an 'harmonious society'. These preliminary results are bound to be controversial and would benefit from further sensitivity analyses. It would point to the need for specific measures in favour of land/agriculture and skilled labour incomes.

The real exchange rates represent the change of the ratio between non-traded goods prices to the prices of traded goods (exports as well as imports). An increase, relative to the baseline scenario means that world market prices have increased less than the prices for non-traded domestically produced and used goods and services – hence a depreciation of the value of domestic production. A decrease conversely means that world market prices have increased

[7] The TradeMap of the International Trade Centre, Geneva reports on the monthly and quarterly figures of China's trade for the whole of 2008 and the first months of 2009.

faster, reflecting an appreciation of the Chinese currency. As expected the 'export push' scenarios 14 and 15 accelerate the depreciation of the RMB, lowering export prices.

However, the scenarios 16 and 17 where the current account is exogenously reduced reflects that the Chinese limit their willingness to run trade surpluses will inevitably mean that other trading partners will have to reduce their deficits. In other words, the other trading partners will also be forced to adjust to lower deficits.

Table 26 for the EU-27 below describe how the main trading partners are performing in the global financial crisis context. As expected, **scenario 13** shows that absorption and GDP are sharply down, although the EU is not as severely affected as North America (Table 27) – this is the crisis impact without stimulus. Scenario 14 with Chinese stimulus mitigates the negative impact on the EU and the EU only to a very limited degree. EU and NAFTA stimulus remains the key to mitigate the effects, without which severe contraction must be affected.

Table 26: GLOBE Macro Results for European Union-27

% change wrt Baseline2008 – Scenarios 13-17

		Crisis		Stimulus	Forced CA Adjustments	
Scenario	**Base**	**sim11A**	**sim11B**	**sim11C**	**sim11D**	**sim11E**
Absorption	18014	-2.686	-2.676	-1.318	-1.347	-1.292
Imports	4464	-2.304	-2.280	-1.114	-1.380	-0.853
Exports	4380	-2.638	-2.629	-1.295	-1.764	-0.829
Consumption	8035	-2.462	-2.455	-1.209	-1.178	-1.243
Government	2840	-3.970	-3.967	-1.971	-1.836	-2.105
Investment	2675	-2.633	-2.625	-1.293	-1.281	-1.308
GDPexp	17930	-2.770	-2.763	-1.363	-1.441	-1.288
Real_ER	1.001	0.197	0.213	0.113	0.028	0.197
FS_Land	60	-5.000	-5.000	-2.500	-2.500	-2.500
FS_UnSkLab	2672	-5.000	-5.000	-2.500	-2.500	-2.500
FS_SkLab	1934	-5.000	-5.000	-2.500	-2.500	-2.500
FS_Capital	4360	-5.000	-5.000	-2.500	-2.500	-2.500
FS_NatRes	26	-5.000	-5.000	-2.500	-2.500	-2.500
WF_Land	1.043	4.679	4.649	2.272	2.674	1.879
WF_UnSkLab	1.054	4.964	4.970	2.442	2.254	2.628
WF_SkLab	1.033	4.795	4.804	2.363	2.231	2.491
WF_Capital	1.060	-5.255	-5.248	-2.606	-2.828	-2.387
WF_NatRes	1.013	3.716	3.691	1.813	1.816	1.826
Terms_of_Trade	1.000	0.302	0.317	0.163	-0.227	0.546

Table 27: GLOBE Macro Results for NAFTA

- % change wrt Baseline2008 - All Scenarios

		Crisis		Stimulus		Forced CA Adjustments
Scenario	Base	sim11A	sim11B	sim11C	sim11D	sim11E
Absorption	17219	-3.259	-3.248	-1.606	-1.641	-1.573
Imports	2354	-2.601	-2.559	-1.248	-1.571	-0.929
Exports	1757	-4.175	-4.162	-2.061	-2.603	-1.521
Consumption	9909	-3.286	-3.280	-1.624	-1.613	-1.637
Government	2234	-3.159	-3.157	-1.563	-1.508	-1.619
Investment	2723	-3.808	-3.801	-1.887	-1.915	-1.860
GDPexp	16623	-3.449	-3.442	-1.705	-1.753	-1.659
Real_ER	1.013	-0.462	-0.446	-0.210	-0.276	-0.147
FS_Land	44	-5.000	-5.000	-2.500	-2.500	-2.500
FS_UnSkLab	4307	-5.000	-5.000	-2.500	-2.500	-2.500
FS_SkLab	3268	-5.000	-5.000	-2.500	-2.500	-2.500
FS_Capital	3382	-5.000	-5.000	-2.500	-2.500	-2.500
FS_NatRes	54	-5.000	-5.000	-2.500	-2.500	-2.500
WF_Land	1.083	2.892	2.798	1.343	0.710	1.998
WF_UnSkLab	1.051	3.220	3.225	1.596	1.520	1.671
WF_SkLab	1.046	3.372	3.382	1.674	1.601	1.744
WF_Capital	1.086	-6.909	-6.904	-3.453	-3.521	-3.386
WF_NatRes	1.071	0.523	0.497	0.253	-0.052	0.576
Terms_of_Trade	1.000	0.647	0.676	0.347	-0.117	0.802

The introduction of the Chinese stimulus package reduces the extent of their welfare losses (absorption as well as GDP) in approximately equal measure, but only to a very limited degree. For both the NAFTA and the EU-27, the trade adjustment takes the form of reduced imports as well as reduced exports, with the latter particularly severely affected for the NAFTA. But unlike in the case of China, which adjust mainly through import contraction, the adjustments in Europe and North America fall on both sides of the trade-balance. In the EU the effect on imports and exports is in approximately equal measures, but the US experiences greater export contraction. In consequence, the effects on pre-crisis levels of trade deficits in the EU should be expected to be modest; for the NAFTA a reduction of the deficit is uncertain if the exports growth turns sharply negative. For both NAFTA and the EU, the terms of trade index moves above unity, indicating that import prices decline somewhat faster than their export prices (except in scenario 16 with forced adjustment).

Of particular importance is how the real exchange rates play their role as a global trade-accommodating factor. Here the systemic difference between the North American and the European economies come to the forefront. Whereas the NAFTA countries report consistently an appreciation of their currency, the EU-27 consistently report a depreciation of the real exchange rate. It means that in the EU-27 the prices of domestic non-traded goods are rising faster than for those of traded goods, whereas in the US the general equilibrium calculations indicate the opposite. These determinants of these results will require further scrutiny, in particular differentiating between import and export price changes.

A further controversial result with respect to factor earnings may be observed with respect to EU and NAFTA. Whereas for China the factor earnings for capital were positive in the context of crisis, the same is negative for both the EU and the US. Returns on capital decrease more than returns on other factors (see WF_Capital in Table 26 and 27).

Table 28 reports on the impact for advanced East Asia, notably Japan and South Korea. In this sub-region the impacts on GDP of the crisis are highly significant, indeed in the same order of magnitude as the US and greater than the EU (sim 11A). As in the EU, adjustments are on both imports and exports in roughly equal measure, implying that historical surplus levels may, broadly speaking, remain of the same order of magnitude.

Advanced East Asia stands to gain a little of a China stimulus **(scenario 14).** Indeed, the region may remain on its baseline growth scenario, if stimulus packages in the NAFTA and EU-27 were to succeed to limit the loss of resource utilization and associated global demand **(scenario 15).** However, the **scenarios 16** in which China would force its current account surpluses down sharply, would cause the sub region to incur absorption and GDP losses to the same extent as the EU and NAFTA as well as terms of trade losses.

