THE GAINS FROM TRADE LIBERALISTION WITH ENDOGENOUS PRODUCTIVITY AND RISK PREMIUM EFFECTS

Paper prepared by:

Andrew Stoeckel and **KK Tang**
Centre for International Economics, Australia

and

Warwick McKibbin
The Australian National University and The Brookings Institution

Technical paper prepared for seminar:

REASON versus EMOTION: Requirements for a Successful WTO Round
Sheraton Hotel, Seattle — 2 December 1999

The authors thank the Rural Industries Research and Development Corporation for financial support.

Contents

Charts and tables

Introduction

Trade is one of the pillars of modern prosperity. It has been known for a long time that reducing barriers to trade can lead to substantial gains — a result that seems quite robust. For example, a comprehensive study by the World Bank of nineteen countries that undertook major liberalisation found substantial beneficial change from trade liberalisation (Papageorgiou, Choski and Michaely 1990). Yet empirical measurement of the long run resource allocation effects from trade liberalisation often show small gains of less than 1 per cent of GDP. For example, Hertel et al. (1999), using the computable general equilibrium (CGE) model called GTAP, showed that a 40 per cent across-the-board tariff cut for all sectors would lead to a 0.24 per cent increase in world GDP.

By contrast, econometric studies suggest that trade liberalisation has a much larger impact on economic growth. Frankel and Romer (1999) found that a 1 percentage point increase in the trade to GDP ratio raises per capita income by 2.0 per cent or 3.0 per cent depending on country samples. Other studies also show that those Asian economies that adopted outward-orientated policies during the period 1965–90 grew 2 percentage points a year faster than those that adopted inward-looking policies (Asian Development Bank 1997).

Part of the reason for this discrepancy between the econometric work and CGE modelling results is that many of the CGE models' estimates of trade reform that became commonplace over the 1990s simply capture the static effects of long run resource reallocation and any consequent terms of trade effects (see, for example, Martin and Winters 1997). But there are other gains besides these static long run effects. There are also dynamic gains that flow from greater capital accumulation. In an intertemporal sense, the better use of resources lifts the return on capital and stimulates investment. This extra investment leads to a dynamic capital accumulation and is an additional gain from liberalisation over that of more standard measures. McKibbin (1999) gives a good account of these dynamic gains as well as other dynamic effects stemming from trade liberalisation.

Another source of gain is the endogenous productivity effect measured by Frankel and Romer (1999) and Chand (1999), which occurs when trade is expanded. Extra competitive pressure on protected industries, and new foreign investment opportunities leading to new technical know-how, can stimulate productivity and lead to higher growth. As Frankel and Romer (1999, p. 394) note, 'trade appears to raise income by spurring the accumulation of physical and human capital and by increasing output for

given levels of capital'. In this study we attempt to capture the contribution to productivity gain.

A final effect hitherto not considered empirically is the impact of openness on risk premiums different countries face when they borrow on the international markets. Rating agencies such as Standard and Poor's and Moody's include openness as a factor in their ratings of a country's sovereign risk. The more open the country the lower the risk. This effect is also included in the analysis of trade liberalisation in the current paper.

First, we discuss the nature of the dynamic model and the input for a simulation to examine the impact of a WTO trade liberalisation in a dynamic setting. Next, we consider the additional impact of endogenous productivity change that flows from opening to trade. Finally, we look at the effect of openness on risk premiums and the impact that might have on countries in a dynamic general equilibrium context.

Quantifying trade liberalisation in a dynamic model

The model used in this paper is the G-Cubed (Asia Pacific) model. To interpret the simulation results it is necessary to summarise the key features of the model. A more complete description of the G-Cubed (Asia Pacific) multicountry model is in the appendix to this paper.

The model is based on the G-Cubed model developed by McKibbin and Wilcoxen (1998). This framework is particularly suited to analysis of trade reform because the model integrates both the financial and goods markets of economies. Resource allocation effects as well as terms of trade effects are captured. In addition, capital flows and different patterns in saving and investment, which change rates of return on capital, lead to investment and capital accumulation. Endogenous interest rates adjust to changing global conditions and perceptions about risk.

Real and financial markets are integrated within economies and across time with explicit arbitrage linking rates of return on different assets. Within an economy, the expected return to each type of asset (that is, bonds of all maturities, equity for each sector, etc.) are arbitraged, taking into account the cost of expected depreciation and adjustment costs of changing physical capital and allowing for a risk premium between a country's return on assets and the return on equivalent US assets. The

impact of a changing of a risk premium in country *i* is most readily seen using the uncovered interest parity condition:

$$r_t^i = r_t^u + E_t \Delta e_t + \gamma_t^i$$

where r_t^i is the rate of return on government securities in country *i*, r_t^u is the interest rate on comparable securities in the United States (or some other reference country), $E_t \Delta e_t$ is the expected depreciation of the nominal exchange rate in time t, and γ_t^i is the risk premium reflecting the market's perceptions of the risk differential associated with the securities issued by country *i*'s government. This risk premium γ_t^i is normally exogenous in most models. However, so as to capture the effect of trade liberalisation on changing risk perceptions, in our model γ_t^i is varied endogenously as a country opens to trade following an empirically estimated relationship. The relationship between openness and risk premiums is discussed later.

Clearly, when the economy reaches an equilibrium in which expected depreciation of its currency is zero, its interest rate will be higher than the equivalent US interest rate by the risk premium associated with its securities. This risk premium could capture a range of factors such as sovereign risk or even restrictions (expected or actual) on international capital flows. During the transition path from the initial shock to the final equilibrium, the domestic interest rate, the expected depreciation term and the risk premium will together determine the expected path of the exchange rate. If $r_t^u + \gamma_t^i$ exceeds the domestic interest rate, then the exchange rate will undergo an anticipated appreciation over time (McKibbin and Martin 1998). If the risk premium increases sharply, then in order to appreciate over time the spot rate may have to depreciate significantly.

Because physical capital is costly to adjust, any inflow of financial capital that is invested in physical capital (that is, direct investment) will also be costly to shift once it is in place. Thus a sharp revision in expectations about future returns to capital can lead to instantaneous falls in the value of capital but not necessarily any instantaneous change in the quantity of physical capital in place. Thus a return in confidence can quickly lead to a return in production capacity as long as the ownership of assets is also resolved quickly.

The decision to invest in physical assets is based on expected rates of return. Changes in an economy, say through trade liberalisation, which

increases the rate of return on capital, causes a capital inflow that must be offset by a deterioration in the trade balance. This occurs through change in real exchange rates causing trade patterns to change. These international capital flows are assumed to be composed of portfolio investment, direct investment and other capital flows.[1] The total net capital flow for each economy with an open capital market is equal to the current account position of that country. The global net flow of total capital is constrained to zero.

Another important feature of the model for the analysis of this paper is the imposition of intertemporal budget constraints so that households, firms, governments and countries cannot lend or borrow forever without undertaking the required resource transfers to service outstanding liabilities. Large foreign debts and concerns about the ability of different Asian countries to service those debts have been one concern flowing from the Asian crisis. Also, government budgets must balance in present value terms, so a deficit today means an appropriate surplus at some future time.

Expectations are yet another feature of the model affecting results. Because agents are forward looking in their behaviour, it matters considerably to results whether policy changes are anticipated and even whether policies are credible. Anticipation of a future credible reduction in trade barriers, for example, will lead to extra investment today.

Allowing for endogenous productivity change with an increasing trade share of GDP is one feature of this study so the production specification is worth noting. Firms produce output from six sectors using inputs of capital, labour, energy and materials. Energy and materials are aggregates of intermediate goods, which are in turn aggregates of imported and domestic commodities that are assumed to be imperfect substitutes. Firms produce according to Cobb-Douglas production functions and choose flexible inputs and a level of investment to maximise their stockmarket value. Technological change is normally exogenous in the model (determined by a growth catch-up model, which is assumed to be unaffected by any shocks) and can be labour augmenting or a total factor productivity increase. For this study, labour augmenting productivity is related to the degree of openness as discussed later.

---

[1] It is important that the basis behind these capital flows is understood otherwise it could inadvertently lead to a inappropriate tightening of macroeconomic policy.

In this paper we assume that the economywide relationship estimated by Frankel and Romer applies at the sectoral level. Thus a rise in openness of a sector j, defined as the sum of exports plus imports of sector j relative to output of sector j, will cause the level of labour productivity of sector j to rise by the average coefficient estimated by Frankel and Romer.

Simulating trade liberalisation

To gauge the impact of endogenous productivity and changes to risk premiums on opening to trade, it is first necessary to generate a baseline and then simulate the effect of trade liberalisation alone. The difference between this simulation and the baseline represents the gains from better resource allocation, any terms of trade effects and the effect of dynamic capital accumulation as a result of higher returns to capital.

The simulation is a full removal of the tariff protection indicated in table 1.

