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ABSTRACT

The signing of the long-awaited Australia-Thailand free trade agreement (ATFTA) on 19 October 2003 at the APEC Meeting in Bangkok, the emergence of new Asian regionalisms such as ASEAN+1 (China) and ASEAN+3 (China, Korea and Japan), and other bilateral, plurilateral and multilateral FTAs world-wide in recent years pose challenges and, at the same time, offer opportunities for member countries. These FTAs require not only ministerial or senior official dialogues or casual heuristic causation on their acceptability and viability but also serious analytical and historical data-based research into these important developments including their underlying fundamental trade-growth and growth-of-trade causation and impact on trade and closer economic relations. Existing methodologies (eg, CGE/GTAP and gravity theory) for this kind of study have their serious coverage and data restrictions. The paper focuses on the empirics of the ATFTA above by using a novel empirical approach that avoids the CGE/GTAP pitfalls and to provide (if any) supporting evidence, emerging challenges and promising opportunities for Australia and Thailand. Implications of the findings for economic integration, trade policy and prospects for trade and welfare improvement for Australia and Thailand in the medium and long terms will also be discussed.

Keywords: New Asian Regionalism, Free Trade Agreement, Economic Integration, Australia-Thailand FTA, ASEAN, Trade and Growth, Gravity Theory, Causality, Economic Modelling, Economic and Trade Policy.

JEL: C32, C51, C52, F02, F14, F15, F42, O11, O41, O53

1 Introduction

The recent signing of the Australia-Thailand CER (Closer Economic Relations) FTA underlies a new official approach to trade policy by the governments of Australia and Thailand (DFAT, 2003). It is also within the context of the current proliferation of other FTAs (see APEC, 2003), the emergence of strong new Asian regionalisms (for example, the ASEAN+3), other bilateral, multilateral and plurilateral FTAs such as Singapore-Australia, Australia-US, Japan-Singapore, Korea-Chile, and the sought-after ASEAN+5 (ASEAN+3 plus Australia and New Zealand) as well as the Cotonou-type regional economic integration advocated by the European Union (EU). These FTAs had been negotiated with the purpose of promoting 'organic' growth and 'normal' opportunities (see Barker, 2002), and their developments compel not only official dialogues and casual causality assumptions but also new serious analytical and empirical research into the fundamental issues of trade, integration, growth, and their viability, sustainability or expansion.

While an apparent reason for this emergence and proliferation of FTAs may be their country members' proximity (distance, size and area) in the Asian region, other economic and non-economic factors within the context of economic relations may also play an important and interdependent part. To date however, not much work on the causal and quantitative significance of these factors in the case of ATFTA or even many other regional Asian FTAs (see ASEAN, 2002) has been done and reported. Worse still, existing methods for this kind of work (eg, CGE/GTAP and gravity theory) have severe coverage and data restrictions and therefore are unsuitable or suboptimal. As a result, their findings may be inappropriate or even unreliable.

The paper proposes in this context to study and model, for reliable and efficient policy analysis, the ATFTA within this comprehensive scope and coverage using an approach with several novel features. First it extends the standard gravity theory (see for example Linneman, 1966, Harrison, 1996, Frankel and Romer, 1999) to construct appropriate simultaneous-equation trade-growth and growth-of-trade models adopting, second, a flexible functional form (Tran Van Hoa, 1992) to avoid restrictive (for example, linear or log) functional specification. Third, it uses 2003 ICSEAD and OECD national accounts and trade time-series data to estimate these models to provide data-consistent and efficient empirical evidence on the Australia-Thailand patterns of trade and growth and historical support (or a lack of it) for this ATFTA. Fourth, trade and growth policy implications including challenges and obstacles and sustainable prospects for Australia and Thailand are also briefly discussed, and finally, possible applications to other free trade agreements (eg, Singapore-Australia, Australia-India and Australia-China) and economic integration suggested.

