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PAPERS

9

Impact of regionalisation on employment: ASEAN

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Foreword

In this study the authors set out to investigate what might be the employment implications of intensified trade links within ASEAN, the Association of Southeast Asian Nations. The study deals only with the original five members, not including Viet Nam. The authors point out that ASEAN is above all a political grouping and was not set up to promote trade, nor, like many associations of developing countries, to give a broader base for import substituting industrialization. Indeed the ASEAN countries are global in their trade orientation, although the authors point to intra industry linkages often supplied by direct investment from Japan. ASEAN members have stated an intention to remove barriers to trade with each other but this is likely to move in step with, and with the same exceptions to, a relaxation of all trade barriers.

Compared to, for example, the European Union, the five original ASEAN members conduct little trade with each other. The authors demonstrate this by means of a gravity model of trade flows. However, there are some strong and intensifying trading relations, principally between Malaysia, Thailand and Singapore. Indonesia and the Philippines play a smaller role. There are also closely emerging product sectors where trade is important, principally electrical and electronic components and textiles and clothing. The countries are, of course, at very different levels of development, a factor which strongly affects the employment consequences of increased trade. The authors have taken considerable care to identify the direct and indirect labour content of output and are able to show the extent to which different intra ASEAN trade levels and patterns affects employment levels. A fairly constant finding is that, the greater the share of Singapore in ASEAN trade, the lower is the creation of employment because of that country's greater capital intensity.

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Impact of regionalisation on employment: ASEAN

1.0 Introduction

With the advent of the single European market, NAFTA and APEC, regional trading schemes once again became prominent. Within the industrialized world and despite their full participation in the process, regionalisation has not always been viewed positively. The debate over regional trading blocs thus alternated between alarmism over the potentially negative impact that such a partition of the world economy might have on global welfare and hope that regionalisation constituted but a stepping stone to a more open, global trading system. In the developing world reactions were more uniformly favourable as expectations rose that regional trading blocs would stimulate more rapid growth. The creation of Mercosur and renewed interest in the Andean Group were based on such expectations.

Despite this latter-day optimism, the literature dealing with regional integration among developing countries is ambiguous, at best, about the benefits accruing to integration partners in the short and medium term. This emerges with particular force from an analysis of the free trade areas, customs unions and common markets established among countries in Africa, Latin America and the Caribbean from the late 1950s through the early 1970s.¹ Modelled loosely on the European Community, these initiatives were to a large extent shaped by a conception of development as a particular form of industrialization, the mass-production of standardized goods. From this perspective, small market size and a need to protect infant industries were identified as the principal obstacles to development and both, it was thought, might be overcome by placing trade liberalization at the centre of a regional integration process.

In developing countries, however, industrial capacity was limited for the most part to the manufacture of finished goods. The industrial structure lacked economies of scale and was highly dependent upon extra-regional imports for machinery, intermediate goods and other non-material inputs. This made trade diversion, that is, a shift from lower cost to a higher cost supplier, rather than trade creation,² the more likely outcome. In consequence, liberalizing intra-regional trade became increasingly more contentious within these groups and by the early 1980s most such schemes were moribund.

The ASEAN trajectory differed markedly from the pattern common elsewhere in the developing world. Founded in 1967 by five pro-Western countries of South East Asia,³ ASEAN was initially conceived as part of a cold war, regional security arrangement and had limited economic content. Because of their low wages and trained workforce, Singapore and later other of the ASEAN countries were able to attract export oriented investment from Japan, North America and to a lesser extent Europe as domestic production in these countries lost competitiveness during the 1970s and 1980s. One consequence of this export orientation was the ability to maintain high levels of domestic market protection which, however, limited the growth of intra-regional trade. Not until their Singapore summit in January 1992 did the ASEAN heads of state sign a free trade agreement and the reasoning behind it sets the ASEAN experience apart from that of earlier Third World regional groupings. As Goh Chok Tong,

¹ For a recent review of that literature with particular reference to LAFTA, the Andean Group, Caricom, UDEAC and Ecowas see Lynn K. Mytelka "Regional Co-operation and the New Logic of International Competition" in L.K. Mytelka (ed.) *South-South Co-operation in a Global Perspective* [Paris: OECD, 1994], pp.21-54.

² The distinction was drawn by Jacob Viner [1950].

³ Singapore, Malaysia, Thailand, Philippines and Indonesia were the founding members. They were joined in 1984 by the oil-rich sultanate of Brunei and by Viet Nam in 1995.

Prime Minister of Singapore articulated the ASEAN rationale, the creation of larger markets in Europe and North America "are defining the new operating environment for ASEAN... Unless ASEAN can match the other regions both as a base for investments as well as a market for their products, investments by multinational companies are likely to flow away from our part of the world".⁴ For ASEAN to play such a role, tariff and non-tariff barriers between the ASEAN member countries would have to be reduced. The new treaty stipulates that trade would be liberalized over a 15 year period, but Indonesia, which along with Thailand had the most highly protected domestic market, suggested that a full free trade area might even be brought about more quickly.

The point of our study, however, is not to evaluate ASEAN--its successes and failures--but to examine the impact of intra-regional trade on employment using ASEAN as a case study. As we note in section one, few of the theoretical or empirical studies that address regional integration issues have gone beyond an analysis of trade creation/trade diversion and their impact on production efficiency to assess the effects of intra-regional trade on employment. It is also exceedingly rare to find studies that compare trade within Third World regional trading blocs to the situation which might have pertained in the absence of formal integration. This is particularly problematic in the ASEAN case, where intra-regional trade has lagged considerably behind the growth of extra-regional trade in manufactured goods and the major impact of trade on employment is the result of extra-regional, export-oriented manufacturing activities.

Section two provides an overview of the major changes taking place in the ASEAN countries, notably with regard to growth, trade, employment and wages.

Section three deals with the role of foreign direct investment in ASEAN with particular attention to the development of Japanese production networks.

Section four describes intra-ASEAN trade and shows that the process of industrialization which accelerated in the late eighties, has been translated into an increase in industrial integration within ASEAN.

Section five elaborates on the labour content of trade. Using input-output tables it evaluates the direct and indirect effects of trade on employment.

Section 6 develops a gravity model that allows a comparison of the existing pattern of intra-regional trade with one derived from such factors as distance and share in world GNP, tariff and non tariff barriers. The model is estimated with both intra- European coefficients, and intra- Latin American coefficients. These estimates are used to evaluate the potential for trade development within ASEAN.

To conclude in section seven we try to estimate three possible scenarios concerning the evolution of intra- ASEAN trade and its impact on employment.

1. Technology, trade and employment in developing countries: A review of the literature

A survey of the literature on international trade reveals a notable lack of attention to the relationship between trade and employment and until recently, almost no work at all on the employment effects of intra-regional trade. Attempts to measure the direct impact of trade on

⁴ Reported in the *International Herald Tribune*: 28 January 1992.

employment in the advanced industrial countries, moreover, have produced contradictory and often inconclusive results. From the literature reviewed in section one, it would appear that this is primarily due to the critical importance of such intervening variables as consumption patterns and technological change. Yet the lack of reliable and comparable survey data means that impact of these variables on the relationship of trade to employment is rarely assessed in econometric analyses. If this is true for the industrialized countries, the data problem in the developing world is even more of a constraint. To partly remedy this problem, section two provides some firm and sector level data on the source, market orientation and technological characteristics of investment in ASEAN manufacturing. Drawing upon this diverse body of literature, it looks briefly at the issue of regional production networks and what these might mean for the employment effect of intra-regional trade.

1.1 Trade and employment

Since David Ricardo, the international trade literature has sought to explain why countries trade and to assess the gains from partial or full trade liberalization. Most explanations for the pattern of international specialization in production and trade have relied on neo-classical assumptions of static comparative advantage based on differences in factor endowments or opportunity costs; on classical approaches relying on productivity gaps, and more recently on imperfect competition and the increasing returns from economies of scale and learning. In this fashion the theoretical literature has attempted to deal with the growing importance of intra-industry and intra-firm trade within what is conventionally known as international trade and to portray the first, at least, as the positive outcome of growth in advanced industrial economies where product differentiation permits the satisfaction of demand from high income populations.

Within this body of literature and given assumptions of full employment, the 'welfare' effects of international trade have generally been estimated in income terms and less often in terms of employment. To the extent that a literature on the employment effects of international trade does exist, it is largely confined to the imports of advanced industrial countries, particularly those from the developing world and there has been a certain polemical tone to it⁵. A number of different approaches to the impact of trade on employment are found in this literature. One set of international economists, for example, computes the factor content of trade [FCT], mainly in terms of value. Their underlying assumption is that imports from the developing countries substitute for local production, one-for-one on a value basis. This misses important changes in the volume and composition of trade that more recent literature has sought to include by proposing the use of volume measures to determine the potential labour displacement due to imports.⁶ As Cortes, Jean and Pisani-Ferry [1995] point out, FCT computations also frequently make use of trade and especially industrial classifications that aggregate goods with different labour and skill-intensities into the same category thus confounding non-competing and competing imports.⁷ Such approaches, moreover tend to

⁵ Imports from developing countries have variously been blamed for job loss, downward pressure on wages and heightened union bashing. Though much of this literature recognizes the role that multinational enterprises headquartered in the advanced industrial countries have played in stimulating these imports through investment in overseas production, there is little interest in stemming the outflow of capital and rather more in erecting new barriers to imports from the developing world.

⁶ For a review of this literature and some efforts to contribute to it, see Cortes & Jean: 1994, Cortes, Jean & Pisani-Ferry [1995], Borjas, Freeman & Katz: 1992, and Wood [1994].

⁷ This point is raised in Cortes, Jean & Pisani-Ferry [1995] pp.12-13.

ignore a host of other trade and non-trade related factors that are associated with declining employment in different industrial sectors at different points in time. Interpreting the results of such econometric analyses thus requires a thorough knowledge of the changing pattern of investment and the technological choices that lie behind these data, a point to which we return in section two.

Other international and labour market economists differentiate goods in terms of their relative prices and skill content and attempt to measure the impact of trade flows on the labour market, notably on wage levels, wage differentials and employment. While evidence that trade between “skill” and “unskill”-rich countries in goods suited to these factor endowments leads to a rise in the wages of skilled workers in the skill-rich country as a two sector Hecksher-Ohlin-Samuelson world with two factors of production [skilled and unskilled workers] would predict, other predictions of such models are not systematically supported by empirical data and many analysts thus resort to exogenous factors to explain their results. The most important of these is technological change⁸ yet until recently there have been few systematic empirical studies in the international trade literature that assess the impact of technological change directly.

The process of globalization, however, has stimulated a large number of studies concerned with the impact of technological change on productivity, employment and the competitiveness of firms and nations. Much of this literature is summarized in a series of papers prepared for the OECD and published as a special issue of *Industry, Science, Technology*. These papers suggest that while trade itself does not have a large impact on the aggregate level of employment, “...intensified technology-based international competition both within the OECD area and between OECD and non-OECD countries has altered the structure of demand for labour, with employment losses in low-wage, low-technology industries.” [Papaconstantinou: 1995]. Uncertainty resulting from the rapid pace of technological change reflected in the radical shortening of product life cycles; the emergence of discontinuities in technological trajectories and the erosion of frontiers between previously distinct industries, put a premium on scanning and flexibility. By weakening the rationale for vertical integration and undermining traditional product-based forms of oligopoly, it gave impetus to the formation of strategic alliances in R&D and production networks⁹ [Mytelka, 1995]. Both equity and non-equity based regional production networks have emerged within NAFTA, in the European Union’s relationship with Eastern and Central Europe as well as in ASEAN. The possibility that the employment effects of arms-length intra-regional trade and trade within structured regional production networks will differ, warrants further investigation. Once again, however, the kind of data that would permit econometric analyses of these differences simply is not available.

Meanwhile, the impact of technological change on trade and employment has become a contentious issue. As Pascal Petit noted, irrespective of whether it is technological change within a national setting alone or technological change resulting from changing competitive conditions including increased import penetration, the key question is “...whether the nature and spread of “destruction” will allow enough time and opportunities for “creative” and fair adjustments to occur in the labour market and in the formation of incomes” [Petit, 1995]. A

⁸ Revenga [1992] suggests that currency appreciation is a possible explanation. Lawrence and Slaughter [1993] and Dwatripont, Sapir, Sekkat, Lamorgese, Guazzarotti [1995], however, provide evidence for the importance of technological change as a key determinant in employment and wage levels. At the very least the literature seems to argue that trade is certainly not the sole determinant of labour market problems in advanced industrial countries.

⁹ Both also contribute to cost reduction in an increasingly innovation-based mode of global competition.

similar question can be posed in newly industrializing economies [NIEs] such as those of the ASEAN group. To what extent, one might ask, will the export-oriented manufacturing sector generate sufficient employment to absorb the inflow of labour from rural areas, particularly in countries such as Thailand, Indonesia and Viet Nam, where a large percentage of the population is still in agriculture?¹⁰ To answer this question requires information not merely on trade but on the growth of manufacturing activity, itself related to intra and extra-regional investment patterns. A critical factor in such an assessment is the impact that technological change in industry will have on the growth of export oriented manufacturing by front-running NICs such as Singapore. This will partly depend upon the extent to which the kinds of technological capabilities needed for higher-value added production are being built domestically and also upon the degree to which domestic consumption and intra-regional trade are rising. The latter, in turn, would likely be affected by the pattern of direct foreign investment [DFI] across the region.¹¹

1.2 Regional grouping and employment

While the general literature on international trade is ambiguous with respect to the impact of trade on employment in advanced industrial countries, those looking more specifically at the question of trade liberalization pay scant attention to the employment effects of intra-regional trade. There are two exceptions to this. One is the spate of articles that appeared in the wake of the decision to create a single market in Europe by 1992.¹² These focus mainly on the introduction of price-based competition in each of the member country markets through the removal of non-tariff barriers¹³ and the elimination of national monopolies through privatization and liberalisation. Simulations then apportion out the resulting productivity gains between wages and employment creation.

The second, involves regional groupings such as NAFTA and APEC which have a north-south dimension. To a large extent the NAFTA studies reflect the same concern with the employment impact of imports from developing countries, found in the broader international trade literature and the results are equally ambiguous. The US Senate hearings, for example, cite studies that estimate employment gains from NAFTA of between 200,000 and 2 million jobs depending upon the assumptions¹⁴ made in the various models [US Senate: 1994, Hufbrauer & Schott: 1993]. The empirical analyses presented in Lustig, Bosworth and

¹⁰ Between 1950 and 1990 the share of agricultural employment in total employment in the Republic of Korea fell from 74.1 per cent to 24.6 per cent, nearly 50 per cent or an average of 12.4 per cent each decade. In contrast, the share of agricultural employment in total employment fell by barely 20 per cent over the same period in Thailand and the Philippines, from 84 per cent to 64.3 per cent in the former and from 67 per cent to 46.8 per cent in the latter and despite a steeper drop in Indonesia, remained at 48.5 per cent in that country in 1990.

¹¹ The importance of FDI in shaping growth derived from regional integration and hence job creation is also noted by Dr. Paul London, Under Secretary of Commerce for Economic Affairs to the US Senate when he argued that "The existence of the NAFTA will increase the attractiveness of foreign investment in North America. Europeans and Asians as well as American swill be more likely to invest in the United States because facilities funded by these investments will have free access to markets in all three member nations. It is no accident that BMW and Mercedes have just elected to build plants in the United States not in Mexico." [US Senate:1994,14].

¹² See for example the collections by Venables & Winters:1991, Dewatripont & Ginsburg:1994, and the papers by Baldwin: 1989 and Mercenier:1995.

¹³ These include policies and practices such as national norms, procurement policies.

¹⁴ Some models look only at trade liberalization in which case the employment effects are minimal. Others include capital movements which give rise to much more important employment effects. The latter is true for ASEAN as well.

Lawrence [1992] similarly vary in their conclusions, with several of the models predicting only minor gains from trade as measured by growth in Gross Domestic Product [GDP], in capital stock or in employment and only a small amount of wage convergence, on the assumption that the bulk of the increase in trade has already taken place; while others, looking at specific sectors or countries, foresee large shifts in population out of agriculture in Mexico, for example, as US grain exports to that country rise.¹⁵

A number of studies have also looked at changes in investment and trade flows within the Asia and Pacific region under conditions of trade liberalization [Frankel & Kahler: 1993, Kreinin & Plummer] but without considering the employment effects. Only one study has linked trade and employment. In that study, Hiro Lee and David Roland-Holst use a calibrated general equilibrium [CGE] model for 10 APEC countries to develop three scenarios. The first examines the effect of bilateral tariff liberalization, the second of bilateral tariff and NTB removal and the third looks at the effects of multilateral tariff and NTB removal, a scenario which approximates a new GATT round. The model makes use of a social accounting matrix for the year 1985 which they had previously constructed and it "explicitly model[s] sectoral employment in domestic production, the inter-sectoral domestic mobility of labour and the labour services or employment embodied in trade between countries." [Lee & Roland-Holst: 1994]. While trade increases under all three scenarios, within each scenario there are significant differences in the gains from trade and hence in employment linkages amongst the ten countries, across bilateral trading patterns and between exports and import. With regard to the second scenario, bilateral tariff and NTB removal, for example,

...Thailand increased its import demand from neighbouring China by 17.2 per cent, but from its southern neighbour Malaysia by only 9 per cent. United States demands for Korean and Chinese goods increase by 21.4 and 18.4 per cent, respectively, but only 2.6 per cent more Indonesian goods come into the country. Singapore increases imports from the Philippines by 9.6 per cent, but from neighbouring Malaysia by only 2.6 percent. From an export perspective, United States prospects improve substantially with respect to Japan ...and the Philippines ..., yet its exports to Singapore rise only 4.4 per cent ... in terms of employment linkages ...the results ... are more variegated ... than the trade flow changes ...The United States and Japan create far more jobs for foreigners than conversely, as expected, but the disparity for Japan is much greater. While creating over 3 million jobs abroad with its import demand, Japan generates only 29,000 new jobs to meet demand from all sources. Job creation from domestic demand is actually negative, the result of import penetration in relatively labour-intensive sectors (Taiwan and Singapore also experience this) [Lee & Roland-Holst: 1994, pp.33-35].

In sum, the results are much more complex than anticipated and they are heavily dependent on the kinds of assumptions incorporated in the model.

For the most part, the literature on regional integration amongst developing countries, however, ignores the relationship between trade and employment, focusing instead on the extent to which customs unions lead to the creation or diversion of trade. For Jacob Viner [1950], who pioneered this line of inquiry, regional integration schemes were only to be

¹⁵ As in the North-South trade literature cited above, the question then becomes whether investment in Mexican manufacturing will generate sufficient new jobs so as to assimilate these rural labourers or whether they will join the flood of migrants entering the United States, a point raised in the literature.

recommended if they contributed to global welfare by shifting trade away from a higher to a lower cost supplier or what he termed trade creation. However, in the developing world, neighbouring countries were most often specialized in the export of similar raw materials and agricultural products. Given their weak technological base, overall poverty, and policies of import substituting industrialization, most developing countries produced only a limited range of manufactured goods making both inter-industry and intra-industry trade difficult. The high import-intensity and relatively small scale of production in these industries raised production costs there, making imports from third parties a lower cost alternative. The market segmenting strategies of foreign investors, moreover, did not encourage national specialization and trade within a regional integration scheme [Mytelka: 1994]. Lack of complementarity, imperfect information and low levels of industrialisation in developing countries thus predicted a very limited range of opportunities for trade expansion within these regional integration schemes [Balassa & Stoutjesdijk: 1975; Kahnert *et al.*: 1969; and Robson: 1971] and the probability was high that trade liberalization would result not in trade creation but in trade diversion, that is, a shift from a lower cost to a higher cost supplier. Nonetheless, most of the developing country leaders who signed agreements to create free trade associations, customs unions or common markets, chose to ignore such possibilities. Instead they focused on the potential dynamic effects that even limited trade liberalization might generate.

As Gehrels, Meade, Lipsey and Johnson,¹⁶ for example, argued, assessing the utility of customs unions solely from the perspective of global welfare as Viner did, ignores the distribution of world-wide income. Taking the latter into consideration, and adjusting for the special characteristics of developing countries, as Massell, Mikesell and Balassa suggested, made it possible to envisage a new set of criteria against which the gains from customs unions could be assessed.

First, one could set the gains or losses in global welfare against those accruing to individual countries. Thus accepting for the moment that trade diversion may be detrimental from the perspective of world economic efficiency, it may nevertheless be true that trade diversion would contribute to raising real income in the developing countries concerned, if, as a result of a widening of the market through integration, local industry mobilised unused resources and widened the export base. Kahnert, Richards, Stoutjesdijk and Thomopoulos [1969], moreover, hypothesised that "in the absence of an integration scheme, trade destroying import substitution might have taken place on the national level" with even more limited effects on growth and specialisation than a customs union would have had, even one involving trade diversion.

Alternatively, one could compare long term gains and losses from integration to those obtaining in the short term. This is particularly relevant for developing countries whose "prime concern" is "to change their factor endowment, their incomes and their consumption patterns" [Stewart: 1984]. If the enlarged market opens new opportunities for profitable investment in industry, makes possible greater economies of scale, accelerates technological learning or increases domestic competition thereby improving efficiency, then present costs from trade diversion would be offset by future benefits both for the developing countries and for the world as a whole in the longer term.

It could, of course, be argued, as Mikesell [1963] pointed out, that the "gains would be greater if each country broadened its export base by expanding its export of both primary

¹⁶ For a collection of articles by these authors see Robson [1971]. The debates themselves are well summarised in Kahnert *et al.* [1969], Balassa [1961], Ethier and Horn [1984] and de Melo and Rodrik [1993].

commodities and of manufactures to the rest of the world.... but [this]... has not happened and it is not likely to happen until developing countries learn to trade and compete with one another on a regional basis." Even limited intra-regional trade could thus be conceptualized as an apprenticeship process which would ultimately lead to multilateral trade liberalization.

During the 1960s and 1970s, however, these theoretical arguments served to justify not a process of progressive liberalization but rather an extension of national policies of import substituting industrialization to the regional level.¹⁷ By insulating the regional market from the world economy, a disincentive to extra-regional exports of manufactured goods was created. By their very design, traditional models of regional integration, thus narrowed the pay off matrix for individual member countries to the gains and losses from intra-regional trade. When such gains were not immediately forthcoming or, because of inequalities in wealth and levels of industrialization at the outset were distributed unevenly, most integration schemes among developing countries took on the form of zero sum games.

The drive to industrialise within national boundaries and thus to maintain and even to increase market segmentation within regional integration schemes, was exacerbated by the role played by key economic actors during this period. Few local entrepreneurs had the size or credibility to penetrate neighbouring markets and the high cost, import-intensive manufacturing sector was itself an impediment to market integration. These actors, therefore, could not provide the support base needed for trade liberalisation. Foreign-owned firms which, by virtue of their size and scanning capabilities, might have been expected to be among the first to engage in intra-regional trade, failed to rationalise to take advantage of the larger market whether in UDEAC, LAFTA, the Andean Group or CARICOM since, for the most part multinational corporations engaged in manufacturing were purveyors of mature technologies and standardized goods to the developing world in this period. Within regional integration schemes, market segmentation was thus the rule.¹⁸

On the export-side, this meant that a large proportion of the licensing agreements between parent firms and their subsidiaries or between licensor and nationally owned local firms contained clauses prohibiting exports [Vaitsos: 1978, Mytelka: 1979]. This reduced both the incentive to rationalise production and to innovate.

On the import-side, regional markets were also of little importance to these subsidiaries since the bulk of their imports came from their parent firm or from other firms in the home country. Parallel production by these MNCs was thus a powerful disincentive to intra-regional trade since maintenance of duplicate plants was preferred if intra-firm transfer pricing and higher retail prices compensated for production inefficiencies resulting from continued market segmentation. By the early 1970s the limited and unevenly distributed gains from intra-regional trade and the conflicts this generated had led to stagnation or decline in most Third World regional integration schemes.

¹⁷ A more detailed presentation of the arguments in this and the following paragraph can be found in Mytelka: 1994.

¹⁸ Thus of the 513 US subsidiaries operating in the Andean Group in the late 1960s, "362 had affiliates in at least one other member country and 258 in at least two" (Vaitsos: 1978, 732). A similar pattern existed in the UDEAC where some 75 per cent of the "single tax" firms were foreign owned and duplicate production existed in nearly all major manufactured goods -- beer, textiles, cigarettes, shoes, industrial gases and aluminium products (Mytelka: 1984, 141-42).

2. Pattern of trade, production and employment in ASEAN

The Malacca straits have been for centuries an active maritime road linking West Asia to East Asia. With trade came diverse ethnic, political and religious influences. Singapore under British domination became the international trade centre for South East-Asia. With the end of the colonial period (mid sixties for Malaysia) came a time of nationalism and protectionism in international trade. Only now with its goal of achieving a free trade zone is ASEAN returning to its old trading tradition, and with economic reform in India, back to its position as a link between the Indian and the Chinese Worlds.

2.1 From producers of primary products to manufacturers

Malaysia, Thailand, Indonesia and to a lesser extent the Philippines, have benefited from exceptional endowments in natural resources and have generally managed their exploitation well, from an economic point of view, though sometimes at the expense of the environment. Given this endowment in natural resources, it is not very surprising that up to the mid-eighties the primary sector was a major source of value added and employment in these countries, and that the development of manufacturing industry came rather late. In most cases industrial development was based on a mix of import-substitution and the downstream transformation of primary products for such industries as the food industry, petrochemicals and furniture and in the most capital intensive industries it took the form of modern public enterprises funded and protected by their respective governments.

In spite of many shortcomings this strategy enabled all ASEAN countries but the Philippines, to sustain a process of rapid development for over twenty years (see graph 2.1). This development was accompanied by a significant decline in poverty (see table 2.1).

Table 2.1. Absolute poverty ratio (per cent of total population)

	1970	1980	1990
Philippines	35	30	21
Thailand	26	17	16
Indonesia	60	29	15
Malaysia	18	9	2
China	33	28	10

Source: World Bank.

With regard to demographic trends, however, the tendency to reduce the rate of population growth is uneven and generally very much below that of other East Asian nations (table 2.2). On average the rates remain close to 2 per cent per annum, which makes the region still one of high population growth. Employment, as a consequence, is one of the crucial problems with which governments have to cope.

