ERIA Research Project Report 2010, No. 5

ERIA-OECD COLLABORATION PROJECT: REGIONAL INTEGRATION IN ASEAN AND EAST ASIA

Edited by
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March 2011

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LIST OF PROJECT MEMBERS

DR. KIICHIRO FUKASAKU (PROJECT LEADER): Head of Regional Desk and the Asia-Pasific Desk Team, Organization for Economic Cooperation and Development (OECD), Paris, France

DR. KENSUKE TANAKA: Directorate for Science, Technology and Industry, Organization for Economic Cooperation and Development (OECD), Paris, France

DR. BO MENG: Directorate for Science, Technology and Industry, Organization for Economic Cooperation and Development (OECD) & Institute of Developing Economics, Japan External Trade Organization (IDE-JETRO)

DR. NORIHIKO YAMANO: Directorate for Science, Technology and Industry, Organization for Economic Cooperation and Development (OECD), Paris, France

OVERVIEW

KIICHIRO FUKASAKU

Background

While most ASEAN and East Asian economies have emerged strongly from the global economic crisis of 2009, policy makers in the region are well aware that their economies need to move towards more resilient, balanced and inclusive growth paths[1]. Given the OECD economies that will likely remain weak in the next few years, ASEAN and East Asian economies should take a full advantage of their endogenous growth potential through deeper economic integration. Assessment of regional integration and its impact is a prerequisite for well-crafted policy actions for facilitating further integration and alleviating possible bottlenecks. An important benefit of strengthening regional ties is the reduction of transaction costs that leads to higher efficiency of resource allocation and welfare gains through enhanced competition in the domestic market. The benefits of integration, however, should be discussed from a comprehensive viewpoint and measured not only by the degree of integration itself (for instance, increased trade and investment flows) but also by whether that integration brings about greater stability and social progress in the region.

The integration of international goods and services markets has significantly advanced from the second half of the 1980s, and Southeast and East Asian countries are among those that have reaped the full benefits of globalisation. Since the early 1990s, official initiatives to strengthen the region's market-driven integration have intensified within the ASEAN. More recently, several initiatives have been launched to foster the economic ties between ASEAN countries and their neighbouring economies, thereby leading the region to a distinct path towards integration[2].

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[1] In this study, unless otherwise indicated, ASEAN and East Asia refer to 16 member economies of the Economic Research Institute for ASEAN and East Asia (ERIA).

[2] For further details, see OECD Development Centre (2010), *Southeast Asian Economic Outlook 2010* (Chapter 3), OECD, Paris.

Project Description

Against this background, the ERIA-OECD collaborative project began in April 2009 for two years with a view to developing a monitoring tool for the integration process of ASEAN and East Asia. The ERIA appointed Dr. Ponciano Intal Jr. as a coordinator for this collaborative project, and after initial discussions between the two institutions, it was agreed upon to focus substantive work on the following two areas: (1) regional integration and business cycle synchronization, and (2) regional integration and production structure.

The construction of comprehensive regional integration indicators requires a large amount of data and information covering different areas of the economy. For instance, concerning macroeconomic integration, it would be imperative to construct business cycle indicators for Asian countries by using the common methodology such as the OECD's "growth cycle" approach. It was also recognised that the ERIA had already examined integration in other areas, such as investment and trade. Therefore, the two institutions agreed to seek synergies in this collaborative project by exploiting the comparative advantage of each organisation and creating several indicators necessary to monitor the integration process.

Intermediate Output

According to the timetable set by the two institutions, the *ERIA-OECD Roundtable* on "Monitoring Regional Integration in Southeast Asia" was held in Jakarta on 30 November 2009. The results of the Roundtable discussions were incorporated into two intermediate reports submitted to the ERIA in March 2010. Subsequently, the ERIA published them as two Policy Briefs, summarizing the main results and policy messages of the first year's collaboration:

- Yamano, N., B. Meng and K. Fukasaku (2011), "Fragmentation and Changes in the Asian Trade Network", *ERIA Policy Brief* No. 2011-01, Jakarta, January; and
- Tanaka, K. (2011), "China's Ties with Southeast Asia: From Green Shoots to Sustained Recovery", *ERIA Policy Brief* No. 2011-02, Jakarta, January.

The main results of the second year's collaboration were presented at the *ERIA-OECD Seminar* on "Regional Integration in ASEAN and East Asia" in Jakarta on 31 January 2011. The seminar was opened by Mr. Hidetoshi Nishimura, Executive

Director, ERIA and Mr. Kiichiro Fukasaku, Head of Regional Desks, OECD Development Centre. The seminar was attended by about 35 participants, including Dr. Rizal Affandi Lukman, Vice Minister of Indonesia's Coordinating Ministry for Economic Affairs and officials from Indonesia's Ministries of Finance, Industry and Trade and BAPPENAS; representatives from Embassies of Australia, Cambodia, China, India, Japan, Malaysia and Thailand as well as the ASEAN Secretariat and the World Bank; and those from the private sector. The summary of this seminar was posted at the ERIA website in February 2011.

Final Report

The Final Report consists of three chapters, as follows:

Introduction and Overview (by Kiichiro Fukasaku)
Chapter 1 – "Monitoring Business Cycles and Macroeconomic Challenges in ASEAN and East Asia" (by Kensuke Tanaka)
Chapter 2 – "Recent Developments in Asian Economic Integration: Measuring Indicators of Trade Integration and Fragmentation" (by Kiichiro Fukasaku, Bo Meng and Norihiko Yamano)
Chapter 3 – "The Evolution of Production Networks in the Asia-Pacific and the Rest of the World: Measuring International Fragmentation Processes" (Norihiko Yamano and Bo Meng)

In what follows, the brief description and key findings of three chapters are presented.

Chapter 1 presents both composite leading and coincident indicators and historical diffusion indices that collectively serve as a tool for the regional monitoring of business cycles in a timely manner. The development of this monitoring tool, called the *Asian Business Cycle Indicators* (ABCIs), has been identified as a priority area of the ERIA-OECD collaborative project. It allows policy makers to trace Asia's business cycle synchronisation and discuss the near-term economic prospects and potential risks for Asian economies in five to six months ahead.

The ABCIs have been developed by the OECD Development Centre in co-operation with the OECD Statistics Directorate. The results of this work have been published on a quarterly basis, with accompanying indicators for five ASEAN countries (Indonesia, Malaysia, the Philippines, Singapore and Thailand) as well as China and India (see

www.oecd.org/dev/abcis). The early analysis of ABCIs indicates that while ASEAN business cycles have continued to be affected by the import demand from OECD countries, China is indeed leading ASEAN recoveries through trade linkages.

Recent macroeconomic challenges include large capital inflows and food price hikes. In this context the author discussed the importance of greater exchange-rate flexibility and macroeconomic co-operation. In particular, strengthening regional cooperation through monitoring and surveillance was emphasised in this chapter. Furthermore, the author argues that governments in the region need to strengthen their fiscal policy frameworks in order to meet the challenge of "rebalancing growth" in the medium term. Given the huge financial demand for infrastructure development, setting appropriate fiscal rules would be important to maintain strong medium-term growth targets without jeopardising fiscal health. Finally this chapter addresses the role of independent fiscal institutions and medium-term budgetary frameworks.

Chapter 2 analyses the contribution to and engagement in global supply chains of Asian emerging and developing economies by measuring several globalisation indicators based on the harmonised input-output and bilateral trade databases developed by the OECD (see Chapter 3 below). It focuses on major structural changes in the Asian trade network from the perspective of integration and fragmentation in global supply chains. It shows that greater fragmentation and higher dependence on supplies of intermediate goods and services from neighbouring counties have gone hand in hand and led to deepening economic integration in ASEAN and East Asia.

The empirical results presented in this chapter have important implications for strategies for regional economic integration in the Asia-Pacific region. In particular, ASEAN countries need to think the strategy for deeper integration from the perspective of the whole East Asian region and not just ASEAN *per se*. The current state of ASEAN-China trade provides a case in point. The sustained growth of China will likely intensify competition in global markets for manufactured goods[3]. While overall welfare consequences for other developing countries are relatively small, ASEAN countries tend to feel greater competitive pressures from China. These countries will need to raise the quality of their exports in textiles and apparel, as well as in electronics and more generally machinery and equipment. On the other hand, the relative decline in wood and other processing industries in China will leave space for expansion in resource-rich ASEAN countries. To exploit such trade opportunities, ASEAN policy

[3] See Dimaranan, B., E. Ianchovichina and W. Martin (2009), "How will Growth in China and India Affect the World Economy", *Review of World Economics*, 145: 551-571.

makers are required to address the challenge of sustainable development in these resource-intensive sectors, such as the depletion of natural resources and environmental degradation and their long-term impact on regional and sub-regional economies.

In conclusion, a key challenge for ASEAN policy makers is to strengthen the ASEAN's position as the hub of free trade agreements with outside partners. In this way ASEAN countries can foster overall trade growth and dynamism in the emerging post-crisis world. At the same time, they need to engage more actively in regional macroeconomic co-operation, with a shared view to reducing vulnerability and ensuring sustained growth. Regional macroeconomic co-operation remains at an early stage in Southeast Asia, but possibilities for further co-operation should be explored (see also Chapter 1).

Chapter 3 takes a further look at the Asian trade network which has been increasingly fragmented since the mid 1990s. Analysis of trade fragmentation in a consistent manner has been identified as another priority area of the ERIA-OECD collaborative project. The OECD has developed and maintained internationally-harmonized Input-Output and Bilateral Trade Databases, which includes 47 countries accounting for more than 90% of global GDP. These databases allow the authors to examine the recent evolution of global production networks involving Asian-Pacific countries at 2-digit industry level (see www.oecd.org/sti/inputoutput).

In this chapter the authors have developed bilateral trade data in end-use and constructed an inter-country, inter-industry model to measure various indicators of production fragmentation. Their results highlight major changes in the pattern of Asia's trade in intermediate goods and services since the mid-1990s, including among others,

- Significant changes in both industry and category components of exports were observed for most Asian emerging economies (e.g. China's machinery, textiles, etc). Larger countries (China, India and Indonesia) increased the product variety of their exports, while smaller economies changed their leading export bundles.
- Despite some recent changes, East Asia's production networks have kept close links with North America's. On the other hand, ASEAN countries have become more dependent on intermediate exports from East Asia. Turning to the case of Europe, the region's inter-industry structure has remained largely self-contained and stable since the mid-1990s.
- The amount of domestic value-added induced by unit value of exports tended to decline due to the increased import contents of exports for all regions. However, the

total value added from trade increased in Asian countries, as the total volume of exports rose.

- While larger economies and those rich in natural resources tended to induce higher value-added impacts on domestic economies, most of indirect effects were leaking into their neighbouring emerging economies, such as ASEAN and Eastern Europe. This reflects the fact that ASEAN and East European countries have become major suppliers of intermediate goods and services to East Asia and Europe, respectively.

In short, the inter-country, inter-industry model developed in this project has proven to be an effective tool to capture the role of intermediate trade in goods and services that has become increasingly important in respective regions (East Asia, Europe and North America).

CHAPTER 1

MONITORING BUSINESS CYCLES AND MACROECONOMIC POLICY CHALLENGES IN ASEAN AND EAST ASIA

KENSUKE TANAKA
Organization for Economic Cooperation and Development (OECD), Paris, France

Abstract

The Asian countries have been able to recover remarkably well from the shock created by the global financial crisis. Their recoveries have gained considerable momentum over the past year and have become increasingly driven by domestic rather than external demand.

The key near-term challenge is to exit from the counter-cyclical policies, beginning with monetary policy while inflationary and financial pressures are increasing. Greater flexibility in exchange rates is required to deal with rising capital inflows into the region. The success of regional exit policies would be further enhanced by greater regional consultation and co-operation on macroeconomic and financial policies.

The crisis has also underscored the need for rebalancing growth in the region toward less dependence on exports and greater dependence on domestic demand. Sustaining rapid but more balanced real growth poses major challenges for fiscal policies in the region. Improvements in the fiscal frameworks used by governments in the region will be important to achieving these goals while sustaining fiscal soundness. Credible medium-term fiscal targets and specification of the means to achieve them are fundamental to such frameworks.

Introduction

ASEAN economies are recovering strongly from their most severe contraction since the 1997 Asian crisis. The recent downturns in real GDP have been both less severe and less prolonged than the previous one, and were precipitated by external shocks rather than by imbalances in its own economies.

The recovery was initially spurred by exports and reinforced by fiscal stimulus but is now becoming dependent on private domestic demand, whose momentum has been steadily increasing. Timely and effective counter-cyclical macroeconomic and financial

policies were major factors underlying the recovery. The next challenge in the near term is to exit from the stimulus measures while continuing to support real growth, beginning with monetary policy and followed by the phasing out of fiscal stimulus in the coming years.

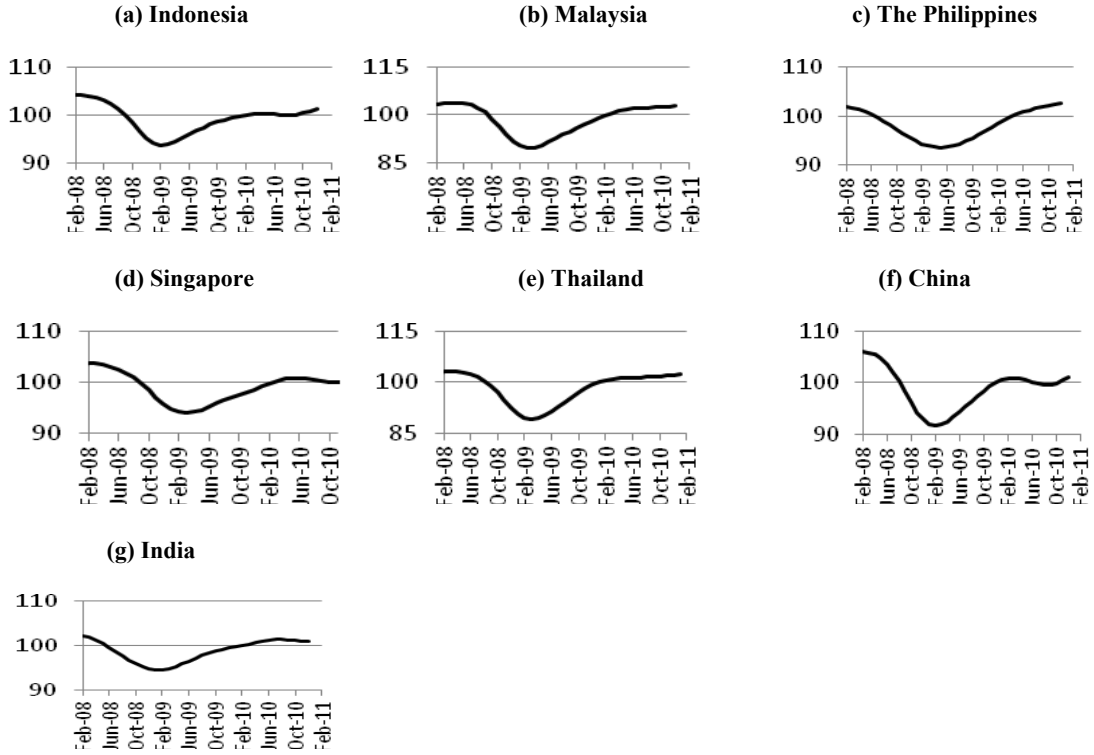
After a short review of recent macroeconomic developments and prospects, the remainder of this chapter discusses near-term monetary and exchange rate policies adopted during the present cycle as well as fiscal challenges.

1. Recent Macroeconomic Developments

Growth began to revive in the spring of 2009 and is gaining momentum during the first half of 2010

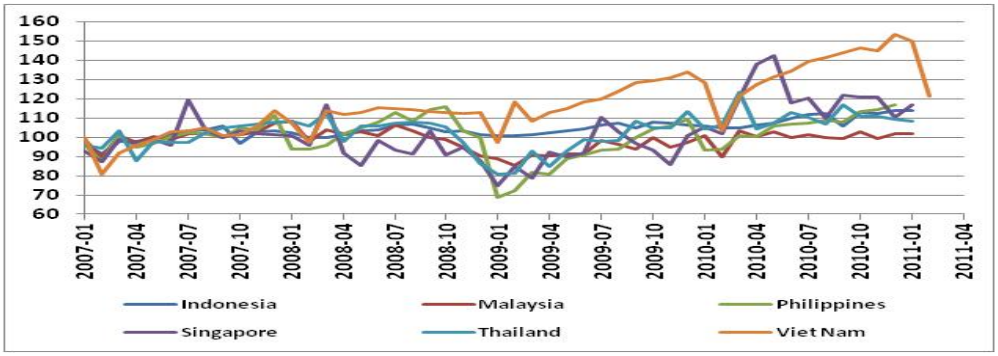
The ASEAN economies shared in the comparatively early and strong recovery in the Asian region as a whole. The OECD Development Centre's recently developed Asian Business Cycles Indicators (ABCIs) indicate that the downturn in Indonesia, Malaysia, the Philippines, Singapore and Thailand bottomed out in early 2009 and that an expansion began in early 2010 (OECD, 2011; Figure 1; Box 1). As with the downturn, the recoveries have been strong in those ASEAN economies - Singapore, Malaysia and Thailand - that are specialised in exports of electronic products. The recoveries began in the second half of 2009. The Asian business cycle indicators together with industrial production and other data highlight that the recoveries gained momentum during the first half of 2010 (Figures 2). The revival in China's domestic demand, spurred by that country's early and large fiscal stimulus, also contributed to the growth in the region. Recoveries of Southeast Asian countries slightly lagged behind that of China. Owing to a relatively quick rebound and the robust growth afterwards, negative output gaps of most Asian countries are closing.

Figure 1. Business cycles of ASEAN and China: Composite coincident indicators



Source: Asian Business Cycle Indicators from This Quarter in Asia, OECD Development Centre (2011)

Figure 2. Industrial Production Index (2007=100): Six countries of ASEAN



Source: CEIC

Box 1: How do the ABCIs measure business cycles in the region?

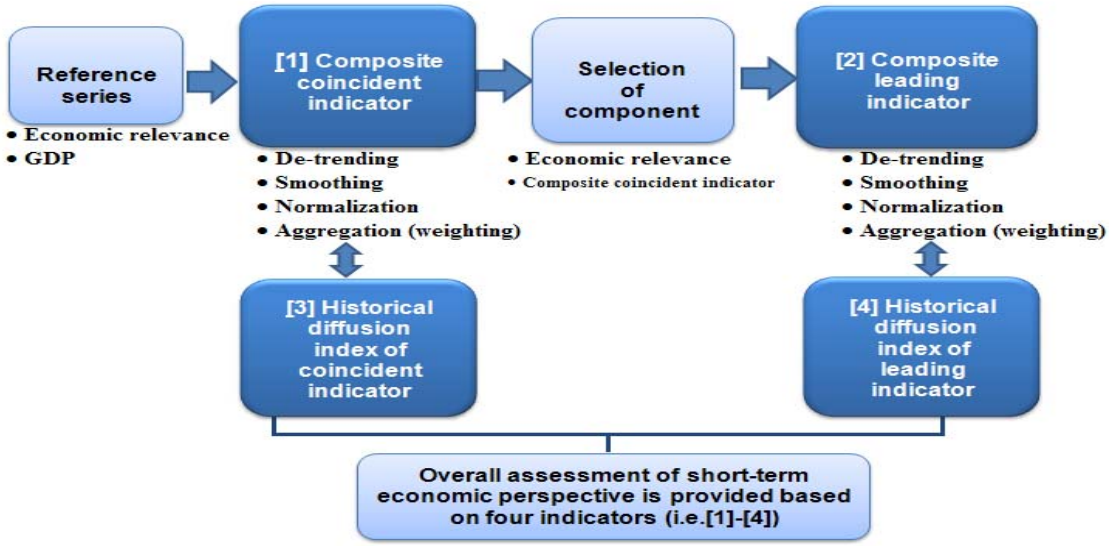
The OECD Development Centre Asian Business Cycle Indicators (ABCIs) provide:

- comparable information on the near-term economic situation in the next 5-6 months in ASEAN countries as well as China and India;
- early warning of potential macroeconomic risks in the region; and

- a tool for regional monitoring and for tracing business cycle synchronisation in Asia.

The OECD Development Centre's ABCIs are constructed in co-operation with the OECD Statistics Directorate. The ABCIs are based on the "growth cycle" approach consistent with the OECD Composite Leading Indicators (OECD CLIs), in which cycles are measured as deviations of economic activity from their long-term trend.

The methodology of the construction ABCIs is tailored to country- specific circumstances. The ABCIs identify cycles by using both i) composite indicators (i.e. leading and coincident) and ii) diffusion indices (i.e. leading and coincident). Each provide different information and, as such, are complementary: the composite index reveals "change" in economic fluctuations and the diffusion index provides a broader picture of "the overall economic activity of the country." The ABCIs coincident indicators are selected mainly by economic relevance and statistical fitness to quarterly GDP. Leading indicators are created based on the coincident indicators and the lead time is in general 5-6 months.



Source: OECD Development Centre (ABCIs)

In the ABCIs, evaluation of the phase of business cycle is done comprehensively by using four sets of information: i) leading indicators of both composite and diffusion and ii) coincident indicators of both composite and diffusion. More precisely, four cyclical phases are identified by composite indicators: *expansion*, when the composite indicator curve is above 100 points and increasing; *downturn*, when the composite indicator curve is above 100 but decreasing, *slowdown*, when the curve is below 100 and decreasing and *recovery*, when the curve is below 100 but increasing. On the other hand, the diffusion index identifies two phases; *upwards* when the diffusion index crosses the 50% threshold from below and *downwards* when the diffusion index passes the threshold from above.

The results of ABCIs are released on a quarterly basis on the web (See *This Quarter in Asia*, www.oecd.org/dev/asiapacific/abcis).

China's ties with Southeast Asia are strengthening: Macroeconomic implications

The recent results of Asian Business Cycle Indicators also suggest that business cycles in Asia have become increasingly synchronised in the last several years (Figure1). This increased synchronisation is partly stemming from strengthened economic links through trade and investment flows, similar institutional arrangements and to a certain extent also from common shocks. ASEAN's economic integration with the rest of Asia has greatly increased over the past decade as a result of the emergence of China as the focal point of regional production chains.

As documented in detail in Chapter 2 and 3, China has become the platform for manufacturing final products using parts and components produced in ASEAN countries. This new division of labour within Asia reflects the relocation of assembly facilities from ASEAN and other less developed Asian countries to China, mediated by multinational corporations seeking to take advantage of China's lower labour costs. As a result, while ASEAN intra-regional trade has increased modestly since 1997, its trade with China has increased substantially. This trade is dominated by parts and components, and is concentrated in consumer and business electronic products and automobiles, whose share of ASEAN exports has increased while that of textiles has declined. This trade is most important, in terms of its share of total exports and in relation to GDP for many ASEAN countries.

Greater trade integration with China has not appreciably reduced ASEAN's countries dependence on export demand from OECD countries, especially the United States and Europe. The bulk of ASEAN exports still ultimately go to countries outside the region, although a larger portion go first to China rather than directly to their ultimate destination than was the case a decade ago. ASEAN countries have become increasing open over the past decade in terms of their ratios of trade to GDP and the contribution of exports to total demand (Pula and Peltonen, 2009).

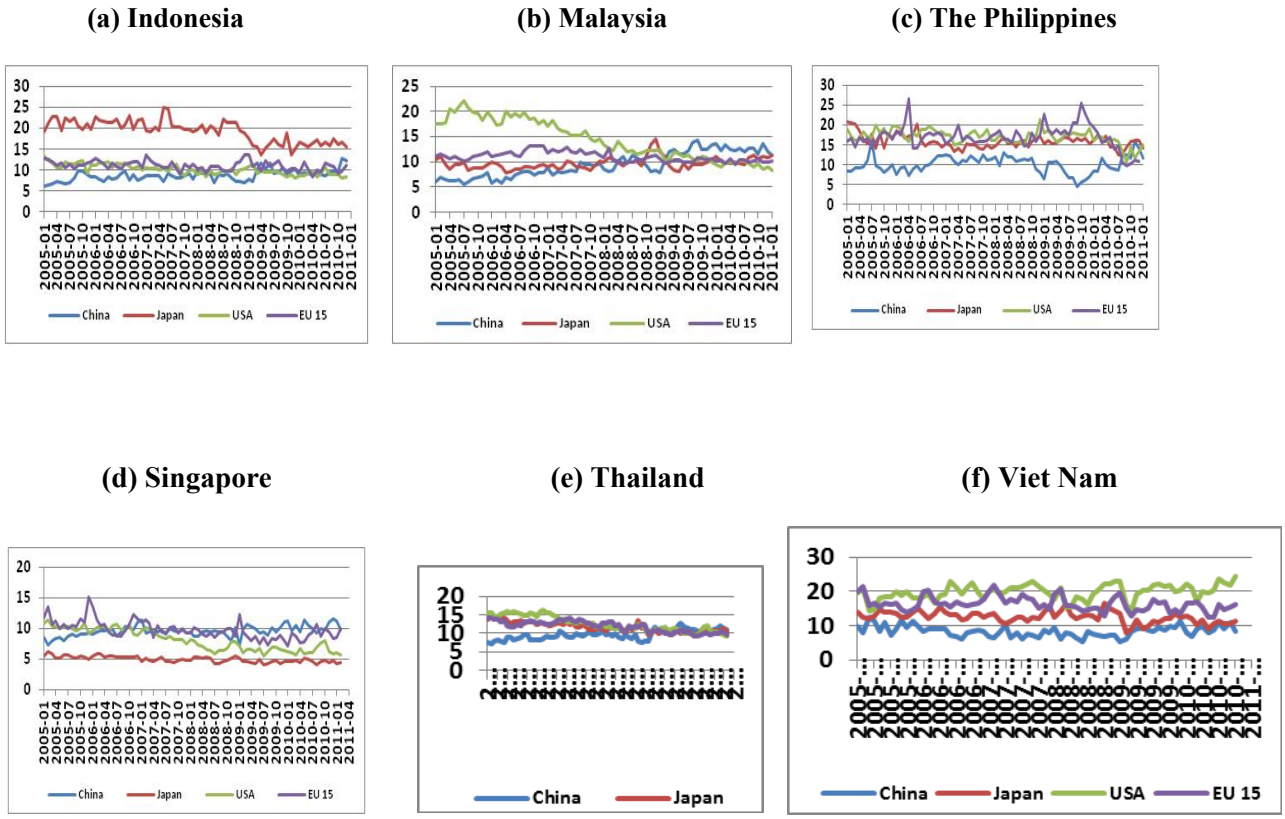
As a result, ASEAN economies remain very exposed to cyclical fluctuations in demand from OECD countries, especially the United States and Europe (ADB, 2007; Park and Shin, 2009b). ASEAN's sensitivity to OECD business cycles is further increased by its concentration on electronics and automobile exports, which are highly sensitive to demand fluctuations. There is some evidence that China is increasing its

importance as a final source of demand for ASEAN but it is still less than that of OECD as a whole (Park and Shin, 2009a). Integration into regional production chains also tends to increase the synchronisation of business cycles among ASEAN countries' and with China (Brooks *et al*, 2009). This tendency is illustrated by the OECD Development Centre Asian Business Cycle Indicators (ABCIs)**.** These indicators show that China's recovery has been consistently leading that of the Southeast Asian region (Tanaka, 2010).

The relatively slow recovery of OECD countries will retard export growth of the Southeast Asian economies, but this will to some extent be compensated for by the emergence of China as new export market for the region. Asia is expected to become an increasingly important destination for ASEAN exports, particularly for the most export-dependent countries. For instance, the response of many firms in Southeast Asia (, in particular Indonesia, Malaysia, Singapore and Thailand) to the sharp downturn in major industrialised economies was to switch their export destinations to large markets that were less affected by the global recession such as China (Figure 3). This switch of export destination to China illustrates China's important role in leading the recovery of the region. This helped support export industries across Southeast Asia and to limit the economic downturn.

Redirecting exports to China could, to a certain extent, compensate for the relatively weak demand in OECD economies immediately after the crisis, but is unlikely to fully make up for it. Export market diversification has its limits though, especially when economies are so intertwined through global production chains. And there is a limit to the extent to which expansionary monetary and fiscal policy can fill the void created by the decline in external demand. Therefore, new sources of growth are needed for ASEAN countries to maintain past growth rates and are most likely to be found in domestic demand.

Figure 3. Export shares of major trading partners of six ASEAN countries (in %), 2005-2011



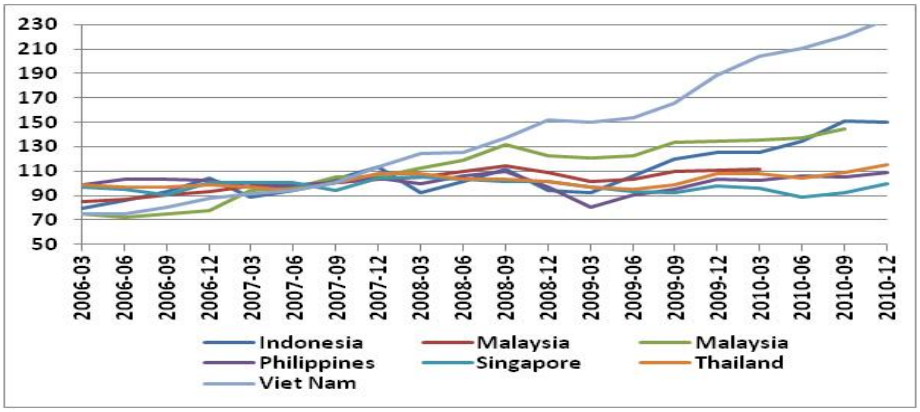
Source: CEIC

The recovery is broadening as consumption gains strength

The recovery in the ASEAN region has broadened over the past year, with domestic demand becoming the dominant source of real GDP growth. Consumption began to rebound in the second half of 2009 and gained further momentum during 2010. Retail sales were up by 20% or more over their year-previous value in the summer of 2010 in Indonesia and the Philippines and also in Viet Nam (although much of the increase was due to rising prices) (Figure 4). Retail sales growth has also been strong in Thailand and Malaysia although it has been weaker in Singapore due to fluctuations in automobile sales.

Business surveys in the region suggest continued strength in consumption in the near-term. Consumer sentiment indicators have recovered strongly in Indonesia, Malaysia and the Philippines.

Figure 4. Retail Sales Index (2007=100): Six countries of ASEAN



Source: CEIC

Exports and imports are overtaking pre-crisis levels and current account surpluses are rising again

Overall, export growth of the ASEAN countries continue to gain momentum during the first half of 2010, with six countries of ASEAN (Indonesia, Malaysia, the Philippines Singapore and Viet Nam) all recording year-over-year increases of 30% to more than 40% by the end of the second quarter. Although lower in 2009 as a whole than in 2008 (except for Myanmar), exports have now overtaken their pre-crisis levels in most ASEAN economies. China, and to a lesser extent other East Asian economies, accounted for a disproportionately large share of the ASEAN export growth during 2009 but growth is likely to come increasingly from outside Asia as the recoveries in other regions take hold.

Falling domestic demand and declining need for imported parts and components in export production led to a sharp drop in ASEAN imports in 2008 and early 2009. Imports are now recovering briskly but their (year-on-year) growth has in most cases been somewhat less than that of exports. Six countries of ASEAN (except for Vietnam) recorded large current account surpluses in the several years prior to the crisis.

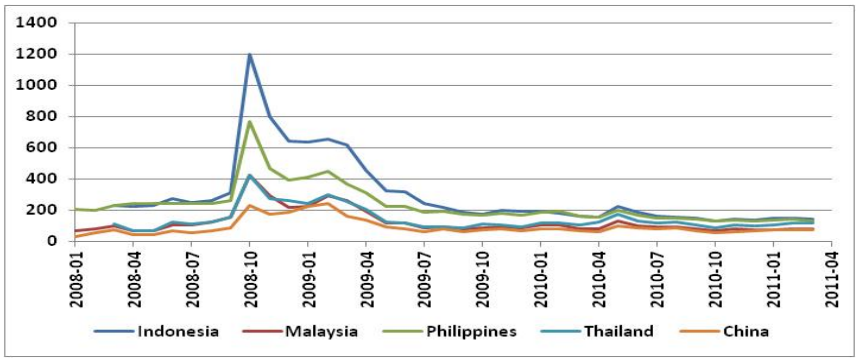
The contraction in exports led to a marked drop in current account surpluses for 2008 but the surplus rebounded in 2009 as import declines followed. Indonesia, Thailand, and the Philippines recorded substantial increases in their current account surpluses in 2009 and the deficits of CLMV countries fell. The surpluses fell in Singapore (due to an improved balance on services and other non-merchandise current

items) and Malaysia but remained the highest in the region. The surpluses of Indonesia, Malaysia, the Philippines and Thailand have fallen back somewhat in 2010, to approximately 5% of GDP for the group as a whole. Despite the increases in 2009, the ASEAN current account surplus is still somewhat lower in relation to GDP than it was in the year before the crisis.

External financial stresses have eased considerably and capital inflows are recovering

External financial stress indicators have eased considerably since the first quarter of 2009 although they remain less favourable than before the crisis. Credit default swap (CDS) rates of most ASEAN countries have fallen to near pre-crisis levels (Figure 5). CDS rates and other ASEAN financial stress indicators have risen back from time to time when market tensions have recurred.

Figure 5. Indicators of sovereign risk spreads: Credit default swaps, 5 year foreign currency (basis points)



Source: DataStream

All Asian emerging market economies experienced a sharp decline in net inflows of foreign direct investment and portfolio and other capital flows during the downturn, but the withdrawal was most severe for Indonesia, Malaysia, the Philippines and Thailand. Capital surged back in 2009 into China and other Asian NIEs, including Singapore, reaching above their rate just before the crisis. Capital inflows into many ASEAN countries began to recover in the second half of 2009 and have continued to be strong during 2010. Portfolio investments have dominated the increased inflows, reflecting increased interest by international investors in the higher yields available in emerging markets. Indonesia recorded especially heavy portfolio inflows during 2010. Indonesia

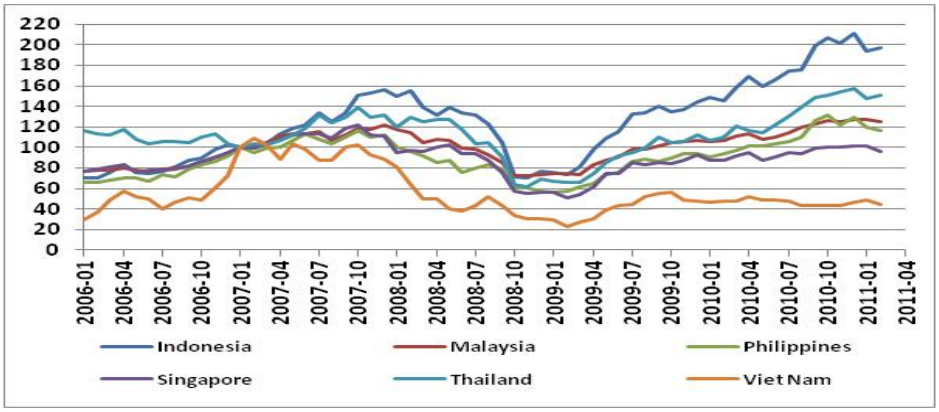
and the Philippines were able to sharply increase their issues of foreign currency-denominated bonds in the latter half of 2009 and 2010 at spreads near to pre-crisis levels.

There has been noticeably less recovery in foreign direct investment (FDI) inflows into the ASEAN region. Positive net FDI inflows into six countries of ASEAN did resume in the first quarter of 2010, following net outflows during the second half of 2009.

Domestic financial conditions have improved considerably

Compared to the aftermath of the 1997 crisis, the spill-over of external financial stresses to domestic financial markets has been much less severe. Regional stock market indices did fall sharply beginning in late 2007 through the first quarter of 2009 (Figure 6). However the declines were not noticeably more severe than those in the United States, Europe, or other emerging markets. ASEAN stock markets have since recovered considerably. Stresses in domestic interbank as well as offshore banking markets were moderate, at least compared to those observed in the markets of many OECD countries, due in part to decisive measures by authorities to inject liquidity and expand the range of instruments eligible for trading with the central bank.

Figure 6. Stock Price Indices: Six countries of ASEAN (Jan 2007=100)



Source: CEIC
Notes: Indonesia: Jakarta Composite, Jakarta Stock Exchange
Malaysia: FTSE Bursa Malaysia, Bursa Malaysia
Philippines: PSEi, Philippine Stock Exchange
Singapore: SGX Strait Times, Singapore Exchange

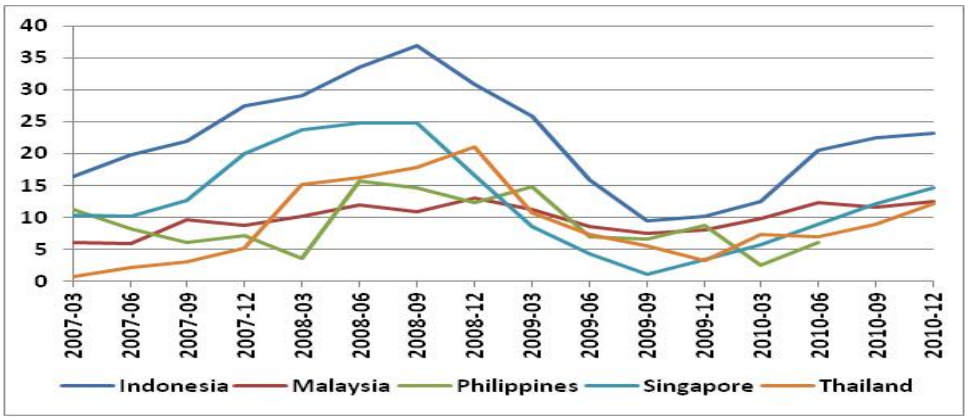
Thailand: SET, The Stock Exchange of Thailand
Viet Nam: HCMC, Ho Chi Minh City Securities Exchange Centre

Domestic credit growth also fell off markedly, although much less severely than during the 1997 crisis in many ASEAN countries, and the drop was more in line with the contraction in real GDP. Access to bank loans became more difficult, especially for smaller and medium-size enterprises (SMEs) and lending risk premia rose, but the changes again appear roughly in line with the severity of the downturn in real activity.

The strong financial positions of the banks and other major financial institutions before the crisis were instrumental in limiting the stresses on domestic financial system. Banking systems in most ASEAN countries entered the crisis with capital adequacy ratios that were not only well above the BIS minimum but among the highest in Asia. These capital ratios have been maintained with little or no erosion during the crisis. There has so far been little rise in non-performing loan rates, which remain at modest rates, although somewhat higher in some cases than the rates in the strongest banking systems of the region,

The easing of financial strains and pickup in real demand has only recently begun to be manifest in a recovery in domestic lending growth beginning in the last quarter of 2009 (Figure 7). Loan growth has been strongest in Indonesia, and Malaysia but, is still subdued compared to past trends in the Philippines. Private sector credit growth has also begun to pickup in Cambodia.

Figure 7. Bank loan growth: five countries ASEAN (percentage changes, year-on-year)



Source: CEIC; National sources
1) Indonesia: Commercial & Rural Banks Loans, Bank of Indonesia
2) Malaysia: Banking System Loan: Total excl Loans Sold to Danaharta, Bank Negara Malaysia
3) Philippines: Outstanding Loans (Gross): All Banks, Bangko Sentral ng Pilipinas
4) Singapore: Loans & Advances (Domestic Banking Units): Total, Including Bills Financing, Monetary Authority of Singapore
5) Thailand: Total Loans (Gross), Bank of Thailand

Monetary and financial regulatory authorities in the ASEAN countries reacted quickly to relieve domestic market stresses and reassure foreign investors as the global crisis intensified after the failure of Lehman Brothers. The measures included bank deposit guarantees of varying duration in the more financially open economies (Malaysia, Thailand, Singapore, and Indonesia); special injections of central bank funds into especially stressed short-term markets; and broadening of the range of instruments used in open market and central bank discount operations (BIS, 2009). Several countries (Indonesia, Malaysia, and the Philippines) employed regulatory forbearance (by relaxing enforcement of mark-to-market rules) to ease strains on financial institutions. To counter exchange- rate pressures, a number of countries also drew on swap lines with the People's Bank of China and the Bank of Japan. Further currency resources were available through the Chiang Mai arrangement, although they were not drawn upon.

Authorities were initially cautious in easing monetary policy to counter the contractionary effects of the global financial crisis. Pressures on their currencies led several ASEAN countries to either raise policy interest rates (Thailand, Indonesia, the Philippines and Vietnam) or to maintain them during the third quarter of 2008, even though the prospective impact of the global downturn on the region was becoming evident.

However as the effects of the crisis on regional output began to take hold and financial pressures reached a crescendo in the wake of the Lehman Brothers failure, policy sharply reversed course. Policy interest rates were cut several times to their lowest levels since the middle of the decade; and Singapore modified its exchange rate target in October 2008 to zero appreciation from the 'modest appreciation' target maintained during the prior three years. Laos and Viet Nam cut their policy rates by a cumulative total of 600 basis points from their peak in 2008 to their trough in the

summer of 2009, while policy rates in Indonesia, Thailand, the Philippines and Malaysia were cut by 300, 250, 200, and 150 basis points respectively over the same period.

The cuts in policy rates, reinforced by declining aggregate demand, led to a marked drop in market nominal and real short-term interest rates in most ASEAN countries that helped to support domestic spending. The support to spending was probably more limited in Singapore, however, given that short term interest rates were already low before the crisis and could fall only modestly and still remain above zero (Takagi, 2009). Longer-term interest rates have come down only modestly, with the result that yield curves have steepened markedly.

Overall, both the run-up to the crisis and the downturn have demonstrated the considerable improvement in ASEAN monetary policy frameworks since the 1997 crisis. Improved frameworks and the generally good record of inflation control before the crisis were important factors behind the more extensive and rapid use of counter-cyclical monetary policy actions during the present downturn compared to prior contractions. Thailand, Indonesia, and the Philippines were able to reduce policy rates while maintaining inflation within bounds that were broadly consistent with their stated inflation targets. The less formal approach followed by Malaysia seems also to have allowed adequate flexibility to counter the downturn.[1]

However the experience during this cycle has highlighted areas in some countries where monetary policy capabilities could be strengthened. As discussed further below, consideration may need to be given to modifying, or at least clarifying, the response of monetary policy instruments to exchange rate movements. Limited financial development in the lower income countries has made monetary policy reliant on credit limits and other direct controls that can distort credit allocation and which make it difficult to limit credit expansion when fiscal deficits emerge. Development of financial

[1] Thailand Indonesia, and the Philippines officially base policy on an inflation targeting framework in which monetary policy instruments are varied to maintain (core) inflation within a preannounced range. Other countries base policy on less formal and explicit frameworks to achieve similar goals of sustaining non-inflationary growth in line with potential. Exchange rate developments have played, to varying degrees, an important role in determining near-term policy adjustments, especially in the most open economies. Only Singapore, however, uses the exchange rate explicitly as an intermediate target: until the crisis, authorities pursued 'moderate appreciation' of the currency against a basket of currencies with unannounced weights.

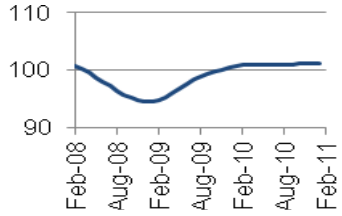
markets and institutions, while a gradual process, is critical to improving the flexibility and overall effectiveness of monetary policy in these countries.

Overall, the near-term outlook is favourable but there remain risks

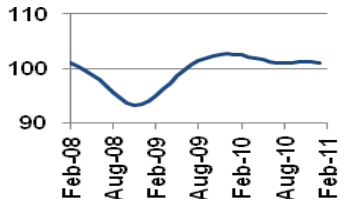
Overall, ASEAN economies are likely to maintain the growth momentum in the first quarter of 2011 according to the latest Asian Business Cycle Indicators (Figure 8 and 9). Real growth should remain robust, although growth in 2011 as a whole is likely to be somewhat less than in 2010. In particular, relatively positive developments in Indonesia, the Philippines and Thailand are associated not only with strong export demand but also sound domestic demand and improved business sentiment. The recovery of China's economy is driven by robust investment. Activity is showing some signs of slowing in India.