2 Development and Challenges of ATFTA

Economic regionalism is not new. It started with the concept of an East Asia economic bloc proposed by Japan even before World War 2 or similar regionalism in the Latin Americas about two decades ago. Effective initiative for regional economic development for the ASEAN and three north-east Asian economies (China, Japan and

Korea) has been claimed to have a long history in the Pacific Rim commencing in 1965, enhanced through Pacific Trade and Development Conference (PAFTAD) in 1968, and the Pacific Economic Cooperation (PECC) in 1980, and the Asia Pacific Economic Forum (APEC) in 1989 (see Kojima, 2002). In 2001 and early in 2002, 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 (NARs) and Asian FTAs. These developments were the direct result of a number factors: the 1997 Asia crisis, the subsequent benign neglect of the US and the EU on Asian crisis economies (see Tran Van Hoa, 2003), the quick recovery and recurring growth in Korea, the emergence of China as a fast post-Asia crisis growing economy, the continuing stagnant state of the world's second largest economy (namely Japan), and the slow pace of the WTO negotiations on almost unsurmountable problems (eg, agriculture subsidies and 'Singapore issues'). The current recovery and growth of Korea have also been put forward by some authors as the leader in the post-crisis 'flying geese' theory for ASEAN+3 economies (see Harvie and Lee, 2002).

In 2003, the NARs and FTAs were indeed numerous and proliferating at an amazing speed at the behest of government leaders especially in the Asian region. They include bilateral and multilateral FTAs such as first ASEAN, ASEAN+3, then the coveted 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), and last but not the least, Vietnam+US. There was currently even a discussion on the setting up of a North Asian FTA in which Japan will play an important part. The setting up of a sweeping US-Australia FTA was also proposed by the Australian government (Hartcher, 2002) and currently under negotiations, to the dismal of New Zealand which wanted on the other hand a trilateral US-CER (Close Economic Relations between Australia and New Zealand). About at the same time, there was a suggestion by New Zealand Prime Minister Helen Clark to set up an Australia-New Zealand Economic Cooperation (ANZEC) to boost the low-activity 20-year old CER. The EU has also been strongly advocating regional integration and liberalisation for the Pacific nations to create EU-type transnational economic partnerships within the Cotonou framework to stimulate trade and create growth among them (Barker, 2002).

The main focus and objective of the NARs and Asian FTAs (as separate from currency or customs unions) are to promote trade 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 the Oceania. This gain, which complements other comprehensive (in scope and coverage) and multilateral objectives, is expected to be substantial and can be delivered especially in the timeframe that cannot be achieved elsewhere within the framework of say the WTO (see DFAT, 2003) or even the APEC. Prominent among these NARs and Asian FTAs is the ASEAN+3 proposal above and part of it, the ASEAN+1 or ASEAN+China FTA which has a 1,700 million people market, a USD2 trillion GDP, and USD1.2 trillion trade. 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.

More recent bilateral FTAs include Australia-Singapore FTA and the Australia-Thailand FTA (the focus of our present study) which was concluded in October 2003.

Late in 2003, an ASEAN+India FTA, an Australia-China FTA and an Australia-Indonesia FTA were also contemplated.

As is well known, the main elements of outcome of the ATFTA are fairly comprehensive and challenging for many countries and that call for appropriate comprehensive studies or at least in major areas or sectors. These elements include trade in goods (all tariffs to be eliminated in 2015), services (liberalisation of market access barriers), investment (improving two-way investment and transparency), movement of business people (visa facilitation), sanitary and phytosanitary (SPS) measures and food standards cooperation, industrial standards-related (assessment procedure conformity) and customs issues (valuation agreement in the WTO), transparency in law and regulation, cooperation in intellectual property rights, competition policy (elimination of anti-competitive practices), e-commerce (no imposition of customs duties on electronic transmissions between Australia and Thailand), government procurement provisions, establishing overseeing joint commission, and dispute settlement provision (DFAT, 2003). Trade is therefore only a small part of the ATFTA or similar agreements.

3 Linkage between Gravity Theory and Australia-Thailand FTA

Since the principal objectives of FTAs are trade liberalisation and welfare improvement (as well as economic integration) for member countries, the FTA premises are that trade (international and domestic) directly and other determinants of trade indirectly significantly and causally affect economic welfare (see Raimondos-Moller and Woodland, 2002) and real wages (see Ruffin and Jones, 2003) and growth (for developed countries – see Frankel and Rose, 1998, Frankel and Romer, 1999) and 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-mercantilist and non-economic aspects (e.g. closer international cooperation and collaboration, social harmony, political stability and prosperity), and, in the context of globalisation, conducive to regional or international economic integrations (ASEAN, 1999).