The tariff rates used in the model have been derived from the GTAP Version 4 database (McDougall, Elbehri and Truong 1998) as well as estimates by the CIE of tariff equivalents for the services sector. Measures of protection for service industries are notoriously hard to come by since

1 **Post-Uruguay Round tariffs by region and sector** G-Cubed (Asia Pacific) model aggregation

	Energy	*Mining*	*Agriculture & food processing*	*Durable manufacturing*	*Non-durable manufacturing*	*Percentage cost reduction achievable in services sector*
	%	%	%	%	%	%
United States	0.1	0.1	0.3	3.5	1.1	1.4
Japan	0.0	0.0	90.5	6.4	0.5	1.5
Australia	0.5	0.4	0.6	5.2	8.5	1.6
New Zealand	0.0	0.4	0.1	2.9	4.2	1.7
OECD Europe & Canada	1.2	0.1	5.4	8.9	3.5	1.4
Indonesia	3.3	1.5	5.9	8.8	9.4	2.0
Korea	1.1	1.7	23.2	11.9	7.5	1.7
Malaysia	2.4	1.3	5.6	12.9	5.6	1.9
Philippines	0.0	1.9	22.4	22.0	17.1	2.1
Thailand	0.3	1.2	15.7	21.4	21.6	2.2
Singapore	0.0	0.0	6.5	4.6	0.1	2.2
China	8.7	3.2	14.6	32.7	36.1	2.2
Chinese Taipei	6.8	0.9	21.1	13.6	7.2	1.7
Hong Kong	0.0	0.0	0.0	0.0	0.0	2.5
India	13.8	3.2	15.9	46.9	41.8	2.1
OPEC (ex. Indonesia)	7.4	12.0	10.0	12.3	12.0	2.2
Eastern Europe	4.4	9.0	4.5	10.1	9.7	1.9
Other	9.4	5.3	8.3	14.5	15.0	2.1

Sources: CIE estimates from GTAP 4 database; World Bank.

most service industries are basically non-tradable and 'protection' is by means other than tariffs. The starting point was the *relativities* of the tariff equivalents for services computed by Bernard Hoekman at the World Bank (see Brown et al. 1995). These tariff equivalents are for services from the sectoral coverage ratio under the GATS (General Agreement on Trade in Services). Using these estimates as a starting point only, the relativities between countries were then calibrated so that the gain to Australia's services sector reform was equivalent to 2 per cent of GDP — a reasonable estimate of the gains from reform of the services sector as measured by the Industry Commission (1995). The 'tariffs' for the services sector are then expressed as the percentage cost reduction that could be achievable from further removal of protective arrangements in the sector (table 1). It can be seen that Indonesia, Korea, Malaysia, the Philippines and Thailand are among the still highly protected economies in the agriculture, food processing, durable manufacturing, non-durable manufacturing and services. It is assumed that trade liberalisation is started in 2000 and finished in 2010. Liberalisation occurs across the board.

Because expectations are important and represented in this model, it is assumed that the policy of removal of barriers to trade is announced in the year 2000 to be implemented smoothly over the following 10 years with equal reductions each year and that the policy is believed to be credible.

Results from the model are generated by, first, projecting a baseline from 1996 to 2070 based on a range of assumptions concerning tariff rates, population growth and sectoral productivity (McKibbin 1999). Once the baseline has been generated, each simulation is run and results are reported as a percentage deviation from baseline. Exceptions are the current account and fiscal balances, which are changes in the current account (or fiscal balance) expressed as percentages of baseline GDP.

Following previous applications of the model (for example, McKibbin 1999) macroeconomic policy is assumed not to respond directly to undesirable fluctuations in short run economic activity. Monetary policy targets a stock of nominal money balances in each economy.

Fiscal policy is a constant level of government spending relative to GDP (as simulated) and a set of fixed tax rates (apart from a lump sum tax on households that varies to satisfy the intertemporal budget constraint on government mentioned earlier). That means that as output expands with a tariff cut two things happen — tariff revenue falls but higher output increases tax revenue, and the fiscal balance changes depending on the net effect of these two changes.

Results of trade liberalisation

Since the purpose of economic activity is consumption, not production, we report estimates for the deviations from baseline in real consumption, as shown in chart 2.

All countries and regions reported in the model experience a gain in real consumption, which is a good proxy for real welfare. In terms of percentage change, the ASEAN countries, China and Taiwan gain the most since that is where the barriers to trade are greatest and hence where the largest gains are possible. For some economies — for example, Malaysia and Thailand — real consumption is 11 per cent and 16 per cent

2 **Changes in real consumption from trade reform**

Data source: Simulations with G-Cubed (Asia Pacific) model.

higher respectively than what it might otherwise be in 2009 due to liberalisation.

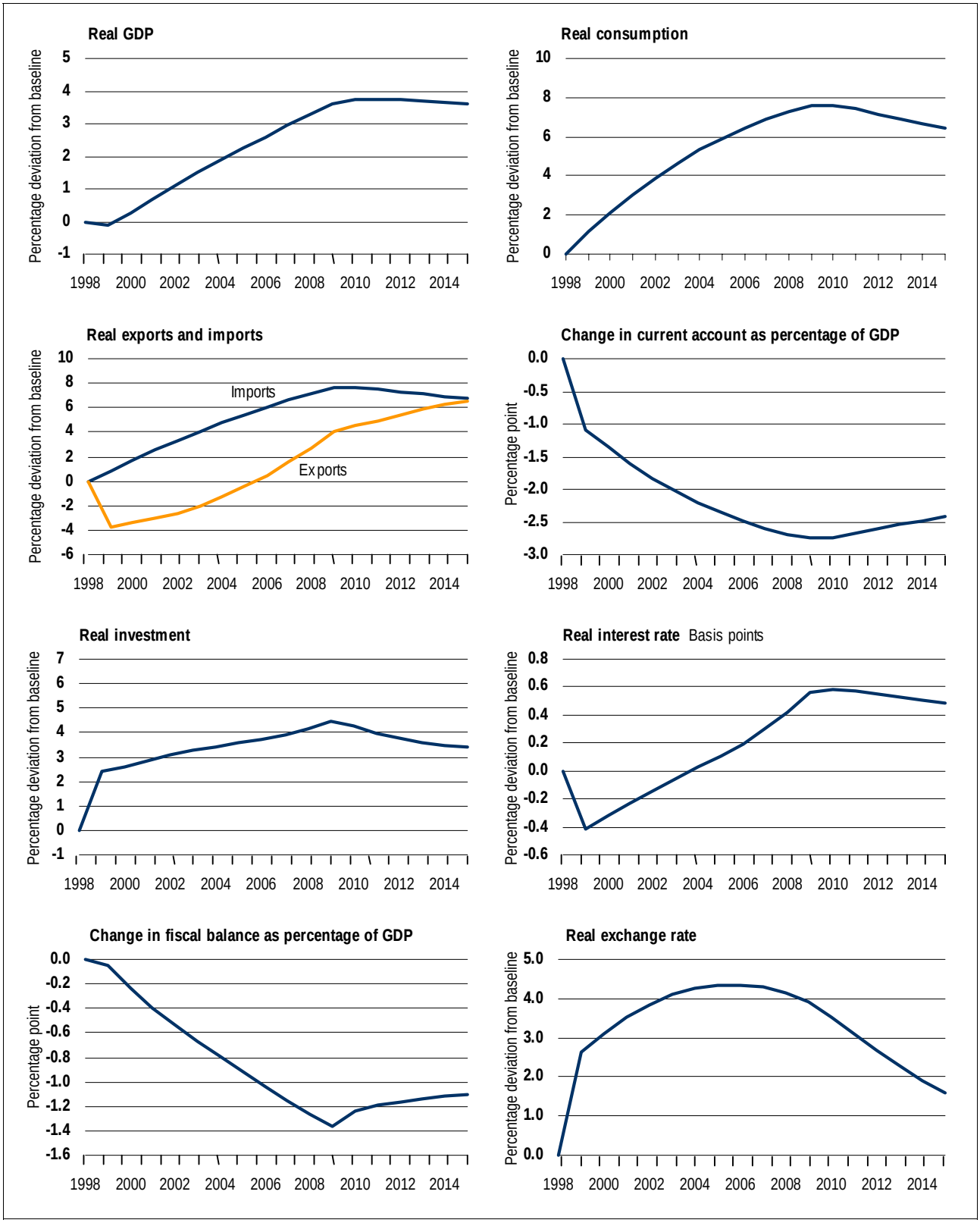
For Europe and other OECD countries, real consumption is around 2 per cent higher in 2010 when full liberalisation is implemented. For the United States, real consumption is just over 1 per cent above the baseline by 2010. The smaller impact is due to two factors. There is less liberalisation being undertaken since the barriers are smaller and the relative attractiveness of investments in Asia — especially in the ASEAN countries — leads to capital being reallocated to those economies and hence smaller increases in income for labour relative to the higher income achieved by capital that is relocated. There is a small decline in investment in the United States as capital flows to Asia.

To see the mechanisms working when a country liberalises it is useful to concentrate on just one country. We choose the Philippines. The effects of full trade liberalisation starting in 2000 and finishing in 2010 on key macro variables are shown in chart 3.

Cutting tariffs has the effect of increasing the return on capital in different sectors depending on the capital intensity of the sector involved and the extent of tariff reduction. The result is that for the Philippines economy as a whole there is an increase in real investment to 2.4 per cent above the baseline in 1999 rising to 4.4 per cent above the baseline by 2009. Part of this additional investment is financed by foreign capital and therefore this capital inflow causes a deterioration in the current account. The current account expressed as a percentage of baseline GDP falls by 2.5 percentage points by 2009. With the removal of protection, consumers partly anticipate the gains and real consumption rises. Rising real consumption and an appreciation of the real exchange, which lowers the price of imports, causes imports to be 8 per cent above the baseline by 2010. Exports initially fall to cause a deterioration in the trade balance sufficient to mirror the increase in current account deficit. By 2004, exports start to increase and, although not shown in chart 3, eventually rise above imports to cause the trade balance to move towards surplus in order to service the foreign capital inflow.