Figure 8. Business Cycles in ASEAN and emerging Asia: Composite leading indicators

(a) ASEAN average



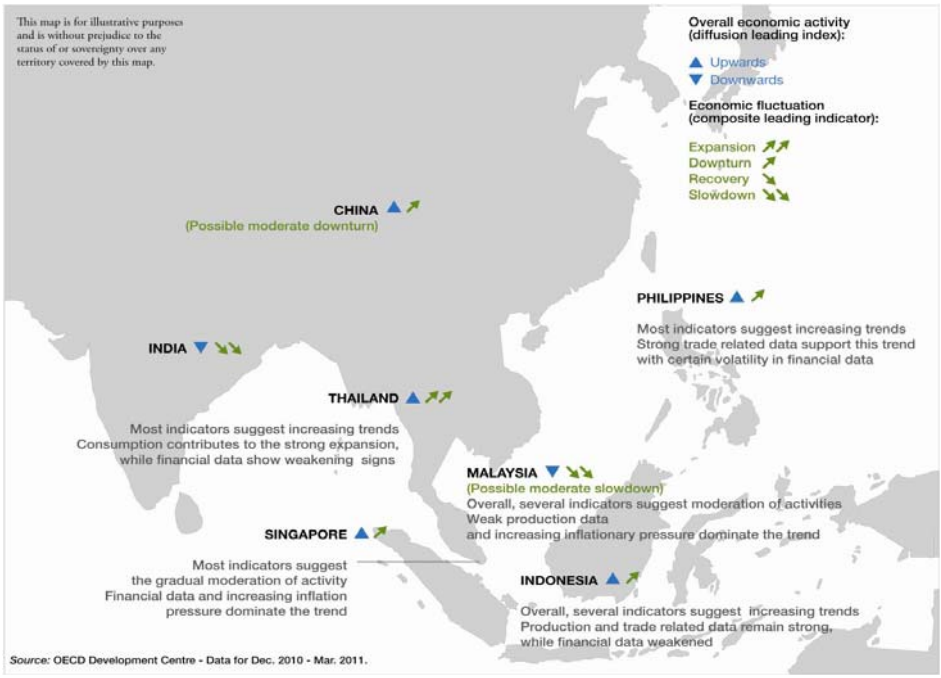
(b) Emerging Asia average



Source: OECD Development Centre

* ASEAN average includes Indonesia, Malaysia ,the Philippines, Singapore and Thailand. ** Emerging Asia average includes ASEAN average plus China and India.

Figure 9. Composite leading indicators and diffusion leading index in Asia



Source: This Quarter in Asia, OECD Development Centre

Nevertheless, the recovery remains vulnerable to adverse developments. The greatest risks probably come from outside the region, inflation or budget deficit and public debt levels could pose risks to some ASEAN recoveries if they are not carefully managed.

Another risk is the possibility of an interruption of recovery in OECD economies, particularly the United States and Europe. In the United States, continued weakness in the housing sector and uncertainty over the strength of the jobs recovery raise questions about the sustainability of consumer spending. The recovery in Europe is likewise weak, further clouded by the commitment to undertake large-scale consolidation by most countries in the medium term, an intervention that could constrain demand in the region (OCED, 2010)

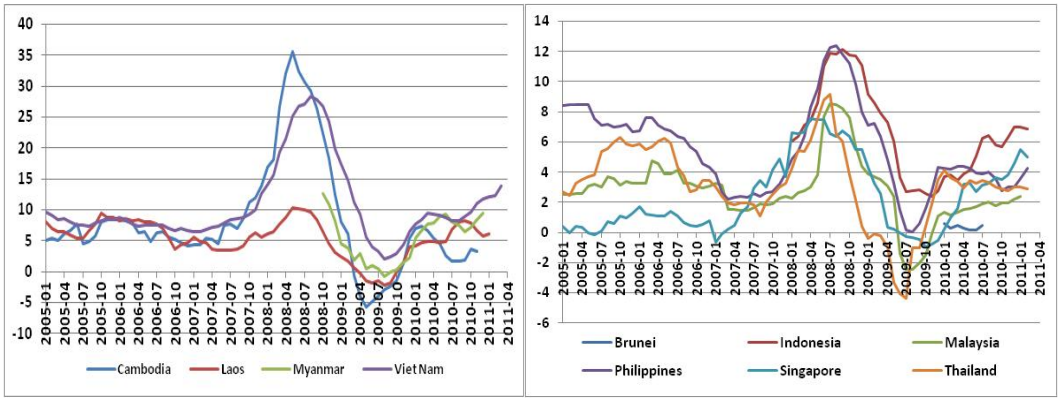
Probably the greatest risk is that growing confidence in the ASEAN economies, coupled with economic uncertainties still lingering in most OECD countries, has boosted capital inflows in the region. The increase in market uncertainty if they were to occur could spill over to ASEAN economies by raising global investor risk aversion, leading to declines in regional stock markets and possibly to further weakness in capital

inflows and setbacks in the recovery of ASEAN bond markets. Provided it did not lead to renewed recessions in OECD countries, such stress would probably not interrupt the recoveries in the real economies now underway in the region. Policy makers in Southeast Asia are concerned about such inflows and potential reversals which might jeopardize the region's macroeconomic stability. Countries are reacting differently; for instance, Indonesia introduced a minimum holding period of central bank notes, while Thailand adopted a withholding tax on foreign investment in Thai bonds.

Inflationary pressures are posing another important challenge to policy makers in the region (Figure 10). Geo-political tensions in the Middle East and North Africa have pushed up oil prices once again. In addition, droughts in China might add to the already significant pressures on food prices. Countries in the region are considering a broad range of options, including subsidies and price caps and likely to tighten their monetary stance as inflationary pressures feed into core inflation expectations.

Figure 10. CPI inflation of ASEAN countries (percentage changes, year- on- year)

(a) Six countries of ASEAN (2005-2011) **(b) CLMV countries (2008-2011)**



Source: CEIC

ASEAN economies in the first half of 2011 (and beyond) are facing the double policy challenges of tightening interest rate policy to quell inflationary pressures, while avoiding additional capital inflows and maintaining competitiveness.

Finally, a tightening of monetary policy in China to restrain the very rapid growth in domestic credit that has emerged and to contain excessive increases in asset prices

would likely slow Chinese real economic growth. Those ASEAN economies with the strongest trade linkages to China would likely experience some headwinds from such a slowdown.

2. Near-Term Monetary and Exchange Rate Policy Challenges

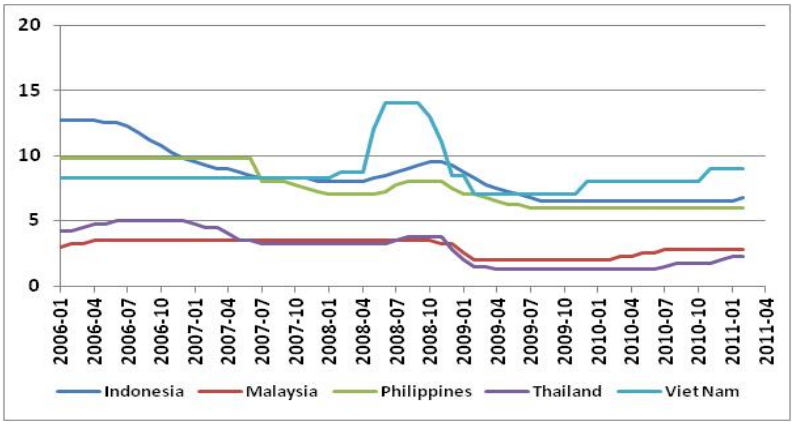
With recoveries now well underway, ASEAN macroeconomic policies will need to shift in their near-term policies toward more normal stances that can sustain growth in line with potential while restraining inflation and maintaining sound fiscal and external finances. As discussed below, there are three key challenges that need to be addressed.

- **Monetary policy stimulus and financial support measures need to be phased out, while allowing for temporary changes in course to respond to further external shocks should they arise.**
- **Greater flexibility of exchange rates is needed to support the exit measures.**
- **Strengthening regional co-operation, in particular surveillance and exchange rates, is important.**

Monetary policy has been tightened in Asia

Policy interest rate cuts came to an end in July 2009 as the economic recovery became evident and in most cases have been held flat since then. The rates are now at their lowest levels in nominal terms in nearly 5 years. Short-term market interest rates are also quite low in nominal as well as real terms, and bank liquidity is generally high. The key challenge now is to manage an exit from this exceptional monetary ease while accommodating the recovery and maintaining room to counter major negative disturbances to growth in particular, recent inflationary pressure should they occur.

Figure 11. Policy interest rates for ASEAN countries (%)



Source: CEIC

This process has already begun in a number of countries. Vietnam raised the policy rate slightly in December 2009, in part to counter pressures on its currency. Malaysia raised its policy rate three times since March 2010, by a total of 75 basis points while Thailand increased its policy rate by 25 basis points in July 2010 and again in August. Monetary tightening is also being pursued through other instruments. Singapore authorities have restored the exchange rate objective back to the 'mild appreciation' stance maintained before the crisis; and Indonesian authorities raised commercial bank reserve requirements by three percentage points in September 2010. Recently, the Philippines also hiked interest rates for the first time since 2008 and China increased the required reserve ratio.

Policy interest rates will need to rise at least enough to offset any increases in core inflation, so that real interest rates do not move in a counter-cyclical direction. However, several considerations argue for caution in monetary tightening. At least for the next several quarters, monetary policy needs to give high priority to increasing the momentum of recovery in domestic demand as a hedge against the still significant uncertainties surrounding the recoveries in ASEAN's main export markets. The fact that OECD countries have not yet begun to reverse their prior monetary easing further suggests that ASEAN countries should tighten fairly gradually, at least until real GDP returns to near its long-term trend.

As the recoveries gain momentum and investor confidence increases, the probability that asset markets will overreact causing unsustainable booms in prices

('bubbles') will increase. The risks of such booms in ASEAN and other emerging market economies relative to those of more advanced economies are probably accentuated by the limited development and diversity in their financial markets and their openness to sometimes very large inflows of capital into those markets. Moreover, past history suggests that boom and bust asset price cycles, if they occur, can cause serious harm to the real economies of ASEAN and other emerging Asian countries (Gouchoco-Bautista, 2009).

Monetary authorities in the People's Republic of China are already facing this issue as the rapid growth in bank lending has threatened to restart the potentially unsustainable booms in property and stock prices that were developing before the downturn. The risks of such booms in most ASEAN economies are probably limited in the near term, given that property price increases have in most cases been moderate over the past several years and the fact that capital inflows are still subdued. However Singapore, where real estate prices have been rising briskly in some sectors and Indonesia, which has been experiencing comparatively large portfolio capital inflows, may face somewhat greater risks. Risks of financial bubbles may also rise in other ASEAN countries as their recoveries proceed, and foreign investors' risk appetite grows. This possibility underscores the need for financial authorities to review prudential regulations and measures to sustain market transparency as the first line of defence against asset market bubbles.

Whether or not, and how, monetary policy frameworks should explicitly incorporate domestic asset prices as indicators or intermediate objectives is controversial even in theory (Box 2). Such incorporation would present considerable practical problems. It is quite difficult to determine in practice to determine whether a boom in asset prices represents a sustainable response to their fundamental determinants or an unsustainable 'bubble'. Detecting unsustainable booms may be particularly difficult in rapidly growing economies where the relation between asset prices and observable economic conditions may be changing. Introducing additional complexity into monetary policy frameworks by incorporating asset prices as targets could make it more difficult for policy makers to clearly and credibly explain the rationale for their decisions to the markets and the public, particularly where the frameworks are relatively new, as they are in most ASEAN countries.

Given the considerable challenges monetary authorities in ASEAN and other emerging economies are likely to face, a policy of varying monetary policy instruments in response to the likely effects of the asset price increases on monetary policy objectives - consistent with the present frameworks - may prove most effective and reliable. Such a policy need not rule out policy responses on those (infrequent) occasions when asset prices become so substantially and obviously misaligned as to present a clear risk to policy objectives for inflation and real growth.

Finally, improving the capacity of policy to prevent asset market bubbles and deal with them if they occur also calls for strong co-operation between monetary policy authorities and financial regulators. Information from financial regulators can help monetary policy authorities in detecting asset bubbles and in improving their ability to interpret asset price movements. As the global financial crisis has graphically underscored, financial and monetary authorities need to jointly monitor and assess systemic risks to the economy.

Box 2: How should monetary policy react if asset bubbles arise?

While the risk of unsustainable bubbles in property, equity, or other asset markets seems limited for the ASEAN region in the near term, they are far from unprecedented and conceivably arise once global financial risk appetites recover and capital inflows into the region return.

Policies that minimise the likelihood of their occurrence are the first, and best, line of defence against unsustainable asset price bubbles. Prudent financial standards and effective regulation are crucial in this respect. This further suggests that temporary relaxations in prudential standards to encourage lending or support markets, where they were instituted, need to be phased out as soon as possible. Sound monetary policy that avoids excessive credit expansion is equally important.

There is more controversy as to how monetary policy should react to indications of unsustainable asset price increases and if so how. Theoretical arguments have been made that incorporating asset prices as intermediate targets for monetary policy can improve outcomes for inflation and real growth by preventing or limiting boom-bust cycles in financial markets (e.g. Cechetti et al 2000). However explicit targeting of asset prices presents considerable practical challenges. It is very difficult to distinguish unsustainable asset price changes from those that are justified by fundamentals. Given the large volatility in asset prices, varying monetary policy settings in response to their movements can lead to excessive and unwarranted fluctuations in monetary policy instruments (ADB, 2010). Partly for this reason, theoretical analyses suggest that any variations in policy instruments in response to asset prices need to be small and probably not continuous.

Effective asset price targeting also requires a high degree of central bank credibility (ADB, 2010). To sustain credibility, it is essential that central bank monetary policy operations be transparent and their rationale well understood by markets.

Greater exchange rate flexibility will be needed

ASEAN exchange-rate regimes are now more flexible than they were before the 1997 crisis, when fixed or near-fixed pegs to the United States dollar predominated. In practice, though, ASEAN authorities have allowed less flexibility in their exchange rates than their *de jure* frameworks would imply. Although the variability of the exchange rate of the largest five economies has been higher in recent years than in the five years prior to the 1997 crisis, it has in most cases remained lower compared to exchange rates for major industrial countries in both bilateral and nominal trade-weighted terms. Indonesia's currency has varied most and evidence suggests it has been the most flexibly managed among the major ASEAN currencies (Frankel and Wei, 2008; ADB, 2010). The currencies of the Philippines, Thailand, Malaysia, and Singapore appear to have been allowed less flexibility.

All the countries of the region have at times engaged in heavy foreign-exchange market intervention to limit fluctuations in their currencies. This intervention and the exchange-rate pressures prompting it have had an upward bias since mid-2008, resulting in substantial increases in foreign exchange reserves.[2] ASEAN authorities have also, less frequently, varied policy on interest rates in response to exchange-rate pressures, most recently in the early stages of the downturn in 2008. These interventions have been most focused on the bilateral exchange rate against the dollar, particularly in the case of Malaysia and the Philippines.

At least to some degree, such interventions might be viewed as appropriate responses to 'disorderly' foreign exchange market conditions or as a normal reaction of monetary policy to the likely impact of a substantial movement in the exchange rate on

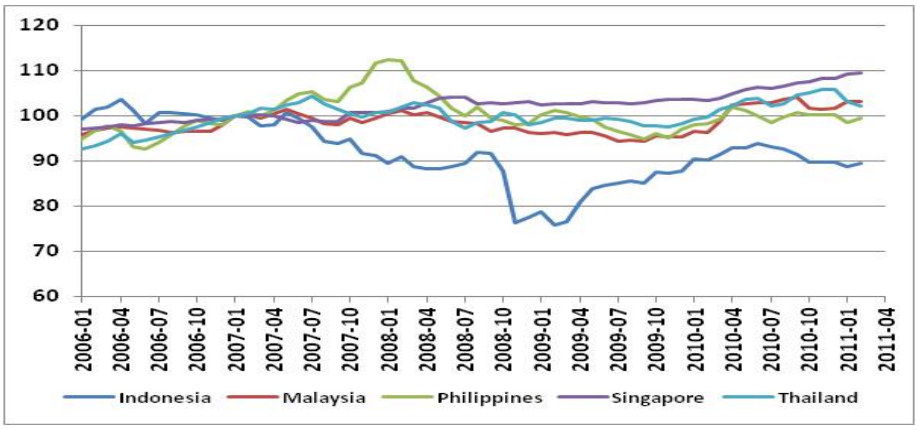
[2] Estimated 'reaction functions' determining central bank foreign currency intervention developed by ADB analysis (ADB, 2010) implies that Thailand and Singapore tend to intervene most strongly against appreciations against the United States dollar while interventions by the Philippines and Indonesia tend to be more symmetric.

domestic real growth and inflation, particularly in the most open economies. However the limited flexibility in the exchange rate that has resulted *de facto* suggests that policy has gone beyond this point.

At present, most ASEAN currencies are moderately higher, roughly 5 to 10%, on a (nominal) effective basis compared to their levels at the beginning of 2007 and are also up *vis a vis* the United States dollar (Figure 14). ASEAN currencies have fallen against the renminbi (RMB), although the decline in most cases has been modest.

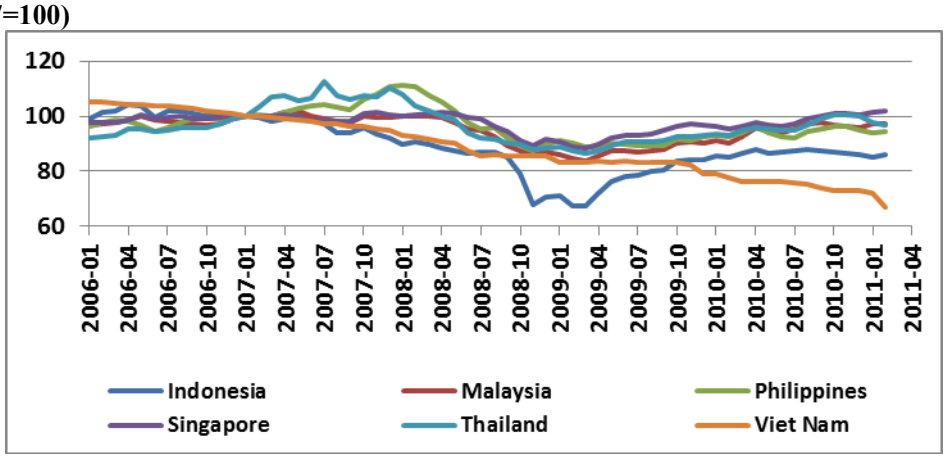
Figure 12. Exchange rates of selected ASEAN countries and China (2006- 2011)

(a) Nominal effective exchange rate (index, 2006-10, January 2007=100)



Source: BIS
Note: A decline indicates a depreciation of the currency.

(b) Exchange rates for the renminbi and Southeast Asian currencies (index, 2006-10, January 2007=100)



Source: BIS
Note: A decline indicates a depreciation of the currency.

Notwithstanding the upward pressure on exchange rates of most currencies of the region stemming from ever increasing surpluses on their balance of payments, most authorities seem to be reluctant to allow their currency to appreciate out of fear of losing competitiveness. However, the recent return to the fluctuation band of the Chinese currency regime and the subsequent appreciation of the RMB should help to reduce this risk.

To allow greater scope for appreciation of ASEAN currencies, it would be appropriate to focus foreign exchange market intervention on relieving disorderly market conditions. In principle, such intervention should be symmetric, reacting similarly and according to the same criteria to currency movements in either direction. Prolonged intervention in one direction should be confined to situations when the currency is clearly becoming seriously misaligned (e.g. in response to speculative capital inflows).

There is also a case for basing interest rate policy responses to exchange-rate movements on their impact on domestic monetary policy objectives in economies where growth is export-driven. This would imply that the policy interest rate should be reduced only if a sustained currency appreciation were deemed likely to lower real growth or inflation below central bank objectives. Allowing ASEAN currencies to rise at a moderate rate, particularly if the RMB and other Asian currencies were also appreciating, could help to contain domestic inflation pressures.

The global crisis highlights the need for review of financial regulatory and supervisory policies

The resilience of ASEAN financial institutions to the global financial crisis is mainly attributable to their very limited exposure to the complex instruments that originated the crisis and to the prompt responses of ASEAN financial authorities. Financial supervision and regulation have been greatly strengthened and principles and practices have become more closely aligned with international norms (Adams, 2008; Lee and Park, 2009). This has facilitated a considerable strengthening of bank financial soundness. Non-performing loans, while still somewhat high by best international

standards in Indonesia, the Philippines and Thailand, are backed by high levels of loan provisions. The development of bond markets, although still limited, and the diversification of activities of banks and other financial institutions into household lending and more sophisticated business services, have also helped to improve the robustness of the systems (Adams, 2008).

Despite these improvements, ASEAN financial regulatory and supervisory systems remain limited compared to counterparts in the most advanced economies. Regional financial authorities are pursuing longer-term plans to further improve financial supervision and develop financial markets, in part to reduce the still relatively high dependence on banks as funding sources. The global financial crisis has increased the need for these efforts and has revealed some new lessons that need to inform policies beginning in the near-term. Three areas in particular merit review.

First, further efforts need to be made to bring regional financial regulatory and supervisory standards into better alignment with international norms, including accounting and disclosure standards and consolidated and cross-border supervision, areas where ASEAN countries compliance has been found to be somewhat below the international average (Lee and Park, 2009). Prudential rules, such as those governing leverage, the definition of capital and other areas will also need to be periodically reviewed and revised as necessary in response to the tightening of standards formulated by the BIS and the other major international financial bodies.

Second, the global financial crisis has underscored the need to review standards for liquidity management, which were found to be woefully inadequate. Such a review is particularly important for ASEAN countries given their exposure to capital flow volatility. Probably the most immediate priority is to review existing prudential

standards and financial institution practices concerning foreign currency exposures to determine where and how these standards need to be strengthened. Such a review should be based as far as possible on effective stress tests incorporating realistic 'worst-case' scenarios including interruption of access to key markets.

Third, ASEAN authorities, as with their counterparts in the rest of Asia and in other regions, need to develop stronger capabilities for macro-prudential surveillance (MPS) of systemic risks to the financial system as a whole. The publication of regular reports assessing financial stability in a number of ASEAN countries is an important element of MPS. However more is likely to be needed, including formal designation of responsibilities for assessing systemic risks and the institution of measures to address them; and the development of indicators for assessing these risks. In strengthening their capabilities in this area, ASEAN authorities will be able to draw on efforts now underway by the Financial Stability Board and IMF to develop a framework and standards for MPS. As discussed below, these efforts could also benefit from strengthened co-operation among ASEAN countries.

Greater regional co-operation could improve policies in various areas

Enhancing ASEAN regional macroeconomic co-operation would help to reduce the vulnerability of the region to economic shocks and to ensure a sustained recovery. The recent crisis has underscored the need to strengthen macroeconomic co-operation within ASEAN, which is lagging other forms of regional co-operation.

ASEAN already has an example of macroeconomic co-operation - the Chiang Mai Initiative. This initiative was originally established in 2003 in the framework of ASEAN+3 as a series of bilateral currency swap arrangements. As originally formulated, the initiative was subject to constraints (such as the requirement that a

country must approve each drawing of its currency) that limited its use. The agreement by ASEAN Finance Ministers in May 2009 to recast the facility into a single multilateral facility is intended to remedy the constraints in order to make the facility more functional.

Co-operation in some other areas deserves further attention. There have also been discussions of co-ordinated exit strategies in the context of the G20 and in Asia as well. Singapore, Malaysia and Hong Kong, China agreed in November 2009 to jointly exit from full guarantees offered on bank deposits. This plan to co-ordinate government guarantees should help in limiting risks of disruptive capital flows among the region's banks, especially in a risk-sensitive environment. Co-operation, at least through consultation, on fiscal policies could also be beneficial to the ASEAN region. Highly open economies receive only part of the overall benefit of their own fiscal stimulus actions, much of which spills over to partner countries through trade and interest rate channels. As a result of this externality, open economies, acting independently, may be more reluctant to apply fiscal stimulus to counter a regional downturn than they would be if they were acting in concert.

As their recoveries become increasingly firm, ASEAN countries, particularly those that exit from monetary stimulus earlier than OECD countries, face an increasing risk of surges in capital inflows and their potentially disruptive impacts on exchange rates and domestic financial markets. Such surges are already an issue of concern for Indonesia and China. Evidence on the effectiveness of controls and other measures to limit capital inflows is mixed. There is some agreement, though, that controls are likely to be most effective for relatively short periods of time rather than as permanent measures.

The management of capital flows is closely related to exchange rate issues. Asian economies entered the onset of the crisis with considerable diversity in exchange rate regimes: some countries have a floating exchange rate regime with considerable flexibility, while other exchange rate systems remain tightly managed. Greater co-operation on exchange rate policies, financial market surveillance and financial integration can be useful tools in managing capital flows (Kawai and Lamberte, 2008). Such co-operation can help to reduce risks of disruptive fluctuations in capital inflows and allow for orderly exchange rate appreciation while limiting adverse effects on competitiveness.

Peer review could provide an effective means of regional co-operation

The effectiveness of regional co-operation largely hinges upon the form of co-operation. Co-operation can take a legally binding rigid framework or a non-binding, flexible scheme. Peer review is an example of the latter and its "soft law" nature makes it suitable as a tool for policy dialogue and capacity building in Southeast Asia. Regional surveillance and monitoring based on peer reviews could potentially work in the region (OECD, 2008). Peer reviews could be applied to different areas of economic activity, not only to macroeconomic surveillance.

Different institutions such as APEC, ASEAN+3 and ASEAN conduct peer reviews in different ways. For instance, APEC has been using peer reviews to achieve the common goals of creating free and open trade and investment in the Asia-Pacific region (Woodhead, 2008). These goals, known as the Bogor Goals, were laid down in the Bogor Declaration in 1994. In the framework of the ASEAN+3, the Economic Review and Policy Dialogue (ERPD) process linked with the Chiang Mai Initiative is evolving. Within the ASEAN Secretariat, the ASEAN Surveillance Process (ASP) was

institutionalised in 1998 after the Asian Crisis, with the aim of strengthening the capacity of policy making at the regional level. Two mechanisms facilitate this: one is a monitoring mechanism that allows early detection of problems that might affect the ASEAN economy in general and the financial sector in particular; and the other is a peer review mechanism that identifies policy issues arising from the monitoring exercises that need to be addressed. More recently, the ASEAN Surveillance Coordinating Unit (ASCU) was established within the ASEAN Secretariat to coordinate the surveillance process. This surveillance mechanism, however, is still in its infancy.

Among ASEAN countries, the peer consultation process has already started. The first example of peer review adapted to regional needs and conditions is the ASEAN Peer Consultation Framework (PCF) in the area of the forest sector. Two consultations have so far been conducted. The first consultation was conducted on the forest sector of Brunei in 2007. The ASEAN Secretariat participated in the assessment team. The second consultation was on the forest sector of the Philippines, with Indonesia and Malaysia acting as assessing countries in 2008. The implementation of peer consultation under the concept of PCF has paved a way forward for ASEAN regional co-operation.

Peer reviews are implemented in a number of ways within the OECD and are an important working method. There is no standardised peer review mechanism as such, but there are tested instruments that help member countries improve their policy making capacity. When considering the application of peer reviews to Southeast Asia, there are two major prerequisites for its success. The first is information sharing: providing high quality data in a timely and systematic manner is critical. Initial attempts by different institutions to produce high quality data in a comparable and timely manner could be

useful in this respect. The other prerequisite for the success of peer reviews in the region is to ensure incentive compatibility to participate in the peer review mechanism. It is crucial to share the benefits of collective policy actions among participating countries. For instance, the reputation effect stemming from continuous macroeconomic cooperation and peer learning from other countries will enhance incentives to participate in collective actions. Strong commitment to co-operation is also critical for effective collective actions (Tanaka, 2009).

Finally, the importance of strengthening regional surveillance is now increasingly recognised. For instance, creation of a new surveillance unit in Singapore has been agreed under the framework of ASEAN + 3. Regional surveillance is being strengthened in the near term.

3. Fiscal Policy Challenges

3.1. Near-term Fiscal Policy Challenges: Stimulus should be phased out gradually

In addition to monetary policy, exit strategies for fiscal policies are also critical. The key near-term issue for regional fiscal policies is the pace at which the stimulus measures are withdrawn. Public sector deficits rose markedly in the ASEAN region during 2009 as a result of the stimulus packages and economic downturns. Most ASEAN countries' deficit rose by approximately 2-3 % of GDP.

The deficit increases were not exceptional in terms of their size - most ASEAN economies recorded somewhat higher deficit to GDP levels in at least one year over the prior decade. The increases were also moderate compared to OECD countries, where the deficit for the region as a whole increased by approximately 5 % of GDP in 2009. Although the ASEAN fiscal deficits have raised government debt levels in relation to GDP, they remain moderate if higher than in most of the rest of East Asia. Moreover,

given their high potential growth rates, ASEAN public debt to GDP ratios can be brought down fairly quickly once sufficient deficit reduction has been achieved.

The pace of the implementation and freedom to slow fiscal consolidation to support growth varies across the region. Where deficit and debt levels are highest and straining the ability of available financing sources, as in the case of Malaysia and the Philippines, consolidation needs to begin fairly immediately and the scope for new stimulus measures is likely to be limited.

These considerations suggest a need for ASEAN countries to begin preparing for the 'exit' from fiscal stimulus. The 'exit', in most cases should be managed flexibly in the near term to allow for the possibility of renewed adverse shocks. Many ASEAN countries should retain some scope to reinstate carefully targeted fiscal stimulus measures (e.g. for income support or infrastructure) in the event that external demand weakens, although the lower income countries may be more constrained in their ability to take such actions.[3] Once the recoveries are more firmly established, it would be prudent to restore balance to primary fiscal deficits, in order to at least stabilise the public debt-to-GDP ratio-over the medium term. The consolidation process is likely to be most successful and robust to unexpected developments if it is embedded in an explicit medium-term fiscal strategy.

3.2. Medium- term Fiscal Policy Challenges: Rebalancing growth and credible fiscal framework

Looking at the medium-term, policy makers in the region are facing to how to move fiscal policy back towards levels consistent with a sustainable path in the medium-term while shifting a more balanced growth. Growth in Southeast Asian economies has traditionally been driven by external demand; these economies have been fast to integrate into global supply chains and flexible in meeting ever-evolving global demand. These characters are the main source of economic dynamism in the region and have helped to achieve remarkable growth rates in the past.

[3] According to IMF estimates, (IMF 2009b, October) the overall planned consolidation in these countries amounts to about 0.9 percent of GDP, higher than the contractions of ¾ and less than ½ percent of GDP now envisaged for industrial Asia and the G20 as a group. However the estimates do not take account of the recent shift in budget plans in Thailand, which now envisages less consolidation than earlier planned.

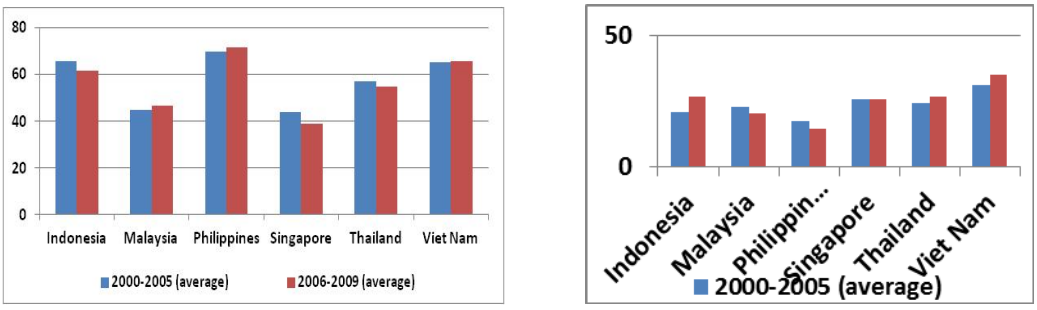
Although the global financial crisis did not have devastating effects on most Southeast Asian countries, it offers an opportunity to rethink past growth strategies. Having emerged strongly from the crisis, these economies need to exploit new sources of growth, given weaker-than-expected import demand in OECD countries (OECD, 2010). Rebalancing growth is therefore critical to achieving more stable and sustained growth in the medium-term.

Rebalancing could help sustain growth but the path of rebalancing will differ by country

The relative importance of major growth drivers has differed considerably among Asian countries over the past couple of decades and suggests that the growth rebalancing over the medium term is likely to take different forms as well. For instance, consumption to GDP ratios vary substantially across Southeast Asia, from the Philippines at 70% to Singapore at 40%; similar diversity is also apparent in the investment to GDP ratios, which range from 30% for Viet Nam to around for the Philippines 15% (Figure 13). This suggests that rebalancing in some countries, the Philippines for example, is likely involve increasing investment while in other countries, such as Malaysia and Thailand, there may need to be greater emphasis on increasing consumption. The policies needed to achieve rebalancing are thus likely to differ among ASEAN countries.

Figure 13. Consumption and investment to GDP ratios of six ASEAN countries (in %)

(a) Private consumption, % of GDP **(b) Gross fixed capital formation, % of GDP**



Source: CEIC

In general, in those economies that rely heavily excessively on exports for growth, rebalancing towards domestic demand could help maintain a high growth rate and at the same time help reduce vulnerability to external shocks. Rebalancing, however, would not mean a sudden switch to domestic-driven growth – a move that might prove disruptive - but rather a gradual boost to consumption and investment while exports remain a major driver of growth. In economies that were not as export-driven in the past, rebalancing may include a greater exploitation of opportunities for exports. In this sense, rebalancing may mean more reliance on domestic demand in some countries but greater dependence on exports in others.

Rebalancing growth is a broad concept - there is no definitive path of rebalancing. As the challenges for rebalancing countries face may differ, development strategies to achieve rebalancing are also likely to be different. Many ASEAN countries already recognize the need to change their growth strategies and have included (or plan to include) an element of rebalancing growth in their new medium- term development plans, in particular, Malaysia and Thailand (see Box 3).

In Thailand, where growth has been dependent on exports, has comparatively great room for boosting domestic demand in a rebalancing strategy. Social policies would be critical to rebalancing, particularly policies to address population ageing, income disparities, and a safety net for employment. For Malaysia, the development of the private sector, in particular small and medium-sized enterprises (SMEs) is critical for stimulating domestic demand, together with shifting to knowledge-based industries. Singapore is aiming to strengthen its human capital to be a hub of the global economy. Coping with its vulnerability to external shocks will be critical and will require improvement in the business environment. Considering the small size of the domestic market, rebalancing needs to be more focused on supply side productivity growth, based on fostering skilled labour.

Indonesia, boasting sound macroeconomic management, including recent fiscal improvements, is now trying to make full use of its large domestic market. Domestic purchasing power is increasing and gradually placing the economy on a domestic demand-driven growth path. Maintaining steady private consumption and investment growth is important for rebalancing. In addition, there is a potential to increase exports by reducing transport costs by overcoming infrastructure bottlenecks, easing behind-the-

border regulations, removing remaining barriers to trade, and increasing the value added of exports. In Viet Nam, improvement of macroeconomic management is the priority. Reform of state-owned enterprises is also critical for rebalancing. In the Philippines, infrastructure development is urgently needed and could also attract foreign investment. The information and communications technology industry (ICT) has important potential for this country, but income disparities and poverty remain big problems for sustained growth.

Box 3. Summary of medium-term development plans in ASEAN countries

Malaysia and Thailand are addressing the challenges of rebalancing growth. The new Malaysian plan (10th Malaysia Plan, 2011-2015) targets an average annual growth rate of 6%, which will be supported by RM 230 billion during the five years (equivalent to approximately 34% of GDP in 2009) of public outlays. In order to ensure this target, the focus is to shift to a high value-added and high-income economy and to transform the structure of the economy. The strategy to promote domestic demand to become a major driver of growth includes energising the private sector and creating an environment which encourages productivity growth. The government will also leverage more vigorous private sector expansion, particularly in taking the lead in the development of new growth areas. The new sources of growth will be healthcare, education and ICT and will depend on innovation and high quality of human capital.

Thailand faces major changes under the 10th National Economic and Social Development Plan (2007-2011). Many of the reforms in the medium-term development plan are intended to achieve greater balance and sustainability in growth. In particular, following the global financial crisis, the Thai government is trying to change the direction of development by focusing on rebalancing growth. The new development plan starting from 2012 will focus on agriculture, infrastructure, education, healthcare, energy, and community-based development. In addition, co-operation with neighbouring countries, especially the development of the Mekong sub-region, will play an important role in boosting economic growth.

Viet Nam is also seeking socio-economic development together with macroeconomic stability. The objective of the forthcoming medium- term plan (2011-2015) is to retain a high economic growth rate based on continued structural adjustment, improvement in competitiveness, and global integration while fostering socio-economic development. The draft plan sets an average GDP growth target of between 7.5-8.5% per annum for the five years and mandates a number of specific tasks including stabilising the macro-economy and renewing the model of growth; improving the market economy institutions within the socialist system; creating a non-discriminatory, transparent, stable and open investment environment; and reforming the state-owned sector.

Indonesia and the Philippines plan to focus on boosting employment and reducing income inequality. Indonesia's National Development Policy in 2010-2014 stresses sustainability and a more equal income distribution. Social security must be developed in order to make workers more productive, educated and skilled. The Plan also sets some development targets such as achieving average annual economic growth of 6.3-6.8% p.a., average annual inflation of 4-6% p.a., an unemployment rate of 5-6% by end-2014, and a poverty rate of 8-10% by end-2014.

The basic task of the Philippines Medium-Term Development Plan (MTPDP) 2004-2010 is to fight poverty. The country aims to open up economic opportunities, maintain socio-political stability, and focus on strategic measures and activities that will spur economic growth and create jobs.

Singapore aims at enhancing human capital development. Singapore has set a target for productivity growth of 2 to 3% per year over the next 10 years, more than double the 1% rate achieved over the last decade. This involves a major transformation of the economy, including deepening human capital; raising business efficiency; expanding global markets; and capturing new growth opportunities in order to promote high value-added activities within Singapore. The government will also invest in education, advanced skills development, research capabilities, and the infrastructure and connectivity needed for a global city.

Current account balances are expected to shrink gradually as the growth of imports outpaces that of exports

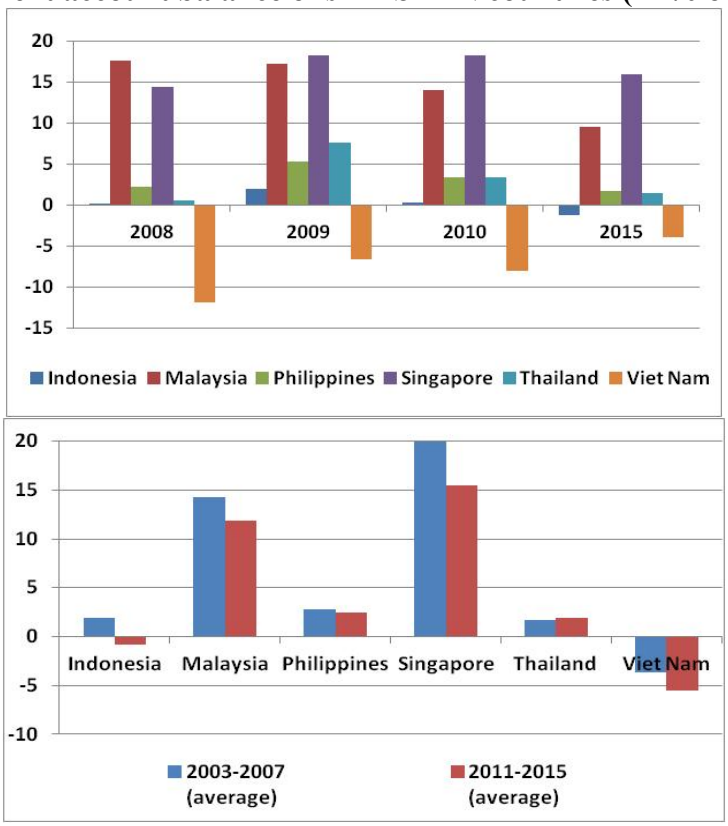
A large and persistent current account surplus is a relatively new phenomenon in Asia. In fact, many countries in the region ran current account deficits before the Asian crisis in 1997-1998 owing to high investment and consumption rates. After the Asian crisis, savings remained relatively buoyant, while the ratio of investment to GDP fell, transforming Southeast Asia from a current account deficit to a current account surplus region.

The region-wide average current account balance is projected to fall from 6.4% of GDP in the pre-crisis period to 4.2% in the post-crisis period because of a more rapid rise in imports than in exports. This decline reflects the moderate progress in growth rebalancing projected for the medium term. While current account balances are expected to deteriorate, they will still be in surplus in most ASEAN economies. The exception is Viet Nam, which recorded current account deficits even before the crisis, reflecting robust import demand due to high GDP growth, large-scale infrastructure projects and tariff reductions.

The medium-term projection results of Southeast Asian Economic Outlook 2010 (see Box 4) suggest that the current account surplus as a share of GDP will slightly decrease in Thailand, the Philippines and Indonesia from 2010 to 2015 (Figure 14). In contrast, the fall in the current account surplus is projected to be relatively large in Malaysia and Singapore, where dependence on external demand is higher. Both countries need to compensate for weak external demand in order to maintain high growth rates. Malaysia has more room to boost consumption than Singapore owing to a larger internal market, Singapore's comparatively high income provides potential for

increasing domestic demand to reduce vulnerability to external demand shocks, but the scope for rebalancing towards consumption will be limited owing to the small size of the domestic market.

Figure 14. Current account balance of six ASEAN countries (in % of GDP)



Source: OECD Development Centre, MPF-SAEO 2010

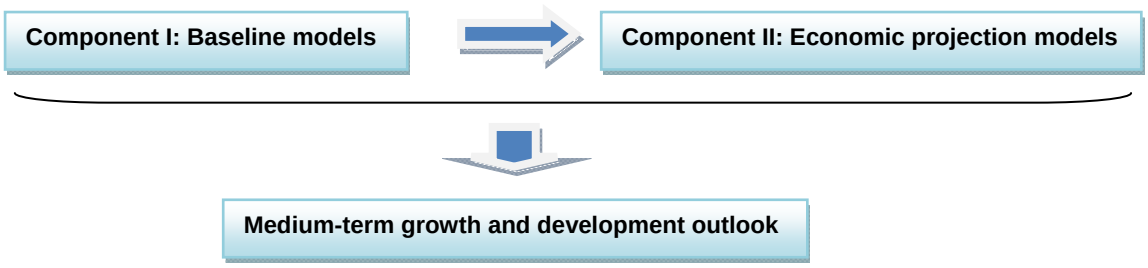
Box 4. The Medium- term Projection Framework for Growth and Development

Framework

The OECD Development Centre constructed the Medium-term Projection Framework for Growth and Development to provide medium-term growth and development scenarios for the Southeast Asian Economic Outlook 2010. The Framework has two components: i) baseline models for medium-term projections and ii) economic projection models, as illustrated below.

Baseline models determine potential output and the output gap, while the economic projection models provide the components of output and other variables; First, the baseline models derive the GDP series that are consistent with the output gap's closing by 2015. Then these reference series are used as input to economic projection models to obtain a set of variables from the models.

How is MPF-SAEO 2010 constructed?



Source: OECD Development Centre, MPF - SAEO 2010

i) Baseline Models: Estimation of the output gap and potential output

One of the key assumptions for the medium-term projections is related to potential output, which is estimated by baseline models.

In Southeast Asia, there is no comparable information on output gaps and potential output. Conventionally, potential output is measured either by applying a statistical filter to actual real output data, such as the Hodrick-Prescott filter, or by a production function approach in which potential output is related to labour and capital inputs. The filtering approach is relatively easy to produce results but there are drawbacks resulting from potential instability in the estimates and the need to specify a value for potential for one period ('end-point' problem); moreover the filtering approach lacks a theoretical base. The production function approach is widely used, but its application to Southeast Asian countries has its limits related to the lack of reliable data.

The estimates of potential output and output gaps used in the baseline models of MPF-SAEO 2010 are based on an alternative approach that has been recently developed, the dynamic stochastic general equilibrium (DSGE) method. The properties of potential output and output gap fluctuations derived from the DSGE approach can be different from those derived from the filtering or production function approaches. A clear advantage of this approach is that it can provide comparable information on potential output and potential output for Southeast Asian countries by using relatively easily available data (for instance, GDP, inflation, and interest rates). In addition, this approach has strong theoretical foundations which explicitly reflect economic optimisation problems and this approach can take account of different types of shocks from both the supply and the demand side.

The model for each country is based on a new Keynesian framework that consists of a dynamic Investment-Savings (IS) equation, a Phillips curve (aggregate supply equation), and a monetary policy reaction function. Equilibrium dynamics are driven by four exogenous shocks: technology, price mark-up, external demand, and monetary policy shocks. The baseline models' parameters are estimated using Bayesian methods. It is assumed that the shocks in the last sample period gradually converge to zero following the estimated stochastic processes. Under these assumptions, the output gap for each country converges to zero by 2015.

ii) Economic Projections Models

With reference to GDP projections conducted by baseline models, economic projection models are used to provide details of the projections for SAEO 2010. Economic projection models are medium-scale demand-driven economic forecasting models that comprise a set of equations describing the five sectors of the economy: real sector, monetary sector, fiscal sector, balance of payments sector and debt sector. The results of projections are derived through iterations to identify a set of economic variables in all sectors including the current account, fiscal balance, investment and private

consumption. The Economic Projection Models take into account national development plans considering their feasibility given the budgetary and other circumstances.

