Impact of Economic Policy Reform and Shocks
on Trade and Growth in Asia:
Econometric Evidence for China

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ABSTRACT

In pursuing policies of trade liberalisation and growth promotion within the framework of regional economic integration, WTO membership and globalisation, major Asian developing economies and China in particular had achieved economic 'miracles' in the past decades. Recently however, they face many challenges, economically and politically (Tran Van Hoa, 2002), compounded by a global (especially the US) economic slowdown (IMF, 2005), terrorist attacks, the SARS and avian flu outbreaks, currently unprecedented Indian Ocean tsunami devastation affecting millions in Asia, and other domestic or international (eg, the current China-Japan tension) uncertainty ahead. What are the development and growth prospects then for these economies or especially China in the medium and long term? The paper introduces the generalised gravity theory (Tran Van Hoa, 2004) to construct a simple flexible simultaneous-equation econometric model of growth and trade of China and its five major trading country or blocs (Japan, ASEAN-6, the European Union, the US, and Australia). The model incorporates explicitly major temporary and persistent structural change. Using latest ICSEAD, OECD and WBWT data, the paper reports efficient empirical results on trade-growth causality, trade determination and effects of shocks and policy reform on trade and growth between these economies and China over the past two decades. Based on these findings and current trade policy and economic relations negotiations, economic policy challenges are then targeted for discussion and for resolution development.

Keywords: Economic Integration in Asia, Regional Free Trade Agreement, Trade and Growth Causality, Structural Change, Generalised Gravity Theory, Modelling Economic and Trade Policy.

JEL: C30, , F15, O11, O47

1   INTRODUCTION

In pursuing policies of trade liberalisation and growth promotion within the framework of regional economic integration, WTO membership and globalisation, major Asian developing economies in Asia in general and China in particular had achieved economic 'miracles' in the past decades. Recently however, they face many challenges, economically and politically (Tran Van Hoa, 2000b and 2002), compounded by a global (especially the US) economic slowdown (IMF, 2005), terrorist attacks, the SARS and avian flu outbreaks, currently unprecedented Indian Ocean tsunami devastation affecting millions in Asia, and other domestic or international (eg, the 2005 China-Korea-Japan tension) uncertainty ahead. In response to and as a result of these internal and external shocks or structural and major policy change, what are the development and growth prospects then for these economies or especially China and their trade and economic relations or cooperation in the medium and long term?

The paper is an empirical study and based on (a) time-tested economic and trade-growth postulates, (b) recent advances in econometric modelling, and (c) *improved efficient* estimation and forecasting methodologies to provide credible answers to these questions for informed academic debates and practical policy analysis. It has a number of novel features. First, it briefly surveys recent FTA developments and its current negotiations within the context of the WTO, regional economic integration (REI), closer economic relations and bilateral and plurilateral trade in the Asian region. Second, it formalises the essential of these conceptual economic-political developments and, introducing the generalised gravity theory (Tran Van Hoa, 2004), constructs a simple flexible simultaneous-equation econometric model of growth and trade of China and its five major trading country or blocs (Japan, ASEAN-6, the European Union (EU), the US, and Australia). Third, the model contains novel features in incorporating explicitly not only chief ingredients of the mercantilistic trade and modern growth theory but, significantly, also major temporary and persistent structural change as conceptualised and used in the contemporary literature on unit-root and cointegration analysis. Fourth, using latest ICSEAD, OECD and WBWT data, the paper obtains and reports efficient empirical results on trade-growth causality, trade determination and effects of structural change and shocks on these economies on China over the past two decades. Finally, based on these findings and current trade policy and economic relations negotiations, economic policy challenges are then targeted for discussion and for resolution development.

2   RECENT TRADE AND ECONOMIC DEVELOPMENTS IN ASIA

Recent trends in China's trade (as a proportion of its GDP) with its major trading partners in the world, namely, the ASEAN, Japan, the US, the EU and Australia, are given in Chart 1.
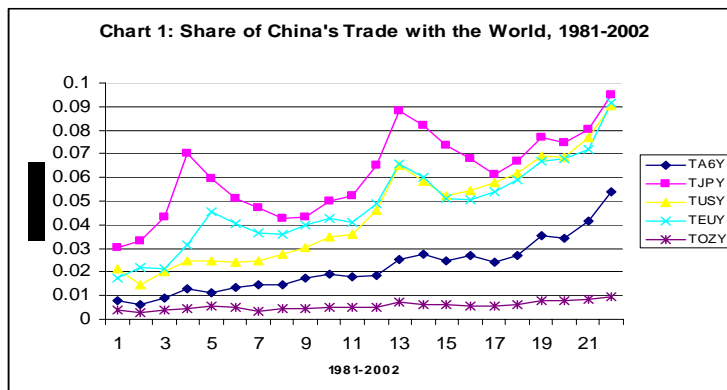
Source: Raw data from 2004 ICSEAD databases and author's calculations

We note from the data reported in the chart that the trends in China's trade with these 5 partners had been growing over the years, and China's largest trade is with Japan, followed by the EU, the US, and the ASEAN in that descending order. Australia's trade with China is small in comparison, and it seems to be rising only very slowly over the sample period. In terms of its volatility or dynamics, China's trade with Japan and the EU peaked around 1986, 1995 and 2001, and that with the US scored a big surge only in around 1995. In terms of growing importance, trade of the US and the EU with China had been trailing that of Japan in the early years, but there appears to be an almost complete convergence in trade value of these three trading partners of China in the early 2000s. While the ASEAN is ranked fourth in trading importance with China in this chart, its trade had been growing steadily especially after the Asia crisis of 1997. When we take into account this picture of China's historical trade trends with its trading partners and incorporate it with recent developments in Asia, there are issues and aspects that could be considered and rigorously investigated empirically to improve informed debates on trade, economic and political relations between China and the world.

Recent developments of new Asian regionalism (NAR) cover regional economic integration (REI) or economic integration agreements (EIA) and FTAs. All have been negotiated and endorsed to promote trade and investment liberalisation, economic development and cooperation for the member countries in the region. The ASEAN+3 FTA proposal for example was discussed in the mid- and especially late-1990s by ASEAN leaders, and implemented notably through the Hanoi Plan of Action in 1998 for ASEAN Vision 2020 (ASEAN, 2002). A number of factors can be attributed to its recent emergence. First, it was the result of decades of fast growth and a number of economic, financial and restructuring developments in North East Asia and in other major trading blocs in the world. Second, it was the result of developments and shifts in focus in North America and the EU in the aftermath of the damaging Asia crisis starting in Thailand in July 1997, and its subsequent contagion to a number of 'once miracle' economies in East and South East Asia, the former USSR, and, to a lesser extent, North and South America and the EU (Tran Van Hoa, 2000a). Third, it was the result of a benign neglect from such international organisations as the International Monetary Fund (IMF) or the economic power of North America and the EU on the plight of crisis countries in Asia, and the of lack of interest of the former in seriously helping to solve the economic, financial and social problems arising from the Asia crisis (Tran Van Hoa, 2002d). In 2001, and early in 2002, other new developments in East and South East Asia gained prominence and assisted in giving rise to a number of new Asian economic integrations or regionalisms and Asian FTAs. These developments included the quick recovery and recurring growth in Korea, the emergence of China as a fast post-Asia crisis growing economy, and the continuing stagnant state of the world's second largest economy (namely Japan). The recent recovery and growth of Korea has also been put forward by some authors as a leader in the post-crisis 'flying geese' theory for ASEAN+3 economies (see Harvie and Lee, 2002).

