



OESTERREICHISCHE NATIONALBANK
EUROSYSTEM

WORKSHOPS

Proceedings of OeNB Workshops

International Trade & Domestic Growth:
Determinants, Linkages and Challenges

September 27, 2007

Trade and Growth: “South-North” Integration, Outsourcing and Skills

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Introduction

In this paper we shall focus on one particular aspect of growth and international trade: the increasing role which lower- and medium-income economies (the “South”) play in the global economy and the role which “outsourcing” plays in the integration of these economies in international trade flows. We shall refer to the stronger position of the “South” in advanced economies’ markets (the “North”) and also in international production activities more generally as “South-North integration”. Linked to this is the issue of the impact of such integration upon labour markets in both the “North” and the “South”, in particular on the position of different “skill groups” (i.e. which we shall define in this paper as groups of employed persons with different educational attainment levels).

This paper will therefore focus on the role of lower- and medium-income economies in international trade flows, attempt to capture the important phenomenon of “outsourcing” and look at the impact which such trade integration might have on “skill demand”. The paper is structured as follows: section 1 discusses the importance of South-North integration for the recent dynamics of global trade integration; section 2 focuses on the issue of outsourcing and skills, providing a review of the literature in this area and section 3 attempts an empirical assessment of this issue through an analysis of trade statistics concentrating in particular upon the “skill content” of trade flows between “southern” and “northern” economies.

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1. The Phenomenon of South-North Trade Integration

1.1 The Current Era of South-North Integration: an Empirical Assessment

“South-North” integration refers to processes of international economic integration between countries with lower income levels (the “South”) and those with higher income levels (the “North”). Such integration processes have played an important role historically e.g. in the period in which colonial empires were formed and in which the economic relationships between colonial “mother” country and colonies were important characterising features. The “new era” of South-North integration refers to a more recent phase in which relationships between countries of different levels of economic development are again an important feature characterising international economic relationships. Amongst the groups of lower or medium-income economies we shall distinguish further a group which we refer to as “successful catching-up economies” (or SUCCESS in short) and other lower or medium-income economies which encompass a large number of countries but which continue to play a marginal role in global trade and production relations. Let us illustrate this in chart 1 which explores the development of SUCCESS and other lower income economies’ market shares in three “northern” markets: those of the EU-15, of the USA and of Japan.

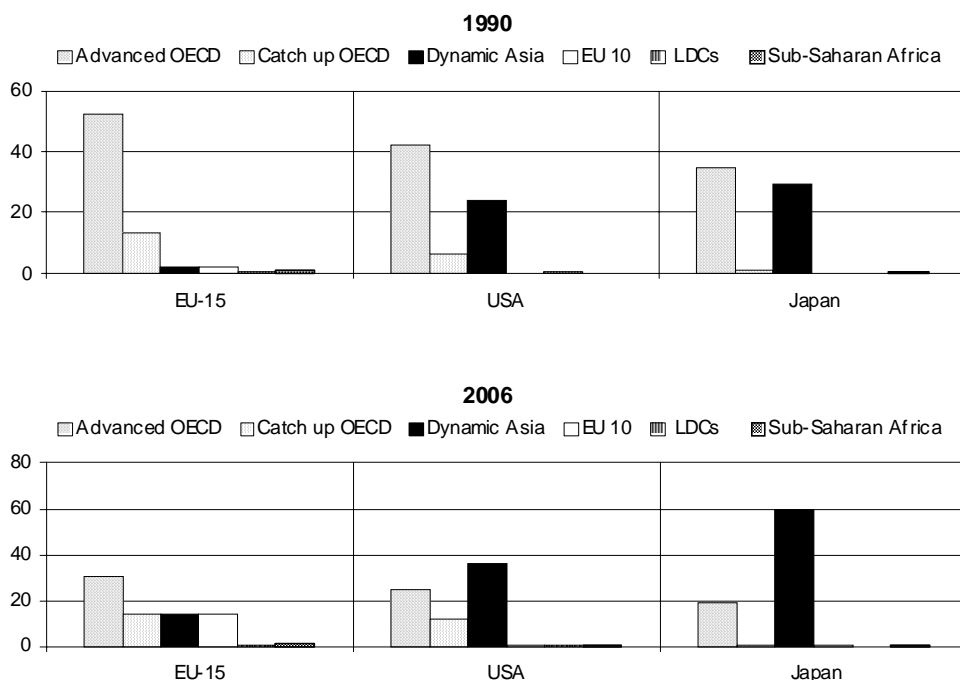
What we can see from chart 1 is that there were substantial changes in market share positions of the SUCCESS economies relative to those of advanced economies. Over the period 1990 to 2006, the market shares in “northern markets” of the SUCCESS economies (Catch-up OECD, EU-10, dynamic Asia) grew dramatically while those of advanced OECD economies declined strongly. There are interesting differences with respect to the three “northern markets” distinguished in chart 1: in the EU-15, three groups of SUCCESS economies were all gaining market shares: the first are the EU-10 which is the group of Central and Eastern European economies which became members of the EU in 2004 or after²; then it is the group of “catching-up OECD economies” which includes the EU southern cohesion countries (Greece, Portugal, Spain) as well as Turkey and, important for the US market, Mexico; finally, it is the group called “dynamic Asia”³. For the EU-15 markets, all the three groups of SUCCESS economies became equally important by 2006, while for the USA and the Japanese market it is “dynamic Asia” which is by far the most important group of SUCCESS economies. For the USA, the group of

² This group consists of the Czech Republic, Hungary, Poland, Slovakia, Slovenia, the three Baltic States (Estonia, Latvia, Lithuania), Bulgaria and Romania.

³ The ‘dynamic Asia’ group comprises Taiwan, Hong Kong, Korea, Singapore; Thailand, Malaysia, Philippines, Indonesia; China and India.

“OECD catching-up economies” also occupies a significant market share position and this is due to Mexico’s role as an important location for “outsourcing activity” following the NAFTA agreement.

Chart 1: Shares in Total Goods Imports in EU-15, USA and Japan – Excluding Intra-Advanced EU-Trade in %



Source: UN Comtrade; authors’ calculations.

Note: Catch-up OECD includes here: Greece, Portugal, Spain, Turkey, Mexico; EU-10 refers to the Central and Eastern European Member States of the EU; Dynamic Asia includes: Hong Kong, Korea, Singapore, Taiwan; Indonesia, Malaysia, Philippines, Thailand; China and India; the LDCs (least developed countries) and Sub-Saharan Africa are UN-defined groupings; in the imports of the EU-15, the intra-advanced EU economies’ trade flows are not included in the aggregate and also not in the advanced OECD trade with the EU-15.

Both for the US and the Japanese markets, the groups of European catching-up economies play no significant role as import suppliers. Hence there is evidence for both “regionalist” as well as “global” economic integration and the predominant dynamic is that of a redistribution of market shares in favour of SUCCESS economies. The – often large – group of countries which have not embarked upon successful catching-up (such as the groups of least developed countries, the LDCs,

and sub-Saharan economies in chart 1) have no significant position in international trade in goods.

Let us summarise the main tendencies emerging from chart 1:

- (i) the strongest dynamic in trade relations currently is the strong increase in market share positions of “successfully catching-up economies” (which we have termed SUCCESS economies);
- (ii) there is quite a strong “regionalist” dimension in international integration processes, i.e. some of the “South-North” integration takes place in a regionally confined setting;
- (iii) there are significant groups of low income economies (we might call them FAILURE economies) which do not feature in this process of South-North integration, i.e. they fail to play any significant role in international trade relations.

What we shall try to analyse in the next two sections are the implications of this significant process of “South-North integration” which we are currently witnessing in the global economy.

1.2 Theoretical Approaches to “South-North Integration”

The current phase of intensified “South-North integration” follows a previous phase after WWII when “North-North integration” was the principal pattern of international economic integration. The strong expansion of “North-North integration” (i.e. trade and FDI linkages between economically and technologically advanced economies) immediately after WWII was rather unexpected as classical trade theory (of the Ricardian and Heckscher-Ohlin varieties) would expect the greatest benefit from trade integration between countries with different levels of economic development. Observing, however, the rapid process of trade integration between advanced economies (mostly in the form of so-called “intra-industry trade”) from the 1970s onwards a range of international economists (pioneers were William Ethier, Paul Krugman, and Elhanan Helpman) attempted to develop the analytical tools with which one could understand the benefits of trade amongst countries at similar levels of economic development⁴. The demonstration of such benefits was based on models which incorporated various features of imperfect competition, product-specific economies of scale and product differentiation. The body of work which emerged from these developments was called “new trade theory”.

⁴ Think of the emphasis put in post-war Europe on the economic integration process amongst advanced West European countries. In fact, the new theoretical developments were usefully employed to analyse the likely impact on the ambitious “Single Market” programme of the European Commission which was implemented in 1992.

However, the new phase of "South-North integration" discussed above, requires again a return to an understanding of processes of international economic integration between countries at different levels of economic development. We shall in the following review shortly the approaches developed in the recent literature on this. Classical trade theory (Ricardo, H-O-S) was based on the idea that there is a certain complementarity between countries which are different from each other either in terms of levels of productivity or know-how or in their relative factor endowments; this complementarity can be exploited through international trade. The principal idea here – analysed in the context of comparative static analysis – was that relative specialisation on different types of industries in different economies would lead to the most efficient use of available resources (in both advanced and less advanced economies) and both advanced and less advanced economies would gain from this.

This idea of complementarity is still valid in the current context of global and regional integration. The notion of specialisation has been extended from simply industrial specialisation to specialisation on production stages and on "tasks" (fragmentation approach) and to segments in the product spectrum (theories of vertical product differentiation and specialisation) and the notion of factor endowment complementarity has been extended by considering a more differentiated array of heterogeneous labour inputs (by skills and educational levels) and types of job executions (using information on detailed occupational structures; see also Grossman and Rossi-Hansberg; 2006). Hence the picture of South-North integration which emerges is that of a much greater scope of production specialisation and production integration across economies with differences in technological know-how, productivity and wage levels as well as the impact which such integration could have on job structures and labour demands in these economies⁵. However, in order to capture the increasing role of SUCCESS economies, it is important to capture the issue of "catching-up" (in productivity and income levels) alongside the issue of international specialisation and integration. In the following we shall refer to the basic features of a model of South-North integration which we have been working on for the past few years and which emphasises the importance of considering patterns of catching-up.