Process

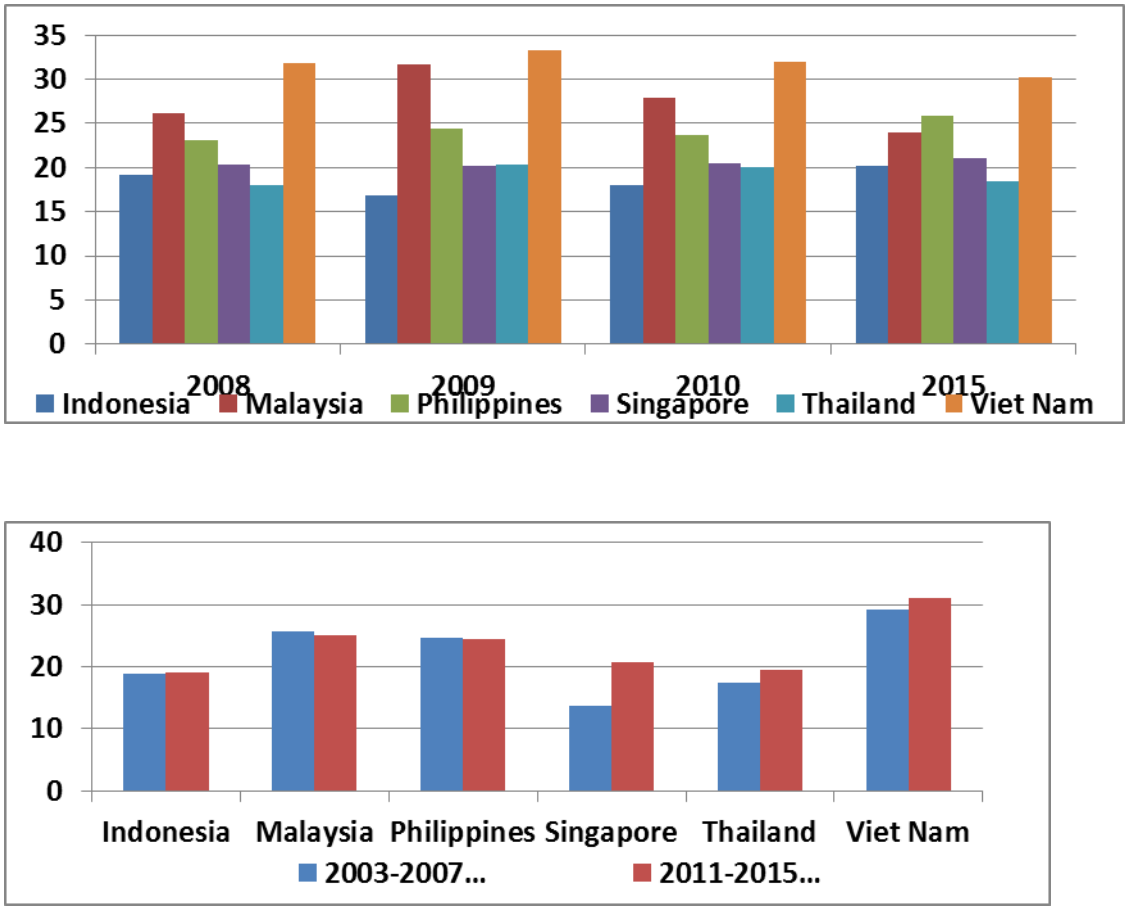
Supplementary data and insights into policy directions were provided during the OECD Development Centre's medium-term outlook missions in July and August 2010. The preliminary results were also discussed with governments and central banks in Southeast Asia during the missions.

For more detailed information, please see the home page of www.oecd.org/dev/asiapacific/mpf.

Moving fiscal policy back towards levels consistent with a sustainable path in the medium term will be critical

The fiscal stimulus packages along with the fall in revenues during the downturn plunged all the Southeast Asian economies into fiscal deficits that are too large to be sustainable in the longer-term. The exception is Singapore, which had a strong balance sheet before the crisis. Looking forward, government spending is projected to be carefully and gradually cut back while assuring that the recovery is sustained, particularly for the first few years of the projection period. The extent of consolidation, however, will be relatively limited in most economies as they face large demand for public investment in infrastructure. Government spending is projected to grow at 20.3% on average over 2011-2015, slightly down from the pre-crisis figure of 21.5%. The growth of government spending will be slower in Malaysia and the Philippines than in other countries, reflecting their more constrained budgetary situation. Viet Nam's high budget deficit of approximately 9% in 2009 similarly leaves little room for further spending growth (Figure 15).

Figure 15. Central government expenditure of six ASEAN countries (in % of GDP)



Source: OECD Development Centre, MPF-SAEO 2010

While policy measures for increasing revenue (such as improving tax administration and expanding the tax base) may be constrained until the recovery is further advanced, there will be pressure for fiscal consolidation on the expenditure side in the medium term. However, care should be taken when cutting expenditure. Cutting development expenditure could erode the future productivity of the economy and inappropriate expenditure cuts in social welfare such as pension provision and fuel subsidies may also adversely affect the poor and vulnerable, worsening inequality and aggravating political instability, as well as decelerating private consumption. Some ASEAN economies, for instance Thailand and Indonesia, are ageing fast and are expected to see more increases in social expenditure in future. In these economies, cutting expenditure is expected to be hard to implement.

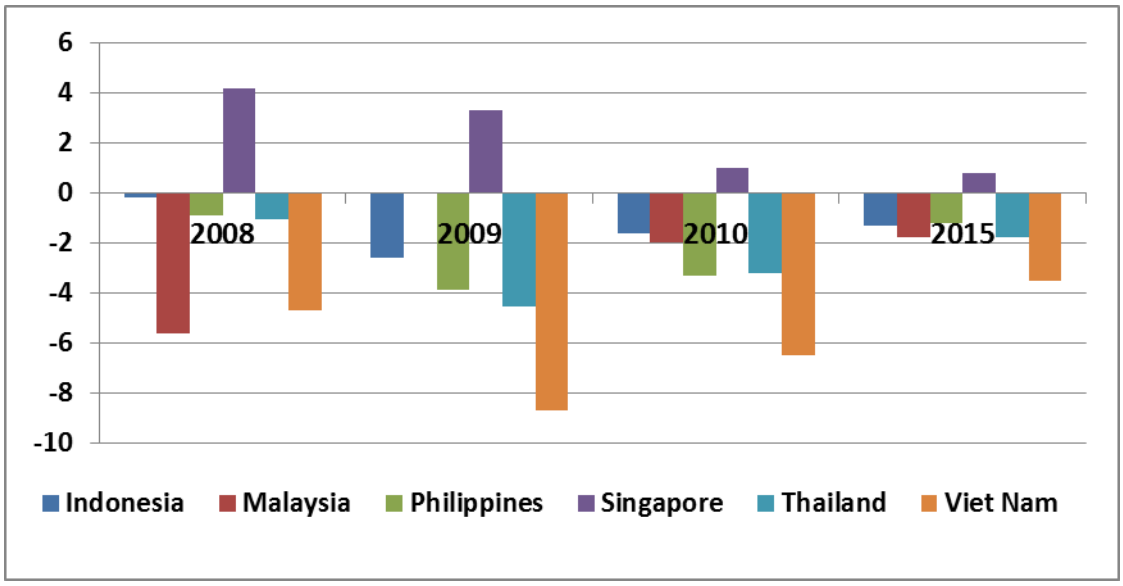
In the medium-term therefore, fiscal balances in most of the economies are projected to return to pre-crisis levels only slowly (Figures 16). The exception is Singapore, whose fiscal performance is still favourable and is likely to improve further thanks to profit transfers from the sovereign wealth funds such as the Government of Singapore Investment Corporation and Temasek Holdings. In Viet Nam, on the other hand, the many infrastructure projects in the pipeline will leave the government little possibility to curtail spending. In Malaysia, fuel subsidies are expected to increase as fuel consumption rises with economic growth, unless a drastic subsidy cut is implemented. At the same time, volatility of oil price movements and hence unpredictability of oil revenue, which accounted for more than 40% of total revenue in 2009, represents a downside risk for public finances. In addition, food price hikes will make it extremely hard for the government to implement fiscal consolidation by cutting subsidies. In Thailand, expenditure cuts have to be implemented very carefully, in part to avoid further political turmoil that could impair the growth momentum by damaging investors' confidence.

Public debt ratios to GDP are expected to increase in the next few years because of the fiscal stimuli undertaken in 2009 and 2010 and gradually decline as fiscal consolidation advances. In the medium term, many Southeast Asian countries will face a trade-off between robust expenditure growth to meet public investment targets and cutting back spending to maintain fiscal sustainability. The reduction of public debt will be gradual in most Southeast Asian countries, except the Philippines, where it will be more rapid as this country is in a more urgent need of putting its public finances in order (Figure 17).

Although the levels of public debt relative to GDP in the ASEAN economies are not very high by international standards, ranging from 40% to 60% of GDP (except for Singapore), and the shares of public debt held externally are also relatively low, it has to be noted that how the governments manage public debt still affects investors' confidence and capital inflows, which are a significant driving force in the region.

As primary balances will remain negative for most ASEAN economies over the projection period, they will need to strengthen fiscal management practices to ensure sustainable public finances (Figure 18) as further discussed in the next section.

Figure 16. Fiscal balance of general government in six ASEAN countries (in % of GDP)



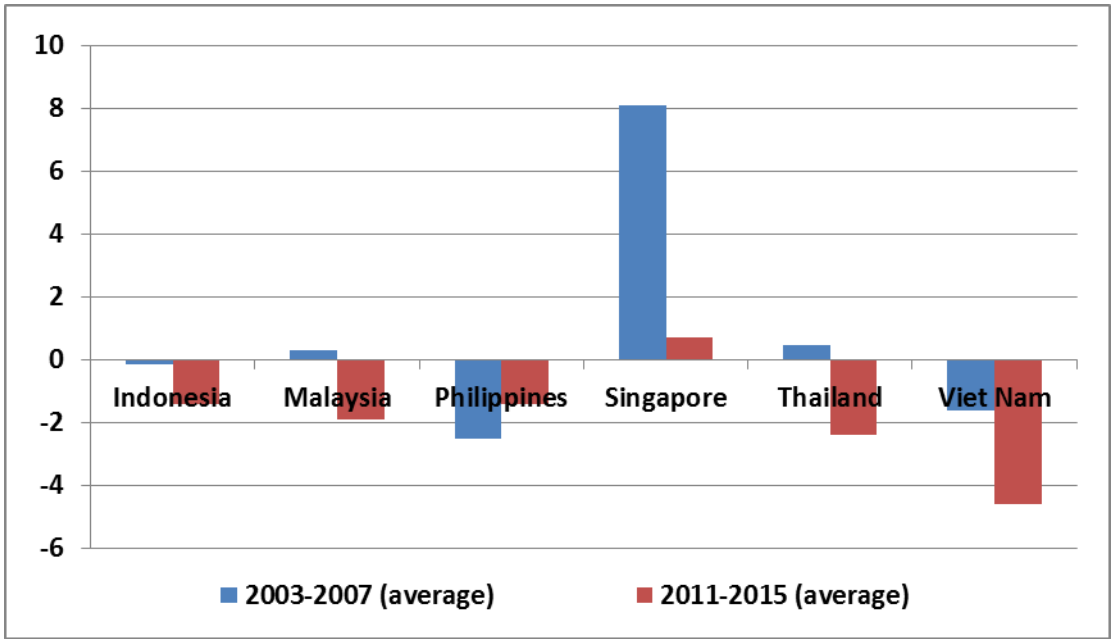
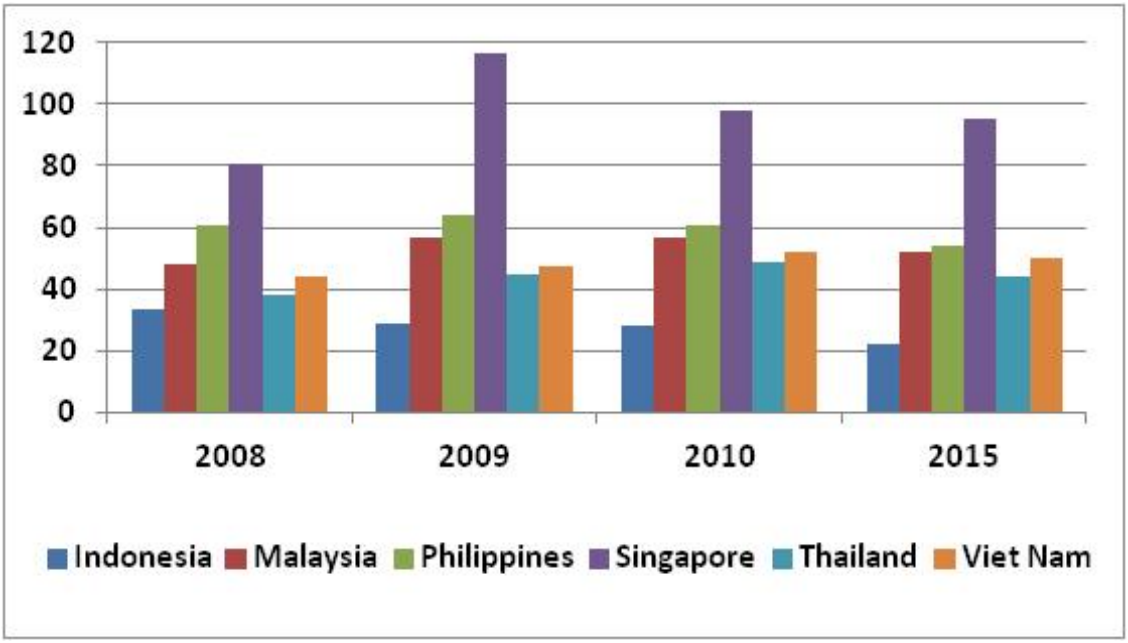


Figure 17. Public debt to GDP ratios of six ASEAN countries (in % of GDP)



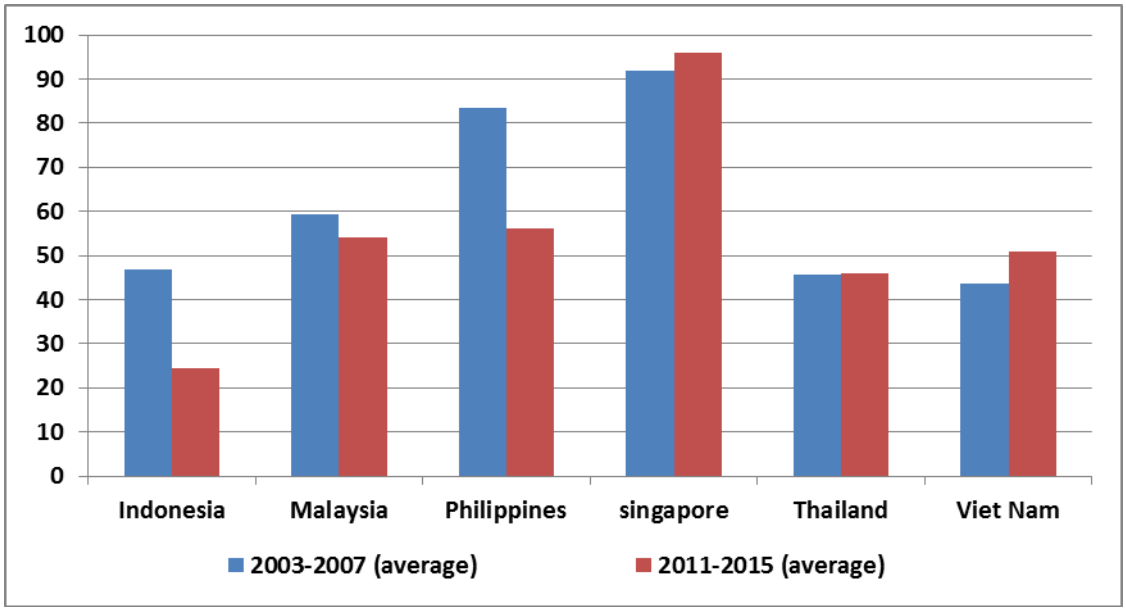
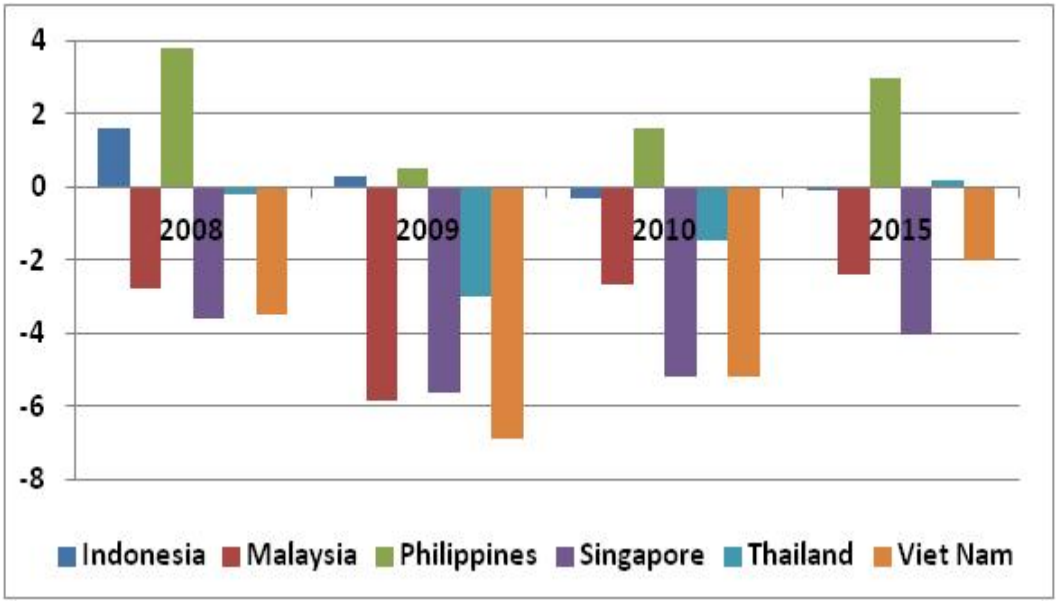
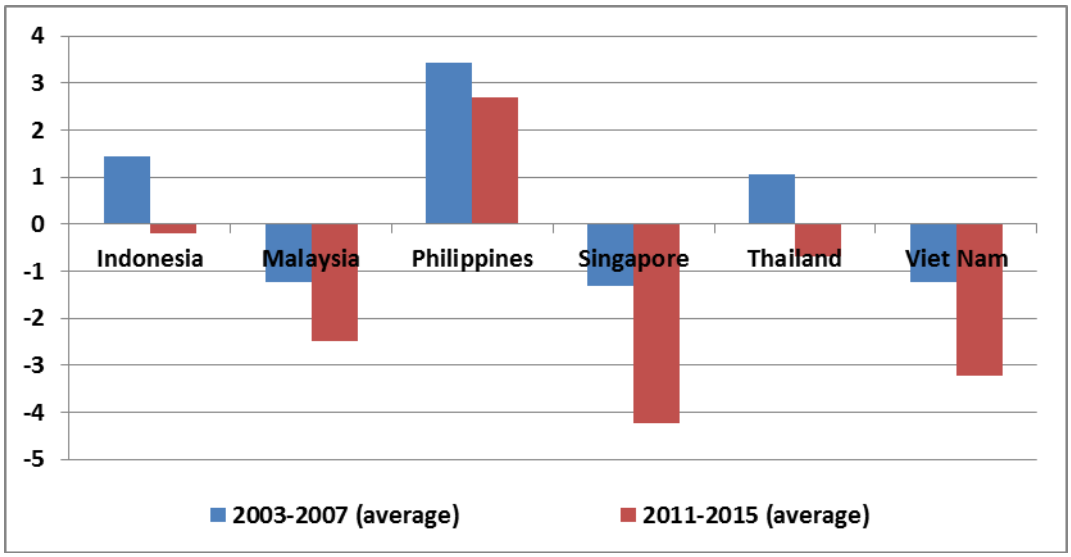


Figure 18. Primary fiscal balance of six ASEAN countries (in % of GDP)





Source: OECD Development Centre, MPF-SAEO 2010
Note: The primary balance is the general government budget balance without interest payments.

Credible medium-term fiscal framework is important to sustaining growth

Appropriate medium-term development plans and their implementation should be a first step in the rebalancing process. In fact, most Southeast Asian countries have already included policies for rebalancing in their new medium-term development plans. Myriads of infrastructure projects are planned for the coming years and it is difficult to argue against the necessity of such projects. The large need for infrastructure in the region implies large burdens on budgets. A major issue is how to accommodate these burdens while re-establishing sustainable fiscal positions. This is even more important given the reduced fiscal space owing to the large-scale stimulus packages to address the adverse impacts of the global financial crisis.

Credible medium-term fiscal frameworks would be useful tools to enhance the feasibility of medium-term plans, in particular large infrastructure projects. Such frameworks would be also helpful in achieving the fiscal consolidation that will be needed in the medium-term and allow for more efficient use of scarce public resources.

As discussed further in the remainder of this section, strengthening of medium-term fiscal frameworks should be guided by three key issues.

- **Appropriate fiscal rules need to be the core element of the fiscal framework.**
- **Independent fiscal institutions (or fiscal councils) can oversee fiscal rules and provide flexibility to the rules if needed.**
- **Medium-term budgetary frameworks consistent with medium-term development plans can strengthen fiscal rules by anchoring expectations.**

Well-designed fiscal rules are the core part of a credible fiscal framework

The major rationale for fiscal rules is the deficit bias that prevents governments from committing to prudent policies. In cases where they do commit, there is the time inconsistency issue, whereby there is a time lag between commitment and action leaves open the possibility that governments may renege. The time inconsistency issue has another dimension: governments may try to saddle their successors (who may be rivals) with large debt so that they have less fiscal space to carry out spending programmes that may not be approved by the present government. To address reneging issues, fiscal rules can be powerful tools. Rules can concern revenues, expenditures, the budget

balance and debt (Table 1). Rules concerning expenditure and the budget balance are the most common, given that governments have more direct control over them.

Table 1. Fiscal rules

Budget balance rules	Can be specified as overall balance, structural or cyclically adjusted balance, and balance over the cycle; can help ensure that the debt-to-GDP ratio converges to a sustainable level.
Debt rules	Set an explicit limit or target for public debt in percent of GDP.
Expenditure rules	Usually set permanent limits on total, primary, or current spending in absolute terms, growth rates, or in percent of GDP.
Revenue rules	Set ceilings or floors on revenues and are aimed at boosting revenue collection and/or preventing an excessive tax burden.

Source: OECD Development Centre based on IMF (2009)

The reneging problem occurs owing to the deficit bias arising when certain interest groups succeed in getting larger marginal benefits than the cost they have to pay. These groups try to increase the types of spending they benefit from, resulting in expenditure slippages and deficit surges. No matter how well designed, expenditure or balanced budget rules alone cannot ensure debt sustainability. At present, very few countries have adopted debt rules that aim at reducing the debt stock. A possible rule to promote debt reduction is a requirement to use unexpected revenues for debt repayment.

Given the economic diversity of the region, a one-size-fits-all approach will not be applicable to ASEAN countries (Adams *et al.*, 2010). Among the Southeast Asian countries, Indonesia has a set of fiscal rules similar to the Maastricht criteria of the European Union. It has a deficit limit of 3% of GDP and a debt ceiling of 60% of GDP. Given that these figures were set for European Union, countries that have lower potential growth rates, such a set of rules seems quite prudent for an emerging economy like Indonesia, which has a relatively low level of debt and high growth potential. Singapore has also adopted fiscal rules concerning the budget balance and net investment income. In any year, the government is obliged to balance the budget and can only draw upon accumulated surpluses in earlier years during their term; the government can spend no more than half of the annual net investment income from its accumulated funds. The Constitution also allows for diverging from the above rules by

including an escape clause (Blondal, 2006). With the approval of the president, in exceptional circumstances, past reserves can be drawn upon. Malaysia's fiscal rules relate to the budget balance and the level of public debt. These laws stipulate that foreign debt can't exceed RM 35 billion (roughly 5% of 2009 GDP), that domestic debt can be no more than 55% of GDP, that outstanding treasury bills can't exceed RM 10 billion at any time, and that debt can only finance development expenditure.

Several other ASEAN countries have no explicit fiscal rules as yet, but their adoption could be helpful in establishing the fiscal discipline necessary for the implementation of medium-term plans and to ensure the sustainability of public finances. The budget balance rule is essentially a guideline aiming at an operating surplus, while the debt rule is enacted in a set of laws.

Appropriate fiscal rules can help avoid high debt levels

Fiscal rules are adopted with the purpose to keep governments to their commitments to sustainable public finances. High levels of debt would be also detrimental to growth. Reinhart & Rogoff (2010) argue that for industrialised countries, a public debt ratio above 90% of GDP ratio threshold lowers the median growth rate by one percentage point. They also show that the source of financing, i.e. external or internal, matters for the growth effect. Moreover, the growth effect is different for emerging economies, with growth adversely affected at a lower debt ratio and by a greater amount when debt rises above the critical ratio: once the external debt to GDP ratio surpasses 60%, growth declines by 2 percentage points. In addition, high levels of debt imply higher risk premia, as investors need to be compensated for higher default risk. This increases the debt service burden and makes it more difficult to issue new debt in case of an adverse shock. High debt levels can also bring about higher inflation. According to Reinhart and Rogoff (2010), in advanced countries there is no link between inflation and public debt levels, while in emerging economies there is a strong correlation. This contrast may reflect the much more limited development of financial markets in emerging economies compared to advanced economies, which makes it difficult to finance budget deficits by borrowing from the private sector rather than through central bank credit expansion.

Moreover, higher debt entails higher debt service and more government expenditures must be devoted to paying interest on outstanding debt. Historically, countries have found that higher debt service crowds out other forms of government expenditures, especially on growth-enhancing activities. Such crowding out effects of high debt are particularly detrimental to ASEAN countries, most of which have large needs for growth-enhancing and development-related expenditure. Higher debt may also imply reduced flexibi

lity for the economy to react to sudden shocks. This is another reason for Southeast Asian economies to adopt a fiscal framework that limits debt to sustainable levels, given that most of these countries are very open economies and some are commodity producers (see Box 4).

Although public finances in Southeast Asia are in a relatively healthier state than in many OECD countries, the large stimulus packages necessitate consolidation once recovery is under way. An important question when implementing consolidation plans is the pace at which the deficits should be brought down. Economic theory provides some guidance with regards to the speed of fiscal adjustment in relation to economic circumstances. In countries where debt is comparatively high and investors are relatively risk averse, a more speedy adjustment is needed (Bi, 2009). The empirical literature on fiscal consolidation suggests that although gradual adjustments appear to be more successful in bringing the budget balance back to normal following sharp rises of debt and deficits, a cold shower approach may be more effective (European Commission, 2007). Considering these circumstances, the speed of adjustment for Southeast Asian countries must be assessed in the country-specific context.

Box 4. How large can the public debt be and what should the debt be used for?

While it is accepted that governments must seek to maintain a sustainable debt to GDP level in the long-term, there is no consensus on the maximum debt level an economy can tolerate. Obviously, governments couldn't increase debt levels without limit: as a share of GDP, tax revenues have some maximum level and spending has some minimum level. At those levels, the natural fiscal limit is reached and the economy cannot support a value of debt higher than that limit (Bi, 2009). By pushing more debt into the future, economy is brought closer to the fiscal limit and fiscal flexibility will be more limited. This constitutes a greater risk as populations are aging worldwide, and fiscal flexibility will be needed in the future to address the issue of age-related spending needs.

Debt *per se* is not an undesirable burden as long as it is sustainable, given that it provides a tax-smoothing opportunity. Barro (1979) assert that under the cyclical economic situation, taxes could contribute to smooth over time and government debt could be the shock absorber because tax rates will not change flexibly. Kirsanova and Wren-Lewis (2007) also argue that debt is a better shock absorber than tax rates, therefore debt should be used to smooth fluctuations in government income. Given that in some Southeast Asian countries the volatility of government income is particularly high owing to a reliance on oil- and natural resource related revenue (in Indonesia and Malaysia, in particular), debt play an role in smoothing fluctuations in government revenue. In addition, a framework to bring down sharply increased deficits and control public debts resulting from commodity price changes is even more important.

Fiscal councils could complement fiscal rules

In contrast to monetary policy, which normally has narrowly defined targets (price stability and growth, at times supplemented by other objectives, such as reducing the risk of financial crisis), fiscal policy has more numerous objectives that can differ by country. Hence, meeting all the objectives for fiscal policy would require a complex set of rules that may be difficult to implement. Owing to design and implementation issues, an independent fiscal authority could be useful to provide flexibility to the formal rules, which are by nature more rigid.

ASEAN countries are in particular need of such flexibility, given the large volatility of the tax base in some of them, which implies a need for discretion in the implementation of fiscal rules. Such discretion could be provided by an independent institution given that the government is always susceptible to deficit bias. Independent fiscal institutions are relatively new even in OECD countries, some of which are using the post-crisis period to bring public finances back onto a sustainable path by establishing such institutions. Independent fiscal institutions are often entrusted with providing macroeconomic forecasts that in some countries have to be used for budget preparation. Another typical task includes the evaluation of government policy proposals and their economic impact. Fiscal councils can be a powerful force for transparency in cases where the government faces political pressures to misrepresent the effects of its policies in its budget proposals.

Southeast Asian countries have not established independent budgetary institutions yet, although the President of Singapore performs such a role. For any government to use past reserves for spending, the approval of the President is needed and in this sense

the President enforces the constitutional fiscal rules (Blondal, 2006). The President, however, does not make the decisions on this crucial point by himself, but must consult the Council of Presidential Advisors. In other Southeast Asian countries, an independent view on fiscal policy and the government's adherence to rules would be useful as well.

An appropriate medium-term framework is critical to achieve targets

Given the important role expectations play in the behaviour of the public, an effective framework for establishing credibility with investors and the public is needed. The government could help to achieve such credibility by anchoring policy actions in a medium-term framework that ideally would include targets at least for revenues, expenditures, deficits and debts in the medium term. The framework should also incorporate responses and outcomes under different scenarios ('stress tests'). The design of such frameworks should be country specific. For example, when the public debt to GDP ratio is initially above the government's long-term target, the framework should specify a specific path for primary budget surpluses needed to bring the debt ratio back down.

In several countries some form of medium-term expenditure framework is in place. Malaysia, for instance, publishes budgetary targets for medium-term development plans by main revenue and spending categories. In the Philippines, medium-term frameworks have became operational in 2006 (Blondal, 2010). The framework has a three year horizon comprising the current budget year and the following two years. Indonesia is also introducing a medium-term framework. For such frameworks to be useful, it is important to update them regularly, to formulate them in a manner consistent with the way the budget is compiled and to place the responsibility of adhering to the framework with the institutions and officials that are responsible for formulating the budget.

Well-designed fiscal rules, a fiscal council that publishes objective reports on government policies and provides recommendations, and a medium-term budgetary framework with achievable objectives can considerably improve the prospects for long-term fiscal soundness. However formal rules and institutions alone are no absolute guarantee for fiscal discipline. It is government commitment that reinforces the power of this set of tools. If the government does not incur any social cost for breaching the

fiscal rules, ignoring the reports of the fiscal council or not observing medium-term objectives, even the best set of institutions may prove ineffective.

Conclusions

The Asian countries have been able to recover remarkably well from the shock created by the global financial crisis. Their recoveries have gained considerable momentum over the past year and have become increasingly driven by domestic rather than external demand. Sound macroeconomic policies sustained in the run-up to the global financial crisis allowed Asian countries to use counter-cyclical monetary and fiscal policies to a much greater extent than in past regional cycles. The rapid and effective implementation of these policies was instrumental in limiting the economic downturns and initiating the rapid recoveries.

The key near-term challenge is to exit from the counter-cyclical policies, beginning with monetary policy while inflationary and financial pressures are increasing. Greater flexibility in exchange rates is required to deal with rising capital inflows into the region. The success of regional exit policies would be further enhanced by greater regional consultation and co-operation on macroeconomic and financial policies. While regional co-operation may take different forms, OECD's peer review mechanism presents a flexible instrument which may be suitable for policy dialogue and capacity building in Southeast Asia.

The crisis has also underscored the need for rebalancing growth in the region toward less dependence on exports and greater dependence on domestic demand. Sustaining rapid but more balanced real growth poses major challenges for fiscal policies in the region. Fiscal deficits need to be brought down at a pace that allows the recovery to continue but which is rapid enough to ensure that public debt levels in relation to GDP remain sustainable. The challenge is all the greater given the substantial need for infrastructure investment in coming years to foster the region's further economic integration, to meet internal development objectives, and to sustain the international competitiveness of ASEAN countries.

Improvements in the fiscal frameworks used by governments in the region will be important to achieving these goals while sustaining fiscal soundness. Credible medium-

term fiscal targets and specification of the means to achieve them are fundamental to such frameworks. Well-designed fiscal rules and independent fiscal institutions can further enhance the effectiveness of the frameworks by reducing the risk that unanticipated developments will prevent fiscal targets from being achieved and by encouraging governments to adhere to their commitments and to provide accurate and transparent information on their policies. A number of Asian countries have taken steps to improve their fiscal frameworks in recent years but further efforts will be needed.

Appendix: List of variables of the ABCIs

The ABCIs use components listed below:

A. Composite Coincident indicators

ASEAN countries

Indonesia

1) Manufacturing production index (Volume)
2) Cargo unloaded at 4 main ports (Ton)
3) Exports (Total) (Value)
4) Retail sales index of household appliances (Value)
5) Electricity consumption (Total) (KWH)

Malaysia

1) Industrial production index (Volume)
2) Electricity consumption (Total) (Kwh)
3) Number of new registrants as unemployed
4) Exports (Total) (Value)
5) Price of standard Malaysia rubber

The Philippines

1) Gross value added: Industry (Philippine Peso)
2) Gross value added: Services (Philippine Peso)
3) Diffusion index: Average capacity utilization (%)
4) Exports (Total) (Value)
5) Manufacturing sales (Total)

Singapore

1) Industrial production index (Total, excluding Rubber processing) (Volume)
2) Retail sales (Total) (Value)
3) Construction contracts awarded: Private (Singapore dollar)
4) Singapore airlines: Cargo carried (Kg)
5) Number of air passenger departures
6) Number of petitions for bankruptcy

Thailand

1) Manufacturing production index (Volume)
2) Capacity utilization rate (%)
3) Newly registered capital investment of business registered at Ministry of Commerce (Thai Baht)
4) Manufacturing production index: Electronic products
5) Number of registered applicants as unemployed
6) Imports (Total) (Value)
7) Retail sales index

Other emerging Asia

China and India

China

1) Industrial production index (Total) (Volume)
2) 500 Industrial Enterprises: Diffusion index: Fixed asset investment (%)
3) Gross sales output (Value)
4) Number of Employee: Manufacturing
5) Imports (Total) (Value)
6) Production of electricity (Total) (KWH)
7) Government revenue: Taxes

India

1) Industrial production index (Total) (Volume)
2) Industrial production index: Food (Volume)
3) Industrial production index: Manufacturing: Production of cotton textiles (Volume)
4) Passenger traffic: Domestic (Person)
5) Cargo handled: Domestic (Ton)

B. Composite Leading Indicators

ASEAN countries

Indonesia

1) Consumer Survey Index: Consumer confidence Index
2) Bank of Indonesia Policy Rate (1 month) (%)
3) Jakarta Stock Exchange: Composite equity market index
4) Producer Price Index/Wholesale Price Index
5) Exchange rate of Indonesian Rupee against US dollar
6) Industrial Production Index: Manufacturing: Paper and Paper Products (Volume)
7) Visitors arrivals through eleven main gates

Malaysia

1) Consumer price index (% change)
2) Money supply (M1)
3) FTSE Bursa Malaysia: Composite equity market index
4) Cargo discharged (Metric Ton)
5) Industrial production index: Manufacturing: Electrical valves, tubes and other electronic components (Volume)

The Philippines

1) Business Expectation Survey: Business volume index for current quarter
2) Business Expectation Survey: Credit access index for current quarter
3) Consumer price index
4) Discount rate (%)
5) Philippine Stock Exchange: Composite equity market index
6) Exchange rate of Philippine Peso against US dollar
7) Production index of basic metals (Volume)
8) Motor vehicle sales (Total) (Unit)

Singapore

1) Non-oil domestic exports (Value)
2) Number of companies newly registered
3) Residential property transaction (Singapore dollar)
4) Singapore Exchange Strait Times: Composite equity market index
5) Consumer price index
6) Industrial Production Index: Electronic products and components (Volume)

Thailand

1) Prime Rate: Minimum Loan Rate (%)
2) Bangkok Port: Container
3) Stock Exchange of Thailand: Composite SET index
4) Motor vehicle sales: Commercial vehicles (unit)
5) Business expectation index (%)
6) Domestic cement sales (Ton)

China and India

China

1) 5000 Industrial Enterprises: Diffusion index: Overseas order level (%)
2) Monetary aggregate (M2)
3) Shanghai Stock Exchange: Turnover value
4) Industrial production of manufactured crude steel (Ton)
5) Industrial production of chemical fertilizer (Ton)

6) Production of motor vehicles (Unit)
7) Production of buildings: floor space of completed buildings (Square meter)

India

1) Motor vehicle sales: Passenger cars (Unit)
2) Call money rate: Major commercial Bank: Lending (%)
3) Monetary aggregate (M1)
4) Bombay Stock Exchange: Composite stock price index (Dollex-200)
5) Industrial Production Index: Manufacturing: Production of non-metallic mineral products (Volume)
6) Industrial production index: Production of consumer goods: Durables (Volume)

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CHAPTER 2

RECENT DEVELOPMENTS IN ASIAN ECONOMIC INTEGRATION: MEASURING INDICATORS OF TRADE INTEGRATION AND FRAGMENTATION

KENSUKE TANAKA
Organization for Economic Cooperation and Development (OECD), Paris, France.

BO MENG
Directorate for Science, Technology and Industry, OECD and IDE-JETRO,

NORIHIKO YAMANO
Directorate for Science, Technology and Industry, Organization for Economic Cooperation and Development (OECD), Paris, France.

Abstract

This paper analyses the contribution to and engagement in global supply chains of Asian emerging and developing economies by measuring several globalisation indicators based on the harmonised input-output and bilateral trade databases developed by the OECD. It focuses on major structural changes in the Asian trade network from the perspective of integration and fragmentation in global supply chains. It shows that greater fragmentation and higher dependence on supplies of intermediate goods and services from neighbouring counties have gone hand in hand and led to deepening economic integration in ASEAN and East Asia. The empirical results presented in this paper have important implications for strategies for regional economic integration in the Asia-Pacific region. In particular, ASEAN countries need to consider the strategy for deeper integration from the perspective of the whole East Asian region and not just ASEAN per se.

1. Introduction

Many Asian emerging and developing economies have shown remarkable dynamism and resilience to the global financial crisis. In particular, the region's most export-oriented economies, such as Hong Kong China, Korea, Malaysia, Singapore and Thailand, have displayed V-shape recoveries in 2010. These and other outward-oriented economies in the region have benefited considerably from China's early rebound due to their trade linkages.[1] As part of their strategic response to the need for rebalancing growth in 2011 and beyond, they are seeking to deepen regional economic integration and unleash the growth potential within the region.[2] In this paper we apply several indicators of trade integration and fragmentation to review recent developments in Asian economic integration and discuss policy implications.[3] Our goal is to analyse major transformations in Asia's trade and production networks since the mid-1990s by applying several globalisation indicators based on OECD's input-output and bilateral trade databases.

A key message arising from this paper is that the progress of Asian economic integration should be measured not only by standard trade integration indicators but also by applying input-output techniques to take into account the recent development of the region's inter-country production networks. This point can be well illustrated by Figure 1. Despite the tariff reductions and other market-opening measures that have taken place in the Asia-Pacific region, there have been only marginal increases over the past decade in the share of intra-regional trade relative to total merchandise trade for ASEAN 10 countries as a group. This share rose from 18% in 1990 to 24 % in 2000, but afterwards it remained almost unchanged until 2005. Then the share inched up to 26 % in 2009. Even if we look at ASEAN+3 or ASEAN+6 as a group and recalculate the intra- versus inter-regional trade shares for the same years, we observe a similar trend,

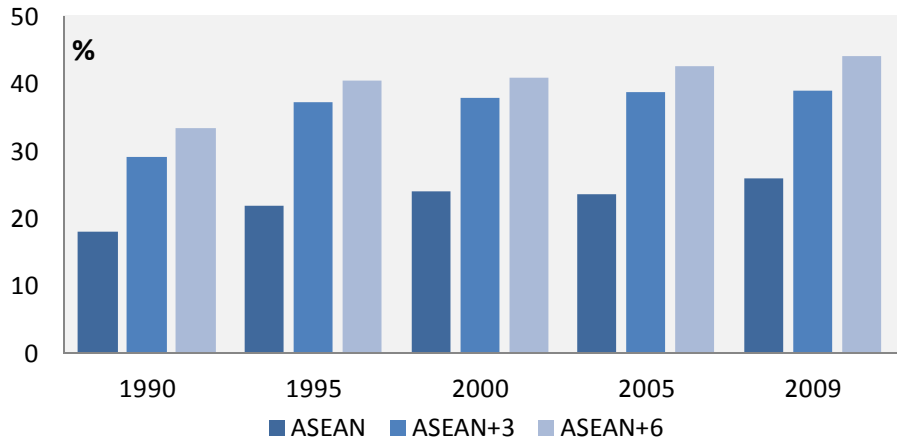
1 See ADB (2010) and OECD Development Centre (2010b, Chapters 1-2) for further details.

2 See, for example, Plummer and Chia *eds*. (2009), Fung *et al*. (2010) and OECD Development Centre (2010b, Chapter 3) for detailed discussions on regional economic integration in ASEAN and East Asia.

3 See ADB (2008) and Capanneli *et al*. (2009) for efforts to measure the progress of Asian economic integration in a broader economic context.

though the size of intra-regional trade becomes larger for ASEAN+3 (39 % in 2009) and ASEAN+6 (44 % in 2009) relative to that of ASEAN alone.[4]

Figure 1. Share of intra-regional trade as percentage of total merchandise trade



Source: OECD Development Centre (2010b)

The relative stability of intra-regional trade shares over the past decade may well be construed as an indication of Asia's overall trade growth based on outward (rather than inward) orientation. This example, however, reveals that merely monitoring intra- versus inter-regional trade shares would not tell us much about the regional integration landscape in Asia. Indeed the relative stability of intra-regional trade shares masks significant structural transformations taking place in the region's inter-country production networks. A thorough assessment of the current state of regional economic integration is thus a prerequisite for any well-crafted policy action for facilitating further integration and alleviating possible bottlenecks in the region.

In what follows, we first review major structural changes in the Asian trade network that have occurred since the mid-1990s and then discuss the region's progress towards deeper economic integration by applying the standard measure of intra-industry trade.

4 "ASEAN+3" means the ASEAN 10 countries (Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam) plus China, Japan and Republic of Korea, while "ASEAN+6" refers to ASEAN+3 plus Australia, India and New Zealand.

Second, we present several indicators of trade fragmentation using OECD input-output tables and bilateral trade databases to shed light on the linkages between trade fragmentation and regional integration. Finally, we conclude by discussing some policy implications.

2. Structural changes in the Asian trade network

2.1. Evolutions of trade hubs

The Asian trade network has undergone a significant transformation since the mid-1990s. An important indication of this is revealed as major changes in export shares between 1995 and 2006 in the leading industries in the Asia-Pacific region (Table 1). The significance of this transformation becomes clear when it is contrasted with the composition of sector shares of world merchandise exports which remained largely stable during the period at the 2 digit level of ISIC (International Standard Industry Classification).[5]

Furthermore, looking more closely at the composition of the leading export sectors, the extent of differentiation and specialisation in the manufacturing sector is very high in the broad category of machinery and equipment, and in particular, office, accounting and computing machinery in China, Malaysia and the Philippines, radio, television and communication equipment in China, Chinese Taipei, Korea, the Philippines, Singapore and Thailand, and motor vehicles in Japan. The similar pattern is also observed for petrochemical products in India and Singapore. On the other hand, many Asian countries (except for Viet Nam) have significantly reduced export shares in the labour-intensive products, such as textiles, leather and footwear.[6]

Another major indication of the rapidly-evolving Asian trade network is the rise of China as the dominant supplier to both regional and global markets. In Table 2 we counted the number of partner countries in which individual supplier country accounts

[5]This study has consistently used the *import* statistics of the OECD bilateral trade database to deal with the statistical shortcomings arising from re-exports and unclassified export items (see Guo *et al*. 2009). For availability of OECD input-output tables and bilateral trade databases, see Annex Table A, while the ISIC sector classification is given in Annex Table B.

[6] It should also be noted that the share of mining products remain dominant in Australia and to a lesser extent in Indonesia, and so does the share of food products in New Zealand.

for more than 15% of total merchandise imports. For instance, the number of partner countries in which China's exports exceed 15% of the partner's total merchandise imports in office, accounting and computing machinery jumped from 1 in 1995 to 11 in 2006 within the Asia-Pacific region and even to 34 if it is counted globally. Although using a different threshold alters the total number of partner countries listed in Table 2,[7] the broad picture arising from this simple exercise remains intact: China has come to the fore as Asia's dominant supplier in wide-raging manufacturing industries for both the Asia-Pacific region and the rest of the world.

