Working Paper DTC-2015-4

Developing Domestic and Export Markets and Leveling Up Trade in Value Added: Lessons Learned

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September 3rd, 2015.

Abstract: There is clear evidence of increased internationalization of ASEAN value chains, as well as industrial growth. Changes have typically been more rapid in Central and Eastern Europe than in ASEAN, probably due to economic transition and joining the EU. Germany has played an important role as an anchor economy—a source of final demand, and of technology rich investment—and ASEAN will need to continue looking to regional economies such as Japan and Korea in that light. The emphasis in most ASEAN countries will now need to shift towards "moving up" to higher value added activities, like research and development, which have positive spillovers for the rest of the economy.

Keywords: Global value chains; Trade in value added; FDI; Trade and investment policy.

JEL Codes: F13; F15.

[1] The author is grateful to Marwa Abdou for excellent research assistance, and to Hal Hill, Lili Yan Ing, and Deborah Winkler, as well as seminar participants, for helpful comments and suggestions.

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1 INTRODUCTION

Value chain trade has become an increasingly important feature of the world economy in recent decades.[2] The Asia-Pacific region, including Southeast Asia, is globally recognized as a leader in many respects, particularly in sectors like electrical equipment, including consumer electronics. Production in these sectors relies on complex networks of trade and investment that result in increasingly tight links between countries.

Although the development of global and regional value chains has been particularly striking in the Asia-Pacific, important changes have also taken place elsewhere in the global economy. Other regions have experienced growth in value chain trade as well, although its intensity varies considerably from one part of the world to another. Against that background, the purpose of this chapter is to examine the spread and performance of value added trade in ASEAN, and to make comparisons with other regions, particularly Latin America and the Caribbean (LAC), and Central and Eastern Europe (CEE). The emphasis in this chapter is on examining the current reality in ASEAN compared with two other important regions, and to examine any policy implications that may flow for ASEAN from experience in those comparator groups.

Analyzing value chains quantitatively is still a relatively recent undertaking. Most research on value chains as such is qualitative, focusing on case studies of their development and spread, and analysis of the way in which value added is divided up among the various actors in the chain. Although some of the qualitative literature is primarily positive, there is a strong strand in that literature that focuses on the implications of value chain trade from a more normative standpoint. Although this chapter discusses some possible policy implications of its findings, it is, by contrast, primarily quantitative and positive in approach.

The study of production networks in East Asia and elsewhere (e.g., Ando and Kimura, 2013, and previous works by those authors) can be seen as laying the groundwork for the quantitative work undertaken here. That literature focused on trade in intermediate inputs, which is indeed one of the key processes underlying the growth and spread of value chains. However, identifying trade in intermediate inputs using traditional trade data is difficult. The approach most commonly adopted was to designate certain products in standard international trade classifications as intermediate inputs, to relate them to other products designated as final, and conduct quantitative work exploiting the distinction (e.g., Saslavsky and Shepherd, 2014).

This chapter takes a different empirical approach. It exploits newly released OECD-WTO data on trade in value added (TiVA). Unlike traditional trade data, TiVA data fully account for the use of intermediate goods and services in production—including imports and exports—and make it possible to isolate domestic value added that is then exported. The TiVA data provide an ideal framework for examining trade in global and regional value chains, as the business models behind these production platforms are increasingly seen in terms of exchanges of value added within a complex network rather than simple shipments of goods from one point to another.

The TiVA data offer the basis for a rich exploration of value chain trade, including in its cross-regional comparative aspects. However, analytical tools are necessary to make the data really talk.

[2] For the purposes of this paper, a value chains is defined as "the full range of activities that firms and workers do to bring a product from its conception to its end use and beyond. This includes activities such as design, production, marketing, distribution and support to the final consumer" (https://globalvaluechains.org/concept-tools).

This chapter adopts four summary measures from the recent literature to provide an entry point into the analysis of value added trade in ASEAN, and to make comparisons possible with LAC and CEE. The four summary measures constitute different ways of looking at the extent of a country's integration into global and regional value chains. The analysis is undertaken for all countries for which data are available in ASEAN, LAC, and CEE. In sectoral terms, the focus is on three areas of special interest from the point of view of value chain analysis: electrical equipment, transport equipment, and textiles and clothing.

Box 1: Volkswagen's Automotive Value Chain

The automotive industry is globally competitive, with European, Asian, and US producers all maintaining significant market shares. In 2007, Volkswagen set itself the goal of performing at the level of Toyota, perceived as the market leader. Part of the strategy put in place in pursuit of that goal was further internationalization of the firm's production process.

In fact, as of 2007, Volkswagen's production process was already quite internationalized. 66% of vehicle production took place outside Germany, with 47% of employees located in other countries, and 75% of sales occurring outside the German market. Volkswagen was already more internationalized than Toyota, but its focus was heavily on the European market, and the firm was conscious of the need to perform better in the US and in the emerging markets of Latin America and especially Asia.

Volkswagen maintains 48 production facilities in 19 different countries, compared with 74 sites in 27 countries for Toyota. In Western Europe, all of Volkswagen's production sites are located in Germany (20). It also has 10 production sites in Eastern Europe: eight produce vehicles, engines, and components, and two produce just engines and components. The key site for Volkswagen in Eastern Europe is Bratislava in the Slovak Republic, an EU member state. Membership of the EU means that goods, people, and capital can—in principle—circulate with a very high degree of freedom not found in other regions, including ASEAN.

By contrast with production, which is relatively decentralized in the Volkswagen model, research and development is relatively centralized in Germany. Although there are other sites around the world for research and development, including in Eastern Europe, most work is done in Germany. There is a clear division of labor within the value chain between these two types of activities. Comparative advantage is surely a strong driver of this decision by the multinational group: Germany has a highly educated workforce and well-established credentials in engineering. However, wage costs are high, so it makes sense to outsource simpler production tasks to neighboring countries. This type of arrangement is typical of value chains, and is a source of commercial success as it provides for continued product upgrading through research and development, and simultaneous control of costs through outsourcing.

Source: Schmid and Grosche (Undated).

Interpreting the results from the quantitative exercise and deriving policy implications is challenging, because the measures are summary in nature, and many factors could potentially explain any observed differences. With that in mind, the chapter also includes a selective review of the literature on value chains in the three regions. The review focuses on recent contributions examining the growth and development of value chains, in particular in the sectors under consideration, and the factors that have given rise to the observed results. Combining the results from the quantitative exercise with those from the literature review makes it possible to discuss ASEAN's relative position

with greater clarity, and to assess the possible implications for Southeast Asia of the different ways in which value chains have developed elsewhere.

Against this background, the chapter proceeds as follows. Section 2 presents the TiVA dataset, and discusses the indicators to be used in the quantitative part of the chapter. Section 3 contains the comparative review, focusing first on the literature (Section 3.1), and then on an analysis of the TiVA data (Section 3.2). The following section draws out some possible policy implications of the findings in Section 3, and Section 5 concludes.

2 TRADE IN VALUE ADDED DATA

2.1 Overview of the TiVA Dataset

Traditional trade data, such as those found in cross-country databases like UN COMTRADE, are recorded in gross value terms. For example, an iPhone shipped from its final assembly point in China to the USA is recorded as an export from China to the USA equal to the full landed price of the phone in the importing market. Although historically appropriate as a first approximation, the advent of value chains has made traditional trade data less and less fit for purpose in terms of understanding and analyzing global flows of goods and services. The iPhone is manufactured using a complex network of value chain interactions, and in fact, relatively little value is added in China compared with the high value added of research and design services located in the USA itself, notionally the importing market.

To take this example further, it is clear that gross value trade data in fact tend to overstate the true level of trade between countries. The reason is that intermediate inputs are double counted. For example, the full landed price of the solid state hard drive used in the iPhone is counted as an export from a source country, such as Thailand, to the assembly point, China. The value of the hard drive is then incorporated again in the price of the final product sent from China to the USA, so the same figure is included in export data for two countries through incorporation in a final product.

Because of the double counting of intermediate inputs, traditional trade data are not compatible with national accounts data. Concretely, GDP is defined as the sum of all value added in the economy, i.e. production less intermediate inputs. Exports and imports in the national accounts are, in principle, smaller than trade data recorded in COMTRADE because they net out intermediate input use. This disconnect is the reason why some countries have exports to GDP ratios that approach, or even occasionally exceed, 100%, which is not possible in terms of true national accounts data.

To deal with these problems, recent research has focused on the idea of measuring trade in value added, rather than gross value, terms. The idea is to construct export and import data that net out trade in intermediate inputs—including services—and are therefore fully compatible with national accounts. A number of researchers have moved forward on this area, such as Johnson and Noguera (2012), and Koopman et al. (2014). Building on these efforts, OECD and WTO created a joint global database of trade in value added (TiVA). The raw TiVA data are available for 57 economies and 11 goods sectors for the years 1995, 2000, 2005, 2008, and 2009. They are constructed using national accounts data, trade data, and input-output matrices. The dataset has figures on various dimensions of value added trade, and is set out bilaterally, i.e. as a matrix showing all relationships between exporters and importers.

The OECD-WTO TiVA dataset is much better suited to the study of value chains than are traditional gross value trade data. For example, the iPhone referred to at the beginning of this section does not double count intermediate input use in the relevant export values, but instead

shows export flows from the countries like Thailand (for components such as the hard drive) to the USA, and only records the value added located in China—primarily assembly—as an export flow from China to the USA. As a result of changes like these, data on openness and bilateral trade balances can be substantially different using TiVA data and traditional trade data.