The extra investment and consumption lead to a rise in real GDP, which generates extra tax revenue. However, there is a loss of tariff revenue so there is a net decline in the fiscal balance.

3 **Changes to key macro variables from trade liberalisation in the Philippines**



Data source: Simulations with G-Cubed (Asia Pacific) model.

Endogenous productivity

As Frankel and Romer (1999) point out, income per person in a country is typically positively correlated with trade but this may simply reflect that countries whose incomes are higher for reasons other than trade may trade more. They note that countries that adopt free-market trade policies may also adopt free-market domestic policies as well as stable monetary and fiscal policies, which are also likely to affect income. That is, the correlation between trade and income does not establish the direction of causation between the two.

The contribution of Frankel and Romer is to shed light on the causality between trade and growth. They do so by using geographical characteristics of a country such as size and distance from markets. They make use of the fact that countries close to each other trade more with each other but of course the levels of incomes in countries have no effect on the geographical distance between them.

Using geographical characteristics as instrumental variables, they find that a 1 percentage point increase in the trade (imports plus exports) to GDP ratio raises per capita income by 2.0 per cent or 3.0 per cent depending on country samples.

In simulating endogenous productivity, we have assumed that each 1 percentage point change of trade to output in sector j increases the level of labour productivity by 2 per cent.

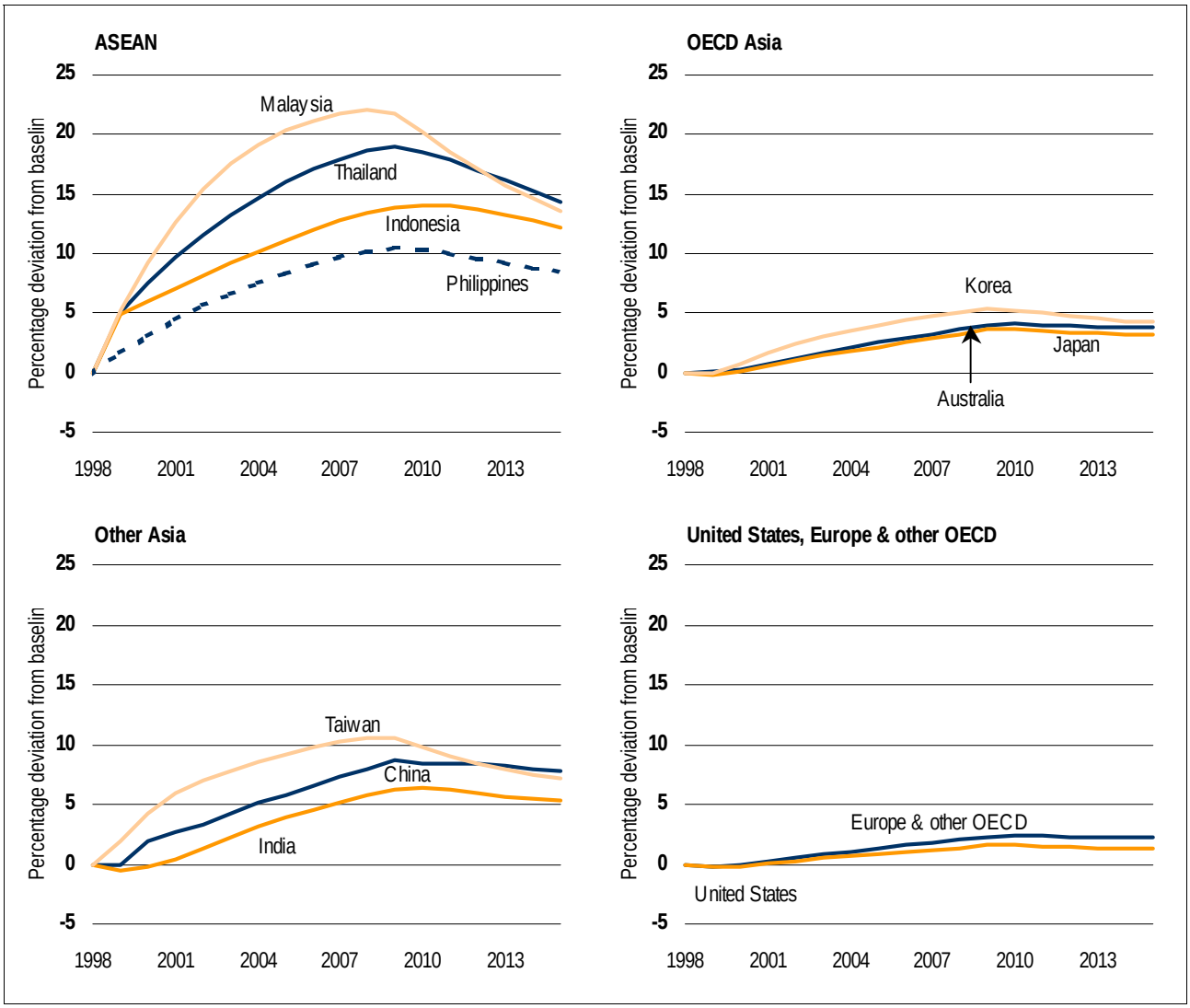
Results

The results of endogenous productivity on real consumption when a country liberalises are shown in chart 4.

A comparison of the results in chart 4 with the results in chart 2 shows that, in broad terms, the time profile and pattern of real consumption gain are much the same as for liberalisation without the endogenous productivity except that the gains for the ASEAN economies are very much larger, and the gains for all countries are larger. Also, the ordering of countries that gain changes a little. Whereas Thailand was the major gainer under trade liberalisation, once endogenous productivity is considered Malaysia is the major gainer. In Malaysia real consumption could be over 22 per cent above the baseline in 2009. The reason Malaysia gains relatively more is due to the trade characteristics of Malaysia and the greater increase in the trade to GDP ratio upon liberalisation, leading to a higher endogenous productivity gain.

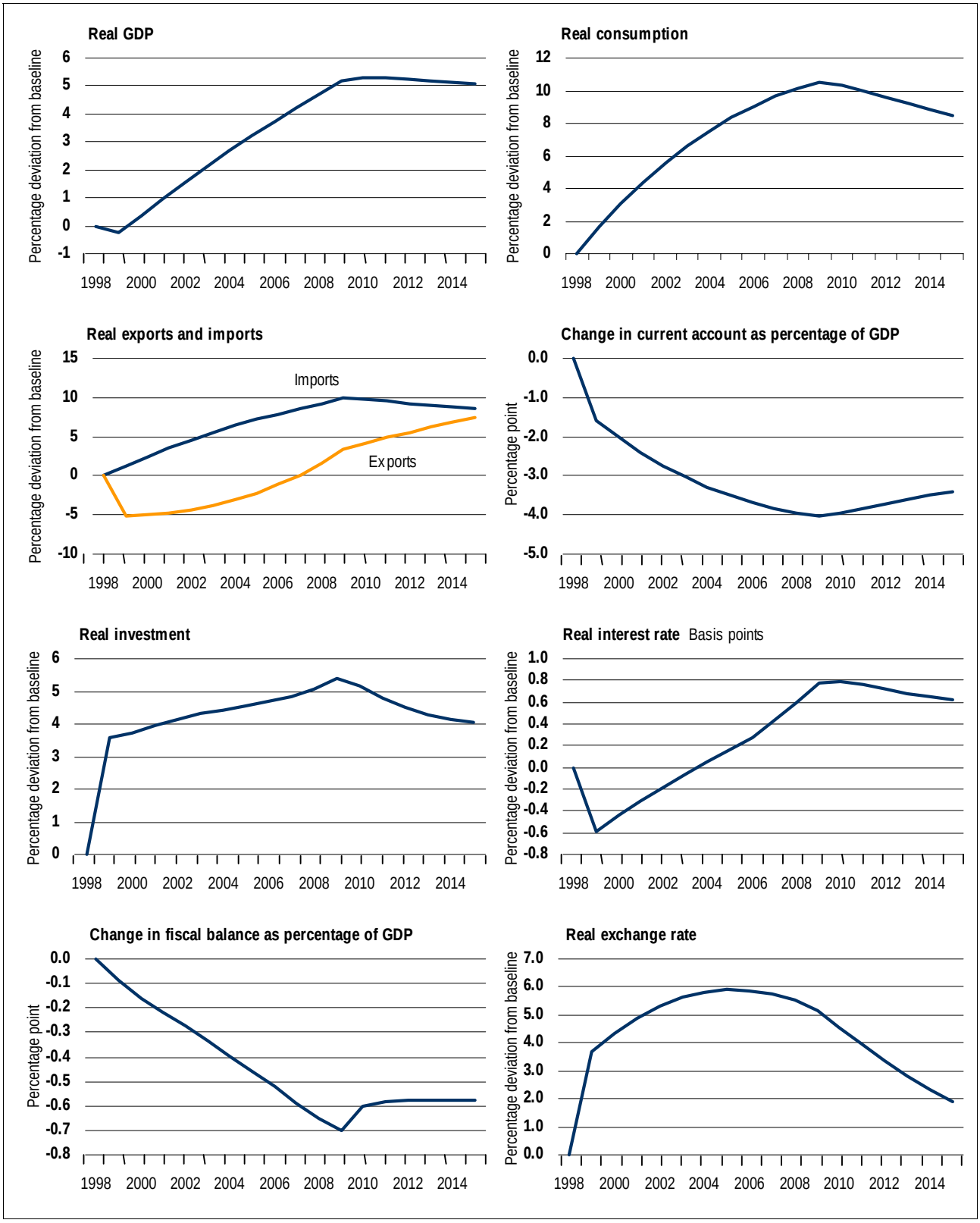
It is worth focusing on the Philippines again as an example of the mechanisms involved and what difference endogenous productivity makes. A comparison of charts 3 and 5 shows that the time profiles of other macro variables such as GDP, the exchange rate and the current account are much the same as before, indicating the same mechanisms at work. However, endogenous productivity leads to bigger adjustments. Real GDP is now 5.3 per cent above the baseline in 2010 compared with less than 4 per cent without endogenous productivity. The effect of trade liberalisation with endogenous productivity is to make GDP higher, real consumption higher, exports initially lower by a greater amount to make way for the larger capital inflow since investment is greater because the return on capital has risen by more.

