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THE ROLE OF EMERGING MARKET ECONOMIES

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In 2008 all ECB publications feature a motif taken from the €10 banknote.

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Abstract

The paper analyses the impact of import penetration on firms' profitability in 15 manufacturing industries in 10 euro area countries during 1995-2004, focusing on the role of emerging market economies. Our results indicate that import competition from emerging market economies has had an overall negative impact on companies' profitability in the euro area manufacturing sector, especially for imports coming from China and Russia. However, similar negative effects are also estimated for imports from the United States. In contrast, imports from Latin America are estimated to be positively correlated with profitability. Finally, we find asymmetric effects on profitability across euro area countries and sectors.

Keywords: Profitability, import penetration, euro area, emerging markets, globalisation

JEL classification: L11, L13, F12, C23

Non-technical summary

Globalisation and in particular the increasing role of emerging market economies (EME) in global trade have often been claimed to have various impacts, e.g. on labour market outcomes, inflation and markups in advanced economies.

This paper contributes to the literature by examining, with a more detailed database on import origins than earlier, the impact of imports on profitability of firms in the euro area manufacturing sector. Furthermore, the potential impacts of imports on profitability at a country and sector level are investigated, varying the import origins.

Principally, imports can have two opposing effects on firms' profitability: First, they can have a *pro-competitive effect* on the market - also called 'market discipline effect'–, thus leading to lower market power of companies and to a decline in their markups and profitability. Naturally, the magnitude of these pro-competitive effects of trade depends on the substitutability between domestically produced and imported goods. Second, imports can also have an opposing effect: Cheaper imported inputs can lead to a *pro-competitiveness effect* on respective companies which use the intermediary goods as inputs, or which resale imported final goods, thus resulting in higher profits.

Given that imports can exert both positive and negative effects on profitability, the overall impact of import penetration on firms' profitability needs to be addressed empirically, and is expected to depend on the domestic market, the industries, and the origins of imports. To investigate the issue, we analyse 15 manufacturing industries in 10 euro area countries during 1995-2004 with a breakdown of imports to 8 consolidated regions, distinguishing imports originating from advanced and emerging market economies.

Given that emerging market economies, and especially emerging Asia, have been able to increase significantly their share of world's export markets over the past decade, it can be assumed that imports from both other advanced economies and emerging market economies can be treated to some extent as substitutes. However, given that the price levels of emerging market economies are significantly lower than those of the advanced economies, imports from emerging market economies are expected to assert stronger effects on profitability than those of the advanced economies – thereby the stronger effects could be both negative, if the market discipline effect prevails in a sector, and positive, if cheaper intermediary goods improve overall the competitiveness of companies in a sector. Naturally, not all emerging market economies export high-technology products; instead, many of them are highly dependent on commodity exports. Therefore, the paper constructs several country groups to control for heterogeneity of imports by region of origin.

Our main findings are the following: First, we find statistically significant and negative effects of total imports on profitability in the euro area manufacturing sector for the sample period: A 10 percent increase in the total import penetration is estimated to decline profitability by 0.9 percent, conditional on

productivity, domestic competition, regulation and labour market conditions. Second, the same holds true for imports from emerging market economies as a whole. In this case, the estimated elasticity is slightly lower at -0.07. Third, in the further breakdown of import origins into eight consolidated regions, we find statistically significant negative elasticities for imports from the United States (elasticity -0.09), China (-0.07), and Russia (-0.05), whereas imports from Latin America (0.05) are estimated to have a positive effect on profitability. Fourth, regarding country heterogeneity within the euro area, we estimate negative and statistically significant elasticities for imports from emerging market economies on profitability for the following countries: Austria (elasticity -0.55), France (-0.20), Portugal (-0.09), and Germany (-0.03), while positive elasticities are estimated for Ireland (0.07), Italy (0.06), Belgium (0.06), Finland (0.06) and the Netherlands (0.03). Fifth, the sector analysis shows that the imports from emerging market economies have had asymmetric effects on profitability across sectors in the euro area manufacturing industry: While statistically significant and positive elasticities are estimated for sectors 'rubber and plastic products' (elasticity 0.44), 'chemicals and chemical products' (0.38), and 'tobacco products' (0.37). For the other sectors, the estimated elasticities for the emerging market import penetration are not statistically significantly different from zero.

1. Introduction

Globalisation and in particular the increasing role of emerging market economies (EME) in global trade have often been claimed to have various impacts, e.g. on labour market outcomes, inflation and markups in advanced economies. For instance, Rogoff (2003) sees the declining monopoly pricing power, which materialises in a reduction of markups, as one of the most important factors driving disinflation worldwide.

Similarly to other advanced economies, also the euro area has recently experienced significant changes in its trade structure, partly because of its expansion, but also because of the growing importance of emerging market economies. For instance, during 1999-2007, China's share of extra-euro area's imports almost tripled from 4.7% to 11.5%, while the value of imports increased more than three fold.[1] Concurrent to the increasing globalisation of trade, firms' profit growth and profit shares have been historically high in many advanced economies (Ellis and Smith, 2007). However, as shown in chapter 2, profitability[2] in the euro area manufacturing sector as a whole has remained rather stable over the past decade.

Recently, Chen et al. (2004, 2006) investigated the impact of trade on prices, productivity and markups, using sectoral data for EU manufacturing sectors over the period 1988-2000, and found that domestic openness acts to reduce profit margins, while the opposing is true of foreign openness. Furthermore, Boulhol (2005) examined the determinants of price-cost margins for OECD countries in 1970-2003, finding an overall small and negative impact of trade on price-cost margins.