Table 28: GLOBE Macro Results for Advanced East Asia

% change wrt Baseline2008 – Scenarios 13-17

		Crisis		Stimulus		Forced CA Adjustments
Scenario	**base**	**sim11A**	**sim11B**	**sim11C**	**sim11D**	**sim11E**
Absorption	8076	-2.801	-2.757	-1.341	-1.493	-1.192
Imports	1411	-2.289	-2.147	-0.989	-1.695	-0.293
Exports	1568	-2.610	-2.578	-1.260	-1.787	-0.739
Consumption	3860	-2.810	-2.784	-1.363	-1.406	-1.322
Government	1155	-2.614	-2.606	-1.282	-1.219	-1.346
Investment	1651	-3.349	-3.320	-1.630	-1.716	-1.547
GDPexp	8234	-2.852	-2.827	-1.386	-1.514	-1.260
Real_ER	0.984	-0.043	-0.108	-0.087	0.227	-0.394
FS_Land	28	-5.000	-5.000	-2.500	-2.500	-2.500
FS_UnSkLab	1898	-5.000	-5.000	-2.500	-2.500	-2.500
FS_SkLab	1167	-5.000	-5.000	-2.500	-2.500	-2.500
FS_Capital	2385	-5.000	-5.000	-2.500	-2.500	-2.500
FS_NatRes	14	-5.000	-5.000	-2.500	-2.500	-2.500
WF_Land	1.042	4.175	3.988	1.876	2.368	1.402
WF_UnSkLab	1.053	4.635	4.660	2.303	2.127	2.475
WF_SkLab	1.034	4.666	4.701	2.327	2.147	2.504
WF_Capital	1.067	-5.606	-5.579	-2.764	-2.928	-2.603
WF_NatRes	1.005	2.686	2.214	0.868	0.578	1.180
Terms_of_Trade	1.000	0.712	0.807	0.444	-0.201	1.075

Table 29 reports the impact for India. It too will experience absorption and GDP losses, relative to its baseline scenario in *all* scenarios 13-17, although to a much more modest degree as compared with all the other regions discussed above. The gains it may derive from a Chinese stimulus package are negligible. It will just like China experience terms of trade losses – with its import prices not declining to the same degree as its export prices. Finally,

the changes in the relative price of its domestic non-traded goods to its internationally traded goods are bound to decline, reflecting a real exchange rate depreciation. This result appears to remain robust, irrespective of the nature of the adjustment of the Chinese currect account surplus.

Table 29: GLOBE Macro Results for India

% change wrt Baseline2008 – Scenarios13-17

		Crisis		Stimulus		Forced CA Adjustments
Scenario	base	sim11A	sim11B	sim11C	sim11D	sim11E
Absorption	952	-0.16	-0.16	-0.07	-0.32	0.17
Imports	170	-0.56	-0.54	-0.26	-1.05	0.53
Exports	126	-0.28	-0.27	-0.13	-0.87	0.59
Consumption	511	-0.02	-0.01	0.00	-0.12	0.11
Government	87	-0.07	-0.07	-0.03	-0.05	-0.01
Investment	184	-0.25	-0.24	-0.12	-0.34	0.10
GDPexp	908	-0.10	-0.10	-0.05	-0.26	0.16
Real_ER	1.042	0.73	0.75	0.38	0.68	0.08
WF_Land	1.204	-0.04	-0.04	-0.02	-0.40	0.36
WF_UnSkLab	1.000	0.00	0.00	0.00	0.00	0.00
WF_SkLab	1.175	-0.01	0.00	0.00	-0.29	0.29
WF_Capital	1.226	0.02	0.03	0.02	-0.32	0.35
WF_NatRes	1.266	-0.49	-0.49	-0.25	0.01	-0.49
Terms_of_Trade	1.000	-0.47	-0.46	-0.22	-0.95	0.50

(Note: Assumption made is zero factor supply changes)

As last but not least, the effects of the crisis context on the Mercosur are simulated. For the present counterfactual scenarios used in this paper it is assumed that the region would (like India) not engage in stimulus packages (Table 30). Negative absorption and growth is coupled with negative developments of factor earnings across the board. Terms of trade losses are negative, even though imports contract to a greater degree than exports.

Table 30: GLOBE Macro Results for Mercosur

- % change wrt Baseline 2008 – Scenarios 13-17

		Crisis		Stimulus		Forced CA Adjustments
Scenario	base	sim11A	sim11B	sim11C	sim11D	sim11E
Absorption	1186	-0.368	-0.365	-0.179	-0.479	0.118
Imports	184	-1.178	-1.163	-0.567	-1.761	0.618
Exports	231	-0.035	-0.022	-0.004	-0.429	0.407
Consumption	612	-0.206	-0.205	-0.100	-0.254	0.051
Government	181	-0.099	-0.101	-0.051	-0.043	-0.057
Investment	210	-0.362	-0.361	-0.178	-0.384	0.025
GDPexp	1233	-0.185	-0.182	-0.088	-0.278	0.097
Real_ER	0.999	0.780	0.819	0.421	1.180	-0.325
WF_Land	1.092	-0.144	-0.212	-0.137	-1.989	1.743
WF_UnSkLab	1.066	-0.116	-0.112	-0.054	-0.281	0.169
WF_SkLab	1.082	-0.202	-0.196	-0.094	-0.244	0.052

WF_Capital	1.111	-0.159	-0.155	-0.074	-0.327	0.173
WF_NatRes	1.083	-1.286	-1.282	-0.634	-0.741	-0.533
Terms_of_Trade	1.000	-0.842	-0.832	-0.405	-1.390	0.563

(Note: Assumption made is zero factor supply changes)

With regards to the Rest of the World, in effect the transition and developing countries not included above, will face a consistently negative impact in terms of absorption and GDP growth. The main channels are through the reduced earnings on natural resources and associated terms of trade losses (Table 31).

Table 31: GLOBE Macro Results for Rest of World

- % change wrt Baseline 2008 - Scenarios 13-17

		Crisis		Stimulus	Forced CA Adjustments	
Scenario	**base**	**sim11A**	**sim11B**	**sim11C**	**sim11D**	**sim11E**
Absorption	7920	-0.834	-0.811	-0.389	-0.841	0.058
Imports	2641	-1.352	-1.303	-0.619	-1.544	0.299
Exports	2697	-0.245	-0.214	-0.090	-0.661	0.474
Consumption	3264	-0.504	-0.492	-0.236	-0.458	-0.018
Government	852	-0.412	-0.409	-0.200	-0.198	-0.203
Investment	1162	-0.894	-0.884	-0.431	-0.786	-0.083
GDPexp	7976	-0.463	-0.446	-0.211	-0.547	0.119
Real_ER	1.010	0.855	0.873	0.436	0.705	0.170
WF_Land	1.162	-0.155	-0.193	-0.112	-0.978	0.760
WF_UnSkLab	1.073	-0.137	-0.130	-0.060	-0.309	0.185
WF_SkLab	1.117	-0.312	-0.293	-0.135	-0.449	0.172
WF_Capital	1.132	-0.500	-0.483	-0.229	-0.707	0.241
WF_NatRes	1.094	-2.384	-2.409	-1.206	-2.089	-0.328
Terms_of_Trade	1.000	-0.983	-0.967	-0.468	1.220	-2.105

(Note: Assumption made is zero factor supply changes)

In summary, a large scale Chinese stimulus package appears to offer a win-win scenario for the country itself as well as for the global economy. China may escape loss of absorption and GDP and remain on or even above its base line scenario (sim 11B through to 11E, Table 25).