⁵ One should however be aware that straightforward results are only obtained in relatively simple models (like the 2x2x2 Heckscher-Ohlin model). Going beyond this (in particular in extending the model to more countries or factors) shows that results are less clear. Nonetheless, the insights from these simplified models still have their merits and can be fruitfully used to discuss ongoing trends.

1.3. The Gerschenkron Model of South-North Integration

The model which we shall outline in this section emphasises the relationship between "northern" (NEs) and "catching-up southern economies" (CUEs) and has been developed in a number of contributions by Landesmann and Stehrer (see 2001, 2006, 2007, 2008). The model is basically a dynamic Ricardian model looking at the dynamics of relative cost developments as explanations of changing patterns of international specialization between NEs and CUEs⁶. They link their analysis of comparative cost dynamics to hypotheses regarding productivity catching-up on the one hand and wage-price dynamics on the other hand. These hypotheses are tested empirically and they find rather strong econometric support for them (see Landesmann and Stehrer, 2001). The idea is rather simple: just like in the new growth theoretical literature which studies the problem of convergence in income (or productivity levels) between countries of different initial levels of income (or productivity), there is an underlying hypothesis which goes back to Alexander Gerschenkron's famous notion of "the advantage of backwardness" (Gerschenkron, 1952, 1962). The advantage of less developed economies consists of the fact that they can benefit from technology (knowledge) transfer and hence this would be the motor behind a successful catching-up process. To be successful in benefiting from such an "advantage of backwardness" however, they have to possess or develop the mechanisms which allow such a successful technology transfer. Moses Abramovitz speaks here of "absorption capabilities" (Abramovitz, 1986). This mechanism of technology transfer can operate at the level of the economy as a whole and can be rather widely interpreted not only as technology transfer in the narrow sense but also as the (selective and often modified) transfer of institutional and behavioural schemes and policies. In the Landesmann and Stehrer model, the Gerschenkron hypothesis is applied at the industrial rather than the economy-wide level. In this form it means that productivity growth in CUEs could be particularly high in industries which start from a high initial technology (or knowledge and productivity) gap compared to the more advanced economies. The behavioural hypothesis here is that if technology and knowledge gaps are high in particular areas of industrial activity, then the scope for learning (and hence for productivity growth) is also high. This boils down to an empirically testable hypothesis whether productivity growth is strong in those industries where initial productivity gaps are big. It so happens that industries with high initial knowledge (and productivity) gaps are often those which would count as more "high tech" and also more "skill"- and "R&D"- intensive.

⁶ However, the model also includes differences in factor endowments specifically in relation to available labour skills, linking it thus also to HO based arguments. In Landesmann and Stehrer (2008) the model was extended to include the effects of outsourcing on labour markets.

Hence, once the Gerschenkron hypothesis has been empirically tested and supported in the cases of CUEs (for econometric support across a wide range of catching-up economies, see Landesmann and Stehrer, 2001) we obtain the first ingredient of a model with changing comparative cost dynamic. More precisely, it is found that the (relative) productivity (and hence catching-up) dynamic in CUEs is higher in industries with more technology- or skill-content than in industries with lower technology- and skill-content. The faster speed of productivity growth results from both a higher initial gap and a stronger convergence parameter in the medium-/higher-tech sectors. If this is a persistent pattern, then CUEs would lose the comparative disadvantage they originally had in industries in which the initial productivity gaps were very large (i.e. medium- or higher-tech industries). To fully state the argument, however, another component of the model is important: the reason is that if higher productivity gains would simply be absorbed by higher relative labour costs in each industry, then the uneven productivity dynamic would not translate into a changing comparative cost dynamic. Hence another important ingredient is added to the model: wage and price-cost dynamic. In this respect we refer to two empirical findings which characterize dynamic catching-up processes: one is that wage growth is less uneven across industrial branches than is productivity growth (labour economists speak here of a "wage drift" in the sense that wage claims made in one industry have an impact on wage claims in other industries as wage bargaining has an economy-wide dimension) and this means that relative labour unit costs fall more strongly in those industries in which there is relatively fast productivity catching-up. This feature supports the dynamic of changing comparative cost dynamic discussed above.

The other phenomenon which is often registered in catching-up economies is that profitability in those industries which undergo fast productivity catching-up is also higher than in the other industries. The high profitability in the fast catching-up industries results from a particular price-cost dynamic and makes investments into such industries attractive. Hence we observe often in successfully catching-up economies that international investment flows into those industries which benefit from the changing character of the dynamics of comparative advantage (i.e. FDI is directed more into medium- and high-tech industries than into low-tech industries; for an analysis of catching-up processes in Central and Eastern Europe in this respect, see Landesmann and Stehrer, 2002). And since international investment is often the conduit of international technology transfer, it speeds up the above pattern of changing comparative advantage.

The link to labour market dynamics is then easily made in that the industries which undergo the fastest catching-up process (i.e. the more medium- and higher-tech industries) are also the more skill-intensive ones and hence labour demand turns in successfully catching-up (SUCCESS) economies in the direction of a higher skill composition – even without any skill bias of technical change. Depending upon the evolution of skill supplies, there is hence also an argument of

observing a rising skill premium in the catching-up economies⁷; this is also in line with another model which has become a very prominent contribution to the analysis of South-North integration, i.e. the Feenstra-Hanson model (see Feenstra and Hanson, 1996, 1997, 1999, 2001). Empirical analysis (see e.g. EU Skills Study, 2007) strongly confirms this model prediction in that labour demand has shifted in the CUEs strongly in the direction a higher demand for skilled workers (see also Landesmann and Vidovic, 2004, for the case of Central and Eastern European economies). We shall see that the empirical analysis conducted in section 3 of this paper confirms the basic dynamics described by the Gerschenkron model of catching-up and international specialisation. Before moving to the analysis of South-North integration and the insights we can obtain with regard to outsourcing from trade statistics, we shall shortly review the literature on the relationship between outsourcing and labour markets.

2. Outsourcing and Skills: a Short Review of the Literature

2.1 Introduction

The traditional question asked in the literature on outsourcing and labour markets is the impact of outsourcing on income differentiation, either on the income distribution between labour and capital or between different types of labour, in particular, skilled and unskilled labour (both in the tradable sectors). While we shall shortly review this literature, we shall not do so thoroughly as there are already a number of such reviews available (see e.g. Knabe and Koebel, 2006; Morrison-Paul and Siegel, 2001; Feenstra and Hanson, 2001; Geishecker and Goerg, 2004; Stehrer, 2006). An interesting question in this context is whether a change in the supply of skills (through educational or training efforts or a change in migration policy) might affect the outsourcing outcome in relation to the degree and types of outsourcing activities and, in further consequence, competitiveness and labour market outcomes.

The first link (change in the supply of skills and effects on income distribution) is really a question similar to the one addressed in traditional trade theory through the Rybczinski theorem. The second link, to competitiveness, is not really much asked in the theoretical literature but has – to some extent – been addressed in empirical studies.

⁷ In this application we assume that potential shifts of skill intensities which may be due to relative wage changes (e.g. higher relative wages of skilled workers would imply a shift in technique) is not strong enough to counteract this effect.

2.2. Theoretical Aspects

Outsourcing at the international level

Outsourcing and fragmentation are now widely covered also in the theoretical literature. A first line of research is based on traditional trade theory and follows closely the Heckscher-Ohlin model (e.g. Arndt, 1997, 1999, Arndt and Kierzkowski, 2001, Deardorff, 2001). In traditional trade theory with two factors (S for skills and L for labour) and two goods (X as the labour intensive and Y as the skill intensive) trade and specialisation patterns are determined by differences of relative endowments in the two countries. The difference in relative endowments leads to a comparative advantage of the skill abundant country in the skill intensive good. Similarly in the Ricardian type models differences in relative productivity levels determines the structure of comparative advantages. It can then be asked what happens if the production of one or both goods can be fragmented into two parts which can be subcontracted (to other firms in foreign countries). These subcontracted activities can either be products or services. In general these fragments require different factor intensities than the composite good. Thus it could be that the more skill intensive fragment of the labour intensive good X is more skill intensive than good Y or as the more labour intensive fragment of good Y. Thus one has to distinguish several cases (see Arndt, 1997). We shall discuss two of them. Let us first discuss the case of offshore sourcing of the import sector. This import sector is – following the idea of comparative advantages – the labour intensive sector in the skill abundant country. Arndt (1997) shows that offshore subcontracting by the import-competing industry (where it is assumed that the labour intensive component is completely outsourced) raises wages of labour relative to skills. In a second stage one can assume that the labour abundant country outsources the skill intensive component of good X to the skill abundant country in the way that each country fully specializes in one segment. Arndt (1997) shows that in this case relative wages are rising in both countries. The effects on general welfare in the two countries are positive and the results are analogous to the Rybczynski effect of technical change or factor accumulation. These results mean that intra-product specialisation can be trade enhancing and welfare improving.

Deardorff (2001) discusses the effects of outsourcing in a Heckscher-Ohlin model. If factor price equalisation holds, it is shown that outsourcing occurs only if it is costless, but this is an uninteresting case. If factor price equalisation does not hold initially then even costly fragmentation is able to produce the good at lower costs as different factor prices can be exploited. This can even be the case if the fragmentation technology uses more resources than the original. In this framework the introduction of fragmentation may lead to factor price equalisation when it did

not obtain initially (Deardorff, 2001). But it could also be that the effect on factor prices goes in the other direction, i.e. they are driven further apart. The direction of factor prices depends systematically on how the factor proportions of fragments compare to the average factor intensities within the cones where the fragments are produced.