The paper contributes to the literature by examining, with a more detailed database on import origins than earlier, the impact of imports on profitability of firms in the euro area manufacturing sector. Furthermore, the potential impacts of imports on profitability at a country and sector level are investigated, varying the import origins.

Principally, imports can have two opposing effects on firms' profitability: First, they can have a *pro-competitive effect* on the market - also called 'market discipline effect'–, thus leading to lower market power of companies to set their prices and to a decrease of their markups and profitability.[3] Naturally, the magnitude of these pro-competitive effects of trade depends on the substitutability between domestically produced and imported goods. Second, imports can also have an opposing effect: Cheaper imported inputs can lead to a *pro-competitiveness effect* on respective companies which use the intermediary goods as inputs, or which resale imported final goods, thus resulting in higher profits.[4]

[1] Moreover, in 2007, China's main export destination was EU-27, while at the same time China was the main trading partner for extra EU-27 imports.
[2] Profitability is measured using Gross Operating Rate, which is defined as (value added at factor cost – personnel costs) / turnover. See Eurostat Short-term Business Statistics for more information.
[3] The pro-competitive effect is also known as market-discipline effect. See Levinsohn (1993).
[4] Needless to say, for domestic companies producing the same intermediary goods, the import competition will have the effects first mentioned.

Given that imports can exert both positive and negative effects on profitability, the overall impact of import penetration on firms' profitability needs to be addressed empirically, and is expected to depend on the domestic market, the industries, and the origins of imports. To investigate the issue, we analyse 15 manufacturing industries in 10 euro area countries[5] during 1995-2004 with a breakdown of imports to 8 consolidated regions, distinguishing imports originating from advanced and emerging market economies.

Given that emerging market economies, and especially emerging Asia, have been able to increase significantly their share of world's export markets over the past decade, it can be assumed that imports from both other advanced economies and emerging market economies can be treated to some extent as substitutes. However, given that the price levels of emerging market economies are significantly lower than those of the advanced economies, imports from emerging market economies are expected to assert stronger effects on profitability than those of the advanced economies – thereby the stronger effects could be both negative, if the market discipline effect prevails in a sector, and positive, if cheaper intermediary goods improve overall the competitiveness of companies in a sector. Naturally, not all emerging market economies export high-technology products; instead, many of them are highly dependent on commodity exports. Therefore, the paper constructs several country groups to control for heterogeneity of imports by region of origin.

In the analysis, we use panel estimation methods by Blundell and Bond (1998) to evaluate the relationship between import penetration by import origin and firms' profitability, while controlling for other factors affecting the latter, such as domestic competition, productivity, scale factors, labour market conditions, and product market regulation. In the analysis, we employ sector level data from Eurostat's Structural Business Statistics (SBS), Intra- and Extra-European Trade (COMEXT) databases, as well as from OECD's online database.

Our main findings are the following: First, we find statistically significant and negative effects of total imports on profitability in the euro area manufacturing sector for the sample period: A 10 percent increase in the total import penetration is estimated to decline profitability by 0.9 percent, conditional on productivity, domestic competition, regulation and labour market conditions. Second, the same holds true for imports from emerging market economies as a whole. In this case, the estimated elasticity is slightly lower at -0.07. Third, in the further breakdown of import origins into eight consolidated regions, we find statistically significant negative elasticities for imports from the United States (elasticity -0.09), China (-0.07), and Russia (-0.05), whereas imports from Latin America (0.05) are estimated to have a positive effect on profitability. Fourth, regarding country heterogeneity within the euro area, we estimate negative and statistically significant elasticities for imports from emerging market economies on profitability for the following countries: Austria (elasticity -0.55), France (-0.20), Portugal (-0.09), and Germany (-0.03), while positive elasticities are estimated for Ireland (0.07), Italy (0.06), Belgium (0.06), Finland (0.06) and the

[5] The following country abbreviations are used: AT=Austria, BE=Belgium, FI=Finland, FR=France, DE=Germany, IR=Ireland, IT=Italy, NL=The Netherlands, PO=Portugal, and ES=Spain.

Netherlands (0.03). Fifth, the sector analysis shows that the imports from emerging market economies have had asymmetric effects on profitability across sectors in the euro area manufacturing industry: While statistically significant and positive elasticities are estimated for sectors 'rubber and plastic products' (elasticity 0.44), 'chemicals and chemical products' (0.38), and 'tobacco products' (0.37). For the other sectors, the estimated elasticities for the emerging market import penetration are not statistically significantly different from zero.

The paper is organized in the following way: chapter 2 presents some stylized facts, chapter 3 reviews the related literature, while chapter 4 presents the empirical analysis. Results are presented in chapter 5, while chapter 6 concludes.

2. Trade and profitability in the euro area manufacturing sector

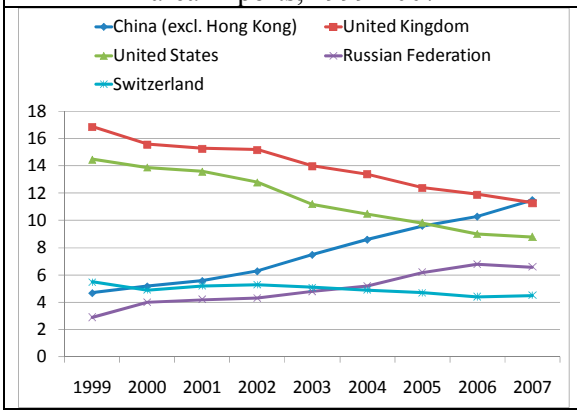
In recent years, there have been significant changes in the euro area's trade structure, particularly as regards to the role of emerging market economies. For example, euro area's[6] imports from China increased in value more than three fold between 1999 and 2007. During that period, China's share of extra-euro area's imports rose from 4.7% to 11.5%, making China euro area's largest trading partner for extra-euro area's imports in 2007. Similar developments were also recorded for Russia, whose share of extra-euro area's imports rose from 2.9% in 1999 to 6.6% in 2007. In contrast, the import shares of advanced economies, such as the United Kingdom and the United States have declined markedly: the share of the United Kingdom declined from 16.9% in 1999 to 11.3% in 2007, while the share of the United States declined from 14.5% to 8.8%. Figure 1 shows euro-area's main import partners and imports by product groups.