Indeed, the TiVA data make it possible to examine aspects of value chain trade that have proved elusive in previous research. Initially, value chains were studied by focusing on trade in intermediate inputs (e.g., Ando and Kimura, 2013). Intermediates were identified intuitively, using standard international trade product classifications. The TiVA approach provides a much finer and more accurate level of analysis on intermediate input use, and importantly it includes services as well as goods. Services trade is a crucial component of value chain activity—in many ways, services such as design, transport, and distribution are the glue that holds value chains together. The TiVA data therefore offer the possibility of rich insights into the operation of value chains, and the possibility of cross-regional and through-time comparisons.

To keep the size of this chapter manageable, the analysis of the TiVA data will be limited in time and sectoral scope. Previous work suggests that the structure of value chain trade remains remarkably stable over time (Shepherd and Archanskaia, 2014). Because of that, the long term will be the focus of the analysis. The two endpoints of the TiVA data, 1995 and 2009, will be compared to give a general picture of dynamic evolutions.[3] Of course, many significant economic events have taken place during that period, including substantial liberalization in some countries, as well as macroeconomic events such as the Asian Financial Crisis. In terms of sectoral scope, the analysis will consider three sectors in which value chain trade is particularly important, but contrasts can be expected among ASEAN, CEE, and LAC countries: electrical equipment, transport equipment, and textiles and clothing. From an intra-ASEAN perspective, electrical equipment is perhaps the most crucial sector, but experience differs somewhat from country to country; in the other regions, the relative importance of the three value chains varies.

Comparing performance across regions and value chains can be informative from a policy perspective. However, it is important to keep in mind that each value chain represents a distinct set of business models. For instance, electronics production is typically more integrated than other industries, so value chains can be expected to behave differently, and be tracked differently through quantitative indicators. This paper is therefore an attempt to map out some of the cross-regional and cross-sectoral differences in value chain behavior, but more detailed research is needed on the ways in which particular value chains operate in the special circumstances of individual countries and sectors.

2.2 Indicators Based on the TiVA Data

The TiVA dataset is a new source that offers real potential for new insights into value chain trade. However, it contains a large quantity of information. Analytical tools are therefore needed to examine value added trade in particular countries and regions. The TiVA bilateral trade matrix, and the tables used to produce it, are raw materials that can be manipulated and transformed to produce

[3] Clearly, the 2009 data may be affected by the aftermath of the Global Financial Crisis. However, as of writing, no later data are available. Avoiding the effect of the crisis entirely would require using 2005 data, which are now 10 years old. In the interests of keeping the analysis as relevant as possible, the paper therefore uses the 2009 data, subject to the caveat that they may be influenced to an unusual degree by broader macroeconomic and financial factors.

indicators that can usefully be compared across regions and time periods. That is the approach adopted in this chapter, building on data work done at OECD (De Backer and Miroudot, 2013).

The first indicator to be examined is the value added to gross exports (VAX) ratio (Johnson and Noguera, 2012). It provides an overall indication of the intensity of production sharing that takes place through value chains. Concretely, it is simply the proportion of total exports measured in gross value terms that is accounted for by domestic value added. Intuitively, a lower VAX ratio means that the level of domestic content in exports is lower, and the foreign content is therefore higher. It clearly shows the effect of netting out intermediate input use—particularly imported intermediate inputs—in value added trade data. Although comparisons of VAX ratios across time periods and countries should not be over-interpreted, because many factors are at play, the exercise is nonetheless useful as it provides a first pass indication of the degree of production sharing that is underway in particular countries and sectors.

The second indicator to be used in this chapter is an index of the number of international production stages (Antras et al., 2012). This indicator measures the length of international value chains in a particular country and sector. The index is equal to one if there is a single production stage involved, and takes progressively higher values as inputs from the same or other sectors are used, according to a weighted average formula (De Backer and Miroudot, 2013):

(1) $N = u.(1 - A)^{-1}$

Where N is a column vector containing the indices according to country (i) and sector (k), u is a unit vector, I is an appropriately dimensioned identity matrix, and A is the matrix of technical coefficients from the international input-output matrix that lies behind the TiVA data.

The last two indicators that will be analyzed are the backward and forward participation indices (Koopman et al., 2010). The first measures the value of imported intermediate inputs in a country's exports (backward participation). The second measures the share of exported goods used as intermediate inputs to produce other countries' exports (forward participation). These two indicators can be summed to give an overall picture of the level of involvement of a country in value chain trade. A higher score is consistent with a greater degree of internationalization.

The participation index is based on the following equations:

(2) $P_{ik} = \frac{VS_{ik}}{E_i} + \frac{VS1_{ik}}{E_i}$

(3) $VBE = V(1 - A)^{-1}E$

Where P is the participation index, E is gross exports, VS is an element of the vector obtained by summing the columns of the VBE matrix (without domestic industries), and VS1 is an element of the vector obtained by summing the rows of the VBE matrix (again without domestic industries). For the VBE matrix, A is defined as above, E is gross exports, and V is the diagonal of a matrix with value added shares by country and industry.

Each of the four indicators analyzed in this chapter presents a different way of looking at a country's degree of involvement in global and regional value chains. As emphasized at the outset, many reasons can lie behind cross-country and through-time variations, so results need to be interpreted cautiously. Nonetheless, the indicators are useful in providing a first picture of the degree to which internationalization of the value chain has taken place in the three sectors under consideration in ASEAN, LAC, and CEE. Section 3.2 analyzes the data in terms of broad trends that are in evidence.

The main interpretation is provided in Section 4, which combines insights from the data analysis and the literature review to examine value chain trade in the three region in comparative perspective, and in particular from the angle of lessons that could be learned by ASEAN from experience in other regions.

3 Comparative Review: ASEAN vs. Latin America and the Caribbean, and Central and Eastern Europe

This section presents the analytical material that is the focus of this chapter. The first subsection presents a selective review of the available literature on global and regional value chains in CEE and LAC, and the second undertakes a quantitative analysis using indicators derived from the OECD-WTO TiVA dataset. The presentation here is positive in nature, not normative. Possible policy implications are discussed in more detail in Section 4.

3.1 Literature Review

The literature review is divided into two parts. First, the discussion focuses on the development of value chains in CEE and LAC, noting their spread, intensity, and the type of exchanges that typify them. Next, consideration is given to the economic impacts of value chains in the two regions, taking account of the different development paths that have been followed. Given the large amount of literature involved, it is necessary to be selective in terms of presentation. The approach taken is therefore to focus on a number of key contributions that provide important insights, rather than to attempt to cover the field.

3.1.1 Development of Value Chain Activity in CEE and LAC

Previous work on global and regional value chains in CEE has highlighted the important role that they have come to play in the period following economic transition, i.e. from the 1990s onwards (e.g., Ando and Kimura, 2013). Machinery is a key sector, with value chain interactions based on trade and investment relations among manufacturing firms.

CEE's relationship with other regions is of particular interest. Although inter-regional linkages, including with Asia, have grown, Western Europe remains the key source of demand for CEE value chain production (Ando and Kimura, 2013). This is an expected finding, in light of factors such as physical proximity, and low trade costs due both to geography and to common membership of the European Union (Godart and Gorg, 2011). Godart and Gorg (2011) identify a range of additional factors that have made CEE countries attractive for Western European firms—especially German ones—looking to internationalize their value chains. Factor costs and productivity are important, but human capital in the form of an educated workforce also plays a significant role.

The rise of value chains in CEE has coincided with restructuring of the Western European manufacturing sector, particularly in Germany, the manufacturing center of Europe (Timmer et al., 2010). Following patterns established elsewhere, for instance in North America, high value added activities have tended to stay in Germany. However, other parts of the value chain that are more labor intensive have been relocated to CEE, as per the Volkswagen example discussed above. The net result for Germany has been a fall in the overall domestic content of manufacturing, as reliance on intermediate goods sourced notably from CEE has increased. This process can potentially result in efficiency and competitiveness gains due to cost savings, as well as specialization according to comparative advantage. However, results are sometimes striking: for example, it has been estimated that only 30% of the value added of a Porsche Cayenne—nominally made in Leipzig—is German.

The car is in fact mostly assembled in the Slovak Republic, a fact that gives rise to concerns in some quarters in Germany (Sinn, 2006).

Although structural factors are important in the spread of manufacturing value chains from Western Europe and particularly Germany to CEE, Godart and Gorg (2011) also highlight the important role played by firm-specific considerations. The decision to internationalize a value chain is a complex one that is influenced heavily by economic variables, but issues such as management structure and competence, and market pressures in relation to final products also come into play. The discussion here focuses on structural factors because of the nature of the empirical analysis conducted in the next section, but in practice it is important to keep in mind that many substantive issues that affect the decision whether or not to internationalize, and which functions to internationalize where, interact in a complex way at the firm-level. One implication is that although country- and region-level studies are useful in understanding the broad dynamics in operation, firm-level empirical analysis—both quantitative and qualitative—still has an important role in helping understand the particularities of individual value chains.

Compared with CEE, the available literature seems to suggest that global and regional value chains are relatively underdeveloped in LAC (e.g., CIDOB et al., 2014). LAC is a large region, however, and there is considerable diversity within it. In South America, value chain participation is typically centered on the supply of raw materials, in contrast to the manufacturing core of CEE value chains. In Mexico, however, there is a greater level of manufacturing, for instance in the well-known maquiladoras. As a whole, however, it is fair to characterize value chain interactions in LAC as less intense than in CEE, and differently focused. In terms of the capture of value added, production is generally centered on low value added activities, such as the production of primary materials.

Against this background, Giuliani et al. (2005) highlight the difficulty many LAC countries have had in moving up in value chains to higher value added activities. The authors highlight structural issues as an important cause. In particular, they stress the region's relative abundance of natural resources, and relative scarcity of labor and capital. Of course, labor is available in large quantities, but in relative terms, free markets tend to lead to specialization by many LAC countries in low value added parts of the value chain. However, sectoral and country specificities can be important, as the example of manufacturing in Mexico shows.