4 **Changes in real consumption from trade reform with endogenous productivity change**



Data source: Simulations with G-Cubed (Asia Pacific) model.

5 Change in key macro variables from changes in trade liberalisation with endogenous productivity in the Philippines



Data source: Simulations with G-Cubed (Asia Pacific) model.

Endogenous risk premium effects and trade liberalisation

Allowing for changing risk premiums on a country's assets when it opens to trade seems a self-evident proposition. After all, financial markets consider openness to trade as part of their country risk ratings. Trade liberalisation reduces the risk associated with a sovereign's assets, and thereby lowers the risk premium embodied in domestic interest rates.[2] The result is stronger investment and, therefore, higher output.

The relationship between trade and risk premium is indirect (otherwise, it should have been taken into account in previous studies, per se). Part of the reason is that our knowledge about the formation of risk premiums is incomplete. While the risk premium γ_t^l was defined earlier in the uncovered interest parity condition, it serves mainly as a residual to 'explain' the interest rate spreads between equivalent assets of different countries when those spreads cannot be accounted for solely by expected exchange rate changes. This residual could be due to several factors including the possible default of loans, and unexpected price and/or exchange rate changes or even unexpected policy changes. The risk premium is a *subjective* estimation of the compensation for the uncertainty associated with a particular asset (relative to a 'riskless' asset such as US Treasury Bills).

When the cost due to uncertainties becomes significant, information about the size of those risks becomes a marketable commodity. Moody's and Standard and Poor's (S&P's) are two well-known international rating agencies that provide risk (or creditworthiness) assessment services.

By nature, risk assessment is an exercise of considerable subjectivity. However, billions of dollars of investments are made each day based on those subjective assessments and vast resources are dedicated to 'getting it right'. We should be able to use that information traded in the market to gauge the relationship between openness and risk premium. There are two difficult parts. One is to partition out the effect of openness on risk premium since many factors determine a country's risk premium. The other is to sort out cause and effect since, as Frankel and Romer (1999) note, free-market trade policies come hand in hand with other free-market domestic policies and stable fiscal and monetary policies.

---

[2] This point is in contrast to the argument of Rodrik (1996) in that greater openness will raise the doses of product cycles and terms of trade effects on income. He shows that, to reduce the risk in private consumption, more open economies tend to have bigger government in order to stabilise income volatility.

On the second point, the evidence and theory strongly suggest the causality is from openness to less risk. For example, using case studies of liberalisation, Snape (1991) argues that significant indirect benefits from opening to world trade come from the discipline imposed on policy regimes other than the trade regime, particularly those with strong rent seeking activities. Also, higher incomes and stronger growth lead to better risk ratings and lower risk premiums, and Frankel and Romer have already shown that trade causes growth.

Theory also points to openness leading to less risk. A country with open trade and financial regimes will have to run sound policies. For example, legislated minimum wages that are well in excess of labour market realities will cause higher unemployment, exports to fall, imports to rise, the currency to depreciate and other imbalances to show up. These imbalances will be politically unpopular. Another example is inappropriate expansionary monetary or fiscal policy — designed perhaps to help win the next election before voters wise up to what is happening. With open financial markets the effect would be a capital outflow, currency depreciation, rising interest rates and other politically unpopular imbalances. An economy fully integrated with the world economy will have greater policy discipline and less risk.

The recent Asian crisis provides a compelling lesson that a financial market sheltered from international 'trade' can erode the foundations of an economy despite years of economic growth and apparently sound macroeconomic policies. One of the underlying reasons of the Asian crisis was that many risk elements were not properly priced, due to either cronyism or moral hazard problems (McKibbin and Stoeckel 1999). If an economy fully embraces open trade in financial services, competition will eliminate financial institutions with unhealthy lending practices. The result will be an overall improvement in the quality of loans and investments (and thus a reduction in risk) in the economy.

How big is the effect of openness and risk premium? The best evidence is likely to come from rating agencies such as Moody's and S&P's. By examining their track record the IMF (1999) found a very clear negative correlation between their rating and the actual default rate for corporate issuers (that is, a higher rating is related to a lower default rate). This implies that the two rating agencies' assessments of investment risk in corporate bonds, on average, are fairly reliable.

Based on experience, rating agencies have developed a 'checklist' for monitoring purposes. This checklist has two broad interrelated categories: political risk and economic risk. Integration into the global trading and

financial system is one of the criteria in the assessment of political risk and is considered a positive element in a county's rating. Income is a criterion that affects ratings: the higher the income the lower the risk.

Table 6 reports the changes of Moody's and S&P's ratings for two groups of countries — crisis countries and non-crisis countries. It can be seen that sovereign rating is highly (negatively) correlated to interest spread. Obviously, the data do not establish that rating determines interest spread, as the logic can also go in the opposite direction. Rating agencies could raise a sovereign's rating when the market reduces the risk premium associated with that sovereign. Fortunately, the econometric work done by Cantor and Packer (1996) sheds light on this causal relationship.

Using the data from Moody's and S&P's, Cantor and Packer estimated that, if the GNP per capita of a sovereign doubles, its rating will be upgraded by 1.24 notches.[3] More importantly, they established that an upward notch in sovereign rating will reduce the interest spread between the sovereign's and US Treasury's bonds (both denominated in Eurodollars) by 22.1 per cent. These figures together imply that a doubling of a country's income will cut down the risk premium associated with its assets by 27.4 per cent. For example, a 200 basis point interest spread will fall to 145 basis points.

More interestingly, Cantor and Packer identified that there is a steep threshold in sovereign credit rating. If a country is classified as an industrialised or advanced economy according to the IMF definition, its rating will be higher by as much as 2.78 notches than it otherwise would be.

In 1998, in terms of GNP per capita (measured at PPP), the threshold of an advanced economy is around US$13 000.[4] Consider a country near the

6 **Rating and interest spread trends**

	Rating changes[a]			*Average spreads*[b]			
	Jun 1997 to Jun 1998	*Jun 1997 to Dec 1998*	*Jun 1997 to Aug 1999*	*Jun 1997*	*Jun 1998*	*Dec 1998*	*May 1999*
	Number of notches			Basis point			
Non-crisis countries[c]	-0.1	-0.6	-0.6	162	307	478	267
Crisis countries[d]	-3.8	-4.6	-4.6	142	615	1 470	1 049
Total	-1.3	-1.8	-1.8	156	403	788	511

[a] Average of Moody's and S&P's. [b] The average spreads for crisis countries and the total sample are distorted by the extremely high level of Russia's spreads. [c] Non-crisis countries include Argentina, China, Colombia, Hong Kong, Mexico, the Philippines, Poland, South Africa, Turkey and Venezuela. [d] Crisis countries include Brazil, Indonesia, Korea, Russia and Thailand.

Source: Adopted from IMF (1999).

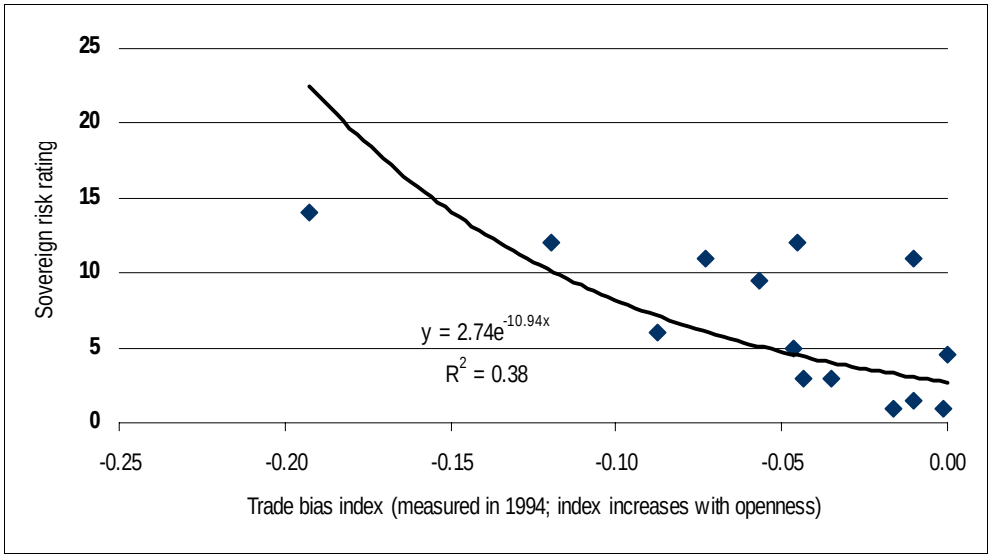
[3] One notch represents a movement, say, from BB- to BB in the case of S&P's, which is equivalent to from Ba3 to Ba2 in Moody's rating scale.

