The Global Economic Crisis and China’s Development and Trade: Evidence-based Policy Responses and Choices

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ABSTRACT

Regional and global economic crises deeply affect all economies worldwide but especially developing Asia where trade and FDI have been crucial ingredients of growth and poverty reduction (World Bank, 2009). The paper introduces a new endogenous trade-growth model embracing crises with improved structural and modelling features over existing approaches (such as descriptive analysis, panel regression and CGE/GTAP, see Tran Van Hoa, 2004) to provide more credible outcomes in the sense of Friedman (1953)-Kydland data-model realism or consistency (2006) to study the impact of these crises on China. Appropriate policy responses and choices are then recommended for informed debates by researchers and for possible use as important inputs by policy-makers.

Keywords: Global financial crisis, China’s economic development, econometric modelling and forecasts, endogenous trade-growth theory, economic and trade policy.

JEL: C51, F13, F17

1 INTRODUCTION

The importance of crises and reforms and their incorporation in realistic economic policy models have been strongly advocated over the years even by eminent neoclassical economists such as Johansen (1982). The issue has been made more pressing with the 1997 Asia meltdown (Tran Van Hoa, 2000a and 2000b) and the current global economic and financial crisis (GEC) (Stiglitz, 2009; World Bank, 2009). In spite of their importance however, only limited research on this crucial specification issue in policy modelling has been carried out or reported in recent years (see Tran Van Hoa, 2004; Edwards, 2006; Cerra and Saxena, 2008). In addition, the methodologies that are available for this kind of study (e.g., the popular CGE/GTAP or fixed-effect panel regression) have serious structural and modelling limitations and
may not be appropriate for the study. The paper adapts the so-called generalised or endogenous gravity theory (e.g., Tran Van Hoa, 2004) to introduce a new and simple (Friedman, 1953) endogenous trade-growth model with improved structural and modelling features (see below) to study the GEC impact on China. Using historical data and suitable system estimation, the paper will provide efficient and credible empirical outcomes in the sense of Friedman (1953) and Kydland (2006) to study this impact. Significantly, it will provide substantive inputs to analysis and debates on appropriate policy responses and choices to crises for use by national and international researchers, analysts, consulting advisers and policy-makers.

2 RECENT TRENDS IN DEVELOPMENT IN CHINA

The recent trends in growth and its average achievement in China and its seven major regional and global trade partners and rivals (i.e., the US, the European Union (EU), Japan, Korea, South East Asia (SEA), India and Australia) over the period 1991-2008 are given in Charts 1 and 2. We note in Chart 1 that China’s growth peaked during its reform in the early 1990s and had slightly declined since. With a mild growth after the 1997 Asia crisis, China’s growth had picked up but only slowly till 2004. During the period, China’s average growth is seen as well exceeding that of its seven major trade partners with an annual average of 10.26 per cent, as compared to 6.36 per cent for India, 5.49 per cent for Korea, 5.16 per cent for SEA, 3.43 per cent for Australia, 2.81 per cent for the US, 2.02 per cent for the EU, and 1.29 per cent for Japan. The trends are also seen as reflecting fairly accurately the effects of policy reforms (e.g., the early 1990 reform in China), economic and financial crises (e.g., the Asia 1997 crisis and its devastating impact on a major East Asia economy, namely Korea, SEA and Japan), and sudden shocks (e.g., the 2001 terrorist attacks on the World Trade Center in New York for the US). The overall close co-movement of growth and its magnitude in the US and Australia during this period is an interesting fact on the outcomes of economic system and structure, management and achievements of the two countries.

While there is a large literature on the many causal factors contributing to (and theories explaining) this growth in China (and other open economies) (e.g., see Levine and Renelt, 1992; Easterly, 2007)), the paper is focused on the commodity and decommoditised (i.e., FDI and services) trade aspects of growth theory and their econometric and testable modelling, and within the economy’s prevailing conditionality environment (Tran Van Hoa, 2005; Krueger, 2007). These aspects are consistent with China’s recent development and openness (i.e., exports- and FDI-led growth) policy, the scope of liberalised merchandise trade embodied in China’s World Trade Organisation (WTO) membership, and the decommoditised trade and competitiveness coverage of regional trade agreements (RTAs) and bilateral trade agreements (BTAs), and the data availability of the unified System of National Accounts 1993 (SNA93).