Demographic pressure makes the ASEAN region one of the world's low labour cost regions. Although data are not very comparable we can roughly estimate that even in Singapore, where per capita income is high, the hourly labour cost of manufacturing workers represents, at current exchange rates, only 30 per cent of the United States cost. Malaysian

and Thai workers cost around 40 per cent of Singaporean costs, Philipinos and Indonesians less than 15 per cent. The large differences are probably not over estimated if we consider that in many cases industrial workers are by a very wide margin better paid than agricultural workers and that absolute poverty is often hidden in the remote regions of these countries. A part of the fight against poverty is in fact based on a change of work.

Table 2.2. Demographic trends and employment structure

	Population (millions)	Population growth (per cent)		Primary sector in total employment (per cent)
	1994	1965-80	1979-94	
Indonesia	190	2.4	1.8	53.0
Malaysia	19	2.5	2.5	26.4
Philippines	67	2.8	2.4	44.9
Singapore	3	1.6	1.8	0.4
Thailand	60	2.9	1.8	60.0

Source: CEPIL-CHELEM 1995, and ILO.

Until the early 1980s, however, the share of primary industries in the production structure and in employment remained very high. A sharp drop in the price of primary goods was at the root of a sudden decline in both revenue for the government and for many people. Indonesia, was hit not only by a decline in oil prices, but also by the appreciation of the Yen, which was the currency used for a significant part of its debt. This crisis led to a shift in development strategy in Indonesia, Thailand and Malaysia, from one based on import-substituting industrialisation to outward-looking driven industrialisation. In Singapore the crisis was due to the crisis of its neighbours, to an enormous rise in labour costs and to overcapacity in the hotel industry. Singapore managed its exit from the crisis through the development of a "high-tech" capacity, a rigorous macro economic policy and a new industrial strategy, including strong relations with Malaysia and Indonesia ("growth triangles" strategy, see below). The Philippines, then in political turmoil, was neither able to escape from the debt trap nor to develop a new development strategy. Of the original ASEAN member countries, the Philippines is now the poorest. However, its exports of manufactures have come to dominate its export trade.

Table 2.3. Share of manufactured products in total exports

	1972	1983	1987	1993
Indonesia	3.9	8.5	21.3	50
Malaysia	27.8	30.8	38.1	68.4
Philippines	13.2	45.4	59.8	72.2
Singapore	42.1	40.7	65.2	78
Thailand	17.0	28.8	42.7	65.5

Source: CHELEM CEPIL.

As a result of these policies there has been a huge increase in export of manufacturing products whose share has dramatically increased since the mid-eighties (see table 2.3).

2.2 Sectoral changes in industrial employment, production and value added

Annex 1 presents a systematic statistical summary making possible a comparison of the major changes occurring in each of these countries over a twenty year period.

Singapore

Since 1973 manufacturing employment has grown as fast as total population (1.8 per cent). But this masks very contrasting trends in sectoral employment. Over the period 1973-1992 employment declined sharply in light industries such as wood, leather, textiles and wearing apparel and rose in what are generally classified as "high tech" industries. Employment in the electrical/electronics industry, for example, rose from 22 per cent in 1973 to nearly 40 per cent of manufacturing employment in 1992. Machinery and metal products are the two other high growth industries.

Malaysia

Employment in manufacturing increased by 3.6 per cent per year between 1973 and 1992. As in Singapore the electrical machinery/electronics industry was by far the leading sector for employment creation, while employment in industries linked to primary products such as food, wood and rubber products declined.

Thailand

Between 1974 and 1991 total employment in manufacturing rose by 3.05 per cent. This, however, reflected a dramatic shift within a number of traditional sectors rather than between traditional and "high tech" industries. Employment in the textile industry, for example, fell from 32.8 per cent to 17.3 per cent of total employment in manufacturing, while employment in the garment sector rose from 0.8 to 14.2 per cent of employment in manufacturing. Employment in the food industry continued to grow, albeit slowly, whereas in the beverage sector it dropped precipitously. Employment in electronics, moreover, was growing rather slowly and accounted for only 4.6 per cent of manufactured employment in 1991.

Indonesia

Contrary to the other ASEAN countries there has been no significant increase in employment in the Indonesian electronics industry. The major increases are registered in more traditional industries like wearing apparel and wood, rubber and plastics. Declines are very high in the food and the tobacco industry.

The Philippines

Employment creation has been below the rate of population growth but the sectoral trend is similar to that in Indonesia. Wearing apparel is the leader in employment creation. Employment in the electronic industry, although more important than in Indonesia, is still modest.

The general trend in employment reflects to some extent a pattern that goes from the most developed country to the least developed. The former is leading in "high tech" employment the latter leads in labour intensive industries. That the level of development reflects the technological level is not surprising, but it bears repetition.

3. The role of foreign investment in ASEAN trade

The ASEAN group is a major exception to the general pattern of decline in regional integration among developing countries, in large part because both its point of departure and its subsequent development were different. ASEAN was first and foremost a political association and only secondarily an economic grouping. As an economic grouping, moreover, it focused less on intra-regional trade and more on investment in export-oriented industry. The ASEAN experience thus reverses the process of using regional trade liberalization as a way station on the road to an open trading system; instead it first learnt to trade with the world and only latterly began its own process of trade liberalization.

3.1 DFI and the pattern of trade

The ASEAN countries, including, to some extent, the Philippines, grew very rapidly from the mid-1980s into the 1990s and that high growth rate was associated with a sharp increase in manufactured exports. Unlike other Third World regional groupings, the ASEAN group trades most heavily with countries in its own region and the increasing outflow of capital from the dynamic, high growth countries of the region - Japan, Republic of Korea and Taiwan (China) - have accelerated the pace of investment in, and exports from, the manufacturing sectors of the ASEAN countries.

Most authors thus agree that the regionalisation of production networks in ASEAN has little to do with free trade agreements carefully negotiated among states and rather more to do with the operation of private business interests [Lim: 1994, Ravenhill: 1994]. As Linda Lim put it

Regional economic co-operation in ASEAN has been extremely limited, with virtually negligible results over a very long period of time. ASEAN is clearly not a trade-driven regional grouping, and it is not clear if the recent agreement to pursue a regional free trade area will deliver significant results by the end of the prescribed 15-year phase-in period. But individually, the ASEAN economies' success has been based on international trade, and particularly on exports of commodities, manufactures and services to the world rather than the regional market. Foreign investment has played a key role in providing the capital, technology and market access required to successfully pursue these export-oriented national development strategies. Because of this history, the ASEAN countries have been understandably reluctant to promote or favour intra-regional trade and investment over extra-regional trade and investment with non-ASEAN partners. Since the 1980s they have unilaterally been pursuing non-discriminatory trade and investment liberalisation to expand trade with, and to attract more investment from, non-ASEAN partners, including the Asian NIEs as well as Japan and Western industrial nations. Indeed, most of the regional co-operation schemes proposed to date also seem primarily motivated by the desire to make the region more attractive to foreign investment from outside the region. [Lim: 1994, 151-152].

The ASEAN countries have been major recipients of direct foreign investment since the early 1980s and the inflows have risen over the decade and into the 1990s even as other countries, Mexico and China, for example, also began to receive an increasing amount of direct

foreign investment (table 3.1.). Japan emerged over the 1980s as a principal foreign investor accounting for over 25 per cent of the direct foreign investment in all ASEAN countries but the Philippines by the end of the decade (table 3.2). The United States is the second largest investor in the region. Towards the end of the 1980s, the Republic of Korea, Hong Kong, Taiwan (China) and Singapore appeared as major investors in the ASEAN group.¹⁹

Table 3.1. Foreign direct investment: Inward flows 1975-1994 (millions of \$US)

	1975-1979 annual avg.	1980	1981	1982	1983	1984	1985	1986
Indonesia	289.9	179.6	133.2	226.3	288.6	226.5	272.1	258
Malaysia	524.3	934.5	1 265.2	1 397.7	1 260.4	797.5	694.5	489
Philippines	73.6	-106.7	172.2	15.5	104.8	9.2	-11.2	127
Singapore	502.0	1 119.3	1 409.1	1 391.1	995.2	883.6	973.7	171
Thailand	85.2	190	293.6	193.2	349.6	403.9	161.4	26
Viet Nam	(a)	0	17.9	11.9	-	-	-0.1	0
Total		2 316.7	4 841.0	3 235.7	2 998.6	2 320.7	2 090.4	1 071.3
Mexico	1 023.5	2 184	254.1	1 643.9	456.5	390.5	501.6	1 523
China	-	57	265	429.5	636.1	1 257.7	1 659.1	1 875
	1987	1988	1989	1990	1991	1992	1993	1994
Indonesia	385	576	682	1 093	1 482	1 777	2 004	2 109
Malaysia	423	719	1 668	2 332	4 000	5 183	5 006	4 348
Philippines	307	936	563	530	544	228	763	2 000 ^b
Singapore	2 836	3 655	2 887	5575	4 879	2 356	5 016	5 588
Thailand	352	105	1 775	2 444	2 014	2 116	1 726	640
Viet Nam*	0	234	330	482	1 159	1 921	2 716	3 200
Total	4 303	6 225	7 905	12 456	14 078	13 581	17 231	17 885 ^b
Mexico	3 246	2 594	3 037	2 632	4 762	4 383	4 389	7 978
China	2 314	3 194	33 393	3 489	4366	11 156	27 515	33 787

(a) \$4.1 million in 1975, * from « l'économie du Viêt-nam », Marie-Sybille de Vienne, b) estimate.

Sources: UNCTC, Transnational Corporations in World Development (1988), Annex Table 1, UNCTC, World Investment Report (1992), Annex Table 1 and UNCTAD World Investment Report (1993), Annex Table 1, IFS on CDROM for 1991-1994, IMF.

Table 3.2. Foreign direct investment in Indonesia, Malaysia, the Philippines and Thailand by origin (per cent)

Investing country	Year	Indonesia	Malaysia	The Philippines	Thailand
Newly industrialized economies	1986	10.5	23.7	10.2	27.6
	1991	22.6	47.4	8.7	31.7
Of which: Singapore	1986	13.1	17.2	0.3	13.9
	1991	3.9	6.6	0.4	12.5
Republic of Korea	1986	2.8	0.3	0.1	0.1
	1991	3.4	6.8	5.7	1.0
Taiwan (China)	1986	2.1	1.0	0.4	7.5

¹⁹ There is some evidence of specialization among NIE investors within the region. Ninety per cent of Korea's overseas investments in the footwear industry are located in ASEAN and most of this is in Indonesia. The same is true of Korea's investments in the Apparel industry. However, in consumer electronics, Korean firms have favoured Thailand [Lee:C.H.;1994,287] and more recently Viet Nam.

Investing country	Year	Indonesia	Malaysia	The Philippines	Thailand
Hong Kong	1991	12.0	28.3	1.5	11.5
	1986	-7.5	5.2	9.3	6.1
	1991	3.2	5.7	1.1	6.8
Japan	1986	40.6	11.1	28.5	57.9
	1991	10.6	20.9	26.9	35.3
USA	1986	16.0	3.3	28.7	17.2
	1991	3.1	11.5	11.1	22.7
Other	1986	22.9	60.9	32.6	-2.7
	1991	63.7	20.2	53.3	10.3

Source: Japan Economic Foundation, *Vision for the economy of the Asia-Pacific region in the year 2000*, Tokyo, 1992.

3.2 Japanese affiliates' networks in ASEAN

A number of particular features of Japanese subsidiaries and affiliates in the manufacturing sector in ASEAN countries have important ramifications for both intra-regional trade and employment.²⁰ First, Japanese affiliates are relatively more capital intensive than affiliates of other multinational corporations. As a result they employ less labour than equivalent United States, European or East Asian firms and their corresponding direct employment effect is lower.

Second, Japanese firms have a higher percentage of expatriates in senior management positions and there are some indications that overall, Japanese affiliates tend to be less skill-intensive than comparable American affiliates of their size and in their industrial sector. In Thailand, for example, in 1990 Japanese firms accounted for 39 per cent of the adjusted gross output in chemicals, 36 per cent in the metal industry, 47 per cent in electric machinery and computers and 47 per cent in vehicles and bicycles. Their share in Thailand's two largest manufacturing sectors, food and textiles was much lower, less than 5 per cent in each [Ramstetter: 1994]. using a sample of 1812 firms operating in Thailand's non-oil manufacturing sectors in that year, Ramstetter calculated the ratio of skilled employment to total employment and the share of foreign workers in skilled employment by ownership, size and industry. In the electrical and computer industries the ratio of skilled employment to total employment was 18.4 per cent for locally-owned firms, 14.6 per cent for Japanese-owned firms, 15.6 per cent for firms from other industrialised countries and 10.2 per cent for firms from the NIEs. In motor vehicles, locally owned-firms again had higher ratios of skilled employment to total employment [24.2 per cent as against 15.2 per cent in Japanese firms, 19.5 per cent in other developed country firms and 8.3 per cent in firms from the NIEs]. In chemicals, firms from other developed countries and from the NIEs both had higher ratios of skilled employment than Japanese firms and in metals and metal products, local companies, firms from the developed countries and the NIEs all have higher ratios of skilled employment to total employment than Japanese firms within all size categories [Ramstetter: 1994]. The foreign worker share of skilled employment in each of these industries was highest in firms from the NIEs and second highest in Japanese firms.

Third, Japanese affiliates have a relatively low and frequently decreasing level of local linkages tending to source more from their parent firm, other affiliates or preferred suppliers

²⁰ The literature is generally in agreement on the following points: see ILO, 1994, Ramstetter, 1994, Sibunruang and Brimble, 1988, Kawabe, 1991, Hill, 1992.

who locate in the host market. Kimbara [1991] shows that the ratio of local procurement to manufacturing cost in Japanese affiliated companies fell in Malaysia from 80 per cent in 1970 to 54.5 per cent in 1975 and hovered between 49.9 and 51.9 per cent from 1985 to 1987. In Singapore, Thailand and Indonesia the ratio rose but from very low bases in the 1970s, reaching only 42.4 per cent in Indonesia in 1986, 57 per cent in Thailand in 1985 and nearly 60 per cent in Singapore by 1987. For Malaysia, Jetro data show that Japanese companies procured 54 per cent of their materials, parts and components from Japan, 28 per cent from local companies and 18 per cent from third countries. "When procuring from Japan, the Japanese subsidiaries rely upon their parent companies for 90 per cent of their procurement. Even in the case of local procurement, more than 20 per cent is from other Japanese companies in Malaysia" [Kawabe: 1991].

Since the mid-1985, Dieter Ernst argues, there has been an notable progression in regional specialization as reflected in an increase of intra-industry trade between Japan and East Asia and amongst East Asian countries through Japanese regional production networks.

MITI data on sales and purchasing patterns of East Asian subsidiaries of Japanese electronics firms clearly document an increase of regional specialization. Within one year, the share of sales to non-Asian destinations (North America, Europe and ROW) declined from more than 20 per cent to 9.4 per cent. At the same time, the share of local sales increased from less than 35 per cent in fiscal year 1991 to more than 45 per cent in FY 1992, while sales to Japan increased from 24 per cent to more than 27 per cent. More than half of the exports of East Asian affiliates of Japanese electronics firms are now designed for Japan, with sales to East Asia trailing well behind as the second largest destination. Less than 20 per cent of the exports of the Japanese electronics transplants in East Asia today go to the United States and Europe. Similar developments can be documented for purchasing patterns. East Asian affiliates of Japanese electronics firms procure hardly anything from extra-regional sources—in 1992, this share was 1.5 per cent much less than the 5.5 per cent share reported for all manufacturing industry. Probably the most important recent change is that, between 1991 and 1992, East Asian affiliates of Japanese electronics firms have increased their procurement from Japan from less than 40 per cent to nearly 47 per cent. This is much higher than the average share of 38 per cent reported for all industries. While the share of intra-regional procurement has remained fairly stable (increasing only slightly from 14.7 per cent to 15 per cent), there has been a substantial decline in local purchases from nearly 44 per cent to less than 37 per cent. [Ernst:1994,10-11].

The domestic linkages of exporting firms are a very important determinant in the indirect employment effects generated by manufacturing firms. When those firms are foreign owned and tend to source from non-local network firms, the employment multiplier, that is the amount of indirect labour associated with one direct worker in a sector, will be significantly reduced. Much less work has been done on regional production networks of American and European firms, but one recent study [Lipsey: 1995] suggests that intra-regional specialization in production and trade by American firms is also taking place.

What then is the importance of intra-regional trade? What is driving it? How might this be changing and with what consequences for employment in the ASEAN member countries? These are the principal questions we shall address in the remainder of this paper.

4. Intra-regional trade

This chapter aims first to describe the general pattern of intra-ASEAN trade. Special attention is paid to geographical and industrial distribution, in order to have a general idea of the structure, the trends and the logic of this trade. We then focus on the employment impact of these trade flows, using factor content calculations.

4.1 Geographical structure of intra-ASEAN trade

Graph 4.1 shows the geographical distribution of intra-ASEAN trade in 1993. It reports the main flows and their share in total intra-regional trade (the flows under 1.5 per cent are not reported). Singapore appears as the core of the trade relationships within the area, as it is directly involved in 81 per cent of the total. It is the sole country having important links with all others in the region, although economically it is the smallest.²¹ These links are remarkably intense, corresponding to a degree of openness of 24.5 per cent with the rest of the zone (see table 4.1, and the evolution overtime in annex 2.1 and 2.2). Its trade relationships with Malaysia are particularly strong, and constitute the most important flows within the region.

The general configuration suggests that the richer the country, the more important its trade relationships with the rest of the zone. The three richest countries, Singapore, Malaysia and Thailand, are quite closely linked, and trade between these countries comprises 69 per cent of the total. Trade between Singapore and Thailand is quite balanced. Malaysia exhibits a large surplus with each of the others.

Table 4.1. Openness to the rest of ASEAN and to the rest of the world, 1993 (per cent)

	$\frac{X_{ASEAN} + M_{ASEAN}}{2 \text{ GDP}}$	$\frac{X + M}{2 \text{ GDP}}$
Philippines	2.4	27.8
Indonesia	2.5	21.8
Thailand	3.9	29.7
Malaysia	15	63.7
Singapore	24.5	108.3
ASEAN	7.5	41.9

Note : X and M refers to the exports and imports. With the subscript ASEAN, it refers to exports to and imports from ASEAN.
Source : CEPII-CHELEM.

Within ASEAN trading relations, the Philippines plays a very small role. With the exception of its imports from Singapore, Philippine trade flows with other countries of the region do not exceed the threshold of 1.5 per cent of total intra-ASEAN trade. This is not only due to its low economic weight: even expressed as a percentage of GDP, its openness to the rest of the zone is weak, relative to that of other ASEAN countries. Indonesia also has weak trade links with ASEAN, relative to its GDP. But this is more a function of its imports, its exports to Singapore are far from negligible.

From this analysis of intra-regional trade in 1993, it is possible to conclude that Indonesia and the Philippines are somewhat on the periphery of the strong trade network existing between the three richest countries, even if their bilateral trade with Singapore is quite

²¹ In 1993, Singapore's GDP was just superior to that of the Philippines, but it was the lowest when expressed in PPP.

important. The geographical distribution of intra-ASEAN trade in 1987 (see graph 4.2) exhibits a pattern similar to that of 1993. Trade between the three richest countries, however, has grown faster than the average for the region as a whole. In particular, the links between Thailand and Singapore intensified, growing from 12.1 per cent to 16.9 per cent of intra-regional trade with exports growing faster than imports. Links between Singapore and Malaysia also intensified over this period.

In contrast, trade between Singapore and Indonesia grew less rapidly. This may be due to the rhythm of economic growth, which is lower in Indonesia than in Thailand. But it also reflects a change in the direction of trade : the share of exports going to Singapore rose from 6.4 per cent to 7.2 per cent for Thailand, while it fell from 8.5 per cent to 6.5 per cent for Indonesia. The dynamics of integration therefore seem to be quite asymmetric, with the fastest rhythm amongst Singapore, Malaysia and Thailand, which are becoming increasingly closely linked. To better understand the dynamics of intra-regional trade we turn next to an examination of the changing composition of these trade flows.

4.2 Composition of intra-regional trade

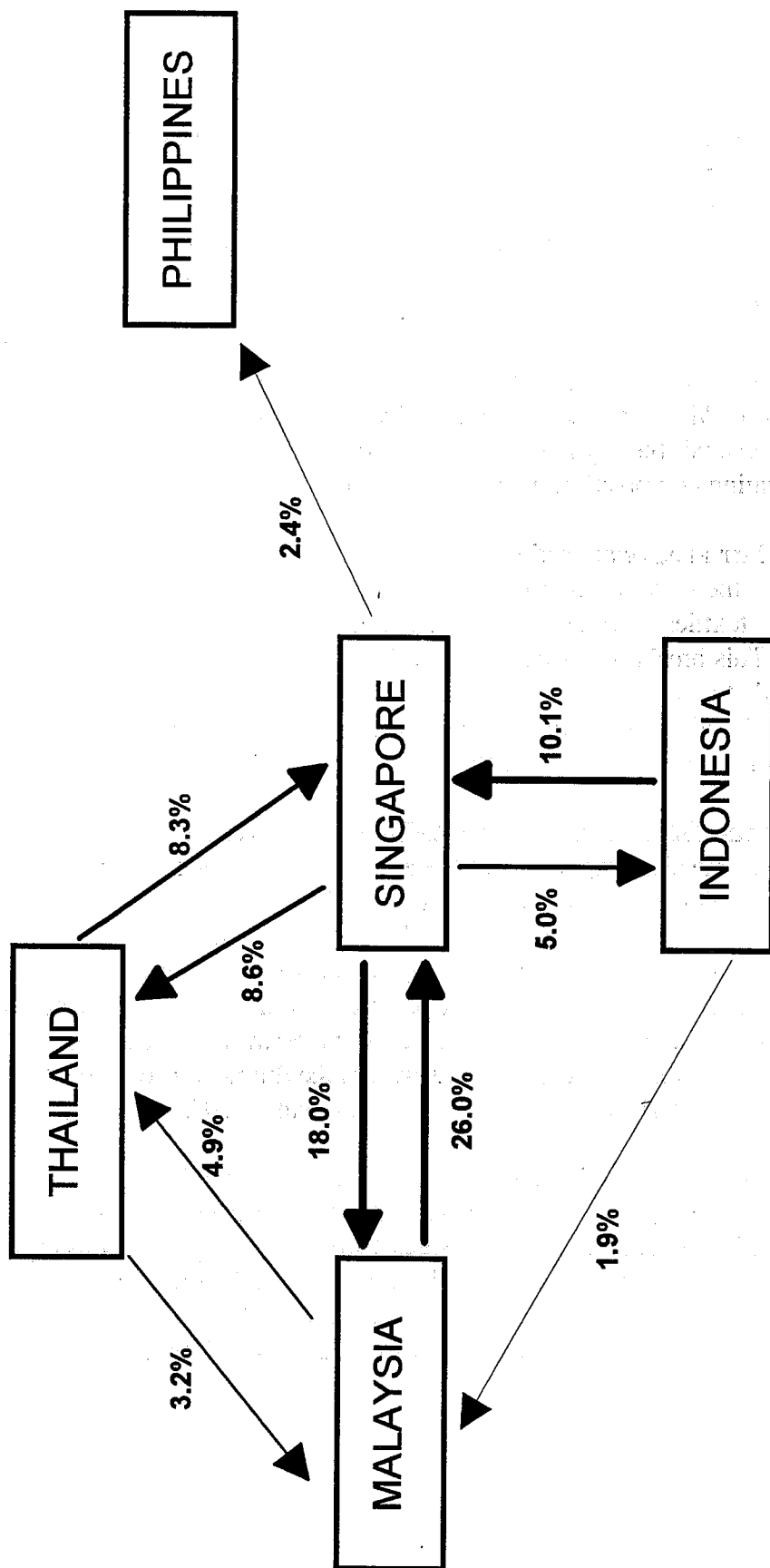
In order to analyse the sectoral distribution of intra-regional trade, we disaggregated the flows into five sectors: textiles-clothing, electrical materials, other manufactures, energy-mining, and agro-food. This breakdown was chosen with the intention of focusing on the shift from resource-based trade to manufactured exports, which is one of the salient features of the growth pattern in the ASEAN region, and within the manufactured sector, the successive growth of exports in textiles and clothing and then electrical and electronic products.

4.2.1 The sectoral distribution of intra-ASEAN trade overtime

Graph 4.3 describes the changing shares of these five sectors in total intra-regional trade over the period 1967 to 1993. The most striking change is in the energy sector, but it is mainly a result of the oil shocks (and counter-shock). Price changes make it difficult to easily examine long term shifts in volume. Concerning the agro-food sector, the trend is more even, with a relative downward trend. The fall is especially clear-cut between 1973 and 1983, because of the dramatic rise in energy export prices, but even afterwards the trend is not really positive. The most striking feature in this table, however, is the dramatic growth of the share of electrical and electronic materials, which reached 40 per cent in 1993, starting from less than 5 per cent in 1967.

Recently the very fast growth of electrical materials has continued and this indicates a very high level of specialisation, particularly considering that the share of electrical materials in world trade was only 14.8 per cent in 1993. Between 1987 and 1993 growth was especially impressive for telecommunication and computer equipment, whose joint share in intra-regional trade rose from 5.5 per cent to 17.9 per cent (see annex 2.3). At the opposite end were consumer electronics, the sole commodity in this sector to experience a decrease in importance.