Arndt and Kierzkowski (2001) are showing in a framework with Ricardian and Heckscher-Ohlin features that in general fragmentation of production can lead to a situation in which a country is worse off than before fragmentation; this would be the case if a country's terms of trade sufficiently worsens as a consequence of fragmentation. Under the assumption that prices for both fragments fall it could even be that – even if the country was heavily specialised in the former composite product – the country no longer produces either of the two fragments. Jones and Kierzkowski (1990) illustrates this with an Olympic gold winner in a decathlon. If the event would be broken up into separate components, the athlete would return without a medal. This means that even if a country is an effective competitor for the composite product potential rivals could exist which are superior in particular fragments. When breaking up the composite production into fragments these rivals may be more effective than the former country. As a finer degree of specialisation is possible with fragmentation this allows for a greater scope of Ricardian comparative advantages. Further, if consumption is heavily biased towards the commodity which is fragmented than the consumer may be better off as the lower price for this commodity more than offsets the other welfare effects.

Jones and Kierzkowski (1990) also discuss the role of services starting from two stylised facts: Purely domestic service links are less costly than service links across countries and, second, the production of services is characterized by strong increasing returns to scale. Using these assumptions the most efficient way of the organisation of production depends on the output level. At low output levels it is most efficient to organize production in a single block. However, when a certain threshold is reached, a domestically fragmented pattern of production becomes more efficient, and with even higher levels of output international fragmentation becomes the most efficient. This framework also gives an idea regarding other causes of the rapid rise in fragmentation. Technical progress in services (e.g. internet and communication technologies, international banking transactions and reductions in transport costs) allows (or makes it more efficient) to break up production processes into fragments which can then be internationally outsourced. With respect to income distribution it is shown that fragmented trade with the relatively unskilled labour abundant country induces a fall in the level of real wages of the unskilled workers. In this case, fragmentation for such a country is like technical progress in the capital intensive sector. On the other hand, the relatively capital abundant country experiences an increase in the relative wage rate due to losses of the labour intensive fragments. However, under different assumptions it is shown that the results can be opposite. Several other cases are

discussed in Jones and Kierzkowski (2001). These results on relative wage rates suggest that this topic needs a very subtle discussion and popular views might go wrong.

Other contributions for example rely on the specific factors framework (e.g. Kohler, 2001a and 2001b). In these papers the conclusions are somewhat different from the traditional Heckscher-Ohlin based contributions and are somewhat similar to the one-sector model's outcome: unskilled labour loses in a country where the unskilled-labour intensive fragment is outsourced to a foreign economy. (This is the outcome when associating skilled labour with the sector specific factor and unskilled labour with the mobile factor.)

Outsourcing at the firm level

When analysing outsourcing at the firm level one has to start with the question why firms might be vertically integrated at all. Coase (1937) answered this question in arguing that market transactions are not costless and thus some stages of the production process are vertically integrated in "firms". Starting from this point of view might help to understand why firms start to vertically disintegrate. One reason for vertically integrating the production process within one firm is that specificities in production factors exist (e.g. firm specific human capital, specific equipment, ...). The "theory of vertical integration" thus shows that specific investment is a determinant for vertical integration albeit integration itself is not costless (e.g. monitoring, bureaucratic costs, etc.). Fragmentation then occurs if the degree of factor specificity declines e.g. via emerging up- and downstream firms, making usage of other products in the value chain, etc.

In an international context the contributions by Grossman and Helpman (2002, 2003) and Antràs and Helpman (2004) shed light on determinants of the choice between domestic and foreign outsourcing or foreign direct investment. The determinants for these are market thickness, search costs for outsourcing partners, and characteristics of contracts. This is extended to include productivity differences in a firm's outsourcing decision by Antràs and Helpman (2004). From these contributions it follows that "thicker markets" reduce search costs and thus outsourcing activities are expected to be higher. Similarly, the availability of search and monitoring technologies (like ICT possibilities) might accelerate outsourcing activities. Further, one expects outsourcing to be more relevant in economic environments which are more interconnected.

In a recent contribution Grossman and Rossi-Hansberg (2006) develop a model of "trade in tasks". Falling costs of off-shoring affect factor prices in a country and have productivity effects benefitting the factor whose tasks are off-shored. The effects of an increased trade in tasks are similar to factor-augmenting technical change.

2.3 Empirical Studies on Outsourcing

In this section empirical studies are summarized with respect to patterns of trade flows and international production integration, including the effects on demand for production factors with special emphasis on the demand for skilled and unskilled workers.

There are already many overviews on the patterns of outsourcing (see e.g. Feenstra, 1998; Yeats, 2001; Kleinert, 2003; Stehrer, 2006) and we thus only shortly summarize the most important facts. All studies on outsourcing – despite relying on different measures of outsourcing – indicate that the amount of international outsourcing has increased substantially over the last few decades. However, these studies also point towards large country differences with respect to levels and importance of outsourcing activities. Larger countries tend to have lower outsourcing activities. Similarly, there are quite large country differences with respect to sectoral reliance on imported intermediate inputs (e.g. Irwin, 1996; Fontagné et al., 1997, Campa and Goldberg, 1997; Hummels et al., 1998; Hummels et al., 2001).

Let us now address the question of the effects of outsourcing on employment. The effects of “globalization” on labour markets are heavily disputed. This debate started in the US in the early 1990s when the NAFTA agreement between US, Canada and Mexico came into being. Whereas in the first phase of this debate trade was blamed as a cause for the rising wage differential between skilled and unskilled workers (see Wood, 1995) it was later argued that skill-biased technical change was the main cause for this rising dispersion (Berman, Bound and Griliches, 1994). However, as Feenstra and Hanson (1996) have argued, outsourcing has a qualitatively similar effect on the demand for unskilled relative to skilled labour within an industry as does skill-biased technological change. Here we focus on empirical studies addressing the effects of outsourcing on labour demand patterns. From a theoretical point of view the effects of outsourcing depend very much on the skill intensities of the outsourcing sectors, the skill intensity of the fragments within the outsourcing sector and the underlying model (e.g. one sector model, general equilibrium models or specific factors model) as outlined above.

There are a number of models which can explain the shifts in relative demand for skilled workers. Feenstra and Hanson (1997) present a model in which outsourcing reduces the demand for unskilled labour in both the skill-abundant and the low-skill abundant country. The reason for this is that the outsourced activities are low-skilled labour intensive relative to those done in the skill abundant country, but skilled-labour intensive relative to those done in the low-skill abundant country. Thus moving these types of activities raises the average skill-intensity of production in both countries. In their study Feenstra and Hanson (1999) found that outsourcing accounts for 20% of the shift in relative employment towards skilled

(measured as non-production) workers in US manufacturing. The increased use of computers and other high-technology equipment within industries account for about 30% of this shift. Autor, Katz and Krueger (1998) uses another measure of computer investment and find that computers explain 30% to 50% of the increase in the relative demand for skilled labour; in this study outsourcing is insignificant for the explanation of the rising relative demand. Görg, Hine and Hijzen (2005) follow the approach by Feenstra and Hanson (1999) and concludes that outsourcing has significantly contributed to the rise of wage inequality in the UK; outsourcing however accounts only for about 12% of the increase. These results are similar to the findings in other studies: there is a significant but small effect on wage levels of unskilled workers and inequality. Studies focusing on employment effects come to similar conclusions, i.e. the effect of outsourcing is small. For example, Anderton and Brenton (1999) find significant negative effects on demand for unskilled workers only for imports from low-wage countries for the UK. On the other hand, Machin and van Reenen (1998) do not find a significant effect on skill structures (again for the UK). Finally, there are only a limited number of studies on the effects in target countries. Egger and Stehrer (2003) find significant impact on the wage structure in three Central and Eastern European countries and conclude that low skill intensive fragments are outsourced to Eastern European countries.

3. Outsourcing and Skills: an Empirical Investigation

3.1 Outsourcing Analysis with Trade Statistics

The basic question we shall be asking in this chapter is which parts of the value chain (distinguished in trade statistics as primary inputs, processed inputs, parts and final goods) are particularly affected by international trade integration. Furthermore, we shall be interested whether international trade integration in these various stages of the production chain are characterized by high-, medium- or low-skill content.

The data set used for this analysis is the UN trade statistics. Furthermore Labour Force Survey (LFS) statistics were used to classify industries by skill content (see box 1 for the classification employed).

We shall start by giving an overview of import structures of the EU-27 by stages of fabrication and skill content and we shall then extend the analysis by looking at sub-groups of EU economies: the EU-North (EU-11), the southern cohesion countries (Greece, Portugal, Spain) and the New Member States (NMS). The reason for this decomposition by country groups is to detect different patterns of intra-EU outsourcing between these three groups of EU economies; apart from this we shall analyse outsourcing patterns of EU economies with a number of country groupings at the global level (for this decomposition see box 2 in this section).

Box 1: Classification of Industries by Skill Types

Skill type	NACE code	High skill share		
		1999	2005	
Low	19	4.8	7.8	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
	18	6.3	7.7	Manufacture of wearing apparel; dressing and dyeing of fur
	17	6.9	8.1	Manufacture of textiles
	20	7.5	8.4	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
	37	8.1	10.0	Recycling
	36	9.6	10.8	Manufacture of furniture; manufacturing n.e.c.
Medium	28	10.1	11.7	Manufacture of fabricated metal products, except machinery and equipment
	26	10.3	11.8	Manufacture of other non-metallic mineral products
	15	11.1	12.2	Manufacture of food products and beverages
	25	11.4	13.4	Manufacture of rubber and plastic products
	21	12.6	15.0	Manufacture of pulp, paper and paper products
	27	13.0	13.4	Manufacture of basic metals
	16	15.4	24.9	Manufacture of tobacco products
	34	16.0	19.5	Manufacture of motor vehicles, trailers and semi-trailers
High	29	18.2	20.6	Manufacture of machinery and equipment n.e.c.
	31	20.8	19.8	Manufacture of electrical machinery and apparatus n.e.c.
	22	21.7	26.7	Publishing, printing and reproduction of recorded media
	35	24.9	24.9	Manufacture of other transport equipment
	33	26.1	27.7	Manufacture of medical, precision and optical instruments, watches and clocks
	24	27.8	33.4	Manufacture of chemicals and chemical products
	32	27.8	29.8	Manufacture of radio, television and communication equipment and apparatus
	23	30.5	32.2	Manufacture of coke, refined petroleum products and nuclear fuel
	30	37.2	41.2	Manufacture of office machinery and computers

Shares of industries in EU-27 employment structures and shares of high-skilled employees

	1999		2005	
	High skill share	Empl. share	High skill share	Empl. share
Low	7.49	19.63	9.02	18.54
Medium	11.08	37.17	12.48	38.46
High	22.22	43.20	24.85	42.99

Notes: The industry groupings (high, medium, low) were obtained by ranking the EU-27 industries – in the aggregate – by the shares of high skill employees (those with concluded tertiary degrees) in total employment (see columns 3 and 4 in first table above). The second table shows the shares of the high-skilled in the three groups of industries (columns 2 and 4) and their shares in total manufacturing employment in the EU-27 (columns 3 and 5). Industry 16 (Manufacture of tobacco products) shows a large increase in the share of high skilled worker in a number of countries which might be explained by higher investments in R&D, marketing due to increasing regulations. Despite the large high-skill share in 2005 we decided to keep this industry in the medium group as the number of employed persons is rather low and thus the figures are somewhat unreliable.