In contrast, seeking to force global readjustment of its trade surplus in the present context, necessitating matching reduction of deficits upon other regions of the global economy is not likely to lead to win-win outcomes. The global trade general equilibrium scenarios do not support an outcome with further improvements of GDP growth for China.

These tentative results will need to be ring-fenced with (i) an improved analysis of the financial cost of the stimulus package; and (ii) a more detailed breakdown of international price responses to the large stimulus package.

5. Modelling Conclusions and Research Agenda

A number of conclusions emerge from the GLOBE model analysis. First, multilateral trade policy reform is beneficial for China and other countries in comparison with unilateral reform as in WTO accession for China. Secondly, unilateral NTB reform should not be avoided where it can be shown to be gainful – such reforms also create a better atmosphere for the reform process. Thirdly, the sectoral trade policy reform issues discussed above should not wait for the outcome of the wider multilateral reform process before they are implemented, even if carried out on a unilateral basis, especially where initial tariffs and indicative NTBs are high.

The background to the trade policy reform process is the appreciation of the RMB relative to a bundle of currencies. This was modelled in GLOBE through a reduction of the current account surplus, creating a significant appreciation of China's real exchange rate. This altered the way in which trade policy reform works, switching the efficiency gains from the export side to the import side and increasing the adjustment challenges for China on the import side. It was also determined that the appreciation of the real exchange rate created a significant trade adjustment challenge for the EU in certain sectors. It was argued that an appreciating real exchange rate for China was not a valid reason for using trade policy to alter perceived bilateral trade imbalances.

The key finding for carbon emissions is that scenarios that generated improved economic welfare as measured by changes in absorption also resulted in lower emissions per unit of output required to produce the GDP. Whilst China's major contribution to CO2 emissions is from the economic growth process itself, it is of interest to policy makers that further trade policy reforms that improve economic efficiency are consistent with lowering emissions per unit of GDP.

Estimates in the change in the level of employment associated with each scenario is a good indicator of the overall changes in poverty as measured around a poverty line, reported in 308

Generally the strongest impacts on lowering poverty are achieved by the most efficient trade policy reform scenarios.

Applying the GLOBE model to the context of the global financial crisis and the stimulus package, a large scale Chinese stimulus package appears to offer a win-win scenario for the country itself as well as for the global economy. China may escape loss of absorption and GDP and remain on or even above its base line scenario.

In contrast, seeking to force global readjustment of its trade surplus in the present context, necessitating matching reduction of deficits upon other regions of the global economy is not likely to lead to win-win outcomes. The global trade general equilibrium scenarios do not support an outcome with further improvements of GDP growth for China. (sim 11D)

These tentative results will need to be ring-fenced with (i) an improved analysis of the financial cost of the stimulus package; and (ii) a more detailed breakdown of international price responses to the large stimulus package.

Research Agenda

The three cluster of counter-factual scenarios assume that the 'balanced' or 'neutral' closure is maintained – the three macro-economic balances are closed in a neutral way and there is no induced shift in the relative proportions of private consumption, public consumption and investment.

However, the standard and pre-conceived notion of a stimulus package is that it will boost domestic demand, in effect shifting outwards the aggregate demand curve. The anticipated multipliers are that the increased public demand for goods and services will lead to increased employment demand as well as increased public investment. Through the multipliers, this will result in increased private consumption from households and firms.

Hence the appropriate 'macro-closure' for a stimulus package is that both the public and the private consumption demand increase relative to investment – the strategy of a stimulus package is essentially 'consumption-led' rather than 'investment-led' and hence the scenarios are implemented with a different macro-closure which shift the relative proportions in favour of consumption. The modelling approach reflects that the behaviour of the government has changed, adopting a different economic policy regime.

In addition to testing the impact of different model closures, the following data-related issue remains on the research agenda: to update the description of NTBs to the 2008 data to estimate China's gains from removing NTBs in a multilateral context at this time, requiring estimation of the NTBs for all of China's trading partners from the ITCs MacMap dataset.

Modelling Bibliography

de Melo, Jaime, and Sherman Robinson. "Product Differentiation and Foreign Trade in CGE Models of Small Economies." The World Bank, 1989.

Devarajan, S., J.D. Lewis, and S. Robinson. "Policy Lessons from Trade Focused, Two-Sector Models." *Journal of Policy Modelling* 12 (1990): 625-57.

K. Dervis, J. De Melo, and S. Robinson. *General Equilibrium Models for Development Policy*. Cambridge, MA: Cambridge University Press, 1982.

Liu, Gang-Li, Sherman Robinson, Zhi Wang, and Marcus Noland. *Global Economic Effects of the Asian Currency Devaluations*: Peterson Institute for International Economics, 1998.

Nolan, Marcus, Sherman Robinson, and Zhi Wang. " The Continuing Asian Financial Crisis: Global Adjustment and Trade." Peterson Institute for International Economics, 1999.

Pyatt, Graham. "A Sam Approach to Modelling." *Journal of Policy Modelling* 10, no. 3 (1988): 327-52.

Thierfelder, Karen, Scott McDonald, and Sherman Robinson. "GLOBE: A SAM Based Global CGE Model Using GTAP Data." United States Naval Academy Department of Economics, 2007.

Annex I : Exports and Imports by Commodity

Table A1: GLOBE Results for Imports by Commodity China

Sector	base	sim01	sim02	sim03	Sim04	sim05	sim06	sim07	sim08	sim09
ccrop	18.793	-0.057	-0.009	2.702	-0.075	8.200	1.110	3.387	0.157	1.728
canim	5.323	1.534	1.708	4.395	5.486	14.325	2.784	9.045	0.504	5.192
ccoa	1.447	1.203	0.114	27.701	0.305	188.046	0.942	2.903	0.133	1.163
colgas	36.912	1.370	-0.253	-0.863	-0.780	-3.036	0.371	1.161	0.092	0.644
comn	19.838	-0.179	-0.301	3.770	-0.937	12.085	0.641	2.021	0.133	1.541
cmtprod	2.959	0.743	0.915	0.184	2.805	0.131	2.084	6.764	0.460	2.307
cofd	14.576	0.701	0.699	3.819	2.148	12.189	2.012	6.499	0.342	2.738
ctext	28.240	2.083	1.842	4.857	5.795	16.330	3.381	10.985	0.431	3.583
cwap	15.606	2.068	1.947	1.871	6.132	5.846	2.827	9.061	0.370	1.920
cwpap	18.694	0.220	0.364	3.863	1.082	12.485	1.119	3.434	0.275	3.561
cpetc	17.724	2.389	0.932	2.344	2.843	6.988	1.715	5.326	0.150	1.126
cchem	111.981	1.615	1.209	1.987	3.740	6.118	1.915	6.029	0.255	1.833
cbsprd	52.084	0.761	0.520	6.234	1.554	21.617	1.219	3.759	0.197	3.833
comanu	16.879	0.706	0.932	0.292	2.854	0.449	1.738	5.478	0.385	1.692
cmvh	20.491	3.129	3.006	2.954	9.734	9.293	3.996	13.090	1.564	6.859
cotn	9.283	0.087	-0.049	-0.963	-0.197	-3.484	0.703	2.154	0.252	1.224
cele	175.764	0.411	0.316	0.921	0.966	2.912	0.474	1.431	0.118	0.471
cmach	156.908	0.941	0.658	0.555	1.984	1.271	1.251	3.884	0.354	1.968
cutil	1.114	-0.029	-0.364	-1.068	-1.121	-3.719	0.497	1.562	0.116	0.879
ccns	2.215	-1.030	-0.663	-1.815	-2.051	-6.074	0.213	0.685	0.100	0.755
ctrdt	56.343	-0.350	-0.263	-0.646	-0.814	-2.190	0.383	1.211	0.100	0.772
cbserv	25.504	-0.303	-0.366	-0.910	-1.133	-3.059	0.534	1.702	0.135	1.061
coserv	12.335	-0.905	-0.609	-1.535	-1.888	-5.161	0.229	0.720	0.103	0.821