Table 1. Leading Export Sectors in the Asia Pacific Region (1995 and 2006, percentage of total exports)

	ISIC Rev.3	Sector	1995	2006
Australia				
	10-14	Mining and Quarrying	28%	43%
	15-16	Food products, Beverages and Tobacco	15%	12%
	27	Basic Metals	22%	18%
China				
	17-19	Textiles, Textile Products, Leather and Footwear	34%	17%
	30	Office, Accounting and Computing Machinery	4%	15%
	32	Radio, Television and Communication Equipment	9%	19%
	36-37	Manufacturing n.e.c; Recycling	12%	9%
Chinese Taipei				
	17-19	Textiles, Textile Products, Leather and Footwear	13%	4%
	24	Chemicals and Chemical Products	9%	11%
	30	Office, Accounting and Computing Machinery	16%	8%
	32	Radio, Television and Communication Equipment	15%	37%
India				
	17-19	Textiles, Textile Products, Leather and Footwear	35%	21%
	23	Coke, Refined Petroleum Products and Nuclear Fuel	2%	9%
	24	Chemicals and Chemical Products	7%	12%
	36-37	Manufacturing n.e.c; Recycling	20%	15%
Indonesia				
	10-14	Mining and Quarrying	26%	27%
	15-16	Food products, Beverages and Tobacco	7%	7%
	17-19	Textiles, Textile Products, Leather and Footwear	18%	10%
	20	Wood and Products of Wood and Cork	13%	3%
Japan				
	24	Chemicals and Chemical Products	9%	10%
	29	Machinery and Equipment, n.e.c	16%	16%
	32	Radio, Television and Communication Equipment	19%	15%
	34	Motor Vehicles, Trailers and Semi-Trailers	17%	19%
Korea				
	17-19	Textiles, Textile Products, Leather and Footwear	16%	3%
	24	Chemicals and Chemical Products	9%	10%
	32	Radio, Television and Communication Equipment	27%	31%
	34	Motor Vehicles, Trailers and Semi-Trailers	6%	10%
Malaysia				
	10-14	Mining and Quarrying	5%	8%
	30	Office, Accounting and Computing Machinery	12%	19%
	32	Radio, Television and Communication Equipment	38%	36%

	ISIC Rev.3	Sector	1995	2006
New Zealand				
	01-05	Agriculture, Hunting, Forestry and Fishing	15%	12%
	10-14	Mining and Quarrying	2%	3%
	15-16	Food products, Beverages and Tobacco	38%	44%
Philippines				
	15-16	Food products, Beverages and Tobacco	10%	3%
	17-19	Textiles, Textile Products, Leather and Footwear	15%	5%
	30	Office, Accounting and Computing Machinery	10%	15%
	32	Radio, Television and Communication Equipment	30%	49%
Singapore				
	23	Coke, Refined Petroleum Products and Nuclear Fuel	11%	19%
	24	Chemicals and Chemical Products	6%	17%
	30	Office, Accounting and Computing Machinery	32%	15%
	32	Radio, Television and Communication Equipment	26%	26%
Thailand				
	15-16	Food products, Beverages and Tobacco	17%	9%
	17-19	Textiles, Textile Products, Leather and Footwear	12%	6%
	30	Office, Accounting and Computing Machinery	16%	14%
	32	Radio, Television and Communication Equipment	14%	17%
Vietnam				
	01-05	Agriculture, Hunting, Forestry and Fishing	19%	7%
	10-14	Mining and Quarrying	21%	23%
	15-16	Food products, Beverages and Tobacco	17%	10%
	17-19	Textiles, Textile Products, Leather and Footwear	32%	31%
World				
	01-05	Agriculture, Hunting, Forestry and Fishing	4%	2%
	10-14	Mining and Quarrying	6%	11%
	15-16	Food products, Beverages and Tobacco	6%	5%
	17-19	Textiles, Textile Products, Leather and Footwear	8%	6%
	23-26	Chemical, Rubber, Plastics, Fuel, and Other non-mineral	16%	18%
	27-28	Basic Metals and Fabricated Metal Products	6%	6%
	29	Machinery and Equipment, n.e.c	9%	8%
	30	Office, Accounting and Computing Machinery	5%	5%
	31	Electrical Machinery	4%	4%
	32	Radio, Television and Communication Equipment	8%	10%
	33	Medical, Precision and Optical Instruments	3%	3%
	34-35	Transport equipment	12%	11%
	20-22,36-37	Other Manufacturing	7%	6%

Notes: Export shares were calculated from import-based bilateral trade statistics.
Source: OECD Bilateral Trade Database, March 2010.

[7] The number of partner countries in which China's exports of office, accounting and computing machinery exceed 20% of the partner's total merchandise imports increased from 1 in 1995 to 31 in 2006.

Table 2. Dominant Suppliers and Sectors in the Asia-Pacific Region (Number of partners in which the country listed accounts for more than 15% of total goods imports)

Country	ISIC Rev.3	Sector	1995		2006	
			Asia-Pacific	TOTAL	Asia-Pacific	TOTAL
China	17-19	Textiles, Leather and Footwear	7	11	12	35
	30	Office, accounting & computing machinery	1	1	11	34
	32	Radio, Television and Communication Equipment	1	1	8	26
	36-37	Other Manufacturing	3	8	9	34
Japan	29	Machinery and Equipment, n.e.c	9	10	9	10
	30	Office, Accounting and Computing Machinery	8	11	1	1
	32	Radio, Television and Communication Equipment	10	13	3	4
	34	Motor Vehicles	11	16	11	18
Korea	17-19	Textiles, Leather and Footwear	2	2	1	1
	32	Radio, Television and Communication Equipment	1	2	2	5
United States	01-05	Agriculture, Forestry and Fishing	10	17	8	13
	24	Chemicals and Chemical Products	9	15	4	10
	29	Machinery and Equipment, n.e.c	6	14	7	13
	33	Medical, Precision and Optical Instruments	11	28	11	32
	35	Other Transport Equipments	9	29	9	32

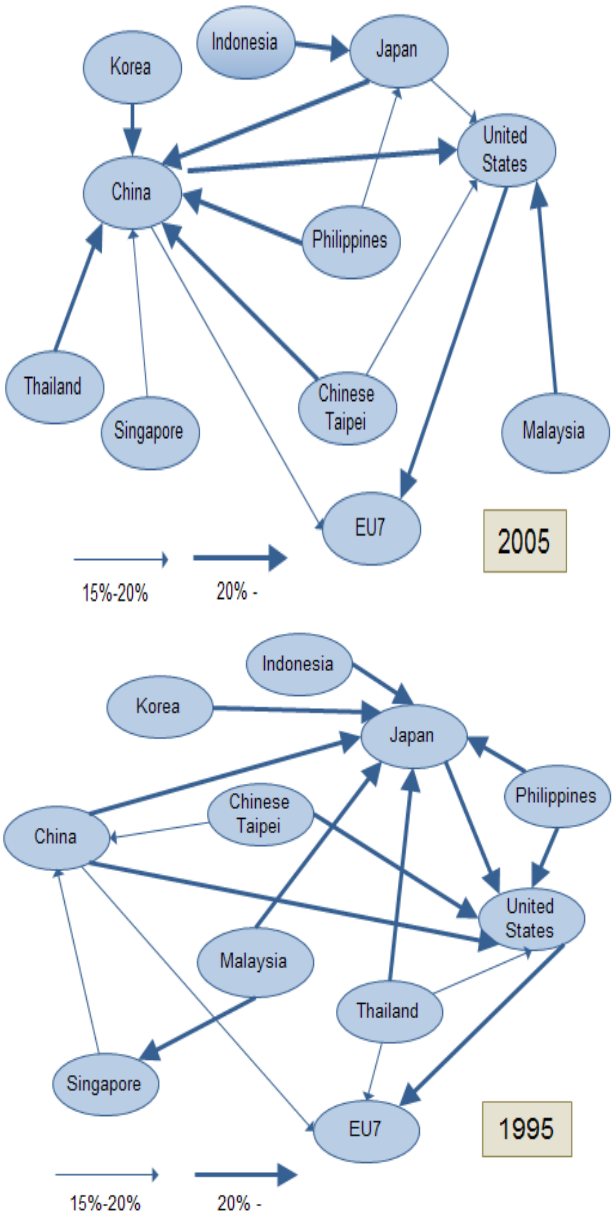
Note: The maximum number of partner countries is 12 for the Asia-Pacific and 46 for total.
Source: OECD Bilateral Trade Database, March 2010.

Similarly, the major transformation of the Asian trade network can be further highlighted by counting the "dominant links" of trade flows in intermediate goods and services. If a country's intermediate exports (in both goods and services) to a particular partner country exceed a given threshold percentage of that country's total intermediate imports (15% or 20% in our exercise), we consider such trade node as a dominant link (Figure 2).

Examining the bilateral intermediate trade data for 46 countries across the world, China, Japan, United States and some European countries (such as Germany and France) are clearly identified as the world's leading destination centres of intermediate goods and services. In general, larger industrialised economies are expected to be identified as dominant trade partners for smaller ones in respective regions, as differentiation and specialisation take place around these larger economies. Figure 2 illustrates major production networks from the Asian perspective. It is clear from this illustration that the emergence of China has significantly transformed the pattern of global production networks over the past decade. Behind this transformation, there was an increased export share of machinery and equipment, which requires a wide variety of goods and services as intermediate inputs.

In order to cast more light on the relative importance of production networks in Asia as opposed to North America and Europe, we calculated the inter- and intra-regional shares of intermediate trade in goods and services between 1995 and 2005. Table 3 presents the results of this work. During the decade concerned, the share of *intra*-Asian (including both ASEAN and East Asia) trade in goods and services increased, while the shares of *intra*-regional flows within North America and Europe fell. This reflects a growing importance of Asia's supply chains in the world economy as captured by intermediate trade in goods and services. In 2005 the amount of intra-Asian intermediate trade is estimated at about 15.1 % of world intermediate trade, compared with 7.5 % in North America and 28.4 % in Europe. However, intra-ASEAN trade in intermediate goods and services stayed almost unchanged at 1.2 %.

Figure 2. Major Trade Partners for Asia's Intermediate Exports in Goods and Services



Notes: EU7 is Belgium, Germany, France, Italy, Netherlands, Spain and United Kingdom. Each arrow indicates that a partner's share of a country's total exports is greater than 15%.

Source: OECD Input-Output Database, March 2010; IDE-JETRO Asian International Input-Output Database 2006; OECD Bilateral Trade Database, March 2010; OECD Trade in Services, January 2010.

Table 3. Inter- and Intra-regional Intermediate Trade in Goods and Services, 1995 and 2005 (% shares of total intermediate trade, exports and imports

		Destination						
		Asia-Pacific				NAFTA	Europe	RoW
Origin		ASEAN	East Asia	Other Asia Pacific	Total			
ASEAN	1995	1.1%	1.9%	0.2%	3.2%	0.8%	0.8%	0.1%
	2005	1.2%	2.6%	0.3%	4.1%	0.9%	0.7%	0.2%
East ASIA	1995	2.6%	4.5%	0.4%	7.5%	3.6%	2.5%	0.4%
	2005	2.1%	6.8%	0.4%	9.3%	4.4%	2.9%	0.5%
Other Asia	1995	0.4%	1.0%	0.2%	1.6%	0.2%	0.4%	0.1%
Pacific	2005	0.3%	1.2%	0.1%	1.6%	0.3%	0.4%	0.1%
Total Asia	1995	4.0%	7.5%	0.7%	12.2%	4.7%	3.7%	0.5%
	2005	3.6%	10.5%	0.9%	15.1%	5.6%	4.1%	0.8%
NAFTA	1995	1.0%	4.2%	0.4%	5.7%	9.1%	4.9%	1.0%
	2005	0.7%	2.7%	0.3%	3.7%	7.5%	3.6%	0.5%
Europe	1995	1.2%	2.5%	0.6%	4.3%	3.6%	30.0%	1.9%
	2005	1.0%	2.5%	0.5%	4.0%	3.7%	28.4%	1.7%
RoW	1995	0.8%	3.7%	0.5%	4.9%	2.4%	9.7%	1.4%
	2005	0.9%	5.3%	0.8%	6.9%	4.3%	8.8%	1.4%

Notes: Intermediate bilateral trade flows are estimated using the framework of multi-regional input-output model (see Box2). ASEAN refers to Indonesia, Malaysia, the Philippines, Singapore and Thailand; East Asia includes China, Chinese Taipei, Japan, and Korea; Other Asia Pacific includes Australia, India and New Zealand; NAFTA is Canada, Mexico and United States; and Europe includes 22 EU countries plus Norway and Switzerland.

Source: OECD Input-Output Database March 2010; IDE-JETRO Asian International Input-Output Database 2006; OECD Bilateral Trade Database March 2010; OECD Trade in Services January 2010.

2.2. Integration of ASEAN priority sectors

In this sub-section, we take a closer look at the extent of trade integration in nine ASEAN priority goods sectors.[8] These priority sectors have been identified as an important vehicle for advancing the Blueprint for the ASEAN Economic Community. The total annual export and import value of these nine sectors in the 6 ASEAN countries (Indonesia, Malaysia, the Philippines, Singapore, Thailand and Viet Nam) averaged USD 464 billion and USD 318 billion, respectively, during the period of 2006-2008 (Table 4). These sectors, taken together, accounted for 55 and 42 per cent of total merchandise exports and imports, respectively. As a matter of comparison, Table 4 also shows the relative export and import shares of these nine priority sectors for China and

[8]Nine ASEAN priority goods sectors are (1) agro-based products; (2) automotives; (3) ICT equipment (e-ASEAN); (4) electronics; (5) fisheries; (6) health care products; (7) rubber-based products; (8) textiles and apparel; and (9) wood-based products. In addition, ASEAN priority sectors include five priority services sectors, such as ICT services (e-ASEAN), health care services, air travel, tourism and logistics. See De Dios (2007), Oktaviani *et al.* (2007), Wattanapruttipaisan (2008) and OECD Development Centre (2010b, Chapter 3) for further details.

India. They are found to be at least as important to China as to ASEAN and much less important to India.

To what extent ASEAN economies are competing with China and India in the global market? Comparison of the export structures of ASEAN and other East Asian economies shows that most of the keenest export competition involves a cluster of economies with similar per capita incomes[9]. In East Asia, five ASEAN economies (Indonesia, Malaysia, the Philippines, Thailand and Viet Nam) display a high degree of export similarity with China.[10] Empirical evidence also suggests that, contrary to the case of China, the export specialisation similarities between ASEAN countries and India are at best modest.[11]

Furthermore, Table 4 highlights that trade in the nine priority sectors is indeed dominated by two sectors, electronics and ICT equipment, in both ASEAN and China; these two sectors taken together accounted for nearly a third of total merchandise exports in both cases[12]. Looking more closely, ASEAN countries tend to specialise in exports of parts and components to global supply chains for electronic products, while China's export specialisation lies in the downstream segments as assemblers of final products, including ICT equipment.[13] On the other hand, India's export specialisation among the nine priority sectors is quite different from that of ASEAN and China. In India, automotive products are predominant in the country's net exports. The export shares of ICT equipment and electronics are much smaller in India than in ASEAN and China.

[9] See Petri (2009, Table 6-1) for further details.

[10] The correlation of export shares with those of China exceeds 30% for all five ASEAN countries (see Petri ibid).

[11] Among ASEAN economies, only Cambodia shows a higher degree of export similarity with India (see Petri *ibid*.).

[12] This number reached 45% when ASEAN economies enjoyed a high-tech boom a decade ago.

[13] This observation is also consistent with the input-output analysis of Asian trade networks presented in the following section.

Table 4. Trade in 9 Priority Goods Sectors: ASEAN, China and India (US$ million and percentage; 2006-2008 annual average

ASEAN

		Exports		Imports		Trade
	Nine Priority Goods Sectors[(c)]	Value	Share	Value	Share	Balance
1	Agro-based products	57,575	6.8	35,745	4.7	21,829
2	Automotives	22,451	2.7	19,597	2.5	2,854
3	ICT equipment (E-ASEAN)	86,781	10.3	41,855	5.4	44,926
4	Electronics	184,648	21.8	165,145	21.5	19,503
5	Fisheries	13,051	1.5	3,644	0.5	9,407
6	Healthcare products	15,527	1.8	15,885	2.1	-358
7	Rubber-based products	22,364	2.6	6,086	0.8	16,278
8	Textiles and apparel	35,741	4.2	18,450	2.4	17,291
9	Wood-based product	26,254	3.1	12,196	1.6	14,058
	Total of 9 PGS	464,392	54.9	318,605	41.5	145,788
	Total	845,506	100.0	768,535	100.0	76,971

China

		Exports		Imports		Trade
	Nine Priority Goods Sectors[(c)]	Value	Share	Value	Share	Balance
1	Agro-based products	25,091	2.1	33,987	3.5	-8,896
2	Automotives	37,899	3.1	21,951	2.3	15,947
3	ICT equipment (E-ASEAN)	208,341	17.3	66,713	6.9	141,628
4	Electronics	174,840	14.5	191,876	20.0	-17,036
5	Fisheries	9,423	0.8	3,438	0.4	5,984
6	Healthcare products	15,776	1.3	12,483	1.3	3,293
7	Rubber-based products	9,380	0.8	9,937	1.0	-557
8	Textiles and apparel	168,967	14.0	26,023	2.7	142,945
9	Wood-based product	42,359	3.5	22,144	2.3	20,215
	Total of 9 PGS	692,075	57.4	388,552	40.5	303,524
	Total	1,206,563	100.0	960,046	100.0	246,517

India

		Exports		Imports		Trade
	Nine Priority Goods Sectors[(c)]	Value	Share	Value	Share	Balance
1	Agro-based products	8,183	2.3	22,174	5.7	-13,991
2	Automotives	59,094	16.9	6,365	1.6	52,730
3	ICT equipment (E-ASEAN)	17,306	5.0	17,031	4.4	275
4	Electronics	27,379	7.8	23,255	6.0	4,124
5	Fisheries	1,683	0.5	4,694	1.2	-3,011
6	Healthcare products	8,973	2.6	9,249	2.4	-276
7	Rubber-based products	4,697	1.3	2,517	0.7	2,179
8	Textiles and apparel	16,780	4.8	13,126	3.4	3,654
9	Wood-based product	2,416	0.7	9,209	2.4	-6,793
	Total of 9 PGS	146,512	41.9	107,620	27.8	38,892
	Total	349,504	100.0	386,464	100.0	-36,960

Notes: (a) Except for Viet Nam in which trade data refer to 2006-2007;
(b) ASEAN figures refer to Indonesia, Malaysia, the Philippines, Singapore, Thailand and Viet Nam.
(c) See Annex I for product definitions.

Source: OECD Development Centre calculation based on the UN Comtrade database

In order to shed more light on the extent of trade integration, we calculate the Grubel-Lloyd (GL) index of intra-industry trade (Grubel and Lloyd, 1975). The GL index measures the degree to which the trade of an individual country in a given product comprises both exports and imports. The level of such two-way trade is regarded as an indicator of a country's economic integration with the global economy.[14] The GL index is 100 if all trade in the category is intra-industry; a value of zero indicates all trade is in one direction (only exports or only imports) so that there is no intra-industry trade.[15]

The phenomenon of intra-industry trade (IIT) is conventionally seen as the two-way trade in manufactured products between similar countries in terms of income levels and relative factor endowment. Evidence, however, suggests the prevalence of IIT in the North-South context.[16] A study by the OECD Development Centre (2010a) also argues that there are expanding opportunities for South-South trade. One source of such trade expansion stems from an increasing number of regional trade arrangements within the South that often leads to greater trade creation than diversion. For example, South-South trade liberalisation can make intermediate inputs cheaper and thereby stimulate South-South trade and eventually South-to-North exports. As discussed in the previous section, trade fragmentation is also beneficial to South-South trade, some of which takes the form of IIT (Box 1).

The GL indices of IIT are presented in Figure 3. Panel A compares the overall level of IIT in the nine priority sectors of six ASEAN and other selected Asian economies. As a matter of comparison, the United States and European Union (25) are also added to this panel. Furthermore, Panels B and C present the sectoral level of IIT with respect to the top four priority sectors in terms of export value: electronics and ICT equipment (E-ASEAN) for Panel B and agro-based products and textiles and apparel for Panel C.

[14] See Austria (2004) and Oktaviani *et.al.* (2007) for the use of IIT in a regional context. See also Ecochard *et al.* (2006) for the relationship between intra-industry trade and economic integration.

[15] The Grubel-Lloyd index for a product i of a given country (GLi) is derived from the formula: GLi/100 = 1 – Abs{Xi - Mi}/(Xi + Mi) where Xi and Mi are exports and imports of product i, respectively, and Abs{Xi – Mi} is the absolute value of their difference. The index is 100 when exports and imports of the product are equal and zero when either exports or imports are zero (so that trade is entirely one-way).

[16] See OECD Development Centre (2010b, Chapter 3) for further details.

On average, the six ASEAN countries are integrated with the global economy as closely as other Asia-Pacific countries, though IIT in some countries is much higher than in others. Singapore's IIT was highest at 70 in the panel; the city state is the hub of Southeast Asia as an entrepôt economy, and much of its trade comprises re-exports.[17] Overall the average IIT index of the six ASEAN economies (46) was 8 points below that of the EU 25 (54) in 2006-2008.

Overall IIT masks large differences across sectors, however. For instance, Malaysia, the Philippines, Singapore and Thailand are highly integrated with global supply chains in electronics, but the situation seems quite diverse among them in the case of ICT equipment (E-ASEAN), as seen in Panel B.[18] This difference between electronics and ICT equipment reflects the industrial characteristic of these economies as suppliers of parts and components to global supply chains in electronic products. Turning to Panel C, much of trade in agro-food is of the inter-industry type for the ASEAN countries (except for Singapore). A similar trend can also be observed for textiles and apparel, which is rather surprising, given the involvement of transnational manufacturing and distribution activities and the fragmentation of production processes from fibres to yarn and fabrics to apparel and other textile products. A low level of intra-industry trade in textiles and apparel may reflect the greater trade barriers facing their producers.

[17] Re-exports accounted for 48% of Singapore's total merchandise exports in 2008 (WTO, 2009).

[18] See, for example, Athukorala and Menon (2010) and Gangnes and Van Asshe (2010) for further discussions on intra-Asian trade in parts and components, especially those in electronics.

Box 1. Fragmentation and Intra-Industry Trade

A basic characteristic of the fragmentation process lies in the distinction between production blocks and service links. A typical case of international fragmentation occurs when production is separated into two or more production blocks that are located in different countries (to take advantage of different factor prices between countries). The blocks must be economically linked by certain types of services that involve communication, transportation and other coordination costs. In other words, total production costs can be decomposed into the production cost *per se* that is subject to constant returns to scale and the service link cost that is treated as a fixed cost over a range of output, thereby introducing increasing returns. As production volumes expand, an initial vertically integrated supply chain may be replaced by an increasingly fragmented one, depending upon whether the total costs with fragmentation become lower than those without fragmentation[1].

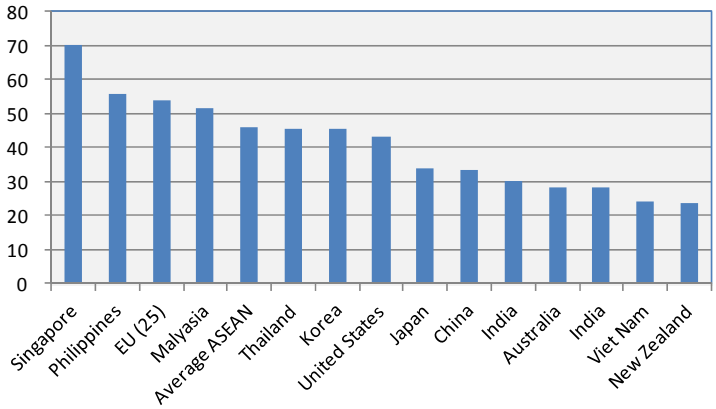
International fragmentation of vertically integrated supply chains is likely to increase intra-industry trade relative to total trade if various segments in the supply chains are classified in the same industrial category. Two major forces have greatly stimulated the process of international fragmentation, resulting in a higher degree of intra-industry trade. The first is liberalisation and deregulation of trade and investment regimes both nationally and regionally. The second is a significant reduction in communication and transportation costs. The spatial dispersion of production across countries usually entails costs of communication, logistics and coordination as well as other trade costs, due to restrictive trade and investment policies and practices. However, advances in telecommunication and transportation technologies and reductions in trade and investment barriers substantially reduce the cost of service links and thus stimulate fragmentation of production processes across national borders[2].

[1] See Kimura and Ando (2005) for a detailed exposition of fragmentation and its application to East Asia.

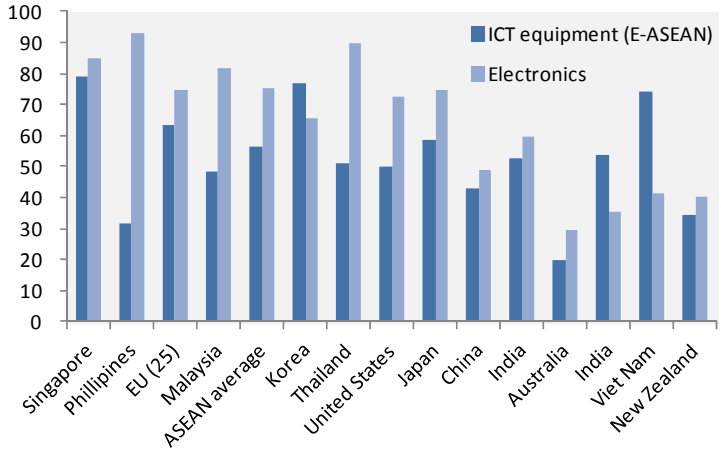
[2] See Jones *et al.* (2002) for further discussion.

Figure 3. Intra-industry Trade (GL) Index, 2006-2008 Average (a)

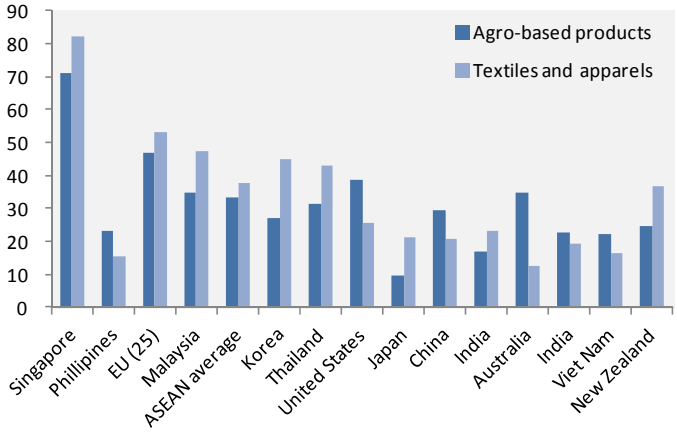
Panel A



Panel B



Panel C



(a) Except for Viet Nam for which the IIT index refers to the 2006-2007 average.

Source: OECD Development Centre calculation based on the UN Comtrade database

3. Fragmentation and Regional integration in Asia

In the previous section our empirical results highlighted Asia's increased dependence on imported intermediate goods and services since the mid-1990s. Our analysis also indicated the extent of trade integration, as measured by the GL index of intra-industry trade, differs significantly across sectors. For instance, both ASEAN and other East Asian economies are highly integrated with global supply chains in electronics, while agro-based products and textiles and apparel show low levels of intra-industry trade compared with those prevailing in the European Union. The linkage between fragmentation and regional integration are further examined in this section by using the harmonised input-output tables for Asian economies. The nature of OECD input-output and bilateral trade databases are briefly described in Box 2, along with the methodological note regarding three indicators of trade fragmentation.

First, we calculate the widely-used Hummels-Ishii-Yi's indicator of vertical specialisation, which measures the import contents of exports (Hummels *et al*. 2001). This indicator captures an important aspect of a country's involvement in global supply chains, by calculating the total amount of imported inputs used for producing a good that is subsequently exported (ICE in Figure 5).

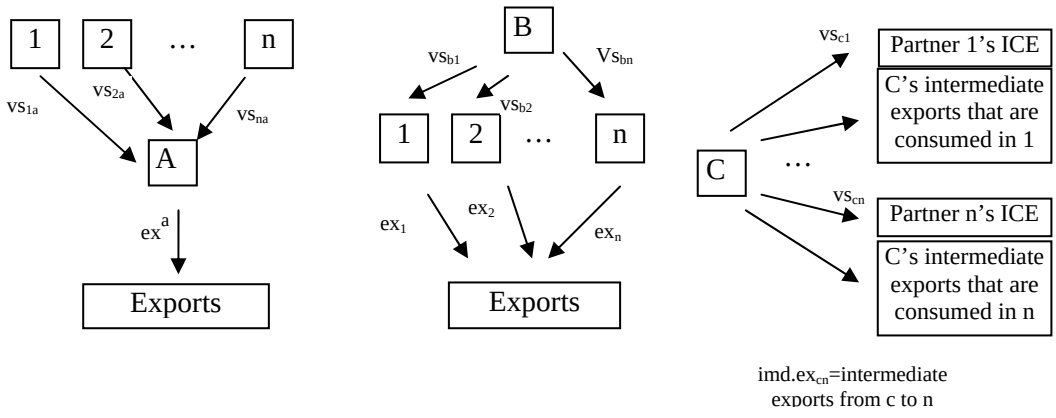
Table 5 reports the measurement results of this indicator (ICE) for (1) total products, (2) higher and lower technology-intensive manufactured products and (3) services with respect to 12 selected Asia-Pacific economies. It shows that the import contents (vertical specialization) shares to the total exports increased between 1995 and 2005 in most of these countries (except for Australia and New Zealand). The significant increases are observed in Chinese Taipei, Malaysia, the Philippines and Thailand and to a lesser extent in China, Japan and Korea. Note, however, that the country order of this indicator may have been affected by the size of economic activities.

Looking at the manufacturing sector, the estimated ICE values for the two different types of products (higher and lower technology-intensive) show that the higher technology-intensive products contained higher import contents of exports in most countries (except for Japan and Singapore). On the other hand, the ICE values for

services sectors are found smaller than the manufacturing sectors in all countries, and significantly so in some countries. This may reflect differences in the extent of trade liberalisation in goods and services and across economies.

Second, the phenomenon of international fragmentation is also captured from an individual supplier's perspective. Here we propose two alternative indicators. One is to measure the share of vertical specialization in a particular country relative to world exports in goods and services (EPE in Figure 4). Another is to measure the share of re-exported intermediate inputs relative to total intermediate exports in goods and services originally supplied by a particular country (REI in Figure 5). The OECD databases for harmonised input-output tables and bilateral trade flows in goods and services enable us to calculate these two indicators (See Box 2 for the measurement details). The measurement results for selected Asia-Pacific economies are presented in Figures 5 and 6 below.

Figure 4. Three Indicators of Trade Fragmentation



Import (from Ps) content share of A's exports (ICE) = $(vs_{1a}+vs_{2a}+\ldots+vs_{na}) / ex_a$ [To country A]	B's exports embodied in partner's exports (EPE) = $(vs_{b1}+vs_{b2}+\ldots+vs_{bn})/(ex_1+ex_2+..+ex_n)$ [From country B]	Re-exported C's intermediate exports (REI) = $(vs_{c1}+vs_{c2}+\ldots+vs_{cn}) / (imd.ex_{c1}+imd.ex_{c2}+\ldots+imd.ex_{cn})$ [From country C]

vs_{AB} is route slice of vertical specialization *i.e.* A's intermediate exports to B that are embodied in B's exports

Table 5. Import Contents Share of Exports by Industry Group (ICE, 1995 and 2005)

	Total		Manufacturing				Services	
			Higher technology manuf.		Lower technology manuf.			
	1995	2005	1995	2005	1995	2005	1995	2005
Australia	14%	14%	28%	25%	16%	20%	10%	11%
China	16%	25%	22%	34%	15%	20%	10%	14%
Chinese Taipei	35%	48%	45%	55%	34%	53%	14%	19%
India	10%	13%	16%	21%	12%	18%	8%	6%
Indonesia	15%	18%	40%	36%	20%	21%	9%	13%
Japan	8%	15%	9%	16%	12%	22%	4%	7%
Korea	30%	39%	32%	41%	34%	42%	19%	23%
Malaysia	39%	52%	49%	65%	40%	45%	13%	31%
New Zealand	18%	18%	27%	26%	20%	19%	15%	14%
Philippines	32%	42%	56%	60%	45%	35%	17%	16%
Singapore	56%	59%	69%	71%	68%	78%	24%	30%
Thailand	33%	50%	57%	67%	29%	47%	13%	22%

Notes: Higher technology-intensive manufacturing group is defined as ISIC Rev.3 24, 29-35; lower technology-intensive manufacturing group is defined as ISIC Rev.3 15-23, 25-28, 36-37; services sector is ISIC Rev.3 50-95. Excludes energy imports (ISIC10-14 and ISIC40).

Sources: OECD Input-Output Database, March 2010; IDE-JETRO Asian International Input-Output Database, 2005; OECD Bilateral Trade Database, March 2010; OECD Trade in Services, January 2010. Includes interpolated and updated tables.

Box 2. Globalisation Indicators Using OECD Input-Output and Bilateral Trade Databases

The OECD has been updating its harmonised Input-Output tables since the mid-1990s (Yamano and Ahmad, 2006). The current edition (March 2010) has increased the country coverage to 30 OECD countries and 16 non-member economies including most of the Asia-Pacific economies. Due to the limited availability of benchmark Input-Output tables for the mid-2000s, the extrapolated data is estimated using annual supply-use tables and national accounts data sources for some countries.

Following the similar methodology of earlier publications (Hummels *et al.*, 2001, De Backer and Yamano, 2007), the import contents of *k*'s export* of product *i* is defined as

$$vs_i^k = u\,\mathbf{A_m^k}\,(\mathrm{I}-\mathbf{A_d^k})^{-1}\,\mathbf{EX_i^k}$$

where *u* is a unity vector which consists of value 1. $\mathbf{A_d^k}$ and $\mathbf{A_m^k}$ are the input coefficient matrices of domestically procured inputs and imported goods and services, respectively, from the national input-output tables. $\mathbf{EX_i^k}$ is a vector of export which only has a value of sector *i* such as

$$\mathbf{EX_i^k} = [0,\ldots,0, \mathrm{export}_i^k, 0,\ldots,0]$$

This vertical specialization is then separated to each route slice of vertical specialization by trade partners using bilateral trade database in goods and services. The country k's import contents originated in country p (vs_i^{pk}) is estimated as

$$vs = u\,\mathbf{A_m^{pk}}\,(\mathrm{I}-\mathbf{A_d^k})^{-1}\,\mathbf{EX_i^k} \quad \text{where } \mathbf{A_m^{pk}} = \mathrm{diag}(ts_1 \ldots ts_n)\,\mathbf{A_m^k}$$

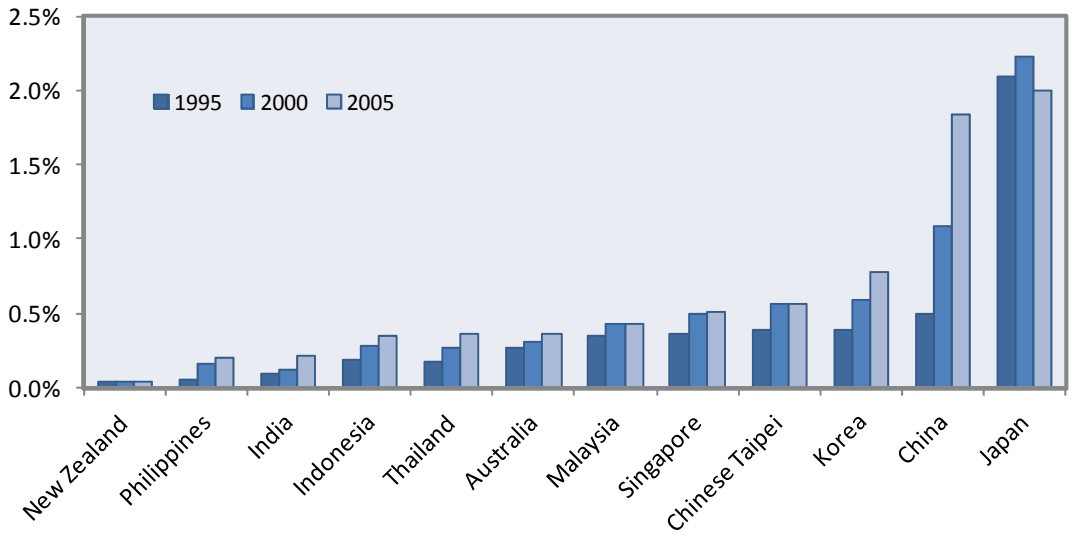
diag ($ts_1^p \ldots ts_n^p$) is a diagonal matrix which the elements are partner *p*'s share to total imports of product 1 to product *n*. Therefore, ts_1^p =imports of product 1 from country p / total imports of product 1.

The indicators of cross-border fragmentation processes are then given as

- Import content share of exports for country *a* (ICE) = $\sum_p vs^{pa} / EX^a$,
- Induced country *b*'s exports by partner p's exports (EPE) = $\sum_p vs^{bp} / \sum_p EX^p$, and
- Re-exported intermediate exports of country *c* (REI) = $\sum_p vs_i^{cp} / \sum_p IMD.EX^{cp}$.

In Figure 5, the indicator of intermediate exports induced by partner's exports (EPE) is expressed as percentage of world exports in goods and services. This represents the backward impacts of marginal changes in world exports in goods and services. Japan and China are those who have the highest export elasticities in this respect. Large increases in EPE were observed for China and to a lesser extent for Korea between 1995 and 2005, while Japan experienced a small decline. For the former countries, the changes in industry composition may have raised the elasticity of intermediate exports.

Figure 5. Induced Intermediate Exports by Partner's Exports (EPE) (Percentage of World Exports in Goods and Services



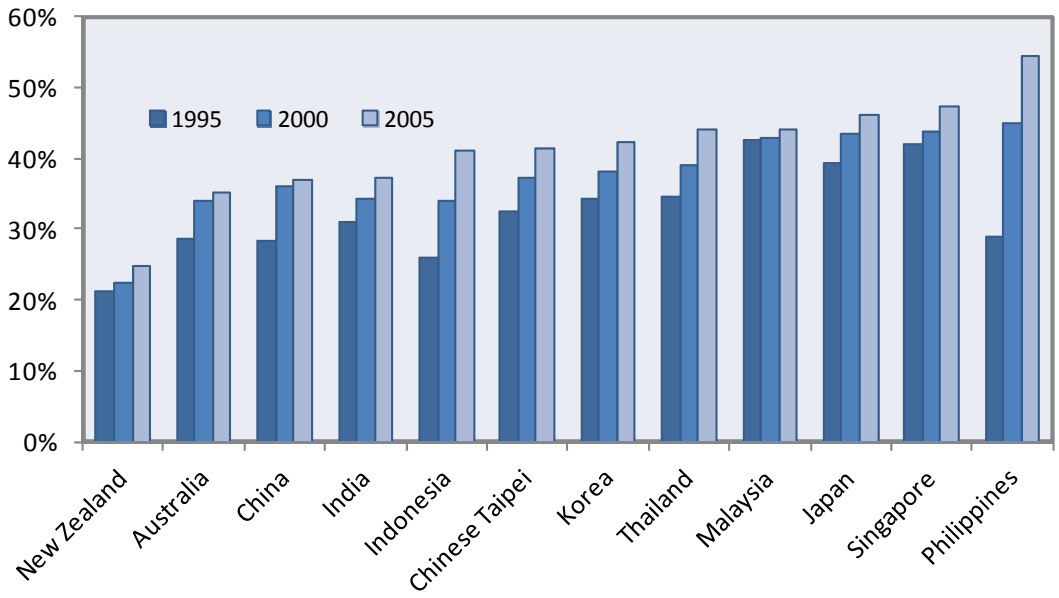
Sources: OECD Input-Output Database, March 2010; IDE-JETRO Asian International Input-Output Database, 2005; OECD Bilateral Trade Database, March 2010; OECD Trade in Services, January 2010.

In contrast to the measurement of ICE and EPE, the country size seems to be neutral to the measurement of REI (Figure 7). Rather the position of a country in the global supply chain is represented in this indicator. In other words, the value of REI becomes high, if a country provides the parts and components used in the assembly factors of the trade partners where most of the final products are sold abroad. The indicator value, on the other hand, becomes smaller, if the country's main exports are provided as the intermediate inputs of domestically consumed goods. The former example is the

Japanese electronic parts and machinery sold to trade partners in Asian assemblers and the latter example is the Australian agricultural products consumed in Japanese and Korean food manufactures.

Seeing from this angle, it is interesting to note two additional observations. One is that the lower value of China indicates that the exported intermediate goods are consumed in the later stage of the global production network. Another important point is the relatively higher value of REI for several ASEAN countries, such as the Philippines, Singapore, Malaysia and Thailand. This suggests that they became suppliers to the earlier stage of the global supply chain between 1995 and 2005.

Figure 6. Re-exported Intermediate Exports (REI) (Percentage of a Country's Total Intermediate Exports in Goods and Services)



Sources: OECD Input-Output Database, March 2010; IDE-JETRO Asian International Input-Output Database, 2005; OECD Bilateral Trade Database, March 2010; OECD Trade in Services, January 2010.

4. Conclusions

This paper analysed the contribution to and engagement in global supply chains of Asian emerging and developing economies by measuring several globalisation indicators based on the harmonised input-output and bilateral trade databases developed by the OECD. It focused analysis on major structural changes in the Asian trade network from the perspective of integration and fragmentation in global supply chains.

Major findings include:

- While the European supply chain structure is relatively stable, some major changes in trade and production networks were observed in East Asia. The partner shares of East Asian trade in intermediate goods and services have significantly increased within the region, as China has emerged as a dominant supplier.
- The shift of major export sectors in China and other Asian emerging economies from labour-intensive products to machinery and equipment and the greater import contents of final export products in these economies have induced a significant transformation in the Asian trade network. This reflects the fact that the machinery production requires a wider variety of domestic and imported intermediate goods and services.
- Increased engagement of ASEAN and East Asian economies as suppliers of intermediate inputs to global supply chains was evident in the period between 1995 and 2005. Four East Asia economies (China, Japan, Korea and Chinese Taipei) supplied about 17 % of world intermediate trade in goods and services in 2005, while five ASEAN countries accounted for about 6 % (Table 3). During this period, ASEAN countries increased the share of intermediate exports to East Asia, but not *vice versa*. For ASEAN, intra-regional intermediate trade remained almost unchanged in relative terms.
- Several ASEAN economies are more closely integrated with global supply chains than other Asian economies largely because of the dominant role played

by their electronics sector. The level of integration, as measured by the intra-industry trade index, differs widely across sectors.

- Another related point is the relatively higher value of REI for several ASEAN countries. This indicator measures the share of re-exported intermediate components relative to total intermediate exports originally supplied by a particular country, so that higher values for ASEAN countries imply that they tend to engage in the earlier stage of global supply chains.

Greater fragmentation and higher dependence on supplies of goods and services from neighbouring counties have gone hand in hand and led to deepening economic integration in ASEAN and East Asia. The empirical results presented in this paper have important implications for strategies for regional economic integration within Asian economies. In particular, ASEAN countries need to think the strategy for deeper integration from the perspective of the whole East Asian region and not just ASEAN *per se*.

A recent study, based on CGE (Computable General Equilibrium) model simulations, concludes that the AEC is likely to increase ASEAN real income by 5.3 per cent or $69 billion relative to the baseline scenario – more than six times the estimated effect of completing the ASEAN Free Trade Area (AFTA), even under conservative assumptions.[19] At the same time, considerably larger gains would be generated should the AEC be extended to include ASEAN's East Asian partners. Indeed, the AEC envisions ASEAN as a region distinct from most other regional groupings by its focus on outward orientation.

It should be recalled in this conjunction that ASEAN Leaders decided in October 2003 to establish an ASEAN Economic Community (AEC) by 2020 as the end goal of regional economic integration (the Bali Concord II). Subsequently, they agreed in January 2007 to accelerate the AEC establishment by 5 years to 2015 (the Cebu Declaration) and adopted in November the ASEAN Economic Community Blueprint.

[19] The estimated net income effect of the AEC takes into account three scenarios: (a) the removal of all remaining tariffs among ASEAN countries (*i.e.* completion of AFTA); (b) scenario (a) plus the removal of NTBs, leading to a 5 per cent reduction in trade costs (as a percentage of trade values); and (c) scenario (b) plus the AEC-induced changes in FDI. Scenario (c) corresponds to the "value added" of the AEC. For details of the simulation results, see Rashid *et al*. (2009).

Implementing the AEC according to its blueprint is critical to enhancing ASEAN's position within global supply chains. An important benefit accruing from strengthened regional economic ties is the reduction of transaction costs that leads to higher efficiency of resource allocation and welfare gains through enhanced competition in the domestic market.

A simulation study by Dimaranan *et al.* (2009) on the global impact of growth in China and India suggests that the improved growth performance of China and India will likely intensify competition in global markets for manufactured goods[20]. While overall welfare consequences for other developing countries are relatively small, ASEAN countries are especially likely to feel greater competitive pressures from China. This means that they will need to raise the quality of their exports in textiles and apparel, as well as in electronics and more generally machinery and equipment. On the other hand, the relative decline in wood and other processing industries in China will leave space for expansion in other developing countries. This will potentially benefit resource-rich ASEAN countries. However, they will have to address the challenge of sustainable development in these resource-intensive sectors, such as the depletion of natural resources and environmental degradation and their long-term impact on regional and sub-regional economies.

A key challenge for ASEAN policy makers, therefore, is to "keep the AEC open" in the run-up to 2015 and strengthen the ASEAN's position as the hub of free trade agreements with outside partners. In this way ASEAN countries can foster overall trade growth and dynamism in the emerging post-crisis world. At the same time, they need to engage more actively in regional macroeconomic co-operation, with a shared view to reducing vulnerability and ensuring sustained growth. Regional macroeconomic co-operation remains at an early stage in Southeast Asia, but possibilities for further co-operation should be explored.[21]

[20] Using a modified version of the standard Global Trade Analysis Project (GTAP) model, this study examines the global implications of strong growth outcomes in China and India in the context of world economic expansion over the period of 2005-2020. A baseline scenario includes an additional 2.1 percentage point annual growth in China and 1.9 percentage point annual growth in India during the period concerned. The analysis also looks at the impact of lowering protection and implementing more effective systems of duty exemptions or drawbacks for inputs used for export production in India.

[21] See Tanaka (2009) for further details.