The NARs and FTAs including customs unions and EIAs (which are accepted exceptions, subject to strict conditions, to the WTO principle of the *Most Favoured Nations under Article XXIV of GATT and Article V of GATS*) are indeed numerous and proliferating at an amazing speed at the behest of government leaders especially in the Asian region. They include plurilateral and bilateral FTAs such as first ASEAN, ASEAN+3, then ASEAN+5, ASEAN+5+Taiwan, Japan+Singapore, Japan+Korea, Japan+Mexico, Korea+Mexico+Chile, Singapore+New Zealand, China+Japan+Korea, Hong Kong+New Zealand, Australia-Japan (NARA), Australia-Singapore, and last, but not the least, Vietnam+US. There was even a discussion on the setting up of a North Asian FTA in which Japan will play an important part. In mid-2003, a protocol was also being negotiated between Washington and Canberra to address key US complaints about the Australian market and to prepare for the setting up of a sweeping US-Australia FTA, as proposed by the Australian government (Hartcher, 2002), to the dismay of New Zealand which wanted, on the other hand, a trilateral US-CER (Close

Economic Relations – an EIA - between Australia and New Zealand). The USAFTA was signed in January 2004. In mid-2002, there was a suggestion by New Zealand Prime Minister Helen Clark to set up Australia-New Zealand Economic Cooperation (ANZEC) to boost the low-activity 22-year old CER. An Australia-Thailand CER Agreement – the first between Thailand and a developed country – was also proposed in mid-2003 and finally signed in November 2003 (DFAT, 2004). A New Zealand and Thailand FTA was signed on 19 April 2005. Current major developments in the Asian, Subcontinent and Oceania regions include an ASEAN+India and Australia-China FTA feasibility study (DFAT, 2005) and Australia-Japan FTA dialogue. The EU has also been strongly advocating regional integration and liberalisation for the Pacific nations to create EU-type transnational economic partnerships (an EIA) within the Cotonou framework, to stimulate trade and create growth among them (Barker, 2002).

3   CRISES, SHOCKS AND POLICY REFORM IN ASIA

As mentioned earlier, the main focus and objective of the NARs and Asian FTAs (as separate from currency or customs unions and EIAs) are to promote trade and living standard either among the Asian economies themselves or with the membership of other economies outside Asia such as the US, Mexico and Chile in the Americas, and Australia and New Zealand in Oceania. Prominent among these NARs and Asian FTAs is the ASEAN+3 proposal above and, part of it, the ASEAN+1 or ASEAN+China FTA with a 1,700 million people market, a US$2 trillion GDP, and trade worth US$1.2 trillion. ASEAN+China was endorsed by the 10 leaders of ASEAN in Brunei in November 2001, and its details were worked out at a negotiating meeting in Beijing in May 2002.

While the focus of the NARs and FTAs is important and the objective is plausible in an economic-theoretic sense, there have been numerous recent developments in the region that could have impeded or sometimes even enhanced the attainment of this objective. These developments include (a) national and international resistance to reform to maintain the status quo, (b) unexpected shocks and crises, and major structural change and 'good-in-a-market-economy-sense' policy reform. The first category encompasses for example the Seattle and Singapore issues, globalisation and agricultural subsidies by the US, the EU, and Japan in the current WTO debates. The second category covers the stock market crash of 1987, the Tiananmen Square uprising in 1989, the Gulf War in 1991, the Asia economic and financial crisis of 1997, the SARS and avian flu of 2004, the devastating tsunami shock of 26 December 2004 in the Indian Ocean, and, from the other spectrum of change, China's major SOE reform of the early 1980s and its pro-FDI reform in the early 1990s.

It should be noted that while the terms shocks, crises, and structural change used above are generic, the content in each case may have completely different characteristics and implications. For example, shocks usually refer to a sudden event that can have damaging effects, and structural change or policy reform are often used to indicate a sudden major change in government management or governance that has been gradually developed or constructed to generate beneficial outcomes. In addition, as is well known in the current literature on unit roots and cointegration studies, shocks and structural change or policy reform can again have short term impact or they can have a lingering, non-decaying, volatile and permanent consequences (Perron, 1989 and 1997, and Tran Van Hoa 2004). Shocks and structural change may also have selectively national, regional and global implications or contagion. The Black Friday stock market crash of October 1987 for example was considered significant chiefly only for developed countries that have a well-developed financial system and linkage, but it may be regarded as a minor event by the LDCs in which a strong financial system is yet to be developed and operated. The Tiananmen Square incident in 1989 may be considered a watershed point in China's reform processes, but it is only of minimal consequences to other economies in the Asian region and beyond. On the other hand, due to its status as an LDC but with a large population and economy, China's WTO membership has

been regarded as having a global effect especially on the countries having trade with China or having trade with the markets China is likely to have a competitive edge in trade with. One of the countries in this latter category is India.

Above, we stipulated that shocks, crises, structural change and policy reform can have significant impact on trade, development, growth (and even welfare and poverty reduction) for a country, a region or globally. This impact may outweigh or boost the gain from liberalised trade and investment and improved cooperation and economic relations as expected from the NARs and FTAs for the member countries. Unfortunately, existing methodologies or approaches that have been used almost routinely in this kind of study are either unable or inappropriate to accommodate this kind of impact in a realistic or historical data-consistent sense. Among these methodologies are the applied or computable general equilibrium (CGE) and its variations (eg, GTAP), the standard gravity theory (GT) (see Frankel and Romer, 1999), and the panel regression (see Dollar and Kraay, 2004). These methods are however severely restricted either by scope and coverage, temporal historical features, and a lack of circular causality. For example, the CGE deals only with trade in goods and is structurally heavily calibrated and essentially static (unable to accommodate crises) modelling [see Productivity Commission Report (2003) for other issues]; the GT deals chiefly with cross-section data and is also unable to accommodate crises or other recent shocks or economic developments in Asia (and other regions); and the PR excludes completely interdependence or circular causality between trade and growth (Tran Van Hoa, 2004).

In the study below, an appropriate modelling approach is adopted to deal more flexibly with the time-tested concept of trade-growth causality and to accommodate more realistically and more efficiently or accurately the impact of shocks, structural change and policy reform on trade, development, growth, economic relations for the countries in the NARs and FTAs in the Asian region. This approach is in addition supported by new and improved econometric or statistical estimation and impact study methodologies that have superior forecasting properties in terms of the average forecasting MSE criterion or average Wald risks (Anderson, 1984).

4   FTAS, ASEAN+3 AND GRAVITY THEORY

Since the primary objectives of FTAs are trade liberalisation and welfare improvement, as well as economic partnerships generally, for member countries, the FTA premises that, directly, trade (international and domestic) and, indirectly, other determinants of trade significantly and causally affect: (a) economic welfare (see Raimondos-Moller and Woodland, 2002); real wages (see Ruffin and Jones, 2003); (b) growth (for developed countries see Frankel and Rose, 1998, Frankel and Romer, 1999); and (c) development (for developing countries, see Harrison (for all countries), 1996, Frankel et. al., (for 10 East and South East Asian countries), 1996, and Tran Van Hoa (for ASEAN, China, Korea and Japan), 2002a). The outcomes also are mutually beneficial in many other non-economic aspects (e.g. closer regional and international cooperation and collaboration, social harmony, political stability and prosperity), and, in the context of globalisation and enhancing international competitiveness, conducive to regional or international economic integration (ASEAN, 1999).

In view of the expectation that FTAs will enhance trade and produce final outcomes of higher growth and higher real wages or better economic development improvement for trading partners or FTA member countries, a useful causality concept in the form of a GT using geographical, demographic and other common or concurrent attributes (see for example Linneman, 1966 and the specification in Table 3 in Frankel et. al., 1996) to explain trade flows (liberalisation) between countries may be appropriate in empirical studies of this trade-growth nexus (for another more restrictive justification, see Rose, 2000). Some extensions to this theory's determinants using OECD country data have also been attempted to deal with trade correlations and output fluctuations (see for example, Otto et. al., 2002). The data used

in these important studies of the GT have been singularly cross-sectional and therefore unable to deal with recent temporal developments in the Asian or other non-Asian regions.

In the case of China vis-à-vis Asian economies and its other major trading countries or blocs in our focus (that is, Japan, ASEAN, the US, the EU, and Australia), the trade-growth impact in a bilateral (China-Japan, China-US, China-Australia) and plurilateral (China-ASEAN and China-EU) context, both of a qualitative or quantitative kind, has not been done or reported. This lack of evidence on the validity of the required premises underlying the foundation of NARs or FTAs leaves much to be desired. In addition, the role played by shocks, structural change and policy reform on this trade-growth causality for these countries and trading blocs has not been addressed or adequately dealt with in the current literature.