As regards to changes in the structure of euro area's imported goods, the share of 'mineral fuels and lubricants' has increased markedly from 10.0% in 1999 to 19.6% in 2007. In relative terms, significant changes have been also recorded for imports of 'Food, drinks and tobacco', which share of imports has declined around 16% in 1999-2007 to 5.5% in 2007. Similarly, the share of 'Machinery and transport equipment' has declined around 18% in that time to 32.5% in 2007. Changes in imports of the other product groups have been less significant over the past decade.

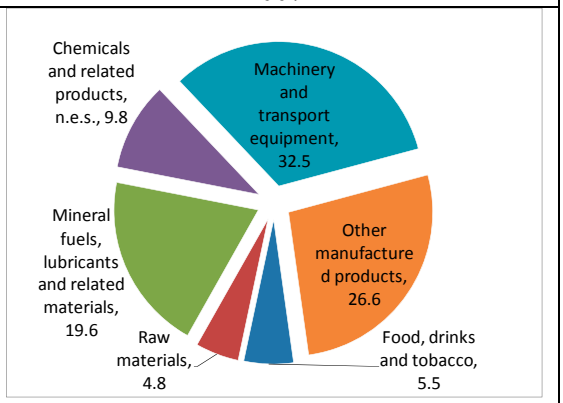
[6] Here euro area consists of the 12 EU Member States that joined euro area before 2007, i.e. excluding Slovenia, Cyprus and Malta.

Figure 1: The structure of euro area (EU12) imports (percent)

The share of five main trading partners of euro area imports, 1999-2007



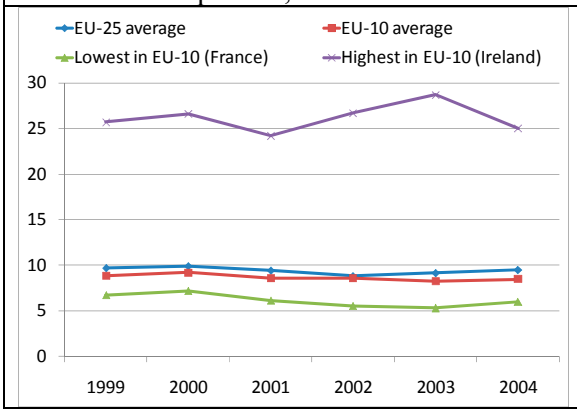
Euro area imports by SITC product groups, 2007



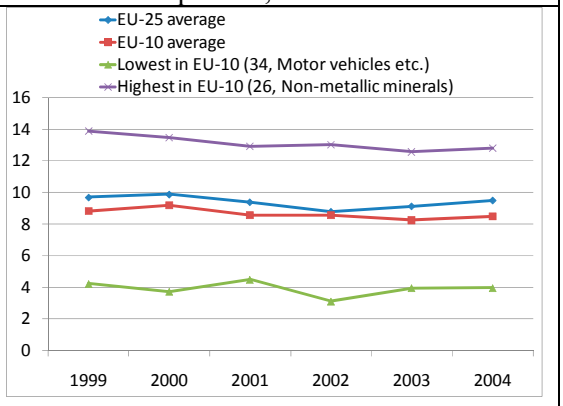
Source: Eurostat COMEXT and authors' calculations.

Figure 2: Profitability in euro area manufacturing using Gross Operating Rate, (percent)

EU-25 and EU-10 averages and country dispersion, 1999-2004



EU-25 and EU-10 averages and sectoral dispersion, 1999-2004



Sources: Eurostat Short-term Business Statistics and authors' calculations.

Regarding profitability developments in the euro area manufacturing[7], it is noticeable that the average Gross Operating Rate remained nearly unchanged at around 8.6% in 1999-2004.[8] However, as shown in figure 2 and tables 1-2, the dispersion of profitability, especially across countries but also across sectors is remarkable: profitability in 1999-2004 was the highest in Ireland and the lowest in France (table 1), while of the sectors, it was the highest in 'Manufacture of other non-metallic mineral products' (NACE 26) and the lowest in 'Manufacture of motor vehicles, trailers and semi-trailers' (NACE 34) (table 2). Despite the overall changes in profitability in the euro area manufacturing were rather modest over 1999-2004, some

[7] Profitability data as measured by Gross Operating Rate is available until 2004 for most countries in the SBS database of the Eurostat.

sectors and countries did record significant changes over the period. For example, profitability in manufacturing sector in Finland, Italy, and France declined more than 10% over 1999-2004, while it increased around 5% in Austria, but remained unchanged in Germany. Similarly, profitability declined more than 10% over 1999-2004 in following sectors (NACE codes in brackets): 'Manufacture of other transport equipment' (35), ' Manufacture of textiles' (17), 'Manufacture of pulp, paper and paper products' (21), 'Manufacture of furniture; manufacturing n.e.c.' (36), 'Tanning, dressing of leather; manufacture of luggage' (19), and ' Manufacture of radio, television and communication equipment and apparatus' (32). In contrast, profitability increased more than 10% in the following sectors over 1999-2004: 'Manufacture of coke, refined petroleum products and nuclear fuel' (23), 'Manufacture of tobacco products' (16), ' Manufacture of wearing apparel; dressing; dyeing of fur' (18), 'Manufacture of medical, precision and optical instruments, watches and clocks' (33), and in ' Manufacture of basic metals' (27).