For some of the analysis, a more detailed decomposition of industries is employed which differentiates the group of high-skill intensive industries into a "high-medium" group (comprising industries 29, 31, 34 and 35) and the rest which we call "high-high". The employment and high-skill employee shares of these two groups are respectively:

Decomposing the shares of high-skill intensive industries in EU-27 into a "high/medium" and into a "high/high" group:

	1999		2005	
	High skill share	Empl. share	High skill share	Empl. share
High/Medium	18.04	21.18	20.05	21.31
High/High	26.24	22.01	29.56	21.69

Note: The decomposition into these two groups was done by employing a ranking procedure of industries for each EU country by skill-intensity and then taking a cross-country average.

To which extent does the analysis undertaken in this section link up with the debate on the impact of outsourcing on labour markets?

Outsourcing is usually defined by purchases ("sourcing") of inputs from abroad; this could be either done by subsidiaries of companies operating both in the "home" and the "sourcing" country or purchasing inputs from foreign suppliers. Short of direct company information which allows one to distinguish between purchases from subsidiaries and other imports, we shall not be able to distinguish between the two forms of imports. Secondly, limiting oneself to the use of trade

statistics, we shall only be able distinguish between imports of primary and processed inputs as well as parts but not relate these imports to the industries which use these inputs. Rather, we can relate these imports to competing domestic producers of the same types of inputs. The more direct measure of "outsourcing" which would relate the imports to the industries which use these inputs for their production processes would require input-output information which we shall not be using in this analysis. Nonetheless, the analysis will be able to identify the skill content of outsourcing activity and the orders of magnitude in relation to the import-competing domestic industries' production levels.

The first information we shall provide is to check the importance of imports of inputs (primary, processed and parts) in comparison to imports of final stage products. This information is presented in table 1 for the years 1995, 2000 and 2005. We also checked whether the imports of these categories of imports are of the types which can be linked to high-, medium-, and low-skill production activities (see box 1 on how we arrived at a classification of industries by skill intensity; at the end of this section we also use a classification which further subdivides the high-skill group into two groups).

Table 1 shows the following: Of total imports of the EU-27 in 2005, 40% are processed inputs, 21.7% are parts and 36% are final goods imports (a negligible 2.2% are classified as primary – i.e. unprocessed – inputs). Hence if we take processed inputs and parts together, these account for almost 2/3 of total imports of the EU-27 and hence the majority of imports. International production integration (or the international "sourcing" of inputs and parts) is therefore an important phenomenon.

If we look at the skill content of the various import types (primary, processed, parts, final) we can see rather different patterns: given our classification of industries by degrees of skill intensity we see in chart 2 that the supply of Parts falls overwhelmingly into the domain of high-skill intensive industries (96.4% while about 43% of employment is happening in these industries on average in the EU-27 in 2005 – see box 3.1 – and 62.3% of total imports); for Processed Inputs only 37.5% falls into the domain of high-skill industries and 53.5% into that of medium-skill industries and for Primary Products it is only 16% in the high-skill and 80.6% in the medium-skill industries. Hence, amongst the input-supplying imports we have a clear hierarchy with parts production falling almost entirely into the domain of high-skill industries, processed inputs being produced mostly by medium-skill and about one third by high-skill industries and primary inputs mostly by medium-skill industries. In comparison, final goods imports of the EU-27 are also mostly in high skill categories (72% which is still substantially less than in the case of imports of parts), but there is also a significant share in low skill areas (about 20%).

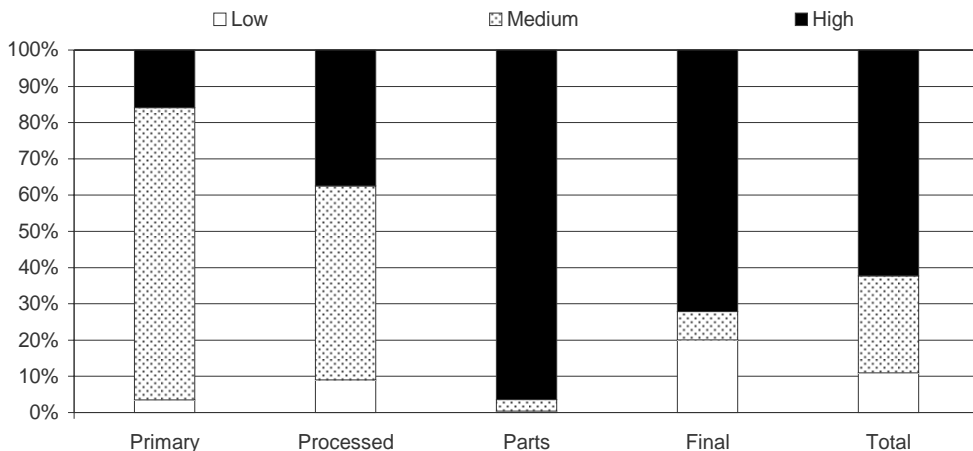
Table 1a: Imports of EU-27 – Shares in Total Imports in %, 1995, 2000, 2005

Year	Industry group	Primary	Processed	Parts	Final	Total
1995	Low	0.1	4.9	0.1	7.6	12.8
	Medium	2.2	26.5	0.8	2.8	32.3
	High	0.8	14.7	19.2	20.1	54.9
	TOTAL	3.1	46.1	20.1	30.6	100.0
2000	Low	0.1	4.4	0.1	7.2	11.7
	Medium	1.7	20.8	0.7	2.7	26.0
	High	1.2	13.9	23.4	23.8	62.3
	TOTAL	3.1	39.1	24.2	33.7	100.0
2005	Low	0.1	3.6	0.1	7.3	11.0
	Medium	1.8	21.4	0.7	2.8	26.7
	High	0.3	15.0	21.0	26.0	62.3
	TOTAL	2.2	40.0	21.7	36.0	100.0

Table 1b: Imports of EU-27 – Change of Shares in Total Imports (pp), 1995–2005, 2000 – 2005

Industry group	Primary	Processed	Parts	Final	Total
			2000-2005		
Low	0.0	-0.5	0.0	-0.5	-1.0
Medium	-0.4	-5.7	-0.1	-0.1	-6.3
High	0.4	-0.8	4.1	3.6	7.4
TOTAL	0.0	-7.1	4.0	3.1	
			1995–2005		
Low	-0.1	-1.3	0.0	-0.4	-1.8
Medium	-0.4	-5.1	-0.1	0.0	-5.6
High	-0.5	0.3	1.7	5.8	7.4
TOTAL	-0.9	-6.1	1.6	5.4	

Source: UN trade statistics; author's calculations.

Chart 2: Skill Composition of Import Categories, EU-27 in 2005

Source: wiiw; calculated from UN trade statistics.

If we look at changes over time, there is evidence that over the period 1995 to 2005 (see table 1b) there has been an increase in the shares of final goods and of parts production in the overall imports bill of the EU-27 and a decline (by 6 percentage points) of processed inputs. Within the supplies of final goods and processed goods there was also a significant increase in the shares of goods produced by high-skill industries (see tables 2a and 2b) and a fall of goods produced by medium- and low-skill industries (in final goods there was a sharper fall of the share of goods produced by low-skill industries, in processed inputs a sharper fall of the share of goods produced by medium-skill industries; parts production falls almost completely into the high-skill category so that there is little scope for further upgrading) given our industry classification.

The next point we want to analyze is where processed inputs and parts are sourced from and what the implicit "skill content" is from the different suppliers.

We shall focus in the following analysis on the sourcing pattern of EU northern countries from different "sourcing regions" (see box 2 for the classification of regions upon which the analysis is based). In particular, we shall check whether the sourcing pattern by type of import category (processed inputs, parts, final goods) and by skill content is different from different suppliers (high-income, medium-income, low-income suppliers). The focus on EU-North rather than on the EU as a whole is because we want to focus on the "outsourcing" from high-income to lower-income economies. We shall take initially a global view in the sense of looking at outsourcing patterns to lower- and medium-income countries all over the

world (including the EU lower income countries in these groupings) and then look at the more specific intra-EU patterns of outsourcing.

Table 2a: Imports of EU-27 – Imports by Types of Import Categories and Skill Content in %

Year	Industry group	Primary	Processed	Parts	Final	Total
1995	Low	4.6	10.6	0.5	24.9	12.8
	Medium	69.4	57.4	3.8	9.3	32.3
	High	25.9	31.9	95.7	65.8	54.9
	TOTAL	100.0	100.0	100.0	100.0	100.0
2000	Low	3.4	11.2	0.4	21.3	11.7
	Medium	56.4	53.2	2.8	8.2	26.0
	High	40.2	35.6	96.8	70.6	62.3
	TOTAL	100.0	100.0	100.0	100.0	100.0
2005	Low	3.5	9.0	0.4	20.1	11.0
	Medium	80.6	53.5	3.2	7.8	26.7
	High	15.9	37.5	96.4	72.1	62.3
	TOTAL	100.0	100.0	100.0	100.0	100.0

Table 2b: Imports of EU-27 – Change in Skill Intensity of Imports (in pp), 2000–2005 and 1995–2005

Industry group	Primary	Processed	Parts	Final	Total
2000–2005					
Low	-1.2	0.6	-0.1	-3.7	-1.0
Medium	-13.0	-4.2	-1.0	-1.1	-6.3
High	14.3	3.6	1.1	4.8	7.4
1995–2005					
Low	-1.1	-1.7	-0.1	-4.8	-1.8
Medium	11.1	-3.9	-0.6	-1.5	-5.6
High	-10.0	5.6	0.7	6.3	7.4

Source: UN trade statistics; authors' calculations.