Just as Western Europe and in particular Germany played a key role as a source of demand in the development of CEE value chains, the US has been an important force in the evolution of value chains in North and Central America, particularly Mexico (Kuwayama, 2009). As in the case of Germany, high value added activities tend to stay in the USA, and lower value added activities are moved offshore to destinations like Mexico. Assembly is an example of a relatively low value added task in the manufacturing sector. Kuwayama (2009) argues that going forward, it will be important for LAC countries to move up manufacturing value chains towards higher value added activities. This process entails renewed attention to the services sector, including areas such as engineering, research, and design. The author argues that policy interventions may be necessary to realize this goal.

3.1.2 Economic Impacts of Value Chain Development

The development paths taken by value chains in CEE and LAC have been substantially different, but similar issues arise, in particular concentration on relatively low value added activities (although the level of value addition appears to be significantly higher in CEE than in LAC). The broad pattern of specialization is the same in both locations, with the advanced "anchor" market

(Germany or the USA) specializing in high value added activities, and the surrounding countries specializing in activities with lower levels of value addition (e.g., Timmer et al., 2013).

Damijan et al. (2013) highlight the important role that internationalization of production has played in restructuring the CEE countries' trade relations, both on the export and import sides. In particular, there has been a notable shift towards imports of intermediate inputs and capital goods. Associated FDI flows have been significantly associated with export upgrading in some countries, but not all. Countries that have been more successful in attracting FDI to technology-intensive industries have tended to experience faster productivity growth.

Productivity gains and economic restructuring are important channels by which value chains can influence economic outcomes. There is the potential for economic benefits to flow even though countries specialize, at least initially, in relatively low value added parts of the chain. Moreover, Kuwayama (2009) points out that in the case of LAC, where there is considerable surplus labor, low value added activities can have significant economic and social advantages. The mechanism at play is the creation of employment in relatively low skill activities. Many developing countries, including some in LAC, have dual labor markets, with significant excess supply of low skill workers. An expansion of value chain activity that increases demand for low skill labor can therefore take up some of the slack in that part of the labor market, which decreases unemployment and potentially, over time, exerts upwards pressure on low skill wages.

3.2 TiVA Indicator Analysis

This section provides a comparative analysis of the TiVA indicators discussed in Section 2. The presentation is data driven, focusing on interpretation of the indicators. Policy implications of this set of findings taken together are discussed in Section 4.

The OECD-WTO TiVA data do not cover all countries in the three regions being compared. It is therefore necessary to use those countries included in the dataset as proxies. Indicators of regional, as opposed to national, performance are calculated by taking the simple average across all countries for which data are available in the region.

Country coverage in the dataset is as follows:

- *ASEAN*: Brunei, Cambodia, Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Viet Nam.
- *Latin America and the Caribbean*: Argentina, Brazil, Chile, and Mexico.
- *Central and Eastern Europe*: Bulgaria, Czech Republic, Estonia, Hungary, Slovak Republic, and Slovenia.

Coverage is reasonably good for ASEAN and CEE, but is quite weak for LAC. Results for that region will therefore need to be interpreted with caution. Nonetheless, much of the region's global value chain activity is concentrated in Mexico, due its proximity to the United States and the influence of NAFTA, so the sample can nonetheless be regarded as informative for comparative purposes.

3.2.1 VAX Ratio

A country's VAX ratio summarizes the proportion of gross exports that is accounted for by domestic value added. Figures 1-3 present comparative results for the three sectors under consideration, namely electrical goods, transport equipment, and textiles and clothing. The lowest VAX ratio of the three sectors is in electrical equipment (61.9% for the world average), followed by

transport equipment (63.7%), and then textiles and clothing (70.1%). World average VAX ratios fell in all sectors between 1995 and 2009, but the fall was much more pronounced in relative terms in transport equipment (-7.4%) and electrical equipment (-6.3%) than in textiles and clothing (-1.9%). A falling VAX ratio can have a number of economic drivers behind it, but a common interpretation is that production chains are continuing to internationalize in all sectors, which means that the ratio of imported intermediates to domestic value added is higher, and thus that the VAX ratio is falling. Under that interpretation, the biggest change in internationalization of production has been seen in transport equipment, followed by electrical equipment, although the latter remains more internationalized (i.e., has a lower VAX ratio) than the former. The level has only fallen slightly in the textiles and clothing sector.

Figures 1-3 also present comparative regional data for each sector. Those data can be used to compare value chain internationalization, and the dynamics behind it, across regions. For electrical equipment, ASEAN's average VAX ratio is five percentage points lower than LAC—indicating greater internationalization—but is 10 percentage points higher than CEE, which indicates the opposite. This is an interesting result, because electronics goods value chains are often associated with Asia, including ASEAN, but this result suggests that the degree of internationalization of production may actually be higher in CEE than in Southeast Asia. Moreover, the relative rate of change is faster in CEE than in ASEAN: the ratio fell by 12.3% between 1995 and 2009 in CEE, but only by 4.5% in ASEAN. It will be necessary to compare these results with more detailed indicators to see if the comparison holds.

For transport equipment, the same pattern of results is evident in levels (Figure 2). Indeed, the quantitative magnitude of the differences across regions is nearly identical to the case of electrical equipment. Again, one interpretation is that despite the importance of transport equipment value chains in Asia, including ASEAN, the degree of internationalization is still not as great as in CEE, notwithstanding the lower ratio with respect to LAC. In terms of dynamics, the pattern for electrical goods is reversed: ASEAN is internationalizing at a relatively faster pace than CEE. The former's VAX ratio declined by 7.7%, compared with 5.8% for the latter. The rate of change is much slower in LAC, at just -2.8%.

Results for CEE and ASEAN are closer in the textiles and clothing sector (Figure 3), although CEE is still a couple of percentage points lower in its average VAX ratio than ASEAN. LAC has a much higher score than either of the two other regions. In terms of the rate of change, the percentage declines in VAX ratios for ASEAN and CEE are quite similar: 4.1% and 5.9% respectively. The result for LAC is closer than in the other sectors, at -2.3%.

Interpreting changes in the VAX ratio is not straightforward. At a policy level, there is clearly a mercantilist temptation to become fixated on maintaining a particular proportion of domestic value added in exports. However, there is strong evidence that domestic and foreign intermediates act in part as complements, not just as substitutes: internationalization of the value chain is associated with rapid growth in trade, including domestic value added—which can increase even though its share in gross exports decreases. To make the point, Figure 4 presents domestic value added in exports for electrical equipment in ASEAN, where VAX ratios have been falling rapidly. As is clear, domestic value added has in fact increased sharply in all three regions as complementarities between domestic and imported intermediates are exploited.

3.2.2 Number of International Production Stages

To investigate the hypothesis that internationalization of production is stronger in CEE than in ASEAN, and that it is rising faster, a logical first step is to look at the number of international production stages in each sector and region. Figures 5-7 present results.

In terms of the world average, the electrical goods sector has the most international production stages, but results for transport equipment are very close. The textiles and clothing sector has noticeably fewer international production stages. These results in levels are exactly reflected in relative changes over time: the electrical goods and transport equipment sectors have seen the biggest percentage increases in the number of international production stages (26.4% and 26.3% respectively), compared with a much lower rate of change of 12.9% in textiles and clothing.

Figure 5 makes it possible to compare results for electrical goods across the three regions under consideration. Although there are more international production stages in ASEAN than in CEE—a result that seems contrary to the indications of the VAX ratio—the rate of change in CEE is much faster. The number of production stages increased by 33.1% in CEE between 1995 and 2009, compared with 26.6% in ASEAN. On the other hand, ASEAN displays a different pattern from the world average in that the number of international production stages is 24.3% higher than in transport equipment; the two figures are nearly identical for CEE. LAC again seems not to be as dynamic as the other regions, with only around half as many international production stages as ASEAN in 2009, and a much lower rate of change over the sample period (14.1%).

Results for transport equipment are in Figure 6. In this case, CEE has considerably more international production stages than ASEAN, the difference being 13.2%. In this case, the evidence from this indicator accords well with preliminary findings from the VAX ratio to the effect that production is more internationalized in this sector in CEE than in ASEAN. It is not just the number of international production stages that is higher in CEE: there is also a faster rate of change, 28.9% between 1995 and 2009, compared with 16.3% in ASEAN. Although LAC has fewer international production stages than either of the other two regions, its growth rate is actually higher than ASEAN's at 21.9%.

The textiles and clothing sector (Figure 7) displays some similarities with the other two sectors, despite its generally lower number of international production stages. ASEAN has the most stages, with a score 16.3% higher than CEE. LAC has far fewer international production stages: its figure is only 43.8% of ASEAN's. However, the picture becomes more interesting when rates of change are considered. On this occasion, LAC has actually seen the fastest growth in the number of international production stages (36.7%), compared with very similar but much lower rates of change in the other two regions (16.5% in CEE and 15.0% in ASEAN). Part of the reason for this result is undoubtedly that LAC started from a much lower baseline in 1995, but the rate of growth is nonetheless impressive.

3.2.3 Backwards and Forwards Participation

The two participation indices focus on trade in intermediate goods. The backwards index captures the proportion of a country's exports that is accounted for by foreign intermediate inputs. The forwards index captures the proportion of a country's exports that are used as intermediate inputs for other countries' exports.