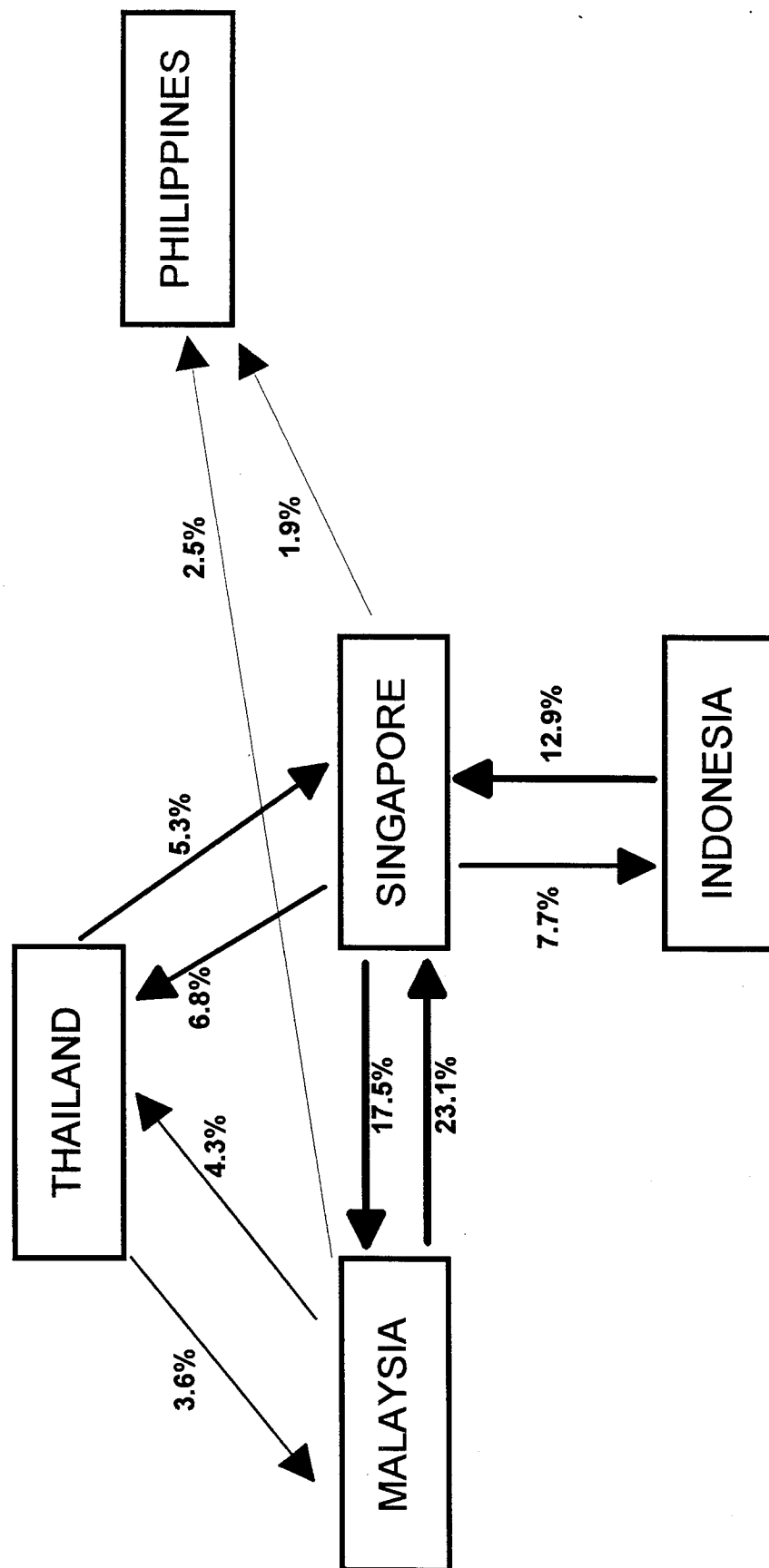
Graph 4.1
Distribution of intra-ASEAN trade in 1993



Note : figures are percentages of total intra-ASEAN trade; flows under 1.5% of intra-ASEAN trade are not reported.

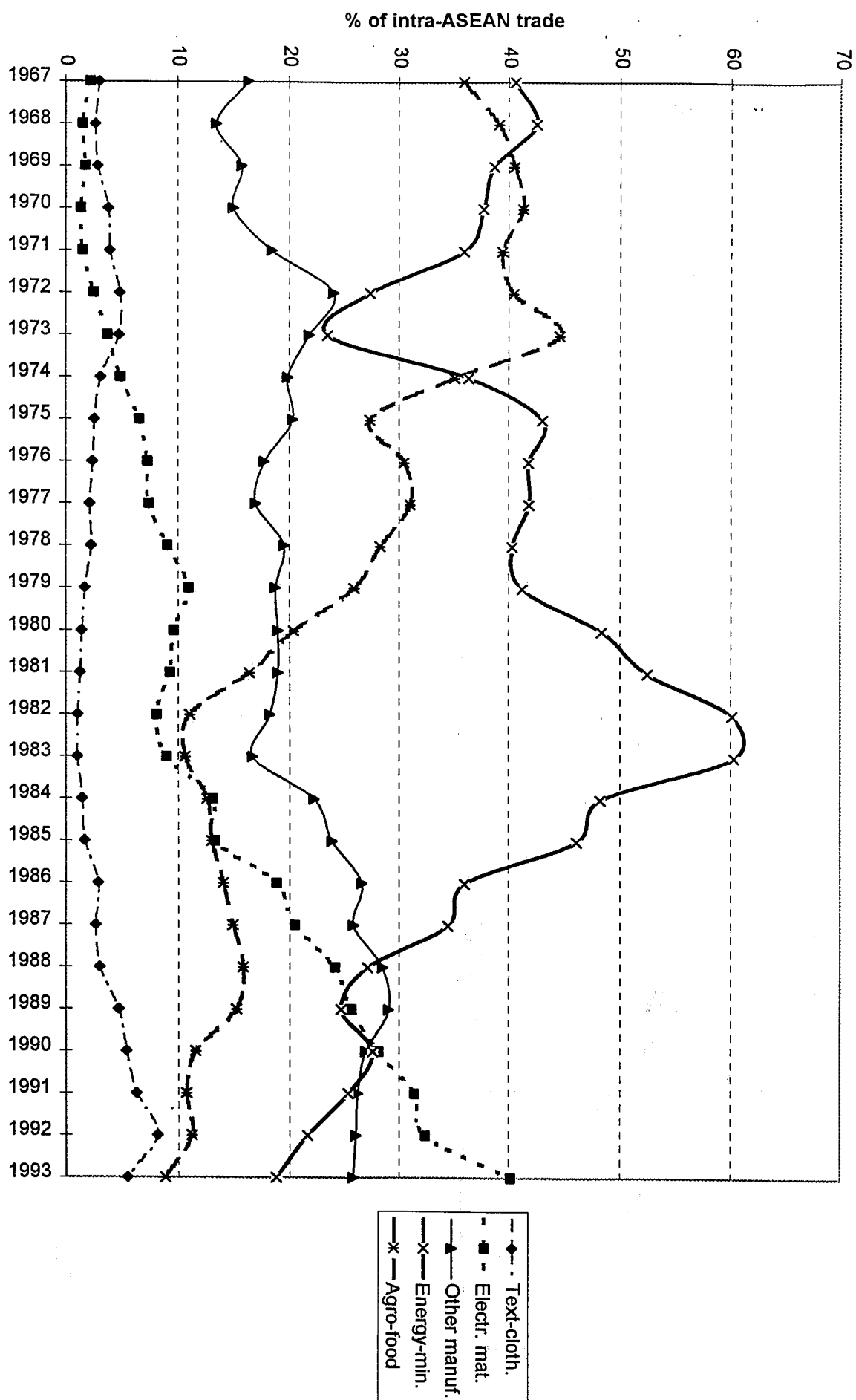
Source : CEPII-CHELEM

Graph 4.2
Distribution of intra-ASEAN trade in 1987



Note : figures are percentages of total intra-ASEAN trade; flows under 1.5% of intra-ASEAN trade are not reported.

Graph 4.3
Sectoral distribution of intra-ASEAN trade, 1967-1993



The other and more traditional sector of specialisation in ASEAN, textiles and clothing also experienced a relative fall in intra-zone trade, notably between 1992 and 1993, after ten years of continuous relative increase. But the evolution by commodity is rather contrasted, with a decrease in the share of clothing and knitwear, and a rise for the rest of the sector, especially for yarns. As in the case of electrical material, intra ASEAN trade flows seem to be less dynamic for the more labour- and less-skill intensive finished goods, than for intermediate products in the production process.

The "other manufactures" sector, saw its trade share slightly decline after 1989, with significant growth between 1967 and 1989, despite strong growth in some commodities like miscellaneous hardware or plastic articles. Natural resource-intensive industries like non ferrous metals and wood articles suffered an even sharper relative decline.

For both primary sectors, agro-food and energy-mining, the recent trend is a significant fall in their relative importance, and very few commodities are exceptions to this rule. While this reflects a development path marked by growth of manufacturing, several of the countries in the region continue to be major exporters of food crops and energy. We would therefore expect to see some intra-regional trade of this nature persist. Recent efforts by countries like Indonesia to become self-sufficient in rice, of course, lead to a significant drop in such trade, as does Indonesia's current project to refine more of its oil at home.²²

4.2.2 Sectoral composition: Main features of important bilateral flows

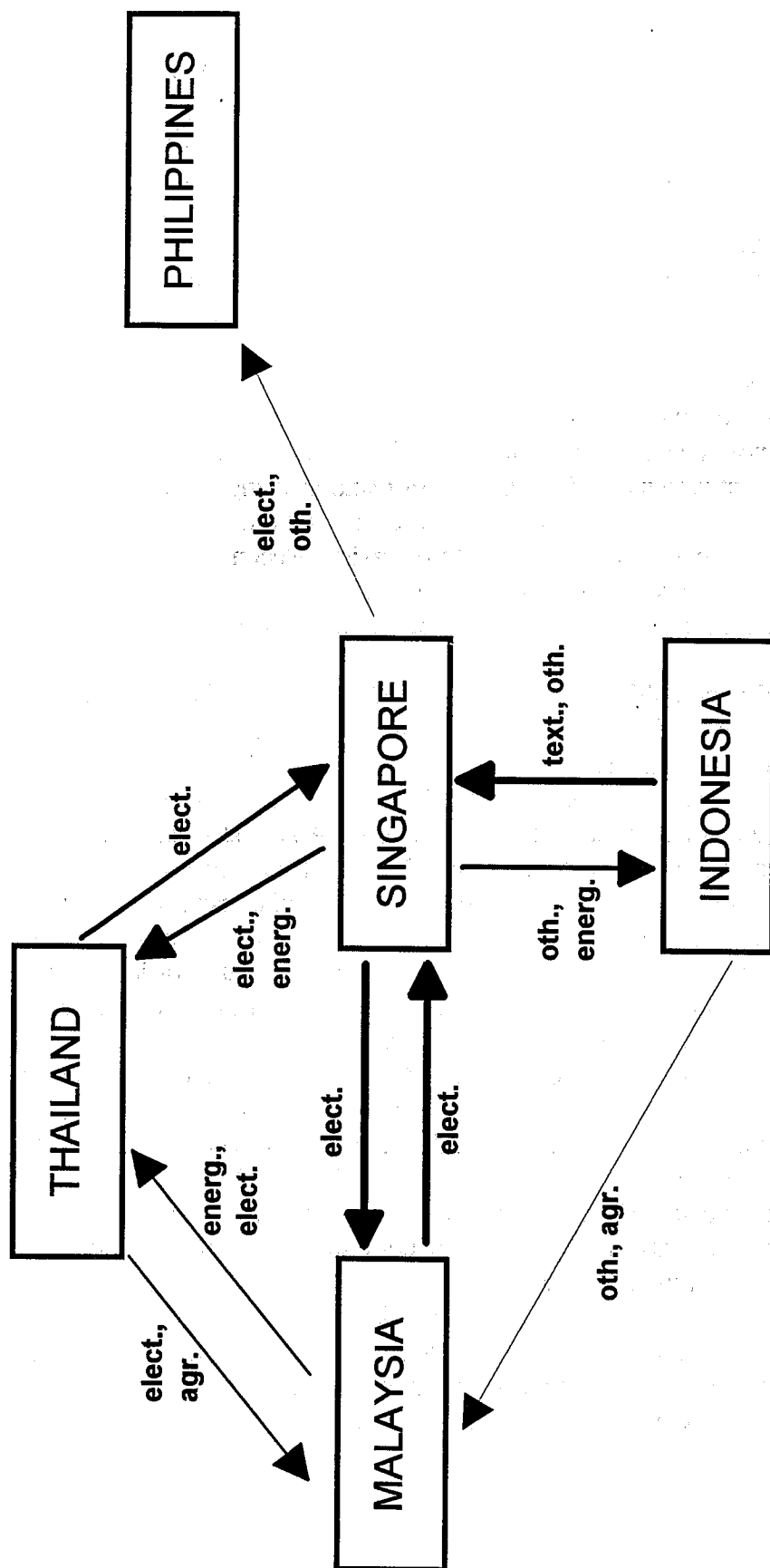
The general features of intra-regional trade cover different kinds of flows. Graph 4.4 describes the dominant sectors in each of the important trade flows within ASEAN identified in graph 4.1. Once again, the general features of Indonesian and Philippine intra-ASEAN trade are different from those of trade between the three others. Amongst these latter, trade flows are overwhelmingly composed of electrical material. This trade clearly corresponds to an international division of production processes, since neither local consumption nor equipment requirements are sufficient to explain the impressive importance of this sector in their mutual trade. In Thailand's trade, primary sectors are also significant, because of its energy imports and its agro-food exports. Other manufactures and textiles-clothing, on the contrary, account for a relatively low proportion of the total among these three countries.

The Philippines, as we have seen, trades little with the rest of the area. Its most important flow, imports from Singapore, consists mainly of electrical materials, with a substantial part of "other manufactures", essentially chemical products (see annex 2.4).

The case of Indonesia is very singular, as the bulk of its local trade consists in textiles-clothing and "other manufactures". In fact its export structure within the region is oriented toward heavy industry like textiles, metallurgy or petroleum refining (see annex 2.5), and toward wood industries. Compared to the rest of the region, the share of electric material in its local exports is particularly low: it seems that this country has not integrated into the regional division of labour in this sector. It is no surprise, therefore, that electric materials are also unimportant amongst its local imports which mainly consist of capital goods, like construction equipment and specialised machines or ships.

²² Previously some of Indonesia's oil was refined in Singapore.

Graph 4.4
Sectoral composition of intra-ASEAN trade in 1993



Note : flows under 1.5% of intra-ASEAN trade in 1993 are not reported. For each flow, the indications denote the most important sectors (concretely here, the one accounting for more than 29% of the total), ranked by decreasing importance.
Legend : "text." = textile and clothing ; "elect." = electrical machinery ; "oth." = other manufacturing ; "energ." = energy and mining ; "agr." = agro-food

Source : CEPII-CHELEM

4.2.3 Intra-regional trade pattern in textiles and clothing

Graph 4.5 shows the geographical distribution of intra-ASEAN trade in textiles and clothing in 1987 and 1993. The shift over these two years is striking. In 1987, the bulk of regional imports was taken by Singapore, and provided by Malaysia and to a lesser extent by Thailand and Indonesia.

In 1993, Singapore was still the main importer, and Indonesia was the largest exporter of textiles and clothing within the region. Indonesia, had, in fact, become by far the most important exporter in the region for this sector, accounting for 66.4 per cent of the total. In particular, exports of Indonesia within the region are very important in clothing, carpets and yarns. Singapore which a dominant player in that industry up to the mid eighties, registered a strong decline since then and became a net importer. At least for the latter, the resulting trade may correspond to a division of productive processes with Singapore.

4.2.4 Intra-regional trade pattern in electrical material

In 1993 as in 1987, the regional trade pattern in electric material is wholly centred on Singapore, and particularly in its exchanges with Malaysia and Thailand (see graph 4.6). The relatively minor importance of Indonesia and the Philippines in intra-regional trade is here evident. In contrast, bilateral relations between Singapore and Malaysia account for more than 55 per cent of the total. Another striking feature is that the geographical distribution of trade in this sector experienced little change during this period of very fast growth, as if this growth had been achieved by the development of the existing relationship. This is not so surprising in a sector where internal and external economies of scale are very high. In fact, three commodities are especially important. Electronic components are the major item traded in the area and represent more than 11.5 per cent of regional exports for all countries except Indonesia, for which it is non-existent (see annex 2.5). On the other hand, the destination of the flows is overwhelmingly Singapore and Malaysia, as shown by the importance of this commodity in their imports (see annex 2.4). These two countries have a leading role in this trade, whether it is through investment, outsourcing, or vertical division of labour: it is especially clear when analysing the trade patterns in such an upstream commodity.

Their leading role is also clear-cut concerning telecommunications equipment, in the sense that this high technology industry is much more important in their regional trade than in that of their partners.

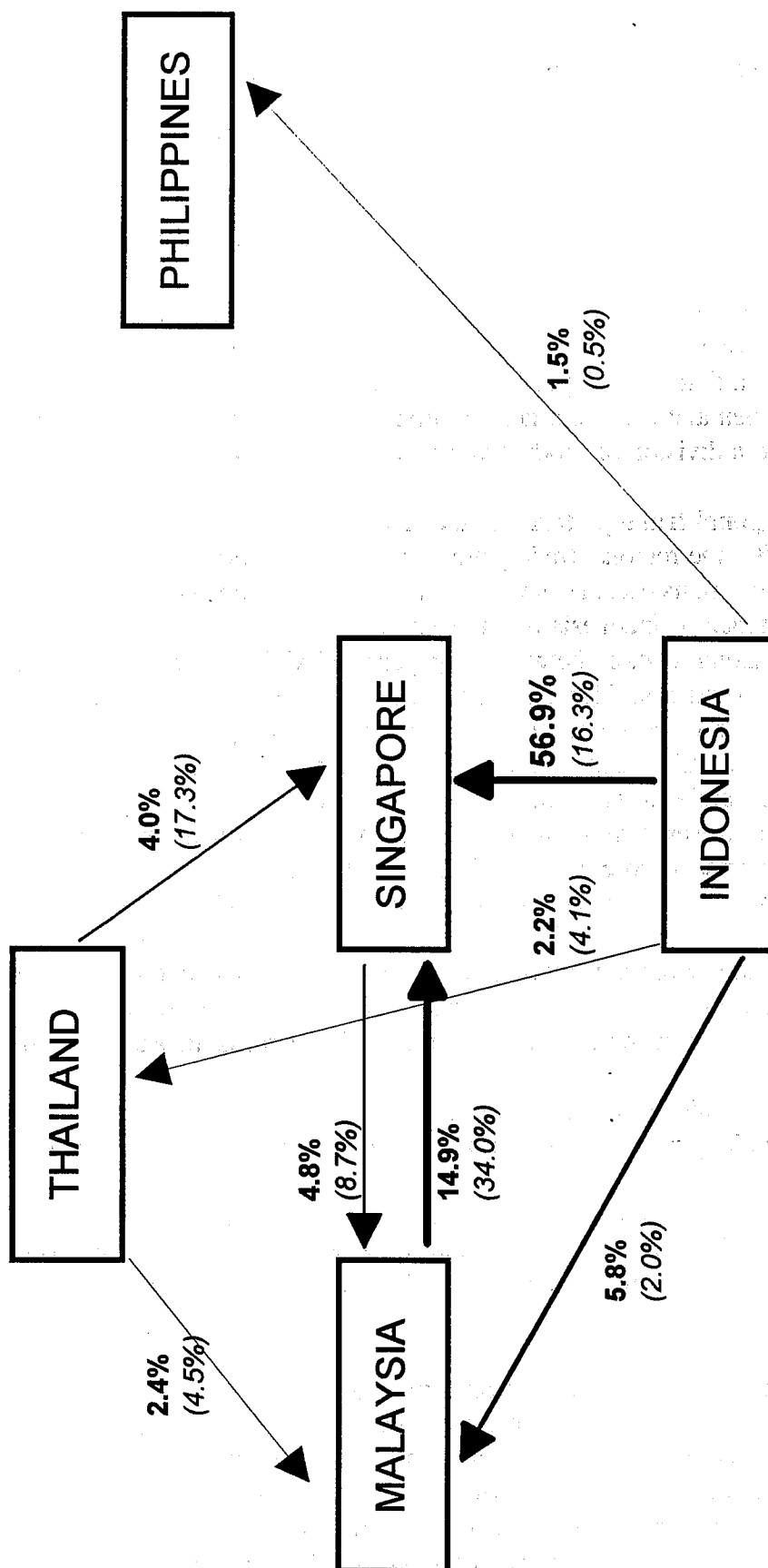
Computer equipment represents an important share of regional exports for all countries except Indonesia, and particularly for Thailand and the Philippines. The destination of the flows, on the other hand, is mainly Singapore, which once again has a leading role in this vertical division of labour.

4.2.5 Intra-regional trade in other manufactures

The pattern of trade in other manufactures (see graph 4.7) is much more equally distributed between the countries of the area. Singapore plays an important role, but so do Indonesia, whose exports are more oriented toward this sector (see above and annex 4.5). Thailand's imports have been the most dynamic component of intra-regional trade in this sector, but this is mainly a phenomenon of catch-up, starting from a relative low level.

This distribution is quite unique when compared to each of the other manufacturing sectors. This sector is less subject to foreign investment and thus to a regional division of labour. As the data show, it is therefore, far less important in intra-regional exports.

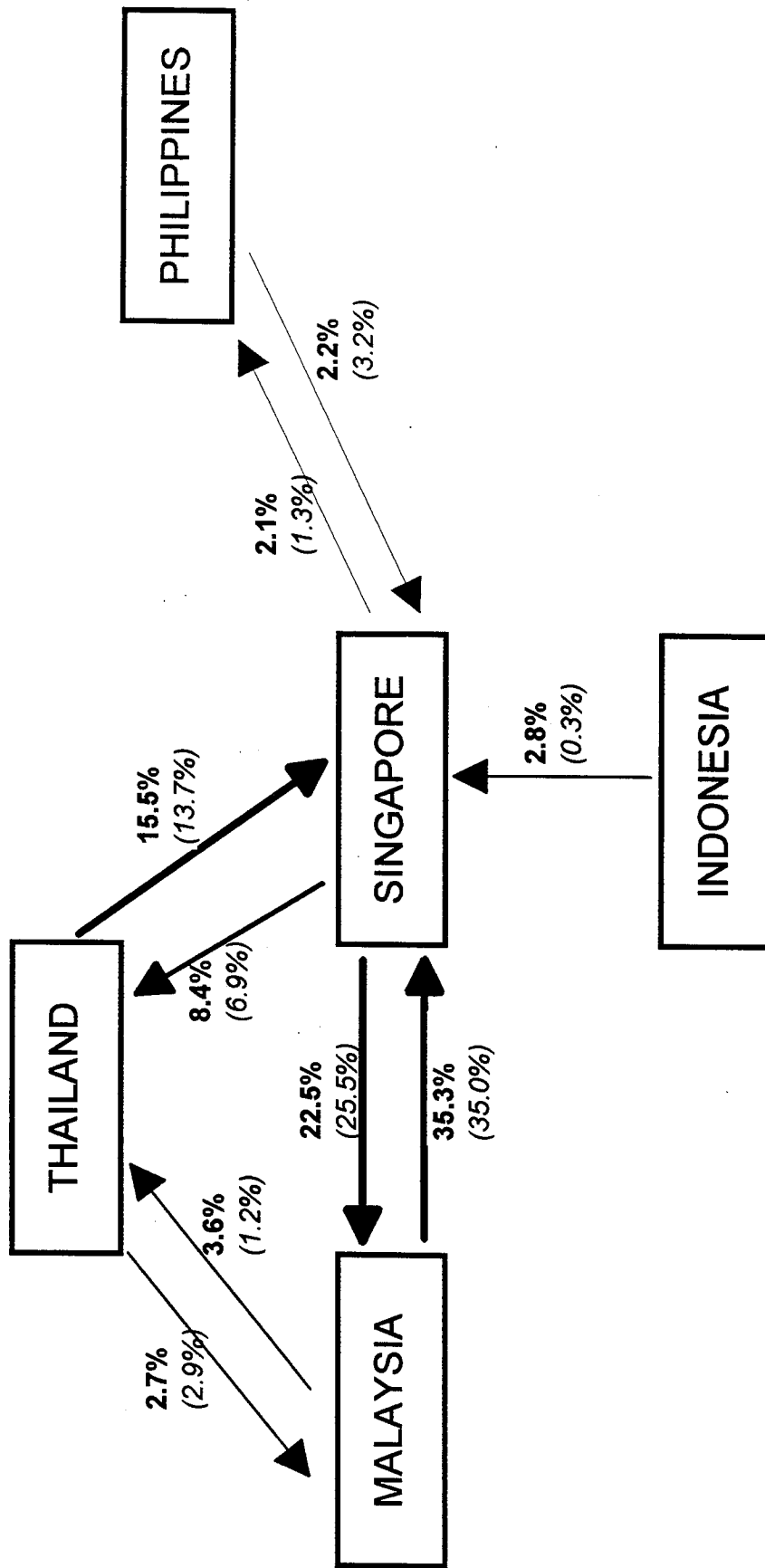
Graph 4.5
Distribution of intra-ASEAN trade in textile and clothing, 1993 (1987)



Note : figures are percentages of total intra-ASEAN trade in textile and clothing in 1993 (in 1987); flows under 1.5% in 1993 are not reported.

Source : CEPII-CHELEM

Graph 4.6
Distribution of intra-ASEAN trade in electric materials, 1993 (1987)



Note : figures are percentages of total intra-ASEAN trade in electrical materials in 1993 (*in 1987*) ; flows under 1.5% in 1993 are not reported.

5. Labour content of trade

Factor content calculations correspond to an accounting approach to the link between trade and the labour market. They do not enable us to describe the effect of trade on production structures, either in terms of labour skill or productivity. They are, moreover, based on a number of very strict assumptions concerning the way imports are produced domestically and the form of their substitution for domestic products. (see section 1). Many criticisms can and have been made about this method when dealing with an industrialised country.

The case of an industrialising country, however, is different. In most developing countries there is a dual labour market. The major problem is therefore how to successfully transfer labour from traditional sectors towards modern ones. The role of trade with regards to this aim is important, especially when the country is specialised in labour intensive industries. That is why, for ASEAN countries, we assume that the labour content of trade may be a good first-order indicator of the impact of trade on employment, and that the criticisms leveled against this method in industrialized countries are second-order issues. Nonetheless we should review these criticisms briefly here.

The problems with this method begin in the data collection stage. Such calculations do not merely account for the labour directly employed in production, but also for the labour embodied in domestic intermediate consumption. In turn, the labour embodied in domestic intermediate consumption includes not only that directly employed in production, but also indirect employment. The result corresponds to the sum of direct and indirect effects, in terms of domestic employment, in producing output of a given value in a given industry.