3 A MODEL OF CHINA’S TRADE-GROWTH INCORPORATING CRISES AND REFORMS

In a number of recent papers, Tran Van Hoa (e.g., 2002a) uses a simple, new and general modelling approach, the endogenous gravity theory, to empirically study trade and its testable causal link to growth in major developing countries in Asia. A new
endogenous trade-growth-crisis (ETGC) model for China with significant improved features is adapted for the present paper. The major and novel structural and modelling features of an ETGC model over existing approaches can be briefly described as follows. First, unlike other modelling studies in this genre (e.g., CGE/GTAP and growth or panel regression), it assumes no a priori (e.g., linear or log-linear) functional form. Second, it recognises country-specific or heterogeneity characteristics of each economy. Third, it covers comprehensive trade in goods and


Notes: In Charts 1-2, data are from USDA (2009), and own calculations.

other factors of production (i.e., FDI and services), and, fourth, other reform, crises and non-economic events (Johansen, 1982) that have affected trade and growth globally or in the region in recent years. Fifth, it importantly incorporates explicitly the interdependence (endogeneity) between trade, growth and major macroeconomic conditions or activities in the trading economies (Krueger, 2007).

Other existing modelling approaches for this kind of trade-growth impact study are inappropriate or not credible (or realistic) for policy uses because of their structural and econometric limitations and subsequently less acceptable outcomes. For example, the CGE/GTAP is essentially confirmatory in nature with its assumed causal functional relationships and given impact parameters. The gravity theory (Frankel and
Romer, 1999) deals principally with cross-section data and is beset with serious cross-
country heterogeneity bias when fixed-effect panel regression is used for all diverse
countries. The growth regression is econometrically fragile (Levine and Renelt, 1992)
and lacks the well-known circular causality (endogeneity) in the sense of Marshall or
Haavelmo among economic activities (e.g., trade, growth, monetary, fiscal and
industry policies) (see also Krueger, 2007). The specification of a linear function for
empirical trade-growth-crisis studies has been increasingly regarded as unsuitable
(Minier, 2007). Previous ETGC studies have also demonstrated the excellent
modelling performance of the EGT models when this performance is assessed by the
Friedman ‘fruitfulness’ (1953) or Kydland data-model consistency (2006) criteria.
Finally, as the economic variables in the ETGC model (being planar approximations
to any functional form) are expressed as their rates of change (or equivalently log
differences when appropriate), the model’s findings can be regarded as long-run
outcomes in the sense of Engle and Granger causality if all of these variables are
integrated of degree one or as short-term Granger causality if they are I(0).

The Model - The ETGC model for China to explore the causal aspects of trade, crisis
and growth relationship, and with features relevant to its development in the past 15
years (when data are available) can be written arbitrarily (or in function-free form
without a priori assumptions about the exact functional forms) as two implicit
functions [for GDP and trade (T) and their testable economic and trade, FDI, services
(SV, trade partners GDP (YT), terms of trade (TT), exchange rates (XR), and crisis
or reform (CR) determinants as

\[
\text{GDP} = \text{GDP}(T, FDI, SV, CR) \quad (1)
\]

\[
T = T(\text{GDP}, YT, TT, XR, CR) \quad (2)
\]

Using Taylor’s series expansions for the functions and neglecting second and higher-
order differentials (see Tran Van Hoa, 2004; See also Baier and Berstrand, 2008, for a
recent use of this approach to deal with possible nonlinearity), the 2-equation model
for GDP and T above can be written equivalently and including comprehensive trade
(see below) and crises or reforms for empirical implementation as

\[
Y\% = a_1 + a_2T\% + a_3FDI\% + a_4SV\% + a_5CR + u_1 \quad (3)
\]

\[
T\% = p_1 + p_2Y\% + p_3YT\% + p_4TT\% + p_5XR\% + p_6CR + u_2 \quad (4)
\]