Figures 8-10 present results for the backwards participation index. Changes in this indicator, and comparisons across groups, are more striking compared with the indicators previously discussed. In terms of the world average, electrical equipment has by far the highest index: it is twice as high as

the index for transport equipment, and more than 3.5 times higher than the index for textiles and clothing. In terms of dynamics since 1995, however, it is the other two sectors where the biggest changes have taken place in terms of the world average. Transport equipment saw an increase of 39.0% in its score, compared with 13.7% for electrical equipment. Two possible interpretations are open: either value chains have tended to internationalize less over the time period, thereby reducing reliance on imported intermediates, or domestic value added as a proportion of the final goods price has on average increased. Given the extensive evidence already marshaled to show that value chains have generally become more, not less, internationalized over time, the second explanation is the only plausible one: domestic value added has tended to increase in relative terms, particularly in transport equipment, and to a lesser extent in electrical equipment. By contrast, the opposite dynamic is true for textiles and clothing: the world average score fell by 38.3% during the sample period, which tends to suggest that value chains have become more focused on lower value added activities, such as assembly from component parts.

Just as the world average varies considerably from one sector to another, so too do the results for ASEAN and the two comparator regions. ASEAN's highest score by far is in electrical equipment (10.1); scores in the other two sectors are much lower (4.3 in textiles and clothing, and 0.7 in transport equipment). The pattern of scores across the three sectors for ASEAN is interesting because it does not reflect what has been observed for other indicators, where there has been a reasonably stable ordering of either electrical equipment or transport equipment at one end of the scale, and textiles and clothing at the other. The surprising result for transport equipment is all the more notable because of the contrast with CEE, which has a score 8.2 times higher, despite similar relative growth rates in both cases (131.9% in ASEAN compared with 120.6% in CEE). Although particularly stark in this case, the result for transport equipment suggests that the value chain is not as internationalized in ASEAN as it is in CEE, for example, and that it is less internationalized than the electrical equipment sector. This interpretation is consistent with results for the other indicators, discussed above.

The comparison between LAC and CEE is interesting for the case of transport equipment. The two regions start from similar baselines in 1995 (2.5 for LAC, and 2.6 for CEE), but subsequent growth rates are very different. CEE has experienced explosive growth of 120.6% in this sector, compared with only 9.6% for LAC. Activity in the transport equipment sector is significant in both regions, although it is more localized in LAC in terms of its involvement in international value chains, being centered on Mexico.

All three regions experienced a fall in their backward participation index over the sample period for textiles and clothing. The fall was most pronounced in CEE (-56.0%), followed by LAC (-28.5%) and then ASEAN (-15.7%). In terms of the pattern of scores, ASEAN has the highest score in both periods, and is separated from the other two regions by a considerable margin. One interpretation of this pattern of results is that there is still considerable assembly activity going on in this sector in ASEAN, although it is declining in relative terms in all regions. It is, however, more persistent in ASEAN than elsewhere, which is reflected in a greater overall importance of imported intermediates in producing exports.

To provide a point of contrast, forward participation indices for the three sectors and regions appear in Figures 11-13. In terms of the world average, electrical equipment has by far the highest score: it is over four times as high as the average score for transport equipment, and over six times higher than the score for textiles and clothing. Taking results for the two indices together clearly suggests that trade in intermediate inputs is particularly important in this sector, which is in line with the

important role that value chains play in production. This pattern of results is also reflected in an aggregate sense in a dynamic comparison of scores in 1995 and 2009: growth in forward participation has been much faster in electrical equipment than in transport equipment; the world average score has, by contrast, fallen noticeably in textiles and clothing.

ASEAN has the highest forward participation index score of any of the three regions under consideration for electrical equipment. The number has also undergone rapid growth in recent years (162% between 1995 and 2009). Exports of intermediate inputs for use in other countries' exports is relatively more important in ASEAN than in the other regions, although CEE's level of participation has only grown at a slightly slower rate, albeit from a much lower starting point.

Transport equipment again sees the order reversed: CEE has a considerably higher score than ASEAN, and its growth rate (180.7%) has been much faster than ASEAN's (47.3%). Whereas LAC could be considered to be relatively dormant in terms of growth of intermediate inputs trade in the electrical equipment sector, that form of trade has actually become relatively less important in transport equipment. There are two possible explanations: either LAC production processes have become relatively less internationalized, or the countries in the sample are exporting relatively more goods for final consumption and fewer intermediate inputs. Given that there is evidence of increasing internationalization in this sector, it is more likely that the second explanation holds.

As was the case for the backwards participation index, the forward index for textiles and clothing contracted in both ASEAN and CEE over the sample period; in LAC there was slight, almost imperceptible, growth. Interestingly, CEE had a higher index score than ASEAN in 1995, but by 2009 had a lower one. The interpretation is that exports of intermediate inputs to be used in other countries' exports have fallen in relative importance in both regions, but the fall has been much sharper in CEE.

4 POLICY IMPLICATIONS

The TiVA data and the literature review have disclosed substantial differences in the ways in which global and regional value chains have developed and spread according to sector and country. In general terms, ASEAN is a strong performer in comparative perspective, particularly in the electrical equipment sector. Value chains in Southeast Asia have undergone considerable internationalization in recent years, and that is evident in the dynamics of key indicators. The only sector in which continuing internationalization has been quite limited in ASEAN is textiles and clothing. Given that that sector is relatively intensive in low skill labor compared with the other two sectors under consideration—electrical equipment and transport equipment—this finding arguably suggests that there is some movement within ASEAN towards higher value added activities. More broadly, ASEAN countries have typically been quite successful in joining GVCs in the sectors considered here. The challenge going forward is to move up within those GVCs to higher value added activities that can have significant economic spillovers, such as research and development, and even to assume a leadership role in terms of strategic decisions at the business level.

In terms of the cross-regional comparison that is the analytical focus of this paper, one finding stands out in sharp relief: value chain development has been very intense in CEE, but relatively limited in LAC. This result needs to be interpreted with caution, because the TiVA data are much more complete in their coverage of CEE than of LAC. Based on the available data, however, it appears that internationalization of production in LAC remains considerably less than in ASEAN or CEE, and the dynamic of change is much slower.

Another important finding that emerges from the literature review relates to the different natures of value chains in CEE and LAC. In the CEE countries, as in ASEAN, value chain activity is focused on manufactured goods. Although there are also some manufacturing value chains in LAC, particularly in countries like Mexico, a more typical setup is that LAC countries supply primary commodities that are transformed elsewhere, with corresponding high levels of domestic value added in primary sectors. The pattern of comparative advantage is therefore perhaps more similar in CEE and ASEAN than it is in LAC and ASEAN.

For these two reasons—greater internationalization and faster change, as well as reliance on manufacturing—it seems clear that the main potential source of policy insights for ASEAN is CEE rather than LAC. A comparison of the two regions, CEE and ASEAN, is instructive for many reasons, but the most obvious one is the different ways in which value chains have internationalized and evolved in the two more sophisticated sectors, namely electrical equipment and transport equipment. ASEAN value chains are more internationalized than those in CEE in the first case, but the opposite is true in the second case. Composition effects might be at play, but the pattern is nonetheless interesting. Backward and forward linkages are noticeably better developed in electrical equipment in ASEAN than they are in transport equipment, so it is important to examine the potential reasons behind that development compared with CEE. Part of the answer is potentially to be found in the special role played by Germany with respect to the CEE countries, an issue that is discussed in detail below. Another part of the answer lies in firm strategies in particular sectors: for example, in the automotive sector, Volkswagen favors outsourcing different elements of the production process to different countries, and having a number of assembly locations, whereas Toyota prefers a single location assembly strategy. Advantages and disadvantages of both approaches are possible, but they clearly give rise to differences in the nature and extent of production internationalization in the regions under consideration. Similarly, differences in the way agglomeration economies work in the two sectors contribute to the overall differences seen in the numbers. A final set of operative factors relates to policy barriers. In electrical products, the tariff environment is relatively free thanks to the WTO Information Technology Agreement, and liberalization of air transport markets has facilitated the emergence of value chains by reducing the cost of rapid transport for high value to weight products, such as components in this sector. In the transport equipment sector, by contrast, many countries have used activist policies of one sort or another to try and encourage development of domestic, rather than international supply chains, and the numbers in ASEAN perhaps still reflect in part the lingering effects of policy barriers.

Another striking fact that emerges from a comparison of value chain indicators for CEE and ASEAN is that there is some evidence that internationalization of even the electrical equipment value chain has been more rapid in a dynamic sense in CEE than in ASEAN. For example, the CEE countries increased their backward participation index by 237.3% between 1995 and 2009, compared with only 18% in ASEAN. The index remains higher in ASEAN than in CEE, but only because of the huge difference in 1995 baselines.

The most likely reason for the rapid growth in internationalization of value chains in the CEE region is a combination of economic transition, supported by closer ties with the European Union, and eventually membership of that regional grouping. The CEE countries have undertaken extensive trade and investment liberalization as a result of these overlapping processes, and those steps have undoubtedly facilitated value chain trade. Importantly, the CEE countries have not only liberalized trade and investment among themselves—with a corresponding growth of intra-regional trade—but also with the large, developed markets of Western Europe, particularly Germany. Germany has played a key role as an "anchor" market for the CEE countries: through a restructuring of its own

production processes, Germany has acted both as a source of demand for the CEE countries' production in value chain sectors, and as a source of investment and technology transfer that has enabled production upgrading, particularly in core CEE countries like Hungary. This process has taken place based on the complete removal of restrictions to trade in goods, and movement of capital and people across borders within the now-expanded EU.