5 A TRADE-GROWTH MODEL TO STUDY THE IMPACT OF SHOCKS AND POLICY REFORM ON CHINA'S TRADE AND GROWTH

Based on our previous modelling and impact studies (eg, see Tran Van Hoa, 2002a, 2002b, 2002c, 2003, 2004, 2005), we consider, for convenience and without loss of generality, a simple model of two simultaneous implicit or arbitrary functions (extension to more functions is straightforward when more variables are considered and endogenised) comprising and extending the basics of the standard cross-section-data-based GT linking trade and growth between two trading countries or blocs. This so-called generalised gravity theory (GGT) comprises not only the GT's geographic or demographic attributes (for the country in focus, China) but also, significantly, economic factors, and the requirements or protocol conditions of a regional FTA or EIA. Since the geographical attributes (such as distance and area) in the cases of China-ASEAN or China-Japan are *a priori* assumed to be a rationale for setting up ASEAN+China or ASEAN+3 (or even ASEAN itself), we can then focus on other relevant demographic (e.g, population as a proxy for size – see Frankel and Romer, 1999), economic and non-economic determinants of trade and growth in our model.

In this model, trade (named T) may be defined as exports or imports or openness (exports plus imports) or broader coverage and scope (including services and investment and ODA)), and growth (Y) may be defined as GNP or, by more popular convention, GDP. The two countries, within the interest of our present study, are as pair-wise (bilateral) combinations of China-Japan, China-ASEAN, China-Australia, China-US and China-EU. Thus

$$F1\ (\alpha, Y, T) = 0 \tag{1}$$
$$F2\ (\beta, T, Y, X, W) = 0 \tag{2}$$

where F1 and F2 are two arbitrary functionals linking trade and growth and their theoretically plausible determinants, α and β are parameter vectors, X and W denote, respectively, other economic (fiscal, monetary, trade and industry policy – see Sala-i-Martin, 1991) and non-economic (e.g, distance, area, size, policy reform and external shocks – see Johansen, 1982) variables, relevant to a country or a group of countries' growth or development. Importantly for our study, in addition to T and Y, data for X and W must be available and consistent with published time-series data in a standard Kuznets-type accounting framework (e.g, SNA93), or the accounting system of Stone (1988), or the recent World Bank World Tables.

Taking the total differentials of (1) and (2), and neglecting the second and higher–order terms in a Taylor's series expansion (see for example Allen, 1960, and Tran Van Hoa, 1992a), the 2-equation model (1)-(2) can be written in stochastic form and in terms of the rates of change (eg, Y%, T%, X% and W%) of all the included econometrically exogenous and endogenous variables (Y, T, X and W) as:

$$Y\% = \alpha1 + \alpha2 T\% + u1 \tag{3}$$

$$T\% = \beta 1 + \beta 2 Y\% + \beta 3 X\% + \beta 4 W\% + u2 \qquad\qquad (4)$$

In (3)-(4), the equations are linear and interdependent in the sense of Marshall or Haavelmo, α's and β's are the elasticities, and u's other unknown factors outside the model (Frankel and Romer, 1999) or the disturbances with standard statistical properties. In (3)-(4) circular and instantaneous causality in the sense of Granger (1969) or Engle-Granger (1987) exists or is regarded as a testable hypothesis. In their non-stochastic forms (in which all disturbances are idealistically zero), these equations form the basic structure of the CGE/GTAP models of the Johansen class, in which all elasticities are usually assumed to be given or known *a priori* and the impact of endogenous or endogenised variables (say T) on Y is dependent on the exogenous variables and calculated system-wise using such iterative procedures as the Gauss-Euler algorithm with a known sparse matrix of elasticities.

It can be verified that our so-called flexible (or function-free) trade-growth equation (3) in the model above is econometrically identified in the sense of mathematical consistency. An impact study of endogenous trade (or exogenous X and W) on growth can be analysed directly via its 2SLS (or reduced-form adjusted) form structurally given in (5) below or indirectly via its reduced form given in (6) in terms of all the exogenous economic and non-economic variables in the model. In (6), T is approximated by X and W. It is well-known in the theory of econometrics that the use of OLS to estimate equation (3) for example will, in this case, produce biased parameter estimates. These two equations can be written as

$$Y\% = a1 + a2\ T\% + v1 \qquad\qquad (5)$$
$$Y\% = p1 + p2\ X\% + p3\ W\% + v2 \qquad\qquad (6)$$

where v's are the new disturbances with standard statistical properties.

An important feature of our modelling approach is that, contrary to the CGE/GTAP restrictive (goods only) and *a priori* (i.e., the values for elasticities are assumed or subjectively or dogmatically given) approach, our impact study is historical-data-consistent as all required elasticities are estimated from the model and from available data and have asymptotically and statistically desirable and consistent properties (an important issue in the GT's empirical applications − see Frankel and Romer, 1999) when suitable estimation and forecasting methods (eg, 2SLS or other instrumental variables (IV) methods) are employed. Another important feature is that, contrary to other SNA93-based or Keynesian system-wide approaches, our impact study has the general flexibility in modelling specification rationale and implementation in assuming explicitly no *a priori* functional forms (eg, linear, log, log-linear) for the equations in the model, and it can handle data on trade or budget deficits (having therefore negative values) and real rates of interest when inflation exceeds the nominal interest rate. The usual method of routine log transformations for all variables in a single or multi-equation econometric model cannot do this.

6 EMPIRICAL IMPLEMENTATION OF THE TRADE-GROWTH MODEL INCORPORATING SERVICES AND FDI

To implement the model [Equations (3)-(4)] above with available data to empirically investigate the causal relationship between, for example, comprehensive trade (that is, goods, services and investment) and growth for China-ASEAN, we can use, given fixed geographical components (distance and area) as discussed, and, for time-series data, population (a proxy for size), conventional economic determinants of trade (eg, see Frankel and Rose, 1998, Frankel and Romer, 1999, and Rose, 2000, and Otto et. al., 2002) and/or other relevant factors (eg, external or internal shocks or policy reform − Johansen, 1982) when such data are available. One such extended model relevant to our focus of study on the possible causality (impact) between say China-ASEAN trade and China's growth may be written in either the

structural equation (7), and supplemented by the full reduced-form equation for T (8) (and similarly for growth Y) as

$$Y\% = a1 + a2\ T\% + a3ST + a4SV + a5FDI + v1 \qquad (7)$$
$$T\% = p1 + p2\ YT\% + p3\ FT\% + p4\ MT + p5\ PT$$
$$\qquad + p6ERT + p7IT + p8POT + p9ST + v2 \qquad (8)$$

In Equations (7)-(8), China's trade (T%) with its ASEAN trading partner for example is assumed to cause, together with crises or shocks or policy reform (ST) and services (SV) and foreign direct investment (FDI), China's growth (Y%), but this trade T (and endogenous SV and FDI) is also affected by economic activities, trade-related policies and external or internal shocks in China and its trading partner, ASEAN. Assuming for convenience that China's trade (traditionally defined as its exports (or imports, see Barro and Helpman, 1991) with its trading partner is affected by this partner's GDP (supply) and other major economic activities, trade-related policies (see Coe and Helpman, 1993 for this approach) or external or internal shocks or policy reform in China (and in its trading partner), then Equation (8) in its reduced form simply assumes that China's partner trade is simply affected by the exogenous factors such as GDP (named YT), inflation (PT) – see Romer (1993), fiscal policy (FT), monetary policy (MT), trade policy and exchange rates (ERT) – see Rose (2000), industry structure (IT) – see Otto et. al. (2002), population (POT) – see Frankel and Romer (1999), and internal or external shocks or policy reform (ST) – see Johansen (1982) - of China and its trading partner. Equation (8) is in fact a derived demand equation for tradable goods (or even transacted services and investment) reflecting essentially its supply (its trading partner) and demand components (China) postulated in standard microeconomic and trade theory.

In deriving equations (7) and (8) for 2 trading countries or blocs above, we assume that Country 1's trade affecting its growth is a testable hypothesis and this trade itself is essentially a demand equation for either imports (from Country 2) and exports (to Country 2) or vice versa or both. For the economies of the ASEAN and China, geographic attributes (that is, being in the neighbouring region) are assumed to be the *prime facie* reason for setting up the ASEAN+3 or ASEAN+China, and the distance and area characteristics are omitted and proxied by population size as all of our variables are expressed in terms of time-series (distance and area may also not be appropriate even for cross-section studies with high-trade and small countries like Singapore and Brunei in ASEAN+3). All variables in the model, that is, Y, T, SY, FDI, YT, FT, MT, PT, ERT, IT and POT are expressed as their rates of change so the units of measurement (i.e., $billion or $million, ratios or index numbers) for the trading countries' variables are irrelevant. ST is a qualitative time-series variable representing internal or external shocks and policy reform having either one-off effects or temporally permanent effects (autoregressive and non-stationary) on trade and growth with discrete values.