Table 1: Profitability by country in euro area manufacturing as measured by Gross Operating Rate, (percent)

Country	1999	2000	2001	2002	2003	2004	Average	Change	% Change
Austria	11.2	11.4	10.7	11.7	11.5	11.7	11.4	0.5	4.5
Belgium	9.5	9.6	8.7	9.1	9.5	9.2	9.3	-0.3	-3.2
Finland	14.1	16.1	13.9	13.1	12.6	11.5	13.6	-2.6	-18.4
France	6.7	7.2	6.1	5.5	5.3	6.0	6.1	-0.7	-10.4
Germany	6.8	6.9	6.9	6.0	6.4	6.8	6.6	0.0	0.0
Ireland	25.7	26.6	24.2	26.7	28.7	25.0	26.2	-0.7	-2.7
Italy	10.7	10.9	10.5	10.2	9.8	9.5	10.3	-1.2	-11.2
The Netherlands	10.7	10.6	9.2	9.2	9.3	9.7	9.8	-1.0	-9.3
Portugal	11.1	11.1	10.1	10.2	10.1	10.3	10.5	-0.8	-7.2
Spain	10.7	10.5	9.7	10.6	10.3	10.5	10.4	-0.2	-1.9
EU-10 average	**8.8**	**9.2**	**8.6**	**8.6**	**8.3**	**8.5**	**8.6**	**-0.4**	-4.0
Min	6.7	6.9	6.1	5.5	5.3	6.0	6.1	-2.6	
Max	25.7	26.6	24.2	26.7	28.7	25.0	26.2	0.5	

Sources: Eurostat Short-term Business Statistics and authors' calculations. Notes: EU-10 average is turnover weighted average.

Given the significant changes in the euro area's trade structure and in profitability across manufacturing sectors, the following empirical analysis will investigate more in detail the effects of increased import penetration on firms' profitability in the euro area manufacturing sector, making also a distinction between the import origins. One should, however, bear in mind that the data constraints limit our analysis to a sample period which was characterised by the creation of the euro area, a growth slowdown in the advanced economies following the burst of the IT bubble in 2001. Moreover, as the profitability data ends in 2004, the latest developments related to the increasing role of China and other emerging market economies cannot be analysed.

[8] Euro area refers in tables 1-2 and figure 2 those 10 EU countries, which are included in the sample given profitability data is not available for Greece and Luxembourg. (see also footnote 5). However, the EU-10 countries accounted for 77% of the turnover in EU-25 manufacturing sector and 64% of the number of firms.

Table 2: Profitability by sector in euro area manufacturing as measured by Gross Operating Rate, (percent)

NACE sector	1999	2000	2001	2002	2003	2004	Average	Change	% Change
15	8.5	8.8	9.0	8.4	8.7	8.2	8.6	-0.2	-2.8
16	6.3	7.5	5.9	4.1	8.0	8.8	6.8	2.5	40.2
17	9.8	10.0	9.2	8.6	8.1	8.0	8.9	-1.8	-18.5
18	7.2	8.5	9.1	8.1	8.4	9.3	8.4	2.0	28.3
19	9.1	8.8	9.4	8.5	7.6	8.0	8.6	-1.1	-11.9
20	9.6	9.9	10.2	9.6	9.7	9.4	9.7	-0.3	-2.6
21	11.9	13.0	12.7	12.1	10.4	10.0	11.7	-1.9	-16.3
22	13.3	13.8	11.8	12.4	12.1	12.4	12.7	-0.9	-6.9
23	4.0	5.9	4.3	4.0	4.9	5.9	4.8	1.9	47.7
24	12.3	12.4	11.7	13.4	12.2	11.6	12.3	-0.8	-6.1
25	11.1	10.0	9.4	9.9	9.3	9.4	9.9	-1.7	-15.2
26	13.9	13.5	12.9	13.0	12.6	12.8	13.1	-1.1	-7.9
27	7.7	9.2	7.1	6.7	6.8	9.1	7.8	1.4	18.2
28	11.4	11.5	11.3	11.0	10.7	10.3	11.0	-1.1	-9.4
29	7.9	8.6	8.6	8.2	7.4	8.0	8.1	0.1	1.2
30	6.7	6.7	5.2	4.1	5.4	6.8	5.8	0.2	2.9
31	7.9	9.1	6.5	5.8	6.8	7.4	7.3	-0.5	-5.7
32	9.9	10.6	7.0	5.8	7.8	8.8	8.3	-1.1	-11.2
33	9.5	12.1	12.6	11.5	11.8	12.1	11.6	2.7	28.0
34	4.2	3.7	4.5	3.1	3.9	4.0	3.9	-0.3	-6.2
35	6.5	6.5	6.6	6.8	5.9	2.5	5.8	-4.0	-61.6
36	9.4	9.5	9.4	8.7	8.1	8.2	8.9	-1.2	-13.2
EU-10 average	**8.8**	**9.2**	**8.6**	**8.6**	**8.3**	**8.5**	**8.6**	**-0.4**	-4.0
Min	4.0	3.7	4.3	3.1	3.9	2.5	3.9	-4.0	
Max	13.9	13.8	12.9	13.4	12.6	12.8	13.1	2.7	

Sources: Eurostat Short-term Business Statistics and authors' calculations. Notes: EU-10 average is turnover weighted average.

3. Related literature

As Oliveira Martins et al. (1996) points out, competition is a complex state and process, because it is multi-dimensional, difficult to quantify, and varies widely between industries. In the literature, the following factors have been found to affect the overall level of competition: number of firms, market concentration, regulation, national and international openness, competition policies, subsidies, procurement policies, and trade policies. The findings of the earlier literature are reflected in the choice of independent variables to our analysis.