In view of the expected final outcomes of having higher growth or development improvement for trading partners or FTA member countries, a useful causality concept in the form of a gravity theory (see Eichengreen and Irwin, 1995) 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 between countries has been proposed and widely applied in empirical studies of this kind (see also 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). All these studies use cross section data and the often-difficult-to-measure 'transit or distance costs' (see Baier and Bergstrand, 2001). In the case of Asian economies or especially the ATFTA member countries in a bilateral context which are our focus for study, not much research both of a qualitative or quantitative kind has been done or reported on the validity of the required premises underlying the foundation of this FTA (namely,

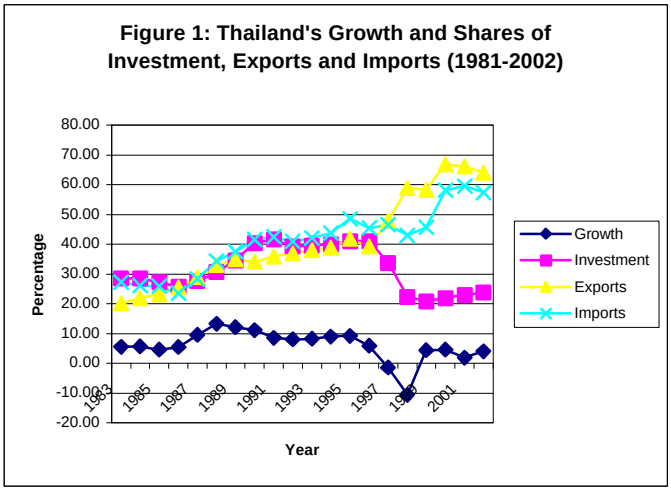
given their regional proximity but diverse culture, history and development components, whether Australia-Thailand trade increases growth in Thailand or Australia, and if it does, the implications for trade and economic policy).

4 An Australia-Thailand Trade-Growth and Growth-of-Trade Model

From a national accounting framework such as the SNA93, a country's growth can be studied from a production or expenditure perspective. In this context, the likely determinants of an open economy's growth come from private consumption, investment, trade and government expenditure. The standard gravity theory (Frankel and Romer, 1999) is by no means comprehensive as it has so far focused only on the contribution by the trade (exports and imports) sector to growth and the 'transaction or distance' costs associated with or determining trade. The task of unravelling the contributing factors to growth over the years is further compounded by the different stages of development of a country in the sense of Schumpeter or Rostow. Some of these characteristics of growth can be seen in Figure 1 below for the historical trends of growth, investment, exports and imports in Thailand during 1981 to 2002.

From this figure, we note that there appears to be a positive relationship between growth and trade share (of GDP) in the early 1980s, the reverse may be seen as true for the early 1990s. Interestingly, in the la

te 1990s, while a decline in investment and import shares seemed to be correlated with falling output growth, this decline appears to be moving together with a rise in export share. To unravel this complicated relationship over time between Thailand's growth and its investment and trade vis-à-vis Australia in the present study would be a useful exercise to assist more practically and reliably economic and trade policy for use by decision makers or official implementing agencies in Australia and Thailand. We also note that while there are several analytical and empirical approaches to studying trade-growth and growth of trade, we focus below on adopting an extension or generalisation of the standard gravity theory to deal with important recent economic and trade developments in the Asian region.



Source: ICSEAD, 2003.

Consider now, for convenience and without loss of generality, a simple model of two simultaneous implicit functions (extension to more functions is straightforward when more variables are considered and endogenised) comprising and extending the basics of gravity theory (see above) linking trade and growth between 2 trading countries. This extended gravity theory has, in addition to the 'distance or gravity theory' features and geographic or demographic attributes (for Australia and Thailand), important economic factors, and the trade liberalisation requirements of the ATFTA. Since the geographical attributes (such as distance and area) in the ATFTA are *a priori* assumed to be a rationale for setting up this FTA and, further, we will use time-series data below to deal with the impact of the region's recent crises, we can then focus on other relevant demographic (eg, population as 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) and may include domestic trade (Frankel and Romer, 1999), and growth (Y) may be defined as GNP or, by convention, GDP. Thus

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

where F1 and F2 are two arbitrary mathematical functionals linking Y and T (1), or T and Y, X and W (2), 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 (eg, distance, area, size, policy shifts and external shocks – see Johansen, 1982) variables, relevant to a country or a group of countries' growth or development. Importantly for empirical implementaion, in addition to data for 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 (eg, SNA93), or the accounting system of Stone (1988), or the recent OECD or IMF databases.