The implications of our model above are important for studying the transmission mechanism or relationship between China's growth and trade with its major trading partners and their linkages. This relationship, if empirically substantiated, can provide powerful evidence on the trade, services, investment and welfare enhancement relationship premises of these countries as trading partners, and, as a result, it would lend crucial support to the viability, sustainability and promising prospects of the new Asian regionalism, namely, ASEAN+China, ASEAN+3, or other bilateral and plurilateral FTAs, as well as to providing empirical evidence for quantifying the comprehensive trade-to-growth impact and suggesting robust and credible trade policy.

7 NEW ADVANCES IN ESTIMATION, FORECASTING AND IMPACT STUDY METHODOLOGIES

The importance of using a suitable estimation method for our model (or similar models) to get more accurate or unbiased results has been emphasised in previous trade-growth studies using standard gravity theory (see for example Frankel and Romer, 1999). These studies deal mainly with the OLS and 2SLS or IV (instrumental-variables) estimation methods. In this section, we briefly survey the various new and improved estimation and forecasting methods that are available, and suggest that their appropriate use can produce more accurate econometric outcomes on the trade-growth causal relationship and subsequently on economic and trade policies and regional integration.

More specifically, in our model, the equations in differential and reduced form as given in equation (8) for the endogenous Y% [or, similarly, for other endogenous T%, SV% and FDI%] can be written more generally with a sampling size T and k independent variables (possible causal components) in matrix notation as:

$$y \quad = \quad Z \quad \beta \ + \ u \qquad\qquad\qquad (9)$$
$$(Tx1) \ \ (Txk) \ \ (kx1) \ \ (Tx1)$$

where $y = Y\%$, Z = the rate of changes of the exogenous and predetermined variables (both static and dynamic), β = the parameters, and u the disturbance satisfying all standard statistical assumptions.

We now define our evaluation criterion (in terms of average MSE or Wald risks) for an arbitrary estimator $\hat{\beta} a$ for β in equation (9) as Wald risk $\equiv MSE(\hat{\beta} a) = (\hat{\beta} a - \beta)'W(\hat{\beta} a - \beta)$ where W is a positive definite. Under Wald risks, we can estimate equation (9), which is essentially a general linear model for structural or behavioural analysis or for direct forecasting and policy studies (see Pindyck and Rubinfeld, 1998), by using the OLS or, at a more statistically efficient level, any of the explicit (Baranchik, 1973) Stein or Stein-rule methods as described below.

More specifically, using equation (9), the basic and most well-known and used method to produce estimates and forecasts of y (or Y%) is the OLS estimator of ß (denoted by $\hat{\beta}$) and written as

$$\hat{\beta} \ = \ (Z'Z)^{-1}Z'y \qquad\qquad\qquad (10)$$

A more efficient method is the explicit Stein estimator of ß (Baranchik, 1973) and given by
$$\hat{\beta} s \ = [1 - c(y-Zb)'(y-Zb)/b'Z'Zb] \ \hat{\beta}$$

$$= [1 - c(1-R^2)/R^2] \ \hat{\beta} \qquad\qquad\qquad (11)$$

where c is a characterising scalar and defined in the range $0 < c < 2(k-2)/(T-k+2)$, and R^2 is the square of the sample multiple correlation coefficient.

A still more efficient method (to avoid, in one respect, implausible results derived from plausible OLS parameter estimates) is the explicit positive-part Stein estimator of ß (Anderson, 1984). This estimator is defined as

$$\hat{\beta} +s = [1 - \min\{1 \ , \ c(y-Z\hat{\beta})'(y-Z\hat{\beta})/\hat{\beta}'Z'Z\hat{\beta}\}] \ \hat{\beta}$$

$$= [1 - \min\{1 \ , \ c(1-R^2)/R^2\}] \ \hat{\beta} \qquad\qquad (12)$$

A new method to obtain estimates and forecasts of ß in equation (9) with better properties in Wald risks has been proposed (see Tran Van Hoa, 1985, Tran Van Hoa and Chaturvedi, 1988, 1990, 1997). It is in a class of explicit improved Stein-rule or empirical Bayes (also known as the two-stage hierarchical information or 2SHI estimators for linear regression models). This estimator includes the explicit Stein and the double k-class (Ullah and Ullah, 1978) estimators as subsets (Tran Van Hoa, 1993a). Other applications of the Stein, Stein-rule, and 2SHI estimators to linear regression models with non-spherical disturbances and to Zellner's seemingly unrelated regression model have also been made (see Tran Van Hoa et al, 1993, in the case of regressions with non-spherical disturbances, and Tran Van Hoa, 1992b, 1992c, and 1992d, in the case of seemingly unrelated regressions).

The explicit 2SHI estimator is a *bona fide* or fully operational (in statistical theory terminology) estimator and defined as

$$\hat{\beta}h = [1 - c(1-R^2)/R^2\} - c(1-R^2)/\{R^2(1+c(1-R^2)/R^2)\}]\ \hat{\beta} \qquad (13)$$

and its positive-part counterpart (Tran Van Hoa, 1986a) is given by

$$\hat{\beta}+h = [1 - \min\{1\ ,\ c(1-R^2)/R^2\} - \{1/((R^2/c(1-R^2)) + 1)\}]\ \hat{\beta} \qquad (14)$$

While all the estimators given above can be applied to the general linear model equation (9) for structural and forecasting analysis, their relative performance in terms of historical, *ex post* or *ex ante* (Pindyck and Rubinfeld, 1998), forecasting MSE can differ. Thus, it is well-known that, in MSE and for $k \geq 3$ and $T \geq k + 2$, $\hat{\beta}s$ dominates (that is, it performs better in forecasting MSE) $\hat{\beta}$, and $\hat{\beta}s$ is dominated by $\hat{\beta}+s$ (Baranchik, 1973, Anderson, 1984). However, it has also been demonstrated (Tran Van Hoa, 1985, Tran Van Hoa and Chaturvedi, 1988) that, in MSE, $\hat{\beta}h$ dominates both $\hat{\beta}$ and $\hat{\beta}s$, and more importantly, $\hat{\beta}+h$ dominates $\hat{\beta}+s$ (Tran Van Hoa, 1986a). Substantial informational gain has also been demonstrated in applied studies (see eg, Tran Van Hoa, 1992a).

A further important result of the 2SHI theory has recently been proved (see Tran Van Hoa and Chaturvedi, 1997): *the dominance of the 2SHI over the OLS and Stein exists anywhere in the range $0 < c < 2(k-1)/(T-k)$*. This indicates that the 2SHI produces better (in terms of smaller Walk risk or generalized Pitman nearness) estimates and forecasts even if the estimating and forecasting equation has only one independent variable in it. *The condition for the optimal Stein dominance in the linear equation up to now requires that $0 < c < 2(k-2)/(T-k+2)$* (see Anderson, 1984). Further MSE-dominance properties of the 2SHI estimators and their extensions over the positive-part Stein estimator in regression equations have been given by Namba (2000, 2001).

One aspect on the data quality used in our study should be noted. It has been demonstrated that the 2SHI dominates other conventional (OLS or 2SLS) estimators when measurement errors exist (Tran Van Hoa, 1986b). Since the poor quality of economic data from the Asian countries and other LDSs is well known, one by-product of our study is that the findings are also optimal in errors-in-variables (EV) cases. Previous applications of the 2SHI to major developing countries in Asia are given in Tran Van Hoa (1993b and 1993c).

8   ECONOMETRIC EVIDENCE ON CHINA'S TRADE WITH ITS MAJOR TRADING PARTNERS AND CHINA'S GROWTH

This section reports substantive results for the five trade-growth simultaneous-equation models that are based on several plausible extensions to the standard GT: such as Taylor's series planar approximation to any arbitrary functional (see below), the use of time-series data, incorporating micro/macroeconomic factors (including significantly services and FDI) and external and internal shocks. These are captured in equations (7) and (8) above. For comparison with the findings of previous studies in standard GT applications, these results are obtained by the OLS, 2SLS and 2SHI for the structural equation of growth, Equation (7).