After the important methodological contributions by Hall (1986, 1988) and Roeger (1995)[9], several authors, following Levinsohn (1993), who introduced the 'imports-as-market-discipline hypothesis'[10], have investigated the role of import competition on firms' profitability. In fact, some of the earlier studies[11]

[9] See also Domowitz et al. (1988).
[10] Levinsohn (1993, 2): 'When faced with intensified international competition, domestic industries, which may have reaped oligopoly profits in a protected domestic market, are forced to behave more competitively'.
[11] See e.g. Harrison (1994) on Cote d'Ivoire, Krishna and Mitra (1998) on India, and Pavcnik (2002) on Chile.

analysed the impact of trade reforms in emerging market economies, and the implicit role of increased import competition on firms' behaviour.

In a recent multi-country study, Boulhol (2005) examines the determinants of price-cost margins for OECD countries in 1970-2003. In particular, the main objective of his paper is to quantify the pro-competitive effects of international trade on price-cost margins. According to his estimates, one percentage point increase in the import penetration lowers price-cost margins by around 0.005, while on average, imports have contributed to a 0.042 decrease in price-cost margins over the sample period.

As regards to studies on EU countries, Sauner-Leroy (2003) analyses the effect of the EU Single Market Programme on markups in the manufacturing industry. His main finding is that the price-cost margins decreased in the period 1989-1993, but increased again between 1994 and 2000. The author points out that the fall in markups in 1989-1993 is related to increasing import competition, while the latter rise is due to efficiency gains, once the manufacturing industry was adapted to the level of competition under the Single Market Programme. According to the results, the Nordic Countries, especially Finland, were least affected by increasing competition.

Furthermore, Chen et al. (2004, 2006) investigate the competitive effects of increased trade on prices, productivity and markups, using sectoral data for EU manufacturing sectors over the period 1988-2000. The authors find that increased openness exerts a negative and significant impact on sectoral prices, as it reduces markups and raises productivity. They also found that domestic openness acts to reduce profit margins, while the opposite is true of foreign openness.

Similarly to our study, Hansson (1992) analyses the effect of imports on price-cost margins by distinguishing import origins by regions. He finds considerable differences in the impact of import origins on the markups by region: imports from less developed countries reduce price-cost-margins in Sweden far more than imports from developed countries. Furthermore, imports from Japan and Asian NICs decrease price-cost margins more than imports from other countries. Hansson (1992) concludes that import competition affected significantly firms' profits in the Swedish manufacturing industries between 1969 and 1987.[12]

Two recently released contributions to markup analysis include Ellis and Smith (2007) and Christopoulou and Vermeulen (2008). The former explains the upward trend of the profit share with increasing technological progress, which gives firms a more favourable bargaining power. The latter estimates markups in euro area countries and the US, and find *inter alia* that services yield on average higher markups than manufacturing.

[12] See also Lundin (2004) and Stålhammer (1991) for other related studies using Swedish data.

4. Empirical analysis

Definition of profitability

In this section, we define the concept profitability that is used throughout the analysis.[13] Starting with the basic concepts, the price-cost margin (PCM), introduced by Collins and Preston (1968, 1969), is computed as follows: Consider a firm with constant returns to scale in the long-run, and let v denote variable cost per unit, δ depreciation rate of capital, ρ competitive rate of return, P output price, Q output, and K the value of capital employed.[14] Then the markup of price over long-run average cost (a proxy for marginal cost) is given by:

$$\frac{P - v - (\rho + \delta)(K/Q)}{P} = \frac{PQ - vQ}{PQ} - (\rho + \delta)\frac{K}{PQ} \qquad (1)$$

In this equation, $\frac{PQ - vQ}{PQ}$ denotes the profitability or economic profits (π): (revenue – variable cost) / revenue. Under competitive markets, the PCM equals (on average) the required rental price of assets employed per unit value of sales.

In the trade models with imperfect competition, the ratio of output prices to marginal cost (C) is a decreasing function of the elasticity of demand (η):

$$\frac{P}{C} = \left(\frac{\eta}{\eta - 1}\right) \qquad (2)$$

Therefore, trade liberalization or a rise in the openness increases the elasticity of demand of domestic goods, decreasing firms' markups and profitability. In the literature, several mechanisms have been developed to model the increase in the elasticity of demand. For instance, in the model of Helpman and Krugman (1985), trade liberalization reduces the market share of domestic firms, increasing the demand elasticity of their products. Other mechanisms include: changes in relative prices (Devarajan and Rodrick, 1991), removal of non-tariff barriers (Bhagwati, 1978), or increase in the available product variety (Krugman, 1978). Similar results are also found in the collusion models, with trade liberalization depressing the prices of domestically produced goods and declining markups.[15]

To measure **profitability** in the EU manufacturing sector, we use the *Gross Operating Rate* obtained from Eurostat's Structural Business Statistics (SBS) database. It is calculated by taking the gross operating surplus and dividing it by turnover, and expressing the result as a percentage. The gross operating surplus is

[13] See discussions on the correct empirical specification of price-cost margins from e.g. Conyon and Machin (1991a,b) and Dickson (1994).
[14] This presentation follows Schmalensee (1989, 960-61).
[15] See Tybout (2001) and references therein for more details.

defined as the surplus generated by operating activities after the labour factor input has been recompensed.[16] It is calculated by subtracting the personnel costs from the value-added at factor cost[17]:

$$\pi = \textit{Gross Operating Surplus} / \textit{Turnover} \quad (3)$$

$$= \textit{(Value added at factor cost – personnel costs)} / \textit{Turnover} \quad (4)$$

In our sample, the profitability measure is available for 10 euro area countries (EU-10): Austria, Belgium, Finland, France, Germany, Ireland, Italy, The Netherlands, Portugal, and Spain. Data limitations do not allow us to analyse the whole euro area, i.e. Luxemburg, Greece, Slovenia, Cyprus, and Malta are excluded from the estimation sample.