Table 3 has three sections: Table 3a shows the composition of imports of EU-North countries by types of imports (primary, processed, parts, final) and from the different sourcing regions, table 3b presents the additional information about the skill content of these various types of imports and table 3c shows the shares which the various import components from high- and low- (plus medium-income) countries have in total imports of EU-North.

The emphasis in the following analysis is on whether sourcing from high- and low-(plus medium-) income countries differs in terms of types of imports supplied, the skill content of these imports and whether there was a shift in the supplies from high- to low-(and medium-) income countries particularly in the areas of parts and processed inputs. The latter shift would indicate an increasing relevance of

“outsourcing” while the former analysis attempts to understand to what extent outsourcing occurs in high-, medium-, or low-skill areas.

Coming to the information contained in table 3a (see also chart 3a) which looks at the composition of imports from different source regions, we can see that both high- and low-(and medium-) income suppliers have been shifting their supplies from processed inputs towards parts and final goods supplies over the period 1995 to 2005. The shift towards parts supplies is strong for the low-(and medium-) income suppliers and negligible for the high-income suppliers.

Table 3a: Imports by EU-North from High-Income and Low-/Medium- Income Countries in % – Imports Distinguished by Import Categories and Skill Content

Year	Industry group	Import categories				Total
		Primary	Processed	Parts	Final	
Imports from High-Income Countries						
1995	Low	1.32	42.90	1.37	54.41	100.00
	Medium	6.02	83.17	2.42	8.39	100.00
	High	1.16	27.54	34.84	36.46	100.00
	TOTAL	2.79	47.34	21.16	28.72	100.00
2000	Low	0.89	41.07	1.57	56.47	100.00
	Medium	6.01	81.78	2.67	9.53	100.00
	High	2.03	23.24	36.43	38.30	100.00
	TOTAL	3.01	40.25	24.75	31.98	100.00
2005	Low	0.65	35.08	1.58	62.69	100.00
	Medium	6.53	81.58	2.61	9.28	100.00
	High	0.36	26.43	32.03	41.18	100.00
	TOTAL	2.11	42.61	21.75	33.83	100.00
Imports from Medium- and Low-Income Countries						
1995	Low	0.87	26.81	0.11	72.22	100.00
	Medium	8.70	78.89	2.28	10.13	100.00
	High	3.81	24.15	38.78	33.26	100.00
	TOTAL	4.43	41.02	17.23	37.32	100.00
2000	Low	0.79	26.94	0.21	72.06	100.00
	Medium	8.91	75.70	2.48	12.92	100.00
	High	2.32	21.05	42.23	34.40	100.00
	TOTAL	3.50	35.14	23.31	38.05	100.00
2005	Low	0.59	23.83	0.37	75.20	100.00
	Medium	6.90	77.61	2.68	12.81	100.00
	High	1.11	20.97	36.48	41.44	100.00
	TOTAL	2.33	34.39	21.74	41.54	100.00

Note: EU North refers to the OMS (EU-15) minus Greece, Portugal, and Spain.

Source: UN trade statistics; authors' calculations.

Box 2: Classification of Regional Groupings

Country	Code	Group	Country	Code	Group
Australia	AUS	HH	Spain	ESP	MH
Austria	AUT	HH	Taiwan	TWN	MH
Finland	FIN	HH	Argentina	ARG	ML
Great Britain	GBR	HH	Brazil	BRA	ML
Italy	ITA	HH	Colombia	COL	ML
Netherlands	NLD	HH	Costa Rica	CRI	ML
Norway	NOR	HH	Greece	GRC	ML
Japan	JPN	JPN	Israel	ISR	ML
USA	USA	USA	Mexico	MEX	ML
Bel./Lux.	BELU	HL	New Zealand	NZL	ML
Belgium	BEL	HL	South Africa	ZAF	ML
Canada	CAN	HL	Uruguay	URY	ML
Denmark	DNK	HL	Venezuela	VEN	ML
France	FRA	HL	Bangladesh	BGD	LH
Germany	DEU	HL	India	IND	LH
Germany, West	BRD	HL	Indonesia	IDN	LH
Iceland	ISL	HL	Malaysia	MYS	LH
Luxembourg	LUX	HL	Mozambique	MOZ	LH
Sweden	SWE	HL	Pakistan	PAK	LH
Switzerland	CHE	HL	Sri Lanka	LKA	LH
Bulgaria	BGR	MH	Thailand	THA	LH
Chile	CHL	MH	Tunisia	TUN	LH
Croatia	HVR	MH	Turkey	TUR	LH
Czech Republic	CZE	MH	China	CHN	China
Estonia	EST	MH	Algeria	DZA	LL
Hong Kong	HKG	MH	Côte d'Ivoire	CIV	LL
Hungary	HUN	MH	Cameroon	CMR	LL
Ireland	IRL	MH	Egypt	EGY	LL
Korea	KOR	MH	Ethiopia	ETH	LL
Latvia	LVA	MH	Ghana	GHA	LL
Lithuania	LTU	MH	Jordan	JOR	LL
Poland	POL	MH	Kenya	KEN	LL
Portugal	PRT	MH	Morocco	MAR	LL
Romania	ROM	MH	Nigeria	NGA	LL
Singapore	SGP	MH	Peru	PER	LL
Slovakia	SVK	MH	Philippines	PHL	LL

Note: The classification into country groupings has been made on the basis of income levels (using GDP per capita at PPP for the year 1990 as we wanted to capture catching-up groups of countries) into high-, medium-, and low-income countries and then grouping them again into high-, medium-, and low-growth economies (on the basis of GDP per capita growth estimated over the period 1980-2003) so that we arrive at 6 country groupings HH, HL, MH, ML, LH and LL where the first letter stands for the income group and the second letter for the growth group; apart from these groupings, USA, Japan and China have been separately identified.

Table 3b: Imports by EU-North from High-Income and Medium- and Low-Income Countries in % – Skill Content of Different Import Categories

Year	Industry group	Import categories				Total
		Primary	Processed	Parts	Final	
Imports from High-Income Countries						
1995	Low	4.14	7.93	0.57	16.57	8.74
	Medium	71.67	58.28	3.79	9.69	33.17
	High	24.20	33.79	95.64	73.74	58.08
	TOTAL	100.00	100.00	100.00	100.00	100.00
2000	Low	2.25	7.76	0.48	13.43	7.60
	Medium	53.41	54.35	2.89	7.97	26.75
	High	44.34	37.89	96.63	78.60	65.65
	TOTAL	100.00	100.00	100.00	100.00	100.00
2005	Low	2.12	5.70	0.50	12.83	6.92
	Medium	86.79	53.81	3.38	7.71	28.11
	High	11.09	40.49	96.12	79.47	65.29
	TOTAL	100.00	100.00	100.00	100.00	100.00
Imports from Medium- and Low-Income Countries						
1995	Low	5.48	18.25	0.17	54.04	27.93
	Medium	57.85	56.66	3.89	7.99	29.46
	High	36.67	25.09	95.93	37.97	42.62
	TOTAL	100.00	100.00	100.00	100.00	100.00
2000	Low	5.16	17.63	0.21	43.54	22.99
	Medium	59.28	50.21	2.48	7.91	23.30
	High	35.55	32.17	97.32	48.55	53.70
	TOTAL	100.00	100.00	100.00	100.00	100.00
2005	Low	4.99	13.55	0.33	35.39	19.55
	Medium	67.35	51.24	2.80	7.00	22.70
	High	27.66	35.21	96.87	57.61	57.75
	TOTAL	100.00	100.00	100.00	100.00	100.00

Note: EU North refers to the OMS (EU-15) minus Greece, Portugal, Spain.

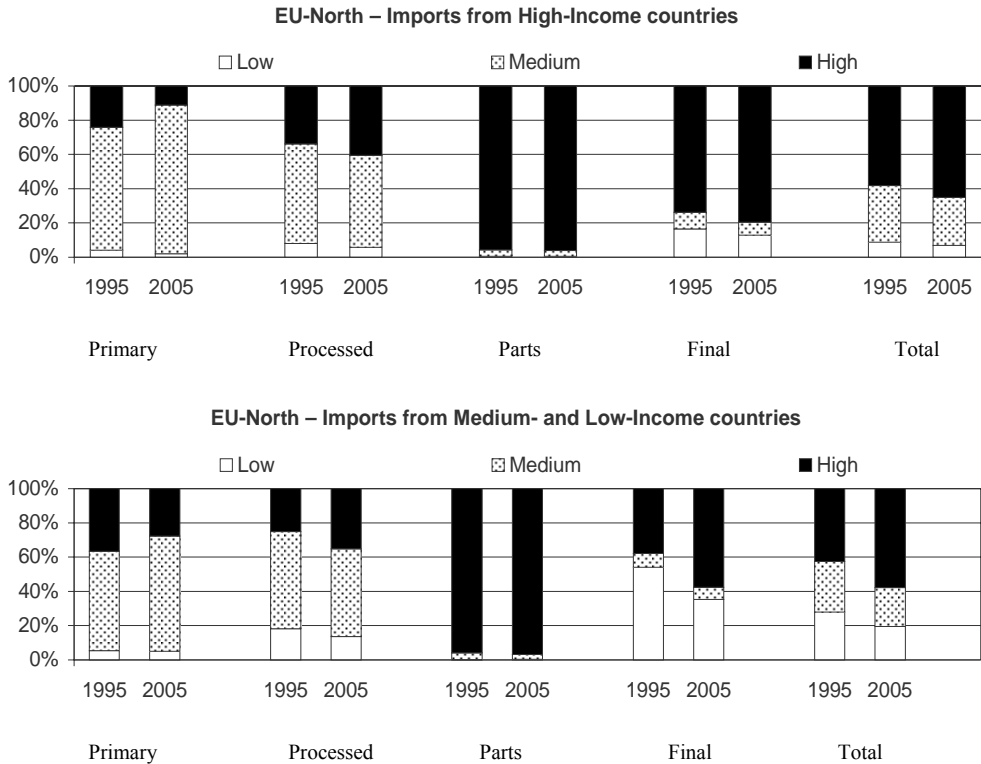
Source: UN trade statistics; authors' calculations.