Table A2: GLOBE Results for Imports by Commodity European Union

Sector	Base	sim01	sim02	sim03	Sim04	sim05	sim06	sim07	sim08	sim09
ccrop	96.582	0.159	0.007	-0.010	0.022	-0.039	1.011	3.306	0.053	0.504
canim	21.932	0.216	0.018	0.031	0.057	0.096	0.310	0.941	0.002	0.707
ccoa	11.331	1.045	-0.010	-0.016	-0.030	0.253	0.008	-0.021	0.011	0.133
colgas	195.772	0.634	0.000	-0.007	0.000	-0.032	0.095	0.303	0.012	0.110
comn	41.779	0.427	0.009	0.078	0.030	0.249	0.144	0.403	0.020	0.146
cmtprod	63.328	0.100	0.003	-0.001	0.010	-0.007	0.705	2.817	0.002	0.048
cofd	166.157	0.147	0.011	0.014	0.034	0.042	0.980	3.232	0.066	1.093
ctext	107.731	0.274	0.025	0.050	0.079	0.177	0.529	1.695	0.086	1.400
cwap	139.049	0.772	0.147	0.322	0.466	1.115	1.327	4.301	0.348	2.441
cwpap	184.263	0.097	0.016	0.034	0.051	0.109	0.072	0.206	0.008	0.053
cpetc	69.241	0.594	0.006	0.007	0.019	0.019	0.189	0.570	0.007	0.059
cchem	568.135	0.117	0.013	0.020	0.040	0.064	0.130	0.396	0.022	0.102
cbsprd	251.822	0.094	0.017	0.036	0.055	0.119	0.190	0.573	0.040	0.216
comanu	166.574	0.202	0.077	0.209	0.240	0.718	0.217	0.652	0.081	0.272
cmvh	428.590	0.057	0.025	0.039	0.082	0.127	0.228	0.717	0.030	0.134
cotn	115.992	0.035	0.016	0.032	0.049	0.108	0.151	0.444	0.013	0.055
cele	365.537	0.182	0.064	0.160	0.201	0.548	0.131	0.380	0.053	0.171
cmach	531.377	0.046	0.027	0.061	0.086	0.208	0.131	0.390	0.030	0.125
cutil	20.238	0.394	0.011	0.017	0.033	0.059	0.080	0.234	0.009	0.079
ccns	23.657	0.149	0.021	0.060	0.066	0.195	0.062	0.166	0.013	0.041
ctrdt	339.077	0.231	0.045	0.094	0.141	0.311	0.053	0.140	0.005	0.016
cbserv	403.563	0.055	0.017	0.029	0.053	0.093	0.062	0.181	0.009	0.044
coserv	113.294	0.137	0.015	0.021	0.047	0.066	-0.004	-0.051	0.003	-0.003

Table A3: GLOBE Results for Imports by Commodity NAFTA

Sector	base	sim01	sim02	sim03	sim04	sim05	sim06	sim07	sim08	sim09
ccrop	30.870	0.145	0.012	0.002	0.039	-0.002	0.608	1.876	-0.005	-0.028
canim	6.057	0.128	0.055	0.139	0.172	0.445	0.362	1.236	-0.010	-0.055
ccoa	2.111	1.268	0.012	-0.075	0.037	-0.208	-0.202	-0.758	-0.004	0.001
colgas	166.570	0.760	0.006	0.001	0.019	-0.011	0.096	0.296	-0.001	0.001
comn	8.604	0.160	0.024	0.092	0.076	0.306	0.105	0.288	-0.007	-0.050
cmtprod	14.000	-0.010	-0.013	-0.044	-0.040	-0.161	3.082	10.053	0.000	0.002
cofd	62.270	0.040	0.021	0.053	0.066	0.158	1.188	3.713	-0.007	-0.005
ctext	54.866	0.220	0.122	0.293	0.385	1.017	1.497	4.823	0.004	0.125
cwap	97.797	0.764	0.294	0.687	0.929	2.363	2.541	8.203	0.050	0.421
cwpap	106.097	0.079	0.089	0.211	0.278	0.719	0.045	0.125	-0.013	-0.105
cpetc	47.269	0.682	0.009	0.006	0.028	0.020	0.382	1.161	-0.004	-0.018
cchem	224.487	0.101	0.034	0.089	0.105	0.301	0.269	0.843	-0.004	-0.025
cbsprd	108.779	0.118	0.023	0.071	0.072	0.248	0.294	0.872	-0.006	-0.016
comanu	112.933	0.264	0.151	0.454	0.473	1.564	0.414	1.288	-0.013	-0.118
cmvh	296.899	-0.019	0.014	0.030	0.046	0.102	0.280	0.885	-0.002	-0.011
cotn	49.448	0.133	0.021	0.058	0.066	0.204	0.120	0.375	0.000	-0.006
cele	271.125	0.468	0.136	0.362	0.427	1.231	0.048	0.137	0.008	-0.046
cmach	317.173	-0.004	0.056	0.165	0.176	0.566	0.193	0.596	-0.004	-0.037
cutil	3.682	0.239	0.020	0.054	0.061	0.193	0.016	0.061	-0.005	-0.031
ccns	2.107	-0.040	0.002	0.034	0.005	0.110	-0.020	-0.032	-0.003	-0.007
ctrdt	119.153	0.149	0.088	0.223	0.275	0.746	-0.034	-0.072	-0.017	-0.108
cbserv	122.079	-0.243	0.002	0.014	0.007	0.042	-0.051	-0.118	-0.010	-0.049
coserv	63.330	-0.088	0.001	0.006	0.002	0.012	-0.106	-0.300	-0.009	-0.044

Table A4: GLOBE Results for Imports by Commodity Advanced East Asia

% change wrt Baseline 2008 – Scenarios 1-9

Sector	base	sim01	sim02	sim03	sim04	sim05	sim06	sim07	sim08	sim09
ccrop	29.246	0.402	0.153	0.320	0.479	1.066	4.070	13.390	-0.015	-0.088
canim	7.371	0.454	0.175	0.461	0.539	1.565	1.477	4.498	-0.026	-0.149
ccoa	15.820	0.483	0.082	0.245	0.254	0.849	0.273	0.833	-0.005	-0.046
colgas	134.452	0.812	0.075	0.186	0.232	0.590	0.422	1.301	0.002	0.018
comn	18.555	-0.174	0.107	0.454	0.329	1.645	0.500	1.458	-0.008	-0.096
cmtprod	14.918	0.398	0.124	0.282	0.387	0.952	6.620	23.507	-0.011	-0.031
cofd	49.703	0.503	0.184	0.429	0.573	1.408	4.327	14.232	-0.019	0.021
ctext	26.754	0.324	0.336	0.783	1.054	2.684	1.701	5.366	0.009	0.343
cwap	39.488	1.303	0.702	1.669	2.208	5.714	3.003	9.532	0.119	0.962
cwpap	40.541	0.397	0.199	0.450	0.621	1.483	0.858	2.577	-0.023	-0.151
cpetc	29.847	0.623	0.086	0.210	0.267	0.732	0.694	2.131	-0.009	-0.057
cchem	133.952	0.146	0.144	0.292	0.453	0.970	0.943	2.909	-0.014	-0.084
cbsprd	93.097	0.110	0.168	0.352	0.523	1.173	0.903	2.758	-0.026	-0.159
comanu	36.054	0.591	0.271	0.699	0.845	2.381	1.100	3.372	-0.026	-0.175
cmvh	47.889	0.161	0.136	0.269	0.428	0.892	1.974	6.226	-0.013	-0.055
cotn	30.865	0.010	0.129	0.283	0.402	0.951	0.404	1.199	-0.008	-0.038
cele	211.812	0.613	0.194	0.459	0.605	1.527	0.404	1.207	0.001	-0.063
cmach	190.808	0.164	0.132	0.328	0.413	1.109	0.711	2.152	-0.011	-0.072
cutil	1.128	1.053	0.136	0.304	0.423	0.987	0.538	1.653	-0.015	-0.066
ccns	6.835	0.727	0.173	0.381	0.537	1.255	0.541	1.641	-0.018	-0.073
ctrdt	111.228	0.812	0.233	0.527	0.725	1.767	0.446	1.345	-0.029	-0.175
cbserv	80.072	0.602	0.165	0.359	0.512	1.190	0.514	1.568	-0.024	-0.123
coserv	37.437	0.715	0.137	0.288	0.427	0.949	0.410	1.217	-0.018	-0.089