Other data issues

The dataset used in the study consists of annual data of 15 manufacturing sectors in the 10 euro area countries for 1995-2004. The manufacturing sectors (Annex Table 1) are selected to give the best possible match between the main databases used in the paper: Eurostat's Structural Business Statistics (SBS) database and Intra- and Extra-European Trade (COMEXT) database.

The above databases are used to calculate the variables in the following way: First, the profitability measures are calculated as stated in the previous section. Second, the measure for domestic competition is calculated using data from the SBS database as the share of large firms[18] of the total domestic turnover in the sector. Third, the value of imports by country, sector and year are extracted from the COMEXT database. The measure for import penetration is calculated as the ratio of import value in the sector to the sum of values of domestic production and imports in the sector. In order to evaluate, whether import penetration from different import origins have a different impact on profitability and markups, we consolidate the import origins into 8 geographical entities: United States, Japan, advanced Europe, China, emerging Asia outside China, Latin America, Central and Eastern Europe, and Russia. The regions are described in Table 2 in the Annex. Fourth, productivity is measured as labour productivity and is calculated as Gross Value Added at basic prices divided by persons employed.[19] Five, the scale factor is calculated as the average size of the firm operating in the sector. This is calculated as dividing the turnover in the sector by the number of firms. Finally, the following variables: "product market regulation", "strictness of employment protection legislation", and "degree of labour union membership" are obtained from the

[16] By excluding capital costs we are introducing an upward bias for profitability in capital intensive sectors.
[17] By using value added instead of gross output we are not taking into account of intermediate inputs, which might lead to an upward bias of profitability as noted by Roeger (1995) in the case of markups.
[18] The firm is considered as large when it employs more than 50 employees.
[19] The variable "persons employed" consist of also temporary staff such as consultants, and is expected to yield to more accurate measure of labour productivity than when the variable "number of employees", which consists only of permanent staff in the sector, is used.

OECD to measure the bargaining power of employees and the degree of product market regulation in a country.[20] Table 3 in Annex gives more details on the data used in the analysis.

Finally, we investigate the time series properties of the series by using panel unit root tests by Levin et al. (2002) and Im et al. (2003), which are shown in table 4 in the Annex. According to the test results, the null hypothesis of a unit root was rejected at 1% level in all series when either a constant or a constant and a linear term were included in the specification. Therefore, all the series were treated as (trend) stationary variables throughout the analysis.

Estimation methods

In order to analyse the effects of imports by import origin on profitability in the EU manufacturing, we estimate the following dynamic panel data models:

$$\pi_{it} = \beta_{\mu}\pi_{it-1} + \beta_{\varphi}\varphi_{it} + \sum_{r=1}^{8}\beta_{r,\theta}\theta_{r,it} + \beta_{\rho}\rho_{it} + \beta_{\delta}\delta_{it} + \beta_{\vartheta}\vartheta_{jt} + \beta_{\omega}\omega_{jt} + \beta_{\psi}\psi_{jt} + \sum_{t=1995}^{2004}\beta_{t}t_{t} + u_{it} \qquad (5)$$

for a sector $i=1,..,144$ (in a country $j=1,...,10$) and time $t=1996,..,2004$, where the error term:

$$u_{it} = \eta_{i} + \nu_{it} \qquad (6)$$

contains a sector-specific effect η_i, and satisfies the standard conditions:

$$E(\eta_i)=0, E(\nu_{it})=0, E(\eta_i\nu_{it})=0 \text{ for } i=1,..,N \text{ and } t=2,..,T \qquad (7)$$

$$E(\nu_{it}\nu_{is})=0 \text{ for } i=1,..,N \text{ and } \forall t \neq s \qquad (8)$$

$$E(y_{i1}\nu_{it})=0 \text{ for } i=1,..,N \text{ and } t=2,..,T \qquad (9)$$

In the equations, π denotes profitability, φ denotes the measure for domestic competition, θ_r denotes the measure for external competition (import penetration by import origin r), ρ denotes the labour productivity, δ denotes the average size of the firm, ϑ denotes the measure for product market regulation, ω denotes the degree of labour unionisation, ψ denotes the measure for employment protection legislation, and t denotes time trends.

The models are estimated using the Generalized Method of Moments (GMM) estimation method due to the endogeneity of market structure on profitability.[21] The models are estimated using "system GMM" following Blundell and Bond (1998), using heteroscedasticity and serial correlation robust standard errors calculated using the one-step procedure.[22] As instruments, we use the second and third lags of the independent variables, as well as the third lag of the dependent variable. Finally, all the models are estimated using Stata 9.2 software with the XTABOND2 command by Roodman (2006).

[20] Following Boulhol et al. (2006), see Nicoletti et al. (2000) or Bassanini and Duval (2006) for more details.
[21] See e.g. Sutton (1991, 1997).
[22] See Windmeijer (2005) for more details.