In order to calculate the total labour content of production, it is necessary to have input-output tables, as well as data about production and employment (the method and the data are detailed in annex 3.1 and 3.2). These data were drawn from various sources: the United Nations Industrial Development Organization's databank INDSTAT3, the International Labour Office's *Yearbook of Labour Statistics*, the United Nations' *Statistical Yearbook for Asia and Pacific*, The Institute of Developing Economies' *International Input-Output Tables Malaysia-Japan 1985 (resp. Indonesia-Japan, Philippines-Japan, Thailand-Japan and Singapore-Japan)*.

The data then had to be harmonised within a single industrial classification. This required aggregation, establishing correspondences, making hypotheses about the existence of certain regularities when data were missing (see annex 3.2), and finally a strict control over results. The data problem lies not only in the differences in sectoral disaggregation, but also in the intrinsic differences between sources because of different definitions or fields. This is true in particular when industrial census data are compared to national accounts data.

As a result of this first stage, it is possible to calculate the total labour content of production by industry. This is described in section 3.1. The base year is 1992, as it is the most recent year for which these calculations possible. We then use these data to analyse the trade structure. In order to do this, trade data, drawn from the CEPII-CHELEM databank, were harmonised with the data on production and employment. This enabled us to calculate the labour content of trade presented in section 3.2.

5.1 Total labour content of production

As we have seen, the total labour content of production measures the employment impact of production, but it is not a correct measure of productivity since it does not take into account imported intermediate consumption. A country which imports all intermediates and merely assembles these inputs into finished products will require little labour to achieve a high value of production, but this corresponds in fact to a low domestic value added.

Nonetheless, the results presented in annex 3.3 show that a rank ordering of the average labour content of production closely parallels a rank ordering of current GDP per capita for the five countries concerned. The relative level of average labour content for each countries in the different industrial categories, however, is far from constant. It is particularly disparate in agriculture, forestry and fishing, with an extremely high labour content of production in Thailand, Indonesia and the Philippines, compared both to other industries and to Malaysia or Singapore. This explains why some industries like food products, wood products, furniture or rubber products have a huge indirect labour content: they have important links with the primary sector.

This phenomenon presents two kinds of problems. First (see annex 3.1), the data for these traditional industries are somewhat problematic because of the abundance of unpaid family labour or self-employed workers. Second, traditional jobs are qualitatively different from modern ones, and the objective for ASEAN countries is to create the latter type of jobs. Under these conditions, the influence of trade on employment would be better measured if we only take into account jobs in the manufacturing and service sectors, although as these are assumed to correspond to the modern sector, although rather approximately.

This is what is done in annex 3.4, and logically in this case direct employment in primary sectors (agriculture and mining) is zero. The highest labour content in manufacturing comes from export industries such as textiles, clothing, wood products, furniture and other manufactures. The other major export industry, electrical machinery, however, has a rather moderate labour content. This does not mean that this industry is less labour intensive in a neo-classical sense: the difference is at least partly due to the way the production process is divided up in this industry. Nevertheless, the difference in labour contents does give some indication of the employment repercussions of flows.

5.2 Total labour content of trade flows

Total labour content of trade is obtained by applying the unitary labour content of production by industry to the trade flows. There is a huge surplus in total labour content of trade for Thailand, Malaysia and Indonesia (see table 5.1), reaching a total of more than 12 million person-years for the last. Most of these surpluses are made in trade with the rest of the world (excluding ASEAN). This is not merely an effect of the net balance of trade. Even when measured per 1 million US\$, the labour content of their exports to the rest of the world is widely superior to that of their imports, and this is also true for the Philippines. This is not surprising given the well known relative abundance of low cost labour in these countries with regards to the rest of the world.

Nevertheless, as we have seen above, a large proportion of the total labour content comes from jobs in the traditional sector. This sector is directly involved in the production of agriculture and also comprises the bulk of the indirect employment content of industries like wood or rubber industries, which in turn are an important part of the total.

Table 5.1. Total labour content of trade flows in 1992

		Trade with the rest of ASEAN		Trade with the rest of the world	
		Total labour content (in thousands)	Labour content per 1 M US\$ flow (in units)	Total labour content (in thousands)	Labour content per 1 M US\$ flow (in units)
Indonesia	Imports	744	311	6 390	290
	Exports	2 250	517	17 261	588
	Net balance	1 507	207	10 871	297
Philippines	Imports	338	260	3 488	254
	Exports	158	276	3 676	378
	Net balance	- 180	16	187	123
Thailand	Imports	928	197	5 459	180
	Exports	1 002	310	11 239	424
	Net balance	74	113	5 780	244
Malaysia	Imports	342	56	1 346	57
	Exports	623	63	2 614	89
	Net balance	280	8	1 269	32
Singapore	Imports	305	24	951	21
	Exports	153	16	685	21
	Net balance	- 152	- 7	- 266	0

Note: expressed in number of (thousands of) person-years.

Source: annex 5.3 and CEPII-CHELEM databank.

Calculations from the authors.

In order to have a better estimate of the impact in term of employment in the modern sector, table 5.2 reports the results when taking into account only jobs in manufacturing or services, and calculating the labour content on the basis of manufacturing trade flows only. The net labour content of trade with the rest of the world, as measured per 1 million US\$, is in large surplus for Indonesia, the Philippines and Thailand, with a ratio of export to import employment of between 1.3 and 1.5. This is due mainly to the large share of clothing in their exports. As Malaysia and Singapore are far less concerned with this, their coefficients more balanced vis-à-vis the rest of the world.

For intra-regional trade, the unitary labour content of the trade flows show fewer differences. Only Indonesia experiences large surpluses, both by unit and in total. Indonesia is a major exporter of textiles and clothing within the region and its net balance of trade with the rest of ASEAN is highly positive. More surprisingly, the Philippines' imports have a higher unitary labour content than its exports, and this is linked above all to the large share of clothing in its intra-ASEAN imports. In contrast, the low labour content of Singapore's exports reflects its growing specialisation in capital- or skill- intensive activities (see Chowdury and Kirkpatrick, 1990).

Table 5.2. Total labour content of manufacturing trade flows in 1992, jobs in manufacturing and services only

		Trade with the rest of ASEAN		Trade with the rest of the world	
		Total labour content (in thousands)	Labour content per 1 M US\$ flow (in units)	Total labour content (in thousands)	Labour content per 1 M US\$ flow (in units)
Indonesia	Imports	202	142	2 655	138
	Exports	651	194	3 216	216
	Net balance	449	51	561	77
Philippines	Imports	131	167	1 701	149
	Exports	84	161	1 658	200
	Net balance	- 46	- 6	- 43	51
Thailand	Imports	259	96	2 289	84
	Exports	308	110	3 014	134
	Net balance	50	13	725	50
Malaysia	Imports	244	53	1 018	46
	Exports	392	54	1 209	57
	Net balance	148	1	191	11
Singapore	Imports	262	25	848	23
	Exports	142	22	658	24
	Net balance	- 120	- 3	- 190	1

Note: expressed in number of (thousands of) person-years; only manufacturing trade flows are concerned.

Source: annex 5.4 and CEPII-CHLEM databank.

Calculations from the authors.

6. What is "natural" about ASEAN?

Is there something special about geographical location that makes for natural trading blocs and would this necessarily apply in the context of geographically close developing countries which rely heavily, for the most part, on a similar range of raw material and manufactured exports? What might the configuration of trade in such a region look like? Will trade be relatively equal in intensity among the partners or might we find less a natural trade bloc and more a hub and spoke arrangement in which a single economy, such as that of Japan in Asia or Singapore within ASEAN, creates both the inducements and, through foreign direct investment, the capital flows that contribute to the development, and shape the composition and structure, of intra-regional trade? As a first look at these problems, we use a gravity model of trade to calculate a "natural" level and then analyse the gap between the observed level of trade and this natural level for ASEAN member countries. The gravity model is a standard approach to empirical studies of the pattern of trade. As in the Newtonian model, which was its inspiration, "attraction", in this instance trade, depends upon "mass", that is to say, economic size and "distance" that is to say geographical and economic barriers to trade. Thus the volume of trade between two countries should increase with size and decrease with distance since it is assumed that proximity reduces transportation and information costs.

6.1 Description of the gravity model and results

6.1.1 Choice of target areas

A number of factors made it particularly difficult to estimate what a free trade arrangement amongst the ASEAN countries might resemble. First, until recently, ASEAN was very far from a common market and tariff and non-tariff barriers to trade amongst its member countries were high. Second, historical data on trade for ASEAN were lacking. It is for this reason that we decided against a sophisticated econometric analysis and chose to use a simple model of the determinants of trade, the gravity model, but applied and computed with coefficients derived from two other geographical areas. Indeed, as we noted above, the interest of a gravity model is to provide a "natural" trade structure based on some fundamental elements in the determination of trade flows such as geographical distance and the economic size of each bilateral partner. Actual flows can then be compared to this "natural" trade structure.

For our purpose, the ideal trading area against which to compare the ASEAN countries would have three features. First it would contain a sufficient number of members to ensure consistent econometric testing. Second it would be a free trade area, in which intrasectoral trade was important. And third the general level of development would be similar to that of ASEAN. Unfortunately no such ideal zone exists. That is why we have decided to use two regions, the EEC (with its 11 members at that time: Germany, the United Kingdom, Belgium and Luxembourg as a whole, France, Italy, Ireland, Spain, Portugal, the Netherlands, Greece and Denmark) and a seven- country Latin American region (Bolivia, Brazil, Argentina, Colombia, Chile, Ecuador and Peru). Thus the coefficients which are calculated in these two regions will be successively applied to ASEAN. After we will analyse the gaps between the computed and the fitted trade flows in both cases.

6.1.2 Main issues, choice of the model

The gravity model stems from Tinbergen (1962) or Linneman (1966), who proposed it as a pragmatic way of combining three sets of determinants of the size of bilateral international trade flows: the importer's demand, the exporter's supply and the costs of doing trade.

The gravity model refers to a country's total trade and is best thought of as providing a long-run equilibrium view of trading patterns. It describes the trade flows from a particular origin (X) to a particular destination (M). The model we use is expressed as the following equation:

$$\text{InFlow}(X,M) = c + \alpha \text{In}D(X,M) + \beta_M \text{In}POP(M) + \beta_X \text{In}POP(X) \\ + \gamma_M \text{In}GDP(M) + \gamma_X \text{In}GDP(X)$$

where Flow (X,M) is the value of trade flow from country X to country M.

C is a constant.

D(X,M) is the distance between the two countries.

POP(X or M) is the population of country X or M.

GDP(X or M) is the GDP per capita, measured at PPP exchange rate, of country X or M.

As we know, the theoretical foundations of the gravity model are not completely consistent, because it explains what happens in international trade, but does not tell us why. Several authors have tried to provide the model with such a theoretical underpinning, notably Anderson (1979), Bergstrand (1985) and Helpman and Krugman (1985), but none of these authors generates a model exactly as that formulated in the equation above.²³ Nevertheless, our main purpose is to ensure empirical consistency and we are less concerned about the theoretical foundations of this model. We hope that such an estimate based on other well-chosen areas will give us a close approximation to what would be the natural trade pattern between the ASEAN countries.

We have chosen market size, income and distance as determinants of bilateral trade among ASEAN countries. These are a minimum set of determinants for a gravity model and the most important. When modelers, in the context of a gravity model, include other determinants of trade, they generally use variables that are specific to the zone under consideration. Moreover, other studies confirm the critical role of these predictor variables, as opposed to others such as export or import prices, for bilateral trade among countries of this area.²⁴ Finally we wish to highlight the fact that population is taken into account twice in our equation: as an indicator of market size, and as personnel income. As is evident below, this enables us to avoid problems with estimates of the population for some countries.

6.1.3 Results

All distances between two countries are distances between capitals. All values are expressed in constant prices in 1990 US dollars. All trade flows concern the pure manufacturing sector and exclude agriculture, energy, mining and quarrying.

The coefficients are for the year 1993. Tests, particularly for the EEC, are highly significant, and the coefficients are also significant. Moreover there is no problem with heteroscedasticity.

Table 6.1. The EEC

R-squared adjusted	0.91	
Number of observations	110	
Coefficients	Value of coefficients	t-values
C	-16.2	-4.33
α	-0.97	-10.7
$\beta(X)$	0.64	11.34
$\gamma(X)$	1.71	7.65
$\beta(M)$	0.76	13.62
$\gamma(M)$	1.07	4.79

Table 6.2. Latin America

R-squared adjusted	0.61	
Number of observations	42	
Coefficients	Value of coefficients	t-values
C	-6.72	-1.27
α	-1.41	-4.96
$\beta(X)$	1.13	6.40
$\gamma(X)$	1.75	4.32
$\beta(M)$	0.66	3.74
$\gamma(M)$	0.16	1.40

²³ See Wang and Winters (1991).

²⁴ See Yu and Zietlow (1995).

Clearly the results are less robust for Latin America than for the EEC and the number of observations is smaller.

6.2 The ASEAN case

6.2.1 Results

Tables 6.3 and 6.4 present the gap between the real flow of exports or imports and the modelled flow, calculated with the coefficients obtained first using EEC data and then Latin American data. This gap is measured as a share of the modelled flow. The formula is: (real flow-predicted flow)/predicted flow.

Table 6.3. ASEAN trade with EEC coefficients, 1993

		Importers					Total
		Indonesia	Malaysia	Philippines	Singapore	Thailand	Exports
Exporters	Indonesia	0	-0.58	-0.43	1.19	-0.67	-0.02
	Malaysia	-0.89	0	-0.42	0.81	-0.55	-0.1
	Philippines	-0.87	0	0	1.54	-0.53	-0.26
	Singapore	-0.88	-0.57	-0.44	0	-0.58	-0.67
	Thailand	-0.9	-0.42	-0.73	1.22	0	-0.29
Total imports		-0.89	-0.54	-0.51	0.98	-0.58	-0.43

Reading horizontally across the table gives us the difference between the flow as calculated by the model and the real flow. For example, the number -0.58 between Indonesia and Malaysia means that exports from Indonesia to Malaysia are 58 per cent below those of predicted exports. In other words, the fitted flow represents 42 per cent of the predicted flow. The last column gives the same result, but for Indonesia's total exports to ASEAN. Thus in the case of Indonesia, the number -0.02 means that exports from Indonesia to ASEAN are 2 per cent below those of modelled exports.

A vertical reading give us similar information, but this time for imports. For example, the imports of Indonesia from the ASEAN are 89 per cent below those predicted by the model.

At the intersection of the last column and the last line, we find the number -0.43. It means that total intra-ASEAN trade is 43 per cent below that predicted by the model. In other words, we would have to multiply actual intra-ASEAN trade by $1/0.57=1.75$ to obtain the "natural" intra-ASEAN trade.

Table 6.4. ASEAN trade with Latin American coefficients, 1993

		Importers					Total
		Indonesia	Malaysia	Philippines	Singapore	Thailand	exports
Exporters	Indonesia	0	-0.9	-0.92	0.08	-0.91	-0.73
	Malaysia	-0.95	0	-0.78	0.67	-0.72	-0.47
	Philippines	-0.96	-0.43	0	2.31	-0.78	-0.65
	Singapore	-0.89	-0.58	-0.5	0	-0.3	-0.67
	Thailand	-0.97	-0.75	-0.94	1.35	0	-0.73
Total imports		-0.93	-0.7	-0.86	0.58	-0.7	-0.65

6.2.2 Main interpretations

It is important to note at the outset that the trade flows extracted from our database²⁵ exclude reexports or reimports. This is especially important for Singapore which has traditionally been a major transshipment port for Asian goods. Leaving aside transshipments, the data presented in Tables 6.3 and 6.4, show strikingly similar results with respect to the pattern of intra-ASEAN trade. First, intra-ASEAN trade seems to be particularly weak compared to that predicted by each of the two different sets of coefficients. If we believe the gravity model we should have by and large twice the amount of actual intra-ASEAN trade. Second, Singapore clearly plays a special role in intra-ASEAN trade. Singapore's imports from ASEAN, for example, are systematically above the predicted level of imports. Yet this is not the case for its exports. Both the EEC and the Latin American coefficients indicate that Singaporean exports to ASEAN are especially weak, 67 per cent less than would have been expected. From this it appears that Singapore seems to be something like the last step of production before exportation to the rest of the world. Third, the weakness of Indonesian trade with ASEAN, given its size and its geographical proximity, is particularly evident and is even more striking than is the result for the Philippines' trade with ASEAN.

6.2.3 Discussion of the results

Consistency

Normally the choice of specification ensures that the results are not very sensitive to population size. This is indeed the case and the main results do not change if, for instance, we halve the population of Indonesia or the Philippines. Were this not the case, we would have encountered a major problem in estimating the relevant population size for these countries since much of their population is not involved in the monetary economy and associated consumption patterns. Although it is reassuring that both sets of coefficients yield the same results, we prefer the EEC coefficients, for at least two reasons. First the econometric tests are clearly more robust in the European case. Second we accord larger importance to the free trade factor in the European example than to the fact that ASEAN and Latin America have similar levels of development. The Latin American coefficients, however, are a good means to control the main features of the results.

Inter-temporal shifts

Different deflators were used in calculating GDP and intra-ASEAN trade figures in our model. As a result, we can not use the gravity model to test the intertemporal shift of intra-ASEAN trade. Nonetheless we may compare the distribution of trade in two or more different time periods. For example, between 1972 and 1993, the gap between the predicted value and the real value of trade has consistently narrowed. It has more or less halved. This means for example that, in comparison with the relative evolution of each country, the extent to which Singapore stands out by virtue of its intra-regional exports and imports has decreased. These findings were checked by estimating the EEC's coefficients for a number of different years and found that, in contrast to ASEAN, the structure of intra-regional trade within the EEC remained identical.

We have also computed the share of trade of each country in total intra-ASEAN trade for different years. For example for the year 1993 the number 24 per cent on the line of imports for Malaysia in table 6.5 means that Malaysia took 24 per cent of total intra-ASEAN imports.

²⁵ Source: Chelem Cepii.

Table 6.5. Patterns of intra-ASEAN trade 1972, 1979, 1985 and 1993 (in per cent of total intra-ASEAN trade)

1972		Indonesia	Malaysia	Importers Philippines	Singapore	Thailand	Exports
Exporters	Indonesia	0	6	0	16	0	22
	Malaysia	1	0	1	23	1	26
	Philippines	1	0	0	1	0	2
	Singapore	4	8	3	8	0	23
	Thailand	10	16	0	0	1	28
Imports		16	30	4	47	3	100
1979		Indonesia	Malaysia	Philippines	Singapore	Thailand	Exports
Exporters	Indonesia	0	2	0	24	1	27
	Malaysia	1	0	1	19	2	23
	Philippines	1	1	0	1	0	4
	Singapore	5	6	0	7	0	18
	Thailand	4	18	2	0	4	28
Imports		10	27	3	51	8	100
1985		Indonesia	Malaysia	Philippines	Singapore	Thailand	Exports
Exporters	Indonesia	0	2	1	14	1	18
	Malaysia	1	0	1	24	1	28
	Philippines	0	3	0	2	1	6
	Singapore	1	7	1	5	0	14
	Thailand	8	21	2	0	4	35
Imports		10	32	4	46	8	100
1993		Indonesia	Malaysia	Philippines	Singapore	Thailand	Exports
Exporters	Indonesia	0	2	1	12	2	16
	Malaysia	1	0	1	28	4	35
	Philippines	0	1	0	1	1	3
	Singapore	1	4	1	10	0	15
	Thailand	4	18	2	0	7	31
Imports		10	32	4	46	8	100

Source: CHELEM-CEPII

The export column shows that Malaysia accounted for 35 per cent of total intra-ASEAN exports. The pattern for Thailand was just the reverse. Thailand in 1993 took only 13 per cent of total intra-ASEAN imports but accounted for 31 per cent of intra-ASEAN exports. This, however, represented a considerable narrowing of the gap between its intra-regional exports and imports if we compare the 1993 figures to those of 1985. In the case of Malaysia, the relationship between its import and export share of intra-ASEAN trade was reversed between the year 1985 and 1993 as their exports to the region grew.

In contrast to Malaysia and Thailand, Indonesia's share of intra-regional exports and imports decreased over the years 1972 and 1993 and those of the Philippines, always low, remained at that level. The constancy of the place of Singapore, especially for imports, is also

strikingly revealed in this table.²⁶ For each year imports of Singapore amounted by and large to half of intra-ASEAN total.

6.2.3 Conclusion

ASEAN is not at all a common market. It is a region with strong domestic market protection in most of the member countries. Moreover it is still, with the exception of Singapore, composed of developing economies and consumption is weak for intermediate goods as well as for finished products. The recent increase in their need for intermediate goods can be satisfied only by trade with the rest of the world. Consequently, their extra-regional trade remains much more important than intra-ASEAN trade. But there is more and more reason to expect an increase in intra-ASEAN trade. In the next section we examine the impact on employment of such an evolution.

7. Three scenarios for the future

This section examines the impact that a number of possible changes might have on trade and employment within the ASEAN region. Three scenarios are envisaged: a "natural" scenario based on a growth of demand within the region, a "free trade" scenario based on a lowering of barriers to intra-regional trade and a "tendency" scenario in which current trends are extrapolated into the future.

As the area's countries develop, intra-regional trade may evolve towards the model of a "natural" region such as that described above with reference to other trading blocs. Using a similar approach, in part 1 we analyse the employment consequences of such an evolution.

However, intra-ASEAN trade, as noted has various sources of dynamism and suffers from a variety of different barriers to trade. Other scenarios, dealing directly with these factors, are thus also plausible. Trade barriers, which are high within ASEAN may fall sharply if the construction of AFTA is achieved or if unilateral trade liberalization takes place within broader institutional arrangements such as the GATT's Uruguay round and its successor, the World Trade Organization [WTO]. In part 2 we thus investigate the impact of lowering tariff and non-tariff barriers amongst ASEAN member countries and the employment consequences this might have.

It is also possible that current trends will continue into the future, including foreign direct investment, whose importance for intra-ASEAN trade was highlighted above. Part 3 takes this as its hypothesis and addresses the trade and employment consequences that would result, paying special attention to the particular development logic of emerging intra-regional production networks that could potentially lead to a very different evolution of trade.

7.1 The "natural" scenario: Demand driven trade

If integration deepens within ASEAN, which would occur were a common market to be formed, regional demand would pull trade to a greater extent than it currently does. Under such conditions, intra-regional trade flows would be affected far more by the main variables estimated in the gravity model presented above. The gravity model, which gives the aggregate

²⁶ Note that this is not contradictory with the fact that the difference between the real flow and the predicted flow with the gravity model have decreased over the period.

trade flows between each pair of countries in the zone, thus provides a point of departure in analyzing the impact of a demand driven pattern of intra-regional trade.

Using the EEC's coefficients, we obtained the "natural flows" for 1993, measured in US dollars at current prices, table 7.1.

Table 7.1. The "natural" trade matrix (millions of dollars at current prices 1993), with EEC's coefficients

		Importers				
		Indonesia	Malaysia	Philippines	Singapore	Thailand
Exporters	Indonesia	0	1 401	415	1 456	1 265
	Malaysia	3 290	0	490	4 226	2 541
	Philippines	376	189	0	154	366
	Singapore	8 990	11 116	1 055	0	4 434
	Thailand	2 134	1 826	682	1 212	0
Total imports		14 789	14 532	2 643	7 048	8 606
						47 618

In order to determine the sectoral composition of these flows and thus to make a better estimate the impact on employment of a growth in regional demand, we adopted the same disaggregation as in section 5. We thus have five sectors, namely textiles and clothing, electric material, other manufactured products, energy and quarrying, and the agro-food sector.

We then calculated sectoral flows using two different hypotheses. In the first hypothesis we assume that each sector maintains its current share in each flow. For example, textiles and clothing represent 18 per cent of the exports flowing from Indonesia to Malaysia. Under the first hypothesis, this proportion remains constant.

In the second hypothesis we assume that each sector has in each flow a share identical to its share in overall ASEAN demand. We thus need to calculate each sector's share in total ASEAN demand. These shares are a target for the structure of demand.

In constructing this matrix we used apparent demand. This is defined as:

$$\text{Demand} = \text{production} + \text{import} - \text{export}$$

Sectoral shares in intra-regional trade and demand are presented in table 7.2, they are significantly different. This is logical, given ASEAN's trade relationship with the rest of the world. ASEAN is an importer of machinery and equipment and an exporter of clothes and electric material.

Table 7.2. Sectoral shares in ASEAN trade and demand (per cent)

	Text-cloth.	Electric. mat.	Other manuf.	Agro-food	Energy-min.
Shares of trade	8	34	26	11	20
Shares of demand	2	2	38	38	20

Obviously, the two hypothesis represent extremes and the ideal solution, would have been to describe a shift of trade that takes into account both the structure of comparative advantage in each country and the structure of domestic demand. But it is very difficult to weigh

correctly the two hypotheses. We have chosen to take an analytical approach to the problem and to compare two cases. The first case is an overestimate of the importance of the structure of comparative advantages as a determinant of trade. The second, is an overestimate of the weight of demand as a determinant of trade. Table 7.3 shows the total predicted flows for each sector in these two cases, summing to a total of 47 618 million \$US.

Table 7.3. Predicted trade flows (million \$US)

	Text-cloth.	Electric. mat.	Other manuf.	Agro-food	Energy-min.
First case, based on shares in trade	2 080	12 029	15 033	6 015	12 461
Second case, based on shares in demand	866	895	18 319	17 901	9 637

7.1.1. Hypothesis 1: Constant export shares

The following table summarizes the evolution of trade under the first hypothesis. The composition of exports remains identical and each sector maintains its current share in each flow.