Taking the total differentials of (1) and (2) and neglecting terms of second and higher –order (see for example Allen 1960, and Tran Van Hoa, 1992a), the 2-equation model (1)-(2) can be written in stochastic forms and in terms of the rates of change (Y%, T%, X% and W%) of all the included exogenous and endogenous variables (Y, T, X and W) as

$$Y\% = \alpha 1 + \alpha 2T\% + u1 \qquad (3)$$
$$T\% = \beta 1 + \beta 2Y\% + \beta 3X\% + \beta 4W\% + u2 \qquad (4)$$

In (3)-(4), the equations are linear and interdependent in the sense of Marshall or Haavelmo, α's and β's 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 testable hypothesis. In their non-stochastic forms, these equations form the basis of applied or computable general equilibrium (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.

It can be verified that our so-called flexible (or function-free) trade-output 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. It is well-known in the theory of econometrics that the use of OLS will, in this case, produce biased parameter estimates. These 2 (reduced-form adjusted and reduced-form) equations can be written as

$$Y\% = \alpha 1 + \alpha 2 \bullet \ \% + v1 \qquad (5)$$
$$Y\% = \pi 1 + \pi 2X\% + \pi\ 3W\% + v2 \qquad (6)$$

where • is T as estimated by the OLS of its reduced form equation [that is, (6) with T% replacing Y%], π's the reduced form elasticities, and v's the new disturbances with standard statistical properties.

An important feature of our modelling approach here is that, contrary to the CGE/GTAP approach, our impact study is data-consistent as all required elasticities are estimated from available data and have asymptotically and statistically desirable and consistent (an important issue in the gravity theory's empirical applications – see Frankel and Romer, 1999) properties 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 approaches, our impact study has the general flexibility in modelling specification in assuming explicitly no *a priori* functional forms for the equations in the model and can handle data on trade or budget deficits and real rates of interest when inflation exceeds the nominal interest rate. Log transformation cannot do this.

Thus, while CGE/GTAP is non-econometric, static and deals only with trade in goods, our model is data-based (all required elasticities are estimated), capable of accommodating dynamics (stickiness and gradual change), add- and sub-factors (internal and external shocks and sudden policy change) in the sense of Johansen, and, crucially for comprehensive trade and economic policy, trade in goods and services and investment (when data for these are available). In addition, since our model specification is general, it can handle both cross-section and time-series data. More specifically, it is particularly suitable for studies of the movements of trade and economic activities in the Asian and Australian economies in recent years, the major economic and financial crises included.

To implement the model (3)-(4) above to empirically investigate the causal relationship between Australia-Thailand trade and growth, 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 (see for example Frankel and Rose, 1998, Frankel and Romer, 1999, and Rose, 2000, and Otto et. al., 2002) and/or other relevant factors (eg, shocks – Johansen, 1982) with available data. One such an extended model relevant to our focus of study on the

possible causality between trade and growth for Australia and Thailand may be written in either the reduced-form adjusted equation (7) and supplemented by the full reduced-form equation for T (8) (and similarly for Y).

$$Y\% = \alpha 1 + \alpha 2 \bullet \% + \alpha 3\ ST + v1 \qquad (7)$$

$$T\% = \pi 1 + \pi 2\ YT\% + \pi 3\ F\% + \pi 4\ M + \pi 5\ P + \pi 6\ ER + \pi 7\ IS + \pi 8\ POP + \pi 9\ SH + v2 \qquad (8)$$

In (7)-(8), from Thailand's perspective, Australia's trade (T%) with its trading partner (Thailand) or *vice versa* is assumed to cause, together with ST, Thailand's growth (Y%), but this trade is also affected by economic activities, trade-related policies and external or internal shocks in Thailand (and Australia). Assuming for convenience that Thailand's trade [traditionally defined as its exports (or imports, see Barro and Helpman, 1991)] with Australia is affected by its GDP and other major economic activities, trade-related policies (see Coe and Helpman, 1993 for this approach) or external or internal shocks in its economy, then Equation (8) in its reduced form simply assumes that Australia-Thailand's trade is a derived demand within the context of the standard theory of consumer demand at the aggregate level and is simply affected by the exogenous factors such as its trading partner's income or GDP (named YT), domestic demand pressure or inflation (P) – see Romer (1993), fiscal policy (F), monetary policy (M), trade policy and exchange rates (ER) – see Rose (2000), industry structure (IS) – see Otto et. al. (2002), gravity-theory factor or population (POP) – see Frankel and Romer (1999), and internal or external sudden shocks (SH) – see Johansen (1982) - in its economy.