ASEAN, by contrast, has focused on liberalization of trade and investment flows through the ASEAN Economic Community (AEC), although ASEAN's regionalism has been more outward focused than in some other regions of the world. Discussions are underway with external partners, but ASEAN lacks a free trade and investment partner with similar characteristics to Germany, i.e., a large, developed market that can be a source of both demand and investment. Of course, ASEAN has important links to such markets, including Japan, Korea, and the USA, but restrictions remain in both trade and investment—market freedoms are nowhere close to being as advanced as within the EU, based on the current degree of implementation on the ground. The CEE countries' experience tends to suggest that ASEAN could gain from undertaking substantial liberalization of trade and investment with a large, developed partner or partners. Historically, Japan has played an important anchor role for ASEAN, but due to its own persistent economic malaise, it is not clear that it currently has the potential to be "ASEAN's Germany". Korea's economy is more dynamic, but its size is significantly smaller. Nonetheless as a relatively close partner in geographical terms, it appears to be a plausible choice.

A Free Trade Agreement between ASEAN and Korea affecting 90% of products entered into force in 2009, with implementation due for 2010. Trade in electrical equipment should therefore be free—all the more so because of the WTO's Information Technology Agreement, which applies to a considerable part of the sector—as should trade in transport equipment. Korea is an important global hub for both industries.

The picture is less clear in relation to investment. Korea and ASEAN signed an Investment Agreement in 2009, but its focus is on core obligations such as transparency, national treatment, and most-favored nation status. It is unclear how much investment regimes have in fact been liberalized in terms of the policy restrictions that make it more difficult to invest at home than abroad. In the EU, by contrast, free movement of capital is one of the core principles of the Single Market. From the CEE countries' point of view, that feature meant that their gradual evolution into full members of the EU entailed real and substantial changes in investment openness vis-à-vis the developed Western European markets, such as Germany. In the context of value chains, trade and investment both need to flow relatively freely, in particular if production upgrading and movement up the value chain are to take place. Although ASEAN has taken some steps in this direction with a potential anchor market like Korea, it appears that there is still considerable work to be done, for example in terms of investment promotion and facilitation, as opposed to protection and liberalization.

In discussing a possible anchor economy for ASEAN value chains, it is important to address the potential role of China. That country is heavily involved in global and regional value chains in electrical equipment and transport equipment, as well as in textiles and clothing. It is already a vital source of demand for ASEAN intermediate goods, a role that is reinforced by the ASEAN-China Free Trade Agreement, which liberalized 90% of tariff lines—a major liberalization, given China's size. China's scale also means that it is also an important source of investment for ASEAN. There is also an Investment Agreement between China and ASEAN, which unlike the Korea agreement includes provisions on investment promotion and facilitation, in addition to protection and liberalization. Again, however, the crucial question remains as to its implementation on the ground.

Although China thus has an important role to play as a source of demand and investment, it is not currently in a position to be "ASEAN's Germany", to follow the CEE comparison. The reason is that China remains a relatively labor abundant country. Although it has undergone significant technology upgrading in recent decades, its domestic economy is still arguably in a phase of technological catch up relative to the global frontier. Germany, by contrast, is at or close to the frontier in key manufacturing sectors. The different dynamic is seen in the value chain tasks that are performed in China. In electrical equipment, for example, China has become an assembly hub, for example for Apple's iPhone. However, assembly is a relatively low value added activity that is labor intensive. China's activities in the high value added end of the chain—engineering, research, and development—are much more limited. The scope for Chinese investment to act as a vector of technology upgrading in ASEAN is therefore also correspondingly limited, although it is to some extent dependent on country baselines: for example, the CLMV countries might be more likely to benefit from Chinese technology than the six original ASEAN members. In any case, China's overall investments in Southeast Asia—of which 59% are in Singapore—are only a fraction of Germany's investment stock in the CEE comparison countries (Figure 14). Indeed, Germany's FDI stock in the Czech Republic alone is 73% higher than China's investment stock in all of the ASEAN countries analyzed in the data section of this paper. Moreover, Japan and Korea both have higher FDI stocks in Southeast Asia than does China, with Japan's level of investment—concentrated in Singapore and Thailand—even higher than Germany's outward FDI stock in the CEE countries considered here. Even though Chinese outward FDI is growing quickly in Southeast Asia—over 50% between 2010 and 2011—it is highly concentrated on Singapore, so its ability to act as a vector for technological upgrading in the broader ASEAN Economic Community is not obvious. The important point to take away is that although China is, and will remain, a vital economic partner for ASEAN, it is important to be open to other options as far as an anchor economy for value chain activities in the region is concerned. The Regional Comprehensive Economic Partnership is therefore an important initiative from a policy perspective, as it would bring ASEAN countries closer to all three potential anchor economies in terms of trade and investment relations.

Linked to the question of anchor economies is the issue of division of labor, and specifically production activities versus headquarters activities (services). Within ASEAN, Singapore is the primary location of headquarters functions, in particular in terms of internationalized activities within value chains. The developed countries of Western Europe, and particularly Germany, play that role with respect to the CEE countries. As developing countries in ASEAN look for ways to move up in their value chains, they will need to be attentive to ways in which they can develop competencies in higher value added functions more often associated with headquarters activities broadly understood. Examples include research and development activities, as well as business services.

Another point of interest in the comparison between ASEAN and CEE relates to the fact that the groups are in fact relatively heterogeneous in terms of development levels. ASEAN includes both the CLMV countries (of which two are in the TiVA data) and Singapore, while the CEE region included in the dataset ranges in terms of development level from Bulgaria to Slovenia: the latter's GDP per capita in PPP terms was 78% higher than the former's in 2013. These kinds of differences in both regions can have important implications for the growth and development of value chain trade and investment. For example, the number of international production stages for the electrical equipment sector in CEE ranges from 0.9 (Bulgaria) to 1.5 (Slovak Republic), compared with 0.7 (Indonesia and Brunei) to 1.7 (Viet Nam). In this case, Viet Nam clearly stands out for its level of internationalization: based on the CEE experience, it might be believed that countries at lower levels

of per capita income tend to have lower levels of internationalization, but Viet Nam—where value chain trade is a vital part of the country's development strategy—tells a different story. One possible implication is that there is an important role for national policy in helping shape the evolution of value chains in the region.

The importance of within-region heterogeneity is reinforced when other indicators are considered. The backward linkage index, for example, ranges from 1.5 in Bulgaria to 15.1 in Hungary in the electrical equipment sector. In transport equipment, there is also a significant range: 0.7 in Bulgaria and Estonia to 9.4 in Hungary. These figures again suggest a very different level and nature of value chain involvement across countries within the same region. The fact that Hungary and other relatively central CEE countries, like the Slovak Republic, stand out is potentially important. These countries are geographically close to Western Europe, and especially the German anchor market. Their level of human capital is high, so workers are relatively well-educated. All of this facilitates internationalization of increasingly sophisticated value chain functions. An implication of this chapter's findings for ASEAN—drawing on the comparison with the most successful CEE countries—is that long-term investments in human capital are an important factor in determining a country's ability to move up value chains into higher value added activities.

To summarize, it is important to keep the potential policy implications of this chapter's empirical findings in perspective. As noted previously, many factors lie behind observed differences in value chain indicators across time periods, regions, and countries. Nonetheless, the combination of the literature review and the data analysis is suggestive of some important possibilities for ASEAN, based primarily on lessons learned from the experience of the CEE countries. First, a liberal trade and investment regime—both intra- and extra-regionally—seems to be a crucial determinant of a region's ability to grow and develop international value chains. Second, it is important to pay particular attention to possible anchor markets, i.e. sources of both demand and investment (including technology). ASEAN has been active in integrating goods markets with regional partners, but it appears that work remains to be done in the area of investment. Third, long-term investments in human capital will be important if ASEAN countries are to continue moving up international value chains to higher value added activities. Of course, the scope to do so varies from country to country, according to development level. But with the possible exception of Singapore—which is at or close to the world technological frontier—there is room for ASEAN countries to both participate more fully in value chains, and to do so through a range of alternative activities associated with higher levels of value addition.

5 CONCLUSION

This chapter has compared value chain experiences in ASEAN, CEE, and LAC. Three sectors have been considered: electrical equipment, transport equipment, and textiles and clothing. The data reveal different levels of internationalization according to region and sector. In general, the electrical equipment and transport equipment sectors are more internationalized than textiles and clothing. In regional terms, ASEAN and CEE both have much more international and dynamic value chains than LAC, although the data for LAC need to be interpreted cautiously due to a small sample.

From a policy perspective, the comparison between ASEAN and CEE is most instructive. The CEE countries have seen rapid internationalization of their production processes, in line with the economic transition and the path to membership of the EU. They have undertaken deep trade and investment liberalization not only among themselves, but also with the large, developed markets of Western Europe. Germany plays a particularly important role as an anchor market for the CEE countries: it is both a vital source of demand for their value chain production, and also a source of

investment through production outsourcing, which can act as a vector for technological change in the host countries. A range of factors lie behind the decision of German manufacturing firms to build productive capacity in CEE, and include the region in international value chains, but among the most important are the free movement of goods and capital, geographical proximity that reduces trade costs, differences in factor abundance and therefore relative prices, and levels of human capital. The last factor appears to be particularly important in the ability of some core CEE countries, such as Hungary, to move up manufacturing value chains to higher value added activities.

The experience of the CEE countries with the EU, and with Germany in particular, has implications for ASEAN's processes of intra- and extra-regional economic integration. The AEC already represents a commitment to the free movement of goods and capital within the region. The CEE experience suggests, however, that the "ASEAN+" initiatives may be of particular importance in terms of the region's ability to interface with potential anchor economies. Although those agreements have made notable progress in terms of freeing up goods trade, there is still much to be done in terms of promoting and facilitating investment with extra-ASEAN partners. Free movement of goods is important from the perspective of intensifying value chain trade, but external investment, including technology transfer, is key if ASEAN countries are to move up manufacturing value chains to higher value added activities.