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Annex

Table A. Target countries of global production network model

	Name			Name			Name			Name	
AR	Argentina	la	DE	Germany	euw	NL	Netherlands	euw	CH	Switzerland	euw
AU	Australia	oa	GR	Greece	euw	NZ	New Zealand	oa	TH	Thailand	as
AT	Austria	euw	HU	Hungary	oe	NO	Norway	euw	TR	Turkey	rw
BE	Belgium	euw	IS	Iceland	oe	PH	Philippines	as	GB	United Kingdom	euw
BR	Brazil	la	IN	India	oa	PL	Poland	oe	US	United States	na
CA	Canada	na	ID	Indonesia	as	PT	Portugal	euw	VN	Viet Nam	as
CL	Chile	la	IE	Ireland	euw	RO	Romania	oe			
CN	China	ea	IL	Israel	rw	RU	Russian Federation	rw			
TW	Chinese Taipei	ea	IT	Italy	euw	SG	Singapore	as			
CZ	Czech Republic	oe	JP	Japan	ea	SK	Slovak Republic	oe			
DK	Denmark	euw	KR	Korea	ea	SI	Slovenia	oe			
EE	Estonia	oe	LU	Luxembourg	euw	ZA	South Africa	rw			
FI	Finland	euw	MY	Malaysia	as	ES	Spain	euw			
FR	France	euw	MX	Mexico	na	SE	Sweden	euw			

Notes: as is ASEAN, ea is East Asia, oa is other Asia-Pacific country, na is North America, la is Latin America, euw is EU15 and Norway and Switzerland, oe is other Europe, rw is rest of the world.

Table B. Sectors

	Sectors	ISIC3		Sectors	ISIC3
1	Agriculture, hunting, forestry and fishing	01+02+05	21	Utility	40-41
2	Mining and quarrying	10+11+12+13+14	22	Construction	45
3	Food products, beverages and tobacco	15+16	23	Wholesale and retail trade; repairs	50-52
4	Textiles, textile products, leather and footwear	17+18+19	24	Hotels and restaurants	55
5	Wood and products of wood and cork	20	25	Transport and storage	60-63
6	Pulp, paper, paper products, printing and publishing	21+22	26	Post and telecommunications	64
7	Coke, refined petroleum products and nuclear fuel	23	27	Finance and insurance	65-67
8	Chemicals	24	28	Real estate activities	70
9	Rubber and plastics products	25	29	Renting of machinery and equipment	71
10	Other non-metallic mineral products	26	30	Computer and related activities	72
11	Basic metals	27	31	Research and development	73
12	Fabricated metal products	28	32	Other Business Activities	74
13	Machinery and equipment, nec	29	33	Public admin. and defence	75
14	Office, accounting and computing machinery	30	34	Education	80
15	Electrical machinery and apparatus, nec	31	35	Health and social work	85
16	Radio, television and communication equipment	32	36	Other community, social and personal services	90-93
17	Medical, precision and optical instruments	33	37	Private households with employed persons	95-99
18	Motor vehicles, trailers and semi-trailers	34			
19	Other transport equipment	35			
20	Manufacturing nec; recycling (include Furniture)	36-37			

CHAPTER 3

THE EVOLUTION OF PRODUCTION NETWORKS IN THE ASIA–PACIFIC AND THE REST OF THE WORLD: MEASURING INTERNATIONAL FRAGMENTATION PROCESSES

NORIHIKO YAMANO
Organization for Economic Cooperation and Development (OECD), Paris, France.

BO MENG
Directorate for Science, Technology and Industry, OECD and IDE-JETRO

Abstract

The Asia-Pacific's production networks are increasingly fragmented, resulting in higher dependence on supplies of goods and services from neighbouring countries. This paper summarises approaches for measuring international production networks and presents selected results based on OECD's suite of internationally harmonised sectoral databases, including its Input-Output tables and bilateral trade database in goods and services. The target economies in these data collections have been expanded recently to cover major economies in Southeast and East Asia from the mid-1990s to the mid-2000s. Therefore, this study is better able to highlight the comprehensive spillovers and feedback mechanisms at the global level than earlier analyses using OECD data resources.

1. Introduction

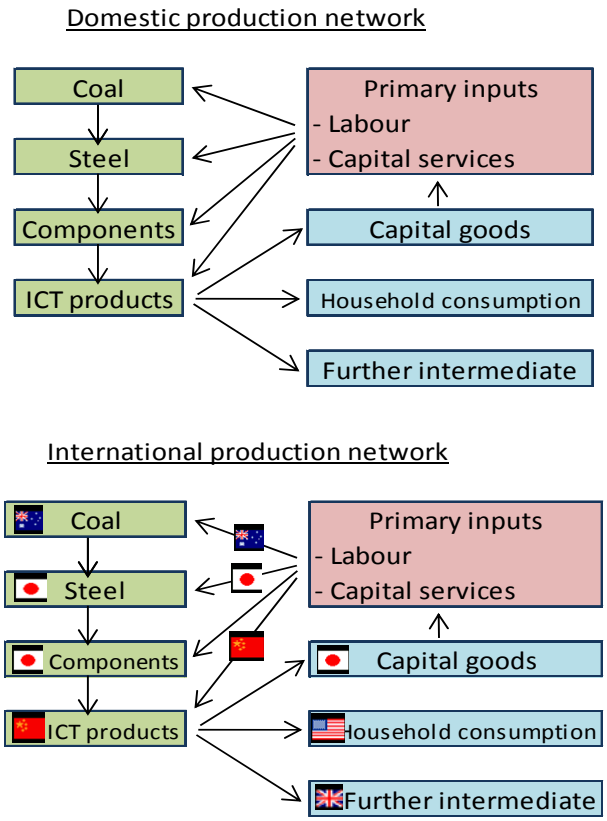
In recent decades, Southeast and East Asian countries[1] have experienced great changes in their trade structures particularly with respect to their trading partners and the types and categories of goods traded. The industrial activities in each Asian country have also been greatly transformed in response to the shifts in demand for goods from neighbouring countries in Asia and the rest of the world.

Another notable phenomenon concerning industrial activity in the Asia-Pacific region is the evolution of global supply chains, in other words, increasingly fragmented production processes distributed over country borders. Both macroeconomic indicators (De Backer and Yamano, 2007; Miroudout, *et al*., 2009) and firm level analyses (Kimura and Ando, 2005; Ando and Kimura, 2009; OECD, 2007) have, in recent years, confirmed the fragmentation of production networks in Asia. Imports, particularly of intermediate goods and services, have become increasingly sensitive to export demand and domestic consumption and investment (Bussière *et al*., 2011).

This international division of production stages (Figure 1) can be considered as the consequence of various changes in social and economic environments such as the removal of trade barriers, the relative increase/decrease in labour costs, more favourable investment conditions and improved logistics and infrastructure services.

[1] The composition of geographical regions and country names in this paper follows the United Nations definitions of standard country or area codes for statistical use (http://unstats.un.org/unsd/methods/m49/m49.htm)

Figure 1. Domestic and global production networks



Since the shift in production activity is highly correlated to the changes in the relative positions in global production networks, competitiveness ranking and productivity of each country, the analysis of globalisation activity has risen high on the agenda for many countries in order to address policy questions such as:

1) What has driven the changes in patterns of international trade in intermediate, investment and final consumption goods?
2) Who has benefitted the most from the evolution of global production networks (countries, regions or industries)?
3) How big are the indirect economic effects from neighbouring countries' shifts in demand?

There has been much research devoted to measuring *globalisation* using international harmonised database such as the import content share of exports (Hummels *et al.,* 2001), alternative demand-driven vertical specialization indicators (Uchida and Inomata, 2009; Yamano *et al.,* 2011), supply-driven vertical specialisation indicators (Meng *et al.,*2010), the effects of processing trade (Koopman *et al.,*2008; Yang *et al.*, 2009) and factor decomposition analysis of vertical specialization (Meng *et al*., 2011).

Given the increased demand for such indicators, OECD and other international bodies have been expanding the country coverage of harmonised industry-based statistics and looking more closely at the classification standards used for statistics such as the International Standard Industry Classification (ISIC) for industry activity, Harmonized System (HS) for trade statistics and Central Product Classification (CPC) for product categories. Based on long experience in harmonising international data at the OECD, this paper summarises the methodology and measurement results of production network indicators for the target countries. Due to the availability of data sources, six economies from ASEAN and four economies from East Asia are respectively selected in our analysis. The rest of the world is divided into the countries and regions shown in Table 1.

Table 1. Target economies

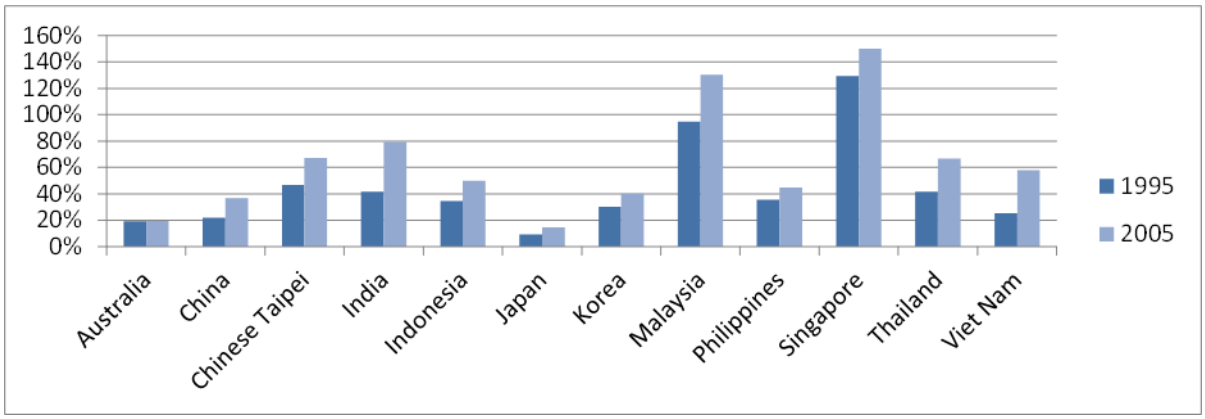
Region	Country	Population (Thousand)			Region	Country	Population (Thousand)		
		1995	*2000*	*2005*			*1995*	*2000*	*2005*
Southeast	Indonesia	191,501	205,280	219,210	EU15 and	Austria	7,948	8,012	8,225
Asia	Malaysia	20,594	23,274	25,633	Other	Belgium	10,137	10,251	10,479
	Philippines	69,965	77,689	85,496	West	Denmark	5,228	5,337	5,416
	Singapore	3,480	4,018	4,267	Europe	Finland	5,108	5,176	5,246
	Thailand	60,140	62,347	65,946		France	57,844	59,062	61,182
	Viet Nam	72,957	78,663	84,074		Germany	81,678	82,212	82,469
						Greece	10,634	10,917	11,104
East	China	1,210,969	1,266,954	1,312,253		Iceland	267	281	296
Asia	Chinese Taipei	21,357	22,277	22,770		Ireland	3,601	3,790	4,134
	Japan	125,571	126,927	127,767		Italy	56,844	56,942	58,607
	Korea	45,093	47,008	48,138		Luxembourg	409	436	465
						Netherlands	15,459	15,926	16,320
Other	Australia	18,072	19,153	20,395		Norway	4,359	4,491	4,623
Asia	India	953,148	1,042,590	1,130,618		Portugal	10,030	10,226	10,549
	New Zealand	3,673	3,858	4,134		Spain	39,388	40,264	43,398
						Sweden	8,827	8,872	9,030
North	Canada	29,302	30,689	32,312		Switzerland	7,041	7,184	7,437
America	Mexico	91,725	98,439	103,947		United Kingdom	58,025	58,886	59,402
	United States	266,278	282,194	295,896					
					Rest	Israel	5,374	6,084	6,692
Latin	Argentina	34,772	36,939	38,732	of the	Russia	148,497	146,670	143,170
America	Brazil	161,692	174,175	186,075	World	Saudi Arabia	18,255	20,808	23,613
	Chile	14,410	15,419	16,297		South Africa	41,375	44,872	48,073
						Turkey	61,771	67,393	72,065
Eastern	Czech Republic	10,331	10,273	10,234		RoW	1,536,413	1,698,930	1,871,663
Europe	Estonia	1,439	1,370	1,347					
	Hungary	10,329	10,211	10,087					
	Poland	38,275	38,258	38,161					
	Romania	22,681	22,138	21,635					
	Slovak Republic	5,364	5,401	5,387					
	Slovenia	1,966	1,985	2,001					

The paper continues as follows: the next section introduces the methodology for measuring trade- related indicators using the latest data produced at the OECD. The third section describes the production structures of the target economies, while the fourth section introduces global fragmentation indicators. A summary is provided in the last section.

2. Changing Patterns of Global Trade Structures

Many observed evidences of trade figures clearly indicate the significant structure change among Asian trade network. In particular China and surrounding economies has increased the production capabilities of various final and intermediate goods and played a role as the world factory region. All of our target Asian countries increased the export dependencies since the mid 1990s (Figure 2). In 2005, Malaysia and Singapore notably have high dependency indices.

Figure 2. Export Dependency (Export of goods and services / GDP)

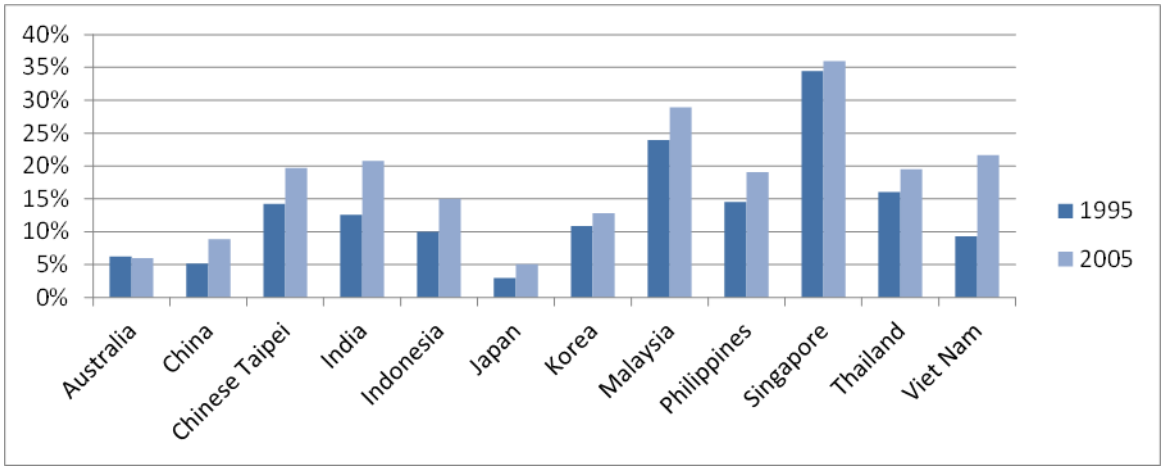


Source: OECD Input-Output Database (2011).

Note: The figures for other countries are available in Annex

At the same time, it is often argued that the imports of intermediate goods have also increased in these countries to produce the exporting goods (Figure 3) and there is a limitation of export oriented growth of output and GDP. In particular, the ratio of total intermediate imports to output has increased in Vietnam (12.3%), Chinese Taipei (5.5%), India (8.1%) and Malaysia (5.0%).

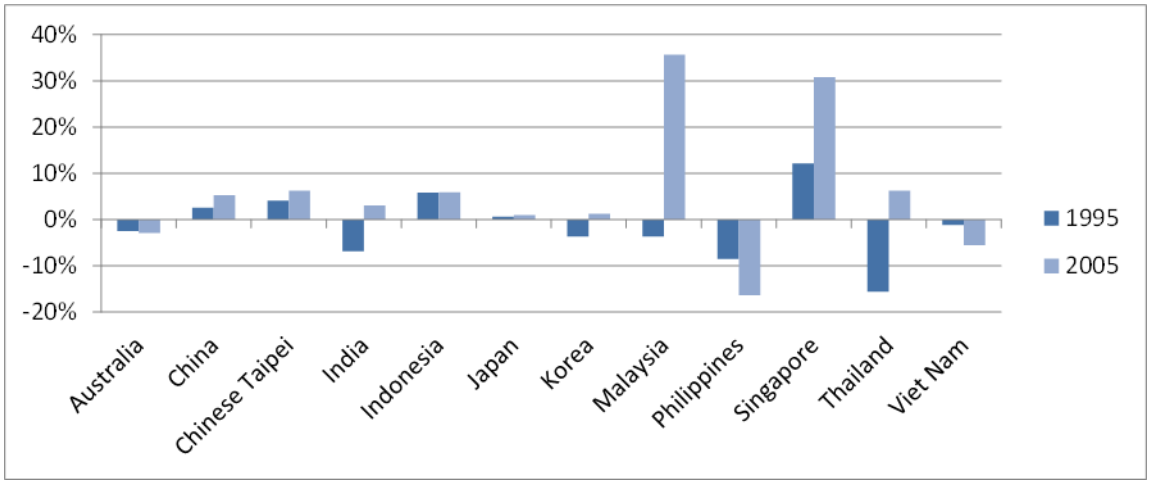
Figure 3. Intermediate Imports Ratio (Intermediate imports to output)



Source: OECD Input-Output Database (2011).
Note: The figures for other countries are available in Annex

The net trade effects, in fact, are very different among Asian countries as observed in the indicator of net trade ratio to total expenditure in Figure 4. Having said that, in general, the trade surpluses have increase between 1995 and 2005 and contributed economic growth in most countries. It also applies to some emerging European countries such as Czech Republic, Estonia, Hungary and Norway (Annex Table B1).

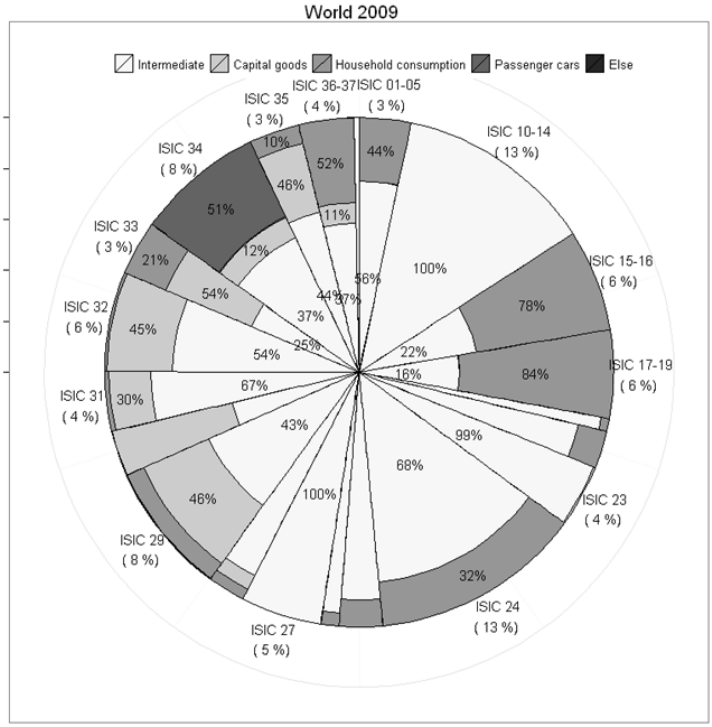
Figure 4. Net Trade Contribution to Total Final Expenditure (GDP)

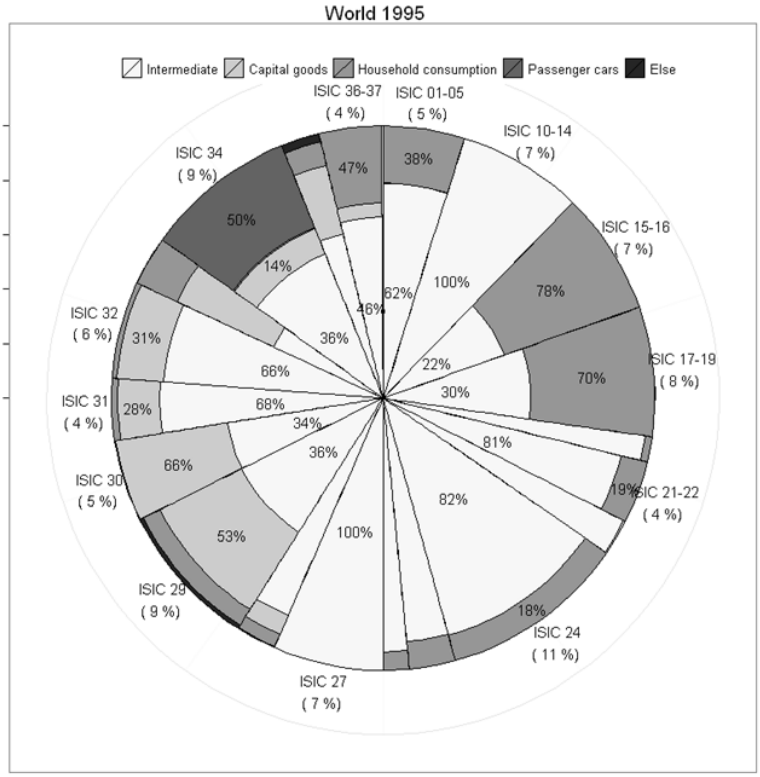


Source: OECD Input-Output Database (2011).
Note: The figures for other countries are available in Annex

As we have seen, an impact from trade activity on domestic economy is widely different. At the same time the global structure (industry share) of goods exported are basically constant between 1995 and 2005 (Error! Reference source not found.). This Error! Reference source not found. also shows that the global shares of end-use structure i.e. intermediate and final goods categories have not significantly changed although the evolutions of production networks in major countries are evident.

Figure 5. Total Merchandize Exports Global Share (1995 and 2008)





The global trade structure seems stable from early 1990s to the late 2000s, but this does not assure the inter or intra region (country group) trade also keeps stable. Here, if a country's intermediate exports to a particular partner country exceed a given threshold percentage of total exports (thresholds of 15% and 20% are used in our exercise), we consider such trade node as a dominant link. Charts with dominant link flows such as Figure 6 and Figure 7 enable us to understand the changes in relative important trade links in Asia Pacific region. In particular, the emergence of China as a dominant demand center, has significantly impacted the location shift of its partner country's exports.

Figure 6. Dominant Trade Links between Countries (exports of intermediates, 1995).

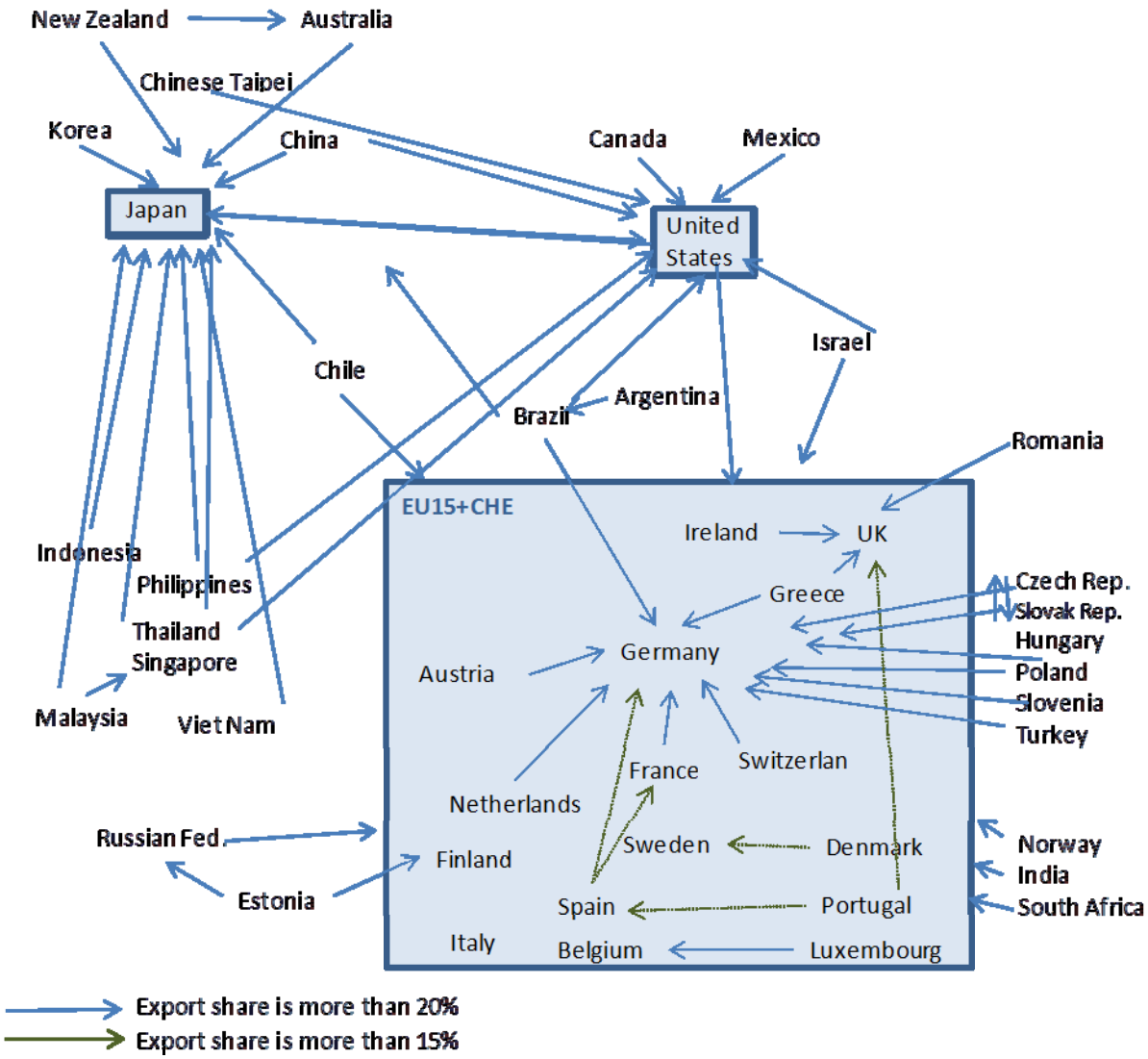
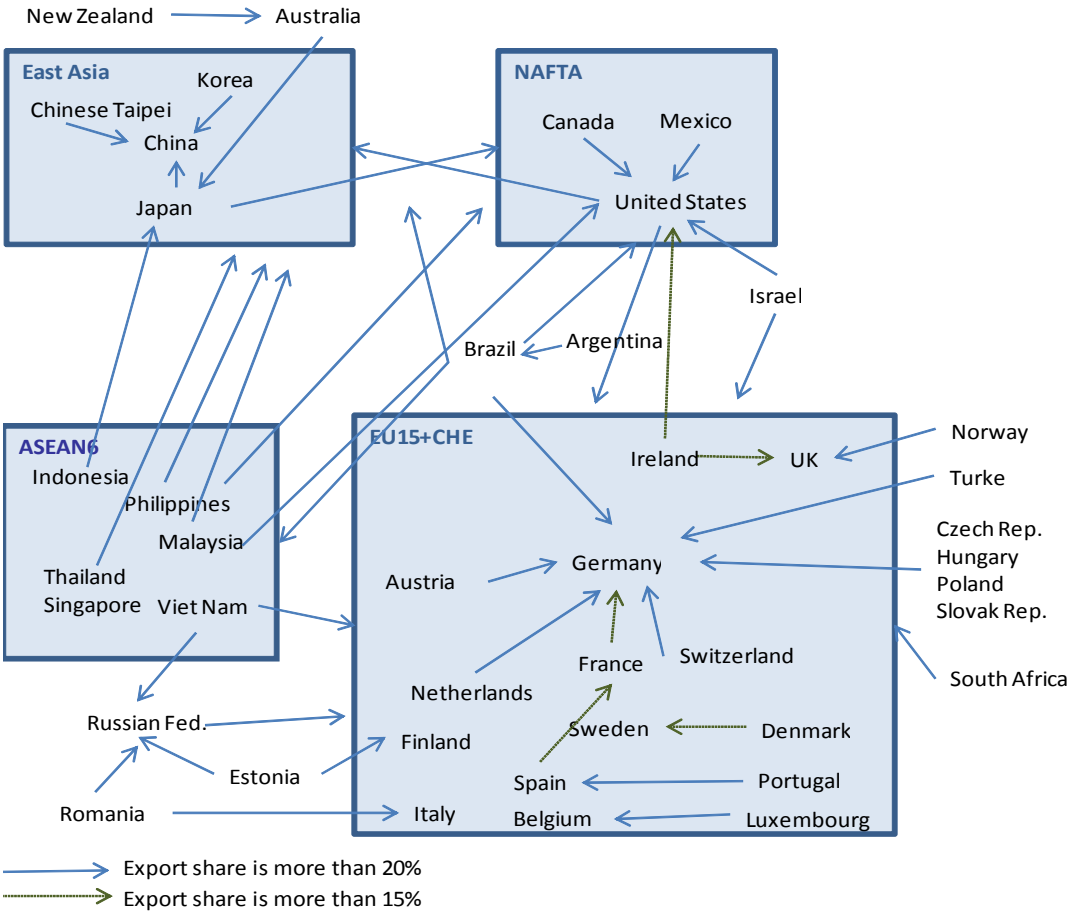
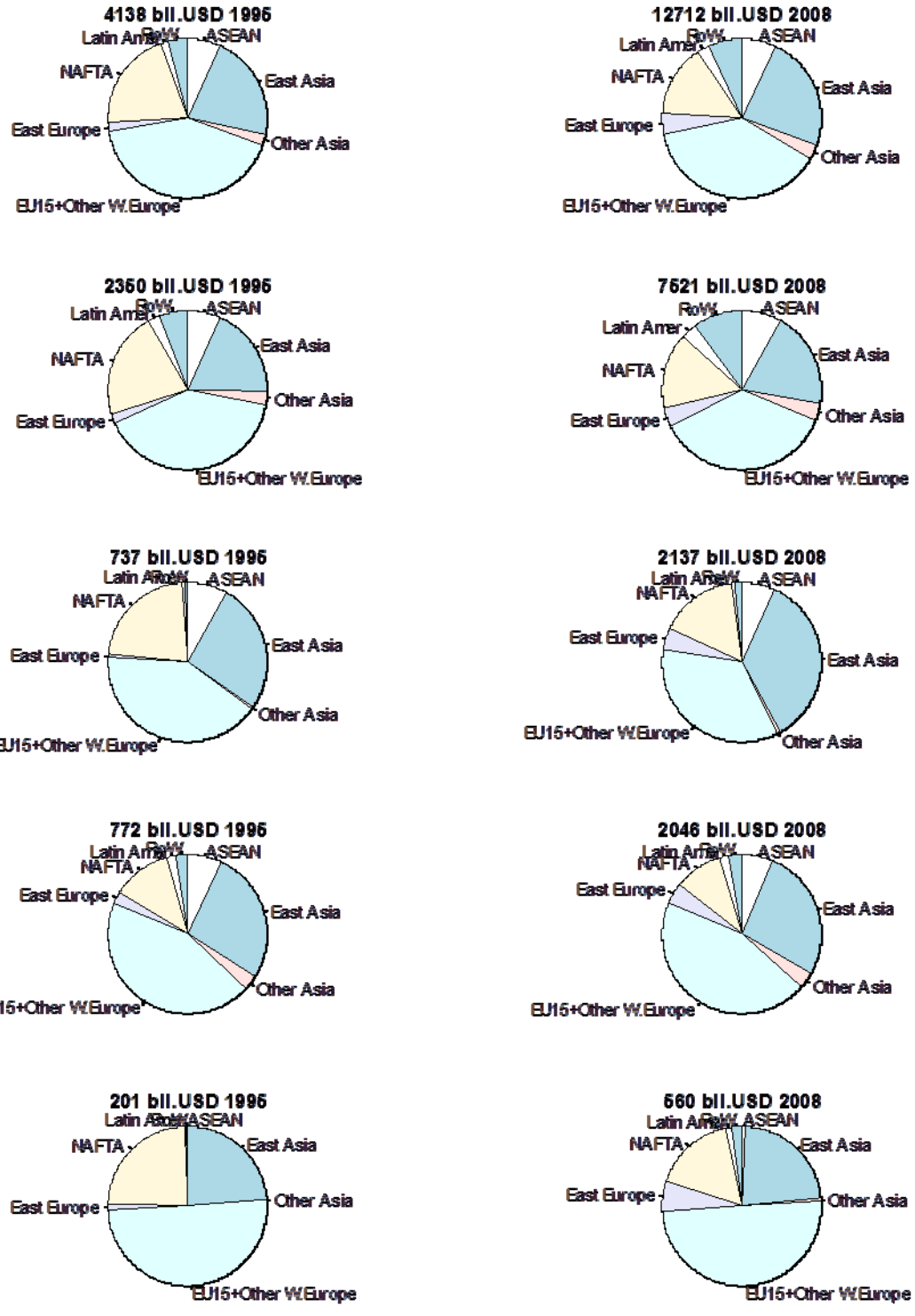


Figure 7. Dominant Trade Links between Countries (exports of intermediate, 2005).



Another global share of trade structure can be explored by the total merchandize export share by regions (Figure 6). The regional export shares over 1995 and 2008 are stable for most end-use categories except for capital goods. Further increasing share of East Asia mainly due to the Chinese exports of capital goods and the emergence of East European region as a supplier of capital goods are the notable changes.

Figure 8. Total Merchandize Exports by Regions (1995 and 2008)



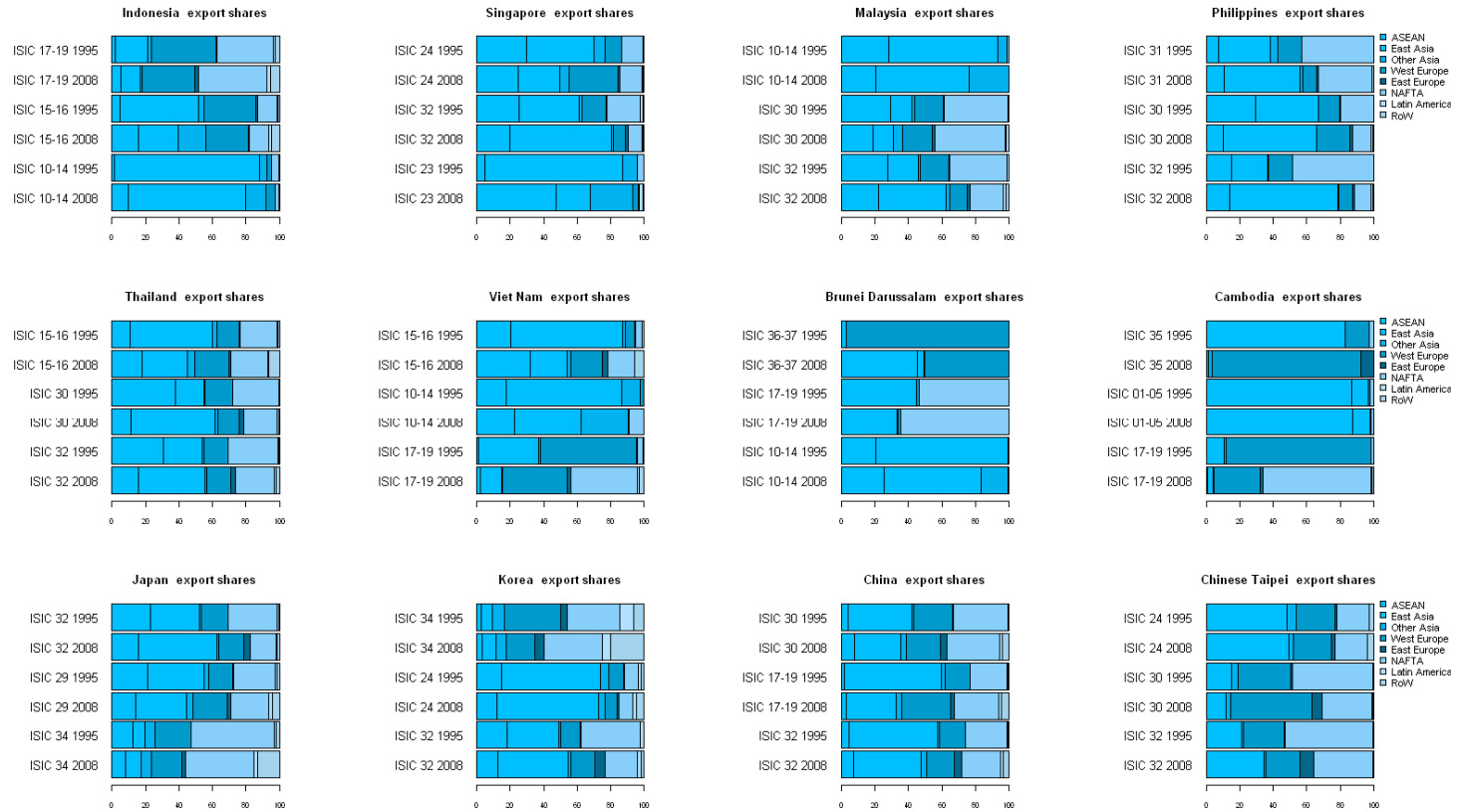
On the other hand, the trade structures of leading exports (Table 2) are widely different across countries and the further international division of labour in these

leading export goods are implied from Figure 7. The characteristics of exports destinations from Southeast Asia and East Asia are broadly separated. While most of the leading products e.g. mining, food and textile products of Southeast Asian countries are mainly supplied to East Asian countries, various machinery products, East Asian leading industries are purchased by other large economies i.e. Western Europe and North America.

Table 2. Selected Leading Exports (Partner Shares, 2005)

South-Eastern Asia		(Mil.USD)	ASEAN	East Asia	Other Asia/Pc	EU15	Eastern Europe	North America	Latin America	RoW
Brunei										
	Mining and quarrying	1.520	14%	56%	11%	0%	0%	20%	0%	0%
Cambodia										
	Textiles, textile products, leather and footwear	26	5%	95%	0%	0%	0%	0%	0%	0%
Indonesia										
	Mining and quarrying	24.707	7%	76%	9%	6%	0%	1%	0%	0%
	Textiles, textile products, leather and footwear	8.939	7%	12%	2%	26%	1%	41%	2%	10%
	Chemicals	5.227	25%	36%	8%	8%	1%	6%	2%	14%
Malaysia										
	Mining and quarrying	13.806	23%	49%	24%	0%	0%	2%	0%	2%
	Office, accounting & computing machinery	23.491	19%	12%	6%	14%	1%	46%	0%	1%
	Radio, television & communication equipment	39.113	27%	34%	2%	14%	1%	21%	0%	1%
Philippines										
	Office, accounting & computing machinery	7.806	13%	45%	1%	13%	2%	24%	0%	2%
	Electrical machinery & apparatus, nec	3.676	3%	72%	1%	4%	0%	20%	0%	1%
	Radio, television & communication equipment	16.485	23%	45%	1%	23%	0%	8%	0%	0%
Singapore										
	Coke, refined petroleum products and nuclear fuel	29.265	39%	26%	17%	2%	0%	1%	0%	16%
	Chemicals	26.880	27%	28%	6%	24%	0%	9%	0%	5%
	Office, accounting & computing machinery	32.308	21%	27%	8%	17%	1%	24%	0%	3%
	Radio, television & communication equipment	71.550	27%	42%	2%	12%	1%	13%	1%	2%
Thailand										
	Food products, beverages and tobacco	11.862	13%	31%	4%	13%	1%	22%	0%	17%
	Office, accounting & computing machinery	11.511	20%	41%	1%	17%	1%	19%	0%	1%
	Radio, television & communication equipment	13.751	16%	42%	2%	14%	1%	23%	1%	2%
Viet Nam										
	Mining and quarrying	8.169	35%	30%	26%	0%	0%	6%	0%	0%
	Food products, beverages and tobacco	4.342	18%	34%	2%	10%	1%	16%	0%	18%
	Textiles, textile products, leather and footwear	8.747	2%	16%	1%	33%	1%	42%	1%	4%
Eastern Asia		(Mil.USD)	ASEAN	East Asia	Other Asia/Pc	EU15	Eastern Europe	North America	Latin America	RoW
China										
	Textiles, textile products, leather and footwear	155.805	5%	22%	4%	22%	2%	25%	1%	19%
	Office, accounting & computing machinery	108.095	6%	31%	2%	27%	1%	30%	1%	2%
	Radio, television & communication equipment	119.823	11%	29%	3%	22%	2%	26%	2%	5%
Chinese Taipei										
	Chemicals	25.629	13%	60%	3%	6%	0%	8%	1%	9%
	Office, accounting & computing machinery	14.672	6%	30%	2%	30%	2%	26%	1%	4%
	Radio, television & communication equipment	46.256	18%	55%	1%	10%	1%	13%	1%	1%
Hong Kong										
	Textiles, textile products, leather and footwear	54.987	4%	35%	2%	21%	0%	30%	0%	7%
	Office, accounting & computing machinery	36.995	9%	64%	2%	12%	1%	10%	0%	2%
	Radio, television & communication equipment	77.735	6%	68%	1%	11%	1%	10%	1%	2%
Japan										
	Machinery & equipment, nec	86.693	14%	37%	3%	14%	1%	24%	1%	6%
	Radio, television & communication equipment	80.155	18%	43%	1%	15%	2%	19%	0%	2%
	Motor vehicles, trailers & semi-trailers	119.258	7%	8%	7%	17%	1%	47%	1%	12%
Korea										
	Chemicals	29.296	10%	59%	3%	6%	0%	9%	2%	11%
	Radio, television & communication equipment	66.063	12%	41%	4%	17%	3%	18%	2%	3%
	Motor vehicles, trailers & semi-trailers	35.918	4%	11%	4%	25%	2%	34%	1%	18%
Australia										
	Mining and quarrying	33.832	6%	69%	7%	10%	0%	3%	1%	3%
	Food products, beverages and tobacco	12.144	11%	43%	6%	12%	0%	21%	0%	7%
	Basic metals	11.875	26%	36%	22%	9%	0%	3%	0%	4%
New Zealand										
	Food products, beverages and tobacco	9.536	12%	23%	9%	21%	0%	22%	0%	12%
	Basic metals	1.200	1%	45%	31%	6%	0%	12%	0%	6%
India										
	Textiles, textile products, leather and footwear	18.239	2%	7%	1%	44%	1%	31%	1%	13%
	Chemicals	11.219	14%	14%	1%	21%	2%	16%	4%	29%
	Manufacturing nec; recycling (include Furniture)	13.325	13%	24%	1%	18%	0%	37%	0%	7%

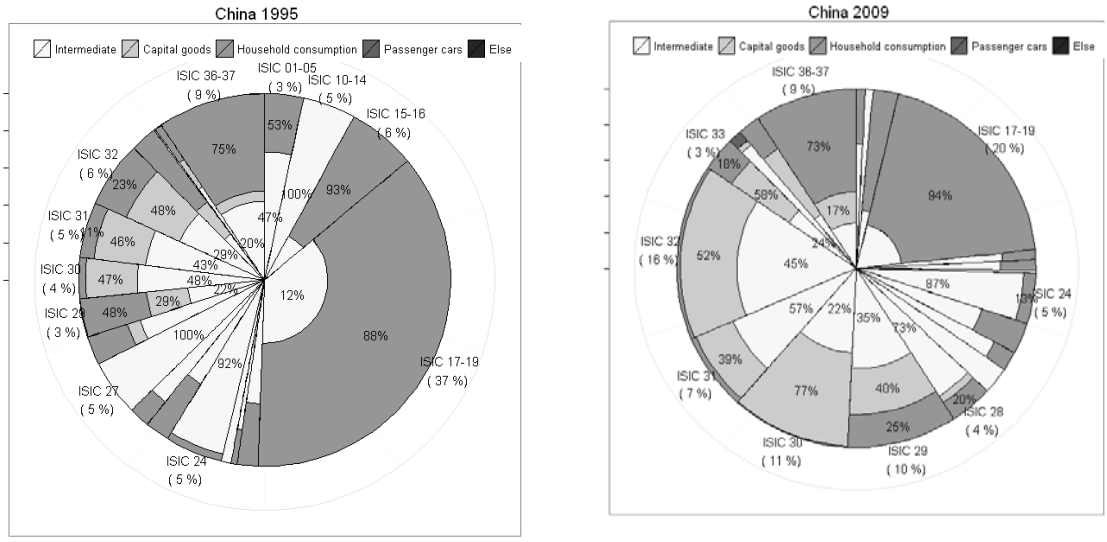
Figure 9. Selected Leading Export byPartner Regions (1995 and 2005, 100=total exports)

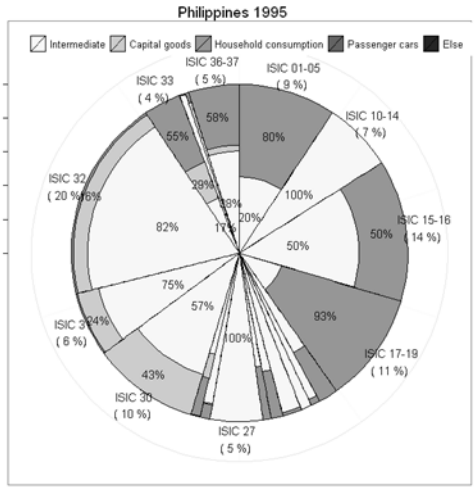


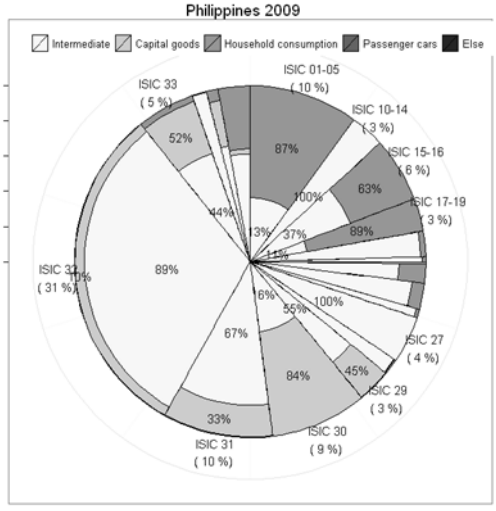
Notes: ISIC01-05 Agriculture, hunting, forestry and fishing, ISIC 10-14 Mining and quarrying, ISIC15-16 Food products, beverages and tobacco, ISIC 17-19 Textiles, textile products, leather and footwear, ISIC24 Chemicals, ISIC29 Machinery & equipment, nec , ISIC30 Office, accounting & computing machinery, ISIC 31 Electrical machinery & apparatus, nec, ISIC 32 Radio, television & communication equipment, ISIC36-37 Manufacturing nec; recycling (include Furniture)

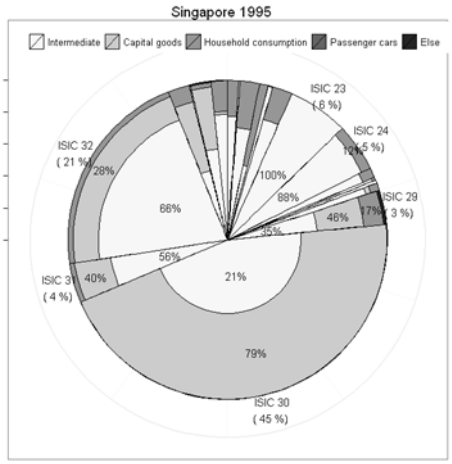
Recently developed bilateral trade database by industry and end-use category allows us to analyse not only the type of goods supplied and purchased from trade partners, but also gives the insights of each country's participation patterns in global production chains (Figure 8 for China and Chinese-Taipei). See Annex C for other country's evolution patterns of exported goods by industry and end-use category). The notable structural changes for Asian countries are summarised as follows:

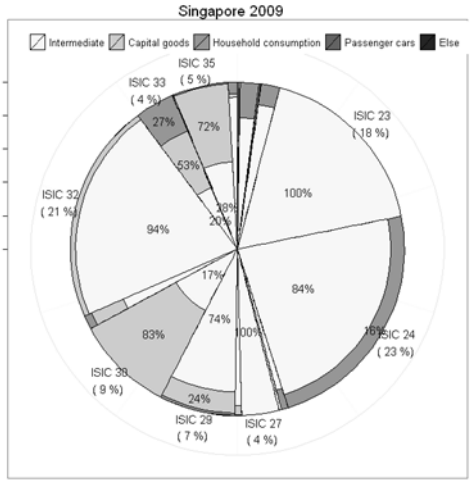
Figure 10. Export Share by Industry and Category (China and Chinese Taipei)











- Australia: The intermediate and final goods shares of major export goods are stable. The share of mining products (ISIC10-14) has significantly expanded partially due to the increases in price of mining products.
- Japan: The industry and end-use category structures of exported goods are basically stable.
- Korea: Household consumption goods of textile industry are replaced by capital goods of precision equipment (ISIC33) and general machinery equipments (ISIC29). Computing machinery (ISIC30) has also lost the share.