Table 7.4. Trade impact of natural attraction

Variation of imports in per cent	Text-cloth.	Electr. mat.	Other manuf.	Agro-food	Energy-min.	Total
Indonesia	544	507	515	579	498	518
Malaysia	142	133	142	124	147	138
Philippines	181	190	151	111	79	132
Singapore	-52	-40	-45	-47	-45	-44
Thailand	218	76	120	106	78	93
ASEAN	-7	34	115	98	128	78
Variations of exports in per cent						
Indonesia	-29	-37	40	14	26	4
Malaysia	-29	-24	23	64	42	10
Philippines	117	9	247	205	17	104
Singapore	166	139	203	198	200	182
Thailand	77	13	129	220	77	85
ASEAN	-7	34	115	98	128	78

Under this hypothesis, intra-ASEAN trade increases by 78 per cent. We are thus modelling a substantial effect and the impact on employment is likely to be very important. As table 7.4. reveals, moreover some flows have changed considerably. Indonesian imports from ASEAN, for example, increased by 518 per cent. In contrast, Singapore's imports from ASEAN decreased by 44 per cent, while its exports increase by 182 per cent. Evidently the main "winner" in this scenario is Singapore. Since its exports are mainly oriented towards extra-

ASEAN countries, the gravity model induces a larger share of intra-ASEAN exports for Singapore and a smaller share for its imports.²⁶

We can now examine the employment content of flows induced by this evolution and then obtain an employment net balance. Two types of results are presented, as in section 5 above: the total employment net balance of trade and the manufactured employment net balance. We display also the initial balance, namely the real balance before the removal, and the final balance, namely without trade barriers, and the variations between both situations, measured as a percentage of the initial net balance.

Table 7.5. Net employment balances

	Initial		Final		Change (per cent)	
	Total	Manufacturing	Total	Manufacturing	Total	Manufacturing
Indonesia	1 506 519	449 227	-2 430 150	-393 245	-261	-188
Malaysia	280 300	147 691	-71 027	-189 265	-125	-228
Philippines	-179 815	-46 267	-340 817	-133 670	-90	-189
Singapore	-152 217	-120 144	225 172	211 375	248	276
Thailand	73 820	49 739	725 277	-104 049	882	-309
TOTAL	1 528 607	480 246	-1 891 545	-608 853	-224	-227

The gravity model describes a completely different (from reality) pattern of intra-ASEAN trade. In such a scenario, because the calculations are very sensitive to trade flows, we can anticipate major changes in the net employment balance. This is indeed what we found. From the data in table 7.5, we observe that the employment effects of Singapore's trade with ASEAN become positive but changes in Indonesia's intra-regional trade, generate particularly negative consequences for employment in that country. The evolution in Malaysia and the Philippines is similar to that in Indonesia, but less strong since variations in their trade were not as important. The shift in the case of Thailand is unique within the ASEAN groups and flows from the fact that its share of intra-regional trade in agro-food products is much higher. In consequence, while its total employment increased under this hypothesis, its employment in manufacturing decreased.

The total employment net balance of intra-ASEAN trade has decreased from 1,528,607 jobs to -1,891,545 jobs, and the manufactured employment net balance has decreased from 480,246 jobs to -608,853. The main reason for this decline in the net employment balance is that the employment content of production in the richest countries, and especially Singapore, is smaller than in the rest of ASEAN. Thus a pattern of trade which is more balanced between ASEAN countries is necessarily less rich in jobs.

To understand the significance of these job losses, it is essential to compare these results to total employment in each country. Table 7.6 presents data on the number of employed persons, job losses for each country and within each country for both total employment and employment in manufacturing.

²⁶ Another hypothesis is that there is no substitution effects between intra- and extra- ASEAN trade, in which case Singapore's exports represent trade creation.

Table 7.6. Change in employment

	Job losses		Change (per cent)	
	Total	Manufacturing	Total	Manufacturing
Indonesia	-3 937	-842	-5.0	-1.1
Malaysia	-351	-337	-4.8	-4.6
Philippines	-161	-87	-0.7	-0.4
Singapore	377	332	19.3	16.9
Thailand	651	-154	1.9	-0.5
TOTAL	-3 420	-1 089	-2.4	-0.8

As we can see the effects on employment are not negligible, especially for Singapore. For ASEAN as a whole, the loss of jobs amounts to 2.4 per cent of total employment. For Thailand and the Philippines the impact is relatively limited. For Singapore, however, the effects are huge, almost 20 per cent of the number employed because the gain in terms of trade balance is important.

7.1.2 Hypothesis 2: Constant demand shares

For the second hypothesis, where each sector has in each flow a share identical to its share in total ASEAN demand, we only give the changes expressed as a proportion of the employed because the calculations are similar to those above. The results, table 7.7, are in some instances, unrealistic.

Table 7.7. Changes in employment

	Job losses		Changes (per cent)	
	Total	Manufacturing	Total	Manufacturing
Indonesia	-7 231	-999	-9.3	-1.3
Malaysia	-453	-237	-6.2	-3.2
Philippines	453	-67	-1.9	-0.3
Singapore	507	315	26.0	16.1
Thailand	-1 627	-140	-5.0	-0.4
TOTAL	-9 258	-1 129	-6.4	-0.8

In terms of orders of magnitude, the figures in table 7.7 are quite similar to those in table 7.6. However, they become quite unrealistic because of a striking swap between the electrical material and agro-food sectors [see table 7.3]. According to hypothesis 2, if Singapore's trade were oriented towards ASEAN, that country would play a significant role in the agro-food sector.

7.1.3 Conclusion

When we apply the coefficients of a reasonable gravity model to ASEAN, we observe dramatic changes in the pattern of trade and in the employment net balance. If we accept that trade could be completely pulled by demand, however, we obtain some unrealistic results (hypothesis 2). This calls our attention to some of the factors that make it difficult to imagine

a really integrated market for ASEAN, at least at this time. Trade in ASEAN is almost completely vertically integrated and outward-oriented. Consequently greater market integration would potentially lead to two problems. First, the richest countries in the region would be likely to take a larger share of intra-ASEAN trade. But as the richer countries have a lower employment content of production, this would result in a significant decrease in the employment content of intra-ASEAN trade. A more inward-oriented trade, under existing conditions, would thus lead to a decrease in jobs. Second, such an evolution would go partly against existing comparative advantage and the organization of production networks within the region currently being put into place by foreign investors and their suppliers. This makes it very difficult to conceive of intra-ASEAN trade without extra-ASEAN trade.

In conclusion, if there were "natural" trade between ASEAN countries, in accordance with a gravity model, there would be a decrease in the number of jobs created. Of course we did not take into account other effects, such as a reduction in the price of inputs or trade diversion. But the first-order effect derives from the large discrepancy between the employment content of production of each country. Moreover intra-regional trade is already vertical and outward-oriented. It thus seems more interesting to analyse the effects of a more realistic change, namely a lowering in tariff barriers.

7.2 The intra-ASEAN free trade scenario: Suppression of tariff and non-tariff barriers

The traditional approach to liberalization is to examine the effects of a reduction in trade barriers. It is a very important debate in the context of AFTA, because trade barriers are still high amongst all ASEAN members, with the exception of Singapore..

The principle of this scenario is very simple. Each country in the region has entry barriers. These were estimated in a study by Lee and Roland-Holst (1994) for a large number of Asian countries, including those in ASEAN. The barriers were measured as the ad valorem average nominal tariff rates and ad valorem equivalents of nontariff barriers for ten sectors in each country for the year 1985.²⁷ Using these data, we then assume that trade barriers are suppressed within ASEAN. We have a partial equilibrium modelling approach and we observe only the first-order effects, namely the trade flows induced by this suppression. We thus assume that if the barriers of a country for a given good decrease, the price for this commodity will fall and imports by this country of this good will increase.

7.2.1 Results

Let us call dd the sum of tariff and nontariff barriers for each sector and for each country: $dd = TB + NTB$. For the five ASEAN countries and for the five sectors, see the values in table 7.8.

As we can see, most markets have a high level of protection. The most closed country is the Philippines and the least is Singapore. We observe that the richer the country, the lower its level of protection.

²⁷ Lee and Roland-Holst note that "[a]lthough variation of protection across countries and sectors has remained relatively stable, actual tariff rates today are probably lower in most of these countries. On the other hand, each...maintains some (and sometimes a considerable) degree of nontariff protection against imports and many of these have been increasing over the same period"[1994,25]. Announcement of future tariff reductions rarely deal with the latter.

Table 7.8. Tariff plus non-tariff barriers (per cent)

dd = TB+NTB	Text-cloth.	Electr. mat.	Other manuf.	Agro-food	Energy-min.	Total
Indonesia	37.7	33.5	32.1	27.6	7.6	26.2
Malaysia	31.5	20.5	22.3	12.8	10.4	18.5
Philippines	40.4	43.4	44	44.8	37.2	41.6
Singapore	1.8	2.5	2.7	7.3	3.3	3.1
Thailand	32.6	22.2	25.5	30.7	18.4	22.8

Source: Lee and Roland-Holst (1994).

If we call p_M the domestic price of imported goods in a given sector and p the border price of this good before application of the tariff, we have $p(1+dd) = p_M$. We also assume, following many estimates based on an Armington assumption, that the price elasticity of imported goods is one.²⁸

Thus :

$$\begin{aligned}
 P_M &= (1+dd) \Rightarrow \Delta p_M = \rho \Delta dd \\
 \Rightarrow \frac{\Delta p_M}{p_M} &= \frac{\Delta dd}{1+dd} = \frac{\Delta M}{M} = \frac{\Delta dd}{1+dd}
 \end{aligned}$$

Consequently we can obtain the first-order effect of a removal of these tariff barriers on the imports of each country. As we assume that this removal is granted only to ASEAN countries, we also obtain exports coming from its members. We assume that that share of each import coming from each exporter remains unchanged. For example, Malaysia provides 21 per cent of Indonesia's clothing imports with or without tariff barriers. Table 7.9 shows the changes in intra-regional imports and exports of each country in each sector of our five sectors, under these assumptions.

Under this hypothesis ASEAN trade increases by only 11 per cent. Again the "winner" in this scenario is Singapore, but this time because the removal of trade barriers, given Singapore's greater openness, is asymmetric. Looking at the trade balance of each country versus the rest of ASEAN, we note that the negative balance of each country slightly decreases while the positive balance of Singapore significantly increases. The barriers in Singapore were especially low, while those of other countries, particularly for the Philippines and Indonesia, were especially high. Moreover the decomposition of the tariff barriers by type of goods was not very discriminating, except perhaps for the energy and mining sector, where the tariff was generally lower than in other sectors. The difference in the shifts between sectors is therefore not very high. After removal of trade barriers, exchange of other manufactured goods increased by 14 per cent and exchange of textiles and clothes decreased by 6 per cent.

We can now examine the employment content of flows induced by this liberalization and then obtain an employment net balance. We present two sorts of results, as before, the total employment net balance of trade and the manufactured employment net balance. We show

²⁸ See for example Goldstein and Khan (1985).

Table 7.9. Trade impact of intra-ASEAN free trade

Variation of imports in %	Text-cloth.	Electr. mat.	Other manuf.	Agro-food	Energy-min.	Total
Indonesia	27	25	24	22	7	18
Malaysia	24	17	18	11	9	15
Philippines	29	30	31	31	27	29
Singapore	2	2	3	7	3	3
Thailand	25	18	20	23	16	19
ASEAN	6	9	14	13	10	11
Variation of exports in %						
Indonesia	4	3	9	9	8	7
Malaysia	4	4	7	15	9	7
Philippines	12	9	17	14	6	12
Singapore	24	18	21	17	11	17
Thailand	11	6	12	14	6	9
ASEAN	6	9	14	13	10	11

also the initial balance (before the removal), the final balance (without trade barriers), and the change between both situations, measured as a percentage of the initial net balance.

Table 7.10. Impact on employment balance

	Initial		Final		Change (per cent)	
	Total	Manuf	Total	Manuf	Total	Manuf
Indonesia	1 506 519	449 227	1 467 742	411 605	-3	-8
Malaysia	280 300	147 691	249 653	104 047	-11	-30
Philippines	-179 815	-46 267	-236 735	-66 478	-32	-44
Singapore	-152 217	-120 144	-128 644	-87 783	15	27
Thailand	73 820	49 739	-33 366	-32 359	-145	-165
	1 528 607	480 246	1 318 650	329 032	-14	-31

Globally there is an advantage for Singapore because its initial trade barriers were very low. As a result, the deficit in the employment net balance for Singapore decreases. This does not change the general pattern of trade where Singapore is an important importer of ASEAN goods. Singapore, which is already at the top of a pyramid of an exporting network, will probably take advantage of any liberalisation process which strengthens its position. This scenario represents a gain of by and large 20 thousand jobs in total and 30 thousand manufacturing jobs if agro-food and energy are included. In contrast, these data illustrate an important loss for the Philippines and even more so for Thailand. This is because the level of protection in the Philippines was very high overall and in Thailand was particularly high for sectors where the labour content was high, such as clothing and agro-food. For Thailand, therefore, there is both a general effect from the removal of barriers to trade and also an important structural effect.

The analysis also shows that the loss of jobs is concentrated in the manufacturing sector. This is due to the specialisation of Singapore in this sector. But the most striking result is the

global loss of jobs after the removal of trade barriers. The total employment net balance of intra-ASEAN trade has decreased from 1,528,607 jobs to 1,318,650 jobs, and the manufactured employment net balance has decreased from 480,246 jobs to 329,032. This is explained by the lower employment content of production in Singaporean manufacturing. Thus, as in scenario 1, a pattern of trade which is more balanced between ASEAN countries is necessarily less rich in jobs.

As in the previous scenario, the significance of this employment effect can be interpreted with reference to total employment and employment in the manufacturing sector of each ASEAN country, table 7.11.

Table 7.11. Impact on employment

	Job losses		Change (per cent)	
	Total	Manuf	Total	Manuf
Indonesia	-39	-38	-0.05	-0.04
Malaysia	-31	-44	-0.42	-0.59
Philippines	-57	-20	-0.24	-0.08
Singapore	24	32	+1.21	+1.66
Thailand	-107	-82	-0.33	-0.25
TOTAL	-210	-151	-0.15	-0.11

As we can see the effects on employment are quite low. At worst the loss of jobs in ASEAN amounts to 0.15 per cent of total employment. And even for Thailand or the Philippines the effects are limited.

7.2.2 Conclusion

The first effects of a removal of trade barriers is a loss of jobs for ASEAN members. Although the richer the country, the lower its level of protection, the richer countries also had a lower employment content of production. A removal of all trade barriers therefore, induced a trade advantage for rich countries, especially Singapore, and led to an overall fall in the employment content of intra-ASEAN trade. The results are quite similar to those in scenario 1, because the pattern of trade is quite similar to the pattern of tariff barriers. But the effects are evidently less pronounced, because the first scenario corresponds to an extreme situation. The effects are also very low compared to total employment. Moreover it seems reasonable to imagine that trade liberalization could have other effects than those described including lower prices of some inputs or beneficial welfare effects. Consequently, although a suppression of trade barriers would lead to a reduction of employment in ASEAN, these effects would not be large and they would be partly offset by other effects not taken into account here.

7.3 The tendency scenario: Extrapolating recent trends

Over the past twenty years the pattern of intra-regional trade has changed considerably, with a major break occurring around 1987 when electrical material emerged as a major trade item. Since then trends have been relatively clear (see sections 2 and 4). A number of factors suggest that recent trends may continue. The existence of internal and external economies of scale, especially for electrical material, is likely to preserve the pattern of comparative advantage and even to develop the existing pattern of sectoral specialisations further. This is

all the more likely as regional production networks are developed through continued inflows of foreign direct investment and the growth of intra-ASEAN direct foreign investment. But most of all the general characteristics of the countries, such as infrastructure or labour skill, change rather slowly. Recent efforts to incorporate existing characteristics into an intra-regional division of labour through the creation of growth triangles, moreover, reinforces this tendency. The sources of trade dynamism may therefore remain the same.

7.3.1 Global and sectoral trade evolution

Nonetheless the future growth and distribution of trade flows amongst countries and across sectors depends on numerous variables whose evolution is difficult to forecast. This is particularly the case with respect to prices and productivity, which depend inter alia on technical change. In a similar way, economic growth has its own logic, whose analysis goes beyond the object of our study. In order to avoid basing our study on hazardous assumptions with regard to these issues, we will assume that the evolution of these variables is neutral. In other words, the relative prices of commodities will remain constant, as will the relative GDP of the area's countries. In this scenario, changes in trade are measured as a percentage of GDP.

We begin by identifying trends in intra-regional trade following the critical turning point year, 1987. We thus base our analysis of the evolution of intra-regional trade on the period 1988-1993, for which the trends have been rather regular and clear. The first main feature is the growth in the volume of trade. Changes in the degree of openness with regard to the rest of the region are traditionally regarded as a good indicator of the importance of trade within regional economies. We assume therefore that the trend in the degree of openness which characterized the period 1988-1993 will continue into the future.²⁹ This enables us to calculate the rate of growth in the volume of trade for each ASEAN country over the subsequent ten years, that is, to the year 2003. We also assumed that trade balances. This was done in order to minimize the uncertainties that result from the sensitivity of net trade balances to changes in the macroeconomic and monetary situation. By assuming that net trade balances we reduce these uncertainties and increase the confidence we have in extrapolating from existing trends.

This leaves the problem changes in the sectoral distribution of trade flows over time. In order to avoid useless complexity, we approach this problem at the level of the trading relationship (imports and exports separately) of each country with the rest of ASEAN, without distinguishing between the partners. This gives a set of ten multilateral, intra-regional trade flows. For each flow, we assume that the future sectoral distribution will be an extension of the recent growth trend for each sector. Concretely, for each of the ten trade flows, we apply the following method: first we break the flow down into five sectors (with the same classification as in section 4). Then we assume that the growth rate for each sectoral trade flow will be identical to its average during the reference period, i.e. 1988-1993. This assumption gives the final shares of each sector within each trade flow.

This determines both the global growth and the final sectoral distribution of each trade flow. Nevertheless, the resulting pattern of trade lacks coherence, since for a given sector the sum of intra-ASEAN imports does not correspond to exports. This is corrected by a proportional adjustment at the sector level, separately on imports and on exports, in order to ensure that the total sum of imports equals that of exports, and that the global sum remains

²⁹ Concretely, we make a linear extrapolation, starting from the 1988-1993 period.

constant. This adjustment is not very important quantitatively, but ensures the coherence of the scenario. It does, however, disturb the trade balances a little, but this is negligible for this scenario.

The trade pattern obtained in this way is then compared with the initial one, measuring trade flows as a percentage of GDP. In analysing the effect on employment it is assumed that the labour content of a given percentage of GDP in a given sector remains constant. Finally, in order to make a *ceteris paribus* comparison between the final and initial stages, we construct a balanced base scenario by bringing net intra-ASEAN trade balances into equilibrium (this done without changing the degree of openness or the sectoral distribution of flows). The base year is 1992, for which we have already calculated the labour content of trade (see section 5). The final year is 2003, i.e. an extrapolation of ten years after 1993, the last year for which we have good information about trade flows.

7.3.2 Labour content of new trade flows

The trade flows in 1992 and the extrapolation to 2003, measured as a percentage of GDP, are described in annex 4. The global intensity of intra-regional trade grows from nearly 7 per cent to more than 10 per cent of ASEAN's GDP. The degree of openness increases for each country, and is especially important for Malaysia. The most striking change concerns electrical material, where trade growth is particularly high, and concentrated on Singapore and Malaysia. Trade intensity rises slightly in the textile and clothing sector, mainly because of Indonesia's exports and Singapore's imports. On the other hand, the energy and mining sector suffers a relative decline.

The labour content of these new trade flows is surprising, as all countries except the Philippines (and Singapore if compared to the base year) exhibit a negative employment net balance (see table 7.12).³⁰ This is due to changes in the agro-food sector. Although the global intensity of trade in this sector did not change significantly, its international distribution does. First, Singapore has developed a large trade surplus in this sector, contrary to the initial situation. Second, all other countries except the Philippines exhibit a high trade deficit in this sector. The global effect on employment is thus highly negative, as the labour content in this sector is far lower in Singapore than in the other countries, and the difference is even more pronounced than in other industries. And this sector is precisely the one with the highest labour content of production. Changes in other sectors are therefore secondary when compared with the agro-food sector. The extrapolation scenario, however, is questionable for the agro-food sector. Import substitution strategies in this sector are not intended to last very long and once a country is self-sufficient in a given industry, there is no further change in the trade balance, in other words it does not become a net exporter. Consequently, we will examine the labour content of trade in manufacturing, excluding employment and trade flows in both the agro-food and energy-mining sectors as in section 5.

The results are then very different (see table 7.13). The most striking feature is the positive effect for Indonesia, which relies mainly on its huge exports of textiles and clothing. Moreover the share of electrical material, which has a low labour content, is very high in its imports. The advantage is apparent in the net balance, whether it is measured in terms of trade flows as a whole or per 1 million US\$. Malaysia also gains in terms of employment, but very

³⁰ The net employment balance of trade flows is not the same in table 7.1 as in section 5. In fact, the labour contents presented in this table are calculated from the counterfactual base case, where net trade balances are nil. 26 April 1996.

Table 7.12

Labour content of balanced trade flows in 1992 (person-years)

Exporter/importer	Text-cloth	Electr. numat.	Other manuf.	Agro-food	Energy-min.	Total	Net balance	Total per 1 million US\$	Net balance per 1 million 1992 US\$
ASEAN Philippines	7 853	60 261	76 309	78 314	5 638	486 500		276	
Philippines ASEAN	15 025	20 283	82 284	76 225	48 732	485 832	668	260	16
ASEAN Indonesia	328 980	26 022	367 237	958 807	18 444	3 443 493		517	
Indonesia ASEAN	11 127	32 434	263 708	718 195	13 769	2 086 664	1 356 829	311	206
ASEAN Thailand	46 501	126 851	129 821	798 771	4 700	2 337 159		310	
Thailand ASEAN	15 773	74 805	156 498	449 214	54 066	1 532 472	804 687	197	113
ASEAN Malaysia	40 395	137 771	115 467	169 459	15 193	984 874		63	
Malaysia ASEAN	32 409	110 288	145 678	123 296	13 638	869 391	115 483	56	8
ASEAN Singapore	8 413	51 602	87 668	7 235	9 886	345 795		16	
Singapore ASEAN	70 581	68 993	61 205	33 920	13 159	512 065	-166 270	24	-7

Labour content of trade, extrapolation to 2003¹ (person-years)

ASEAN Philippines	11 266	76 576	120 477	233 935	66 112	508 365		272	
Philippines ASEAN	29 932	100 830	120 845	210 075	22 540	484 223	24 142	268	5
ASEAN Indonesia	895 900	184 981	54 896	51 509	706	1 187 993		239	
Indonesia ASEAN	91 268	349 130	121 236	1 041 327	524	1 603 484	-415 492	326	-86
ASEAN Thailand	6 002	341 476	86 686	284 006	2 611	720 781		113	
Thailand ASEAN	12 855	194 261	282 653	1 069 251	14 442	1 573 461	-852 680	249	-137
ASEAN Malaysia	18 916	393 769	145 873	90 566	3 917	653 041		51	
Malaysia ASEAN	38 923	407 848	91 282	132 866	2 679	673 598	-20 557	52	-1
ASEAN Singapore	6 190	144 606	50 901	48 339	216	250 252		18	
Singapore ASEAN	113 193	149 673	26 909	4 500	1 502	295 778	-45 525	21	-3

¹From trends between 1988 and 1993.

Source: Annexes 7.1 and 5.1.

Calculations from the authors.

Table 7.13

Non-primary labour content of balanced trade flows in 1992¹ (person-years)

Exporter/importer	Text-cloth	Electr. mmf.	Other manuf.	Total	Net balance	Total per 1 million US\$	Net balance per 1 million 1992 US\$
ASEAN Philippines	6 684	51 416	53 444	111 544		141	
Philippines ASEAN	11 983	17 305	57 768	87 056	24 488	164	-23
ASEAN Indonesia	282 260	23 834	130 184	436 278		191	
Indonesia ASEAN	9 276	29 706	168 352	207 335	228 943	126	64
ASEAN Thailand	40 750	105 707	93 501	239 958		80	
Thailand ASEAN	13 581	62 336	103 653	179 571	60 387	80	0
ASEAN Malaysia	39 579	134 568	104 477	278 624		51	
Malaysia ASEAN	31 343	107 723	135 765	274 831	3 793	51	8
ASEAN Singapore	8 404	51 497	87 373	147 274		21	
Singapore ASEAN	70 504	68 853	60 874	200 231	-52 958	23	-7

Non-primary labour content of trade, extrapolation to 2003^{1,2} (person-years)

ASEAN Philippines	9 589	65 336	84 379	159 304		145	
Philippines ASEAN	23 873	86 030	84 841	194 743	-35 440	141	5
ASEAN Indonesia	768 670	169 426	19 461	957 557		195	
Indonesia ASEAN	76 087	319 772	77 398	473 256	484 301	115	80
ASEAN Thailand	5 260	284 558	62 434	352 251		58	
Thailand ASEAN	11 069	161 881	187 209	360 158	-7 907	73	-14
ASEAN Malaysia	18 534	384 614	131 990	535 138		45	
Malaysia ASEAN	37 642	398 365	85 071	521 078	14 060	45	0
ASEAN Singapore	6 183	144 312	50 730	201 225		17	
Singapore ASEAN	113 068	149 370	26 764	289 202	-87 976	21	-4

¹Jobs in services and manufacturing only, energy and agro-food excluded; ² From trends between 1988 and 1993.

Source: Annexes 7.1 and 5.1.

Calculations from the authors.

slightly. The bulk of its trade is composed of electrical material and is balanced, with the surplus in "other manufacturing" compensating for the deficit in textiles and clothing.

Thailand's exports to the rest of the region become extremely specialised, as electrical material rises to more than 85 per cent of the total! As the structure of its imports is less specialised, and as the labour content of electrical material is moderate, the net employment balance of trade is negative, inspite of a trade surplus in manufactures as a whole. For Singapore, the employment deficit comes from its substantial trade deficit in textiles and clothing, which accounts for nearly one sixth of its exports to ASEAN, but only for a negligible share of imports. For the Philippines, the trade deficit in both textiles and clothing and electrical material leads to an employment deficit.