Table A5: GLOBE Results for Imports by Commodity India

% change wrt Baseline 2008 – Scenarios 1-9

Sector	base	sim01	sim02	sim03	sim04	sim05	sim06	sim07	sim08	sim09
ccrop	2.593	-0.908	-0.048	-0.005	-0.150	-0.059	4.482	14.703	-0.018	-0.165
canim	0.326	-0.901	-0.039	0.023	-0.114	0.016	1.843	5.561	-0.018	-0.190
ccoa	1.537	1.717	-0.090	0.246	-0.283	1.997	5.187	17.607	-0.011	-0.148
colgas	29.808	1.161	-0.026	0.034	-0.081	0.094	1.081	3.255	-0.009	-0.083
comn	10.188	0.513	0.028	-0.236	0.087	-0.744	0.683	2.066	-0.009	0.049
cmtprod	0.060	-0.939	-0.039	0.050	-0.120	0.155	5.412	18.271	-0.020	-0.165
cofd	3.457	-0.758	-0.080	-0.015	-0.250	-0.144	12.316	49.902	-0.014	-0.148
ctext	2.764	0.117	0.391	1.100	1.230	3.803	3.452	10.961	0.024	0.457
cwap	0.582	0.616	0.134	0.451	0.425	1.559	2.055	6.254	-0.001	0.022
cwpap	2.241	-0.719	-0.028	0.073	-0.088	0.234	2.052	6.203	-0.021	-0.178
cpetc	2.891	0.919	-0.009	0.106	-0.029	0.326	1.344	4.061	-0.013	-0.130
cchem	14.393	-0.077	0.033	0.177	0.103	0.590	2.004	6.143	-0.021	-0.194
cbsprd	19.628	0.279	-0.027	0.038	-0.084	0.134	2.162	6.734	-0.009	-0.085
comanu	4.536	-0.110	0.030	0.231	0.093	0.773	1.969	5.893	-0.020	-0.200
cmvh	1.643	-0.511	-0.040	0.014	-0.117	0.045	3.818	12.417	-0.014	-0.151
cotn	3.389	-0.225	-0.043	0.027	-0.133	0.097	1.067	3.028	-0.010	-0.123
cele	8.736	0.520	0.079	0.323	0.247	1.101	-0.306	-1.220	-0.001	-0.130
cmach	14.864	0.214	0.010	0.143	0.029	0.479	1.630	4.869	-0.010	-0.116
cutil	0.107	-0.323	0.005	0.174	0.014	0.595	-0.874	-2.880	-0.025	-0.207
ccns	0.879	-1.201	-0.018	0.093	-0.057	0.315	-1.179	-3.893	-0.018	-0.170
ctrdt	6.209	-0.906	0.016	0.181	0.049	0.609	-0.801	-2.689	-0.029	-0.242
cbserv	12.321	0.319	-0.030	0.071	-0.095	0.243	-0.650	-2.232	-0.029	-0.234
coserv	1.592	-1.175	-0.031	0.063	-0.099	0.212	-0.926	-3.144	-0.024	-0.209

Table A6: GLOBE Results for Imports by Commodity Mercosur

Sector	base	sim01	sim02	sim03	sim04	sim05	sim06	sim07	sim08	sim09
ccrop	3.985	-0.028	-0.012	0.074	-0.038	0.236	1.655	5.565	-0.007	-0.089
canim	0.294	0.132	0.007	0.124	0.021	0.400	2.803	10.349	-0.008	-0.080
ccoa	1.417	-0.127	-0.019	0.110	-0.059	0.590	0.121	0.333	0.001	-0.026
colgas	10.570	1.582	-0.011	0.059	-0.036	0.178	0.497	1.659	-0.002	-0.024
comn	1.999	-0.259	-0.003	0.165	-0.011	0.569	0.484	1.412	-0.004	-0.073
cmtprod	0.906	0.148	-0.009	0.046	-0.028	0.151	1.127	3.858	-0.004	-0.039
cofd	4.660	0.074	-0.011	0.092	-0.036	0.295	2.052	6.825	-0.007	-0.074
ctext	4.067	0.184	0.105	0.342	0.331	1.186	2.457	8.067	-0.003	0.047
cwap	2.359	0.949	0.523	1.425	1.650	4.922	3.210	10.669	0.109	0.825
cwpap	4.186	-0.016	-0.010	0.102	-0.032	0.342	1.602	5.241	-0.008	-0.070
cpetc	5.194	1.094	0.017	0.184	0.054	0.618	0.311	1.101	-0.011	-0.118
cchem	33.254	0.042	0.006	0.120	0.018	0.396	1.374	4.462	-0.005	-0.062
cbsprd	6.916	-0.094	0.007	0.131	0.021	0.447	1.352	4.311	-0.005	-0.019
comanu	3.978	0.138	0.082	0.399	0.255	1.370	2.762	9.067	-0.012	-0.132
cmvh	12.310	-0.059	-0.007	0.074	-0.021	0.248	1.703	5.665	0.002	-0.018
cotn	6.123	-0.188	0.011	0.141	0.033	0.473	0.586	1.976	-0.005	-0.059
cele	14.223	0.006	0.028	0.203	0.087	0.689	1.133	3.672	0.001	-0.049
cmach	24.581	-0.116	0.012	0.167	0.036	0.564	1.468	4.763	0.002	-0.026
cutil	2.305	0.339	0.004	0.158	0.013	0.545	0.207	0.787	-0.008	-0.083
ccns	0.112	0.358	-0.015	0.171	-0.049	0.564	0.295	1.226	-0.004	-0.066
ctrdt	13.222	0.260	0.023	0.255	0.072	0.854	0.192	0.895	-0.014	-0.139
cbserv	13.080	-0.050	-0.007	0.180	-0.023	0.601	0.204	0.933	-0.013	-0.127
coserv	4.870	0.226	-0.018	0.150	-0.058	0.497	0.118	0.647	-0.009	-0.106

Table A7: GLOBE Results for Imports by Commodity Rest of World – % change wrt Baseline 2008 – Scenarios 1-9