- United States: The industry and end-use category is stable during 1995 to 2009.
- Cambodia: The textile export to East Asian countries remains the dominant export activity.
- Philippines: Most parts of export share of textile products have replaced by the share of radio, television and communication equipments (ISIC32). Unlike China's exports of radio, television and communication equipments, the exports are mainly end up as intermediate parts and equipments in partner countries.
- Singapore: Singaporean exports are previously specialized in final goods of office machinery (ISIC30) and intermediates of communication equipments (ISIC32). While the exports of communication equipments remain, exports of office machinery have replaced the position by petro-chemical products (ISIC23-24).
- Thailand: The export shares of food products (ISIC15-16) and textile products (ISIC17-19) have decreased and chemical products (ISIC24) and motor vehicles (ISIC34) are emerging. The variety of exporting goods has increased in Thailand.
- Viet Nam: The agricultural export has lost the majority share and capital and intermediate of machinery sectors (ISIC 29, 30, 31 and 32) have increased.

3. Economic and Production Structures of Target Economies

The trade statistics related indicators of previous section imply that the global supplies of goods and intermediates for large OECD economies and world total remained stable while the exporting structures of emerging countries have significantly changed. The reasons for this can be further analysed using the internationally harmonised input-output database.

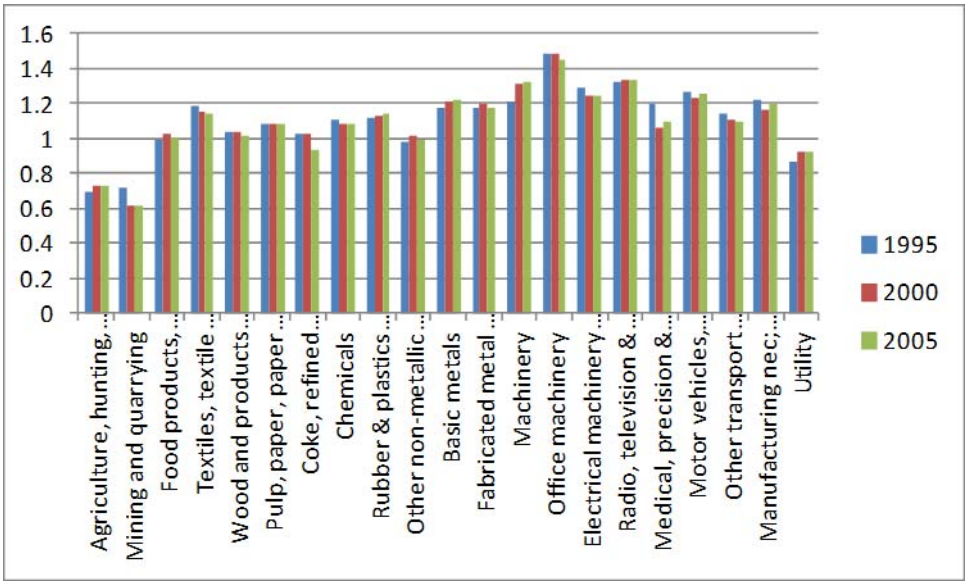
The traditional indicator to analyse the overall impacts of marginal changes in final demands on domestic economy is well known as backward and forward linkage indicators. The former indicator measure the impact of unit increase in final demand on output (*BL*) is written as

$$BL = u\,(\mathrm{I}\text{-}A)^{-1}$$

where, *u* is a unifying row vector of 1 and A is input coefficient matrix which is Z X* where Z is intermediate transaction matrix and X* is a diagonal matrix of inverse of output. The term of $(\mathrm{I}\text{-}A)^{-1}$ is referred to as Leontief Inverse.

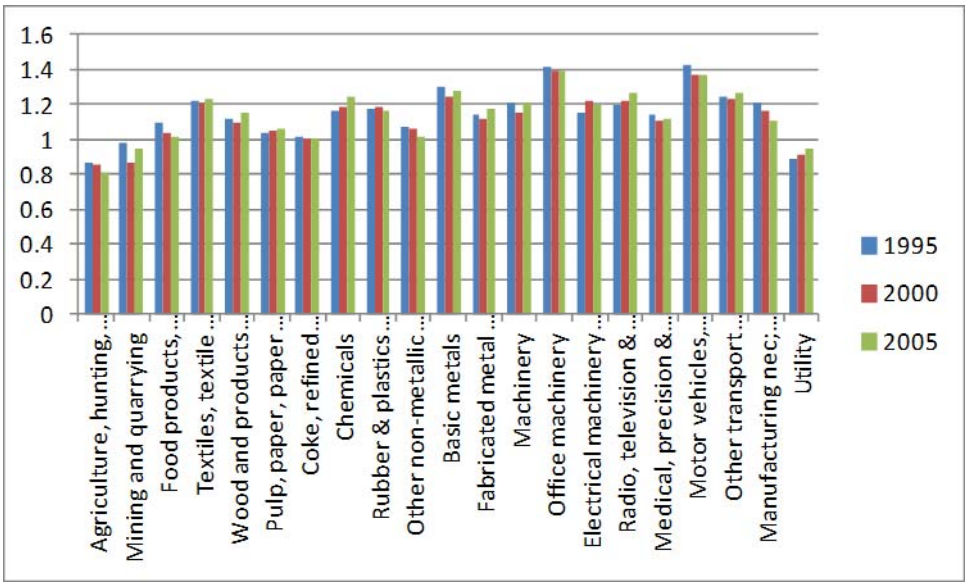
Measurement results using OECD Inter-country Inter-industry model (2011) for both Southeast and East Asia indicate that (Figure 11 and Figure 12) machinery sectors (ISIC Rev.3: 32-35) have relatively higher backward effects on their economy and primary sectors (ISIC Rev.3: 01-14) have relatively less indirect ripple effects on other sectors.

Figure 11. Backward Linkage (Southeast Asia)



Note: Southeast Asia is Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, Thailand and Viet Nam. Industry average = 1.0.
Source: Region aggregate tables are estimated from the OECD Inter-country Inter-industry model (2011).

Figure 12. Backward Linkage (East Asia)



Note: East Asia is China, Chinese Taipei, Japan and Korea. Industry average = 1.0.
Source: Region aggregate tables are estimated from the OECD Inter-country Inter-industry model (2011).

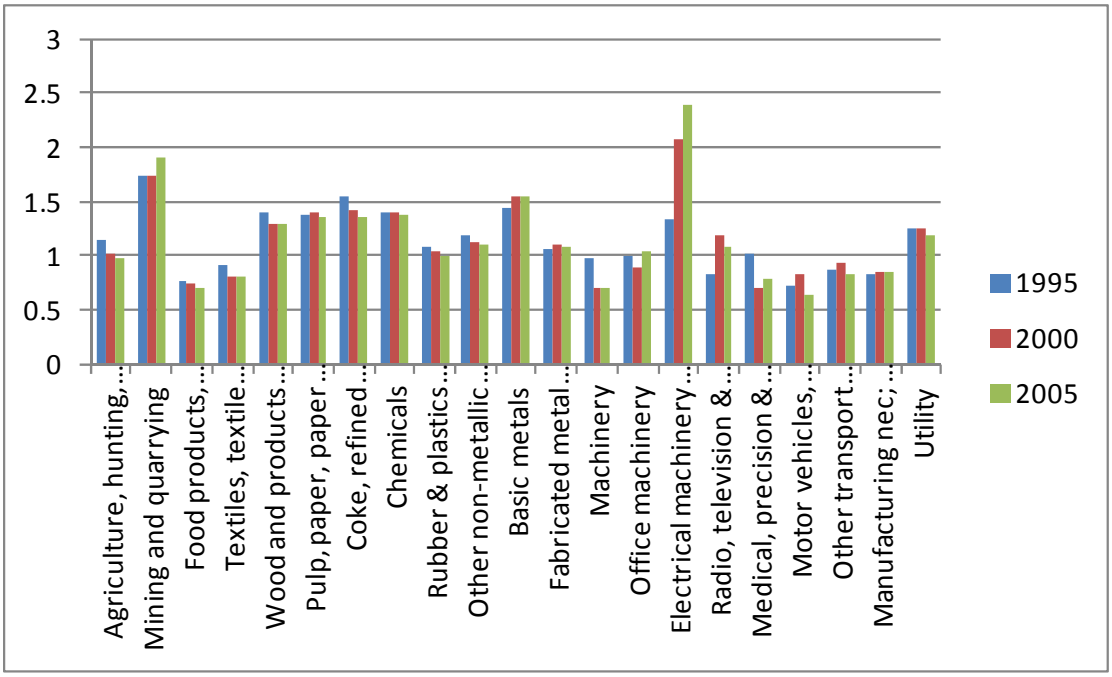
Alternatively, forward linkage measured by supply-driven model (Ghoshian inverse) is given as

$$FL = (I-G)^{-1} u$$

where u is a unifying column vector of 1 and G is allocation coefficient matrix = X* Z.

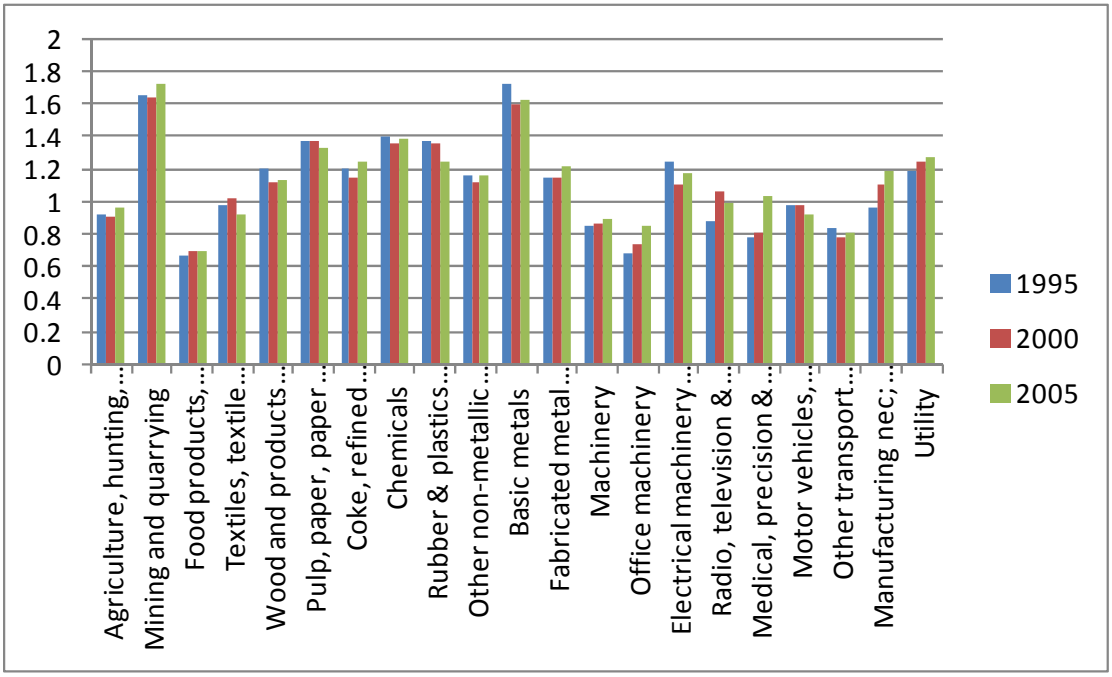
The forward linkage indicators measured for Southeast and East Asian regions show that Mining and quarrying (ISIC10-14) and Basic metals (ISIC 27) sectors are located in the upper stream of the industrial chain (Figure

Figure 13. Forward Linkage (Southeast Asia)



Note: Southeast Asia is Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, Thailand and Viet Nam. Industry average = 1.0.
Source: Region aggregate tables are estimated from the OECD Inter-country Inter-industry model (2011).

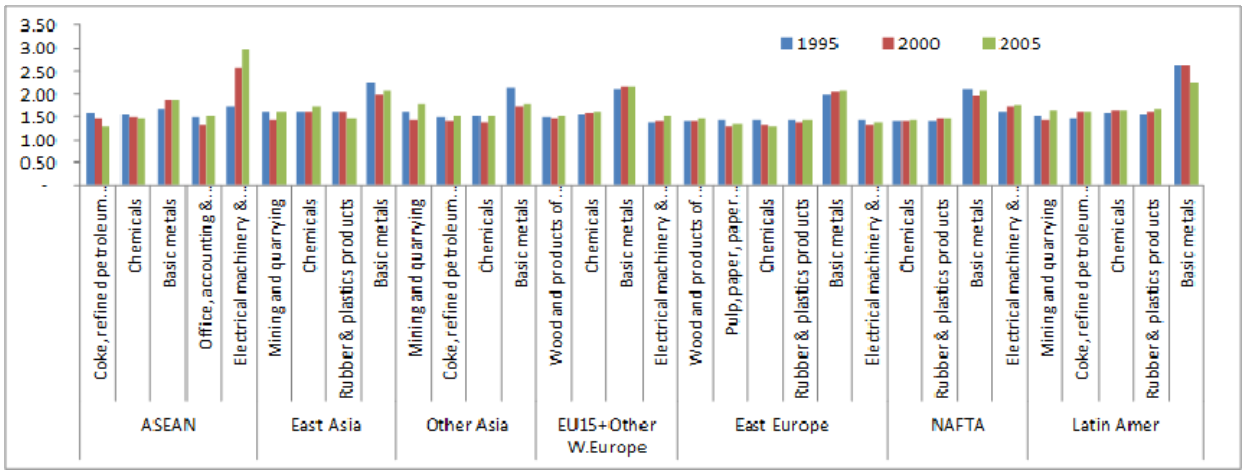
Figure 14. Forward Linkage (East Asia)



Note: East Asia is China, Chinese Taipei, Japan and Korea. Industry average = 1.0.
Source: Region aggregate tables are estimated from the OECD Inter-country Inter-industry model (2011).

If we define a key influential sector as a sector that has the higher magnitude of backward and forward linkage indices, the key sectors are selected by the multiple of backward and forward indicators. The material manufacturing sectors such as refined petroleum products, chemical products and basic metals are chosen as key sectors in each region. It should be noted again that there are some exceptions. Electric machinery has one of highest linkage impacts on economy in Southeast Asia, Western Europe and Northern America. Office and computing machinery is also selected as a key sector in ASEAN economy.

Figure 15. Key Sectors by Region



Note: Regional aggregates are derived from OECD Inter-country inter-industry model (2011). Forward linkage indicators are estimated based on Leontief inverse matrix and standardized by the average figure.

Source: OECD Input-Output Database (2011).

The Leontief inverse derives not only the economic impacts in terms of production, but it is also used as the multipliers of employment and income. For example, the value-added induced by final demand vector (F) can be defined as

$$V\,(\mathrm{I}\text{-}A)^{-1}\,\mathrm{F}$$

where V is a vector of sectoral GDP-Output ratio. The average value-added induced by each component of final demand expenditure e.g. household consumption and gross fixed capital formation in a country is then written as

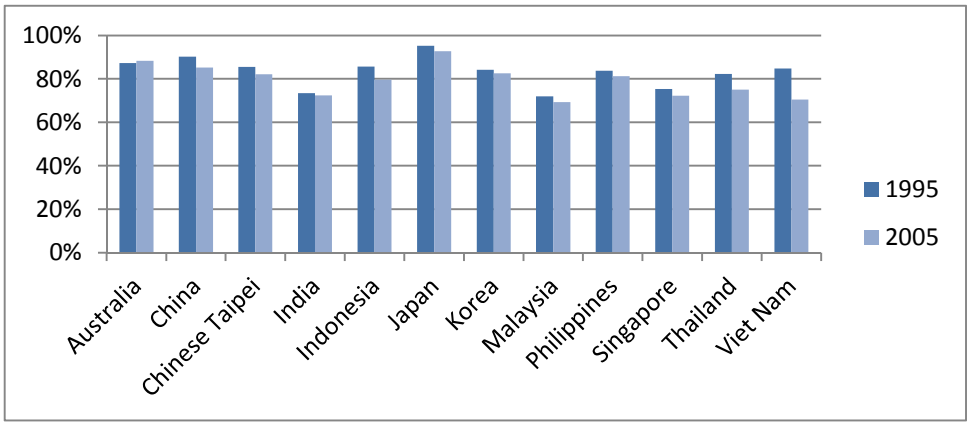
$$\left(V\left(I-A\right)^{-1}F\right)/(uF)$$

where u is unifying row vector.

Applying above formula to the input-output tables of our target economies, the decreasing in domestic value-added impacts over 1995 and 2005 are confirmed both for household consumption and gross fixed capital formation (Figure 16 and Figure 17). These indicators, in general, imply that the external leakages of economic

impacts are significant in smaller ASEAN countries particularly for Thailand and Viet Nam.

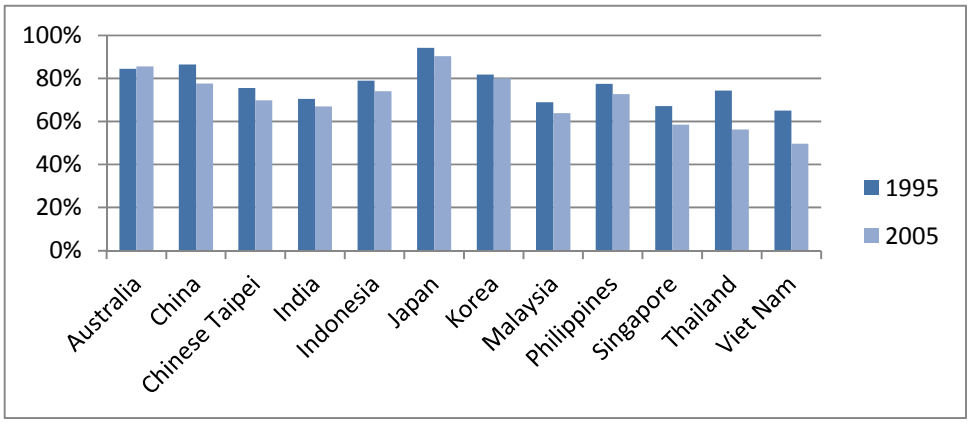
Figure 16. Domestic Impact Ratio of Household Consumption Expenditure (1995 and 2005)



Note: The figures for other countries are available in Annex

Source: OECD Input-Output Database (2011).

Figure 17. Domestic impact ratio of gross fixed capital formation expenditure (1995 and 2005)



Note: The figures for other countries are available in Annex

Source: OECD Input-Output Database (2011).

4. International Fragmentation Indicators

The framework of single country input-output model

As we have seen in the previous sections, the marginal economic effects of domestic final expenditures i.e. household consumption and capital investment are widely different across countries (Figure). It is also true for the domestic value-added (or import contents) of exports. **Import contents share of exports** (vertical specialization), a well known indicator on globalisation indicates the backward effects of global supply chains of exports. The indirectly imported intermediate values that are included by country's exports (ICE) is defined as

$$ICE = {uAm(I - Ad)^{-1}E} \Big/ {uE}$$

where u is a unifying row vector of 1, Am is import coefficient (import matrix / output), Ad is input coefficient of domestically provided goods and services (domestic transaction matrix / output), E is export vector of goods and services. Import contents share can also be estimated for individual sector's export.

Figure 18. Import Content of Exports (Total industry)

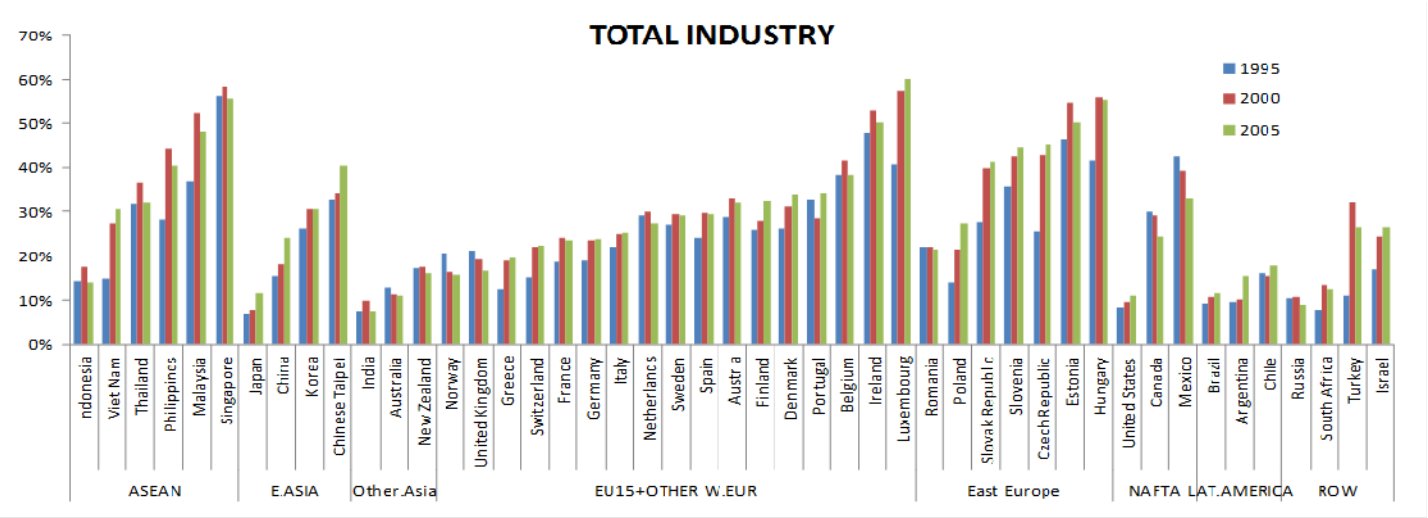


Figure 19. Import Content of Exports (Assembly Manufacturing)

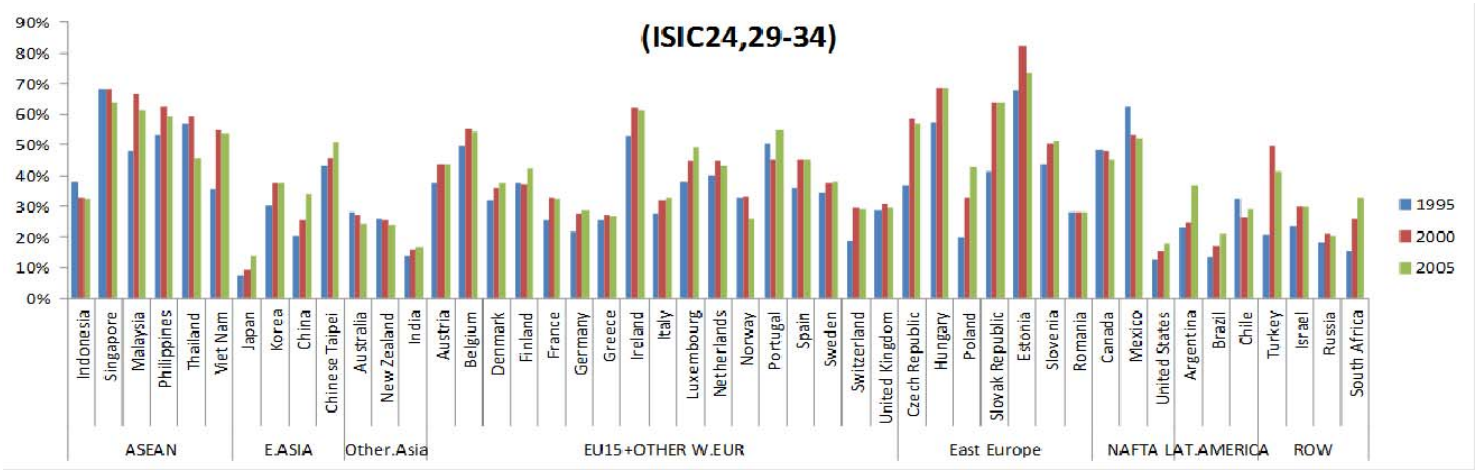
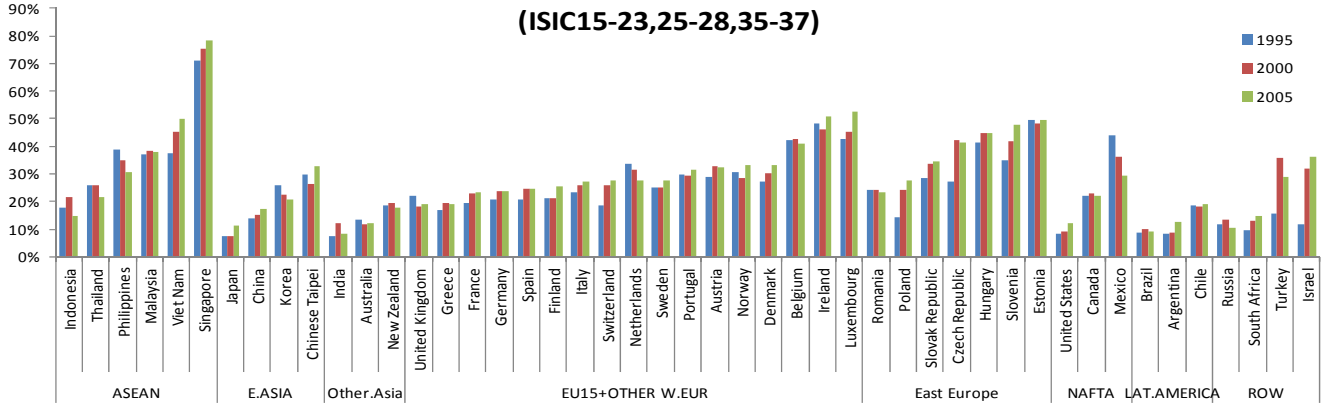
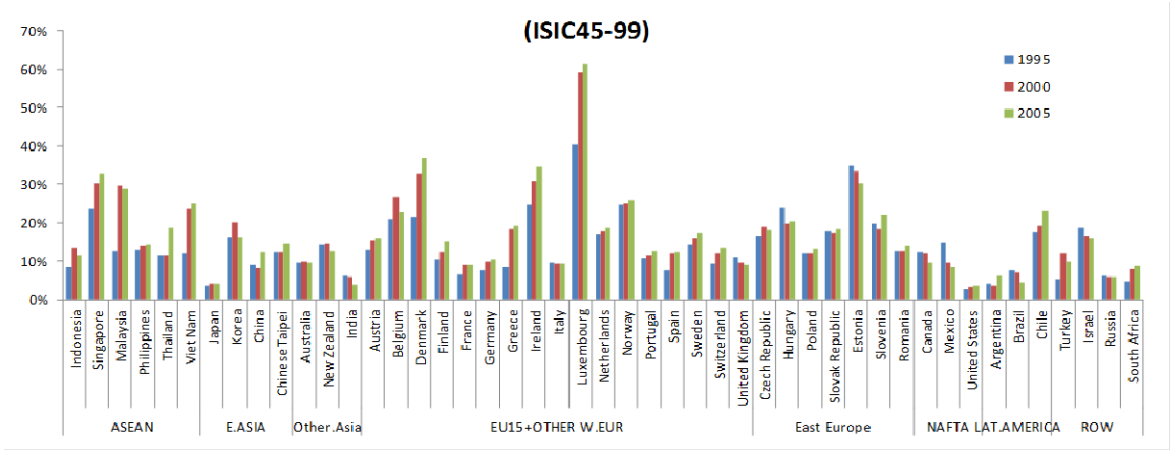


Figure 20. Import Content of Exports (Other manufacturing)



Note: Intermediate imports of mining sectors are excluded

Figure 21. Import Content of Exports (Services)



Note: Intermediate imports of mining sectors are excluded

Firstly, the natural resource oriented countries depend less on imported intermediates because these industries are primary suppliers to other industries. Also, large industrialized economies depend less imported goods due to the existence of wider variety of domestic suppliers. Divergent parts, equipment and services are available in larger countries.

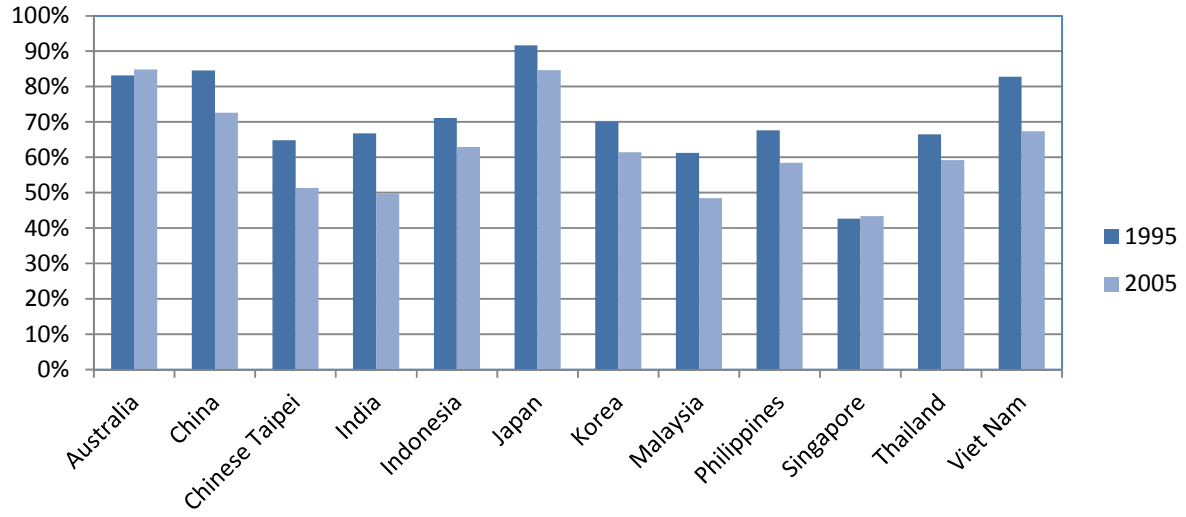
Note that the rest of the economic demand induced by exports is equal to domestic contents i.e. value-added (IVE) , so ICE is rewritten as

$$ICE = 1 - IVE ,$$

where *IVE* is $uV(I - Ad)^{-1}E \big/ uE$.

The marginal impacts on domestic value-added had decreased over 1995-2005 for most Asian countries (Figure). However, this marginal impact has increased in natural resource oriented economies such as Australia mainly due to the changes in the price effects of mining products.

Figure 22. Induced Value-added by Unit Exports



Other final expenditures of domestically provided goods and services e.g. government expenditure and gross fixed capital formation, indeed, induce intermediate imports as well.

The induced intermediate imports is, therefore, sum of each final expenditure components and written as

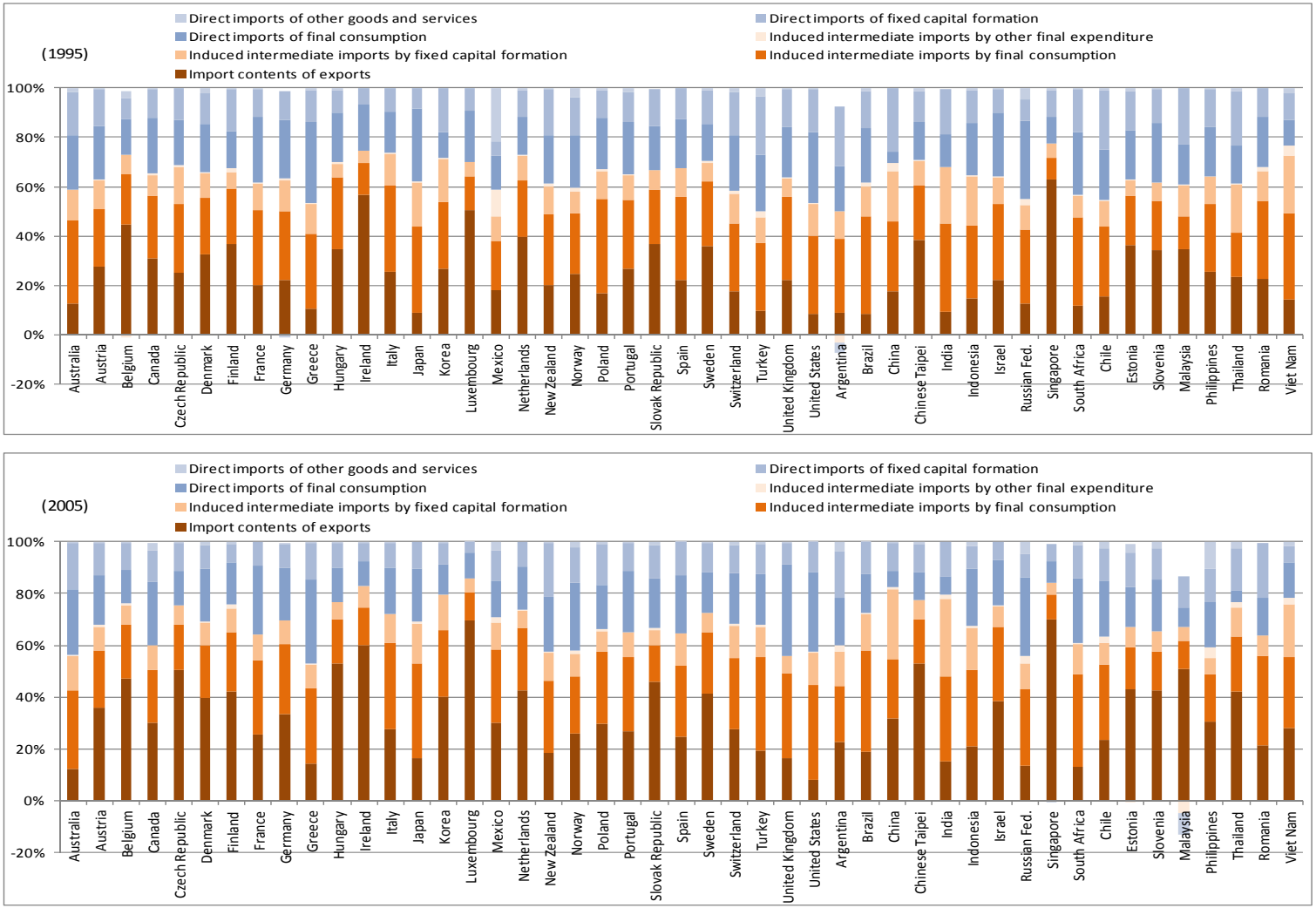
Intermediate imports = $u\left(Am(I-Ad)^{-1}(E+Fdc+Fdk+Fdi)\right)$

where Fdc is final consumption of domestic goods and services, final demand of domestic capital formation and Fdi is changes in inventories of domestic goods.

The total imports are then described as a sum of induced intermediate imports and direct imports of final goods and services as

Total imports = $u\left(Am(I-Ad)^{-1}(E+Fdc+Fdk+Fdi)+Fmc+Fmk+Fmi\right)$

Figure 23. Direct imports of final demand and induced intermediate imports (1995 and 2005)



The evidences of increased inter-country leakages of economic impact of unit increased in final expenditures i.e. exports, consumption and capital formation are confirmed by the backward linkages indicators separated by geographical regions or any other groups such as OECD member group and BRIICS.

Inter-country Input-output model framework

The evolution of fragmented production processes in different geographical regions and increased linkages of economic activity across borders have changed the structures of international spillover and feedback effects, the ripple effects on other countries. One effective database used in regional economics to record the transactions between regions is interregional input-output database.

The inter-country input-output database is useful data to measure the economic dependencies across countries in order to interpret the various economic policies e.g. formation of custom union, free-trade agreement and regional market integration. This database is not only useful to measure the globalisation indicator, but also it can be used as a fundamental data of various economic empirical models such as international computable general equilibrium model, environmental pollution embodied in international trade and international diffusions of innovation activities (R-D expenditures).

At OECD, using the harmonised input-output tables and bilateral trade coefficients in goods and services, the inter-country input-output tables for the reference years of 1995, 2000 and 2005 are estimated applying the multi-regional input-output model techniques previously established for regional analyses (Chenery-Moses; Isard).

The model specification and estimation procedures are briefly summarised as follows:

a) Preparation of Input-Output tables for reference years using the latest published data sources e.g. supply and use tables, national account and trade statistics.

b) Preparation of Bilateral import data in end-use for reference year

c) Conversion of c.i.f. price based imports to fob price-based imports to minimize the inconsistency issues of mirror trade (import=export) in international I-O system.

d) Separation of import matrix of national I-O tables by bilateral trade statistics

e) Total adjustment (missing sectors, trade with rest of the world, etc)

Once the inter-country table estimated, the countries can be easily aggregated to any regional blocs such as NAFTA, EU, and ASEAN. The regional aggregated database table allows us to examine directly the regional average figures of production and trade structures.

The non-domestic part of induced output i.e. **inter-country spillover effects,** have increased particularly in European region. This spillover effects is measured by the ratio of inter-country part of Leontief inverse (B). For simplicity, three countries example can be expressed as follows.

$$B = \left[(I - A)^{-1}\right] = \left[\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} - \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}\right]^{-1} = \begin{bmatrix} B_{11} & B_{12} & B_{13} \\ B_{21} & B_{22} & B_{23} \\ B_{31} & B_{32} & B_{33} \end{bmatrix}$$

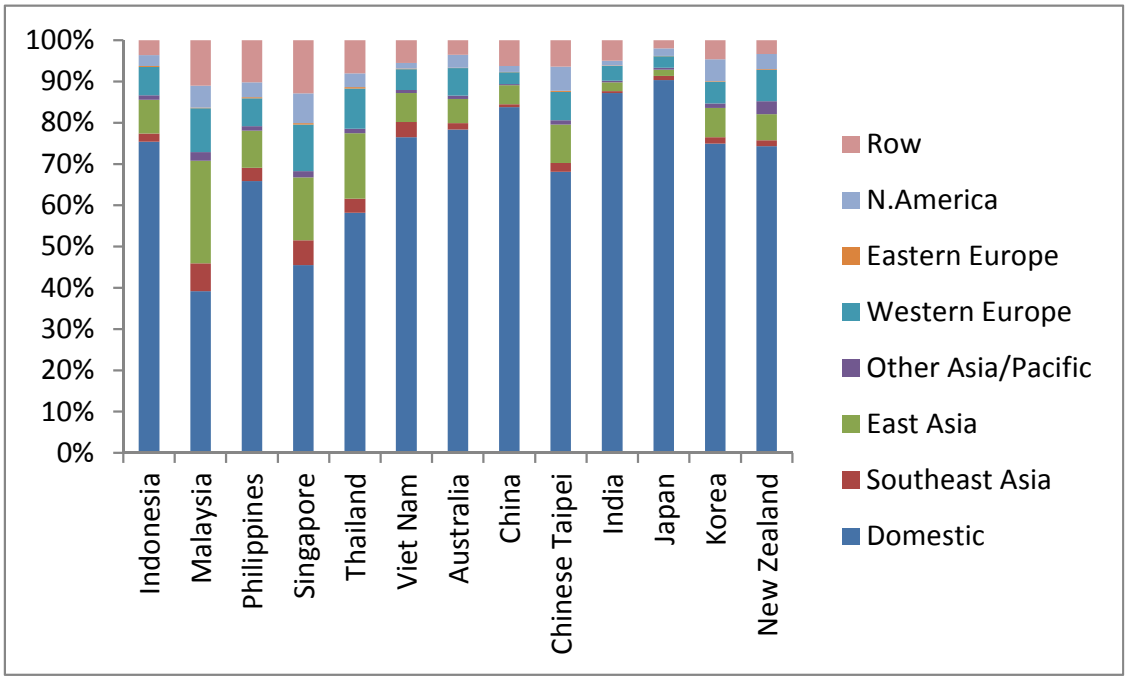
The spillover effect (S_1), the output induced in foreign countries due to the increase in final expenditure of country 1 is then defined as

$$S_1 = (B_{21}+B_{31})/(B_{11}+B_{21}+B_{31}).$$

The spillover magnitudes are widely different across Asian countries (Figure for Asian/Pacific countries and Annex for all target countries). While the induced output remains within domestic economy in large countries (China, India and Japan), the spillover magnitudes are greater in smaller Asian countries. In particular, the domestic impacts of final expenditures are less in the higher income countries in Southeast Asia (Malaysia, Singapore and Thailand). Nonetheless, most of the ripple effects of these countries are still

confined in the other Asian countries; more than 70% of total economic effects are induced within Asia/Pacific region.

Figure 24. Inter-country Spillover effects



Source: OECD Inter-country inter-industry model (March 2011)

More advanced inter-country I-O based indicator such as **Fragmentation chain index** measures the complete effects involved in induced intermediate trade regarding increases in country's exports of final expenditure. While the import contents share index of single country framework does not measure the further inducement effects of trade by partner countries, our fragmentation chain index explicitly measure the indirect trade flows.