[4] This is the figure for the 'poorest' advanced country — Greece.

threshold, such as Uruguay, which has GNP per capita of US$9480. If the gain from trade liberalisation is sufficient to push it through the threshold, it will enjoy a 'bonus' reduction in the risk premium of 61.3 per cent (for example, from 200 basis points to 77.3 basis points).[5] This figure is not only meaningful for those developed countries that are right in front of the development threshold. This is because, with trade liberalisation a developing country will move up the development ladder, reducing the time it takes to reach the threshold of being an advanced country.

In this study, we have adopted a pragmatic approach of estimating the relationship between the average risk rating by Moody's and S&P's and the level of openness of an economy. This relationship is shown in chart 7 where the sovereign risk rating is plotted against the trade bias index (TBI) for 15 countries. The data of rating were obtained from Cantor and Packer (1996); the data of the TBI were kindly provided by Weerasinghe (forthcoming).

7 **Sovereign risk rating against openness** Average of Moody's and Standard & Poor's ratings on 29 September 1995



Data sources: Cantor and Packer (1996); Weerasinghe (forthcoming).

The TBI is construed in the following way:

$$TBI = \frac{1 - t_x}{1 + t_m} - 1$$

where t_x is the ratio of the collected revenue from export taxes (negative if subsidies) to total exports, and t_m is the ratio of the collected revenue from

[5] Obviously, the classification of development stage is not solely dependent on income. But the point we are trying to make here can apply to other criteria.

import tariffs to total imports.[6] Therefore, t_x and t_m are roughly measures of average export and import taxes.

The TBI aims to capture the bias in trade protection between import and export sectors.[7] In particular, if the protection in both sectors is the same, there is effectively no protection. A caveat of this measurement is that it does not take into account the dispersion of taxes within the import and export sectors, respectively.

In chart 7 the data of the TBI are for 1994. [8] The sovereign risk rating is the average rating of Moody's and S&P's on those countries on 29 September 1995. Assuming a nonlinear relationship between sovereign risk rating and the TBI, we can fit in an exponential curve for the data:

$$dR = 2.74*\exp(-10.94*TBI)*dTBI$$

According to financial institutions, 15 notches of sovereign risk rating correspond roughly to 850 basis points. Using this information, it is possible to deduce the relationship between risk premium (measured in basis points) and the TBI:

(1) $$d\xi = -1696*\exp(-10.94*TBI)*dTBI$$

The exponential relationship implies that there is a diminishing return in removing trade distortions in terms of reducing risk premium. This is because risk premium is an aggregate measure of various sources of risk. As an economy's trade regime becomes more open, its sovereign risk will be increasingly dominated by non-trade factors.

We prefer to use this relationship of risk premium reduction and trade liberalisation instead of the empirical result of Cantor and Packer (1996). This is because Cantor and Packer estimate the relationship between income and risk reduction. In the following simulations, both trade liberalisation and the endogenous productivity gain from liberalisation will raise national incomes. Using the result of Cantor and Packer implies that we would need to endogenise risk premium as a function of income, which itself is a function of another endogenous variable, productivity. It would inevitably raise the computational complexities in solving the model.

---

[6] In the simulation, t_x is assumed to be zero as we do not have reliable data for it.

[7] Bhagwati (1978) and Krueger (1978) originated the concept of the TBI. The version suggested by Weerasinghe (forthcoming) is a simplified version, focusing on taxes only.

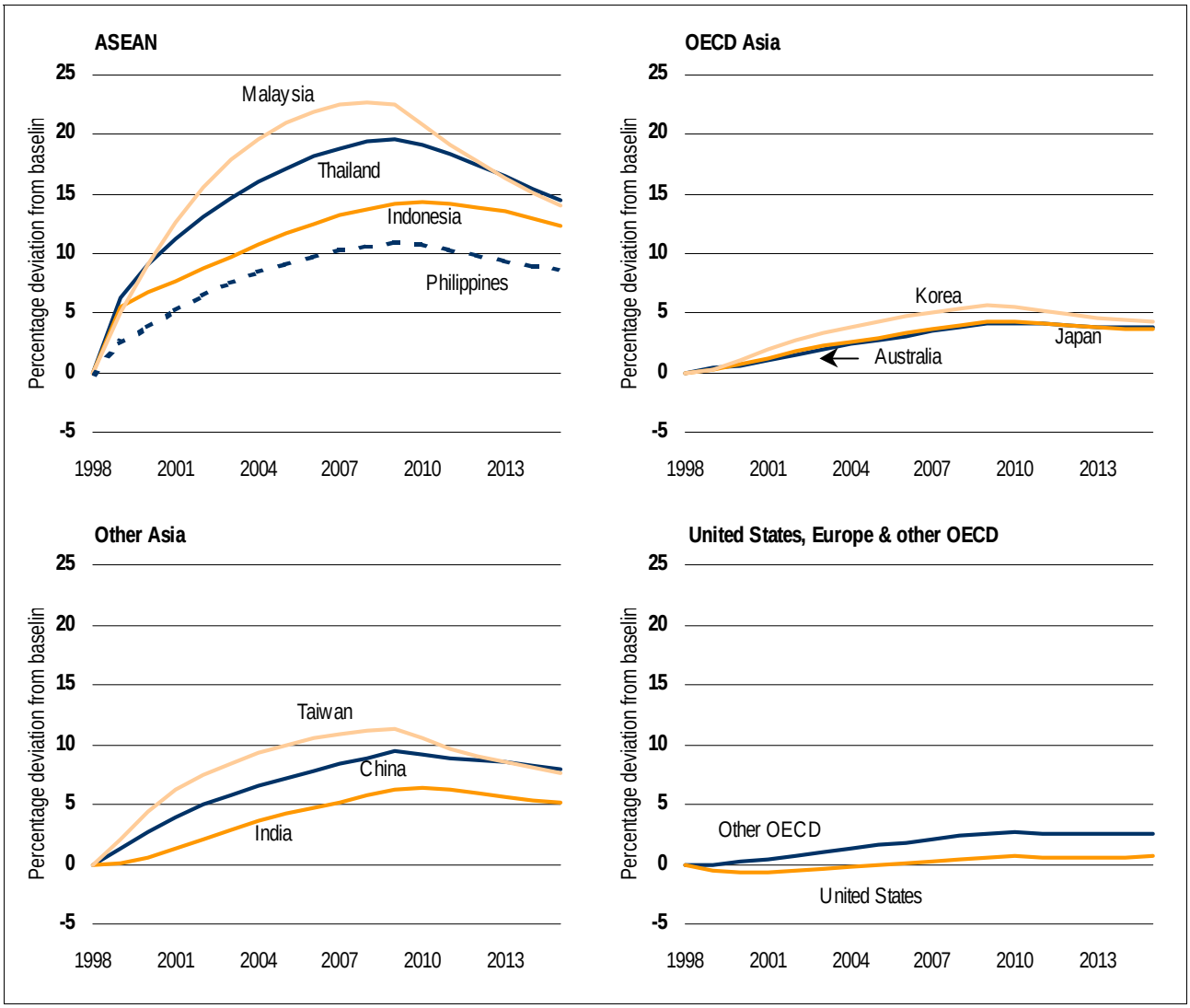
[8] We do not have sufficient TBI data for 1995.

Using our estimation, on the other hand, can separate the productivity shock and the risk premium shock, as the latter is approximately a function of exogenous tariffs.

Results

The results from including endogenous risk premiums as countries open to trade in addition to endogenous productivity and the dynamic gains built into the conventional G-Cubed model are shown in chart 8. The pattern of effects on real consumption is similar to that in chart 4 with one major exception. All countries experience a higher level of real consumption by 2010 of the order of 0.5–1.0 percentage points higher

8 **Change in real consumption from trade liberalisation with endogenous productivity and risk premiums**



Data source: Simulations with G-Cubed (Asia Pacific) model.

except for the United States, which records an initial lower level of real consumption before becoming positive by 2006. GDP in the United States rises but real consumption initially falls because investment returns in the rest of the world have become relatively more attractive. These more attractive returns lead to a capital outflow from the United States and so real consumption falls to make way for these more attractive returns.