7.3.3 Conclusions

To summarise, let us emphasize that the extrapolation of recent trends leads to an accentuated pattern of specialisation within ASEAN. Looking at the agro-food sector, the results are somewhat surprising, and one must be very cautious when drawing conclusion. For the manufacturing sectors the features are clear, with in particular a strong specialisation of Indonesia in textiles and clothing and of Thailand, Malaysia and Singapore in electrical material. This is no surprise given the analysis of intra-regional trade presented in section 4. In this context, it is understandable that employment gains will be concentrated in Indonesia. Nevertheless, apart from this, the non primary employment effects are rather low.

Conclusions

ASEAN plays two different roles: one is political and the other economic. Politically with the growing pressure of China on the region there is a demand in Southeast Asia for some common countervailing policy. Taiwan (China) is looking towards the Southeast, Viet Nam joined ASEAN in 1995, Laos, Cambodia and Myanmar will probably join before the end of the century. Economically, with rapid industrialisation there are growing opportunities to increase the division of labour within ASEAN which increases interest in a free trade zone.

From outside ASEAN, there is also strong pressure from Japan, through trade and FDI links. Given the tendency of Japanese firms to develop closed, intra firm specialisation rather than open local sourcing, this could diminish the degree of economic integration between ASEAN countries.

To answer that concern two points can be raised. The first is that Japanese investment is less than that of other NIE's and is differently distributed; the second is that Japanese firms themselves tend to be less integrated as the distance to Japan rises. In fact, the cost of maintaining close intra firm integration might rapidly exceed the cost of developing local sources in order to achieve requirements.

So far as the impact of ASEAN on employment is concerned, we conclude that the first effects of a mutual removal of trade barriers would be a loss of jobs for ASEAN members. The richer the country, the lower its present level of protection. A removal of all trade barriers therefore brings a trade advantage for the richer countries and an overall fall in the employment content of intra-ASEAN trade. But these effects would be not large and would be partly offset by dynamic effects.

On the other hand, a scenario based on the extrapolation of recent trends in intra-ASEAN trade suggests that this will lead to an accentuated pattern of specialisation. This is particularly clear for Indonesia textiles, and for Thailand, Malaysia and Singapore in electrical material. The employment gains would therefore be concentrated in Indonesia, with few employment effects elsewhere outside the primary producing sectors.

Bibliography

- Anderson J. [1979] "A Theoretical Foundation for the Gravity Equation" *American Economic Review*, Vol. 63.
- Balassa, B. [1961] *The Theory of Economic Integration* [Homewood, Ill.: Richard D. Irwin].
- Baldwin, R. [1989] "The Growth Effects of 1992", *Economic Policy* 9: pp. 248-281.
- Bergstrand J. [1985] "The Gravity Equation in International Trade - Some Microeconomic Foundations and Empirical Evidence", *Review of Economics and Statistics*, Vol. 71.
- Borjas, G., R. Freeman & L. Katz, [1992] "On the Labor Market Effects of Immigration and Trade" in G. Borjas & R. Freeman (eds.) *Immigration, and the Work Force* [Chicago: University of Chicago and NBER], pp. 213-44.
- Chaponière, J-R [1994] "L'ASEAN" in *Economie Internationale La Revue du Cepii*, No. 57, 1er trimestre, pp.35-62.
- Chowdury A. & C. H. Kirkpatrick [1990] "Human Resources, Factor Intensity, and Export Structure of Singapore and Malaysia", *ASEAN Economic Bulletin*, Vol. 6, No. 3.
- Cortes, O. & S. Jean, [1994] *Commerce international, emploi et salaires* [Paris: CEPII, Document de Travail No. 94-01, Août].
- Cortes, O., S. Jean & J. Pisani-Ferry, [1995] "Trade with Emerging countries and the Labour Market: The French Case" paper prepared for the CEPII-ECARE workshop "International Trade and Employment: The European Experience [Paris, 25 September].
- de Melo, J. & A. Panagariya (eds.) [1993] *New dimensions in regional integration* [Cambridge: Cambridge University Press, 1993].
- Dewatripont, M. & V. Ginsberg (eds.) [1994] *Europe 1992 and Beyond* [Amsterdam: North Holland].
- Dewatripont, M., A. Sapir, K. Sekkat, A. Lamorgese & G. Guazzarotti [1995] "Labor Market Effects of Trade with LDC's in Europe" paper prepared for the ECARE/CEPII conference on International Trade and Employment: the European Experience [Paris, 25 September].
- Dixit, A. & J.E. Stiglitz [1977] "Monopolistic Competition and Optimum Product Diversity" *American Economic Review*, 76, pp. 177-190.
- Ernst, D. [1994b] "Network Transactions, Market Structure and Technology Diffusion --Implications for South-South Co-operation" in L.K. Mytelka (ed.) *South-South Co-operation in a Global Perspective* [Paris: OECD Development Centre], pp. 89-124.
- Ernst, D. [1994a] *Carriers of Regionalization: The East Asian Production Networks of Japanese Electronics Firms* [Berkeley: BRIE Working Paper No. 73, November].
- Ethier, W. & H. Horn [1984] "A New Look at Economic Integration" in H. Klerzkowski (ed.) *Monopolistic Competition and International Trade* [Oxford: Clarendon Press], pp. 207-229.
- Goldstein M. & Khan M. S. [1985] "Income and Price Effects in Foreign Trade" in *Handbook of International Economics*, Vol. 2, edited by Jones R. W. & Kenen P. B., Elsevier Science Publishers.
- Helleiner, G.K. [1981] *Intra-firm trade and the Developing Countries* [London: Macmillan].
- Helpman, E. & P. Krugman [1985] *Market Structure and Foreign Trade: Increasing Returns, Imperfect Competition, and the International Economy* [Cambridge, Ma.: MIT Press].
- Hufbauer, G. & J. Schott [1993] *NAFTA: An Assessment* [Washington, D.C.: Institute for International Economics].
- Husson M. [1994] "Le contenu en emploi de la demande finale", *La Revue de l'IRES*, n°14, winter.
- ILO [1985, 1993, 1994] *Yearbook of Labour Statistics*.
- ILO [1994] *The Economic and Social Impact of Export Processing Zones: the Case of Malaysia*, Geneva: ILO Working Paper 66.
- Institute of Developing Economies [1991] *International Input-Output Tables Indonesia-Japan 1985*.
- Institute of Developing Economies [1991] *International Input-Output Tables Thailand-Japan 1985*.
- Institute of Developing Economies [1992] *International Input-Output Tables Malaysia-Japan 1985*.
- Institute of Developing Economies [1992] *International Input-Output Tables Philippines-Japan 1985*.
- Institute of Developing Economies [1992] *International Input-Output Tables Singapore-Japan 1985*.
- Kahnert, F., P. Richards, E. Stoutjesdijk & P. Thomopoulos [1969] *Economic Integration Among Developing Countries* [Paris: OECD Development Centre].

- Kawabe, Nobuo [1991] "Problems of and Perspectives on Japanese Management in Malaysia" in Shoichi Yamashita (ed.), *Transfer of Japanese Technology and Management to the ASEAN Countries* [Tokyo: Tokyo University Press], pp. 239-266.
- Kierzkowski, H. (ed.) *Monopolistic Competition and International Trade* [Oxford: Clarendon Press].
- Kimbara, Tatsuo [1991] "Localization and Performance of Japanese Operations in Malaysia and Singapore" in Shoichi Yamashita (ed.), *Transfer of Japanese Technology and Management to the ASEAN Countries* [Tokyo: Tokyo University Press], pp. 153-68.
- Krugman, P. [1981] "Intraindustry Specialization and the Gains from Trade" *Journal of Political Economy*, Vol. 89, No. 5, pp. 959-974.
- Lancaster, K.J. [1980] "Intra-Industry Trade under Perfect Monopolistic Competition", *Journal of International Economics*, 10, pp. 151-176.
- Lawrence, R.Z. & M.J. Slaughter [1993] "International Trade and American Wages in the 1980s: Giant Sucking Sound or Small Hiccup?" *Brookings Papers on Economic Activity*, Microeconomics, 2: PP. 161-210.
- Lee, Hiro and D. Roland-Hoist [1994] "Trade Liberalization and Employment Linkages in the Pacific Basin" [Paris: OECD Development Centre, Technical Papers No. 94].
- Lim, L. [1994] "The Role of the Private Sector in ASEAN Regional Economic Co-operation" in L.K. Mytelka (ed.) *South-South Co-operation in a Global Perspective* [Paris: OECD Development Centre], pp. 125-168.
- Linnemann H. [1966] "An Economic Study of International Trade Flows", North-Holland Publishing Company, Amsterdam.
- Lipsey, Robert [1995] *Trade and Production Networks of U.S. MNCs and Exports by Their Asian Affiliates*, NBER Working Paper 5255 (September).
- Lustig, N., B. Bosworth, R.Z. Lawrence (eds.) [1992], *North American Free Trade: Assessing the Impact* [Washington, D.C.: Brookings Institution].
- Mercenier, J. [1995], "Can '1992' Reduce Unemployment in Europe? On Welfare and Employment Effects of Europe's Move to a Single Market" *Journal of Policy Modeling*, 17 (1): pp. 1-37.
- Mytelka, Lynn K., [1979], *Regional Development in a Global Economy: The Multinational Corporation, Technology and Andean Integration*, (New Haven: Yale University Press) pp. 182-204.
- Mytelka, Lynn K., [1984], "Competition, Conflict and Decline in the Union Douanière et Economique de l'Afrique centrale" in D. Mazzeo, ed., *African Regional Organisations*, (Cambridge: Cambridge University Press).
- Mytelka, Lynn K., [1994] "Regional Co-operation and the New Logic of International Competition" in L.K. Mytelka (ed.) *South-South Co-operation in a Global Perspective* [Paris: OECD Development Centre], pp. 21-54.
- Mytelka, Lynn K., [1995] "Dancing with Wolves: Global Oligopolies and Strategic Partnerships" in J. Hagedoorn (ed.) *Technical Change and the World Economy*, Convergence and Divergence in Technology Strategies [London: Edward Elgar].
- Papaconstantinou, G. [1995] "Globalisation, Technology and Employment: Characteristics and Trends" in *STI Review*, No. 15, pp. 177-235.
- Petit, Pascal. [1995] "Technology and Employment: Key Questions in a Context of High Unemployment" *STI Review*, No. 15, pp. 13-47.
- Ramstetter, Eric (1994) "Comparisons of Japanese Multinationals and other Firms in Thailand's Non-Oil Manufacturing Industries" *ASEAN Economic Bulletin*, Vol. 11, No. 1 (July), pp. 36-58.
- Revenge, A. [1992], "Exporting Jobs: The impact of import competition on employment and wages in US Manufacturing" *Quarterly Journal of Economics*, 107, pp. 255-284.
- Robson, Peter (ed.) [1971] *International Economic Integration* [U.K.: Penguin].
- Sibunruang, Atchaka & Peter Brimble [1988] *The Employment effects of Manufacturing Enterprises in Thailand* [Geneva: ILO, Working Paper No. 54].
- Silvers, A. & c. Rookley [1994] "Salarios y tecnología en los patrones regionales del tratado comercial Estados Unidos-México" *Revista Latino Americana de Economía, Problemas Del Desarrollo*, Vol. XXV, [Oct.-Dic.], pp. 35-53.
- Stewart, Frances [1984] "Recent Theories of International Trade: Some Implications for the South" in H. Kierzkowski (ed.) *Monopolistic Competition and International Trade* [Oxford: Clarendon Press], pp. 84-108.
- Trivoli, George and Pual Herbig (1993) "Investment Strategies and Activities of Leading US Multinational Firms in East Asian Markets: An Empirical Study" *The International Trade Journal*, Vol. VII, No. 6 (Winter), pp. 673-711.
- UNIDO [1993] *Industry and Development Global Report*.

- United Nations [1988] *International Recommendations for Industrial Statistics*, Statistical Papers, Series M, No. 48, Rev.1, United Nations Publications.
- United Nations [1994] *Statistical Yearbook for Asia and Pacific*.
- US Senate [1994] *Hearing before the Committee on Governmental Affairs*, One Hundred Third Congress, First Session, Nov. 10o, 1993 [Washington, GPO].
- Vaitsos, Constantine, [1978], *The role of Transnational Enterprises in Latin American Economic Integration Efforts: Who Integrates and with Whom, How and for Whose Benefit?* (Geneva: UNCTAD, Doc. No. TAD/EI/Sem.5/2).
- Venables, A.J. & L.A. Winters (eds), [1991] *1992: Trade and Industry* [Cambridge: Cambridge University Press].
- Wang Z. K. & Winters L. A. [1991] "The Trading Potential of Eastern Europe", *CEPR Discussion Paper n° 610*.
- Wood, A [1994] *North-South Trade, Employment and Inequality: Changing Fortunes in a Skill-Driven World* [Oxford: Clarendon Press].
- Yu C.-M. J. & Zietlow D. S. [1995] "The Determinants of Bilateral Trade Among Asia-Pacific Countries", *Asean Economic Bulletin*, vol. 11, n° 3.

Annex 1
Industrial data summary

Notes:

(a) Average number of employees: annual percentage change between 1973 and 1992 (1972 and 1991 for Thailand)

(b) Production at constant 1980 prices: annual percentage change between 1973 and 1992 (1972 and 1991 for Thailand)

(c), (d) Average number of employees: share of the industry in total manufacturing (in per cent)

(e)=(d)-(c)

(f), (g) Value added at current prices: share of the industry in total manufacturing (in per cent)

(h)=(g)-(f)

(i), (j) Value added at current prices by employee, in relation to the manufacturing average (index=100 for manufacturing average)

(k), (l) Value added/gross output at current prices

(m), (n) Wage bill/value added at current prices

NA: not available

Source: INDSTAT3 databank, UNIDO

Annex 1 (a)
Industrial data summary for Singapore

Industries (ISIC 3 digits)	Growth		Industries shares in manufacturing				V.A./employment (manuf average =100)		V.A/Gross output		Wage bill/ V.A.	
	Employment 92/73 (a)	Production 92/73 (b)	1973 (c)	1992 (d)	92-73 (e)	1973 (f)	1992 (g)	92-73 (h)	1973 (k)	1992 (l)	1973 (m)	1992 (n)
300 Total manufacturing	1.78	NA	100.0	100.0	0.0	100.0	100.0	0.0	0.30	0.32	0.34	0.34
311 Food prod.	1.23	1.41	4.7	3.2	-1.4	5.0	2.6	-2.4	0.18	0.31	0.30	0.39
313 Beverages	0.85	2.73	1.3	0.6	-0.7	1.5	1.1	-0.4	0.48	0.50	0.37	0.25
314 Tobacco	0.63	3.38	0.6	0.2	-0.4	1.2	0.6	-0.6	0.24	0.43	0.23	0.19
321 Textiles	0.23	0.32	7.0	0.9	-6.1	4.7	0.5	-4.2	0.39	0.31	0.36	0.51
322 Wearing apparel	1.12	1.31	10.4	6.5	-3.8	3.2	2.0	-1.2	0.28	0.30	0.59	0.64
323 Leather prod.	1.18	0.27	0.4	0.2	-0.1	0.2	0.1	-0.1	0.18	0.36	0.40	0.57
324 Footwear	0.28	0.47	1.0	0.2	-0.8	0.3	0.1	-0.2	0.33	0.31	0.65	0.59
331 Wood prod.	0.16	0.13	6.5	0.6	-5.9	5.4	0.3	-5.1	0.30	0.26	0.37	0.55
332 Furniture	2.69	2.96	1.2	1.8	0.6	0.6	0.7	0.2	0.39	0.35	0.57	0.58
341 Paper and prod.	1.48	1.24	1.7	1.4	-0.3	1.2	1.4	0.2	0.38	0.44	0.30	0.36
342 Printing and publish.	2.23	4.25	3.8	4.8	1.0	3.6	4.9	1.3	0.55	0.57	0.39	0.40
351 Industrial chemicals	3.47	9.98	0.7	1.4	0.7	2.0	3.4	1.4	0.47	0.32	0.20	0.27
352 Other chemicals	1.59	7.05	1.7	1.5	-0.2	3.4	6.0	2.5	0.48	0.65	0.20	0.13
353* Petroleum refineries	1.25	1.75	1.5	1.1	-0.5	14.0	7.0	-7.0	0.18	0.17	0.15	0.14
354 Misc. petr. & coal pr.												
355 Rubber prod.	0.36	0.66	2.5	0.5	-2.0	2.9	0.3	-2.6	0.09	0.36	0.31	0.52
356 Plastic prod.	3.28	1.74	2.4	4.4	2.0	1.6	2.5	1.0	0.38	0.40	0.35	0.48
361* Pottery, china, earthenware	0.90	0.48	0.5	0.3	-0.2	0.4	0.4	-0.1	0.49	0.52	0.56	0.28
362 Glass & prod.												
369 Oth. non-met. min. pr.	1.30	1.28	1.8	1.3	-0.5	2.8	1.7	-1.1	0.42	0.33	0.26	0.28
371 Iron & steel	1.21	3.06	0.7	0.5	-0.2	2.0	0.8	-1.2	0.50	0.38	0.18	0.29
372 Non-ferrous met.	1.49	1.26	0.3	0.2	0.0	0.4	0.3	-0.1	0.33	0.36	0.23	0.34
381 Fabricated met. pr.	2.92	1.84	5.1	8.4	3.3	4.8	6.6	1.8	0.37	0.38	0.36	0.43
382 Machinery	2.38	4.68	5.4	7.2	1.8	5.6	6.0	0.3	0.43	0.38	0.40	0.50
383 Machinery electric	3.20	8.64	22.0	39.7	17.7	18.6	39.9	21.3	0.39	0.29	0.32	0.30
384 Transport equipment	1.44	4.27	10.9	8.8	-2.1	11.5	8.0	-3.5	0.47	0.45	0.51	0.45
385 Profes. & scien. equip.	1.36	1.17	3.2	2.5	-0.8	1.9	1.9	0.0	0.38	0.50	0.57	0.42
390 Oth. manufact. prod.	1.11	1.17	2.7	1.7	-1.0	1.2	0.9	-0.3	0.21	0.26	0.48	0.51

Source: INDSTAT3 databank, UNIDO.

Note: 353*=353+354; 361*=361+362

Annex 1 (b)
Industrial data summary for Malaysia

Industries (ISIC 3 digits)	Growth		Industries shares in manufacturing					V.A./employment (manuf average =100)		V.A./Gross output		Wage bill/ V.A.	
	Employment 92/73	Production 92/73	1973	1992	92-73	Value-added	1973	1992	92-73	1973	1992	1973	1992
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(m)	(n)
300 Total manufacturing	3.61	NA	100.0	100.0	0.0	100.0	100.0	0.0	100	100	0.30	0.26	0.27
311 Food prod.	2.21	2.83	12.8	7.8	-4.9	14.9	7.7	-7.3	117	98	0.19	0.20	0.26
313 Beverages	1.26	2.82	1.3	0.5	-0.9	2.8	1.3	-1.5	213	292	0.46	0.19	0.15
314 Tobacco	0.63	1.39	2.4	0.4	-2.0	5.4	1.0	-4.4	226	239	0.38	0.12	0.18
321 Textiles	2.09	3.87	7.8	4.5	-3.3	4.3	3.6	-0.7	56	81	0.36	0.33	0.31
322 Wearing apparel	6.58	4.60	3.9	7.0	3.2	1.4	2.6	1.2	36	37	0.29	0.38	0.52
323 Leather prod.	3.28	NA	0.2	0.2	0.0	0.1	0.1	0.0	48	33	0.26	0.32	0.46
324 Footwear	1.18	NA	0.5	0.2	-0.3	0.2	0.1	-0.2	41	34	0.33	0.49	0.57
331 Wood prod.	2.09	2.20	17.3	10.0	-7.2	16.0	5.7	-10.3	93	57	0.38	0.30	0.40
332 Furniture	5.00	2.20	1.7	2.3	0.6	0.8	1.0	0.2	46	43	0.29	0.54	0.42
341 Paper and prod.	4.94	NA	1.2	1.7	0.4	0.7	1.8	1.1	59	107	0.29	0.32	0.28
342 Printing and publish.	1.85	NA	5.3	2.7	-2.6	4.9	2.9	-2.1	93	106	0.49	0.36	0.37
351 Industrial chemicals	3.36	2.83	1.1	1.0	-0.1	2.6	8.1	5.4	238	784	0.34	0.20	0.08
352 Other chemicals	2.05	5.32	2.3	1.3	-1.0	4.7	2.7	-1.9	204	211	0.47	0.20	0.21
353 Petroleum refineries	2.00	3.00	0.2	0.1	-0.1	2.0	1.8	-0.3	959	1486	0.11	0.15	0.08
354 Misc. petr. & coal pr.	10.35	NA	0.0	0.1	0.1	0.1	0.4	0.3	240	319	0.49	0.14	0.11
355 Rubber prod.	2.84	4.94	8.3	6.6	-1.8	9.1	5.3	-3.8	109	81	0.19	0.24	0.31
356 Plastic prod.	5.95	7.09	3.0	4.9	1.9	1.8	3.2	1.4	61	65	0.34	0.29	0.32
361 Pottery, china, earthenware	7.23	4.08	0.4	0.9	0.4	0.3	0.4	0.1	69	41	0.56	0.35	0.46
362 Glass & prod.	2.55	4.28	0.5	0.4	-0.1	0.5	0.7	0.2	94	202	0.45	0.28	0.24
369 Oth. non-met. min. pr.	2.77	4.08	3.8	2.9	-0.9	4.3	4.5	0.2	113	154	0.51	0.26	0.21
371 Iron & steel	2.69	4.84	2.2	1.6	-0.6	3.2	3.0	-0.1	145	186	0.34	0.24	0.21
372 Non-ferrous met.	11.30	2.08	0.2	0.7	0.5	0.4	0.6	0.2	170	86	0.46	0.26	0.37
381 Fabricated met. pr.	2.72	4.80	5.9	4.5	-1.5	4.5	4.7	0.2	77	105	0.31	0.32	0.30
382 Machinery	3.17	7.45	4.3	3.8	-0.5	3.4	5.7	2.3	79	150	0.43	0.33	0.25
383 Machinery electric	11.09	18.17	8.8	27.0	18.2	7.8	23.5	15.7	89	87	0.46	0.22	0.31
384 Transport equipment	3.36	7.02	3.2	3.0	-0.2	2.7	4.9	2.2	86	167	0.27	0.37	0.20
385 Profes. & scien. equip.	10.65	NA	0.6	1.7	1.1	0.4	1.2	0.8	70	72	0.43	0.30	0.32
390 Oth. manufact. prod.	10.50	NA	0.7	2.1	1.4	0.4	1.2	0.8	59	57	0.29	0.30	0.31

Source: INDSTAT3 databank, UNIDO.

Annex 1 (c)
Industrial data summary for Thailand

Industries (ISIC 3 digits)	Growth		Industries shares in manufacturing					V.A./employment		V.A./Gross output		Wage bill/ V.A.	
	Employment 91/74	Production 91/74	1974	1991	91-74	1974	1991	91-74	(i)	1974	1991	1974	1991
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(k)	(l)	(m)	(n)
300 Total manufacturing	3.05	NA	100.0	100.0	0.0	100.0	100.0	0.0	100	0.36	0.36	0.16	0.12
311 Food prod.	3.37	1.66	12.4	13.7	1.3	9.8	7.1	-2.7	79	0.25	0.27	0.17	0.16
313 Beverages	0.34	4.24	11.5	1.3	-10.2	34.1	3.9	-30.2	296	0.74	0.77	0.11	0.06
314 Tobacco	28.32	1.69	0.2	1.4	1.3	0.0	4.9	4.9	7	0.48	0.83	0.45	0.08
321 Textiles	1.61	3.63	32.8	17.3	-15.5	14.9	5.3	-9.7	46	0.45	0.38	0.23	0.26
322 Wearing apparel	56.68	NA	0.8	14.2	13.5	0.1	8.7	8.5	16	0.26	0.51	0.39	0.21
323 Leather prod.	7.44	NA	0.3	0.8	0.5	0.1	1.6	1.5	24	0.42	0.51	0.84	0.05
324 Footwear	211.00	NA	0.1	4.0	3.9	0.0	0.8	0.7	13	0.50	0.46	0.43	0.39
331 Wood prod.	1.26	2.27	6.4	2.6	-3.7	2.6	1.0	-1.5	40	0.45	0.44	0.24	0.20
332 Furniture	6.78	NA	0.8	1.8	1.0	0.2	0.7	0.5	28	0.23	0.51	0.24	0.20
341 Paper and prod.	10.58	3.42	0.3	1.1	0.8	0.4	0.4	0.0	124	0.32	0.28	0.15	0.22
342 Printing and publish.	1.67	NA	3.7	2.0	-1.7	1.7	NA	NA	47	0.39	0.00	0.33	#DIV/0!
351 Industrial chemicals	1.28	3.44	2.8	1.2	-1.6	3.3	2.7	-0.6	117	0.39	0.42	0.14	0.15
352 Other chemicals	1.82	3.13	3.5	2.1	-1.4	2.2	2.1	-0.1	62	0.34	0.34	0.26	0.17
353 Petroleum refineries	0.62	1.80	0.7	0.2	-0.6	10.2	NA	NA	1373	0.14	0.00	0.05	#DIV/0!
354 Misc. petr. & coal pr.	1.00	1.8	0.0	0.0	0.0	0.0	0.0	0.0	56	0.24	0.39	0.36	0.05
355 Rubber prod.	8.33	2.32	1.3	3.4	2.2	1.7	2.7	1.0	137	0.45	0.37	0.12	0.13
356 Plastic prod.	25.24	NA	0.2	1.6	1.4	0.2	0.6	0.3	114	0.34	0.47	0.10	0.22
361 Pottery, china, earthenware	18.38	NA	0.2	1.1	1.0	0.0	0.5	0.5	12	0.38	0.61	0.56	0.17
362 Glass & prod.	1.42	NA	2.4	1.1	-1.3	1.7	1.1	-0.6	72	0.46	0.61	0.34	0.16
369 Oth. non-met. min. pr.	3.92	4.90	3.1	3.9	0.9	1.5	5.9	4.4	49	0.38	0.47	0.39	0.13
371 Iron & steel	25.18	4.07	0.3	2.2	1.9	0.0	3.0	3.0	16	0.23	0.35	0.54	0.11
372 Non-ferrous met.	10.35	0.7	0.2	0.8	0.5	0.2	0.8	0.6	71	0.26	0.19	0.11	0.23
381 Fabricated met. pr.	1.59	5.33	7.8	4.1	-3.7	9.1	2.8	-6.3	117	0.37	0.49	0.20	0.16
382 Machinery	6.81	NA	1.7	3.7	2.0	0.9	17.9	17.0	56	0.29	0.67	0.20	0.03
383 Machinery electric	4.00	6.42	3.5	4.6	1.1	1.6	12.2	10.6	46	0.27	0.55	0.31	0.07
384 Transport equipment	5.81	10.39	2.6	4.9	2.3	3.2	10.3	7.1	125	0.24	0.67	0.21	0.08
385 Profes. & scien. equip.	29.55	NA	0.1	0.7	0.6	0.0	0.3	0.3	14	0.47	0.56	0.31	0.21
390 Oth. manufact. prod.	31.37	NA	0.4	4.1	3.7	0.1	2.7	2.6	19	0.37	0.50	0.24	0.14

Source: INDSTAT3 databank, UNIDO.