Sector	Base	sim01	sim02	sim03	Sim04	sim05	sim06	sim07	sim08	sim09
ccrop	60.180	-0.319	0.028	0.092	0.088	0.323	2.462	7.956	-0.014	-0.130
canim	8.062	-0.526	0.028	0.095	0.088	0.369	1.151	3.681	-0.012	-0.100
ccoa	6.240	0.385	0.031	0.050	0.096	0.044	0.258	0.774	-0.007	-0.067
colgas	88.213	0.535	0.029	0.077	0.089	0.309	0.369	1.151	-0.001	-0.011
comn	21.964	-0.153	0.022	0.142	0.068	0.539	0.544	1.661	-0.003	0.025
cmtprod	27.338	-0.492	0.018	0.043	0.058	0.189	3.229	11.037	-0.006	-0.045
cofd	96.827	-0.344	0.009	0.072	0.030	0.257	3.054	10.022	-0.009	-0.071
ctext	80.540	0.111	0.083	0.208	0.265	0.738	2.259	7.330	-0.041	-0.261
cwap	51.194	-0.034	0.292	0.721	0.923	2.530	2.395	7.812	0.042	0.352
cwpap	70.143	-0.139	0.019	0.073	0.061	0.264	1.232	3.840	-0.011	-0.067
cpetc	63.316	0.158	0.035	0.115	0.108	0.486	1.505	4.775	-0.009	-0.080
cchem	243.843	0.002	0.030	0.074	0.095	0.252	0.848	2.639	-0.010	-0.084
cbsprd	161.157	-0.150	0.024	0.083	0.073	0.291	0.908	2.799	-0.007	-0.027
comanu	83.127	-0.320	0.055	0.180	0.171	0.650	1.265	3.966	-0.009	-0.072
cmvh	139.155	-0.193	0.019	0.057	0.063	0.215	1.316	4.231	0.002	-0.004
cotn	67.396	-0.165	0.019	0.080	0.061	0.302	0.513	1.603	-0.001	-0.029
cele	178.152	0.158	0.037	0.092	0.115	0.296	0.496	1.473	0.001	0.003
cmach	305.267	-0.213	0.030	0.091	0.093	0.328	0.466	1.411	0.001	-0.007
cutil	9.377	-0.287	0.022	0.076	0.070	0.271	0.130	0.380	-0.011	-0.078
ccns	12.654	-0.838	0.027	0.120	0.084	0.438	-0.304	-0.957	-0.005	-0.053
ctrdt	520.071	0.119	0.139	0.413	0.433	1.429	0.827	2.649	0.031	0.232
cbserv	124.859	-0.186	0.030	0.111	0.093	0.405	-0.036	-0.091	-0.016	-0.119
coserv	62.864	-0.643	0.024	0.092	0.074	0.348	-0.341	-1.077	-0.010	-0.086

Table A9: GLOBE Results for Exports by Commodity China –

Sector	base	sim01	sim02	sim03	sim04	sim05	sim06	sim07	sim08	sim09
ccrop	6.734	0.740	0.789	2.007	2.459	6.831	5.040	17.138	1.215	12.054
canim	3.541	0.914	0.602	2.112	1.866	7.267	0.932	2.843	-0.062	6.009
ccoa	4.161	-0.297	0.708	1.467	2.210	2.897	0.378	1.168	-0.093	-0.737
colgas	0.982	-3.127	0.705	2.356	2.205	9.085	-0.257	-0.799	-0.186	-1.494
comn	3.000	-0.283	0.861	1.303	2.688	4.708	-0.023	-0.104	-0.116	-1.369
cmtprod	1.941	1.151	0.857	2.502	2.689	8.728	2.627	7.901	0.087	3.042
cofd	17.937	0.808	0.757	1.998	2.353	6.769	3.680	11.977	0.800	14.514
ctext	59.392	0.722	1.148	3.139	3.586	10.827	2.991	9.552	0.536	7.437
cwap	108.727	1.714	1.526	3.440	4.809	11.773	3.761	12.072	0.963	6.847
cwpap	28.509	1.084	1.013	2.574	3.163	8.847	0.561	1.729	-0.079	-0.952
cpetc	9.302	-1.217	0.463	1.488	1.441	5.533	0.535	1.678	-0.103	-0.845
cchem	56.395	0.090	0.909	2.525	2.844	8.811	0.914	2.764	0.154	0.033
cbsprd	43.058	0.434	0.839	2.313	2.617	7.954	0.921	2.781	0.060	-0.681
comanu	68.217	1.199	0.898	2.650	2.801	9.116	0.894	2.692	0.171	0.076
cmvh	14.715	0.428	0.716	2.296	2.195	7.851	0.107	0.188	-0.148	-0.852
cotn	12.634	0.768	1.172	3.030	3.662	10.373	1.894	6.034	0.027	0.048
cele	201.170	3.370	1.378	3.526	4.292	11.902	0.713	2.103	0.217	0.004
cmach	117.669	0.280	0.884	2.813	2.767	9.759	0.597	1.751	0.038	-0.493
cutil	0.965	0.172	0.651	1.852	2.027	6.680	-0.226	-0.711	-0.095	-0.847
ccns	2.028	0.997	0.783	2.136	2.419	7.078	0.019	-0.022	-0.038	-0.385
ctrdt	137.455	0.936	0.773	1.930	2.412	6.579	0.158	0.469	-0.069	-0.574
cbserv	31.080	0.611	0.741	1.856	2.307	6.278	-0.196	-0.657	-0.107	-0.854
coserv	10.365	0.941	0.569	1.362	1.760	4.507	-0.368	-1.185	-0.128	-0.963

Table A10: GLOBE Results for Exports by Commodity European Union

% change wrt Baseline 2008 – Scenarios 1-9

Sector	base	sim01	sim02	sim03	sim04	sim05	sim06	sim07	sim08	sim09
canim	17.517	0.006	0.058	0.238	0.171	0.773	0.254	0.798	0.137	1.201
cbserv	431.437	-0.029	-0.004	0.009	-0.012	0.037	0.024	0.095	-0.006	-0.025
cbsprd	232.364	0.023	0.011	0.129	0.032	0.441	0.247	0.793	0.043	1.280
cchem	629.754	0.129	0.001	0.019	0.000	0.059	0.125	0.407	0.044	0.330
ccns	25.606	-0.269	0.001	-0.003	0.003	-0.001	-0.012	-0.041	0.001	0.011
ccoa	1.418	-0.608	0.012	0.044	0.037	-0.194	0.012	0.101	0.002	0.281
ccrop	53.807	0.101	-0.004	0.034	-0.011	0.120	-0.309	-0.940	-0.058	-0.470
cele	260.247	-0.302	-0.109	-0.286	-0.339	-0.949	0.061	0.230	-0.037	0.183
cmach	650.844	0.041	0.037	0.008	0.111	-0.013	0.242	0.764	0.141	0.774
cmtprod	68.426	0.000	0.016	0.041	0.048	0.141	0.561	1.746	0.009	-0.009
cmvh	498.673	0.113	0.089	0.123	0.285	0.398	0.224	0.709	0.126	0.537
cofd	163.182	0.045	0.026	0.068	0.081	0.240	0.468	1.537	-0.007	-0.242
colgas	19.388	3.701	0.005	0.076	0.016	0.328	-0.052	-0.109	-0.020	-0.196
comanu	159.951	-0.094	-0.015	-0.106	-0.047	-0.373	0.325	1.021	0.024	0.164
comn	25.732	-0.276	0.034	0.080	0.102	0.317	0.334	1.108	0.043	1.693
coserv	110.369	-0.269	-0.010	-0.003	-0.032	-0.002	-0.073	-0.203	-0.016	-0.090
cotn	108.963	0.003	-0.022	-0.054	-0.072	-0.187	-0.078	-0.213	0.024	0.083
cpetc	60.419	0.937	0.005	0.020	0.014	0.066	0.360	1.170	0.021	0.180
ctext	87.246	-0.186	-0.119	-0.239	-0.374	-0.817	-0.368	-1.171	-0.087	-1.108
ctrdt	479.080	0.043	0.029	0.116	0.090	0.407	0.457	1.487	0.011	0.118
cutil	18.622	-0.140	-0.007	0.005	-0.021	0.017	0.040	0.144	-0.001	0.022
cwap	88.501	-0.414	-0.202	-0.499	-0.634	-1.680	-0.543	-1.746	-0.199	-1.494
cwpap	186.920	0.040	0.001	0.045	0.002	0.152	0.268	0.853	0.020	0.411