On a macro-policy level, ASEAN will need to pay renewed attention to the "ASEAN+" initiatives from this perspective. There is a strong case to be made for prioritizing integration with a regional anchor economy. The regional dimension is important so as to keep trade costs low, which facilitates value chain interactions. Although China is an important source of demand for ASEAN exports—including within value chains—it is still in a process of catch up with respect to the global technology frontier. Japan is much better placed from that perspective, but its economy has been in considerable difficulty for an extended period of time. A potential anchor that offers both technology and dynamism is Korea. It has the advantage of already being a global hub in two industries that are of particular importance for ASEAN value chains, namely electrical equipment and transport equipment.

Comparing experiences across the three regions considered in this chapter, it is clear that national and regional policies interact to provide a conducive environment to value chain trade. Getting the regional stance right, particular as regards investment, is important. But so too are national policies in areas such as human capital formation (i.e., education and training). Movement up the value chain requires access to an educated workforce, so investments in this area are a necessary complement to free flows of goods and capital with key partners. The experience of the CEE countries—which started from a relatively strong basis in human capital, and then liberalized movements of goods, services, people, and capital—should be highly instructive for ASEAN going forward, as the emphasis in most countries shifts from joining GVCs to moving up.

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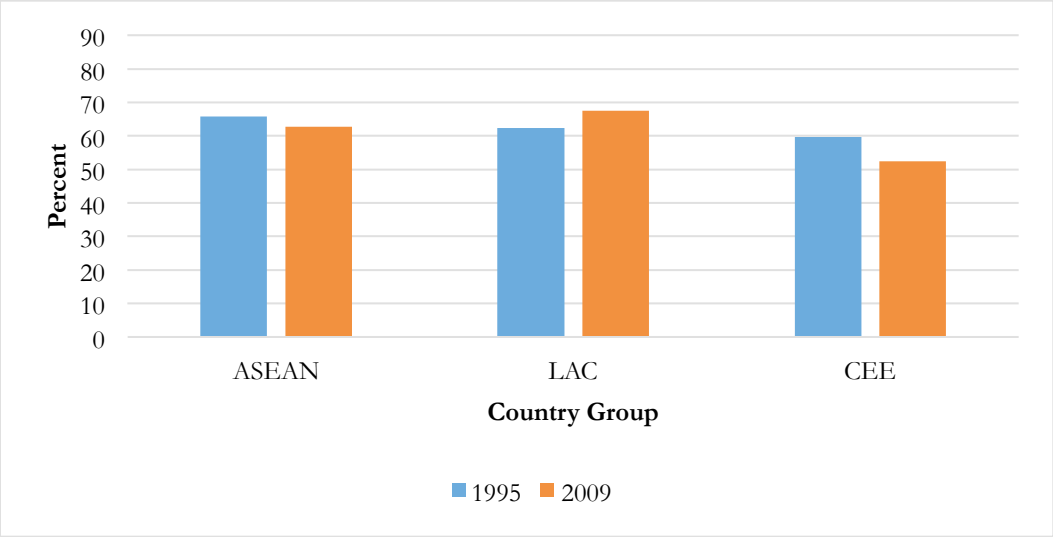
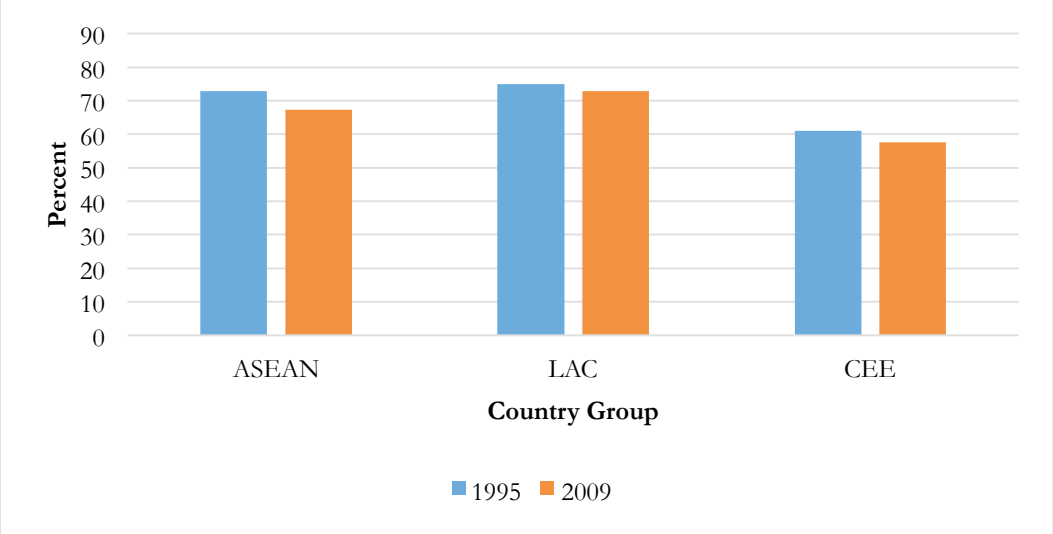
FIGURES AND TABLES

Figure 1: VAX ratio (electrical equipment).



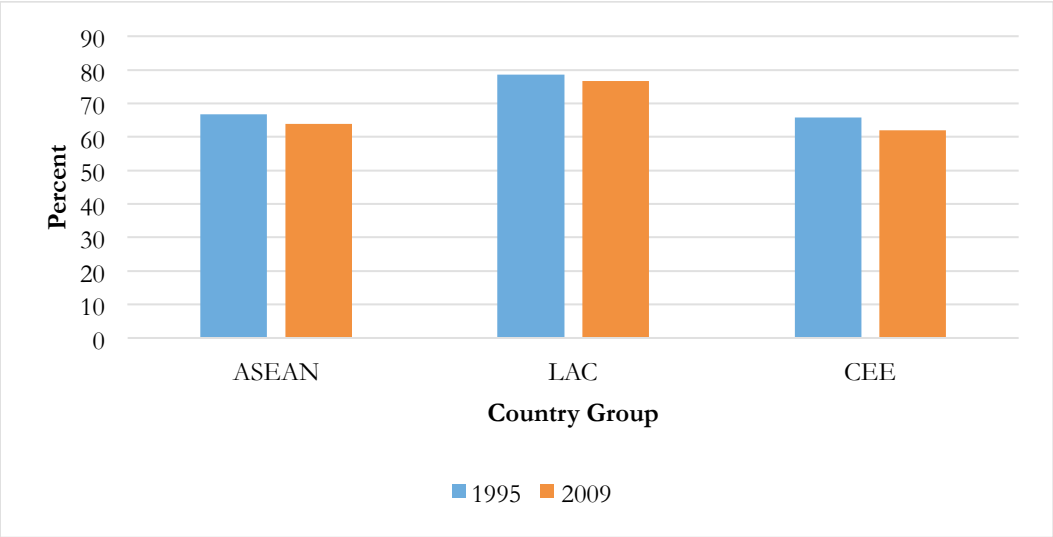
Source: OECD-WTO TiVA Indicators.

Figure 2: VAX ratio (transport equipment).



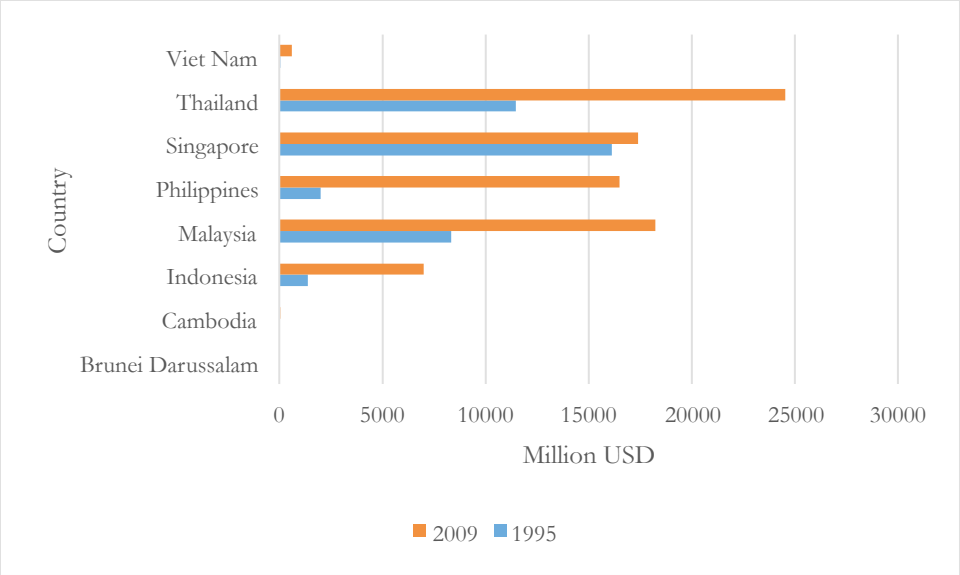
Source: OECD-WTO TiVA Indicators.

Figure 3: VAX ratio (textiles and clothing).