Where % denotes the rate of change and the u’s represent error terms or omitted
determinants (Frankel and Romer, 1999). The model’s economic-theoretic rationale
can be briefly described as follows. In equations (3)-(4), China’s GDP growth (Y\%) is
assumed to be (or to be tested) as being dependent on its trade or openness (T), FDI
and financial services (SV), crises, shocks or policy reforms (CR). But this
endogenous trade and factors of production for example are also affected by economic
activities (see below), trade-related policies (TT, XR) – see Coe and Helpman, 1993 –
and structural change – see Johansen, 1982; Tran Van Hoa, 2002a; Edwards, 2007;
Vera and Sexona, 2008) in China and its trading partners. Assuming for convenience
and for lack of sufficient sampling sizes for the data, that the GDP of China’s major
trade partners (e.g., the OECD) is a proxy for all variables reflecting their own
economic activities in addition to policy reforms and shocks, then the reduced-form
equation for T (and GDP, FDI and SV), in our two-simultaneous equation model,
simply assumes that China’s trade with the world is crucially affected by the
exogenous factors such as the world’s GDP (named YT), fiscal policy, monetary policy, inflation pressure – see Romer (1993), XR – see Rose (2000), industry policy – see Otto et. al. (2002), population (POP) – see Frankel and Romer (1999), and CR – see Johansen (1982) and Tran Van Hoa (2004).

Equation (4) is in fact a derived demand equation for China’s tradable commodities reflecting essentially the world’s demand for China’s products and China’s domestic supply conditions, as postulated in standard microeconomic and international trade theory. The model’s exogenous factors (or instrumental variables) explicitly constitute China’s domestic and international micro and macroeconomic conditioning environment. These conditioning variables have been only scarcely incorporated in econometric models in this genre to date. The tests for significant causality between China’s trade with the world and their impact on China’s growth in a crisis situation are then based on the testing of the structural equations (3)-(4) above by appropriate statistical estimation and testing procedures.

The Data - Data for the models’ estimation were obtained from China-NBS, France-CHELEM, UK-Economic Intelligence Unit (EIU), US Department of Agriculture (ERS-USDA), and Japan-ICSEAD databases. For consistency with previous studies, all economic data (except GDP) are in current value. In our study, all original data are obtained as annual and then transformed to their ratios (when appropriate). The ratio variables include China’s total world trade (exports+imports or openness) in goods (T), FDI, financial services (SV), money supply (M2), and government budget (G) and debts, all divided by China’s GDP. Other non-ratio variables include population (a gravity factor proxy, see Frankel and Romer, 1999), OECD’s real GDP, terms of trade, real exchange rates, interest rates, inflation, and binary variables representing the occurrence of the economic, financial and other major crises, policy shifts or reforms in China over the period under study. All non-binary variables are then converted to their percentage rates of change. The use of this percentage measurement is a main feature of our approach, and it avoids the problem of a priori known functional forms (see above) and also of logarithmic transformations for negative data [such as budget (fiscal) or current account deficits]. In this paper, we focus on a unidirectional direction of trade and growth, that is, the determination of China’s trade and its possible causal impact on China’s growth and within the GEC environment. This conditional causality transmission mechanism is the fundamental foundation of trade agreements or relations as discussed.

4 EVIDENCE-BASED FINDINGS AND THEIR REALISM PROPERTIES

The empirical findings for the structural EGTC equations (3) and (4) in the two-simultaneous equation model of China’s growth as a result of trade with the world are given in the table below. Conceptually interpreted, the equations can be implicitly regarded as growth regressions when they are estimated by the OLS or maximum-likelihood method that will produce, as is well-known, biased impact or elasticity parameters. Or they can be regarded as a structural equation in a simultaneous equation model with circular causality or endogeneity. As a result and for consistency in efficient impact studies, an instrumental-variables estimator such as the 2SLS, 3SLS or Generalised Moment Method (GMM) has to be used when appropriate for this estimation. The instrumental variables in this case are all the exogenous conditioning variables explicitly incorporated or assumed for the model as described
above and they reflect the micro and macroeconomic conditioning environment of China and, when available, its major trading economies. The trade-growth-crisis causality issues are similar when directionally reversed and viewed from the world’s perspective.