Table 3c: Shares of High-Income and Medium- and Low-Income Countries in Total EU-27 Imports in % – Imports Distinguished by Import Categories and Skill Content

Year	Industry group	Import categories				Total
		Primary	Processed	Parts	Final	
Imports from High-Income Countries						
1995	Low	0.09	3.28	0.09	3.64	7.11
	Medium	1.57	21.26	0.62	2.19	25.65
	High	0.48	12.41	15.82	17.04	45.77
	TOTAL	2.14	36.96	16.54	22.89	78.54
2000	Low	0.05	2.70	0.08	3.05	5.90
	Medium	1.14	15.84	0.52	1.92	19.44
	High	0.89	10.88	17.64	18.82	48.25
	TOTAL	2.10	29.44	18.25	23.80	73.60
2005	Low	0.03	2.03	0.07	2.84	4.99
	Medium	1.18	15.41	0.50	1.83	18.93
	High	0.15	11.22	14.55	18.42	44.35
	TOTAL	1.37	28.67	15.12	23.11	68.29
Imports from Medium- and Low-Income Countries						
1995	Low	0.05	1.61	0.00	3.98	5.66
	Medium	0.59	5.24	0.14	0.64	6.62
	High	0.32	2.32	3.41	3.09	9.16
	TOTAL	0.96	9.18	3.57	7.73	21.45
2000	Low	0.04	1.67	0.01	4.10	5.84
	Medium	0.59	4.93	0.15	0.82	6.50
	High	0.34	3.01	5.74	4.94	14.04
	TOTAL	0.99	9.61	5.91	9.87	26.39
2005	Low	0.03	1.54	0.02	4.40	6.01
	Medium	0.57	5.99	0.18	0.97	7.73
	High	0.19	3.80	6.40	7.55	17.96
	TOTAL	0.80	11.35	6.61	12.93	31.70

Source: UN trade statistics; authors' calculations.

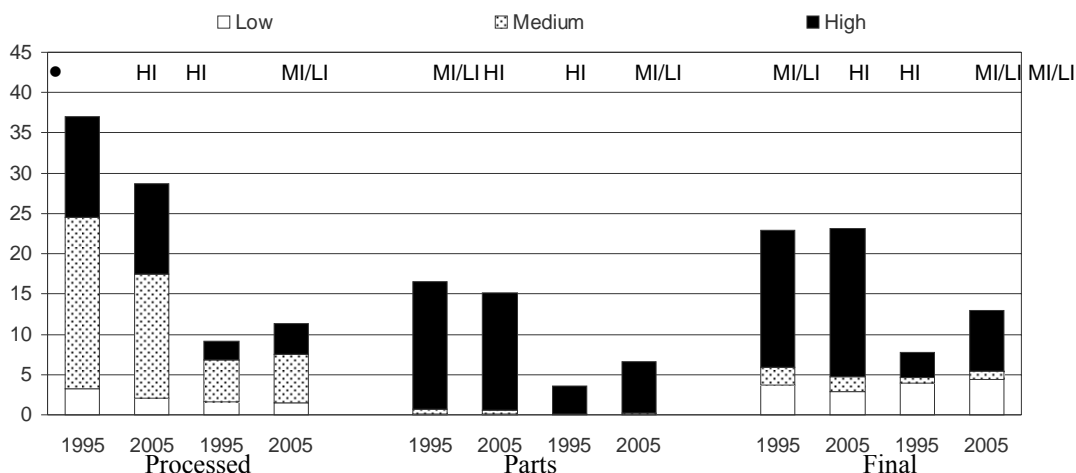
Chart 3a: Imports of EU-North from High-Income and Medium- and Low-Income Countries and by Import Categories and Skill-Content



Source: wiiw; calculated from UN trade statistics; EU North is defined as the High-Income countries of the EU comprising the EU-15 without Spain, Portugal and Greece.

Chart 3b: Shares of High- and Medium- and Low-Income Countries in EU-North Total Imports; by Import Categories, 1995 and 2005

in % of total imports



Note: HI: High-Income countries, MI/LI: Medium- and Low- Income countries.

Source: wiiw; calculated from UN trade statistics.

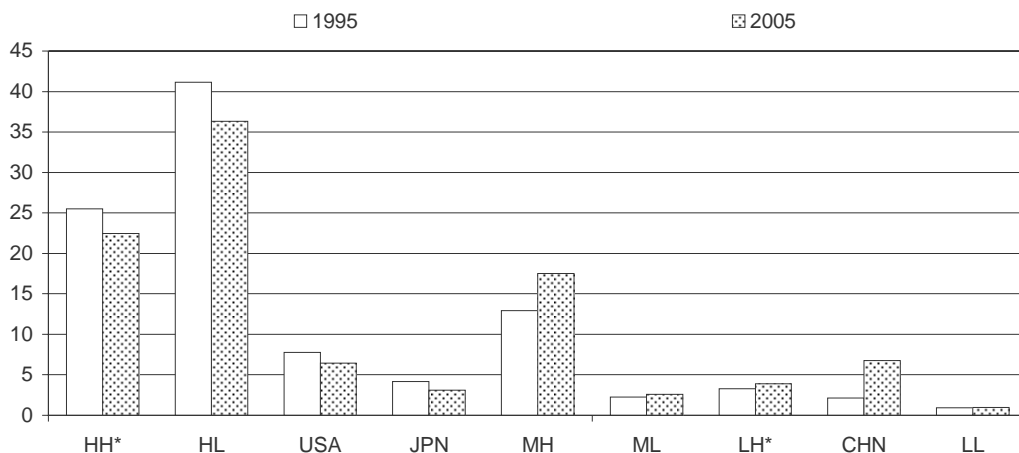
From table 3b (see also chart 3b) we can see another important shift, namely that in the skill composition of imported goods: There is a shift towards higher skill composition in all categories of imports (processed, parts and final) and both in imports from high-income and low-(and medium-) income suppliers, but the shift is much stronger for the supplies from low-(and medium-) income suppliers than from high-income suppliers: thus while the share of high-skill goods in total imports from high-income countries has increased from 58% in 1995 to 65% in 2005 (i.e. by 7 percentage points), that from low-(and medium-) income suppliers has increased from 42% to 58% (i.e. by 16 percentage points); on the other end, the shares of low-skill products supplied by high income producers has declined from 9% to 7% over the period 1995 to 2005, while that from low-(and medium-) income suppliers from 28% to 20%. Hence what we can see is that while there is still a difference in the skill content of goods supplied by high- and low-(and medium-) income suppliers the difference has been declining.

Next, we show the shift in the weights of different suppliers and in this analysis we shift back towards analyzing the import structure of the EU-27 (see table 3c): From the figures in this table we can see that there was a significant shift in the share of EU-27 imports in favour of imports accounted for by low- and medium-

income suppliers and a fall in the share of imports accounted for by high-income suppliers. Thus while high-income suppliers accounted in 1995 for 79% of total imports, in 2005 this share fell to 68%; symmetrically, the shares of low-(and medium-) income suppliers moved from 21% to 32%. Particularly strong was the increase in the shares of low- and medium-income suppliers in high-skill imports which increased from a share of 9% in the total import bill of the EU-27 to 18% (i.e. it more than doubled) while the shares in low- and medium-skill products increased only mildly. The presence of low- (and medium-) income producers in the high-skill segments of both parts and final goods production more than doubled and they account now for slightly less than 50% of supplies in this skill segment.

Hence the analysis shows that there is a significant shift towards higher skill content in all categories of imports, but that this shift is particularly strong in imports from low-(and medium-) income suppliers. We shall now extend the analysis towards a more detailed geographical break-down of source countries (using the detailed grouping discussed in box 2).

Chart 4: Imports of EU-27 by Source Regions, 1995 and 2005



Note: HH ... High-Income countries without USA and JPN; LH* ... Low-Income countries without CHN.*

Source: wiiw; calculated from UN trade statistics.

In chart 4 we can see the shares of different suppliers and in the different import categories in total EU-27 imports. The different suppliers belong to either the group of high income countries (we distinguished four groups therein; for details see box 2), medium-income countries (where we distinguished high-growth and low-growth economies; the high growth group includes most of the NMS) and low-income countries (where again a high-growth and a low-growth group was distinguished; China was singled out by itself). The main feature of changing

import shares in chart 4 is that the groups of high-income countries are losing market shares and two groups of countries, in particular, are gaining market shares: the group of middle income high growth (MH) economies and China.