Table A11: GLOBE Results for Exports by Commodity NAFTA

Sector	base	sim01	sim02	sim03	sim04	sim05	sim06	sim07	sim08	sim09
Ccrop	53.251	-0.097	-0.013	0.386	-0.045	1.197	2.155	6.940	0.010	0.082
Canim	7.127	0.140	0.076	0.541	0.209	1.721	1.171	3.696	0.004	-0.068
Ccoa	3.621	-0.491	0.039	0.525	0.122	2.786	0.353	1.078	0.006	0.030
Colgas	52.319	-0.456	0.013	0.048	0.040	0.173	-0.069	-0.206	0.003	0.001
Comn	10.389	-0.278	0.013	0.439	0.037	1.463	0.195	0.595	0.009	-0.078
cmtprod	13.672	0.168	0.091	0.113	0.280	0.372	4.767	17.100	0.000	0.011
Cofd	43.163	0.147	0.082	0.216	0.255	0.730	2.724	8.813	-0.004	-0.111
Ctext	22.957	-0.100	-0.164	-0.343	-0.517	-1.180	-0.875	-2.734	-0.034	-0.446
Cwap	14.954	-0.330	-0.265	-0.703	-0.830	-2.359	-1.258	-3.803	-0.083	-0.639
Cwpap	83.002	0.010	-0.036	0.075	-0.114	0.225	0.223	0.689	0.006	0.007
Cpetc	24.306	-0.063	0.037	0.113	0.112	0.359	0.464	1.440	0.003	0.011
Cchem	199.443	0.024	0.119	0.151	0.377	0.481	0.584	1.791	-0.005	-0.031
Cbsprd	70.144	-0.263	-0.005	0.244	-0.019	0.827	0.138	0.412	0.001	-0.080
comanu	51.341	-0.197	-0.052	-0.227	-0.165	-0.781	0.351	1.060	-0.002	0.028
Cmvh	190.656	-0.058	0.038	0.077	0.116	0.248	0.013	0.015	-0.010	-0.049
Cotn	83.129	-0.243	0.023	0.006	0.069	0.011	0.182	0.471	-0.003	-0.014
Cele	169.127	-0.768	-0.131	-0.326	-0.403	-1.077	0.287	0.845	-0.021	0.005
Cmach	270.660	-0.046	-0.003	-0.050	-0.011	-0.194	0.263	0.762	-0.017	-0.068
Cutil	3.667	-0.138	-0.013	-0.036	-0.040	-0.132	0.088	0.261	0.011	0.063
Ccns	4.745	0.001	0.034	0.049	0.107	0.176	0.134	0.339	0.006	0.012
Ctrdt	129.602	0.161	0.025	0.067	0.080	0.241	0.454	1.376	0.027	0.181
Cbserv	138.823	0.399	0.016	0.029	0.051	0.105	0.200	0.566	0.016	0.088
Coserv	96.943	0.138	0.008	0.010	0.025	0.045	0.085	0.210	0.011	0.058

TableA12: GLOBE Results for Exports by Commodity Advanced East Asia

% change wrt Baseline 2008 – Scenarios 1-9

Sector	base	sim01	sim02	sim03	Sim04	sim05	sim06	sim07	sim08	sim09
ccrop	29.246	0.402	0.153	0.320	0.479	1.066	4.070	13.390	-0.015	-0.088
canim	7.371	0.454	0.175	0.461	0.539	1.565	1.477	4.498	-0.026	-0.149
ccoa	15.820	0.483	0.082	0.245	0.254	0.849	0.273	0.833	-0.005	-0.046
colgas	134.452	0.812	0.075	0.186	0.232	0.590	0.422	1.301	0.002	0.018
comn	18.555	-0.174	0.107	0.454	0.329	1.645	0.500	1.458	-0.008	-0.096
cmtprod	14.918	0.398	0.124	0.282	0.387	0.952	6.620	23.507	-0.011	-0.031
Cofd	49.703	0.503	0.184	0.429	0.573	1.408	4.327	14.232	-0.019	0.021
ctext	26.754	0.324	0.336	0.783	1.054	2.684	1.701	5.366	0.009	0.343
cwap	39.488	1.303	0.702	1.669	2.208	5.714	3.003	9.532	0.119	0.962
cwpap	40.541	0.397	0.199	0.450	0.621	1.483	0.858	2.577	-0.023	-0.151
cpetc	29.847	0.623	0.086	0.210	0.267	0.732	0.694	2.131	-0.009	-0.057
cchem	133.952	0.146	0.144	0.292	0.453	0.970	0.943	2.909	-0.014	-0.084
cbsprd	93.097	0.110	0.168	0.352	0.523	1.173	0.903	2.758	-0.026	-0.159
comanu	36.054	0.591	0.271	0.699	0.845	2.381	1.100	3.372	-0.026	-0.175
cmvh	47.889	0.161	0.136	0.269	0.428	0.892	1.974	6.226	-0.013	-0.055
cotn	30.865	0.010	0.129	0.283	0.402	0.951	0.404	1.199	-0.008	-0.038
Cele	211.812	0.613	0.194	0.459	0.605	1.527	0.404	1.207	0.001	-0.063
cmach	190.808	0.164	0.132	0.328	0.413	1.109	0.711	2.152	-0.011	-0.072
cutil	1.128	1.053	0.136	0.304	0.423	0.987	0.538	1.653	-0.015	-0.066
ccns	6.835	0.727	0.173	0.381	0.537	1.255	0.541	1.641	-0.018	-0.073
ctrdt	111.228	0.812	0.233	0.527	0.725	1.767	0.446	1.345	-0.029	-0.175
cbserv	80.072	0.602	0.165	0.359	0.512	1.190	0.514	1.568	-0.024	-0.123
coserv	37.437	0.715	0.137	0.288	0.427	0.949	0.410	1.217	-0.018	-0.089