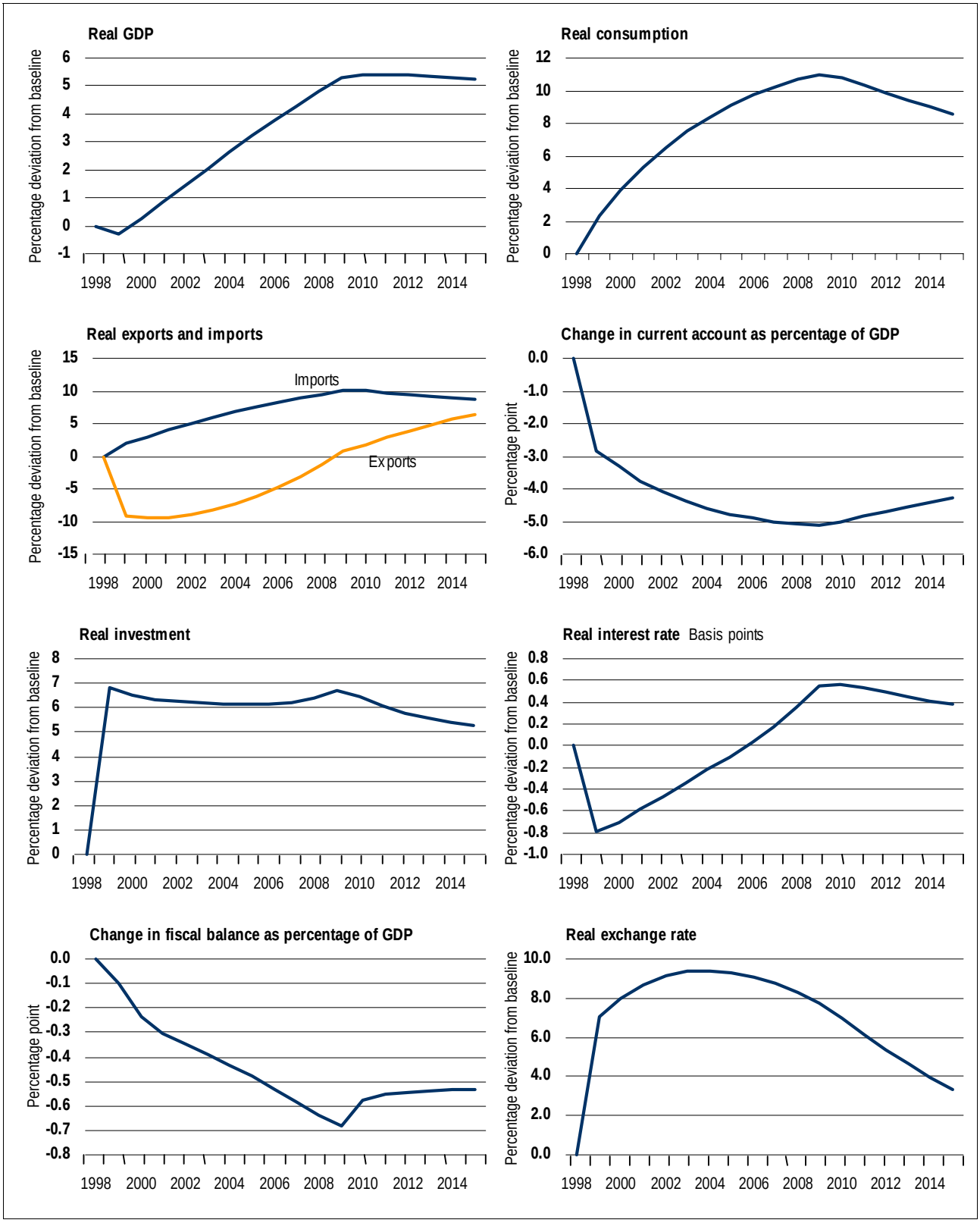
In a completely forward looking model with consumption smoothing, this profile of consumption would not be expected. However, in the G-Cubed model the real interest rate is endogenous in the short run and thus, as investment opportunities emerge, the real interest rate rises causing a tilting of consumption in the United States away from the present towards the future. In addition, there are both backward and forward looking consumers in the model. With a rise in the return to capital outside the United States, there is a fall in the demand for capital in the United States and owners of existing capital experience a capital loss. In the model the housing stock falls in value, which affects the income flows of backward looking households, which reduce consumption. This is only a temporary effect as over time the higher returns to investments outside the United States lead to higher incomes and rising consumption over time.

To see the mechanisms at work we refer to the Philippines again (chart 9). Again, by comparing the results with chart 5, it can be seen that the same pattern of results emerges, indicating the same effects are working, only now the impact of trade liberalisation is greater and there is another major difference. Now, by also lowering the risk premium on Philippines assets forward looking investors bring their plans forward and there is substantially more investment in the first year. Investment could be about 3 percentage points higher than without the risk premium effect.

Effect of risk premium in perspective

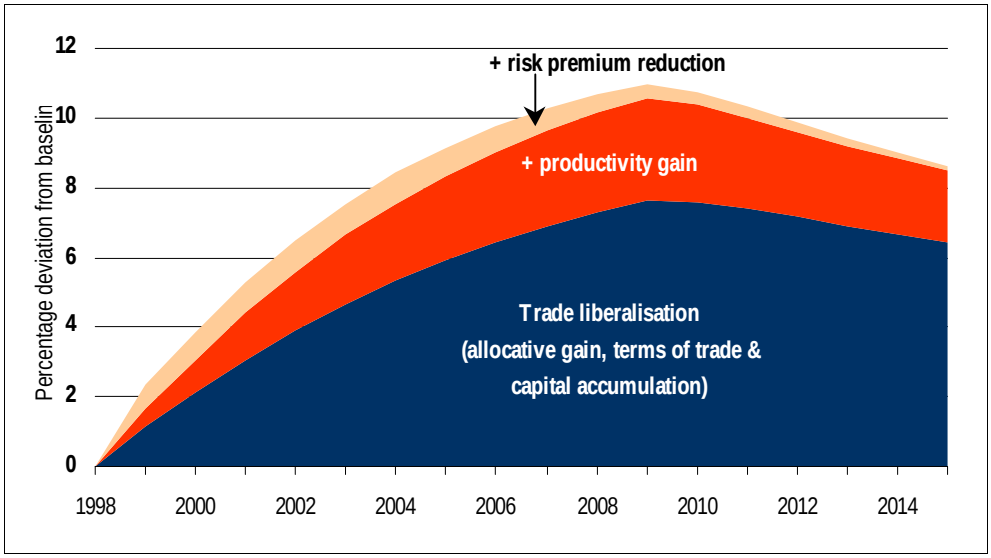
The contribution of each component of the gains from trade liberalisation for the Philippines is shown in chart 10. Just the resource allocative gains, terms of trade effects and dynamic gains from capital accumulation would lead to real consumption being nearly 8 per cent above what it might otherwise be in 2010. When endogenous productivity gains are included, real consumption could be over 10 per cent higher than otherwise. Adding the effect of lower risk as a country opens to trade could cause real consumption to be 10.8 per cent higher in 2010 than it might otherwise be.

9 **Change in key macro variables from changes in trade liberalisation with endogenous risk premiums in the Philippines**



Data source: Simulations with G-Cubed (Asia Pacific) model.

10 **Composition of the gain in real consumption from full liberalisation in the Philippines**



Data source: Simulations with G-Cubed (Asia Pacific) model.

The effect of the reduction in the risk premium appears to be small compared with the effects of static gain and endogenous productivity. But there are reasons to believe we are underestimating this effect.

Firstly and most importantly, due to the difficulties in obtaining the baseline value of *TBI*, in the simulation we approximate equation (1) by:

(2) $d\xi = -1696*\exp(-10.94*dTBI)*dTBI$

For countries with high protection such as Pakistan, this 'approximation' indeed reduces the size of the risk premium shock by 2–4 times. Fully acknowledging the limitation caused by data requirements, we are putting efforts into gathering better data on the TBI.

Secondly, it should be noticed that, in a global model, the risk premium is a wedge between returns to assets of different sovereigns. Therefore, a change in risk premium as interpreted in this paper is analogous to a terms of trade change in commodity trade. A change of relative prices between commodities will cause a change in the production and consumption patterns of commodities; while in the capital market, a change in the relative return between financial assets will cause a shift in investment portfolios (and thus intertemporal production and consumption patterns).

However, the terms of trade effect is a zero-sum game; any improvement in the terms of trade for a country must come at its trading partners' expense. Similarly, a reduction in risk premiums alone does not

necessarily result in global gain except where there is a gain from the more efficient use of resources. Notwithstanding the above, the risk premium is actually a compensation for subjective assessment of uncertainty. In other words, it is not only a relative change (of asset prices), but also an absolute change (of uncertainty). As a consequence, a change of risk premium *should* be associated with not just a change in the mean values of investment and output (due to the terms of trade and resource reallocation effects), but also a change in their *variance*. For risk-averse agents, a reduction in the variance of consumption without changing the mean is still welfare enhancing. In other words, in the extreme case that the global terms of trade effects sum to be zero, there will still be a welfare gain from reducing global investment uncertainty. This means that deterministic models could underestimate the actual welfare gain flowing through the risk premium channel.[9]

Lastly, there could be feedback effects from a lower risk premium to greater openness. Using theoretical models Aizenman (1989) established that, when default leads to a penalty such as a trade embargo, a reduction in country risk will boost domestic investment bias towards the trade sector, raising the openness of the economy. In the context of our paper, the ultimate implication of this argument is obviously a multiplication of the positive impact of openness on economic growth.