In addition to the main model estimates, we also evaluate the impacts of import penetration on firms' profitability by country and sector, by estimating the model in equation 5 with interaction terms for the sectors and countries. To evaluate the effects for country *j*, we estimate the following model with country dummies interacted with sector-specific import penetration:

$$\pi_{it} = \beta_\mu \pi_{it-1} + \beta_\varphi \varphi_{it} + \beta_\theta \theta_{it} + \beta_\rho \rho_{it} + \beta_\delta \delta_{it} + \beta_\vartheta \vartheta_{jt} + \beta_\omega \omega_{jt} + \beta_\psi \psi_{jt} + \sum_{t=1995}^{2004} \beta_t t_t + \sum_{j=1}^{10} c_j + \sum_{j=1}^{10} c_j \theta_{it} + u_{it} \quad (10)$$

Similarly, to evaluate the effects for sector *i,* we estimate the following model with sector dummies interacted with sector-specific import penetration:

$$\pi_{it} = \beta_\mu \pi_{it-1} + \beta_\varphi \varphi_{it} + \beta_\theta \theta_{it} + \beta_\rho \rho_{it} + \beta_\delta \delta_{it} + \beta_\vartheta \vartheta_{jt} + \beta_\omega \omega_{jt} + \beta_\psi \psi_{jt} + \sum_{t=1995}^{2004} \beta_t t_t + \sum_{i=1}^{15} s_i + \sum_{i=1}^{15} s_i \theta_{it} + u_{it} \quad (11)$$

5. Empirical results

The empirical results are presented in the tables 3-5. Overall, the models seem to be well-specified as shown by the tests of overidentifying restrictions (Hansen's J-statistics), as well as the test statistics of the Arellano-Bond (1991) test for serial correlation in residuals. In all cases, the test for overidentifying restrictions can not be rejected, validating the use of lagged values of the variables as instruments. Regarding the tests for serial correlation in residuals, the null hypothesis of serial correlation of AR(2) in differences is not rejected at conventional levels of statistical significance, reflecting that overall there is no AR(1) serial correlation in levels of the residuals. Furthermore, the estimated coefficients for the lagged dependent variables are statistically significant at 1% level, and not close to unity, indicating absence of potential misspecification or a unit root in the series. Finally, there is one important caveat that should be noted: Due to the nature of the data, there is potentially an upward bias in the estimated coefficients due to the attenuation bias, as higher domestic and international competition leads weaker firms to exit the industry, thereby leaving only advantageous firms in the sample.[23] The results are discussed more in detail in the following sections.

The overall effects of import penetration on profitability

The estimates of the equation (5) are presented in table 3. Column 1 in table 3 provides the estimates for the model, where import penetration variable is constructed using total imports. Column 2 shows the estimated coefficients for the model, where import penetration is calculated separately for imports from advanced and emerging countries. Finally, column 3 presents the estimated coefficients with an import origin breakdown into 8 regions.

[23] However, the chosen estimation method can partly alleviate this problem.

According to the estimation results, import penetration is found to have overall a statistically significant negative effect on profitability with an elasticity of -0.09 (table 3, column 1). This implies that a 10 percent increase in the import penetration would decrease profitability by 0.9 percent, *ceteris paribus*. Furthermore, we find import penetration with imports from emerging market economies to have a statistically significant negative effect on profitability with an elasticity of -0.07. In contrast, the import penetration variable with imports from advanced economies is estimated not to be statistically significant (table 3, column 2). Regarding different import origins, we find statistically significant negative effects for imports from the United States (elasticity -0.09), China (-0.07), and Russia (-0.05), while the import penetration variable with imports from Latin America is estimated to have a positive effect (0.05) on profitability. Finally, import penetration variables with imports from advanced Europe, Japan, emerging Asia outside China, and emerging Europe are estimated not to be statistically significant.

Interestingly, import penetration from advanced Europe (intra-European trade) is estimated not to have statistically significant effects on profitability[24], while imports from some emerging market economies and the United States are estimated to have negative effects. The obtained results for import penetration from emerging market economies and the United States (with the exception of Latin America) are in line with the pro-competitive effect or the 'imports-as-market-discipline hypothesis', where foreign competition declines domestic market power, leading to a lower markups and profitability in the sector.[25] However, as Tybout (2001) points out, this could also be due to the fact that sectors that are relatively more efficient and have higher profitability can be less open, due to stronger entry competition. In any case, this issue is at least partly controlled for by the inclusion of the productivity variable in the models. While the negative coefficient of Russia is obviously related to energy as an input factor, the negative effects of imports from the United States and China could be associated with more processed goods competing with domestically produced items. Moreover, imports from Latin America are not 'disciplining the market' but rather enhancing competitiveness of the domestic companies; as e.g. Brazil is EU's principal source of food and raw material imports, it seems that goods from this continent enhance the profitability of firms, which further process them.

As noted by Schmalensee (1989, 976), the negative effects of import penetration on profitability are often found in the empirical literature. However, given the recent empirical evidence on EU countries with a detailed breakdown of import origins is scarce, it is hard to directly compare our results to existing

[24] This is most likely the reason why imports from advanced economies as a whole are not found to have a statistically negative effect on profitability in table 3, column 2 despite of the estimated negative effect of the United States.

[25] See also Schmalensee (1989, 976) for the survey of the earlier empirical evidence: ´The ratio of imports to domestic consumption tends to be negatively correlated with the profitability of domestic sellers, especially when domestic concentration is high.'