In deriving (7) and (8) for Australia-Thailand's trade, 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 two economies of Australia and Thailand, geographic attributes (that is, being in the neighbouring region) are assumed to be the *prime facie* reason for setting up the ATFTA, and the distance and area characteristics are omitted as all of our variables are expressed in terms of time-series (it should be noted that distance and area may not be appropriate variables with high-trade countries like Singapore and Brunei). All variables in the model, that is, Y, T, YT, F, M, P, ER, IS and POP are expressed as their rates of change (a feature of the function-free form), so the units of measurement for the trading countries' variables are irrelevant. SH is a qualitative variable representing shocks having either one-off effects or temporally permanent effects on trade and growth with discrete values.

The implications of our model above are important for studying the transmission mechanism or relationship between trade and growth of Australia and Thailand. This relationship, if empirically substantiated, can provide powerful evidence on the trade and welfare enhancement relationship of these two countries as trading partners in a bilateral trade agreement, and, as a result, it would lend crucial support for the viability, sustainability and promising prospects of the ATFTA.

5 Substantive Evidence on ATFTA Trade-Growth and Growth-of-Trade Causality

This section reports substantive results for a number of trade-growth simultaneous-equation models based on several significant extensions to the standard gravity theory (see below) and given in (7) and (8) above. For comparison with the findings of previous studies (see Frankel and Romer, 1999), these results are obtained by the OLS and 2SLS methods for the structural equation of growth (7). Other available methods with superior structural and forecasting (or impact) MSE properties in the sense of average Wald risks include the Stein and 2SHI methods (for a description of these methods, see Tran Van Hoa, 1985, 1986 and Tran Van Hoa and Chaturvedi, 1997, and for previous applications, see for example Tran Van Hoa, 2002c and 2003) but their results are not reported in this paper.

Data – Due to the limitation of the required data in our studies, all original data are obtained as annual and then transformed to their ratios (when appropriate). The ratio variables include trade (exports and imports), government budget, and money supply (M2) all divided by GDP, and unemployment rate. Other non-ratio variables include exchange rates, population and binary variables representing the occurrence of the economic, financial and other major crises over the period 1981 to 2002. All non-binary variables are then converted to their percentages. This percentage measurement is a main feature of our modelling approach and avoids the problem of *a priori* functional forms (see above) and also of logarithmic transformations for negative data [such as budget (fiscal) or current account deficit].

The data for trade (exports (X) and imports (IM) respectively), GDP and estimated mean population (named POP) are retrieved from ICSEAD 2003 databases. Openness between the two trading countries is defined as T=X+IM although the separate effects of either X or IM on trade have been experimented with (see below). All economic data are at current prices. Fiscal, monetary, trade and industry policy data for Thailand are obtained from ICSEAD 2003 databases and proxied, respectively, by government budget/GDP (BR), M2/GDP (M2R) and lending rates (R), inflation (P), export and import prices (XP and IMP), exchange rates of Baht per US dollar (ER), and unemployment rate (UR). In addition to the usual demographic (eg, population) and economic components in our model, we also identified three major world crises that had affected the economies in the region (and other economies outside the region) during our sampling period and included them as three dummy variables with persistent effects after their occurrence (the one-off effects was postulated but discarded as implausible in the study). These are the stock market crash of 1987 (C87), the Gulf War of 1991 (C91), and the Asia crisis of 1997 (C97). Various modelling experiments in our study also showed that these crises all have a permanent effect on growth in the economies in the region.

The Estimated Models - The various bilateral trade-growth and growth-of-trade models for the Thai economy are estimated using these annual data and for the period 1981 to 2002. The two-simultaneous equation trade-growth and growth-of-trade models for Australia and Thailand in our studies that are based on (7)-(8) can be written fully for estimation and analysis as

$$Y\% = \alpha_1 + \alpha_2 TOZ\% + \alpha_3 C87 + \alpha_4 C91 + \alpha_5 C97 + v1 \qquad (9)$$

$$TOZ\% = \beta_1 + \beta_2 YOZ\% + \beta_3 XP\% + \beta_4 IMP\% + \beta_5 BR\% + \beta_6 M2R\% + \beta_7 CPI\% + \beta_8 ER\% + \beta_9 UR\% + \beta_{10} POP\% + \beta_{11} R\% + \beta_{12} C87 + \beta_{13} C91 + \beta_{14} C97 + v2 \quad (10)$$