Overall gains

The overall gains from trade liberalisation including dynamic capital accumulation, endogenous productivity and endogenous risk premium effects are shown is table 11. If the world removed all barriers to trade, world real consumption is estimated to rise by $630 billion in the year 2010. The annual gains of Asian developing countries would be among the biggest in proportion to the size of their economy (as represented by their GDPs) because they experience some of the greatest barriers to trade and so the reductions in their risk premiums are also the greatest.

Because the gains from liberalisation vary over time as liberalisation is phased in and dynamic effects work through, another way to report the annual gains over time is to show what would happen to asset prices in key economies. Asset prices represent a future view of an economy's prospects discounted by an appropriate interest rate for the country. The best indicator of asset prices is the index of the overall stockmarket in

[9] In fact, agents are risk neutral in our model.

each country. The potential changes in key stockmarket indicators are shown in table 12.

11 Potential gains in real consumption in 2010 from full liberalisation

	Value	*As a proportion of GDP*
	US$ billion	%
United States	44.0	0.6
Japan	149.1	4.3
Australia	14.4	4.2
Indonesia	24.9	14.3
Malaysia	16.0	20.9
Philippines	9.2	10.8
Thailand	26.6	19.1
China	65.2	9.1
India	18.1	6.4
Taiwan	33.2	10.5
Korea	22.5	5.5
Rest of OECD	205.2	2.6
Total[a]	628.6	

[a] Total does not include other countries such as Singapore, New Zealand and Hong Kong.

Source: Simulations with G-Cubed (Asia Pacific) model.

12 Estimated changes in stockmarket values in 2000 as a result of full liberalisation

	Indexes	*10 Nov 1999*	*Net Change*	*Percentage change*
United States	Dow Jones Industrial	10 617	-245	-2.3
Japan	Nikei 225	18 229	152	0.8
Australia	Australian All Ordinaries	2 919	22	0.7
Indonesia	JSX Composite Index	639	33	5.2
Malaysia	KLSE Composite	716	47	6.6
Philippines	Philippines Composite	1 988	69	3.5
Thailand	Thailand	426	27	6.4
India	Bombay SE Sensex	4 622	26	0.6
Taiwan	Taiwan Weighted	7 363	218	3.0
Korea	Korean Kospi	947	1	0.1

Source: Simulations with G-Cubed (Asia Pacific) model.

Two observations are the potentially large gains to stockmarket prices, especially in Asia and the fall in the Dow Jones. The Malaysian stock-market shows one of the biggest gains; it could rise by 47 points or 6.6 per cent. Indonesia could also gain considerably; the JSX Composite Index could rise by 33 points or 5.2 per cent. Thailand, the Philippines and Taiwan would also gain considerably.

The reason for the fall in the Dow Jones index is the relatively more attractive returns to investments in Asia on liberalising trade globally than in the United States. Asian economies are doing more liberalisation under the scenarios simulated here. Therefore there are bigger gains to

endogenous productivity and reductions in risk premiums and hence higher returns on assets in Asia. Investors in the United States sell US investments and invest in Asia. The Dow Jones index declines as result although US citizens would be better off because they are investing in higher returning assets.

Conclusions

In this paper we have considered some gains to trade liberalisation not considered in traditional comparative static frameworks. By using a dynamic intertemporal GE model we have been able to include the gains from the dynamic accumulation of capital. Also, in this study we have taken advantage of some new estimates by Frankel and Romer on the effect of trade on growth and we have included estimates of endogenous productivity growth from trade liberalisation. In addition, since the model used here formally integrates financial variables in each economy with endogenous capital flows, interest rates and exchange rates and deals explicitly with expectations, we have been able to estimate the general equilibrium impacts of lower risk premiums on a country's sovereign assets as it opens to trade.

Incorporating the impact of changes in risk through an empirically estimated relationship between risk and openness is a novel aspect of this paper. Although the results are preliminary and likely to be *underestimates* of this effect, we have made a first attempt to empirically model this relationship and the impact on countries as they liberalise trade. More technical details of this approach and the implications can be found in McKibbin, Stoeckel and Tang (forthcoming).

We find that the usually small gains estimated by studies using static CGE models may be underestimates of the actual gains once dynamics, endogenous productivity and risk effects are taken into account. This is not surprising given the evidence from the growth experience of countries that have undertaken significant trade liberalisation. The gains from trade liberalisation do not merely reflect a more efficient use of a given stock of resources but arise more importantly from fundamental changes in the decisions of firms, households and policy makers.

As already pointed out, this paper is a preliminary attempt to incorporate the risk factor in quantifying the impact of trade liberalisation. Much more has to be done. First, in this paper we have only limited country data to estimate the relationship between risk premium and openness. To expand the dataset and therefore to obtain a more reliable estimation will

be the top priority for further research. Second, in our model, we consider only changes in the mean values of investment and output as a result of changes in risk premiums — not changes in their variance. Nevertheless, risk is fundamentally about uncertainty and thus variance. Therefore, a more comprehensive approach should take both into account. Obviously, that would probably mean a complete change of model setting from deterministic models to stochastic models.

Appendix G-cubed (Asia Pacific) — the model used

The G-Cubed (Asia Pacific) model emerged from a research program designed to link two strands of quantitative economic modelling:

- traditional multisectoral general equilibrium models — which capture interactions between sectors but which are often static, do not generally incorporate the financial sector and do not have full macroeconomic closure; and
- macroeconomic models — which are mostly dynamic and have full macroeconomic closure but which usually do not capture inter-sectoral interactions and often do not have a well-specified supply side.

Origins of G-Cubed (Asia Pacific) model

The origins of G-Cubed (Asia Pacific) are the MSG2 macroeconomic model (McKibbin and Sachs 1991) and the G-Cubed model. Both of these models have proved successful in a wide variety of applications. The G-Cubed model has been an important tool in analysing greenhouse gas policy in the global economy (McKibbin and Wilcoxen 1998).

Several features of G-Cubed (Asia Pacific) make it an ideal tool for analysing the effects of trade liberalisation with endogenous productivity and risk premiums.

- With its macroeconomic detail, and integrated real and financial markets, G-Cubed (Asia Pacific) can account for the effects of a financial shock on interest rates, exchange rates and international capital movements. It can also account for the effects of different government fiscal and monetary responses to these shocks. The model fully integrates wealth effects on consumption and captures debt burdens and expectations.
- With its explicit treatment of expectations, G-Cubed (Asia Pacific) can account for the ways in which future policy changes that are credible can affect economic activity in the early stages of implementation.
- As a global general equilibrium model, G-Cubed (Asia Pacific) accounts for the interactions between sectors and between regions. Thus, it can capture the effects of policy changes and shocks within an economy and between economies.
- As a dynamic model, G-Cubed (Asia Pacific) can account explicitly for the time paths of policies and shocks.

By contrast, the comparative-static modelling frameworks used in traditional computable general equilibrium models do not include treatment of dynamics, interest rates, expectations or capital movements.

Country to industry coverage

G-Cubed (Asia Pacific) separately identifies 18 countries/regions. Table A1 sets out the economy and six sector coverage of the version of G-Cubed (Asia Pacific) used in this study. Some food items occur in non-durable manufacturing, and the mapping between G-Cubed (Asia Pacific) and SIC sectors is shown in table A2.

A1 **Economy and industry coverage of G-Cubed (Asia Pacific)**

Economies		***Sectors***
United States	China	Energy
Japan	Chinese Taipei	Mining
Australia	Korea	Agriculture
New Zealand	Hong Kong	Durable Manufacturing
Indonesia	India	Non-durable manufacturing
Malaysia		Services
Philippines		
Singapore		
Thailand		
Other OECD		

A2 **Relationship between G-Cubed (Asia Pacific) and SIC sectors for agriculture and non-durable manufacturing**

G-Cubed (Asia Pacific)	***SIC code***	
Agriculture	01	Agricultural production — crops (excluding cereal preparations and flour)
	02	Agricultural production — livestock and animal specialities
	07	Agricultural services
	08	Forestry
	09	Fishing, hunting, and trapping
	24	Lumber
Non-durable manufacturing	20	Food and kindred products (including cereal preparations and flour)
	21	Tobacco products
	22	Textile mill products
	23	Apparel and other finished products made
	26	Paper and allied products
	27	Printing, publishing and allied industries
	28	Chemical and allied products
	30	Rubber and miscellaneous plastics products

Key features

Detailed specifications of the theoretical structure of G-Cubed (Asia Pacific) can be found in McKibbin (1996). The key features of G-Cubed (Asia Pacific) are that it:

- specifies the demand and supply sides of industrialised economies;
- integrates the real and financial markets of these economies;
- fully accounts for stocks and flows of real resources and financial assets;
- imposes intertemporal budget constraints so that agents and countries cannot indefinitely borrow and lend without undertaking the resource transfers necessary to service outstanding liabilities;
- has short run behaviour that is a weighted average of neoclassical optimising behaviour and liquidity constrained behaviour;
- has a real side that is disaggregated to allow for production and trade of multiple goods and services within and between economies;
- has full short and long run macroeconomic closure with annual macrodynamics around a neoclassical growth model; and
- can be solved for the full rational expectations equilibrium annually from 1996 to 2100.