Table A13: GLOBE Results for Exports by Commodity India

Sector	base	sim01	sim02	sim03	sim04	sim05	sim06	sim07	sim08	sim09
ccrop	4.299	0.752	0.040	0.026	0.125	0.078	2.860	9.536	0.002	0.012
canim	0.257	1.263	0.003	-0.008	0.007	-0.012	2.261	7.616	0.012	-0.010
ccoa	0.046	-1.778	-0.018	-0.378	-0.053	-1.871	1.449	4.407	0.004	0.102
colgas	0.000	-2.465	0.053	-0.195	0.166	-0.501	-0.802	-2.286	-0.002	0.030
comn	5.587	-4.994	-0.333	3.934	-1.023	12.911	2.188	7.645	0.097	-0.189
cmtprod	0.769	1.262	0.077	0.044	0.240	0.208	3.812	15.361	0.011	0.115
Cofd	5.892	1.019	0.092	0.074	0.287	0.275	2.345	7.578	0.003	-0.021
ctext	11.173	0.136	-0.159	-0.537	-0.500	-1.827	3.500	11.684	-0.073	-0.894
cwap	10.548	-1.279	-0.282	-1.102	-0.882	-3.661	5.975	20.573	-0.268	-1.808
cwpap	1.132	0.910	0.054	-0.045	0.167	-0.134	2.181	7.239	0.016	0.121
cpetc	4.018	-0.230	0.026	-0.024	0.080	0.044	3.018	9.632	-0.001	0.016
cchem	13.025	0.339	0.095	-0.020	0.293	-0.094	2.801	9.305	0.004	0.098
cbsprd	8.891	-0.867	0.123	0.499	0.380	1.755	2.572	8.635	0.018	0.091
comanu	18.967	0.124	-0.042	-0.311	-0.131	-1.042	2.295	7.722	0.011	0.243
cmvh	2.680	0.387	0.054	-0.011	0.162	-0.036	2.929	9.491	0.001	0.096
cotn	1.070	0.150	0.078	-0.027	0.244	-0.097	3.543	11.883	0.009	0.139
Cele	1.226	-1.638	-0.057	-0.360	-0.175	-1.192	3.182	10.520	-0.009	0.175
cmach	6.103	-0.828	0.037	-0.109	0.116	-0.373	2.086	6.904	-0.002	0.108
cutil	0.008	0.593	0.009	-0.140	0.029	-0.451	1.771	5.937	0.037	0.304
ccns	0.370	1.262	0.039	-0.026	0.124	-0.088	1.996	6.534	0.026	0.215
ctrdt	9.974	1.702	0.098	0.070	0.305	0.250	2.093	6.978	0.049	0.414
cbserv	14.134	-0.726	0.060	-0.103	0.190	-0.345	1.738	5.894	0.046	0.381
coserv	1.475	2.040	0.047	-0.065	0.148	-0.216	0.953	3.259	0.026	0.238

Table A14: GLOBE Results for Exports by Commodity Mercosur – % change wrt Baseline 2008 – Scenarios 1-9

Sector	base	sim01	sim02	sim03	sim04	sim05	sim06	sim07	sim08	sim09
ccrop	25.227	0.641	0.035	0.232	0.099	0.672	2.156	6.280	0.000	0.028
canim	1.178	-0.068	0.051	-0.127	0.160	-0.402	1.969	6.785	-0.001	-0.118
ccoa	2.125	3.877	0.062	-0.386	0.195	-1.879	-0.534	-2.176	0.005	0.130
colgas	8.553	-1.518	0.012	-0.187	0.038	-0.564	0.018	-0.197	0.007	0.091
comn	16.668	1.064	-0.046	0.953	-0.137	3.174	-0.226	-1.339	0.020	-0.068
cmtprod	9.992	-0.230	0.055	-0.190	0.168	-0.621	7.570	29.840	0.008	0.111
Cofd	27.486	0.332	-0.004	0.035	-0.012	0.081	1.890	5.666	-0.011	-0.178
ctext	2.588	0.292	-0.090	-0.570	-0.258	-1.872	0.270	0.377	-0.055	-0.553
cwap	6.288	-0.227	-0.284	-1.034	-0.893	-3.438	-0.047	-0.693	-0.134	-0.879
cwpap	13.734	0.263	-0.050	-0.024	-0.151	-0.132	0.042	-0.345	0.008	0.044
cpetc	6.698	-0.953	0.028	-0.109	0.086	-0.332	0.810	2.510	0.003	0.059
cchem	15.641	0.449	0.028	-0.173	0.087	-0.580	-0.314	-1.349	-0.005	0.021
cbsprd	28.057	0.688	0.016	0.383	0.050	1.326	0.026	-0.531	0.004	-0.072
comanu	2.527	0.046	-0.027	-0.296	-0.084	-0.992	0.029	-0.361	-0.001	0.067
cmvh	14.002	0.237	0.059	-0.102	0.179	-0.351	-0.026	-0.520	-0.023	-0.036
cotn	5.574	0.653	0.045	-0.263	0.141	-0.881	-0.139	-1.051	-0.002	0.097
Cele	2.533	-0.125	-0.045	-0.424	-0.138	-1.399	-0.559	-2.127	-0.016	0.076
cmach	11.169	0.340	0.004	-0.256	0.016	-0.851	-0.653	-2.516	-0.011	0.017
cutil	2.092	-0.157	0.007	-0.101	0.024	-0.325	-0.288	-1.193	0.009	0.076
ccns	0.101	-0.658	0.037	-0.133	0.118	-0.428	-0.104	-0.739	0.010	0.098
ctrdt	17.072	-0.031	0.068	-0.069	0.213	-0.207	0.254	0.404	0.033	0.295
cbserv	9.102	0.110	0.037	-0.166	0.116	-0.547	-0.145	-0.877	0.019	0.175
coserv	3.267	-0.704	0.027	-0.177	0.085	-0.581	-0.348	-1.442	0.011	0.125

Table A15: GLOBE Results for Exports by Commodity Rest of World

Sector	base	sim01	sim02	sim03	Sim04	sim05	sim06	sim07	sim08	sim09
ccrop	60.599	-0.296	0.017	0.190	0.052	0.538	2.437	8.116	-0.004	-0.050
canim	10.749	0.126	-0.008	0.173	-0.038	0.358	1.043	3.187	0.001	-0.175
ccoa	12.785	0.293	-0.016	1.880	-0.050	13.542	0.333	1.015	0.015	0.137
colgas	548.128	0.810	0.004	-0.005	0.012	-0.039	0.317	0.984	0.010	0.085
comn	38.158	0.669	-0.010	0.431	-0.033	1.332	0.742	2.268	0.019	-0.039
cmtprod	9.400	-0.043	0.000	-0.043	-0.003	-0.224	2.549	8.559	0.006	0.045
Cofd	95.178	-0.173	-0.009	0.223	-0.030	0.612	3.874	13.189	-0.007	-0.194
ctext	66.306	0.441	-0.152	-0.388	-0.475	-1.438	2.360	7.494	-0.110	-1.357
cwap	90.688	1.350	-0.242	-0.685	-0.756	-2.420	2.884	9.242	-0.224	-1.550
cwpap	58.757	-0.223	-0.034	0.185	-0.110	0.464	0.909	2.743	0.017	0.043
cpetc	92.705	0.859	0.090	0.199	0.277	0.581	0.905	2.806	0.009	0.075
cchem	183.838	0.204	0.231	0.222	0.730	0.583	1.275	3.968	-0.010	-0.004
cbsprd	182.624	0.042	-0.006	0.206	-0.023	0.677	1.052	3.237	0.004	-0.068
comanu	63.550	0.159	-0.051	-0.230	-0.159	-0.846	0.800	2.421	-0.002	0.069
cmvh	40.204	-0.956	0.017	0.004	0.045	-0.047	0.763	2.354	-0.027	-0.072
cotn	26.985	-0.136	-0.041	-0.166	-0.126	-0.609	0.928	2.852	0.002	0.089
Cele	192.212	0.878	-0.037	-0.184	-0.118	-0.801	0.809	2.382	0.008	0.121
cmach	149.989	0.070	0.020	-0.129	0.060	-0.559	1.105	3.412	-0.037	-0.087
cutil	12.343	0.931	-0.013	-0.054	-0.041	-0.206	0.344	1.079	0.016	0.114
ccns	7.839	0.761	-0.002	-0.036	-0.005	-0.144	0.524	1.556	0.016	0.102
ctrdt	627.241	0.403	0.105	0.300	0.327	1.011	0.971	3.082	0.042	0.320
cbserv	99.025	-0.056	-0.014	-0.084	-0.045	-0.335	0.355	1.076	0.024	0.181
coserv	50.423	0.296	-0.015	-0.077	-0.047	-0.292	0.116	0.315	0.019	0.150