Data − Due to the limitation of the required data in our studies, especially dealing with developing economies (see also Austrade, 2003), all original data are obtained as annual and then transformed to their ratios (when appropriate). The ratio variables include trade (exports and imports), services, FDI, government budget, and money supply (M2), all divided by GDP, and unemployment rates (open unemployment/labour force). Other non-ratio variables include RMB/US exchange rates, population and binary variables representing the occurrence of the economic, financial and other major crises or policy shift or reform over the period 1981 to 2002. All non-binary variables are then converted to their percentage rate of changes. The use of this percentage measurement is a main feature of our modelling and impact approach and 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]. As the average micro/macroeconomic data for the countries in the ASEAN (and the EU) are difficult (if not impossible) to measure and our sampling size is limited, we have focused on a unidirectional direction of trade below in a 'dual' context: China's trade with Japan, ASEAN, the US, the EU and Australia, and the impact of this trade on China's growth.

The data for regional (eg, ASEAN and the EU) and national (e.g, China, Australia and the US) trade [exports (X) to and imports (IM) from, respectively], services (SV), foreign direct investment (FDI), GDP and estimated mean population (named POP) are retrieved from ICSEAD's 2004 regional trade databases. Openness between 2 trading countries is defined as T=X+IM although the separate effects of either X or IM can be experimented with. All trade and economic data are at current prices in US dollars. Fiscal, monetary, trade and industry policy data for the country of focus, China, were also obtained from the 2004 ICSEAD databases and approximated, respectively, by government budget/GDP (BY), M2/GDP (M2Y), interest rates (R), exchange rates per US dollars (XR), and unemployment rate (UR). In addition to the usual demographic and economic components in our model, we also identified (due to ICSEAD data unavailability before 1980) 5 major crises that had affected China, the ASEAN, the US, the EU, and Australia (and other economies) during our sampling period, and included them as 5 dummy variables with persistent effects after their occurrence (one-off effects were postulated but empirically discarded as implausible in the study). These are the stock market crash of 1987 (C87) which was coinciding with China's Broadening Reform period 1984-88, the China Tiananmen Square turmoil (C89), the Gulf War of 1991 (C91) which was coinciding with China's Rectifying Program during 1988-91, China's Deepening Reform since 1992 (C93), and the Asia crisis of 1997 (C97). The outbreaks of SARS in 2003, avian or bird flu early in 2004, and the December 2004 tsunami devastation have been omitted due to a lack of sufficient data. Various modelling experiments in our study also show that these crises all have an econometrically permanent or non-decayed effect (reflecting autoregressiveness or non-stationarity) on growth in China.

The Estimated Models - The various bilateral and plurilateral trade-growth models for China and its 5 trading partners are based on the availability of these data. The 2-simultaneous equation trade-growth model for China and Australia in our studies, for example, that is based on Equations (7)-(8), can be written fully using *mnemonic notation* for estimation and impact analysis as:

$$YCN\% = \alpha_1 + \alpha_2 TOZ2Y\% + \alpha_3 SY\% + \alpha_4 FDIY\% + \alpha_5 C87 + \alpha_6 C89 + \alpha_7 C91$$
$$+ \alpha_8 C93 + \alpha_9 C97 + v1 \qquad\qquad (15)$$

$$TOZ2Y\% = \beta_1 + \beta_{12}YOZ\% + \beta_3BY\% + \beta_4M2Y\% + \beta_5R\% + \beta_6CPI\% + \beta_7XR\% + \beta_8UR\%$$
$$+ \beta_9POP\% + \beta_{10}C87 + \beta_{11}C89 + \beta_{12}C91 + \beta_{13}C93 + \beta_{14}C97 + v2$$

$$(16)$$

where, in percentage change, YCN = China's GDP, TOZ2Y = Australia's total trade (exports + imports or openness) to China divided by China's GDP, SY = total services/GDP, FDIY = total direct investment/GDP, and YOZ = Australia's GDP. The variables BY, M2Y, R, CPI, XR, UR and POP denote, respectively, fiscal, monetary, interest rates, inflation, exchange rate, industry policy and population in Australia. The v's are the disturbances representing other unknown factors but with effects on YCN and TOZ2 (and SY and FDIY) respectively (see Frankel and Romer, 1999 for this rationale). The trade-growth models for China-ASEAN, China-US, China-EU, and China-Japan can be similarly constructed.

Substantive Findings – Five sets of empirical findings for 5 trade-growth models and based on Equations (15)-(16) above for China and its 5 trading countries/blocs are given in Table 1. These models provide information on the causality direction of trade (goods/services/FDI)-growth activities. Due to the importance of the estimation methods used that can provide greatly different results/conclusions even for the same model and data (see further detail in Frankel and Romer, 1999) and also for the purpose of statistical efficiency comparison, three types of estimated structural parameters have been calculated for each model. These are the OLS, the 2SLS (an IV) and the 2SHI (applied to the 2SLS). The dominance of the 2SHI over the 2SLS has also been demonstrated (Tran Van Hoa, 1986c, 1992a). For hypothesis testing, the 2SHI has approximately the same asymptotic properties as OLS and 2SLS.

Table 1
Impact of Trade, Services and FDI with Major Trading Blocs on China's Growth
Generalised Gravity Theory in Flexible Structural Form
1981 to 2001

Variables	China-ASEAN			China-Japan			China-US		
	OLS	2SLS	2SHI	OLS	2SLS	2SHI	OLS	2SLS	2SHI
Constant	9.30**	9.24**	8.93**	9.74**	9.40**	8.23**	9.78**	9.41**	8.80**
Openness/GDP	0.03**	0.03**	0.03**	0.02@	0.02@	0.02@	0.04@	0.05@	0.05@
Services/GDP	0.01	-0.01	-0.01	0.003	-0.003	-0.003	-0.004	-0.02	-0.02
FDI/GDP	0.04**	0.05**	0.04**	0.04**	0.05**	0.04**	0.04**	0.05**	0.04**
Stock Crash 87	1.12@	1.18*	1.14*	1.44	1.68*	1.58*	1.13	1.43@	1.34@
China Turmoil 89	-6.97**	-6.96**	-6.73**	-7.42**	-7.28**	-6.83**	-7.46**	-7.29**	-6.82**
Gulf War 91	4.90**	4.70**	4.54**	4.45**	3.92**	3.68**	4.83**	7.53**	4.17**
China Reform 93	2.15**	2.32**	2.24**	2.33**	2.75**	2.58**	2.15**	4.46**	2.21**
Asia Crisis 97	-2.84**	-2.79**	-2.69**	-2.67**	-2.56**	-2.40**	-2.75**	2.36*	-2.50**
R^2	0.97	0.73	0.99#	0.96	0.91	0.98#	0.96	0.95	0.98
F	43.07**	39.57**	4.80**	25.57**	21.88**	5.49**	25.84**	21.06**	5.13**
DW	1.71	1.77	1.32&	2.10	2.15	1.36&	2.19	2.17	1.32&

Table 1 (continued)

Variables	China-EU			China-Australia		
	OLS	2SLS	2SHI	OLS	2SLS	2SHI
Constant	10.37**	10.10**	9.35**	9.72**	9.61**	8.75**
Openness/GDP	-0.009	-0.003	-0.003	0.01	-0.004	-0.004
Services/GDP	0.009	0.009	0.008	0002	0.003	0.003
FDI/GDP	0.04**	0.05**	0.04**	0.05**	0.06**	0.05**
Stock Crash 87	0.41	0.72	0.67	1.36	1.02	0.93
China Turmoil 89	-7.17**	-7.25**	-6.72**	-7.59**	-7.02**	-6.40**
Gulf War 91	4.48**	4.35**	4.04**	4.56**	3.58**	3.26**
China Reform 93	2.66**	2.72**	2.55**	2.56**	3.35**	3.05**
Asia Crisis 97	-2.80**	-2.75**	-2.55**	-2.76	-2.59**	-2.36**
R^2	0.95	0.94	0.97#	0.95	0.93	0.97#
F	19.54**	18.64**	3.20**	19.88**	14.74	5.49**
DW	2.44	2.40	1.35&	2.24	2.42	1.21&

Sources of data: World Bank (2004) as compiled by Australia's 2004 DX database. ICSEAD Trade Data (2004). Notes: ** significant at the 5% level, * significant at the 10% level @ significant at the 15% level. # correlation coefficient between actual Australia growth and its 2SHI estimate. & DW calculated using the formula DW=2(1-ρ). Tests on 2SHI estimates are based on their asymptotic properties as T -> ∞.