Like other models, G-Cubed (Asia Pacific) essentially consists of a theoretical framework, data and parameters.

Theory

The model theory consists of behavioural and accounting relationships. The model recognises a number of economic agents including firms, households and government.

Firms

Each sector is represented by a firm, which chooses its inputs and level of investment so as to maximise its stockmarket value, subject to a multiple input production function and output prices (which are given as far as the firm is concerned).

Sectoral output is produced using capital, labour, energy and materials. Energy and materials are aggregates of inputs of intermediate goods,

which are in turn aggregates of imported and domestic commodities that are assumed to be imperfect substitutes.

The capital stock in each sector changes according to the rate of fixed capital formation and the rate of depreciation. Investment is subject to rising marginal installation costs so that total real investment is the value of purchases plus the per unit cost of installation. The per unit cost is a function of the rate of investment. This implies that, once in place, it is costly to move physical capital between sectors. In contrast, financial capital is perfectly mobile.

The goal of each firm is to choose its inputs to maximise intertemporal net (of tax) profits. Taxes included are a corporate income tax, taxes on inputs (such as a carbon tax) and an investment tax credit.

Wages

Wages are determined by assuming that labour is mobile between sectors in each region, but not between regions. Thus, each sector in a region pays the same wages. Wages in a particular country adjust according to an overlapping contracts model where nominal wages depend on current and expected inflation and on labour demand relative to labour supply. Long run labour supply is determined by the (exogenous) rate of population growth. In the short run, hours worked can fluctuate. For a given nominal wage the demand for labour determines short run unemployment in each sector. This varies, depending on the composition of demand for each sector's output.

Households

Household behaviour is assumed to be a weighted average of two types of behaviour. In the first, households aim to maximise intertemporal utility subject to a wealth constraint. Wealth consists of human wealth and financial assets. Human wealth is the present value of the expected future stream of after-tax labour income. Financial wealth is the sum of real money balances, real government bonds, net claims against foreigners and the value of capital in each sector.

In the second type of behaviour, households base their consumption on after-tax current income.

Government

Real government spending is exogenous and constant as a share of GDP. Government consumption is financed by taxes (corporate and personal income taxes) and by issuing government debt.

The government budget must balance in present value terms but need not balance in any single period. Thus, if the government runs a budget deficit today, it must run an appropriate budget surplus at some point in the future. If not, the government will be unable to pay interest on debt and private agents will not be willing to hold it. The specific fiscal closure chosen is that at every instant in time the government must levy a lump sum tax equal to the value of interest payments on the outstanding debt.

Financial markets and balance of payments

The model accounts for flows of assets between regions, consistent with the flows of goods. The model specifies that money is required to undertake transactions and so the demand for money is a function of GDP and short term nominal interest rates. The supply of money is exogenously chosen by the central bank in each region.

Asset markets are assumed to be integrated across regions. The model allows for risk premiums on assets held in different currencies. These are calculated as part of the baseline of the model and are designed to replicate 1996. When undertaking simulations it is assumed that risk premiums are independent of the shock under consideration.

For the results reported in this paper, exchange rates are assumed to be floating. Also, it is assumed that OPEC (Organisation of Petroleum Exporting Countries) chooses its foreign lending in order to maintain a desired ratio of income to wealth and that Eastern Europe and the former Soviet Union, as well as other developing countries, are constrained in what they can borrow from the rest of the world. In these countries, any available foreign exchange — given a current account constraint, the demand for exports and the servicing costs of external borrowing — is allocated to imports of goods from all other regions.

References

ADB (Asian Development Bank) 1997, *Emerging Asia: Changes and Challenges*, Manila.

Aizenman, J 1989, 'Investment, openness, and country risk', in Frenkel, JA, Dooley, MP, Wickham, P (eds), *Analytical Issues in Debt*, International Monetary Fund, Washington, DC, pp. 83–101.

Bhagwati, JN 1978, *Foreign Trade Regimes and Economic Development: Anatomy and Consequences of Exchange Control Regimes*, Ballinger Publishing for NBER, Cambridge, MA.

Brown, DK, Deardorff, AF, Fox, AK and Stern, RM 1995, 'The liberalisation of services trade: potential impacts in the aftermath of the Uruguay Round', in Martin, W and Winters, LA (eds), *The Uruguay Round and the Developing Economies*, World Bank Discussion Papers no. 307, Washington, DC.

Cantor, R and Packer, F 1996, 'Determinants and impacts of sovereign credit ratings', *Economic Policy Review* (Federal Reserve Bank of New York), vol. 2, October, pp. 37–53.

Chand, S 1999 'Trade liberalization and productivity growth: time series evidence from Australian manufacturing', *Economic Record*, vol. 75, no. 228, pp. 28–36.

CIE (Center for International Economics) 1999, *Global Trade Reform: Measuring the Gains*, Canberra.

Edwards, S 1997, 'Trade policy, growth, and income distribution', *American Economic Review*, vol. 82, no. 2, pp. 205–10.

FAO 1998, *The State of Food and Agriculture 1998*, Food and Agriculture Organisation of the United Nations, Washington, DC.

Frankel, JA. and Romer, D 1999, 'Does trade cause growth?', *American Economic Review*, vol. 89, no. 3, pp. 379–99.

Hertel, TW, Anderson, K, Francois, JF, Hoekman, B and Martin, W 1999, Agriculture and non-agricultural liberalization in the millennium round, Paper prepared for the World Bank's integrated program of research and capacity building to enhance participation of developing countries in the WTO 2000 Negotiations, Presented at the Conference on Agriculture and the New Trade Agenda in the WTO 2000 Negotiations, Geneva, 1–2 October.

IMF (International Monetary Fund) 1999, *International Capital Markets: Developments, Prospects, and Key Policy Issues*, Washington, DC.

Industry Commission 1995, *The Growth and Revenue Implications of Hilmer and Related Reforms*, report to the Council of Australian Governments, Canberra.

IPC (International Policy Council on Agriculture, Food and Trade) 1998, *Building a Global Open Food System: The Case for Further Agricultural Trade Liberalization*, Washington, DC.

Krueger, AO 1978, *Foreign Trade Regimes and Economic Development: Liberalization Attempts and Consequences*, Ballinger Publishing for NBER, Cambridge, MA.

Lee, Jong-Wha 1995, 'Capital goods imports and long-run growth', *Journal of Development Economics*, vol. 48, no. 1, pp. 91–110.

McDougall, R, Elbehri, A and Truong, PT (eds) 1998, *Global Trade, Assistance and Protection: The GTAP 4 Data Base*, Center for Global Trade Analysis, Purdue University.

McKibbin, W 1996, *Quantifying APEC Trade Liberalisation: A Dynamic Analysis*, Working Paper in Trade and Development no. 1, Economics Department, Research School of Pacific and Asian Studies, Australian National University, Canberra, and Brookings Discussion Paper in International Economics no. 122, Brookings Institution, Washington, DC.

—— 1998, *The Economic Crisis in Asia: An Empirical Assessment*, Brookings Discussion Paper in International Economics no. 136, Brookings Institution, Washington, DC.

—— 1999, Trade liberalization in a dynamic setting, Paper prepared for the Second Annual Conference on Global Economic Analysis, Denmark, 19–21 June.

—— and Martin, W 1998, *East Asian Crisis: Causes and Policy Responses*, Brookings Discussion Paper in International Economics, Brookings Institution, Washington, DC.

—— and Sachs, JD 1991, *Global Linkages: Macroeconomic Interdependence and Cooperation in the World Economy*, Brookings Institution, Washington, DC.

—— and Stoeckel, A 1999, East Asia's response to the crisis: a quantitative analysis, Paper prepared for ASEM Regional Workshop 'From Recovery to Sustainable Development', Denpasar, Indonesia, 15–17 September.

——, —— and Tang, KK (forthcoming), 'Trade reform, risk and productivity growth'.

—— and Wilcoxen, P 1998, 'The theoretical and empirical structure of the G-Cubed model', *Economic Modelling*, vol. 16, no. 1, pp. 123–148.

Martin, W and Winters, LA (eds) 1995, *The Uruguay Round and the Developing Economies*, World Bank Discussion Papers no. 307, Washington, DC.

Papageorgiou, D, Choski, AM and Michaely, M 1990, *Liberalizing Foreign Trade in Developing Countries: The Lessons of Experience*, World Bank, Washington, DC.

Rodrik, D 1996, *Why Do More Open Economies Have Bigger Governments?*, NBER Working Paper no. 5537 Cambridge, MA.

Snape, RH 1991, 'East Asia: trade reform in Korea', in Shepherd, G and Langoni, CG (eds), *Trade Reform: Lessons from Eight Countries*, International Center for Economic Growth, ICS Press, San Francisco, ch. 9.

Standard & Poor's 1998, *Sovereign Credit Ratings: A Primer*, December, New York.

UN 1998, *The World at Six Billion*, Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, New York.

Weerasinghe, L (forthcoming), Trade openness and economic performances: a cross-country study, Unpublished PhD thesis, Australian National University, Canberra.

World Bank 1999, *World Development Report 1999/2000*, Oxford University Press, New York.