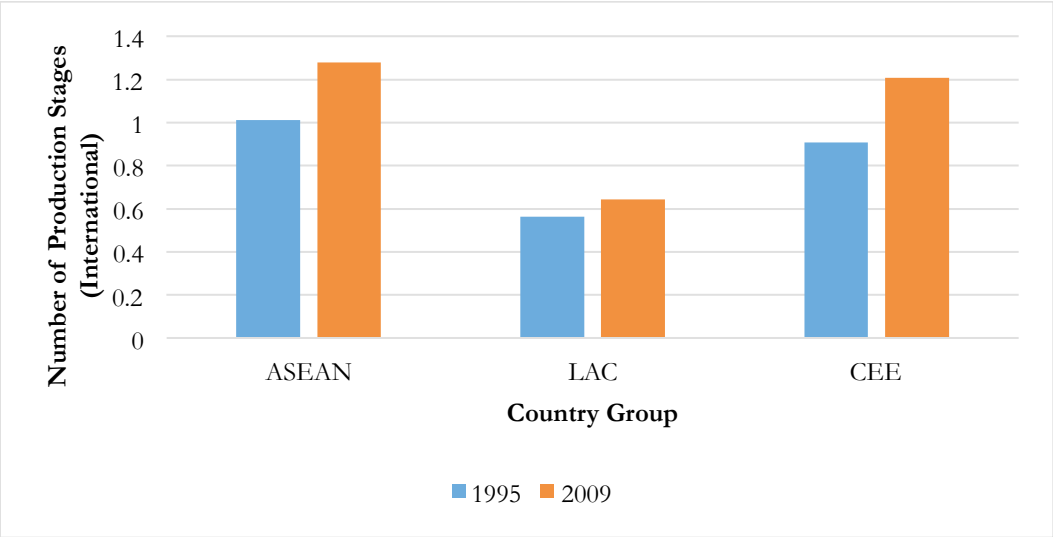
Source: OECD-WTO TiVA Indicators.

Figure 4: Domestic value added embodied in gross exports, million USD, ASEAN, 1995-2009.



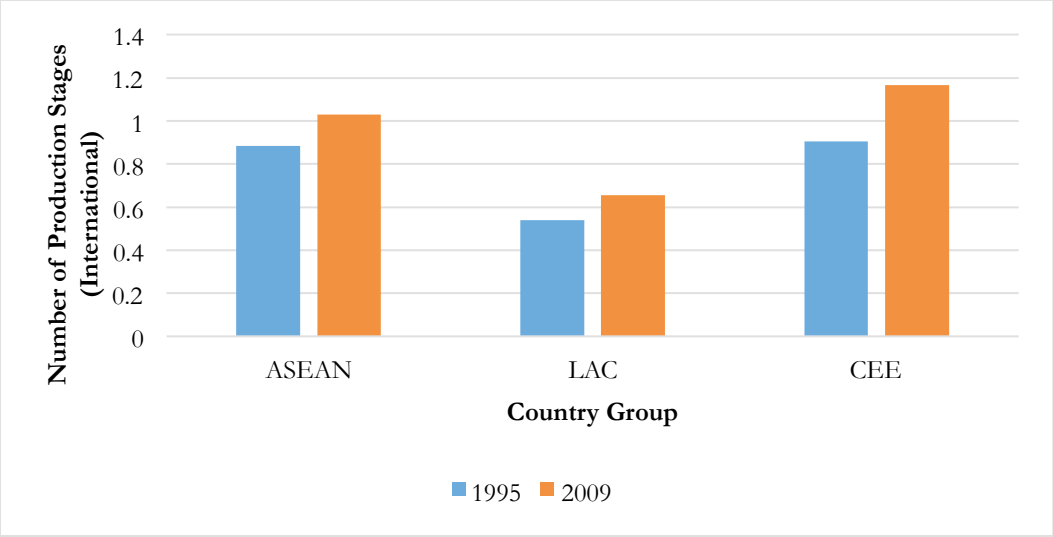
Source: OECD-WTO TiVA Indicators.

Figure 5: Number of international production stages (electrical equipment).



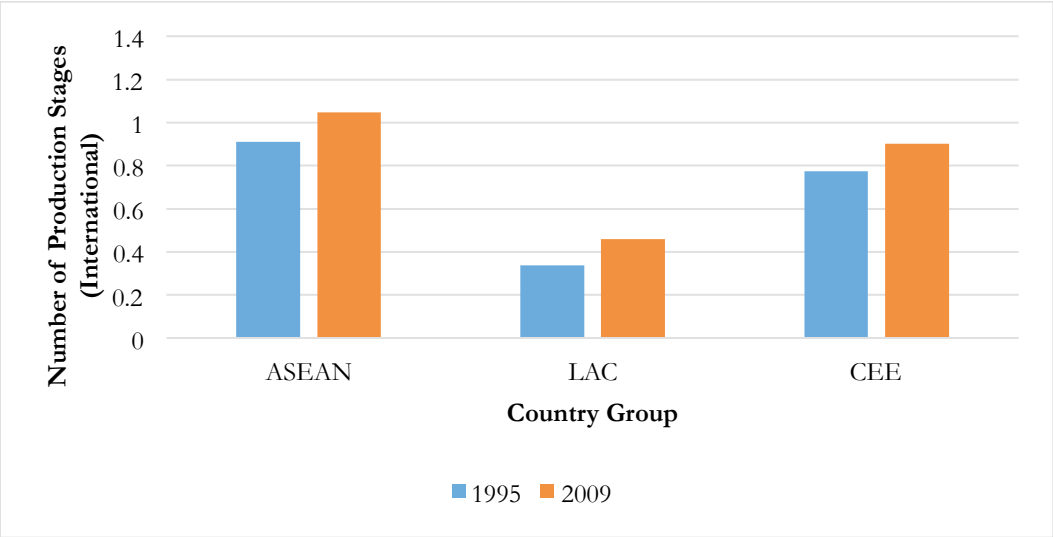
Source: OECD-WTO TiVA Indicators.

Figure 6: Number of international production stages (transport equipment).



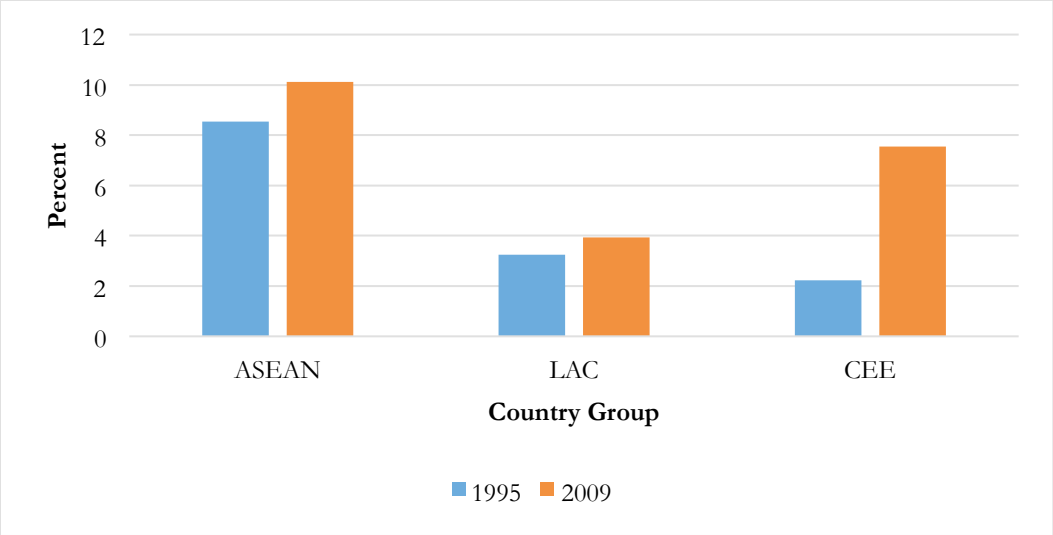
Source: OECD-WTO TiVA Indicators.

Figure 7: Number of international production stages (textiles and clothing).



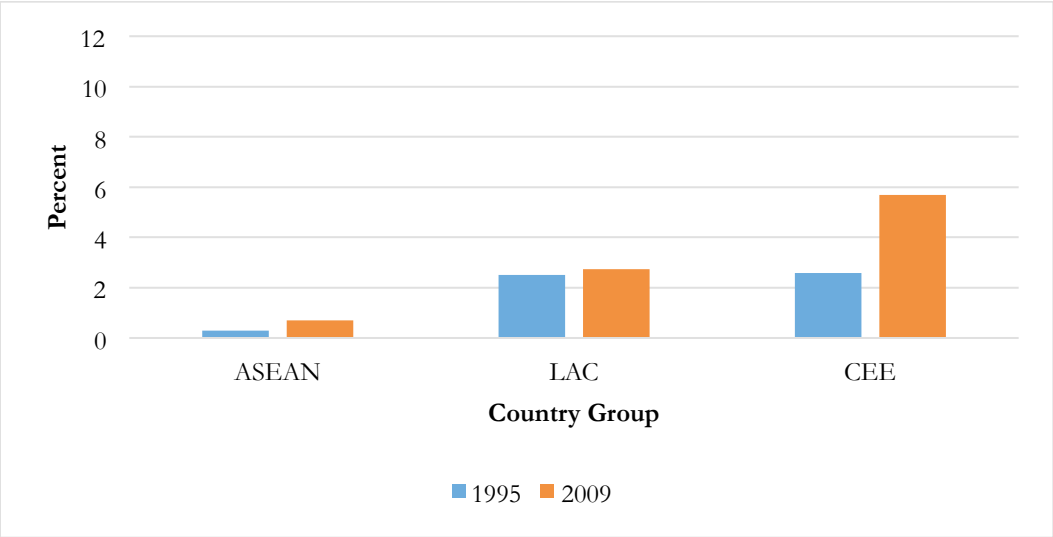
Source: OECD-WTO TiVA Indicators.

Figure 8: Backward participation index (electrical equipment).