From the results given in Table 1, we note 5 important findings. First, while having *high success in modelling output growth* (change in GDP) has been internationally accepted as difficult, all 5 estimated models of growth vis-à-vis trade in goods, services, and investment between China and its 5 trading partners have statistically significant (using the F-test) and much higher modelling performance (that is, R^2 reaching up to 99 per cent) relative to other trade-growth causality models as reported in previous international studies. As R^2 is an average number for the whole sample size used in estimation, it may not be able to give a detailed period-by-period success of the estimated models. It is important to note that a graph of China's observed and predicted growth fluctuations based on the 5 estimated models for the period (1981-2001) under study would give a better measurement of modelling success. The graphs for these growth data and their forecasts have also been plotted (not reported here) and the results indicate that the peaks, troughs and turning points of the growth data are accurately predicted for almost all of the 20-year period under study. Second, when we look at the dynamic features of the estimated models using either plots or standard diagnostic tests, all estimated models also appear free from serious first or higher order autocorrelation-induced or simple Markov scheme inefficiency problems.

Third, trade, as defined by total trade/GDP between China and its 5 trading partners, has positive and significant impact on China's growth vis-a-vis the ASEAN, Japan, the US, and negative but insignificant vis-s-vis the EU and Australia. Fourth, the introduction of financial services and investment into the models (which the CGE, GT and PR are unable to do) shows a stark contrast between the impact of trade, services and investment. More specifically, while services inflows and outflows have a dampening but negligible (statistically not significant) effect on China's growth, and the beneficial evidence of openness on China's growth is not always observed for all 5 models under study, FDI is found on the contrary to have a uniformly positive and significant (mostly at the 1 per cent significance level) impact on China's growth. Finally, the introduction of crises, shocks or major policy reform into the models (which is natural for this kind of impact study but which the CGE, the GT and the PR are also unable to accommodate) provides very informative evidence on the characteristics of these crises, shocks, policy reform, and the role they have played in or contributed to the economic performance of China in recent years.

9 IMPLICATIONS FOR CHINA'S TRADE POLICY AND ECONOMIC RELATIONS

While the GGT models we used for study above may be simple and illustrative in their structure, they contain the main and conventional ingredients of and analysis on trade, growth, their major determinants, and their relationships for the 6 trading countries or blocs under study. They are also fairly consistent, for comparative purpose, with similar previous studies of a different kind (eg, the CGE, GT, PR or other quantitative trade-growth studies). The empirical findings reported in the preceding section also provide a number of new and interesting results on trade-growth causation where trade has been notably expanded to include services and investment, and on the effect of sudden shocks and gradual policy reform for which very limited research has been carried out and reported. Finally, the findings are seen as providing empirical support (or rejection) of recent (or similar) FTA initiatives at the highest political level in Asia. This claim is credible in the sense that the findings provide important data-based inputs and implications with historical support for international trade negotiations or dialogues and for formulating co-operation policy for China and its major trading economies either in Asia or other regions.

Some of these new trade and economic relation FTA initiatives include, as we mentioned earlier, the ASEAN+China and Australia-China FTAs. The methodology proposed and used in this study can also be adopted for analysis of other FTAs in the Asian and other regions. These include for example the Australia-Korea FTA, the currently ministerially mooted Australia-Mexico (for South America), the Australia-Emirates and Australia Kuwait (for the Middle East or West Asia) FTAs (ABC, 2004), and the Australia-Japan or Australlia-India FTA proposal.

Does China's Trade with its Major Trading Partners Cause China's Growth?

Trade-to-growth is an important causality topic in economics that has attracted some of the best minds in the field over the last 15 years or so (see for example Frankel and Romer, 1999, for a survey), and the conclusions have not been finalised for all cases. Our empirical results above show that, in the specific case of China vis-a-vis its major global trading partners, its trade (when defined as the relative size of openness to its GDP) with the ASEAN, Japan and the US, has only a weak empirical support as a statistically significant and beneficial determinant (except the ASEAN) of China's growth. The impact of China's trade with the EU and Australia on China's growth is damaging but this impact is statistically insignificant. A partial explanation for this weak evidence could be in the relative size of trade of the EU and Australia with China during the period under study (see similar evidence on the significance of Australia's trade in Guttmann and Richards, 2004).

Does China's Trade with its Major Trading Partners Impact China's Growth Differently and Where the Most Gains Come from?

It should be noted that, based on the findings given in Table 1 above, China appears to have gained most from its trade with the US, the ASEAN, and Japan in that descending order. This is despite that fact that China-Japan's trade is the largest of China's 5 trading partners. This would have important implications in trade and economic relation priority setting for government and corporate trade policy makers in China, the US, Japan, and the ASEAN. The evidence also appears not to support empirically the current proposal by the Australian government to develop further the country's trade and economic cooperation with China via a formal FTA framework. We can infer that the motives for this proposal may have been more on the volume and growth of China-Australia trade, political or based on other non-economic aspects.

Impact of Financial Services and Investment on China's Growth and Trade Policy

As mentioned earlier, one of the innovative and novel features of our paper is the introduction of comprehensive trade in goods, services and investment into the GGT models. At this stage,

the measurement of services and investment follows the concept of openness in trade in which both inflows and outflows have unweighted impact. Given this definition, it appears that, from the results reported in Table 1, the effects of services from and to China's 5 major trading partners are barely significant. This can be attributed to some extent to the volatility of service flows during the sample period. In contrast, the important role of FDI on China's growth can be more robustly ascertained from Table 1 where FDI is seen to be uniformly, statistically, significantly and positively impacting China's growth in all 5 trade-growth models for the 5 trading partners. The impact as estimated by the 2SLS (or IV) appears to be largest (6 per cent) for the China-Australia model and slightly less (5 per cent) for all other 4 models. This evidence would support the objectives of FTAs where not only trade in goods is traditionally important but also, and especially, trade in investment (a major issue of scope and coverage in FTA negotiations) would have a more critical role in the economic performance of not only China but other member countries of the FTAs. One implication is that negotiations on investment liberalisation and promotion under an FTA or economic relation framework can now assume empirically a more prominent part in the feasibility and scoping agenda. The evidence also supports an effective introduction or promulgation of a competition law and policy among the trading partners within this framework to promote trade and investment.

Do Crises and Economic Policy Reform Affect China's Growth?

The specification of shocks, crises and policy reform, either of the sudden or gradual kind and with temporary or long-lasting effects, in our GGT models is one of their significant modelling features. This feature has not been captured adequately or at all by well-known existing methodologies such as the CGE/GTAP, the GT and the PR. The types of shocks and policy reform we introduced into our models, as discussed earlier, include major recent developments in the Asian region and elsewhere. These cover the Black Friday stock market crash of 1987 (C87, a major event in developed countries with a strong financial market), the Tiananmen Square incident in China in 1989 (C89, a distinct local event with presumably wide repercussions), China's Rectification Program reform adopted in 1991 (C91), China's Deepening reform since 1993 to the present (C93; see Harvie, 1999), and the Asia crisis with damaging contagion regionally and, to a lesser extent, globally, that started in Thailand on 2 July 1997 (C97). In the terminology of Box-Jenkins time-series analysis or the literature on unit roots and cointegration (see for example Perron, 1989, 1997), the shocks (ie, C87, C89 and C97) have the characteristics of a sudden change, and China's economic policy reforms (C91 and C93) are assumed to have the feature of a gradual change. From our modelling experiments, all shocks and policy reforms have been found to have a non-decaying permanent effects of the non-stationary kind on China's trade and growth for the sampling period under study.

From Table 1, it appears that C87, which was regarded as crucial, significant and damaging event for developed countries' financial markets and economic performance in 1987, is found to have a statistically weak but beneficial effect on China's growth in all 5 bilateral and plurilateral GGT models. A partial explanation may be that this stock market crash period was, while significant for free-market economies, relatively irrelevant to China which was then a socialist-oriented economy with a weak or non-existing financial system. Another explanation may be China's Broadening reform period (1984-88) during which reforms in China's urban-industrial sectors and the gradual dismantle of the central planning system were carried out with positive outcomes (see Harvie, 1999). In contrast, the Tiananmen Square turmoil in 1989 (C89) which was considered a minor event by many as far as its impact on world economies is concerned is a statistically significant impediment to China's growth in all 5 GGT models. In fact, this impact is the largest (or the most serious) among the other economic and non-economic determinants of China's growth incorporated into the models, and the results are found for all models vis-a-vis China's trading partners.