Judged from the table, the standard statistical performance of the estimated ETGC models for China’s trade and growth above appears acceptable in terms of the R² and DW values. The performance of the models can also be evaluated by the Kydland data-model consistency (2006) criterion where the trend gap (or discrepancy) between historical data and model predictions have to be tight and small. The criterion was advocated earlier by Milton Friedman (1953) in the sense of model (theory) and reality consistency, but it seems to be overlooked by econometric modellers and corporate and government policy-makers alike in recent years. This performance is given in Charts 3-4 for China’s observed growth and total trade with the world and modelled values. A visual indicates that the models emulate well and significantly the troughs, peaks and turning points of China’s growth and trade even during the highly volatile period of late 1990s (the Asia crisis) to early and mid-2000s (terrorist attacks, China’s WTO membership, and China’s departure from the dollar peg in 2005) in the global economy and China. *Ex ante* simulation or extrapolation of the estimated models for forward policy analysis and their reliability are based on these findings.

### Table 1. Crises and China’s World Trade and Growth

**ETGC Modelling in Flexible Structural Form: GMM Estimates**

<table>
<thead>
<tr>
<th></th>
<th>GROWTH</th>
<th>WORLD TRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Const</td>
<td>7.587**</td>
<td>-32.702**</td>
</tr>
<tr>
<td>China’s World Trade/GDP</td>
<td>0.078**</td>
<td></td>
</tr>
<tr>
<td>FDI/GDP</td>
<td>0.010**</td>
<td></td>
</tr>
<tr>
<td>Services/GDP</td>
<td>0.000**</td>
<td></td>
</tr>
<tr>
<td>China’s Growth</td>
<td></td>
<td>3.318**</td>
</tr>
<tr>
<td>OECD Growth</td>
<td></td>
<td>3.395**</td>
</tr>
<tr>
<td>Terms of Trade</td>
<td></td>
<td>0.479**</td>
</tr>
<tr>
<td>Real Exchange Rates</td>
<td></td>
<td>0.793**</td>
</tr>
<tr>
<td>China’s Reforms 1992</td>
<td>3.308**</td>
<td>-15.999**</td>
</tr>
<tr>
<td>Asia Crisis 1997</td>
<td>-2.939**</td>
<td>15.841**</td>
</tr>
<tr>
<td>China’s WTO Membership</td>
<td></td>
<td>10.060**</td>
</tr>
<tr>
<td>China’s XR Float 2005</td>
<td>2.560**</td>
<td>-16.861**</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.900</td>
<td>0.788</td>
</tr>
<tr>
<td>DW</td>
<td>2.521</td>
<td>2.915</td>
</tr>
</tbody>
</table>

Note: **=Significant at 5%, *=Significant at 10%. The p-value for the overidentifying restriction test=0.074.

### Chart 3. ETGC Modelling Performance of China’s Growth: Friedman-Kydland Criterion
5 IMPLICATIONS FOR CHINA’S POLICY RESPONSES AND OPTIONS TO THE GLOBAL ECONOMIC AND FINANCIAL CRISIS

What are then the policy implications of our substantive empirical findings for discussions and possible policy uses in the context of China’s growth and world trade prospects and crisis management in the face of present and future regional or global economic and financial crises? And how these implications can be fruitfully used in negotiations or trade policy formulation relevant to growing economic and trade relations between China and some of its major trade partners or blocs in the future?

Crises and Policy Reforms and China’s Economic Development

While sudden crises, shocks and major gradual policy reforms have been acknowledged by a large number of economists as important sources of fluctuations in economic performance worldwide (see Johansen, 1982; Tran Van Hoa, 2002a; Edwards, 2007; OECD, 2009; Stiglitz, 2009), they have rarely been incorporated in well-known economic policy modelling studies such as the CGE/GTAP, gravity theory, growth or panel regression, or in a more realistic (that is, with multiple structural breaks and with temporary or non-decaying effects) manner in the often-used cointegration or unit root analysis of economic activities. An important feature of the endogenous growth-trade approach and its derived ETGC models above is in its flexibility in accommodating these events.