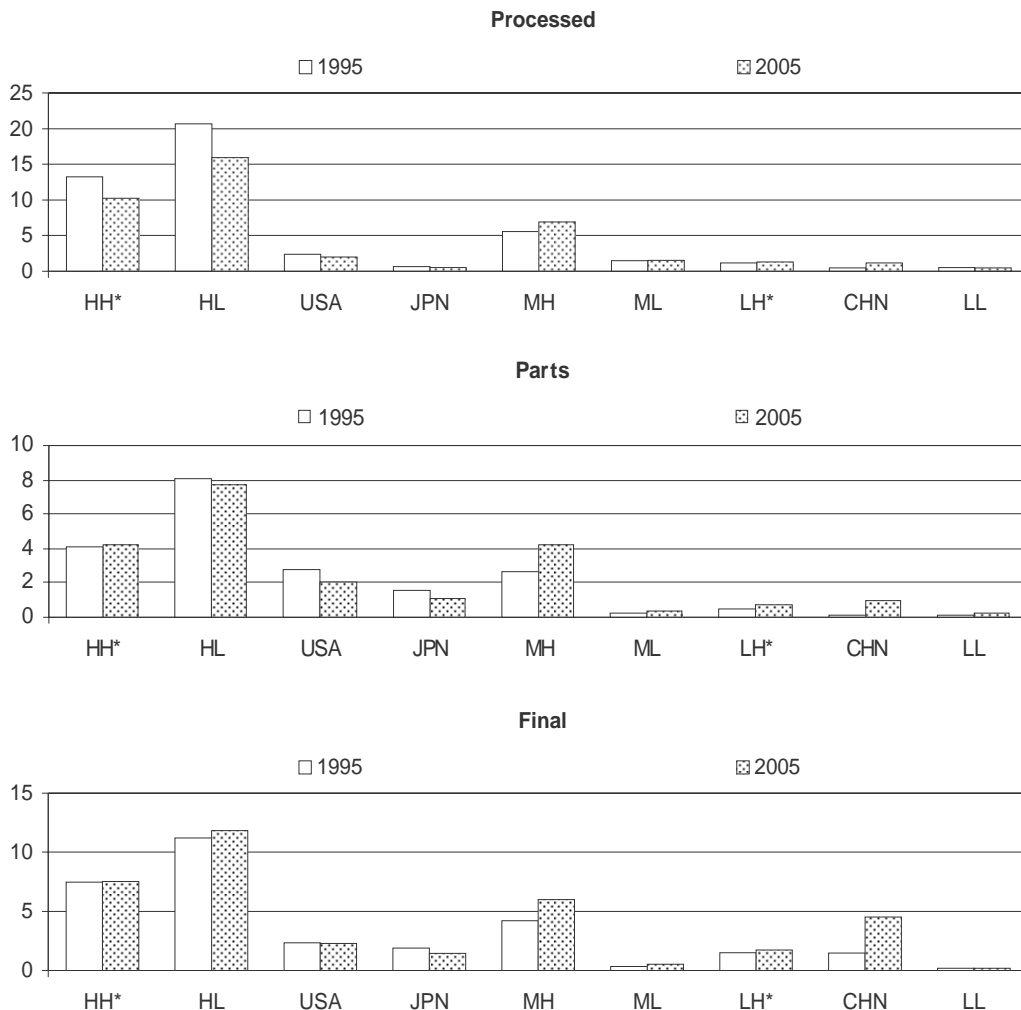
Chart 5 investigates further features in the development of import shares by looking at differences in market share performances of the different suppliers in different import categories (primary, processed, parts, final). The interesting features which emerge from chart 5 is that high-income countries are losing shares in EU-27 total imports especially in processed inputs and parts production (although the group of high-income high-growth economies – HH – are holding their shares) while in final goods their shares (in total EU-27 imports) are maintained. This is clearly evidence for an outsourcing story. The main beneficiaries are the middle income-high growth (MH) economies and China which are both increasing substantially their shares in EU-27 imports. The MH economies are occupying a significant market share position in all three categories of imports and China mostly in final goods. This can be interpreted as evidence for the importance of geography in outsourcing where geographic proximity matters in supplying processed inputs and parts and hence the MH countries (many of which are European) feature strongly in these import categories. It is also clear that other middle- and low-income countries (ML, LL, LH without China) hardly feature in import shares except for the LH without China group (LH without China which consists predominantly of other South and South-East Asian countries); they feature in final goods imports of the EU-27 but not in processed inputs and parts which again supports the idea that geographic proximity matters in outsourcing.

Next we discuss the changing skill content of imports from the different suppliers. We shall focus here on the evidence for skill upgrading by different suppliers, concentrating on the "important players" in EU imports, i.e. the high-income countries on the one hand (HH, HL, USA) and the middle income high growth (MH) economies on the other as well as China. Table 4a presents the shares of these supplier groups in total EU-27 imports thereby distinguishing industries with high-, medium- and low-skill contents in the different import categories; Table 4b shows changes in these shares.

The features revealed in these tables show both an outsourcing and skill upgrading story: First of all, the change in import shares between China and middle income high-growth (MH) economies, on the one hand, and the high-income countries (both of the high- and the low-growth variety as well as the USA) on the other hand, is clearly visible. Secondly, the percentage point increases of import shares of China and those of the MH economies especially in the high-skill segment of industries is clearly in evidence. There is, however, a difference between the MH countries (many of which are European) and China in that China increases its import shares mainly in final goods, while the increases of the MH countries took place across all the three categories of imports (i.e. processed inputs,

Chart 5: Imports of EU-27 by Source Regions and by Import Categories – 1995 and 2005

shares in % of total imports



Note: HH ... High-Income countries without USA and JPN; LH* ... Low-Income countries without CHN.*

Source: wiiw; calculated from UN trade statistics.

parts and finished goods). Looking at it from the high-income countries point-of-view, we can see that they lose shares in EU-27 imports mostly in processed inputs, and there particularly in the medium skill segment. This indicates that the high-income countries are subject to outsourcing of the processing of inputs, but

maintain a relatively strong position in finished goods trade. Successfully upgrading middle income countries make particularly strong inroads in the high-skill segments of processing and parts production while China's import incursions are concentrated – in contrast to the MH economies – in final goods exports (both at the low skill and the high skill end).

Finally, we focus more explicitly on the pattern of intra- and extra-EU import structures of EU high-income economies (for which we use the term EU-North; see above). Table 5 shows the shares of total EU-North imports which fall into the different import categories (primary, processed, parts, final) and which come from four different sources (the EU northern countries themselves; the southern EU economies – Spain, Portugal and Greece; the New Member States; and the Rest of the World).

The basic pattern which we observed in relation to the global imports analysis of the EU with the different country groups above can be seen here as well although we only focus this time on the sourcing pattern of the EU northern economies. We observe, in the first instance, a shift of import shares from intra-EU North to a stronger import dependence upon imports from the EU medium-income regions (EU South and NMS) and also a stronger import presence of the Rest of the World (which we already know is driven by low- and medium-income regions such as China and other catching-up economies while the richer OECD economies experience declining import shares). Thus the shares of intra-EU North trade in total EU-North imports have fallen from 62.5% in 1995 to 55.1% in 2005, while that of the NMS has risen from 3.5% to 6.2% and that of EU-South from 3.9% to 4.2%. Furthermore, it is interesting to see how the composition of imports has changed by trading partners. In total EU North imports, the import structure has changed towards final goods (which accounted in 1995 for 30% of imports and in 2005 for 36%) while the shares of processed inputs and primary inputs have declined (the latter from 46% to 40%). At the same time we see a distinct shift for the NMS to supply a much higher share of parts (these accounted for 16.5% of imports from the NMS in 1995 and have in 2005 increased to 32.4%) while the share of processed inputs has declined. There is here a distinct difference to the EU southern countries or for the Rest of the World which did not experience such a strong shift in the direction of parts: in fact the share of processed inputs in the southern European exports to the EU-North holds up at a high level of 45% of their exports, while for the Rest of the World there is a strong shift in the direction of final goods and away from processed inputs and from parts.

Table: 4a: Shares in Total EU-27 Imports (%), 1995 and 2005

From country groups:	Industry group	Year	Primary	Processed	Parts	Final	Total
China	Low	1995	0.003	0.107	0.000	0.897	1.007
	Medium	1995	0.040	0.164	0.007	0.125	0.336
	High	1995	0.001	0.193	0.134	0.443	0.771
	TOTAL		0.044	0.463	0.142	1.465	2.114
	Low	2005	0.003	0.240	0.001	2.076	2.319
	Medium	2005	0.046	0.495	0.022	0.327	0.890
	High	2005	0.003	0.441	0.986	2.103	3.533
	TOTAL		0.052	1.176	1.009	4.506	6.743
Middle income – High growth (MH)	Low	1995	0.017	0.713	0.006	1.698	2.434
	Medium	1995	0.278	3.256	0.095	0.387	4.016
	High	1995	0.187	1.587	2.571	2.130	6.474
	TOTAL		0.481	5.556	2.672	4.214	12.923
	Low	2005	0.017	0.718	0.015	1.177	1.927
	Medium	2005	0.292	3.450	0.116	0.474	4.332
	High	2005	0.114	2.746	4.061	4.343	11.265
	TOTAL		0.423	6.915	4.192	5.995	17.524
High-income – low growth (HL)	Low	1995	0.053	1.769	0.055	1.575	3.453
	Medium	1995	0.933	12.130	0.368	1.259	14.690
	High	1995	0.203	6.771	7.641	8.375	22.989
	TOTAL		1.189	20.670	8.064	11.209	41.132
	Low	2005	0.019	1.070	0.044	1.364	2.497
	Medium	2005	0.752	8.871	0.299	1.084	11.006
	High	2005	0.078	6.001	7.349	9.382	22.810
	TOTAL		0.848	15.943	7.692	11.830	36.312
High-income – high-growth (HH) without USA	Low	1995	0.028	1.263	0.031	1.776	3.098
	Medium	1995	0.424	7.996	0.161	0.767	9.348
	High	1995	0.259	4.005	3.874	4.917	13.056
	TOTAL		0.710	13.265	4.066	7.460	25.501
	Low	2005	0.015	0.861	0.022	1.313	2.211
	Medium	2005	0.366	5.820	0.140	0.646	6.971
	High	2005	0.065	3.552	4.075	5.581	13.273
	TOTAL		0.446	10.234	4.236	7.540	22.456
USA	Low	1995	0.011	0.186	0.007	0.179	0.383
	Medium	1995	0.214	0.944	0.045	0.127	1.329
	High	1995	0.019	1.241	2.747	2.024	6.030
	TOTAL		0.244	2.370	2.798	2.330	7.742
	Low	2005	0.003	0.082	0.006	0.111	0.202
	Medium	2005	0.057	0.585	0.032	0.082	0.756
	High	2005	0.011	1.345	2.027	2.089	5.471
	TOTAL		0.070	2.012	2.064	2.283	6.429

*Table 4b: Changes of Shares in Total EU-27 Imports, 1995 to 2005**in percentage points*