Annex 1 (d)
Industrial data summary for Indonesia

Industries	Growth		Industries shares in manufacturing				V.A./employment		V.A/Gross output		Wage bill/ V.A.	
	Employment 92/73	Production 92/73	1973	1992	92-73	Value-added 1973 1992 92-73	1973	1992	1973	1992	1973	1992
	(a)	(b)	(c)	(d)	(e)	(f) (g) (h)	(i)	(j)	(k)	(l)	(m)	(n)
300 Total manufacturing	4.59	NA	100.0	100.0	0.0	100.0 100.0 0.0	100	100	0.35	0.30	0.21	0.19
311 Food prod.	3.41	5.26	20.1	14.9	-5.2	24.8 10.9 -13.9	124	73	0.31	0.23	0.21	0.26
313 Beverages	3.35	2.39	0.7	0.5	-0.2	1.8 0.6 -1.2	248	117	0.47	0.27	0.19	0.23
314 Tobacco	2.23	3.84	18.7	9.1	-9.6	17.7 11.6 -6.1	94	127	0.38	0.35	0.10	0.09
321 Textiles	2.97	3.78	28.8	18.6	-10.2	26.0 12.1 -13.8	90	65	0.35	0.29	0.21	0.18
322 Wearing apparel	99.53	NA	0.2	4.5	4.3	0.1 2.1 2.1	45	47	0.53	0.32	0.31	0.36
323 Leather prod.	4.30	NA	0.3	0.2	0.0	0.2 0.2 -0.1	83	64	0.19	0.19	0.23	0.28
324 Footwear	11.25	7.09	0.6	1.6	0.9	0.6 1.1 0.5	94	67	0.51	0.48	0.22	0.24
331 Wood prod.	15.67	19.47	3.6	12.3	8.7	2.7 10.0 7.3	75	81	0.35	0.33	0.29	0.21
332 Furniture	7.37	NA	0.6	0.9	0.3	0.3 0.5 0.2	53	53	0.62	0.46	0.32	0.35
341 Paper and prod.	7.90	5.71	1.2	2.1	0.9	1.2 3.1 2.0	95	150	0.23	0.24	0.38	0.15
342 Printing and publish.	2.95	NA	2.6	1.6	-0.9	0.7 1.6 0.9	28	98	0.49	0.36	0.57	0.40
351 Industrial chemicals	7.82	5.18	0.7	1.2	0.5	1.8 3.1 1.3	252	259	0.45	0.31	0.18	0.23
352 Other chemicals	4.11	3.35	4.8	4.3	-0.5	5.4 4.3 -1.1	113	102	0.41	0.28	0.27	0.30
353 Petroleum refineries	NA	2.36	NA	NA	NA	NA NA NA	NA	NA	NA	NA	NA	NA
354 Misc. petr. & coal pr.	NA	NA	NA	NA	NA	NA NA NA	NA	NA	NA	NA	NA	NA
355 Rubber prod.	28.41	13.79	1.1	7.0	5.9	1.4 5.3 3.9	121	76	0.24	0.28	0.29	0.23
356 Plastic prod.	10.04	NA	1.2	2.7	1.5	0.4 1.5 1.1	32	54	0.38	0.18	0.35	0.33
361 Pottery, china, earthenware	13.25	NA	0.2	0.7	0.4	0.2 0.4 0.2	75	57	0.48	0.38	0.32	0.36
362 Glass & prod.	NA	20.86	3.5	3.0	-0.5	2.6 1.9 -0.7	73	63	0.44	0.27	0.30	0.22
369 Oth. non-met. min. pr.	3.93	NA	NA	0.8	NA	NA 9.0 NA	NA	1064	NA	0.44	NA	0.06
371* Iron & steel	NA	94.80	NA	0.8	NA	NA 9.0 NA	NA	1064	NA	0.44	NA	0.06
372 Non-ferrous met.	3.74	7.09	3.6	2.9	-0.7	3.6 5.5 1.9	100	185	0.35	0.31	0.22	0.17
381 Fabricated met. pr.	2.70	NA	1.3	0.8	-0.5	1.3 1.0 -0.3	99	132	0.53	0.32	0.28	0.28
382 Machinery	3.63	10.36	2.6	2.0	-0.5	2.9 2.5 -0.4	114	126	0.40	0.21	0.21	0.26
383 Machinery electric	14.28	3.66	2.2	6.7	4.6	3.4 10.6 7.2	159	158	0.35	0.32	0.26	0.18
384 Transport equipment	28.99	NA	0.0	0.1	0.1	0.0 0.1 0.1	31	48	0.40	0.22	0.50	0.47
385 Profes. & scien. equip.	NA	NA	0.7	0.8	0.1	0.3 0.5 0.2	44	60	0.49	0.32	0.30	0.32
390 Oth. manufact. prod.	5.60	NA	0.7	0.8	0.1	0.3 0.5 0.2	44	60	0.49	0.32	0.30	0.32

Source: INDSTAT3 databank, UNIDO.

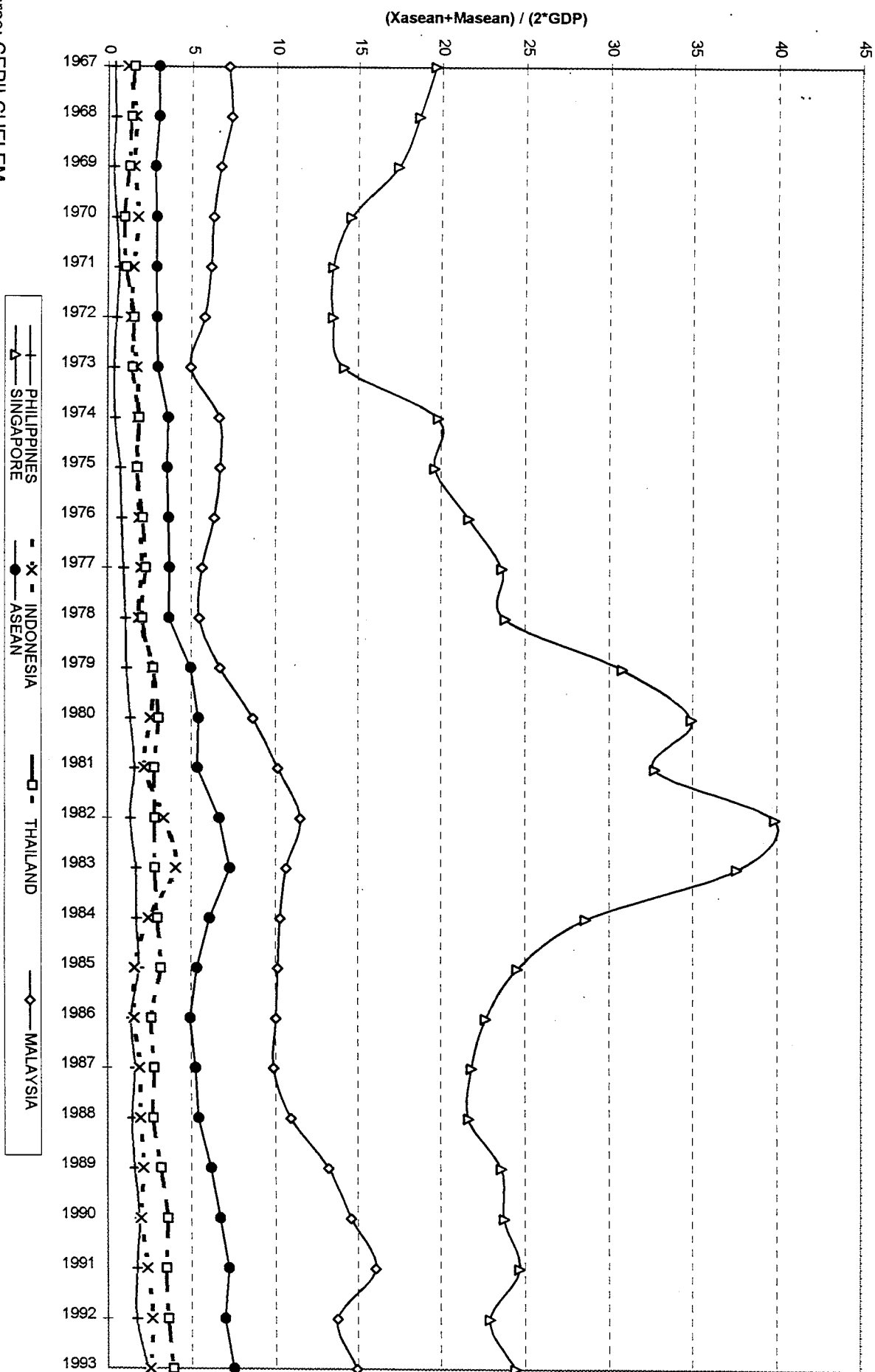
Note: 371* =371+372; 361* =361+362

Industries (ISIC 3 digits)	Growth		Industries shares in manufacturing					V.A./employment		V.A./Gross output		Wage bill/ V.A.		
	Employment	Production	Employment			Value-added		(manuf average =100)						
	92/73	92/73	1973	1992	92-73	1973	1992	92-73	1973	1992	1973	1992	1973	1992
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)
300 Total manufacturing	1.88	NA	100.0	100.0	0.0	100.0	100.0	0.0	100	100	0.36	0.33	0.19	0.26
311 Food prod.	1.50	6.62	21.3	16.9	-4.3	27.0	18.1	-8.9	127	107	0.33	0.27	0.14	0.26
313 Beverages	1.82	17.12	3.4	3.3	-0.1	5.7	13.5	7.8	169	411	0.51	0.58	0.17	0.11
314 Tobacco	0.60	5.31	4.3	1.4	-2.9	4.8	4.9	0.0	113	353	0.36	0.51	0.15	0.06
321 Textiles	1.18	5.37	16.2	10.2	-6.0	8.5	4.1	-4.4	53	40	0.36	0.30	0.28	0.45
322 Wearing apparel	7.29	22.59	5.6	21.8	16.2	1.1	8.5	7.4	20	39	0.44	0.50	0.46	0.50
323 Leather prod.	4.41	5.04	0.4	0.9	0.5	0.2	0.3	0.1	40	30	0.32	0.51	0.33	0.59
324 Footwear	1.53	22.59	1.2	1.0	-0.2	0.2	0.2	0.0	16	22	0.38	0.43	0.55	0.46
331 Wood prod.	1.11	3.71	9.0	5.3	-3.7	4.7	3.3	-1.4	52	62	0.43	0.38	0.29	0.37
332 Furniture	4.69	7.45	1.9	4.8	2.9	0.5	1.2	0.7	27	25	0.41	0.40	0.48	0.56
341 Paper and prod.	1.31	4.26	2.3	1.6	-0.7	2.9	1.6	-1.2	124	101	0.30	0.31	0.20	0.20
342 Printing and publish.	1.33	7.56	3.1	2.2	-0.9	1.9	1.5	-0.4	62	68	0.43	0.37	0.32	0.44
351 Industrial chemicals	1.33	4.91	1.5	1.1	-0.4	4.8	2.7	-2.1	322	255	0.40	0.27	0.10	0.18
352 Other chemicals	1.60	4.91	3.9	3.4	-0.6	7.1	9.1	2.0	181	271	0.41	0.37	0.21	0.22
353 Petroleum refineries	3.12	NA	0.2	0.3	0.1	7.2	5.5	-1.7	3743	1721	0.33	0.19	0.02	0.05
354 Misc. petr. & coal pr.	3.19	4.71	0.0	0.1	0.0	0.2	0.0	-0.1	442	71	0.25	0.20	0.05	0.24
355 Rubber prod.	2.30	6.80	2.4	3.0	0.5	1.9	2.0	0.1	79	68	0.38	0.39	0.23	0.37
356 Plastic prod.	2.07	NA	2.0	2.2	0.2	1.0	0.9	-0.1	51	43	0.33	0.24	0.30	0.34
361 Pottery, china, earthenware	3.06	6.68	0.3	0.5	0.2	0.2	0.4	0.2	64	80	0.55	0.56	0.32	0.43
362 Glass & prod.	0.96	6.68	1.3	0.7	-0.7	1.6	1.5	-0.1	122	217	0.53	0.58	0.21	0.33
369 Oth.non-met. min.pr.	0.99	6.68	3.5	1.8	-1.7	2.8	3.3	0.5	81	178	0.44	0.42	0.23	0.19
371 Iron & steel	1.38	NA	2.5	1.8	-0.7	4.3	2.5	-1.8	173	136	0.29	0.20	0.13	0.23
372 Non-ferrous met.	1.22	NA	0.5	0.3	-0.2	0.8	0.9	0.1	151	254	0.36	0.14	0.20	0.10
381 Fabricated met. pr.	1.19	39.06	4.0	2.6	-1.5	3.2	1.8	-1.4	81	72	0.32	0.31	0.25	0.35
382 Machinery	1.72	6.26	2.1	1.9	-0.2	1.4	1.1	-0.3	68	57	0.48	0.28	0.31	0.52
383Machinery electric	3.71	19.40	3.3	6.5	3.2	2.8	7.0	4.2	84	107	0.38	0.29	0.26	0.31
384 Transport equipment	1.19	33.54	2.6	1.7	-1.0	2.7	3.0	0.3	102	180	0.26	0.25	0.23	0.17
385 Profes.& scien. equip.	5.50	NA	0.2	0.6	0.4	0.1	0.2	0.1	47	34	0.48	0.49	0.30	0.48
390 Oth.manufact.prod.	4.79	10.35	0.9	2.2	1.3	0.3	0.6	0.3	40	29	0.44	0.34	0.33	0.54

Source: INDSTAT3 databank, UNIDO.

ANNEX 2.1

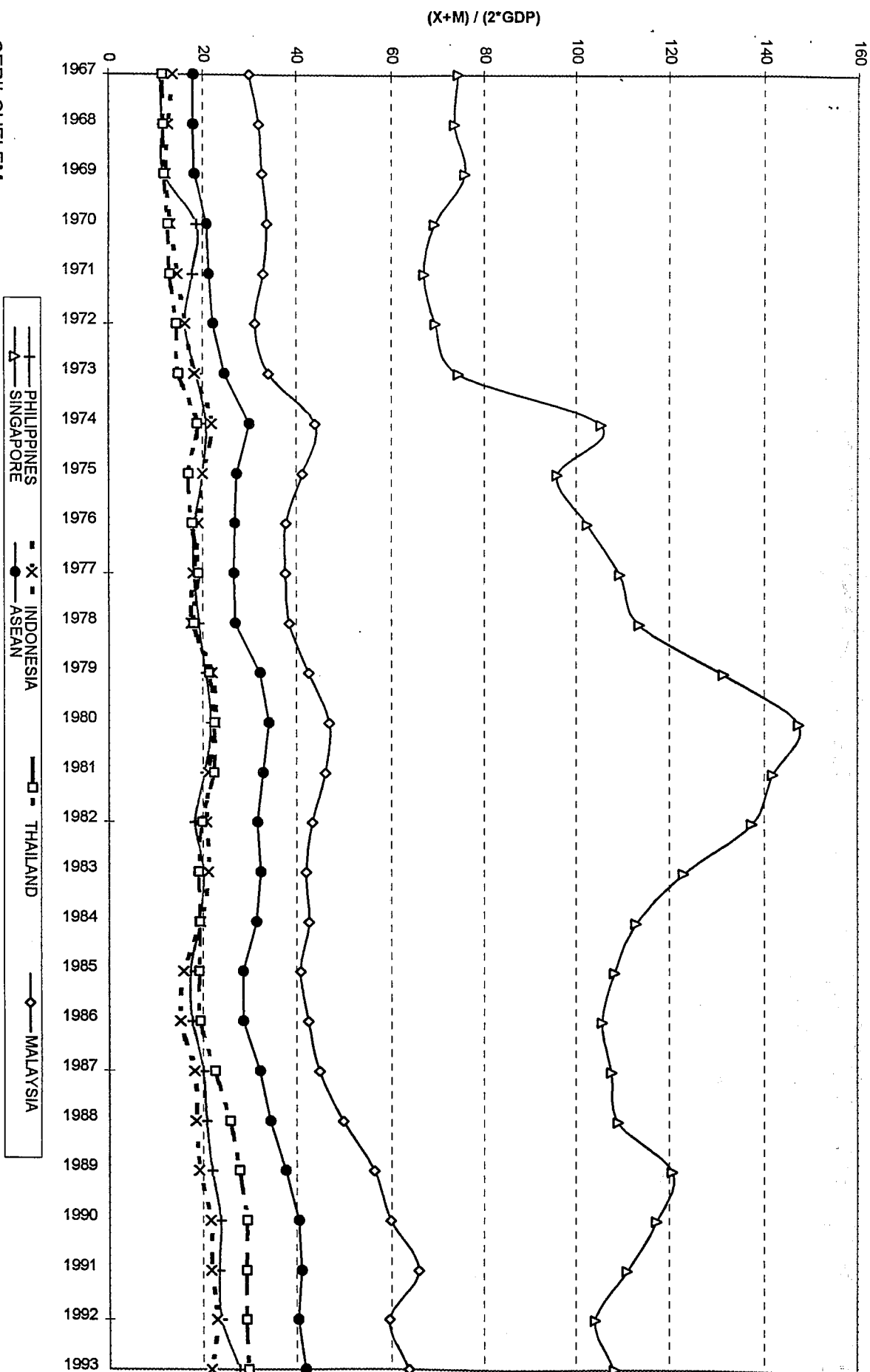
Degree of openness with regards to ASEAN, 1967-1993



Source: CEPIL-CHELEM

Annex 2.2

Degree of openness, 1967-1993



Annex 2.3
Detailed sectoral composition of intra-ASEAN trade

63

	1973	1979	1987	1993
Textile and clothing	4.73	1.71	2.68	6.43
Yarns fabri.	2.76	0.29	0.52	2.21
Clothing	0.54	0.77	1.13	1.05
Knitwear	0.12	0.08	0.30	0.19
Carpets	0.94	0.39	0.50	1.06
Leather	0.36	0.18	0.23	0.92
Electrical materials	3.70	10.91	20.44	40.14
Elec.compon.	0.07	7.70	8.36	10.97
Consum.elec.	0.25	0.85	2.50	1.14
Telecom.equ.	0.25	0.48	1.82	7.55
Comput. equ.	0.24	0.14	3.64	10.38
Dom.elec.ap.	0.09	0.18	0.28	0.49
Elect.equipm	0.27	0.34	1.41	3.28
Elect.app.	2.53	1.23	2.43	6.34
Other manufacturing	21.81	18.74	26.81	26.74
Cement	1.83	0.68	0.24	0.22
Ceramics	0.37	0.18	0.27	0.39
Glass	0.30	0.21	0.42	0.30
Iron steel	0.48	0.36	0.73	0.97
Tubes	0.41	0.42	0.30	0.29
N.fer.metals	0.81	2.02	2.20	0.85
Articl.Wood	0.66	0.41	1.35	0.38
Furniture	0.22	0.10	0.21	0.51
Paper	1.03	0.41	1.41	1.58
Printing	0.39	0.28	0.28	0.38
Misc.man	0.44	0.41	0.71	1.37
Metal.struct	0.95	0.42	0.32	0.58
Msc.hardware	1.86	1.43	1.74	2.74
Engines	0.84	0.58	0.62	0.99
Agri.equipm.	0.23	0.03	0.02	0.02
Mach. tools	0.33	0.20	0.30	0.32
Const.equipm	1.17	0.79	0.73	0.36
Spec.mach.	0.86	0.40	0.77	0.48
Arms	0.11	0.09	0.23	0.01
Precis.instr	0.22	0.24	0.54	0.38
Clockmaking	0.10	0.36	0.11	0.19
Optics	0.09	0.08	0.18	0.57
Vehic.comp.	0.85	0.44	0.29	0.55
Cars	0.85	0.50	0.20	0.67
Comm.vehic.	0.49	0.09	0.11	0.06
Ships	0.30	0.31	0.78	0.62
Aeronautics	0.20	0.30	0.25	0.35
Bas.in.chem.	0.49	0.40	0.78	0.43
Fertilizers	0.59	0.57	0.83	0.41
Bas.or.chem.	0.53	0.72	1.47	1.42
Paints	0.53	0.34	0.80	1.15
Toilet	0.93	3.33	2.98	1.49
Pharm. prod.	0.90	0.43	0.39	0.46
Plastics	0.02	0.06	0.15	0.12
Plastic art.	1.13	0.89	2.65	3.23
Pneu.tires	0.26	0.21	0.34	0.23
Jewels	0.05	0.03	0.08	0.66
Energy and mining	23.49	41.26	34.61	18.78
Iron ores S.	0.04	0.03	0.26	0.16
Non.fer.ores	2.01	0.43	0.30	0.38
Unp.min.nes.	0.65	0.57	0.47	0.66
Coals	0.10	0.07	0.13	0.27
Crude oil	7.62	24.78	16.22	6.24
Natural gas	0.09	0.72	0.38	0.30
Coke	0.00	0.00	0.00	0.00
Ref.pet.pr.	12.98	14.67	14.08	10.05
Man. gas	0.00	0.00	0.00	0.00
Gold non.mon	0.00	0.00	2.67	0.71
Agro-food	44.66	26.88	14.89	8.82
Cereals	7.09	5.29	1.68	0.64
O.ed.agr.pr.	4.16	2.87	2.93	1.56
N.ed.agr.pr.	19.64	10.27	4.86	2.09
Cereal prod.	1.02	0.59	0.44	0.33
Fats	4.56	2.92	1.49	1.50
Meat	1.16	0.74	1.32	0.99
Preserv.meat	0.46	0.26	0.42	0.15
Preserv.veg.	1.72	0.88	0.84	0.72
Sugar	2.16	0.60	0.25	0.34
Animal food	2.24	1.37	0.50	0.24
Beverages	0.28	0.04	0.08	0.10
Man.tobaccos	0.16	0.03	0.08	0.16
NES	1.63	1.51	1.67	1.08
TOTAL	100.00	100.00	100.00	100.00

Note : all figures are percentages of total intra-ASEAN trade.

Source : CEPII-CHELEM.