For China's policy reforms which are regarded as gradual change and introduced or effected over a number of years, the findings of their outcomes in China's growth as obtained from Table 1 are remarkable. First, the Gulf War in 1991 (C91), as we are aware, coincided with China's Rectification program of 1988-91 in which fixed investment and production were increased albeit these were associated with a sharp rise in inflation and in retrenchment measures especially in the SOE and TVE sectors. From the perspective of the developed countries involved in the Gulf War, the subsequent consequence of C91 would be expected to be negative through the crowding-out effect of available resources. But from China's perspective, the total benefits of C91 which are interpreted as policy reform in the above context on China's growth are significantly captured by our GGT models. Second, from the findings on C93 [reflecting the outcomes of the Deepening period (1992-2002 – our data, or 1992-present in an economic management context) of reform in China], all our GTT models provide statistically significant results to lend support to the claim that the outcomes uniformly and statistically reflect the expected benefits of China's Deepening reform policy during this period. The benefits are, in addition, found through the trade-growth transmission mechanism between China and all its 5 trading partners.

Finally, while many economists and policy makers have, for various reasons, claimed that the Asia crisis of 1997 which has had devastating and lingering impact and contagion on many countries in the Asian region, and to a lesser extent, in the USSR, Africa and the EU, should be considered as negligible or irrelevant to China's development and growth. Our empirical findings here reject this claim, and show that the Asia crisis (C97), when used to approximate a long-lasting effect of this unfortunate economic and financial meltdown in Asia, has had a strong and damaging impact on China's growth as measured through the trade-growth nexus relating causally China's trade to its major trading partners, namely, the US, Japan, ASEAN, the EU, and Australia.

The first derivative conclusion from our findings here is that a contemporary trade-growth model for China (or any other country) vis-a-vis its 5 (or any other) trading partners without (a) the inclusion of these recent shock (sudden change) factors (as implied by Frankel and Romer, 1999, but not dealt with in standard GT or CGE/GTAP impact evaluation studies), economic policy reform (gradual change), or (b) as rightly stipulated by Johansen (1982) for policy analysis even in neo-classical models, may have serious and biased results on the causation and subsequent policies being explored and formulated for governments, national and international trade agencies.

The second derivative conclusion is that shocks (and major policy reform), when appropriately modelled and measured with historical trade-growth data, do seriously affect a country's development and growth and, from a policy's perspective, severely damage its ability to carry out economic and social reforms, regional and global economic relations activities. In this context, the tsunami devastation in the Indian Ocean on the Boxing Day 26 December 2004 would be a major issue for governments and policy-makers in the affected countries and regions as far as development and growth prospects in the future are concerned.

Are China's Trade-Growth Causation Results Affected by Estimation Methodologies?

In previous studies of trade-growth, OLS results of trade-growth models based on the gravity theory or similar theory seem to indicate an underestimation of the trade effect. In other words, IV (eg, 2SLS) estimates of the trade effect are usually found to be at least larger than OLS estimates. In our present studies, this is also supported for trade (openness/GDP) only in the China-ASEAN, China-Japan and China-US models. In terms of FDI however, the underestimation of the OLS is uniformly true for all 5 trade-growth models. Four reasons have been put forward to explain the underestimation of the OLS and two explanations for the overestimation of the 2SLS (see Frankel and Romer, 1999, for a brief survey).

It is well known from the bias $-\beta Cov(Vu)$ of the OLS in the standard errors-in-variables models (that is, $y=\beta X^*+u$, but X^* is unobserved and proxied by observed X with $X=X^*+V$, where V is measurement errors) or, equivalently, in simultaneous-equation econometric models, that the specification of the model or the instruments (as captured through $Cov(Xu)$) solely determines a downward or upward bias of the OLS. In our view, it is the nature of the model and the characteristics of the instruments and collected data that empirically determine the estimation bias. A general conclusion for a model may not be made in this case.
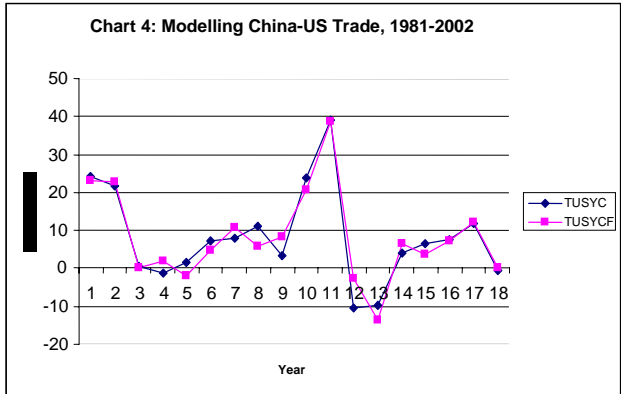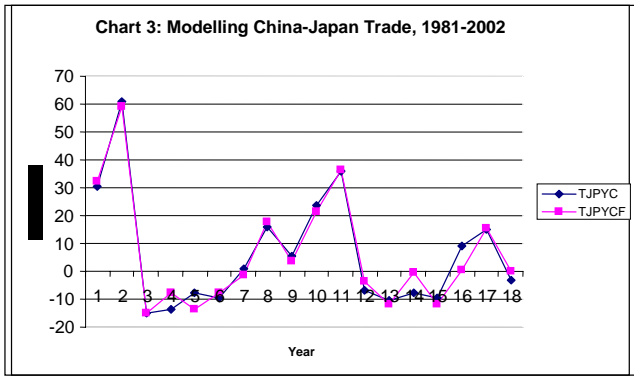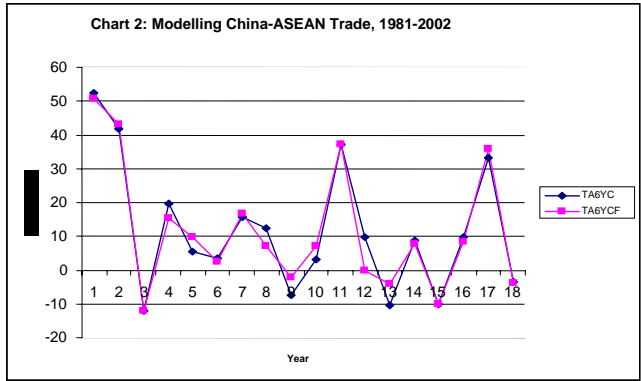
When we take into account new advances in the estimation and forecasting theory in econometrics and its sister, statistics, and when we are focused on higher efficiency for the estimates of the models that are subject to misspecification (eg, omitted relevant variables) or measurement errors or simultaneity bias, then the 2SHI estimates should, as has been demonstrated earlier, be used. In this case, the impact based on the OLS is underestimated and that on the 2SLS overestimated and seriously so in some trade-growth models. In addition, historical and ex-post forecasts and impact derived from the OLS and 2SLS will be seriously statistically biased and informationally suboptimal.
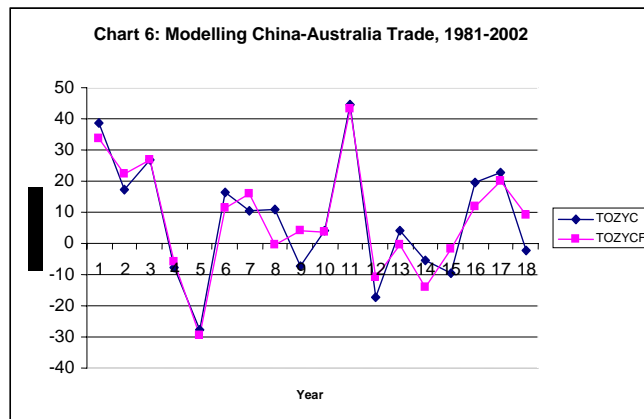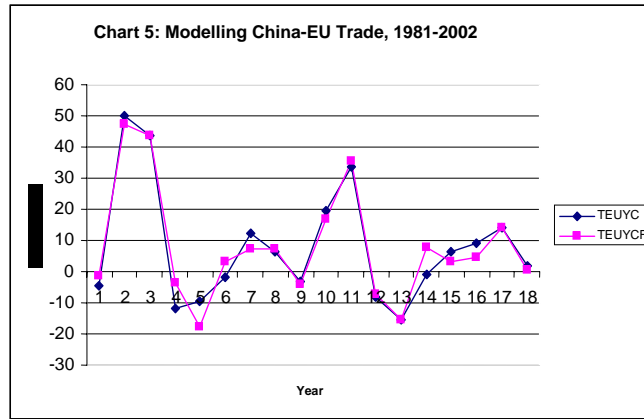
Do Our Trade Forecasts Model Observed Trade Well?