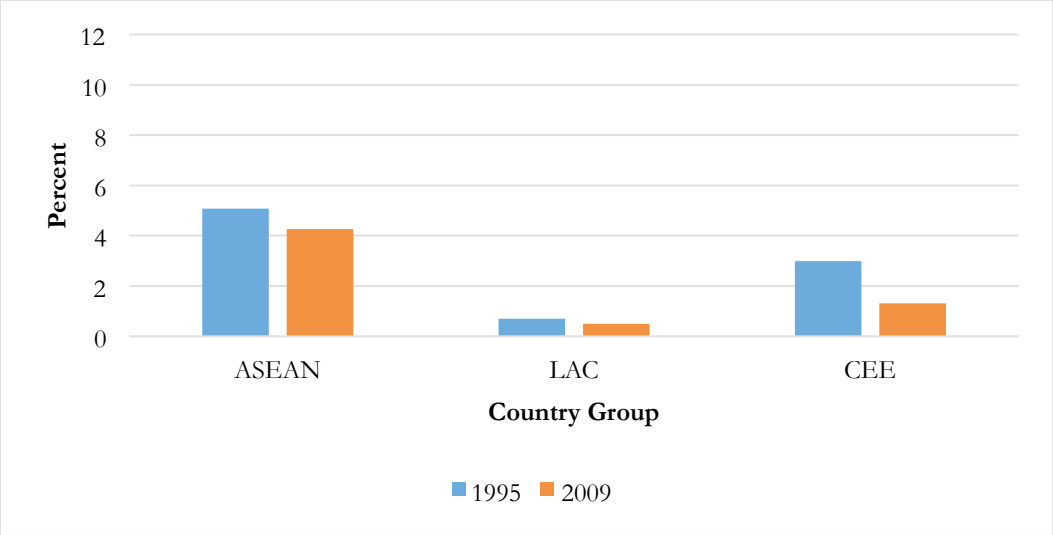
Source: OECD-WTO TiVA Indicators.

Figure 9: Backward participation index (transport equipment).



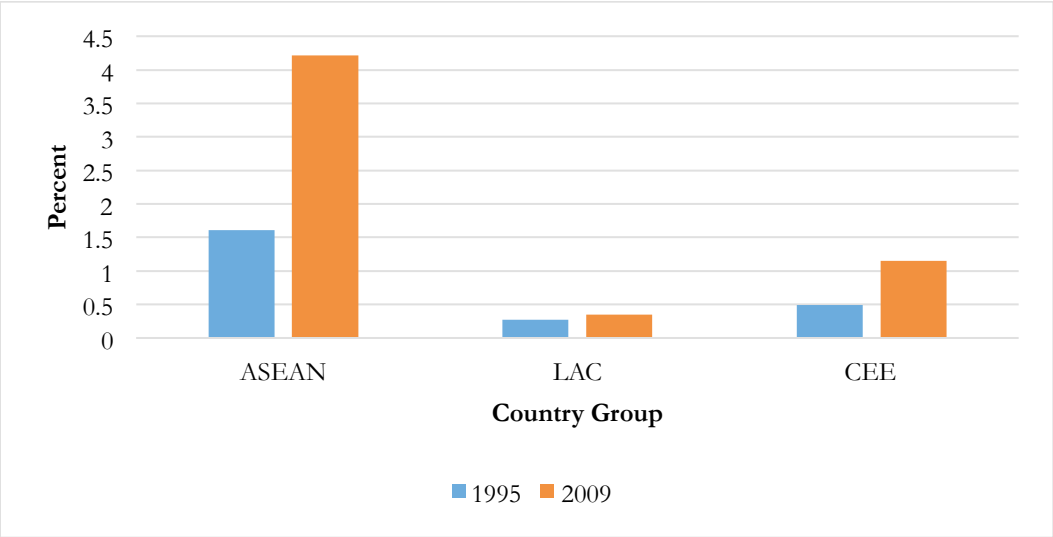
Source: OECD-WTO TiVA Indicators.

Figure 10: Backward participation index (textiles and clothing).



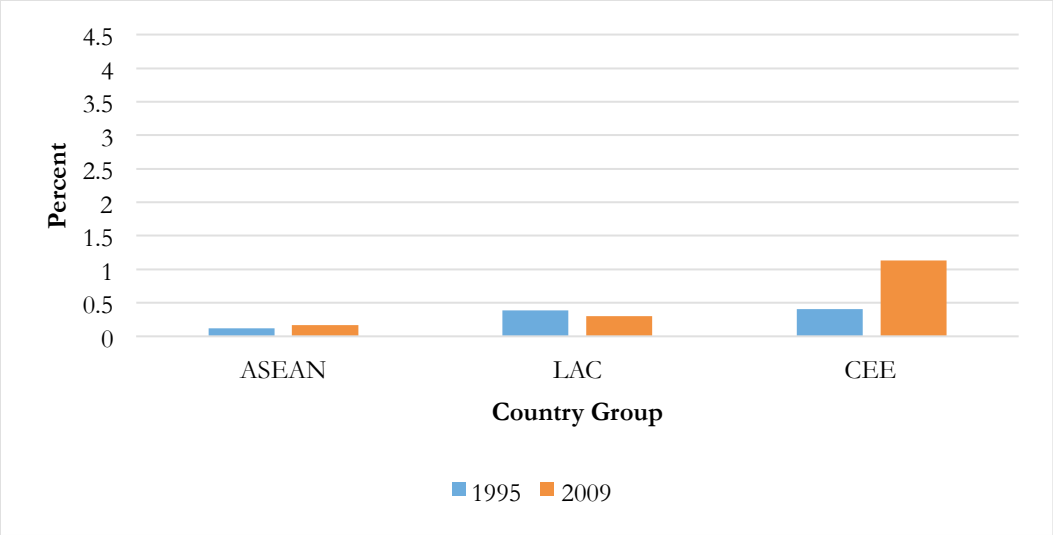
Source: OECD-WTO TiVA Indicators.

Figure 11: Forward participation index (electrical equipment).



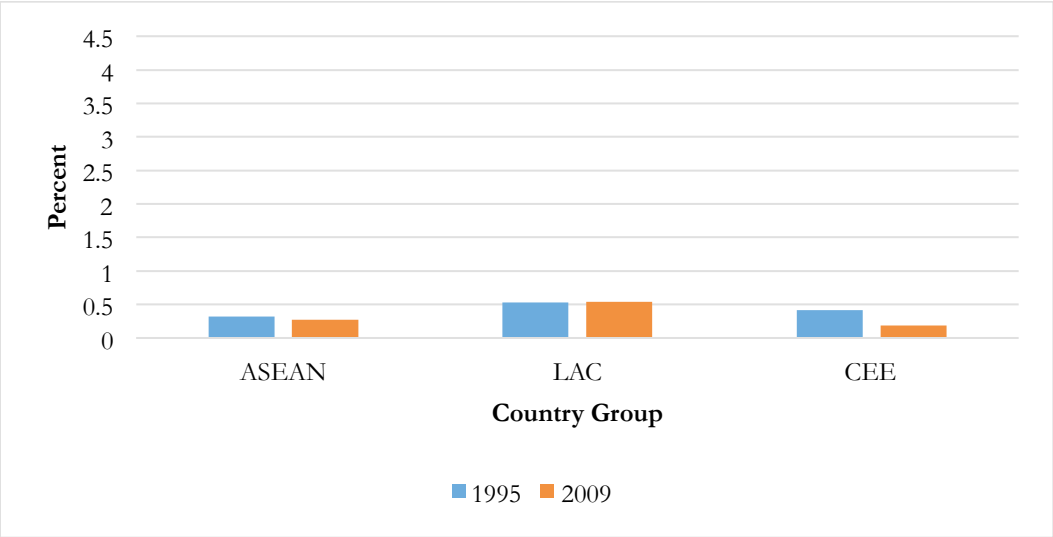
Source: OECD-WTO TiVA Indicators.

Figure 12: Forward participation index (transport equipment).



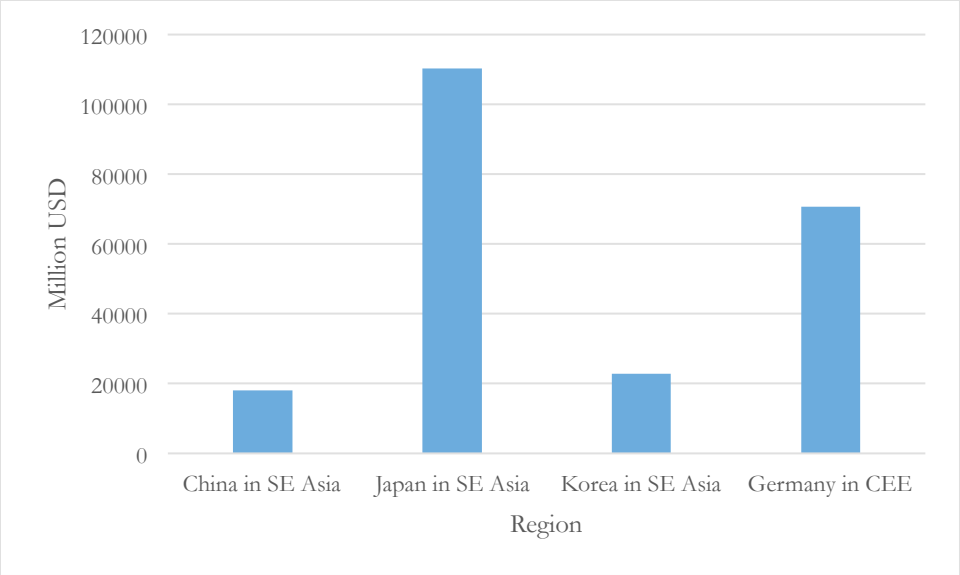
Source: OECD-WTO TiVA Indicators.

Figure 13: Forward participation index (textiles and clothing).



Source: OECD-WTO TiVA Indicators.

Figure 14: Outward FDI stocks of China, Japan, and Korea in Southeast Asia, and Germany in CEE, 2011, million USD.



Source: UNCTAD Bilateral FDI Statistics. Note: Southeast Asia is defined as elsewhere in the paper, i.e. Brunei, Cambodia, Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Viet Nam. Similarly, CEE is defined as Bulgaria, Czech Republic, Estonia, Hungary, Slovak Republic, and Slovenia.