where, in percentages or growth rates, Y=Thailand's GDP, TOZ= Thailand's total trade (exports+imports or openness) with Australia as share of Thailand GDP, and YOZ=Australia's GDP. The variables BR, M2R, R, XP and IMP, CPI, ER, UR and POP denote respectively fiscal policy (BR), monetary policy (M2R and R), domestic demand pressure or inflation (CPI), trade policy (XP, IMP and ER), and industry or labour policy (UR), and a gravity or market size factor represented as usual by population (POP) in Thailand. v's are the disturbances representing other unknown factors on Y and TOZ respectively (see Frankel and Romer, 1999). The trade-growth and growth-of-trade models for Australia can be similarly constructed.

Substantive Empirical Evidence – The empirical findings for the trade-growth model and based on the equations (9)-(10) above for Australia and Thailand are given in Table 1. It should be noted that, in terms of mathematical consistency or econometric identifiabiliity, both equations as specified in (3) and (4) and with our relevant variables included are identified. Due to the importance of the estimation methods being used that can provide greatly different results even for the same model (see further detail in Frankel and Romer, 1999) and also for the purpose of statistical efficiency comparison, two types of estimated structural parameters (elasticities) have been calculated for the structural trade-growth model (9). These are the OLS and the 2SLS.

TABLE 1

Thailand's Growth and Trade with Australia
Extended Gravity Theory in Flexible Functional Form – Structural Equations
1981 to 2002

Variables	OLS	2SLS	OLS	2SLS
		Thai Growth		
Constant	5.37**	5.39**	7.17**	8.85**
Openness/GDP	-0.02	0.07	---	---
Exports/GDP	---	---	-0.11**	-0.17**
Imports/GDP	---	---	0.09@	0.25**
Stock Market Crash 87	6.36**	5.42**	3.53	-0.43
Gulf War 91	-3.52@	-2.78	-2.67	-0.81
Asia Crisis 97	-7.48**	-9.14**	-6.04**	-6.59**
R^2	0.64	0.66	0.74	0.69
F	7.08**	7.45**	8.51**	6.95**
DW	1.93	1.96	2.53	2.03

Sources of data: 2003 ICSEAD Databases and 2003 OECD National Accounts.
*Notes: ** significant at 5% level, * significant at 10% level, @ significant at 15% level. The estimates are for the model (9) and the exogenous variables are given in (10) in text.*

From the results given in Table 1, we note three important findings. First, while modelling output growth has been notoriously difficult to have high empirical success, all four estimated Australia-Thailand trade-growth models have statistically significant and much higher modelling performance (that is, R^2 reaching up to 74 per cent) relative to other trade-growth causality models as reported in previous studies. Second, a graph of Thailand's observed and estimated growth fluctuations for all four models for the period under study (not reported here) also indicates that the peaks, troughs and turning points of these fluctuations are very accurately predicted for the whole of the period under study (1981-2002). Third, all estimated models which are static structurally also appear free from autocorrelation-induced inefficiency problems.

Trade, as defined by openness/GDP between Thailand and Australia, has no statistically significant impact (with a small elasticity of –0.02 and 0.07) on Thailand growth. While all crises under study have, as estimated by the OLS, significant impact on Thai growth, the stock market crash of 1987 has the wrong sign and the Gulf War in 1991, as estimated by the 2SLS, becomes insignificant. The most substantial and significant damaging effect on this growth comes from the Asian economic and financial crisis starting in 1997 in Thailand. This has a value of –9.14 per cent by the 2SLS and –7.48 by the OLS.

In other modelling experiments to evaluate the use of other definitions of trade (see above), we decomposed total Australia-Thailand trade into Thailand's imports from Australia (i.e., Australia's exports) and Australia's imports from Thailand (i.e., Thailand's exports) separately and included them in the growth-trade equation (9). The empirical findings from these models are also given in Table 1. From these results, both Thailand's exports to and imports from Australia have some impact on Thailand's growth. The impact of exports is however significant but negative. The impact (elasticity) of imports ranges between 0.09 for the OLS and 0.25 for the 2SLS and is significant. The 2SLS findings show that all three crises under study have a negative effect on Thailand's growth, but only the 1997 Asia crisis has a powerful (of a magnitude of between 6.04 and 6.59) and significant damaging impact (at the 5% level) on this growth.