Annex 2.4
Detailed sectoral composition of imports from ASEAN, by country, 1993

Import zone	PHILIPPINES	INDONESIA	THAILAND	MALAYSIA	SINGAPORE	ASEAN	WORLD
Textile and clothing	3.38	1.55	1.27	3.03	8.95	6.43	11.09
Yarns fabri.	2.40	1.16	0.92	1.19	3.35	2.21	1.98
Clothing	0.29	0.03	0.02	0.37	2.01	1.05	3.29
Knitwear	0.10	0.03	0.01	0.23	0.26	0.19	2.21
Carpets	0.23	0.11	0.06	0.42	1.97	1.06	0.60
Leather	0.35	0.22	0.26	0.82	1.36	0.92	3.01
Electrical materials	20.43	13.51	31.04	44.10	48.51	40.14	34.85
Elec.compon.	4.27	4.06	7.11	14.40	12.75	10.97	8.85
Consum.elec.	0.35	0.26	1.25	0.50	1.66	1.14	4.73
Telecom.equ.	1.77	4.12	4.36	8.86	9.37	7.55	4.08
Comput. equ.	3.84	0.43	10.58	6.43	14.90	10.38	12.24
Dom.elec.ap.	0.16	0.19	0.57	0.41	0.54	0.49	0.63
Elect.equipm	5.50	1.49	3.05	3.38	3.39	3.28	1.25
Elect.app.	4.54	2.98	4.10	10.11	5.91	6.34	3.06
Other manufacturing	31.24	45.29	23.84	25.01	22.29	26.74	21.58
Cement	0.16	0.11	0.02	0.38	0.16	0.22	0.12
Ceramics	0.83	0.61	0.10	0.11	0.49	0.39	0.30
Glass	0.58	0.36	0.23	0.29	0.30	0.30	0.21
Iron steel	0.97	1.00	2.56	0.52	0.62	0.97	0.35
Tubes	0.89	0.64	0.47	0.03	0.23	0.29	0.18
N.fer.metals	0.45	1.21	0.64	0.21	1.25	0.85	0.66
Articl.Wood	0.31	0.06	0.27	0.11	0.59	0.38	3.33
Furniture	0.12	0.05	0.05	0.12	0.93	0.51	1.17
Paper	1.18	1.57	1.33	2.36	1.29	1.58	0.67
Printing	0.24	0.70	0.20	0.42	0.36	0.38	0.26
Misc.man	1.82	1.21	1.30	1.90	1.10	1.37	1.85
Metal.struct	0.37	1.15	0.14	0.38	0.65	0.58	0.25
Msc.hardware	3.11	2.26	3.00	3.87	1.94	2.74	1.45
Engines	0.81	4.26	0.46	0.25	1.06	0.99	0.73
Agri.equipm.	0.01	0.13	0.00	0.01	0.01	0.02	0.01
Mach. tools	0.25	0.74	0.19	0.58	0.17	0.32	0.10
Const.equipm	0.25	2.14	0.04	0.03	0.37	0.36	0.12
Spec.mach.	0.39	2.73	0.21	0.24	0.36	0.48	0.18
Arms	0.00	0.05	0.00	0.02	0.00	0.01	0.01
Precis.instr	0.44	1.22	0.44	0.50	0.15	0.38	0.42
Clockmaking	0.04	0.01	0.02	0.03	0.38	0.19	0.36
Optics	0.04	0.39	0.09	0.17	1.05	0.57	0.59
Vehic.comp.	0.61	0.24	1.32	0.56	0.31	0.55	0.22
Cars	0.10	0.46	0.12	0.23	1.18	0.67	0.51
Comm.vehic.	0.02	0.09	0.04	0.01	0.09	0.06	0.07
Ships	1.59	4.83	0.52	0.08	0.12	0.62	0.26
Aeronautics	0.13	1.31	0.48	0.12	0.26	0.35	0.43
Bas.in.chem.	1.18	1.12	0.37	0.67	0.11	0.43	0.15
Fertilizers	1.55	0.48	1.54	0.14	0.01	0.41	0.22
Bas.or.chem.	3.19	2.77	2.64	1.79	0.39	1.42	1.28
Paints	1.93	3.37	1.49	1.39	0.42	1.15	0.60
Toilet	1.18	2.19	0.53	1.06	1.93	1.49	0.82
Pharm. prod.	1.32	0.27	0.60	0.65	0.20	0.46	0.26
Plastics	0.33	0.91	0.15	0.02	0.02	0.12	0.11
Plastic art.	3.92	4.31	2.18	5.61	2.12	3.23	1.52
Pneu.tires	0.93	0.31	0.11	0.09	0.26	0.23	0.39
Jewels	0.00	0.03	0.01	0.05	1.40	0.66	1.39
Energy and mining	31.60	31.74	33.44	17.20	11.29	18.78	16.71
Iron ores S.	0.00	1.49	0.06	0.09	0.05	0.16	0.15
Non.fer.ores	5.01	0.09	0.11	0.16	0.12	0.38	0.74
Unp.min.nes.	0.48	0.65	0.34	0.52	0.86	0.66	0.26
Coals	0.95	0.00	0.26	0.68	0.02	0.27	0.42
Crude oil	12.67	5.12	13.51	0.00	6.38	6.24	5.00
Natural gas	0.15	0.00	0.00	1.15	0.05	0.30	3.86
Coke	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Ref.pet.pr.	11.93	24.39	18.86	13.80	2.81	10.05	6.08
Man. gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gold non.mon	0.40	0.00	0.30	0.78	0.99	0.71	0.22
Agro-food	8.79	7.75	7.86	8.99	8.95	8.82	14.83
Cereals	2.03	0.18	0.01	1.04	0.52	0.64	0.71
O.ed.agr.pr.	0.53	0.77	0.09	0.84	2.70	1.56	2.07
N.ed.agr.pr.	3.42	0.32	5.71	1.36	1.38	2.09	4.77
Cereal prod.	0.16	0.16	0.04	0.32	0.42	0.33	0.15
Fats	0.91	3.34	0.21	1.48	1.72	1.50	1.94
Meat	0.23	0.07	1.13	1.36	0.98	0.99	2.28
Preserv.meat	0.06	0.04	0.02	0.26	0.15	0.15	0.87
Preserv.veg.	0.76	0.35	0.28	0.86	0.75	0.72	0.84
Sugar	0.08	1.60	0.02	0.71	0.07	0.34	0.59
Animal food	0.19	0.66	0.27	0.43	0.04	0.24	0.35
Beverages	0.07	0.25	0.03	0.06	0.09	0.10	0.15
Man.tobaccos	0.35	0.01	0.05	0.26	0.13	0.16	0.12
NES	4.57	0.15	2.55	1.66	0.00	1.08	0.93
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Note : all figures are percentages of the flows.
Source : CEPII-CHELEM.

Annex 2.5
Detailed sectoral composition of exports to ASEAN, by country, 1993

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Export zone	PHILIPPINES	INDONESIA	THAILAND	MALAYSIA	SINGAPORE	ASEAN	WORLD
Textile and clothing	1.64	24.96	3.60	2.80	1.06	6.43	4.69
Yarns fabri.	0.59	11.65	1.70	0.80	0.06	2.21	2.64
Clothing	0.31	5.41	0.38	0.53	0.08	1.05	0.30
Knitwear	0.01	1.06	0.16	0.02	0.03	0.19	0.09
Carpets	0.17	5.98	0.25	0.15	0.32	1.06	0.45
Leather	0.44	0.85	1.12	1.30	0.57	0.92	1.11
Electrical materials	52.00	8.68	68.94	46.93	40.33	40.14	27.49
Elec.compon.	28.79	0.40	14.12	12.82	11.52	10.97	9.64
Consum.elec.	0.36	0.81	0.27	2.12	0.73	1.14	0.73
Telecom.equ.	2.45	2.80	4.23	11.20	7.79	7.55	4.43
Comput. equ.	14.24	1.97	30.75	9.89	6.98	10.38	4.72
Dom.elec.ap.	0.32	0.05	0.86	0.58	0.47	0.49	0.38
Elect.equipm	2.28	0.54	3.36	3.74	4.12	3.28	2.24
Elect.app.	3.56	2.00	5.35	6.58	8.71	6.34	5.34
Other manufacturing	26.40	32.74	17.96	23.47	28.90	26.74	48.20
Cement	0.08	0.48	0.63	0.06	0.14	0.22	0.23
Ceramics	0.27	0.26	0.55	0.75	0.04	0.39	0.51
Glass	0.37	0.80	0.76	0.20	0.03	0.30	0.29
Iron steel	0.43	2.95	0.21	1.34	0.13	0.97	3.69
Tubes	0.02	0.42	0.26	0.46	0.12	0.29	0.68
N.fer.metals	4.14	2.47	0.21	0.87	0.18	0.85	1.57
Articl.Wood	0.03	2.17	0.16	0.13	0.00	0.38	0.11
Furniture	0.24	0.60	0.23	1.00	0.14	0.51	0.23
Paper	0.23	3.14	0.46	1.27	1.79	1.58	1.43
Printing	0.06	0.02	0.09	0.48	0.57	0.38	0.26
Misc.man	0.56	0.49	1.14	1.02	2.28	1.37	1.77
Metal.struct	0.17	0.67	0.23	0.67	0.64	0.58	0.49
Msc.hardware	1.18	0.96	2.66	2.03	4.42	2.74	3.23
Engines	0.53	0.61	1.27	1.52	0.58	0.99	4.25
Agri.equipm.	0.04	0.00	0.05	0.01	0.01	0.02	0.12
Mach. tools	0.16	0.06	0.33	0.20	0.55	0.32	1.33
Const.equipm	0.15	0.61	0.28	0.29	0.38	0.36	1.62
Spec.mach.	0.66	0.38	0.70	0.73	0.20	0.48	3.64
Arms	0.18	0.00	0.00	0.00	0.01	0.01	0.12
Precis.instr	0.10	0.08	0.19	0.22	0.78	0.38	1.24
Clockmaking	0.03	0.58	0.14	0.24	0.00	0.19	0.51
Optics	0.27	1.95	0.44	0.52	0.15	0.57	0.79
Vehic.comp.	6.26	0.07	0.35	0.26	0.73	0.55	1.69
Cars	0.06	2.08	0.26	0.79	0.19	0.67	2.10
Comm.vehic.	0.00	0.03	0.02	0.14	0.02	0.06	0.80
Ships	0.03	0.67	0.02	0.20	1.31	0.62	1.08
Aeronautics	0.05	0.03	0.03	0.44	0.55	0.35	3.32
Bas.in.chem.	0.92	0.46	0.32	0.18	0.69	0.43	0.66
Fertilizers	5.36	0.82	0.06	0.38	0.06	0.41	0.57
Bas.or.chem.	0.77	0.96	0.71	0.68	2.69	1.42	2.01
Paints	0.24	0.50	0.54	0.49	2.39	1.15	1.10
Toilet	0.57	1.06	0.80	2.50	1.04	1.49	1.39
Pharm. prod.	0.53	0.17	0.43	0.26	0.81	0.46	0.59
Plastics	0.03	0.08	0.28	0.21	0.01	0.12	0.49
Plastic art.	0.52	1.50	2.53	2.49	5.25	3.23	2.66
Pneu.tires	0.15	0.31	0.36	0.37	0.03	0.23	0.37
Jewels	0.03	4.27	0.25	0.03	0.01	0.66	1.26
Energy and mining	4.61	14.22	2.78	15.93	27.39	18.78	11.44
Iron ores S.	0.18	0.01	0.02	0.06	0.39	0.16	0.39
Non.fer.ores	0.37	1.80	0.04	0.13	0.18	0.38	0.24
Unp.min.nes.	0.15	1.64	1.29	0.36	0.37	0.66	0.36
Coals	0.00	1.77	0.01	0.00	0.03	0.27	0.08
Crude oil	0.91	4.04	0.00	12.73	0.00	6.24	5.27
Natural gas	0.51	0.16	0.02	0.02	0.74	0.30	0.13
Coke	0.00	0.00	0.00	0.00	0.01	0.00	0.02
Ref.pet.pr.	1.17	1.69	1.36	2.62	25.02	10.05	3.73
Man. gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gold non.mon	1.23	3.12	0.03	0.01	0.64	0.71	1.22
Agro-food	9.21	17.68	14.47	10.16	2.07	8.82	6.26
Cereals	0.06	0.13	4.82	0.01	0.00	0.64	0.62
O.ed.agr.pr.	1.14	3.59	1.35	2.43	0.03	1.56	1.05
N.ed.agr.pr.	1.88	4.93	1.50	3.13	0.20	2.09	1.40
Cereal prod.	0.42	0.10	0.55	0.52	0.15	0.33	0.17
Fats	2.94	2.93	0.13	2.44	0.44	1.50	0.79
Meat	0.13	4.02	2.18	0.36	0.01	0.99	0.57
Preserv.meat	0.20	0.23	0.57	0.11	0.00	0.15	0.09
Preserv.veg.	1.41	0.31	1.06	0.85	0.61	0.72	0.50
Sugar	0.74	0.14	2.00	0.10	0.02	0.34	0.13
Animal food	0.12	0.18	0.22	0.10	0.43	0.24	0.50
Beverages	0.12	0.29	0.08	0.04	0.09	0.10	0.22
Man.tobaccos	0.04	0.74	0.01	0.06	0.09	0.16	0.21
NES	7.35	1.93	2.26	0.71	0.26	1.08	2.03
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Note : all figures are percentages of the flows.
Source : CEPII-CHELEM.

Annex 3.1. Industrial statistics

Industrial statistics come from the United Nations Industrial Development Organisation (UNIDO) databank¹ INDSTAT3. This provides, in the International Standard Industrial Classification with 3 digits, information on value added, output, average number of employees, index of production, wage bill² ... These figures may differ from those given by other sources, mainly for three reasons :

- Industrial census data do not include the activities of firms or enterprises with fewer than a certain number of employees. Ideally this number is five, but it varies across countries and branches.
- Industrial census data include the receipts for and exclude the costs of related non-industrial activities. In the value-added data of national accounts, non-industrial activities are not considered.
- Industrial census data do not include unpaid family workers or own account workers. This point, and more generally the exclusion of small firms noted above, may explain why employment data from INDSTAT3 differ importantly from the figures of the International Labour Office's *Yearbook of Labour Statistics*.

Nevertheless, this databank provides very valuable information; it is standardised both in its methodology and in sectoral classification, and covers a relatively long period (data are available from 1973 for ASEAN).

¹ These data are partly described in the Industry and Development Global Report (UNIDO, annual), and further information can be found in *International Recommendations for Industrial Statistics* (Statistical Papers, Series M, No. 48, Rev.1, United Nations Publications).

² All values are in current dollars.

Annex 3.2. Direct and total labour content of production

The total labour content of production in a given industry includes not only the employment directly used, but also that one embodied in the production of intermediate consumption. This, in turn, includes the labour embodied in its intermediate consumption, and so on. The technical coefficient matrix A describes these relations, as it gives, for each industry, the value of intermediate consumption, broken-down by industry of origin. The (i,j) element of matrix A indicates the value (in dollars) of output from industry i used as intermediate consumption in the production of one dollar's output in industry j .

The total labour content of production is then drawn from the direct labour content by the following calculation:³

$$T = [(I - A)^{-1}]^t . D$$

where T is the industries' total labour content vector
 D is the industries' direct labour content vector
 A is the technical coefficient matrix
 I is the unity matrix
 t indicates transposition

This calculation requires data from input-output tables and on employment and production. Data need to cover the whole economy, with the same classification. We chose a classification as disaggregated as possible having regard to the data available. The manufacturing sector was broken-down in the 3 digit ISIC classification, with a few sectors aggregated. For the rest of the economy, we had to use the 1 digit ISIC. We finally have 29 industries, including 21 manufacturing industries.

The first problem was to obtain, with the same classification, data on the direct labour content of production, i.e. for each industry the ratio of production to employment. For the whole economy, we had to start from the *Statistical Yearbook for Asia and Pacific* (United Nations, annual). It provides, at the 1 digit ISIC level, data on value added at current prices and employment for 1992. The production level was derived from value added assuming that, for each industry, the ratio of value added to output was equal to its value in the input-output table of Malaysia. The discrepancy between the two sources may be significant, given the differences noted above. For the detailed (3 digit) manufacturing industries, data on production and employment was directly available from the INDSTAT3 databank, which allows the calculation of the average direct labour content of production. We then made a proportional adjustment of the data on the direct content in manufacturing industries, in order to ensure that the average labour content in total manufacturing corresponded to that given by the United Nations. Finally, in manufacturing, the average level of labour content is drawn from the *Statistical Yearbook for Asia and Pacific*, and the detailed structure from the INDSTAT3 databank.

³ Cf. for instance Husson M., "Le contenu en emploi de la demande finale", *La Revue de l'IREs*, n°14, winter 1994.

We used the *International Input-Output Tables Malaysia-Japan 1985* (Institute of Developing Economies, Tokyo), with 61 industries, as a basis for the technical coefficients matrix. Taking Malaysia as a basis is acceptable with regards to the quality of its data and to its intermediate income level in relation to the rest of ASEAN. This table was aggregated in our 1/3 digit classification, and then each column was divided by the industry's production, in order to obtain the technical coefficients matrix for Malaysia. For the four other countries we started from more aggregated tables : 7 sectors for Indonesia, Singapore and Thailand, 10 sectors for Philippines. These tables gave the general structure of the technical coefficients matrix for each country. The detailed structure (in our 1/3 digit classification) within each industry was assumed to be identical to that in Malaysia. All these tables allowed domestic intermediate consumptions to be specifically measured, apart from imported intermediate consumption.

Annex 3.3

Direct and total employment content per 1 M US\$ production in ASEAN countries, 1992

Industries, ISIC 1 or 3 digits	Direct employment for a production of 1M US\$					Direct + indirect employment for a production of 1M US\$					(direct + indirect) / direct employment				
	Singapore	Malaysia	Thailand	Philippines	Indonesia	Singapore	Malaysia	Thailand	Philippines	Indonesia	Singapore	Malaysia	Thailand	Philippines	Indonesia
100 Agriculture, forestry, fishing	22	205	951	690	1'472	31	229	1'159	825	1'628	1.4	1.1	1.2	1.2	1.1
200 Mining, quarrying	9	6	23	134	33	12	10	68	202	53	1.3	1.7	2.9	1.5	1.6
311 Food prod.	14	15	66	49	104	24	102	733	733	1'239	1.7	7.0	11.1	14.8	12.0
313 Beverages	11	15	32	28	74	18	36	124	102	180	1.6	2.4	3.8	3.7	2.4
314 Tobacco	5	15	30	28	90	8	24	69	68	157	1.5	1.6	2.3	2.4	1.8
321 Textiles	23	39	157	146	147	37	77	296	300	291	1.6	2.0	1.9	2.1	2.0
322+323+324 Wearing, leather, footwear	38	85	110	258	211	49	113	193	339	291	1.3	1.3	1.8	1.3	1.4
331 Wood prod.	19	54	140	122	134	25	185	1'391	866	2'347	1.3	3.4	9.9	7.1	17.5
332 Furniture	32	88	159	316	279	43	165	770	849	1'067	1.4	1.9	4.8	2.7	3.8
341+342 Paper and printing	20	39	7	81	70	27	60	41	162	129	1.3	1.5	6.2	2.0	1.8
351 Industrial chemicals	5	6	24	21	39	10	29	96	159	159	2.1	4.7	4.1	7.6	4.1
352 Other chemicals	6	18	42	27	90	15	46	134	203	217	2.3	2.5	3.2	7.5	2.4
353+354 Petroleum refineries and products	1	2	1	3	NA	2	7	15	16	NA	2.1	4.8	10.1	6.2	NA
355 Rubber prod.	21	35	60	112	122	27	121	794	666	1'424	1.3	3.5	13.3	6.0	11.6
356 Plastic prod.	26	54	174	111	107	32	76	223	232	181	1.2	1.4	1.3	2.1	1.7
361+362 Pottery and glass & prod.	14	57	106	71	121	19	93	310	215	479	1.4	1.6	2.9	3.0	4.0
369 Oth.non-met. min.pr.	10	29	39	46	141	15	51	99	143	260	1.5	1.7	2.5	3.1	1.8
371+372 Basic metal	9	12	28	22	13	13	28	93	138	186	1.4	2.5	3.3	6.1	13.9
381 Fabricated met. pr.	18	27	88	86	55	24	47	147	177	147	1.3	1.7	1.7	2.1	2.7
382 Machinery	18	21	17	98	80	25	45	96	213	208	1.4	2.1	5.5	2.2	2.6
383Machinery electric	11	25	26	53	55	15	42	57	123	109	1.4	1.7	2.2	2.3	2.0
384 Transport equipment	19	18	40	27	67	24	26	72	102	102	1.2	1.5	1.8	3.7	1.5
385+390 Oth.manufact.prod., including scien. equip.	22	53	101	239	172	29	76	161	367	257	1.3	1.4	1.6	1.5	1.5
400 Electricity, gas, water	3	17	21	33	37	8	37	38	97	152	2.3	2.2	1.8	2.9	4.2
500 Construction	11	55	48	133	106	18	92	231	281	447	1.6	1.7	4.8	2.1	4.2
600 Trade, restaurants and hotels	18	122	104	302	412	27	148	152	438	493	1.5	1.2	1.5	1.5	1.2
700 Transport, storage, communication	10	47	104	250	205	16	61	152	310	255	1.6	1.3	1.5	1.2	1.2
800 Financing, insurance, real estate, business services	9	38	104	202	51	14	50	152	242	102	1.6	1.3	1.5	1.2	2.0
900 Community, social, and pers. services	39	134	104	280	525	46	153	152	350	651	1.2	1.1	1.5	1.3	1.2
Total	13	67	159	228	362	23	96	343	387	601	1.8	1.4	2.2	1.7	1.7

Sources : International Input-output Tables 1985 (Singapore-Japan, Malaysia-Japan, Thailand-Japan, Indonesia-Japan, Philippines-Japan),

Institute for Developing Economies ; Yearbook of Labor Statistics, 1993, 1994, International Labor Organisation ; Statistical Yearbook for

Asia and the Pacific, 1994, United Nations.

Calculations from the authors.

Note : industries 600, 700, 800 and 900 are aggregated in the case of Thailand.

Annex 3.4

Non primary direct and total employment content per 1 M US\$ production in ASEAN countries, 1992

Industries, ISIC 1 or 3 digits	Direct employment for a production of 1M US\$					Direct + indirect employment for a production of 1M US\$					(direct + indirect) / direct employment				
	Singapore	Malaysia	Thailand	Philippines	Indonesia	Singapore	Malaysia	Thailand	Philippines	Indonesia	Singapore	Malaysia	Thailand	Philippines	Indonesia
100 Agriculture, forestry, fishing	0	0	0	0	0	7	10	26	31	23					
200 Mining, quarrying	0	0	0	0	0	3	4	29	41	11					
311 Food prod.	14	15	66	46	104	24	47	129	113	212	1.6	3.2	2.0	2.5	2.0
313 Beverages	11	15	32	26	74	17	31	62	49	112	1.6	2.0	1.9	1.9	1.5
314 Tobacco	5	15	30	26	90	8	22	40	37	107	1.5	1.4	1.4	1.4	1.2
321 Textiles	23	39	157	136	147	37	73	252	226	229	1.6	1.9	1.6	1.7	1.6
322+323+324 Wearing, leather, footwear	38	85	110	239	211	49	111	176	301	274	1.3	1.3	1.6	1.3	1.3
331 Wood prod.	19	54	140	113	134	23	74	192	184	204	1.2	1.4	1.4	1.6	1.5
332 Furniture	32	88	159	293	279	43	121	240	427	355	1.4	1.4	1.5	1.5	1.3
341+342 Paper and printing	20	39	7	75	70	27	58	29	140	117	1.3	1.5	4.5	1.9	1.7
351 Industrial chemicals	5	6	24	20	39	10	24	52	109	92	2.1	4.0	2.2	5.6	2.4
352 Other chemicals	6	18	42	25	90	15	41	83	137	150	2.3	2.3	1.9	5.5	1.7
353+354 Petroleum refineries and products	1	2	1	2	NA	2	5	8	11	23	2.1	3.1	5.6	4.7	NA
355 Rubber prod.	21	35	60	103	122	26	57	103	203	190	1.3	1.6	1.7	2.0	1.6
356 Plastic prod.	26	54	174	103	107	32	75	204	200	158	1.2	1.4	1.2	1.9	1.5
361+362 Pottery and glass & prod.	14	57	106	66	121	19	77	136	124	172	1.4	1.4	1.3	1.9	1.4
369 Oth. non-met. min. pr.	10	29	39	43	141	15	47	62	97	188	1.5	1.6	1.6	2.3	1.3
371+372 Basic metal	9	12	28	21	13	12	22	47	69	54	1.3	1.9	1.6	3.3	4.1
381 Fabricated met. pr.	18	27	88	80	55	24	43	115	143	97	1.3	1.6	1.3	1.8	1.8
382 Machinery	18	21	17	91	80	25	40	45	169	132	1.4	1.9	2.6	1.9	1.7
383 Machinery electric	11	25	26	49	55	15	41	47	105	100	1.4	1.6	1.8	2.1	1.8
384 Transport equipment	19	18	40	25	67	24	24	54	61	84	1.2	1.4	1.4	2.4	1.2
385+390 Oth. manufact. prod., including scien. equip.	22	53	101	221	172	28	73	133	267	224	1.3	1.4	1.3	1.2	1.3
400 Electricity, gas, water	3	17	21	33	37	8	36	34	85	108	2.3	2.1	1.6	2.6	3.0
500 Construction	11	55	48	133	106	18	82	111	210	216	1.6	1.5	2.3	1.6	2.0
600 Trade, restaurants and hotels	18	122	104	302	412	26	141	127	363	460	1.5	1.2	1.3	1.2	1.1
700 Transport, storage, communication	10	47	104	250	205	16	59	127	291	237	1.6	1.2	1.2	1.2	1.2
800 Financing, insurance, real estate, business services	9	38	104	202	51	14	49	127	234	78	1.6	1.3	1.1	1.2	1.5
900 Community, social, and pers. services	39	134	104	280	525	46	151	127	329	576	1.2	1.1	1.2	1.2	1.1
Total	13	46	63	129	160	19	61	92	172	202	1.5	1.3	1.5	1.3	1.3

Sources : International Input-output Tables 1985 (Singapore-Japan, Malaysia-Japan, Thailand-Japan, Indonesia-Japan, Philippines-Japan), Institute for Developing Economies ; Yearbook of Labor Statistics, 1993, 1994, International Labor Organisation ; Statistical Yearbook for Asia and the Pacific, 1994, United Nations.

Calculations from the authors.

Note: direct employment in agriculture, forestry fishing and mining, quarrying is not taken into account; the contents calculated here concern

FLAWS IN 1992

Expressed in percentage of GDP

EXPORTER	IMPORTER	Text-cloth.	Electr. mat.	Other manuf.	Agro-food	Energy-min.	TOTAL
ASEAN ----->	PHILIPPINES	0.05	0.93	0.52	0.19	0.08	1.77
PHILIPPINES ----->	ASEAN	0.09	0.31	0.60	0.20	0.57	1.77
ASEAN ----->	INDONESIA	0.90	0.19	0.73	0.55	0.31	2.67
INDONESIA ----->	ASEAN	0.03	0.23	1.03	0.42	0.95	2.67
ASEAN ----->	THAILAND	0.18	1.85	0.69	0.77	0.10	3.59
THAILAND ----->	ASEAN	0.05	1.09	0.89	0.38	1.17	3.59
ASEAN ----->	MALAYSIA	0.66	5.68	3.09	1.67	2.67	13.78
MALAYSIA ----->	ASEAN	0.60	4.55	4.10	1.50	3.02	13.78
ASEAN ----->	SINGAPORE	0.40	7.04	7.31	0.62	7.58	22.95
SINGAPORE ----->	ASEAN	3.32	9.41	5.01	2.55	2.66	22.95
ASEAN	ASEAN	0.59	2.34	1.83	0.79	1.43	6.97

EXTRAPOLATION TO 2003

from trends between 1988 and 1993. Expressed in percentage of GDP.

EXPORTER	IMPORTER	Text-cloth.	Electr. mat.	Other manuf.	Agro-food	Energy-min.	TOTAL
ASEAN ----->	PHILIPPINES	0.07	1.18	0.83	0.58	0.88	3.54
PHILIPPINES ----->	ASEAN	0.18	1.56	0.89	0.54	0.26	3.43
ASEAN ----->	INDONESIA	2.44	1.34	0.11	0.03	0.01	3.93
INDONESIA ----->	ASEAN	0.25	2.53	0.48	0.61	0.04	3.89
ASEAN ----->	THAILAND	0.02	4.98	0.46	0.27	0.06	5.79
THAILAND ----->	ASEAN	0.04	2.83	1.61	0.91	0.31	5.71
ASEAN ----->	MALAYSIA	0.31	16.24	3.90	0.90	0.69	22.04
MALAYSIA ----->	ASEAN	0.73	16.83	2.57	1.62	0.59	22.33
ASEAN ----->	SINGAPORE	0.29	19.73	4.25	4.12	0.17	28.55
SINGAPORE ----->	ASEAN	5.32	20.42	2.20	0.34	0.30	28.59
ASEAN	ASEAN	0.87	6.77	1.37	0.80	0.26	10.06

Source: CEPII-CHELEM.
Calculations from the authors.