The findings from the table above indicate that the three major crises or shocks and policy reforms over nearly two decades in our study (i.e., China’s early 1990s reform, the 1997-98 Asia crisis, and its exchange rate float in 2005) do have an impact on China’s economic growth. The findings of significant benefits from China’s early 1990s reform and the country’s exchange rate float in 2005, and a severe adverse impact of the 2 July 1997 Asia crisis, provide evidence to confirm the well-supported views and facts on the effects on China’s reform and openness policy and the regional and global crises’ serious contagion (Tran Van Hoa, 2001, 2002c). The impact of China’s long-awaited WTO membership on its development since 2001 is also positive but statistically insignificant (not reported).
From a quantitative perspective of the impact, our findings show that ‘good’ policy reforms produce far larger gains in economic performance than trade liberalisation or decommoditised trade agreement policy. On the contrary, our findings show that major crises could wipe out economic gains achieved by trade and FDI liberalisation over many years. These outcomes are being unfortunately observed with the current GEC and the crisis economies in both developed and developing countries (OECD, 2009). Our study strongly indicates the importance of crisis management and prevention and of the exploration of the causes of crises for remedial policy measures.

Another implication of the findings is that, due to the far-reaching effects of crises, shocks and policy change on a large number of sectors in an economy, the need to specify these aspects of structural change in a multi-equation or even single-equation policy model is clearly desirable and appropriate. This casts doubts on quantitative or descriptive studies of trade and growth that ignore these sub- and add-factors especially in their multiple structural breaks in the sense of Johansen (1982) or in the unit-root analysis literature and their policy modelling specification.

**Crises and Policy Reforms and China’s World Trade**

As seen from Table 1, while multiple break structural change in China in the form of reforms or crises over recent years has the expected effects on China’s growth, the outcomes are not that clear-cut or predictable in the case of China’s total trade with the world. For example, while the cases of China’s overall terms-of-trade upward adjustments and yuan/dollar deterioration or depreciation seem to have had the expected outcome of significantly generating more China’s trade, the country’s early 1990s reforms had a negative impact on its world trade. Surprisingly, the 1997 Asia crisis does not seem to have had a damaging impact on China’s world trade. In fact, it appears to have boosted this trade substantially, thus confirming to some extent many economists’ and policy-makers’ assessment during the crisis that, with its essentially non-market structure, China had escaped (and benefited from) the contagion of this regional turmoil. On the other hand, China’s total trade was hurt however by its policy of floating (or equivalently appreciating) exchange rates and as the event was announced in 2005.

Our findings also confirm strongly the view held by free traders that a WTO membership would bring about more trade and economic prosperity (see Tomz et al., 2007, and Rose, 2007, for a recent debate on this issue). While the effect of China’s WTO membership on its growth is positive but statistically weak, this effect on China’s world trade is significantly beneficial. In terms of successful crisis management of the current GEC in the context of regional and global co-operation however (OECD, 2009; Prime Minister, 2009), our findings do appear to lend strong empirical support to the current call by international leaders for a concerted and united effort to control further GEC meltdown by promoting more trade and not protectionist policy. This effort could mitigate to some extent however the impact of the GEC on growth in China and, by implications, other economies affected by the GEC.

**Policy Implications for China in Crisis Management and Regional Trade Agreements**
The findings as obtained above (Table 1) reveal conceptually and, importantly, empirically the foundation of economic successes and slowdowns in one important regional economy in Asia, namely China, a country that is exerting rising global economic and geo-political influence. The findings show that economic and financial crises can impede the country’s economic development, and that appropriate policy reform provides a strong impetus to faster development and to promote international co-operation that ultimately will lead to higher welfare for the population as a whole and stability in the region. However, the expected benefits of policy reform and the damages of regional crises on China’s world trade are not clear-cut.

In this context, an Australia-China, ASEAN-China, ASEAN Plus and APEC or East Asia Summit free trade agreement which have been actively promoted by regional leaders to enhance trade, FDI and service liberalisation are all important regional and institutional trade arrangements to China’s growth. But the growth of China and especially its major trade partners (e.g., the OECD countries), and China’s free trade policy appear also to play an important role in assisting China’s past and future trade and economic development.

The economic and financial meltdown as a result of the GEC is expected to pose a serious threat to the world’s demand for China’s exports and trade, its growth and unemployment. These are aggravated by a flexible exchange rate regime and financial globalisation and its immediate and borderless transmission. This calls for urgent efforts of the global community to solve the GEC damaging effects on growth and employment not only in the short term but also, fundamentally, in the long term. Rigorous quantitative research with credible data-based evidence into the causes and effects of the GEC is a step in the right direction to find a long-term solution in this case.

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