From country groups:	Industry group	Primary	Processed	Parts	Final	Total
China	Low	0.000	0.133	0.001	1.179	1.313
	Medium	0.006	0.332	0.014	0.201	0.554
	High	0.002	0.248	0.852	1.660	2.762
	TOTAL	0.008	0.713	0.868	3.040	4.629
Middle income – high growth (MH)	Low	0.000	0.005	0.009	-0.521	-0.507
	Medium	0.014	0.194	0.020	0.087	0.316
	High	-0.073	1.160	1.490	2.214	4.791
	TOTAL	-0.059	1.359	1.520	1.781	4.601
High-income – low growth (HL)	Low	-0.034	-0.699	-0.011	-0.212	-0.956
	Medium	-0.181	-3.260	-0.069	-0.175	-3.684
	High	-0.126	-0.769	-0.292	1.007	-0.180
	TOTAL	-0.341	-4.728	-0.372	0.621	-4.819
High-income – high-growth (HH) without USA	Low	-0.013	-0.402	-0.009	-0.462	-0.886
	Medium	-0.058	-2.176	-0.021	-0.122	-2.376
	High	-0.194	-0.453	0.201	0.663	0.217
	TOTAL	-0.264	-3.031	0.170	0.079	-3.046
USA	Low	-0.008	-0.104	-0.001	-0.068	-0.181
	Medium	-0.157	-0.358	-0.013	-0.045	-0.573
	High	-0.008	0.104	-0.720	0.066	-0.558
	TOTAL	-0.174	-0.358	-0.734	-0.047	-1.313

*Source: UN trade statistics; authors' calculations.**Note: For country groups see box 2.*

Table 5: Import Shares in EU North Imports in %, 1995 and 2005

Year	Industry group	Shares in EU-North imports by partner					Shares in total EU-North imports				
		Import categories					Import categories				
		Primary	Processed	Parts	Final	Total	Primary	Processed	Parts	Final	Total
EU-North											
1995	Low	0.10	4.10	0.10	5.30	9.60	0.07	2.55	0.08	3.28	5.98
	Medium	2.00	30.80	0.80	3.10	36.70	1.27	19.25	0.51	1.92	22.95
	Med/High	0.00	1.10	12.30	10.90	24.30	0.00	0.68	7.67	6.83	15.17
	High/High	0.80	15.50	4.70	8.40	29.40	0.49	9.68	2.93	5.28	18.37
	Total	2.90	51.50	17.90	27.70	100.00	1.82	32.16	11.18	17.31	62.47
2005	Low	0.00	2.70	0.10	4.80	7.70	0.02	1.47	0.06	2.66	4.22
	Medium	2.00	25.50	0.80	2.90	31.20	1.11	14.07	0.41	1.60	17.20
	Med/High	0.00	1.00	14.40	11.10	26.50	0.00	0.53	7.95	6.12	14.60
	High/High	0.30	16.10	4.20	14.10	34.70	0.14	8.90	2.31	7.75	19.10
	Total	2.30	45.30	19.50	32.90	100.00	1.28	24.97	10.74	18.13	55.12
EU-South											
1995	Low	0.10	6.30	0.10	13.00	19.60	0.01	0.25	0.00	0.51	0.77
	Medium	1.90	30.00	1.00	2.60	35.40	0.07	1.17	0.04	0.10	1.39
	Med/High	0.00	1.40	14.70	8.50	24.70	0.00	0.05	0.58	0.33	0.97
	High/High	4.40	9.30	2.50	4.10	20.40	0.17	0.37	0.10	0.16	0.80
	Total	6.50	47.00	18.30	28.30	100.00	0.25	1.84	0.72	1.11	3.92
2005	Low	0.10	4.10	0.10	7.30	11.60	0.00	0.17	0.01	0.31	0.49
	Medium	1.80	29.50	0.70	2.50	34.60	0.08	1.25	0.03	0.11	1.47
	Med/High	0.00	1.40	16.30	10.70	28.40	0.00	0.06	0.69	0.46	1.21
	High/High	2.60	9.90	3.40	9.50	25.40	0.11	0.42	0.14	0.41	1.08
	Total	4.40	44.90	20.60	30.10	100.00	0.19	1.90	0.87	1.28	4.24
New Member States											
1995	Low	0.10	7.20	0.00	18.00	25.30	0.00	0.25	0.00	0.63	0.89
	Medium	3.70	29.60	0.70	3.20	37.30	0.13	1.04	0.03	0.11	1.31
	Med/High	0.00	1.70	12.00	7.60	21.30	0.00	0.06	0.42	0.27	0.75
	High/High	0.40	9.50	3.80	2.40	16.00	0.01	0.33	0.13	0.09	0.56
	Total	4.20	48.00	16.50	31.30	100.00	0.15	1.69	0.58	1.10	3.52
2005	Low	0.20	6.00	0.10	11.00	17.30	0.01	0.37	0.01	0.68	1.06
	Medium	2.40	18.20	1.00	3.70	25.30	0.15	1.12	0.06	0.23	1.56
	Med/High	0.00	2.20	26.90	9.60	38.70	0.00	0.13	1.65	0.59	2.38
	High/High	0.10	5.70	4.40	8.60	18.70	0.01	0.35	0.27	0.53	1.15
	Total	2.60	32.10	32.40	32.90	100.00	0.16	1.97	2.00	2.02	6.16

Table 5 continued: Import Shares in EU North Imports in %, 1995 and 2005

Year	Industry group	Shares in EU-North imports by partner					Shares in total EU-North imports				
		Import categories					Import categories				
		Primary	Processed	Parts	Final	Total	Primary	Processed	Parts	Final	Total
							Rest of World				
1995	Low	0.20	5.00	0.00	12.20	17.40	0.07	1.51	0.01	3.66	5.25
	Medium	2.60	17.70	0.60	2.00	22.90	0.78	5.33	0.18	0.62	6.90
	Med/High	0.00	0.90	11.30	8.90	21.20	0.00	0.27	3.40	2.69	6.37
	High/High	0.80	11.30	13.80	12.60	38.50	0.23	3.41	4.16	3.78	11.57
	Total	3.60	35.00	25.80	35.70	100.00	1.07	10.52	7.75	10.75	30.09
2005	Low	0.10	3.40	0.00	12.10	15.60	0.03	1.17	0.02	4.16	5.38
	Medium	1.50	14.90	0.50	2.10	19.00	0.52	5.14	0.17	0.71	6.54
	Med/High	0.00	1.00	9.50	9.80	20.40	0.00	0.34	3.28	3.40	7.02
	High/High	0.30	14.20	12.20	18.30	45.10	0.11	4.90	4.21	6.32	15.53
	Total	1.90	33.50	22.30	42.30	100.00	0.66	11.54	7.69	14.59	34.48
							Total				
1995	Low	0.10	4.60	0.10	8.10	12.90	0.14	4.56	0.10	8.08	12.88
	Medium	2.30	26.80	0.80	2.80	32.60	2.25	26.80	0.75	2.75	32.55
	Med/High	0.00	1.10	12.10	10.10	23.30	0.00	1.07	12.07	10.12	23.25
	High/High	0.90	13.80	7.30	9.30	31.30	0.90	13.79	7.31	9.30	31.31
	Total	3.30	46.20	20.20	30.30	100.00	3.30	46.21	20.23	30.26	100.00
2005	Low	0.10	3.20	0.10	7.80	11.20	0.07	3.18	0.10	7.81	11.15
	Medium	1.90	21.60	0.70	2.70	26.80	1.85	21.58	0.68	2.65	26.76
	Med/High	0.00	1.10	13.60	10.60	25.20	0.00	1.07	13.58	10.56	25.22
	High/High	0.40	14.60	6.90	15.00	36.90	0.36	14.57	6.94	15.00	36.87
	Total	2.30	40.40	21.30	36.00	100.00	2.28	40.39	21.29	36.03	100.00

Source: UN Trade Statistics and authors' calculations.

Hence this short analysis of intra-EU and extra-EU trade patterns shows a strong increase of trade flows between NMS and North-EU. There is a particularly strong expansion of exports of parts, while the EU southern countries are more strongly linked to EU North via the supply of processed inputs. This difference in trade composition also implies that a different set of industries and hence skills are involved in these trade flows, as parts are produced mainly by engineering industries (skill group 3) which have a high skill content compared to the skill content embodied in processed inputs. Finally, imports from the Rest of the World into the EU-North have shifted further towards final goods and away from processed inputs and parts supplies which again confirms the hypothesis about geographic dimension of outsourcing activities.

4. Summary and Conclusions

The following provides a summary of the results obtained from the empirical analysis undertaken in section 3 of this paper:

- The decomposition of trade flows to the EU-27 (including intra-EU-27 trade) has shown that there is a significant difference in the skill content of different import categories (primary inputs, processed inputs, parts, final goods).
- Grouping suppliers into high-income and low-/middle-income economies we observed an upward pressure in the skill content of exports to the EU-27 of both types of economies, but the up-grading proceeded more rapidly amongst the low-/medium-income economies.
- Furthermore, there was a significant shift in the shares of EU-27 imports in favour of those supplied by low-/medium-income countries as compared to those supplied by high-income economies. Particularly the medium-income-high growth economies (MH) and China are gaining in market shares.
- The observed changes in skill content and in the shares of imports by low-/medium-income economies particularly in the areas of processed inputs and parts production supports an outsourcing story combined with catching-up. High-income countries are losing market shares particularly in processed inputs and in parts and less in final goods.
- Geography does matter in outsourcing which is shown by the fact that China and other high-growth/low-income economies (mostly outside Europe) make less inroads in processed inputs than in finished goods while MH countries (a lot of them in Europe) increase their shares in intermediate inputs (processed and parts) quite strongly.
- The analysis of intra-EU outsourcing patterns has shown that the NMS do indeed play an important role in the shifts in import structures of EU northern economies. They not only account for a higher share of imports of EU-North, but their export structure to EU-North has shifted significantly towards the supplies of parts (which have a high skill content). EU southern countries are more strongly represented in processed inputs (which have lower skill content). Imports from the Rest of the World into the EU-North are shifting towards final goods imports confirming our hypothesis that geographic proximity is important for outsourcing activities.

The analysis of "outsourcing" activity from trade statistics which has been undertaken in this paper has thus confirmed the increasing importance of South-North integration. It has supported the view taken in this paper that current patterns of trade integration and trade specialisation are strongly affected by the significant role played by SUCCESS (successfully catching-up) economies. An understanding of their role in international economic relations requires the recognition of differentiated patterns of catching-up which are not well captured by traditional

theories of international trade but for which we have attempted to provide some analytical building blocks in section 2 of the paper.

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