Figure 25. International Fragmentation Production Process

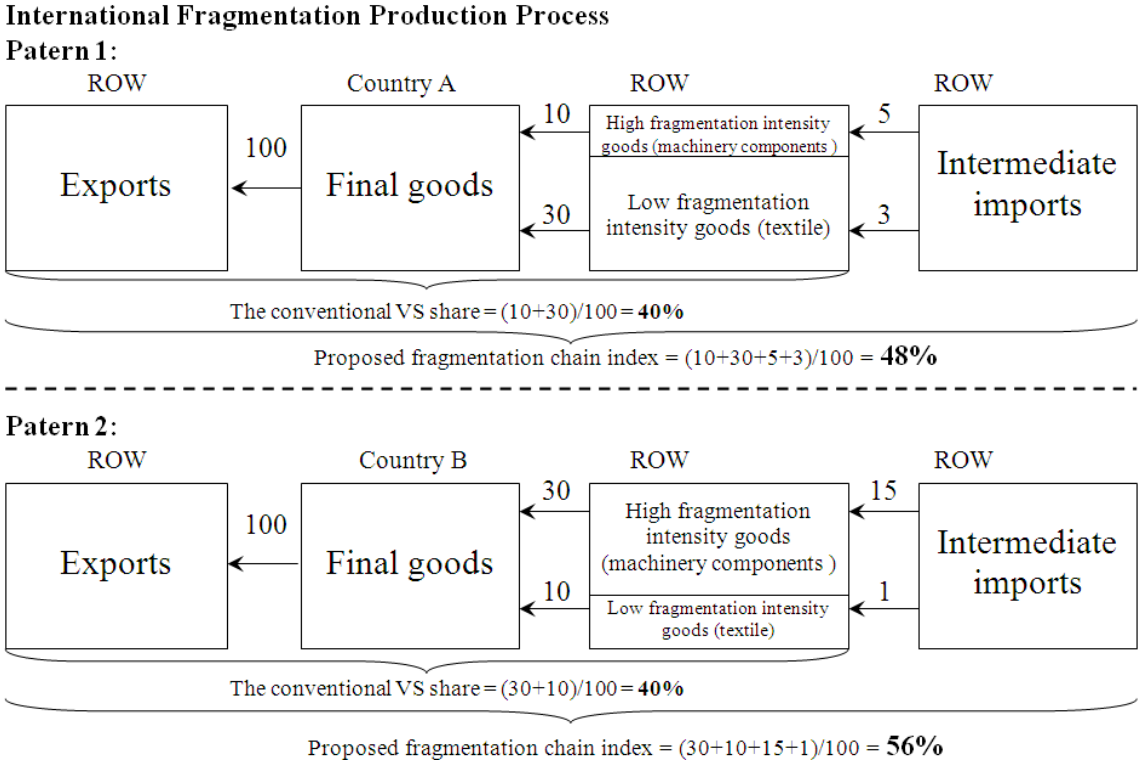
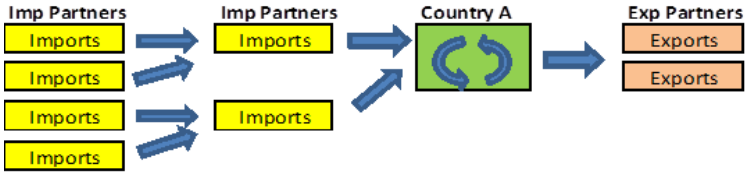


Figure illustrates an example of international fragmentation in multi-country framework. Both target country A and B import total of 40-unit intermediate goods from the rest of the world (ROW) to produce 100 units exporting goods for the ROW. In this case, the conventional VSs for both counties are measured at the same level of 40%. However, the component (structure) of imported intermediate goods for both countries is different. For country A, its imports include 10-unit high fragmentation intensity goods (machinery), and 30-unit low fragmentation intensity goods (textile). On the other hand, Country B's imports comprise 30-unit high fragmentation intensity goods, and 10-unit low fragmentation intensity goods. As a result, the further induced intermediate imports due to country A's exports may be 8 units, and for country B, the figure should be larger than the case of country A since for producing high fragmentation intensity goods, much more intermediate imports will be induced in ROW by global production networks. When considering the spillover impact by

the way of the ROW, it is easy to see that the participation degrees measured by the proposed Fragmentation Chain Index for the target countries are different.



Let the global intermediate transactions (N countries x S sectors) induced by final demand is written as

$$Z = A\,diag([I - A]^{-1} F),$$

where F is a column vector of final demand (N countries x S sectors).

Direct intermediate imports of country A (FCd) is then defined as

$$FCd = u(\Theta \otimes Z)u \Big/ \sum E$$

where u is again unifying vector, Θ is the element of 1 for the cells corresponds to import matrix of country A, and $\otimes$ represents a cell-by-cell multiplier calculation.

The rest of international fragmentation transactions (FCr) is $FCr = u(\Psi \otimes Z)u \Big/ \sum E$

where Ψ is a matrix with element of 1 for the off-diagonal parts. For simplicity, the three regions examples can be expressed as follows

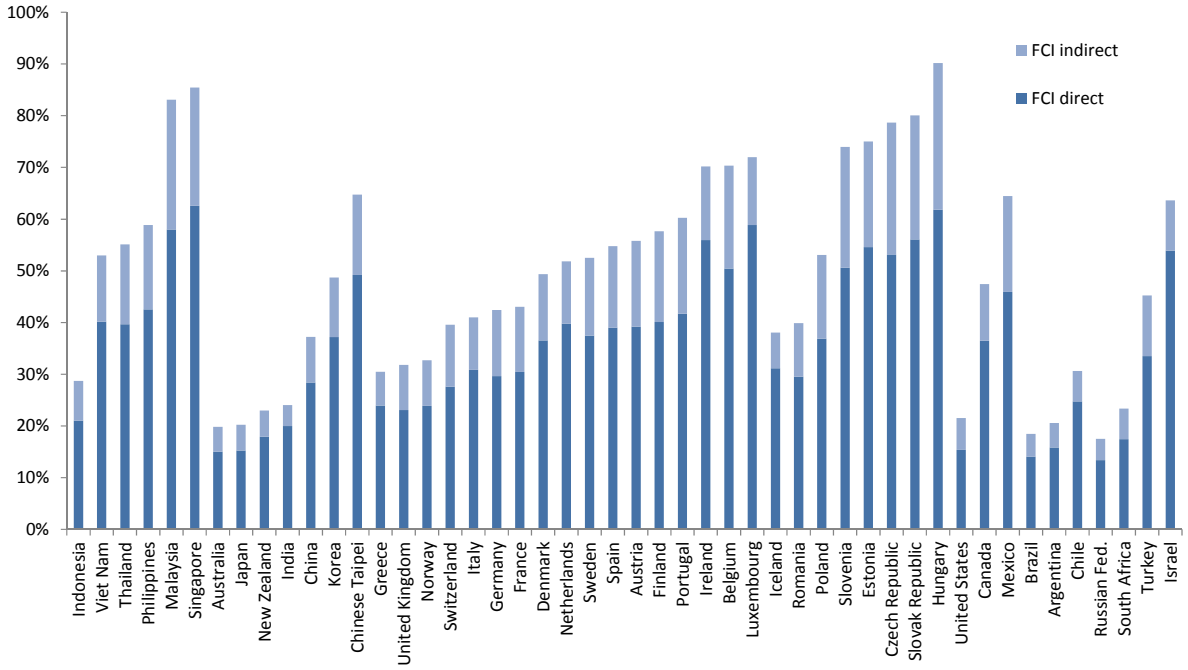
$$Z = A \cdot diag\left[(I - A)^{-1} \begin{bmatrix} F_1 \\ 0 \\ 0 \end{bmatrix} \right] = \begin{bmatrix} z_{11} & z_{12} & z_{13} \\ z_{21} & z_{22} & z_{23} \\ z_{31} & z_{32} & z_{33} \end{bmatrix}$$

$$FCI_1 = FCd + FCr = u \begin{bmatrix} 0 & 0 & 0 \\ 1 & 0 & 0 \\ 1 & 0 & 0 \end{bmatrix} \otimes \begin{bmatrix} z_{11} & z_{12} & z_{13} \\ z_{21} & z_{22} & z_{23} \\ z_{31} & z_{32} & z_{33} \end{bmatrix} u / F_1 + u \begin{bmatrix} 0 & 1 & 1 \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix} \otimes \begin{bmatrix} z_{11} & z_{12} & z_{13} \\ z_{21} & z_{22} & z_{23} \\ z_{31} & z_{32} & z_{33} \end{bmatrix} u / F_1$$

$$= (z_{21} + z_{31}) / F_1 + (z_{12} + z_{32} + z_{13} + z_{23}) / F_1$$

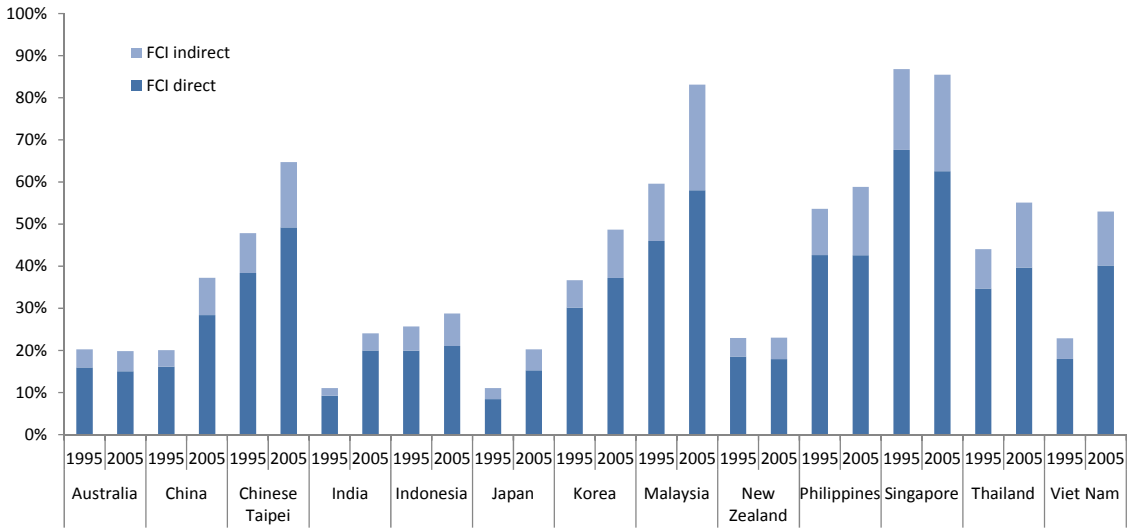
The indirect induced trade flows are not explicitly measured in conventional vertical specialization index of single-country based framework. For most countries, total fragmentation chain has increased between 1995 and 2005, and contributions of indirect imports are evident. The conventional vertical specialisation measures underestimate the fragmentation magnitudes around 10 to 20%. The measurement result of Indonesia, for example, clearly illustrates the differences between conventional measurement results and overall effects. Although the direct effect decreased in 1995 to 2005, the total fragmentation magnitude increased due to the significant increase in indirect part. It is also true for most countries that the indirect fragmentation chain index has increased more, so the global value chains become longer and inter-country spillover effect plays more import role in the whole production processes.

Figure 26. Fragmentation chain index (1995 and 2005)



Source: OECD Inter-country inter-industry model (March 2011)

Figure 27. Fragmentation chain index for Asia (1995 and 2005)



Source: OECD Inter-country inter-industry model (March 2011)

Average propagation length (APL) indicator in multi-country framework, another advanced analysis using inter-country input-output model, indicates the complexity of inter-industry transaction both domestic and inter-country production network. APL is an indicator which indicates the complexity of inter-industrial transactions in the input-output table (Dietzenbacher and Romero, 2007; Romero *et al*., 2009; Inomata, 2008). While backward linkage indicator only shows the overall effects of marginal changes in final demand for each sector in target economy, APL allows us to evaluate the fragmentation process into spatial fragmentation and functional fragmentation.

The APL indicator APL_{ij} can be defined as follows:

$$APL_{ij}=H_{ij}/B_{ij} \text{ for } i\neq j,\ L_{ij}=H_{ij}/(B_{ij}-1) \text{ for } i=j$$

where, $B = (I-A)^{-1} = (I+A+A^2+A^3\ldots)$ is Leontief inverse, $H=(I+1A+2A^2+3A^3\ldots)=B(B-I)$ is the APL related matrix.

Using single national I-O table (with *n* sectors), the average figures of propagation by industry and country are given as

- Average propagation length of industry i $= \sum_j APL_{ij} / n$.
- Average propagation length of total economy $= \sum_i \sum_j APL_{ij} /(nn)$.

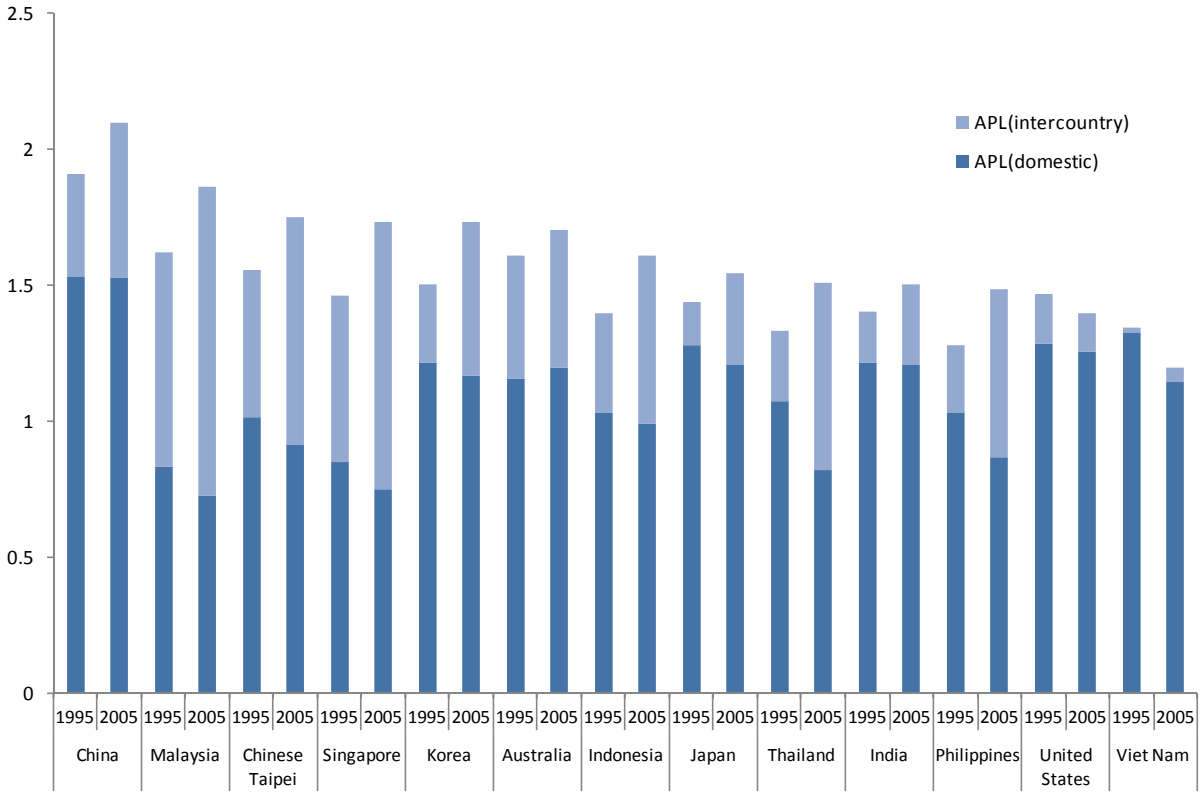
In the framework of inter-country I-O model, the APL indicator can be easily decomposed into domestic and internationally fragmented parts separately as shown below:

$$APL = APLd + APLm$$

- $$\begin{bmatrix} APL_{11} & APL_{12} \\ APL_{21} & APL_{22} \end{bmatrix} = \begin{bmatrix} APL_{11} & 0 \\ 0 & APL_{22} \end{bmatrix} + \begin{bmatrix} 0 & APL_{12} \\ APL_{21} & 0 \end{bmatrix}$$

The measurement results for Asian and clearly indicate that the propagation production processes has increased particularly in foreign propagation. The magnitude of changes in this index basically follows the result of fragmentation chain index.

Figure 28. Average propagation link indicator in multi-country framework



Source: OECD Inter-country inter-industry model (March 2011)

Finally, **Production stage decomposition analysis** is a technique developed to extract the transaction at each production process. Using the input coefficient of inter-country input-output table, following decomposition technique explicitly gives the orders of economic impacts on domestic and foreign economies for each production stage

Leontief inverse (B) = $(I-A)^{-1}$ where I is diagonal matrix and A is input coefficient.

$$B= (I+A+A^2+\ldots)$$

For example, 95% of original output is reproduced by the 4^{th} stage of production network in the OECD inter-country input-output table i.e.

0.95 sum $((I-A)^{-1}$ FD) = sum $((I+A+ A^2+A^3+ A^4)$FD). However, the number of indirect production stages to reach 95% of original output is very different across sectors and countries. In general, country has complex machinery manufacturing sectors such as automobile assembly sectors have high backward effects and depends on longer supply chains, while most of services sectors demand is accomplished by few stages of indirect inter-industry linkages.

Note that more detailed analysis of production stage decomposition is to decompose the transaction by each sectoral linkage and gives the order of magnitude of linkages in the perspectives of both country and industry. This analysis explicitly gives the insights of trade and industry policy implications at detailed sectors of specific bilateral relationship, but the computing requirement demand is enormous. It is recommended that the sectors and countries to be grouped at certain levels to achieve the results in time.

Figure 29. Spillover of GDP by production stages (ASEAN, East Asia and Other Asia/Pacific)

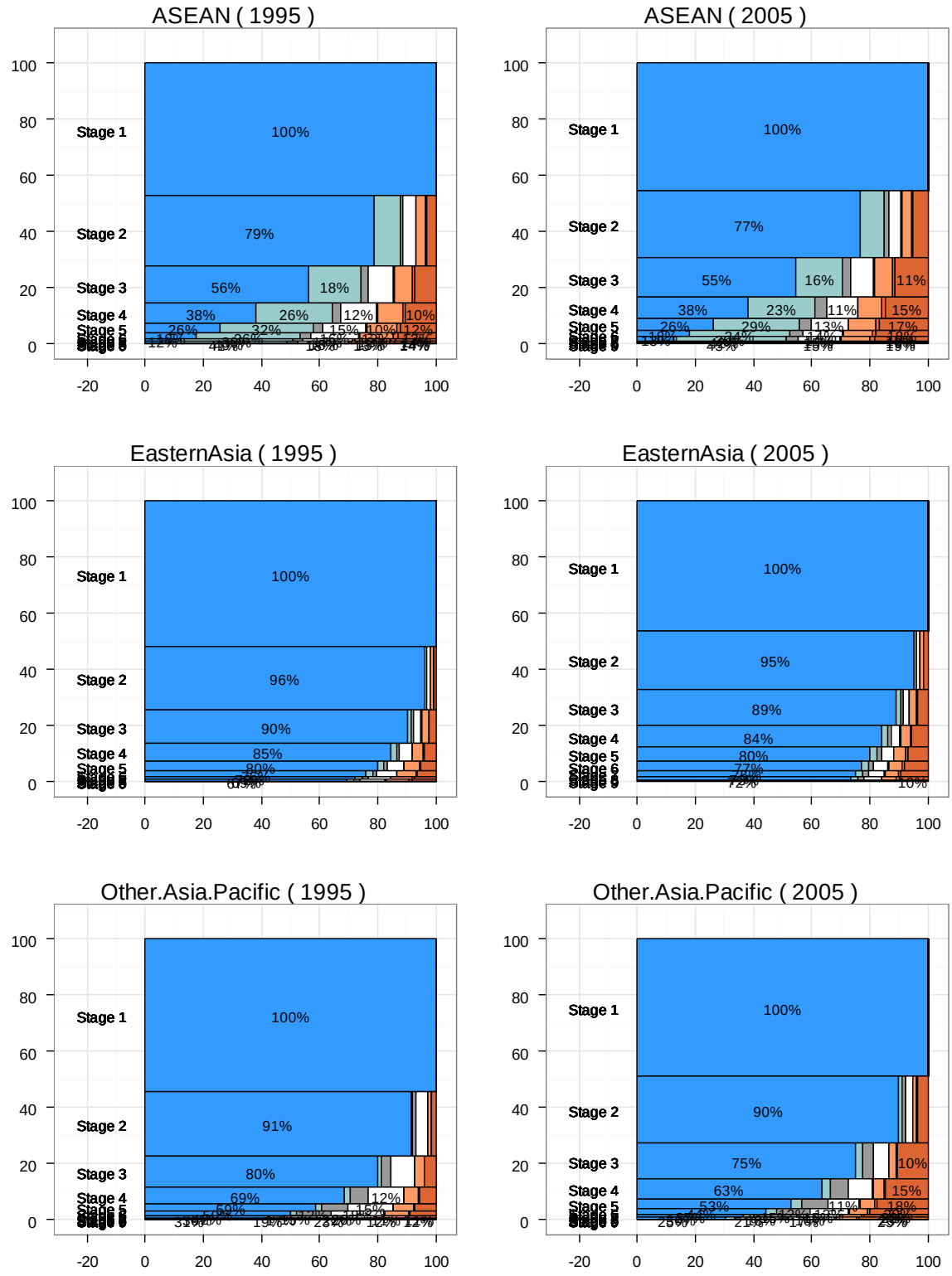
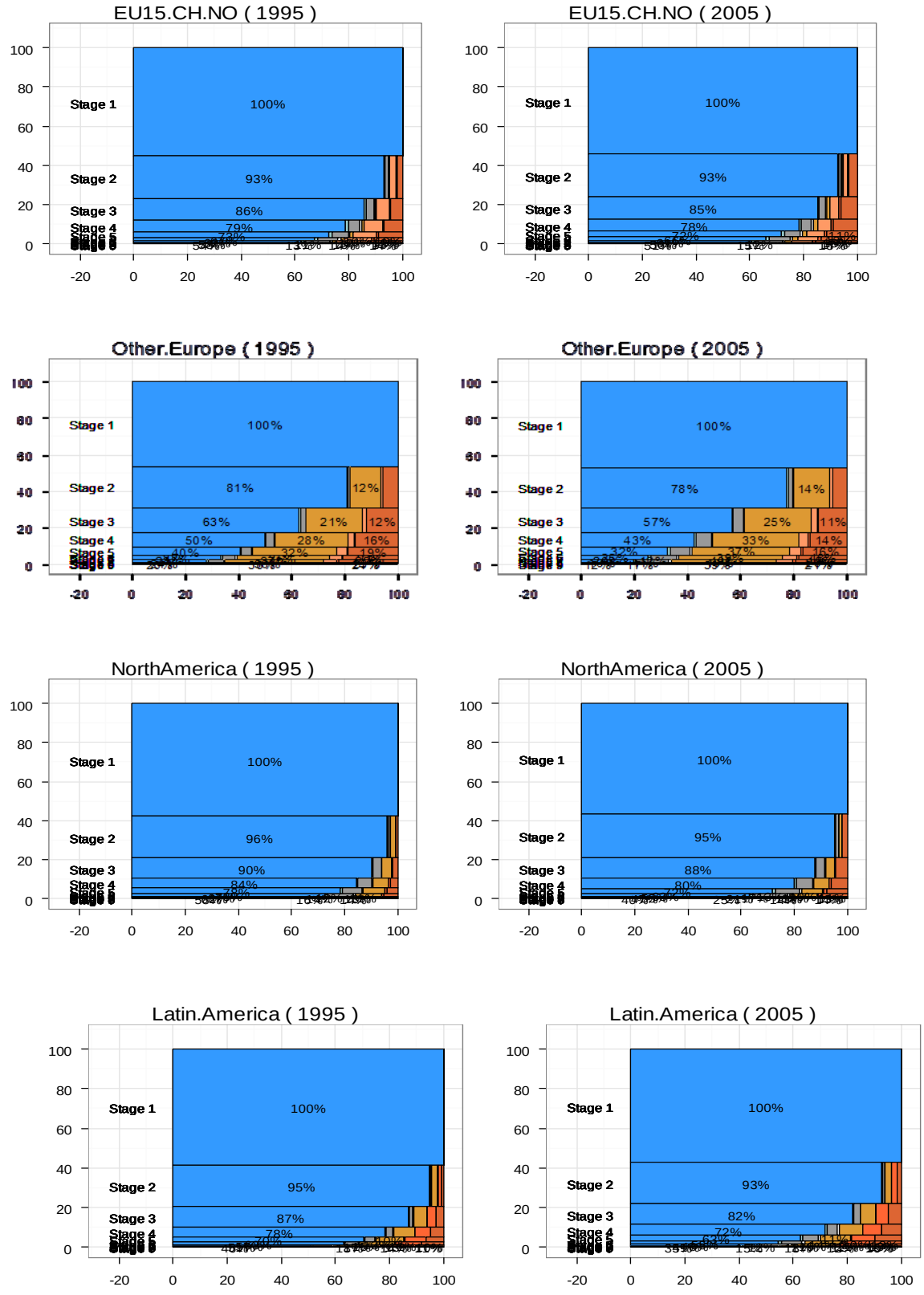


Figure 30. Spillover of GDP by production stages (EU15+Switzerland+Norway, Other Europe, North America and Latin America



5. Concluding Remarks

Firstly, the measured indicators of bilateral trade in end-use and input-output fragmentation indices, in general, show that the participation intensities on global production network of large and developed countries are relatively stable compared to the emerging countries in Asia. These differences imply two evolutionary patterns of division of labour across countries.

1) The relative positions in global production networks of smaller economies, on the other hand, are sensitive to the changes in external factors such as removal of trade barriers and changes in final expenditure patterns in larger countries.
2) The industrial specialisation is less visible in larger countries, because their domestic production networks are much more self-contained that those in smaller countries.

Secondly, it is clear from the impact of globalisation that all countries have increased the dependencies on external markets both for inputs (intermediate and final goods imports) and outputs (exports). It is thus evident that the marginal gain in terms of value-added from exports and other final demand components has decreased in most countries. However, the total value added from trade increased in Asian countries, as the total volume of exports rose.

The measurement limitation of the framework of single-country, input-output model is obvious, and the inter-country, input-output model is a very useful tool to understand the inter-country spillover.

However, the inter-country, input-output model is a data-intensive approach. It requires highly harmonised data from neighbour countries to measure the inter-country economic spillover. We should therefore suggest that the statistical cooperation across Asian countries become much more important to pursue this research avenue.

As we have seen that the evolution of production networks is affected by complex factors, the unidirectional impact of regional integration is not clearly identifiable.

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Annex

A. Data sources

OECD Input-Output Database: Symmetric inter-industry Input-output for the mid 1990s – the mid 2000s. The latest (March 2011) dataset has expanded the country coverage to 43 countries for the mid 1990s and the early 2000s, and 39 countries for the mid 2000s. Published based national input-output data sources of each country are converted to symmetric input-output tables in harmonized format using various estimation procedures (Yamano and Ahmad, 2006).

In this project, the coverage of database has expanded to include majority of South Eastern and Eastern Asian countries (14 countries).

OECD STAN BTD-End-use Category: The annual merchandize trade statistics for the years after late 1980s is available for all countries in the harmonized detail classification. Using the detailed database (6 digit level in various HS codes) of OECD ITCS and UN Comtrade trade statistics, commodities are classified into following end-use category by industry group: intermediates, household consumption, gross fixed capital formation, motor vehicles and miscellaneous. This sectoral bilateral trade database by end-use becomes very useful database to estimate the import matrix for the countries the official import matrix is not available and to link the country tables to develop inter-country inter-industry model. For example, the specific events of changes in trade structures of 2000s, i.e. the evolution of global supply chain in regional trade blocs and trade collapse in 2008/09 can be examined.

Bilateral trade in services: The data sources for bilateral trade in services increasing become available for recent years as the offshoring of services has been significantly increasing in all OECD countries (OECD, 2008).

B. Trade Indicator results

Table B1. Trade dependency indicators

	Net trade / Export			Intermediate import / Output			Export / GDP		
	1995	2005	change	1995	2005	change	1995	2005	change
Argentina	0%	7%	7%	3%	6%	3%	11%	25%	15%
Australia	-3%	-3%	0%	6%	6%	0%	19%	20%	0%
Austria	-3%	2%	5%	12%	15%	3%	31%	46%	15%
Belgium	6%	5%	-1%	17%	19%	2%	58%	63%	6%
Brazil	-2%	4%	6%	3%	5%	1%	8%	18%	9%
Canada	-1%	4%	5%	12%	11%	-2%	36%	38%	2%
Chile	-6%	0%	6%	9%	12%	2%	28%	41%	13%
China	3%	5%	3%	5%	9%	4%	22%	37%	15%
Chinese Taipei	4%	6%	2%	14%	20%	5%	47%	67%	20%
Czech Republic	-7%	3%	10%	13%	21%	8%	42%	79%	38%
Denmark	6%	6%	0%	10%	15%	5%	35%	50%	15%
Estonia	-23%	-12%	11%	23%	24%	1%	75%	75%	0%
Finland	9%	5%	-4%	10%	14%	4%	40%	46%	6%
France	0%	-2%	-2%	7%	9%	1%	23%	26%	3%
Germany	2%	7%	5%	7%	11%	3%	23%	37%	14%
Greece	-9%	-15%	-6%	8%	10%	2%	19%	19%	0%
Hong Kong	-1%	0%	1%	3%	2%	-1%	11%	8%	-3%
Hungary	-22%	-4%	18%	25%	24%	0%	58%	72%	14%
Iceland	-4%	-15%	-11%	13%	8%	-5%	34%	21%	-13%
India	-1%	-4%	-3%	4%	9%	4%	11%	19%	8%
Indonesia	-1%	5%	6%	8%	10%	2%	23%	34%	11%
Ireland	14%	14%	0%	28%	27%	-1%	95%	89%	-6%
Israel	7%	1%	-6%	7%	16%	9%	29%	46%	16%
Italy	2%	-1%	-4%	8%	9%	1%	26%	27%	1%
Japan	1%	1%	0%	3%	5%	2%	9%	15%	5%
Korea	-4%	1%	5%	11%	13%	2%	30%	40%	10%
Luxembourg	16%	17%	1%	24%	37%	13%	87%	139%	52%
Malaysia	-4%	36%	39%	24%	29%	5%	95%	130%	35%
Mexico	-35%	-3%	32%	20%	11%	-9%	26%	25%	0%
Netherlands	8%	9%	2%	14%	15%	1%	47%	52%	5%
New Zealand	3%	1%	-2%	8%	7%	0%	32%	30%	-2%
Norway	5%	18%	13%	11%	10%	-1%	42%	49%	8%
Philippines	-9%	-16%	-8%	15%	19%	5%	36%	45%	9%
Poland	0%	-1%	-1%	7%	11%	4%	24%	38%	13%
Portugal	-10%	-13%	-3%	12%	13%	1%	30%	29%	-1%
Romania	-5%	-12%	-7%	11%	14%	3%	30%	34%	4%
Russian Fed.	4%	11%	7%	6%	7%	0%	26%	34%	7%
Singapore	12%	31%	19%	34%	36%	2%	129%	150%	21%
Slovak Republic	3%	-5%	-8%	16%	24%	8%	64%	84%	20%
Slovenia	-5%	-4%	0%	15%	20%	5%	60%	65%	5%
South Africa	3%	-3%	-6%	5%	7%	2%	21%	23%	2%
Spain	-4%	-9%	-5%	8%	10%	2%	20%	24%	4%
Sweden	9%	10%	2%	12%	14%	2%	43%	51%	8%
Switzerland	5%	3%	-2%	6%	11%	5%	25%	37%	11%
Thailand	-16%	6%	22%	16%	19%	3%	42%	67%	25%
Turkey	-8%	-14%	-6%	7%	12%	4%	19%	23%	5%
United Kingdom	0%	-4%	-4%	9%	8%	0%	29%	26%	-3%
United States	-1%	-5%	-4%	3%	4%	1%	10%	9%	-1%
Viet Nam	-1%	-6%	-4%	9%	22%	12%	25%	58%	33%

Table B2. Selected leading imports (partner shares,1995)

South-Eastern Asia	(Mil.USD)	ASEAN	East Asia	Other Asia/Pc	EU15	Eastern Europe	North America	Latin America	RoW
Brunei									
Food products, beverages and tobacco	172	81%	2%	8%	3%	0%	3%	0%	3%
Machinery & equipment, nec	143	22%	20%	1%	16%	0%	22%	0%	18%
Motor vehicles, trailers & semi-trailers	147	19%	56%	0%	17%	0%	1%	0%	7%
Cambodia									
Food products, beverages and tobacco	155	74%	8%	2%	8%	0%	2%	0%	6%
Textiles, textile products, leather and footwear	939	11%	67%	1%	1%	0%	0%	0%	20%
Coke, refined petroleum products and nuclear fuel	211	99%	0%	0%	0%	0%	0%	0%	1%
Indonesia									
Coke, refined petroleum products and nuclear fuel	9,453	61%	19%	1%	0%	0%	1%	0%	17%
Chemicals	7,250	27%	31%	7%	17%	0%	9%	1%	7%
Machinery & equipment, nec	5,724	16%	46%	4%	23%	0%	10%	1%	0%
Malaysia									
Chemicals	7,663	30%	32%	4%	18%	0%	11%	0%	6%
Office, accounting & computing machinery	8,360	24%	64%	0%	3%	0%	9%	0%	0%
Radio, television & communication equipment	28,818	22%	42%	0%	14%	0%	20%	0%	2%
Philippines									
Mining and quarrying	4,045	16%	2%	2%	0%	0%	1%	3%	77%
Office, accounting & computing machinery	3,450	17%	75%	0%	3%	0%	5%	0%	0%
Radio, television & communication equipment	16,645	14%	38%	0%	8%	0%	39%	0%	1%
Singapore									
Mining and quarrying	16,020	14%	8%	6%	0%	0%	0%	0%	71%
Office, accounting & computing machinery	16,891	42%	38%	1%	6%	1%	11%	0%	0%
Radio, television & communication equipment	48,680	31%	51%	0%	9%	0%	8%	0%	1%
Thailand									
Mining and quarrying	17,332	15%	0%	3%	1%	0%	0%	0%	80%
Basic metals	12,225	6%	50%	14%	8%	0%	2%	3%	16%
Radio, television & communication equipment	12,469	20%	62%	0%	6%	0%	12%	0%	0%
Viet Nam									
Textiles, textile products, leather and footwear	3,920	6%	85%	1%	4%	0%	1%	1%	2%
Coke, refined petroleum products and nuclear fuel	4,703	53%	37%	0%	0%	0%	0%	0%	10%
Chemicals	4,925	29%	47%	4%	10%	0%	3%	0%	6%
Eastern Asia	**(Mil.USD)**	**ASEAN**	**East Asia**	**Other Asia/Pc**	**EU15**	**Eastern Europe**	**North America**	**Latin America**	**RoW**
China									
Mining and quarrying	69,189	6%	0%	17%	2%	0%	2%	8%	64%
Chemicals	67,574	11%	51%	2%	13%	0%	13%	1%	10%
Radio, television & communication equipment	98,718	24%	63%	0%	5%	0%	6%	0%	1%
Chinese Taipei									
Mining and quarrying	23,821	13%	6%	10%	1%	0%	1%	1%	68%
Chemicals	21,051	8%	50%	1%	16%	0%	18%	0%	7%
Radio, television & communication equipment	33,535	20%	50%	0%	6%	0%	12%	0%	12%
Hong Kong									
Textiles, textile products, leather and footwear	40,261	2%	85%	1%	7%	0%	1%	1%	2%
Office, accounting & computing machinery	27,792	18%	71%	0%	4%	0%	6%	0%	1%
Radio, television & communication equipment	76,788	18%	73%	0%	4%	0%	5%	0%	1%
Japan									
Mining and quarrying	113,167	14%	2%	12%	0%	0%	2%	3%	66%
Food products, beverages and tobacco	35,295	13%	21%	12%	14%	0%	27%	7%	6%
Korea									
Mining and quarrying	53,962	13%	4%	9%	0%	0%	1%	3%	68%
Chemicals	23,007	6%	47%	1%	18%	0%	21%	1%	4%
Radio, television & communication equipment	29,090	19%	53%	0%	6%	0%	21%	0%	1%
Australia									
Chemicals	13,121	5%	12%	2%	42%	0%	18%	0%	20%
Machinery & equipment, nec	12,895	6%	28%	3%	37%	0%	21%	1%	4%
Motor vehicles, trailers & semi-trailers	14,109	10%	52%	1%	22%	1%	10%	1%	4%
New Zealand									
Chemicals	2,324	9%	16%	22%	29%	0%	16%	0%	8%
Machinery & equipment, nec	2,244	4%	30%	10%	38%	0%	17%	1%	1%
Motor vehicles, trailers & semi-trailers	2,966	6%	51%	15%	20%	0%	5%	0%	2%
India									
Mining and quarrying	75,033	1%	1%	3%	7%	0%	0%	0%	88%
Chemicals	12,840	12%	24%	1%	20%	1%	13%	1%	29%
Basic metals	16,620	2%	9%	13%	40%	1%	2%	0%	32%

C. Export share by industry and category

Figure C1. Export share by industry and category (Australia)

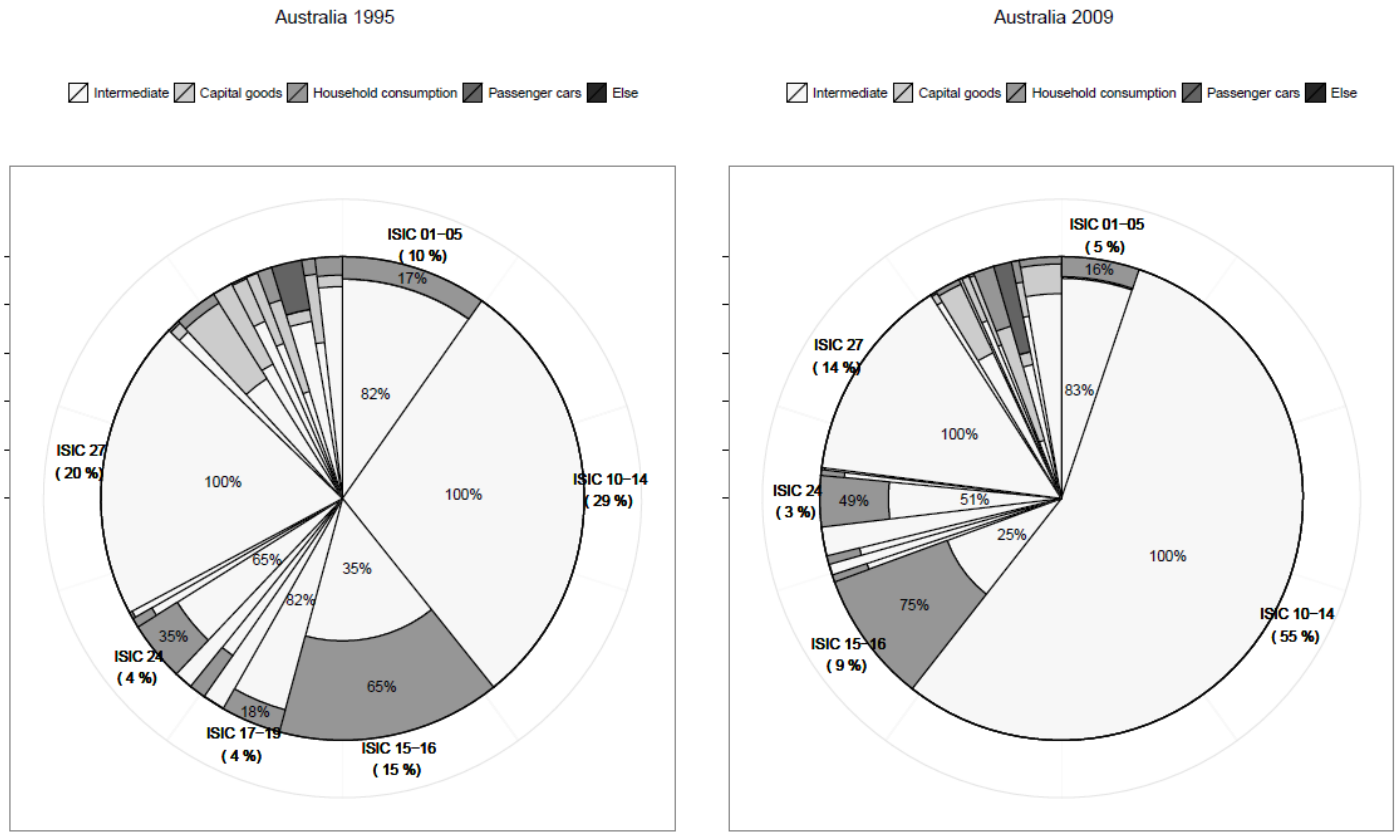


Figure C2. Export share by industry and category (Brunei Darussalam)

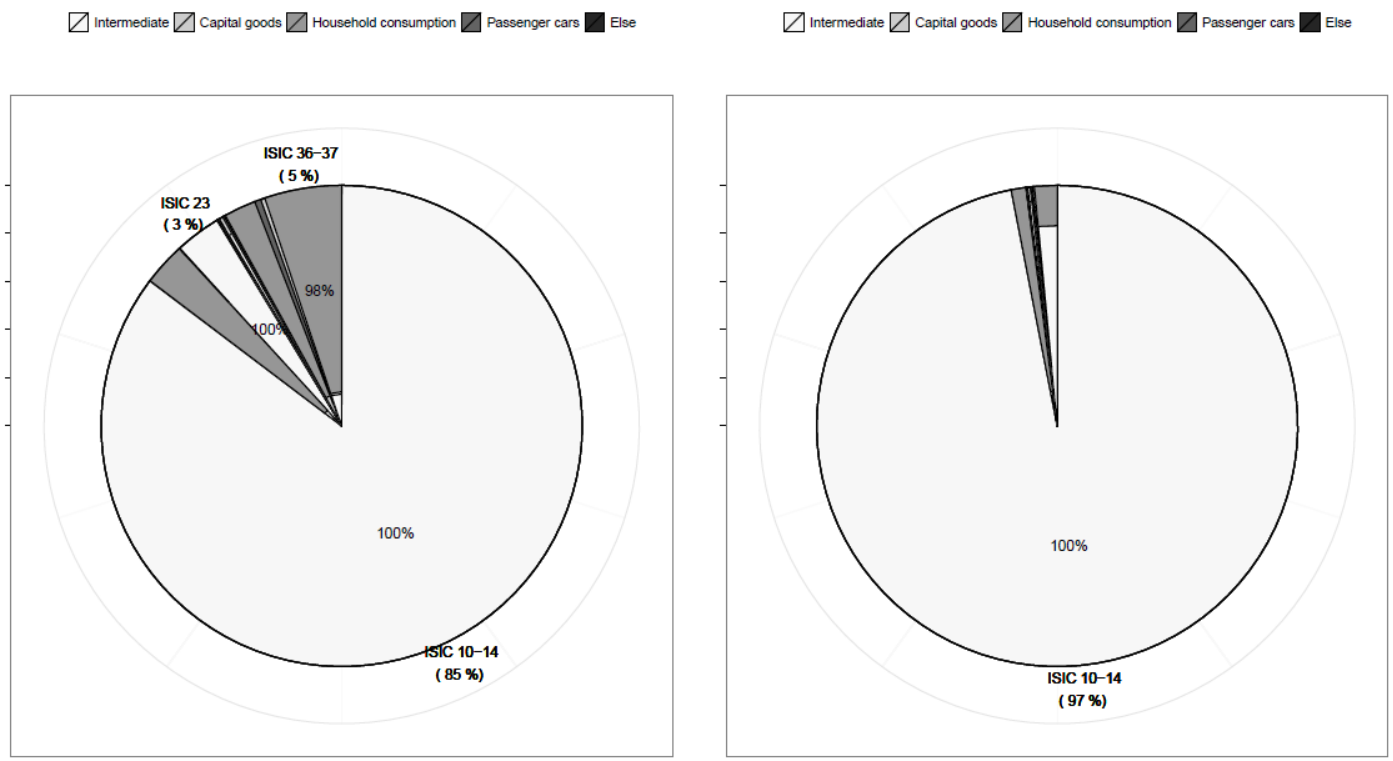


Figure C3. Export share by industry and category (China)

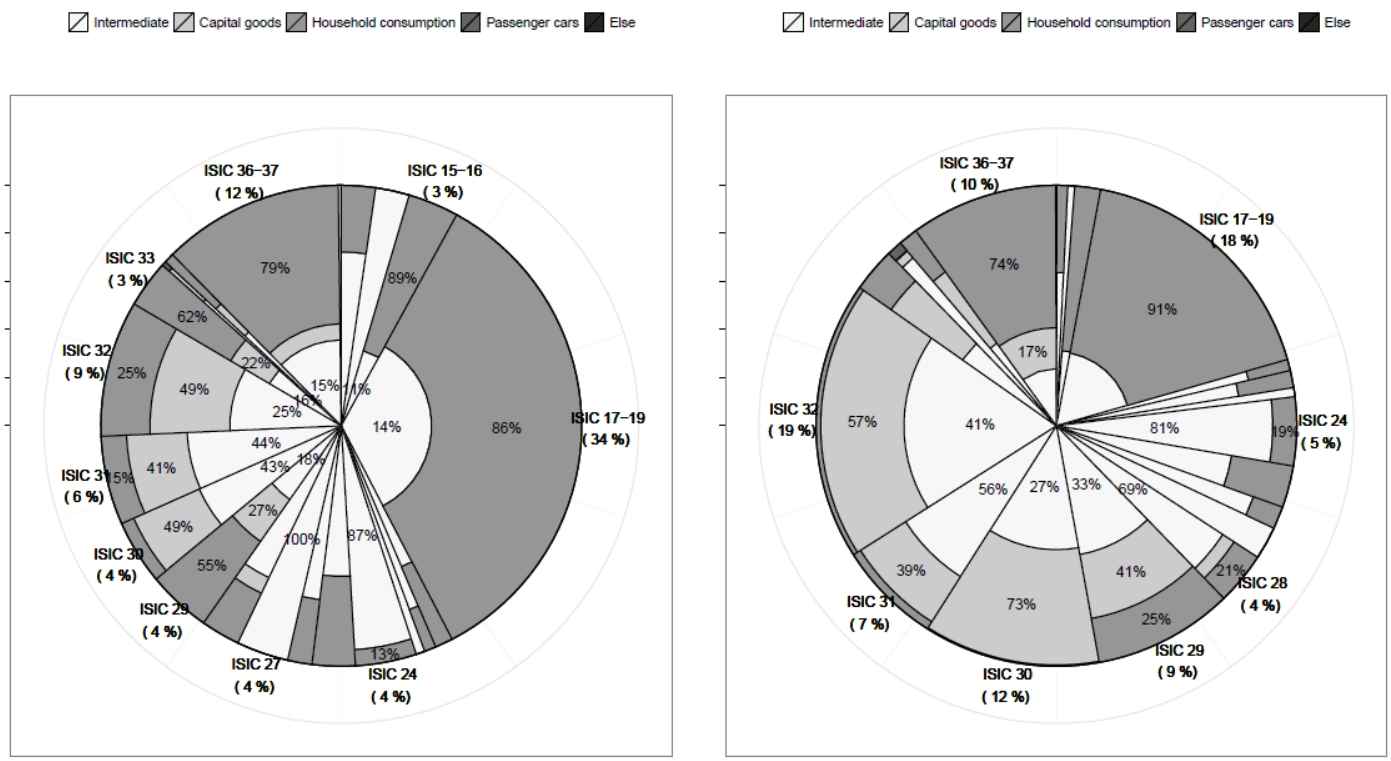


Figure C4. Export share by industry and category (Chinese Taipei)