This is a question on the accuracy and reliability of the trade-growth model and the instruments – in a simultaneous-equation context- used (a point often raised in the literature, see Frankel and Romer, 1999). The answer in this case has to be relative, as different models will have different instruments and therefore different accuracy or reliability outcomes. To answer this question for our simultaneous-equation models of trade-growth above, we have calculated the proxy for T, namely $\check{T}$, from its reduced form for each of the estimations requiring a knowledge of $\check{T}$. Standard evaluation criteria such as the correlation coefficient, the RMSE, and the Theil-MSE-decomposition Um (bias), Us (variation), and Uc (covariance) where, by definition, Um + Us + Uc = 1 (see Pindyck and Rubinfeld, 1998), are then used to evaluate the proxy performance of $\check{T}$ as compared to its actual T in each of the 5 models reported in Table 1. The results of this evaluation are given in Table 2.

The graphs of the actual trade flows between China and its 5 major trading partners and their estimates from our 5 trade-growth models have also been plotted (see Charts 2-6). From these graphs, we first note that, as in the earlier studies using our new modelling flexible (that is, simultaneous-equation and function-free GGT) approach, the $\check{T}$ very accurately emulates all troughs, peaks and turning points of the actual T in all 5 models. Second, the excellent modelling success here should also be assessed in the context of modelling the rates of changes of major economic variables or activities, a notoriously difficult task according to researchers in this field.

Third, as the $\check{T}$ seems to be a very good estimated proxy to T in all models, our findings would enhance the robustness and reliability of our estimation (by the OLS, 2SLS or 2SHI) of the impact of China's trade with its major 5 trading partners on its growth, and provide mre credible empirical support to related recommendations on trade policy or economic relations.

Chart 2: Modelling China-ASEAN Trade, 1981-2002

Chart 3: Modelling China-Japan Trade, 1981-2002

Chart 4: Modelling China-US Trade, 1981-2002

Chart 5: Modelling China-EU Trade, 1981-2002

Chart 6: Modelling China-Australia Trade, 1981-2002

Table 2
Reliability of Merchandise Trade Proxy in
Models on China's Trade with its Five Major Trading Partners
Openness (Exports+Imports)/GDP
1981 to 2002

Model	China-ASEAN	China-Japan	China-US	China-EU	China-Australia
Correlation Coefficient	0.98	0.98	0.96	0.97	0.94
RMSE	3.83	3.67	3.23	4.15	6.42
Mean Error	0.00	0.00	0.00	0.00	0.00
Um	0.00	0.00	0.00	0.00	0.00
Us	0.01	0.01	0.02	0.01	0.03
Uc	0.99	0.99	0.98	0.99	0.97

Notes. Ub+Us+Uc = 1. See Pindyck and Rubinfeld (1998) for further detail on these evaluation criteria. The estimates are based on TSP calculation.

Implications for China's Trade and Investment Policy

Our findings as given in Table 1 appear to support the view that China's merchandise trade (ie, exports and imports of goods), while being considered widely as the most important element of all FTAs or closer economic relations by the media and in political debates and dialogues even at the highest level of government or corporation, constitutes empirically only a small contribution to China's growth, based on historical data over the past 2 decades or so. In addition, China's trade with the ASEAN, while being small in comparison with Japan, the US and the EU, is the only significant contribution to China's growth. In contrast, FDI is seen as the most important driver of China's economic performance over this period. The implication is that an overemphasis on trade and trade liberalisation policy and less focus on FDI and FDI promotion policy, while being fashionable in many quarters of governance, is in appropriate and misguided in this case.

Implications for China's Regional FTA Strategy

The findings above lead us *a fortiori* to the conclusion that the ASEAN, in spite of its smaller trade share in world trade, has been playing an increasingly important and significant part in China's economic 'miracle' performance in recent years. In this context, an ASEAN+China FTA is not only logically appropriate from a 'regional', 'gravity' or Asian perspective, but also is empirically supportable from a research-based policy perspective.

Do We Have Empirical Support for the bilateral Australia-China FTA Proposal by Australia?

After the successful negotiations and signing of the Australia-Singapore FTA and the ATHFTA in 2003, and the AUSFTA early in 2004, the Australian government has proposed official dialogues and negotiations with a view to set up further bilateral FTAs for countries in the region (eg, Australia-Indonesia and Australia-Japan) and beyond (eg, Australia-Mexico, Australia-Emirates, and Australia-Kuwait). In fact, an Australia-China trade and economic framework was agreed in May 2002 to enhance bilateral trade and investment and officially signed on 24 October 2003 (DFAT, 2004), and a full Australia-China FTA is currently (April 2005) investigated by a feasibility study. Coupled with the slow progress of the Doha agreements on WTO agendas, the subsequent dismal outcomes from the WTO Seattle and Cancun Ministerial Meetings and arising concerns from the new Singapore Issues, these

bilateral FTA proposals were seen as natural developments within a 'big picture' (WTO and GATS) framework and logical extensions of the current new Asian regionalism resulting in the proliferation of the FTAs in many forms and guises especially in the Asian and Oceanic regions.

As we have mentioned earlier, the objectives of setting up an FTA are, in addition to better regional cooperation, political stability and security, to enhance trade between its country members and to improve their growth, development and ultimately welfare and income inequality. These objectives necessarily require the validity of the premise that trade does in fact directly and positively affect growth in these FTAs. What are the determinants of trade and how they affect growth and development provide only auxiliary information on the interaction of the various activities in the trading member countries, and to provide a more accurate measurement of the impact of enhanced trade generated. Our findings reported above lend support to the hypothesis that China-Australia trade has been small and had hardly any impact on China's growth. The implications are, based on our present findings and historical data over the past 20 years or so, that an Australia-China FTA would therefore serve more as a regional political cooperation (eg, the recognition of China as a market economy with more favourable treatment – even elimination of anti-dumping charges - is a requisite of an Australia-China FTA) agenda because of the rapid rise of the Chinese economy in world economic and political power and its geographical gravity or closeness than a genuine economic and trade objective of mutual benefits. Further research would need to be carried out on this issue

Implications for China-Trade and Regional and Global Cooperation

In our earlier study (Tran Van Hoa, 2002a) it was pointed out that while trade between the Asia 3 or ASEAN members and other trading blocs (e.g, NAFTA and EU) reflects an important historical trend in the past 30 years or so, the composition of trade by tradable commodities is also important in promoting growth and development. Since the majority of trade between the Asia 3 or ASEAN and other advanced economies in North America and the EU involve groups of tradable commodities of a hi-tech nature, it was claimed that this technology transfer is essential to growth and development in the Asia 3 or ASEAN in general and in China in particular. FDI is another important component for technology transfer.

The implications of this for our present study are fourfold. First, while showing an interest in improving trade with China, the proposed Australia-China FTA for example can still cultivate this regional trade, investment, and economic cooperation as useful for technology transfer from a developed country (that is, Australia) with a Western cultural background in the region to China. Second, a closer economic cooperation between China and Australia may have an extra economic benefit in a global context when the major trading blocs such as NAFTA (the US and Canada) and the EU are seemingly heading more towards regional self-interest or even economic isolationism. Third, with the current swelling dissatisfaction with globalisation supported vehemently mainly by US transnational corporations which were beset at the same time with corporate corruption and accounting scandals and even with the prediction of the end of globalism by some analysts, bilateral or regional FTAs and CERs may avoid to some extent these problems and pitfalls of globalisation. Finally, an FTA or a closer Australia-China relation would put the member countries in a closer framework to promote trade, investment and growth (DFAT, 2004) and to deal better with crises such as the economic and financial turmoil, terrorist attacks or tsunami devastation that, on recent experience, have wrought havoc on the 'once miracle' economies in the region in the form of economic slow-down and deep recession, political and social unrest, welfare deterioration, and regional instability. These problems and developments have also affected Australia but to a lesser extent.

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