6 Challenges and Opportunities from the ATFTA

While the models we used for study of the challenges and opportunities of the ATFTA above may be simple and notably static in their structure, they contain the main and conventional ingredients of trade-growth analysis and are fairly consistent with similar previous studies for comparison. The empirical findings reported in the preceding section also provide a number of interesting results on trade-growth causation with important international trade or co-operation policy implications for Thailand and Australia in particular or for other regional and international economic integrations with similar interest and objectives in general. Some of our findings may be useful in providing significant evidence and information for trade-growth analysis, discussions and policy consideration, and complement other studies of the more descriptive and casual causality kind in this area of investigation.

Does Australia-Thailand Trade Cause Thailand's Growth? This is an important topic in trade-growth studies that has attracted some of the best minds in this field of

research in the last 10 years or so (see for example Frankel and Romer, 1999, for some survey), and the conclusions have not be finalised for all cases. The results in our study above show that, in the specific case of Australia-Thailand bilateral trade when trade is popularly defined as the relative size of openness, the ATFTA that has just been signed between the two countries' leaders in Bangkok has no empirical support as a significant and positive determinant of the country's growth.

Do Australia-Thailand's Exports or Imports Contribute to Thailand's Growth? When trade is decomposed into its two components, exports and imports, the findings of trade-growth causation are a bit more clear-cut. More specifically, contrary to conventional expectations or assumptions in recent international trade debates or studies, it is not exports to but imports from Australia that have driven part of Thailand's growth over the past two decades. Due to the data limitation in our sample however, the findings are not sufficient to help us to differentiate whether import-substitution or export-orientation has been the more substantive driver of growth in the different stages of Thailand's recent economic development.

Do Crises Affect Thailand's Growth? When openness is used as a proxy for trade between Australia and Thailand in our models, crises and trade do appear to affect Thailand's growth but the only real crisis that significantly and negatively affected Thailand's growth is the 1997 Asia crisis. It is interesting to note that the stock market crash of 1987 that had severe impact on developed economies has a significantly beneficial impact on Thai growth in the openness models and a damaging effect only in the case of the exports-imports-growth model estimated by the 2SLS. But this effect is statistically insignificant.

When decomposed trade and the more reliable or efficient 2SLS estimation method are used, all three crises (the 1987 stock market crash, the 1991 Gulf War and the 1997 Asia meltdown) incorporated in our models do have a declining effect on Thailand's growth. However, the 1997 Asia crisis is found to be the only development that exerted a strong sign-wise and statistically significant and damaging impact on Thai growth.

A natural conclusion from both types of trade-growth models reported in Table 1 is that a contemporary trade-growth model for Thailand or even for other major Asian developing economies without the inclusion of these recent shock factors (as implied by Frankel and Romer, 1999, but unable to account for in standard gravity theory studies, or stipulated for inclusion in models of this kind by Johansen for policy analysis, 1982) may have serious and biased results on the causation being explored and on the policy that may emerge accordingly.

Are Australia-Thailand's Trade-Growth Causation Results Affected by Estimation Methods and Why? In previous studies of trade-growth, OLS results of trade-growth models based on the gravity or similar theory seem to indicate an underestimation of the trade effect. The 2SLS or generally IV estimates of the trade effect are usually found to be larger. Four reasons have been put forward to support the underestimation of the OLS and two explanations for the overestimation of the 2SLS (see Frankel and Romer, 1999, for a brief survey). In our studies here, the underestimation of the OLS is also found for the trade effect in both total trade and

exports-imports models. This finding would be in support the results of the majority of previous results.

It is well known from the bias $-\beta Cov(Vu)$ of the OLS in errors-in-variables models (that is, for the model $y=\beta X^*+u$, but X^* is unobserved and proxied by observed X with $X=X^*+V$, where V is measurement errors) or equivalently in simultaneous-equation 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 that determine the estimation bias. The standard theorems on the consequences of omitted relevant variables and included irrelevant variables in a linear model should be invoked for an informed discussion on this econometric issue. A general conclusion may not be made.

Are Our Reduced-form Estimates of Australia-Thailand's Trade Good Proxy for its Observed Trade? This is a question on the accuracy and reliability of the trade-growth model and the instruments 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 on our empirical models, we have calculated the proxy for T (namely • above) and for exports and imports from their reduced forms for each of the estimation requiring their knowledge. Standard evaluation criteria such as the R^2, the DW statistics, the correlation coefficient and the Theil-MSE-decomposition Um (bias), Us (variation) and Uc (covariance) are then used to evaluate their proxy performance as compared to their actual values in each model reported in Table 1. The results of this evaluation are given in Table 2.