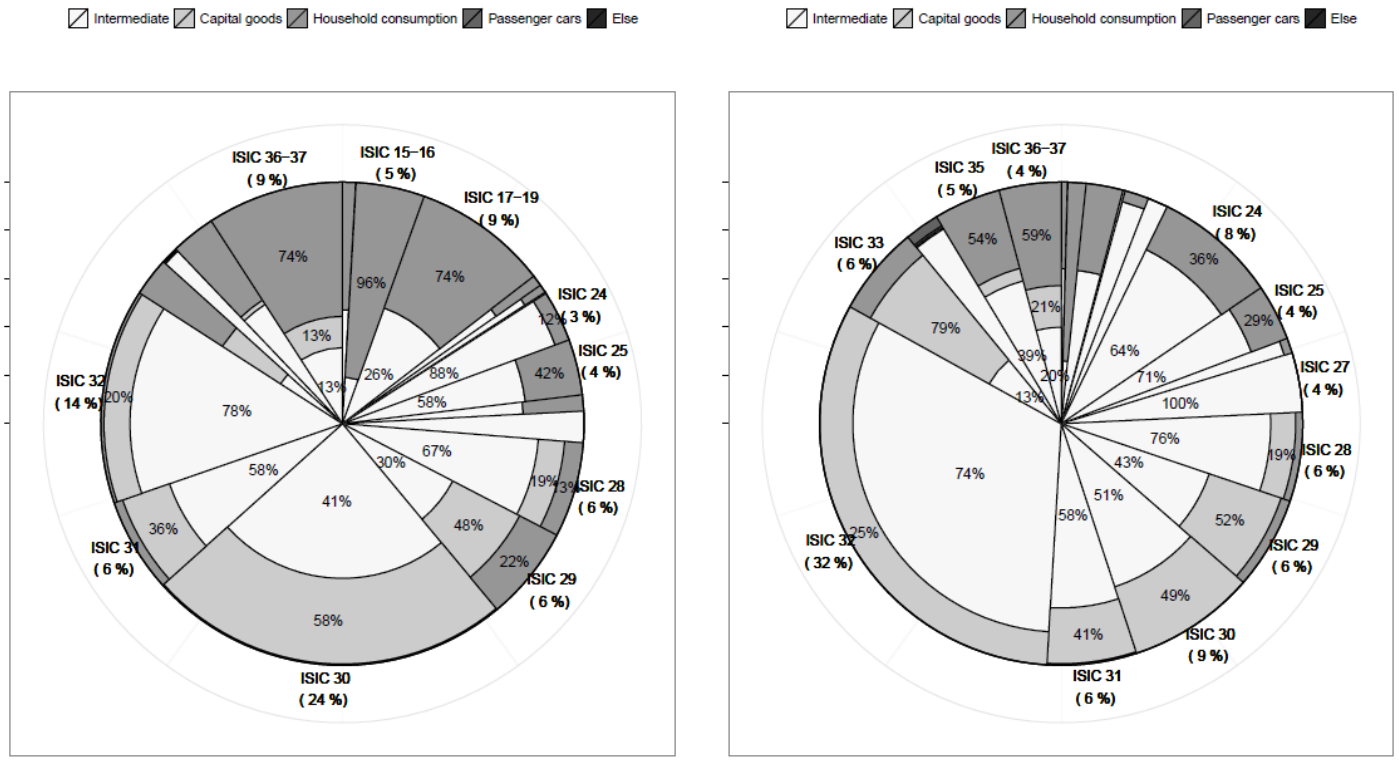


Figure C5. Export share by industry and category (India)

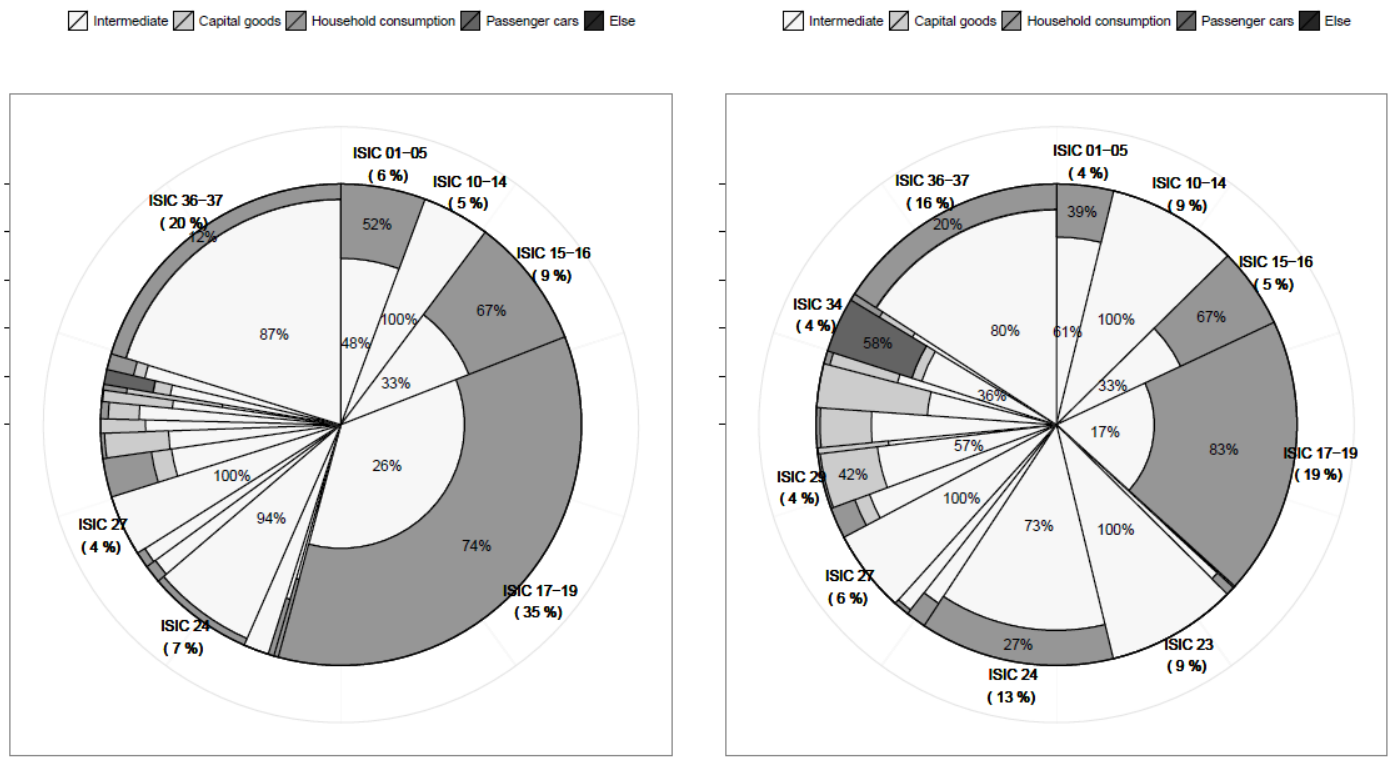


Figure C6. Export share by industry and category (Indonesia)

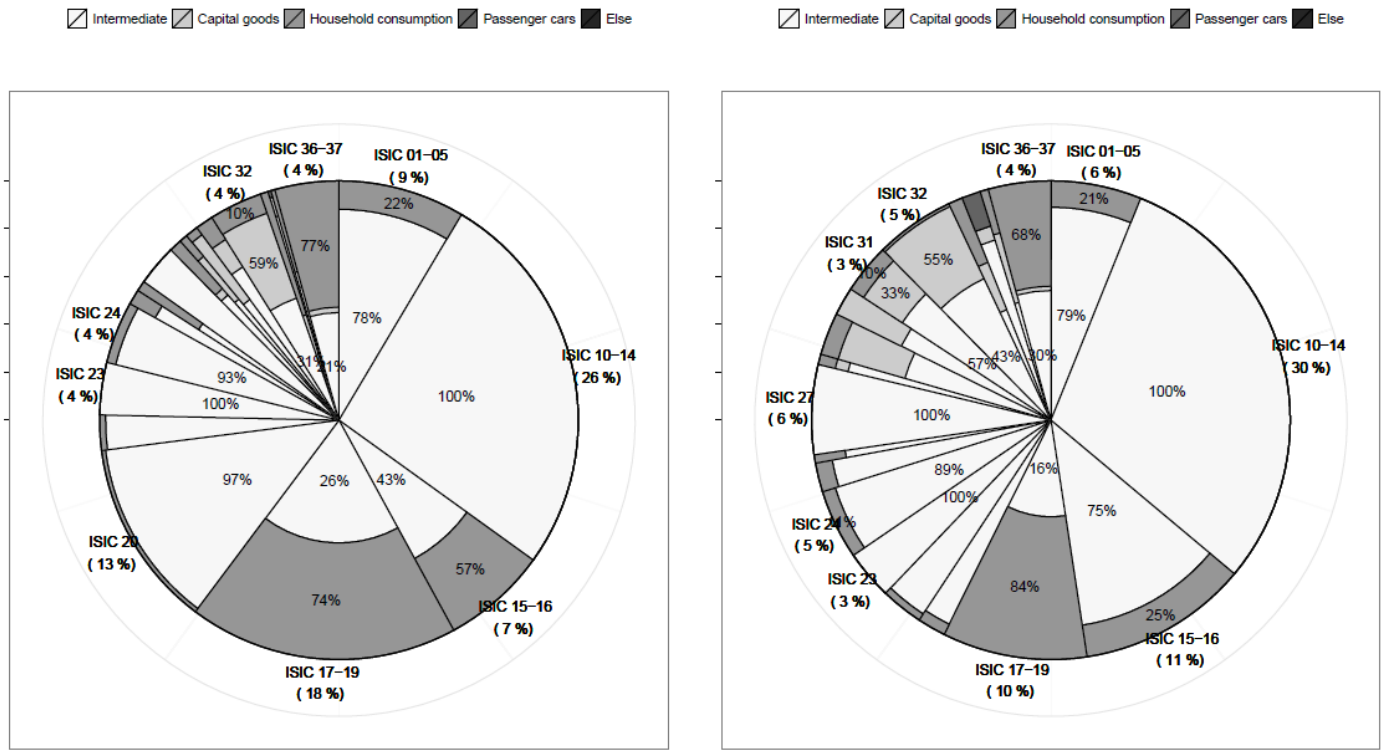


Figure C7. Export share by industry and category (Japan)

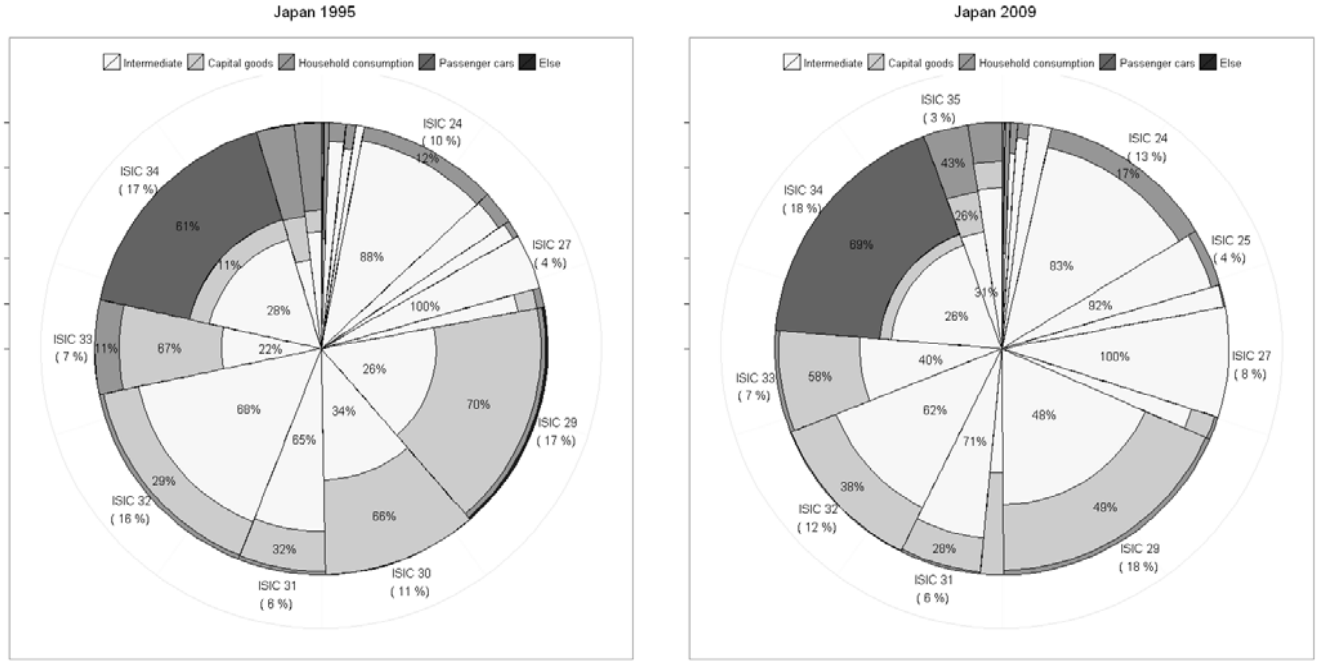


Figure C8. Export share by industry and category (Korea)

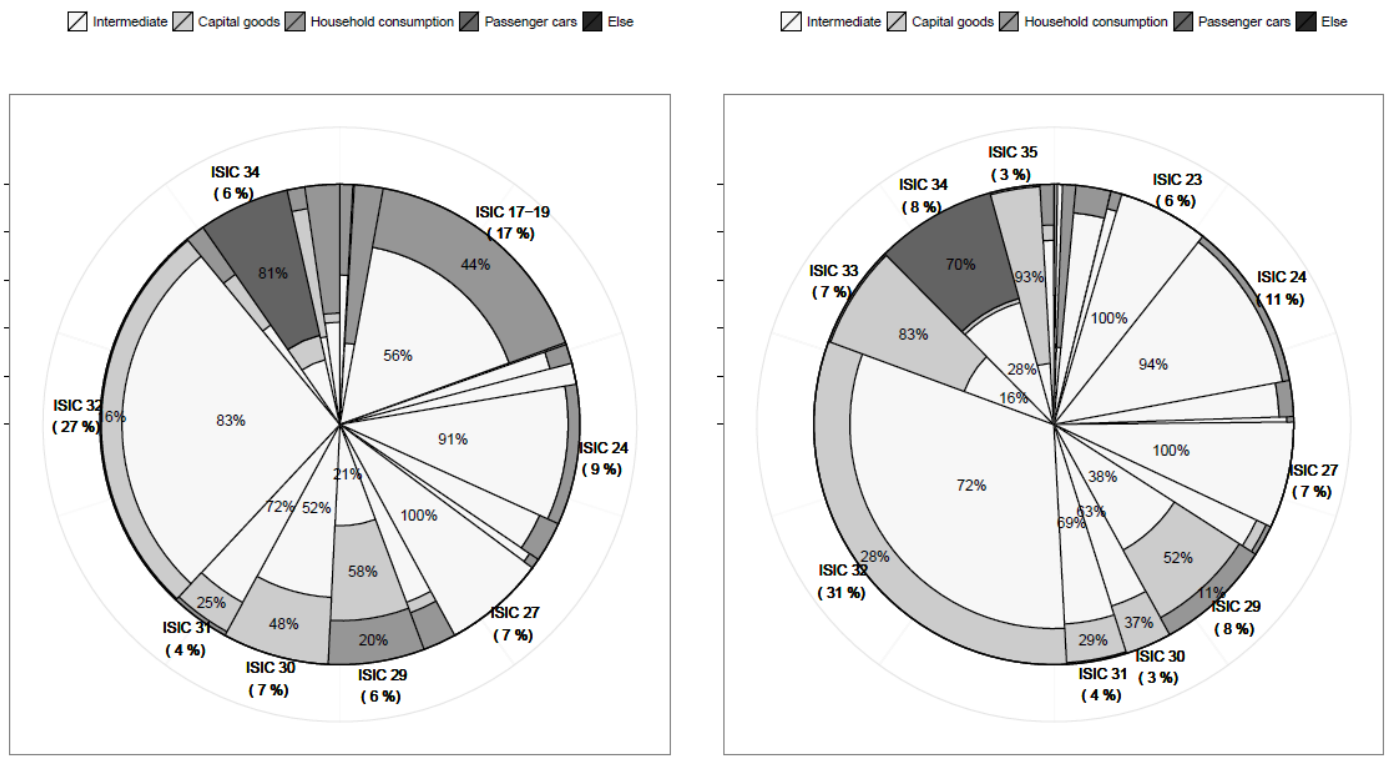


Figure C9. Export share by industry and category (Malaysia)

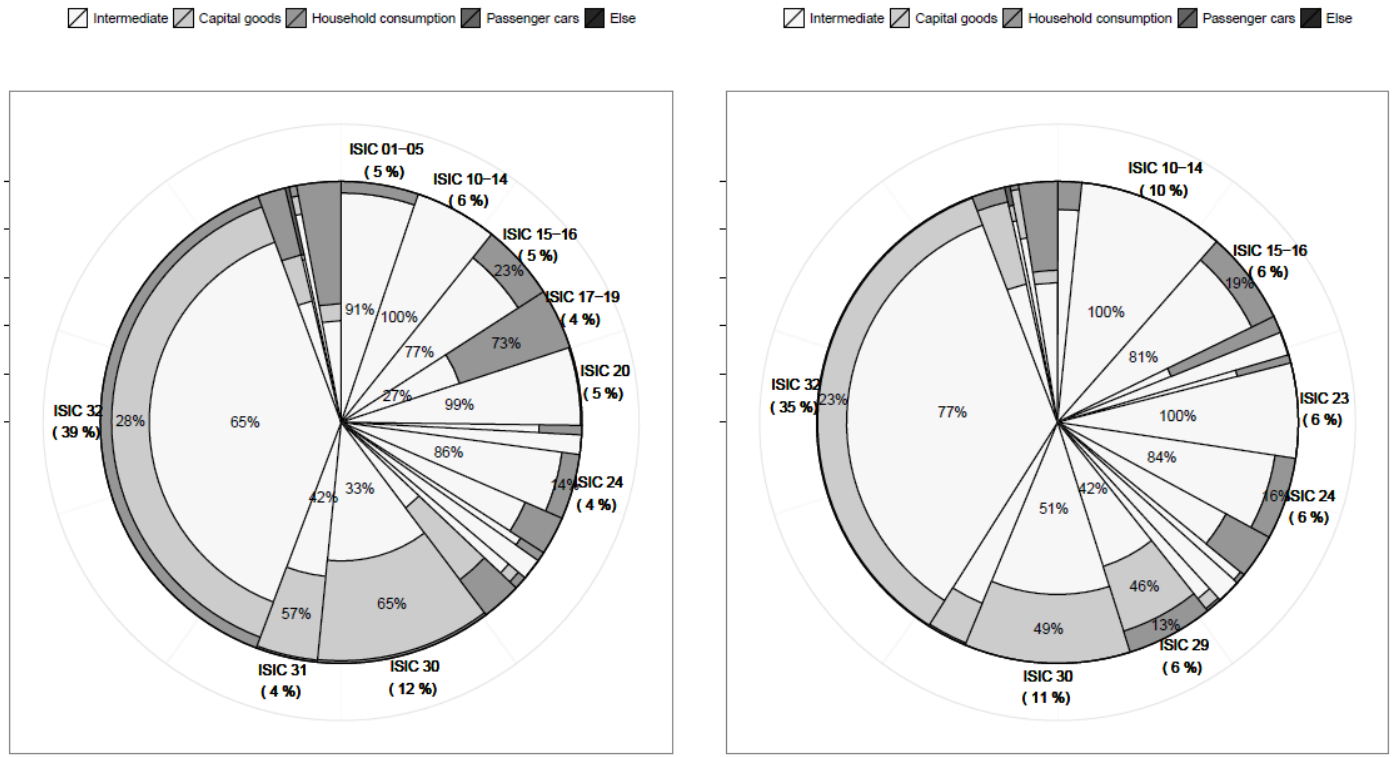


Figure C10. Export share by industry and category (New Zealand)

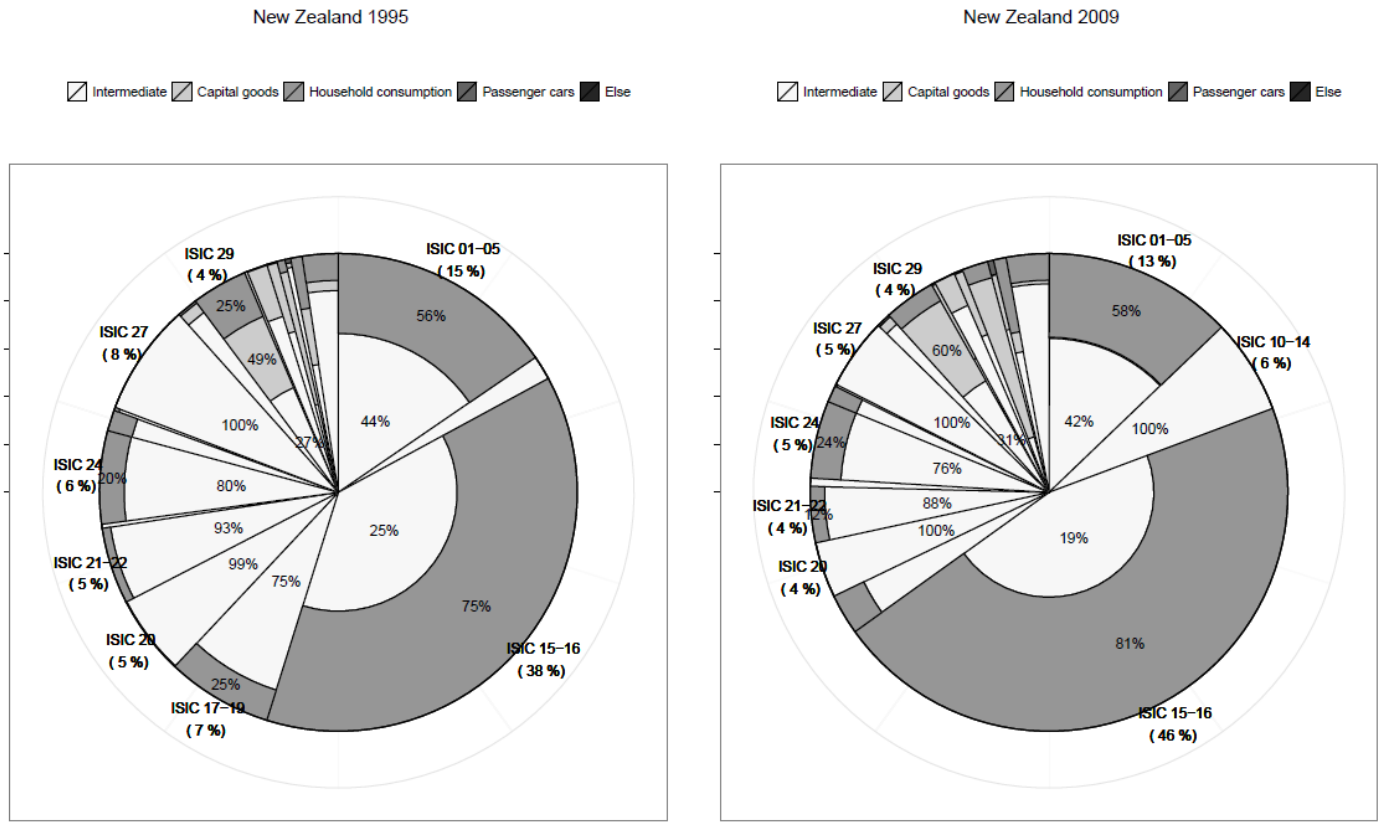


Figure C11. Export share by industry and category (Philippines)

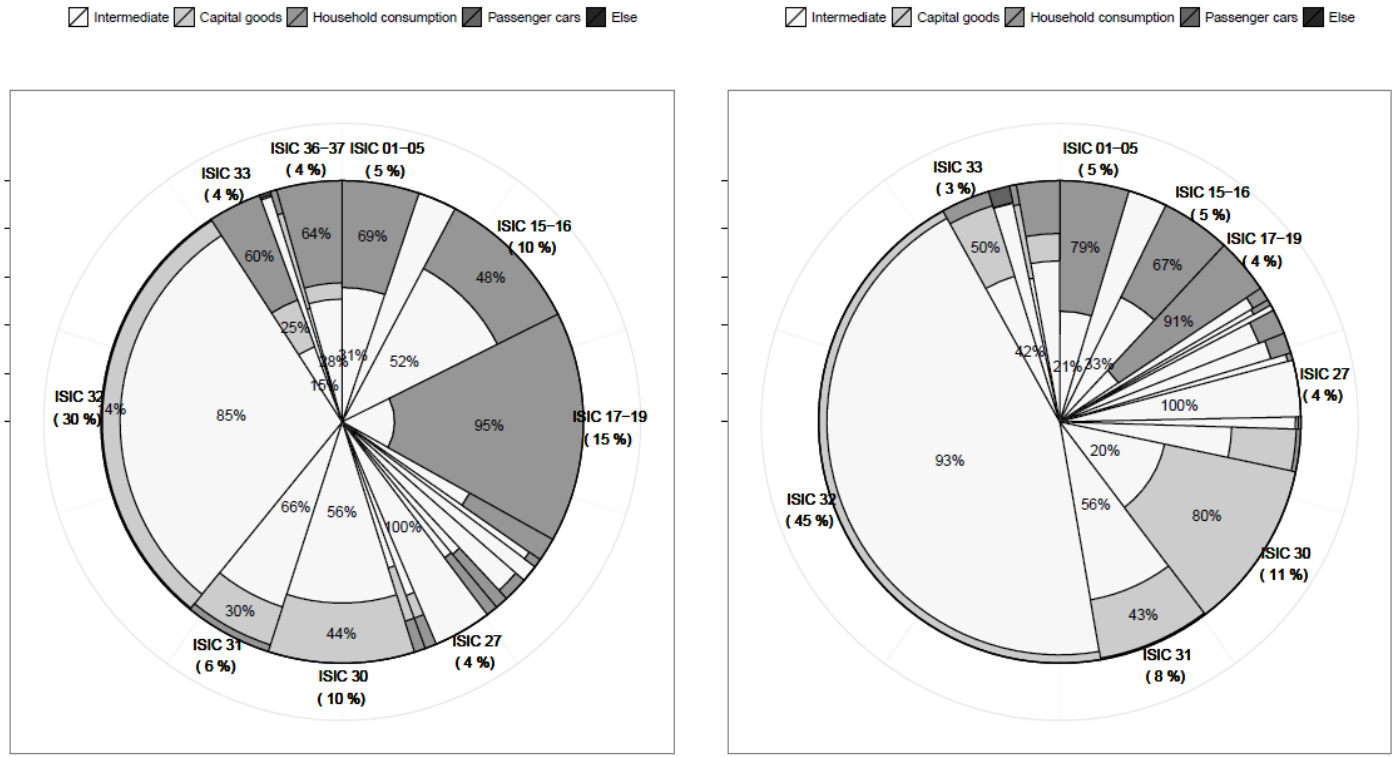
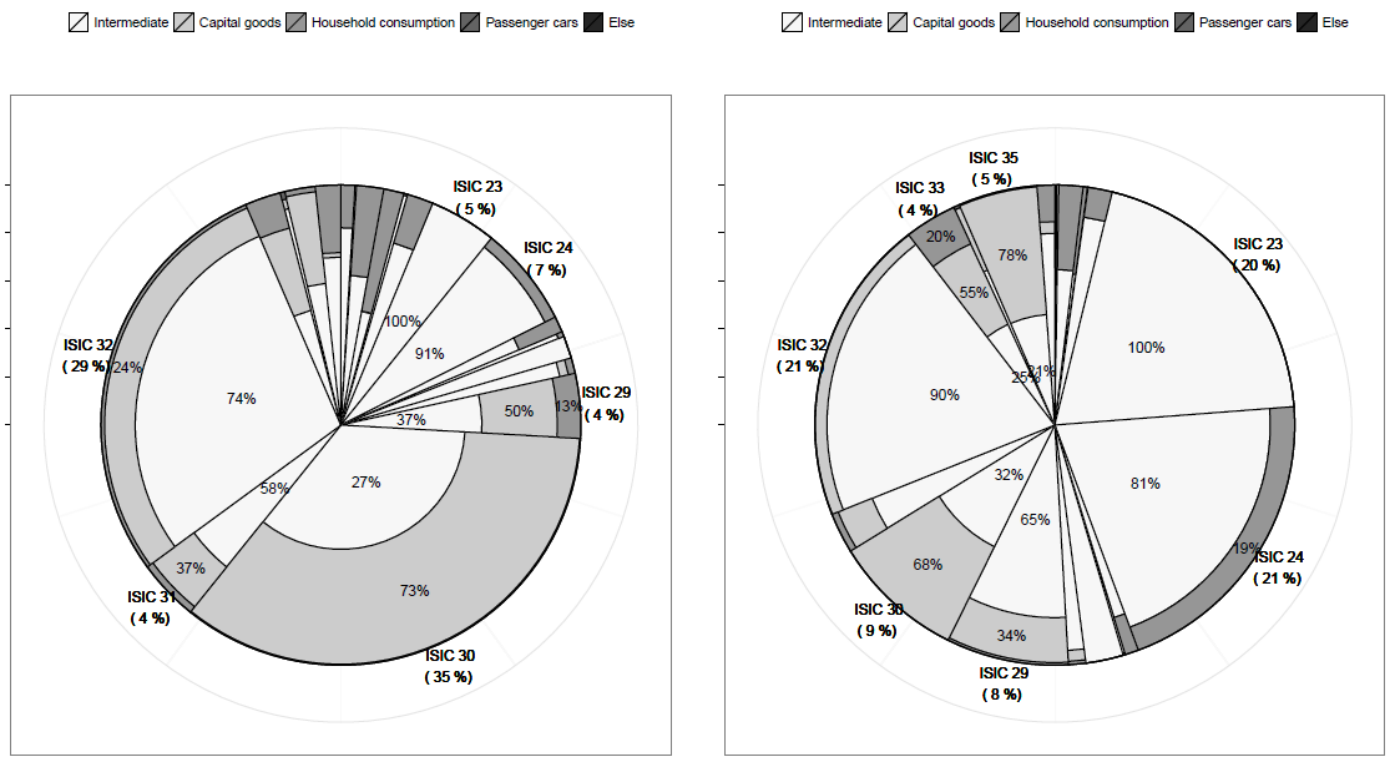


Figure C12. Export share by industry and category (Singapore)



The Figure C13. Export share by industry and category (Thailand)

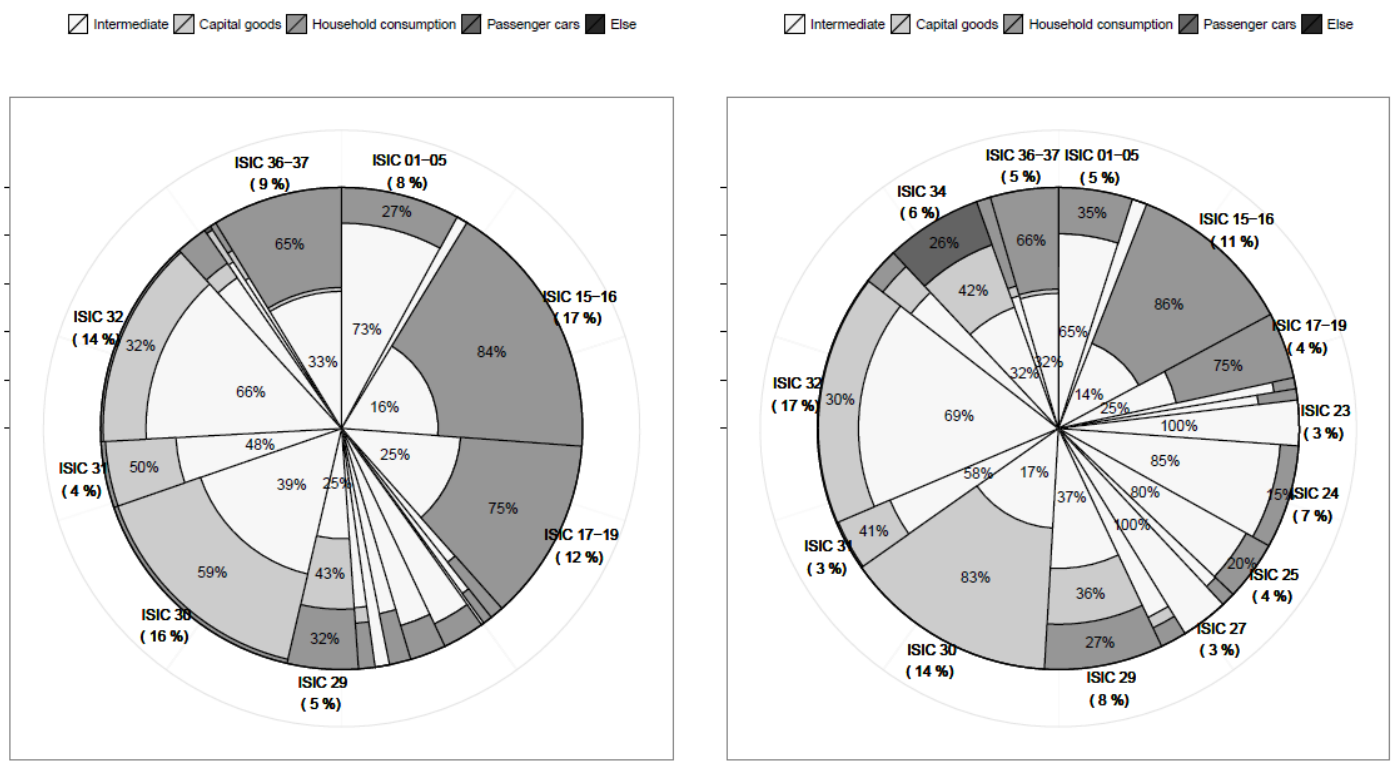
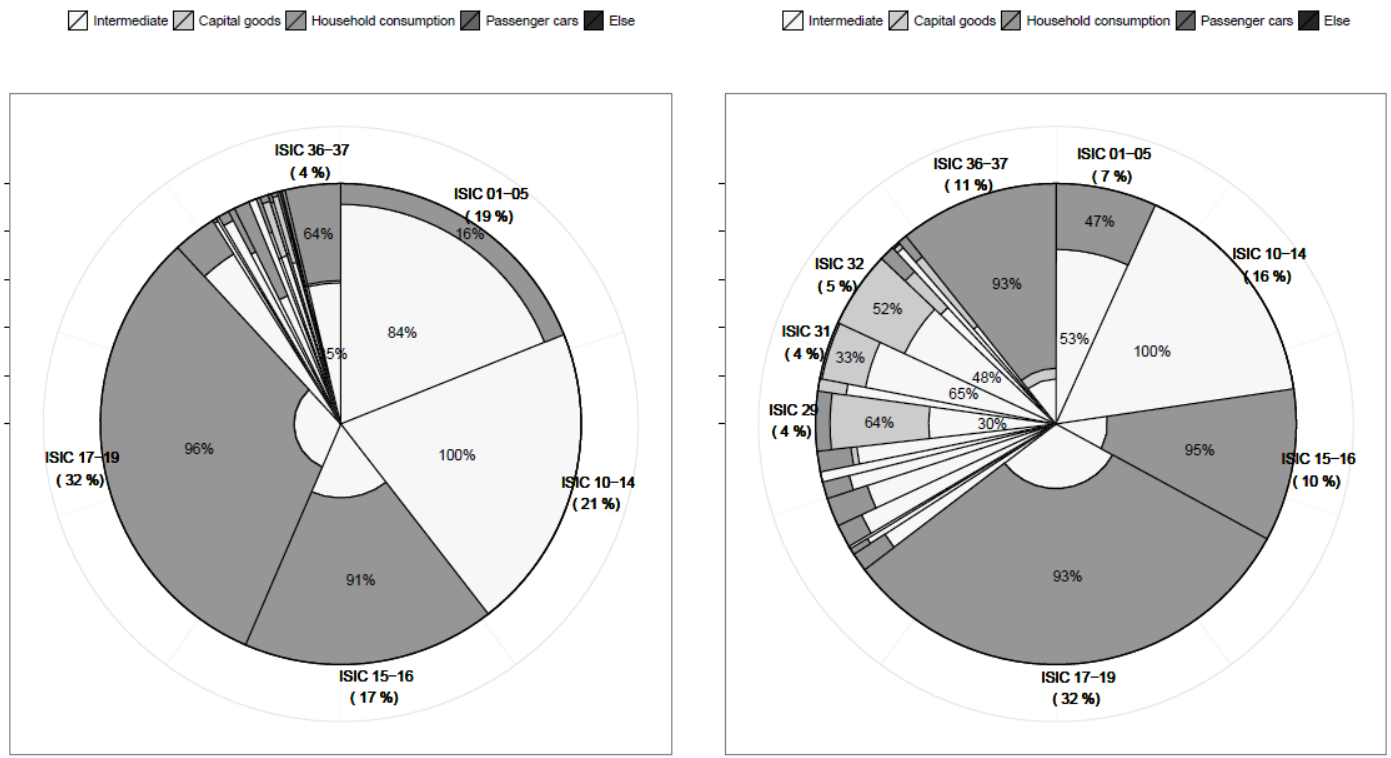
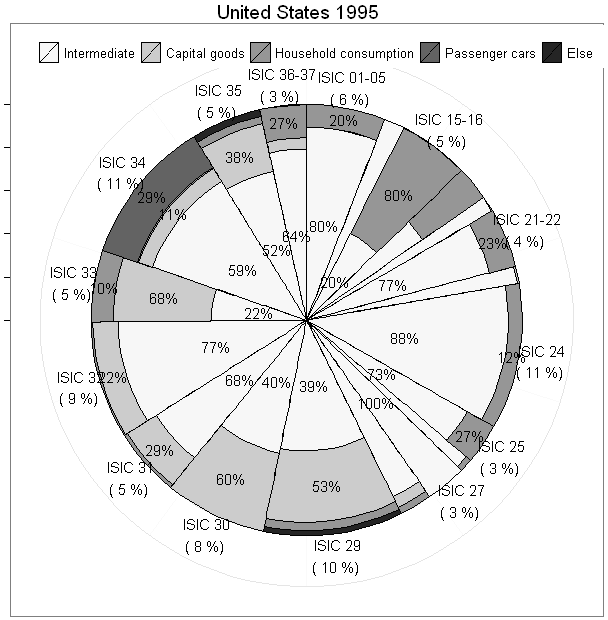
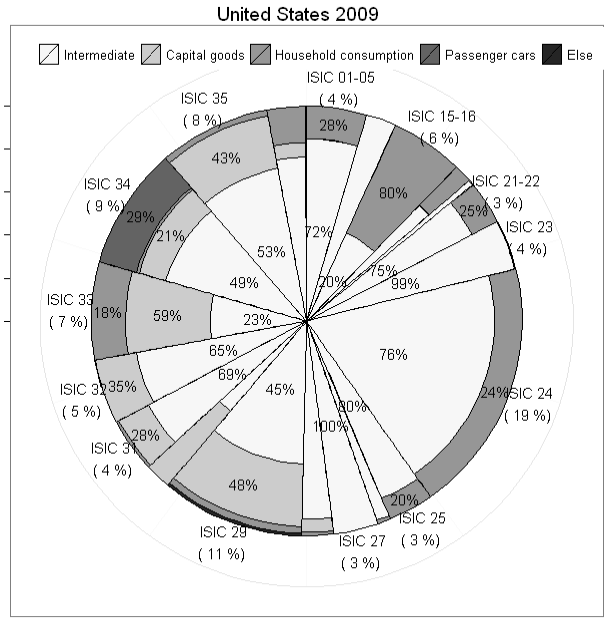


Figure C14. Export share by industry and category (Viet Nam)




United States 1995
Intermediate
Capital goods
Household consumption
Passenger cars
Else
ISIC 01-05 (6 %)
ISIC 15-16 (5 %)
ISIC 21-22 (4 %)
ISIC 24 (11 %)
ISIC 25 (3 %)
ISIC 27 (3 %)
ISIC 29 (10 %)
ISIC 30 (8 %)
ISIC 31 (5 %)
ISIC 32 (9 %)
ISIC 33 (5 %)
ISIC 34 (11 %)
ISIC 35 (5 %)
ISIC 36-37 (3 %)


United States 2009
Intermediate
Capital goods
Household consumption
Passenger cars
Else
ISIC 01-05 (4 %)
ISIC 15-16 (6 %)
ISIC 21-22 (3 %)
ISIC 23 (4 %)
ISIC 24 (19 %)
ISIC 25 (3 %)
ISIC 27 (3 %)
ISIC 29 (11 %)
ISIC 31 (4 %)
ISIC 32 (5 %)
ISIC 33 (7 %)
ISIC 34 (9 %)
ISIC 35 (8 %)

D. domestic contents and import contents indicators

	domestic VA impacts of houhouse consumption				domestic VA impacts of GFCF				domestic VA impacts of exports		
	1995	2005	change		1995	2005	change		1995	2005	change
Argentina	92%	90%	-2%		88%	83%	-5%		86%	79%	-6%
Australia	87%	88%	1%		84%	86%	1%		83%	85%	2%
Austria	87%	82%	-5%		78%	75%	-4%		70%	64%	-6%
Belgium	78%	75%	-3%		71%	69%	-2%		58%	55%	-3%
Brazil	90%	87%	-3%		86%	80%	-6%		86%	79%	-7%
Canada	86%	88%	2%		77%	79%	2%		69%	73%	4%
Chile	84%	78%	-6%		82%	79%	-3%		79%	75%	-4%
China	90%	85%	-5%		87%	78%	-9%		85%	73%	-12%
Chinese Taipei	85%	82%	-3%		75%	70%	-6%		65%	51%	-13%
Czech Republic	73%	72%	-1%		70%	67%	-3%		67%	50%	-17%
Denmark	86%	80%	-6%		79%	74%	-5%		71%	63%	-8%
Estonia	66%	74%	8%		61%	67%	6%		51%	48%	-3%
Finland	86%	82%	-4%		80%	76%	-3%		70%	60%	-9%
France	87%	85%	-2%		83%	83%	0%		77%	70%	-7%
Germany	88%	84%	-4%		85%	80%	-5%		78%	71%	-7%
Greece	88%	86%	-3%		75%	76%	1%		82%	69%	-13%
Hong Kong	96%	95%	-1%		95%	98%	2%		91%	87%	-4%
Hungary	65%	75%	11%		62%	69%	7%		50%	43%	-7%
Iceland	81%	88%	6%		80%	91%	10%		77%	72%	-5%
India	93%	87%	-6%		78%	71%	-7%		83%	77%	-6%
Indonesia	88%	86%	-2%		76%	78%	1%		83%	82%	-1%
Ireland	76%	74%	-2%		66%	70%	4%		52%	48%	-4%
Israel	86%	78%	-8%		78%	71%	-6%		58%	58%	0%
Italy	85%	84%	-2%		81%	81%	0%		74%	69%	-5%
Japan	95%	93%	-2%		94%	90%	-4%		92%	85%	-7%
Korea	84%	83%	-2%		82%	80%	-2%		70%	61%	-9%
Luxembourg	76%	68%	-8%		70%	59%	-10%		57%	38%	-18%
Malaysia	72%	69%	-3%		69%	64%	-5%		61%	48%	-13%
Mexico	79%	88%	9%		68%	82%	15%		57%	66%	9%
Netherlands	82%	79%	-2%		74%	78%	4%		66%	64%	-2%
New Zealand	84%	86%	2%		78%	80%	2%		79%	82%	3%
Norway	81%	82%	1%		76%	80%	4%		77%	83%	7%
Philippines	84%	81%	-2%		77%	73%	-5%		68%	58%	-9%
Poland	81%	80%	-1%		76%	75%	-1%		77%	67%	-10%
Portugal	81%	80%	-1%		75%	74%	-2%		62%	59%	-4%
Romania	83%	76%	-7%		74%	74%	0%		70%	67%	-4%
Russian Fed.	87%	87%	-1%		86%	82%	-5%		87%	89%	2%
Singapore	75%	72%	-3%		67%	59%	-9%		43%	43%	1%
Slovak Republic	74%	73%	-1%		66%	68%	2%		61%	48%	-13%
Slovenia	76%	79%	3%		65%	69%	4%		57%	53%	-5%
South Africa	89%	82%	-7%		83%	74%	-9%		88%	80%	-7%
Spain	88%	85%	-3%		84%	82%	-2%		72%	65%	-8%
Sweden	82%	78%	-4%		75%	74%	-2%		68%	64%	-5%
Switzerland	89%	83%	-6%		86%	77%	-9%		84%	73%	-11%
Thailand	82%	75%	-7%		74%	56%	-18%		67%	59%	-7%
Turkey	90%	81%	-9%		85%	70%	-15%		86%	66%	-20%
United Kingdom	85%	83%	-2%		82%	82%	0%		75%	77%	2%
United States	95%	93%	-2%		90%	89%	-1%		89%	86%	-3%
Viet Nam	85%	71%	-14%		65%	50%	-15%		83%	67%	-15%