We first note that, from the plots (not reported here) of Thailand's actual openness/GDP, exports/GDP and imports/GDP and their reduced-form estimates, all estimates or historical forecasts of these variables can emulate very accurately all troughs, peaks and turning points of the actual fluctuations for the whole period under study. Notable in our results is the ability of our estimates to predict accurately the sudden and large decline in Thailand's output growth in serious crises. In addition, the results in Table 2 indicate that, according to the conventional evaluation criteria, the reduced-form estimates have modelled exceptionally well their actual movements over the sample period. This finding would enhance the reliability and robustness of our 2SLS estimation of the impact of Australia-Thailand's trade or exports and imports on Thai growth.

TABLE 2
Reliability of Trade (Exports and Imports) Modelling in Australia-Thailand Trade-Growth and Growth-of-Trade Models
1981 to 2002

Variable Proxy	Openness/GDP	Exports/GDP	Imports/GDP
Summary Modelling Performance Statistics			
R2	0.822	0.765	0.741
DW	2.100	1.982	1.970
Correlation Coefficient	0.907	0.875	0.861
RMSE	4.681	7.355	7.208
Mean Error	0.000	0.000	0.000
Um	0.000	0.000	0.000
Us	0.049	0.067	0.075
Uc	0.951	0.933	0.925

Notes. The estimated model is the reduced form given in (10) in text in which the dependent variable is either Openness/GDP, Exports/GDP or Imports/GDP. Ub+Us+Uc = 1. see Pindyck and Rubinfeld (1998) for further detail on these evaluation criteria. The estimates are based on TSP.

Do We Have Empirical Support for the ATFTA to Meet New Challenges from Globalisation and Crises? As we have mentioned earlier, the objectives of setting up the ATFTA are, in addition to better bilateral trade and economic cooperation and relations, to enhance trade between Australia and Thailand to improve the two countries' welfare. These objectives necessarily require that trade does in fact directly and positively affect growth. What are the determinants of trade and how they affect growth provide only auxiliary information on the interaction of the various activities in the trading partners' economies. These economies have to face new challenges in the context of current increasing globalisation and an uncertain post-crisis environment due to a global slow-down, terrorist attacks and other contemporary challenges. Our findings reported above lend ample support to the hypothesis that trade activities (that is, exports and imports) between Australia and Thailand do affect Thailand's growth especially during the current increasing globalisation process, and this is sufficient to provide an empirical basis to this new Asian FTA (for further detail on the challenges and opportunities of the emerging new Asian regionalism, see also Tran Van Hoa and Harvie, 2003).

The findings also indicate that, while trade between Australia and Thailand plays an important but small part (the best impact obtained is only 0.25 per cent from imports/GDP) in improving Thailand's growth, major external shock factors and especially the Asia crisis of 1997 have also been found to be more influential in causing unfortunately a decline in Thai growth. A pure gravity theory based only cross-section data analysis may, in this case, not be able to integrate these factors in its explanation of trade-growth causality. In addition, better economic crisis management to minimise or even prevent similar future crises is seen to be a main ingredient to promote trade and growth not only in Thailand or between Thailand and Australia but in other developing economies in the Asian region (Tran Van Hoa, 2002b and 2002c).

Opportunities from the ATFTA: The above conclusions appear to indicate that trade and crises management are important issues in Thailand's growth and development plans. More specifically, more openness may enhance Thailand's welfare and, more imports from Australia are likely to benefit initially Thai industries and subsequently Thai consumers and exports. This is also a widely held expectation from the Australian government and transnational industries or companies. Since Australia is known to be more advanced and competitive in the technology and management (services) sectors, our findings on Thailand's growth dependence on trade (that is, imports) with Australia seems plausible. A good trade policy or economic cooperation and relations emanating from the ATFTA should take this consideration into account.

This opportunity can be amplified further. In our earlier study (Tran Van Hoa, 2002a), it was pointed out that while trade between developing Asian economies and developed countries 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 Asia 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 Asia. The private and official expectations reported in the Australian media after the signing of the ATFTA that focus chiefly in Australia's potentially higher sales of wine and cars to Thailand in the implementation of the ATFTA seem to have missed the pivotal objectives of this important free trade agreement and closer economic relations and integration between the two countries.

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