Table 3 - Main models

Dependent variable: profitability	(1)	(2)	(3)
Profitability (t-1)	0.6326***	0.6007***	0.5173***
	[0.1009]	[0.1086]	[0.1467]
Productivity	0.4052***	0.4765***	0.7608***
	[0.1216]	[0.1368]	[0.2367]
Size	-0.2065***	-0.2260***	-0.3266***
	[0.0671]	[0.0717]	[0.1002]
Domestic competition	-0.0339	-0.0189	-0.0447
	[0.0388]	[0.0379]	[0.0402]
Labour union density	-0.0539	-0.0469	-0.0061
	[0.0335]	[0.0354]	[0.0521]
Employment protection legislation	-0.1027	-0.0802	0.045
	[0.0908]	[0.0986]	[0.1456]
Product market regulation	-0.4932***	-0.5293***	-0.8453***
	[0.1644]	[0.1823]	[0.2910]
Import penetration	-0.0881**		
	[0.0397]		
Import penetration (Advanced)		-0.0288	
		[0.0467]	
Import penetration (EMEs)		-0.0714*	
		[0.0365]	
Imports from advanced Europe			-0.0823
			[0.0620]
Imports from USA			-0.0864**
			[0.0345]
Imports from Japan			0.0082
			[0.0204]
Imports from China			-0.0716*
			[0.0411]
Imports from other emerging Asia			0.0508
			[0.0452]
Imports from emerging Europe			-0.0274
			[0.0297]
Imports from Latin America			0.0495**
			[0.0246]
Imports from Russia			-0.0502***
			[0.0192]
Observations	1040	1040	990
Number of sectors	144	144	141
Number of instruments	190	190	190
Hansen J-statistic p-value	0.989	0.991	0.988
AR1 p-value	0.000	0.000	0.000
AR2 p-value	0.273	0.313	0.524

*Notes: Robust standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1.*
Models include also a constant and time dummies.
Estimation method: Blundel - Bond (1998) GMM.

literature. However, our results are broadly in line with those of the Boulhol (2005), who studied OECD economies, but opposite to those of Sauner-Leroy (2003) and Imbs et al. (2004, 2006) who studied EU countries. The difference to the latter studies might be due to differences in the sample period or due to different estimation methods.

Our results also show that there is no statistically significant effect of domestic competition or concentration on profitability.[26] Regarding the other variables in the models, we find productivity to have a statistically significant and positive impact on profitability, in line with economic theory. In contrast, the average size of the firm[27] and the proxy for product market regulation are estimated to have negative impacts on profitability. Finally, proxies for regulation, and labour market conditions are found not to be statistically significant.

Country and sector effects

To analyse whether import penetration has had asymmetric effects on euro area countries or manufacturing sectors over the sample period, we estimate the models specified in the equations (10) and (11) with interaction terms of import penetration with country and sector dummy variables. In the models, Austria and 'basic metals and fabricated metals' (NACE sectors 27+28)[28] are chosen as the reference country and sector, as they are the closest to the euro area average jointly in profitability and import penetration. As with the main models, the country and sector analysis is done for both specifications: for the total import penetration, and for the import penetration originated with emerging market economies only. The estimation results of the equations (10) and (11) are presented in tables 4 and 5, respectively.

In the country analysis, we find statistically significant and negative elasticities for total import penetration on profitability in the following countries (in the order magnitude): Austria (elasticity -0.47), Portugal (-0.17), Italy (-0.05), the Netherlands (-0.03) and Finland (-0.002), while the elasticities are estimated to be statistically significant and positive for Ireland (0.17) and Belgium (0.07). Regarding imports from emerging market economies, negative and statistically significant elasticities are estimated for Austria (-0.55), France (-0.20), Portugal (-0.09), and Germany (-0.03), while positive elasticities are estimated for Ireland (0.07), Italy (0.06), Belgium (0.06), Finland (0.06), and the Netherlands (0.03).

The results should be seen together with the general trends in profitability in the euro area countries. In fact, profitability increased during the estimation sample period[29] in Austria (27%), Ireland (13%), Spain (9%), and Belgium (5%), while it declined in Portugal (19%), the Netherlands (10%), Italy (9%), Finland (9%), France (3%), and Germany (3%). Interestingly, despite Austria is estimated to be the most negatively

[26] As Schmalensee (1989, 975) states, many studies have failed to find a positive linear relation between concentration and profitability.

[27] The average size of the firms in the sector can proxy, e.g. the scale effects (positive effect), there seems to be no support for a general relation between absolute firm size and profitability. (see Schmalensee 1989, 982).

[28] The sector consists of sectors 27 and 28 in the NACE classification.

impacted by the total and EME import penetration of the euro area countries, the profitability of the firms rose there over the sample period.

Table 4 - country models

Dependent variable: profitability	(1) Total imports	(2) EME imports
Profitability (t-1)	0.6564***	0.6098***
	[0.1482]	[0.1527]
Productivity	1.1026***	1.2934***
	[0.3365]	[0.3526]
Size	-0.4168***	-0.4219***
	[0.1067]	[0.1154]
Domestic competition	-0.1279*	-0.0467
	[0.0752]	[0.0691]
Labour union density	0.0605	-0.4321
	[0.4899]	[0.5595]
Employment protection legislation	-0.0575	-0.3298
	[0.1812]	[0.2177]
Product market regulation	-0.7448*	-0.7222
	[0.4428]	[0.5578]
Import penetration	-0.4713***	-0.5533***
	[0.1370]	[0.1163]
Import penetration x Belgium	0.5442***	0.6159***
	[0.1935]	[0.1560]
Import penetration x Finland	0.4690**	0.6126***
	[0.1902]	[0.1480]
Import penetration x France	-0.0984	0.3506**
	[0.2835]	[0.1694]
Import penetration x Germany	0.4043	0.5185***
	[0.2856]	[0.1662]
Import penetration x Ireland	0.6380***	0.6259***
	[0.2237]	[0.1387]
Import penetration x Italy	0.4203**	0.6159***
	[0.1969]	[0.1857]
Import penetration x Netherlands	0.4391***	0.5856***
	[0.1669]	[0.1401]
Import penetration x Portugal	0.3033*	0.4621***
	[0.1602]	[0.1566]
Import penetration x Spain	-0.0412	0.2867
	[0.2709]	[0.2397]
Observations	1040	1040
Number of sectors	144	144
Number of instruments	118	118
Hansen J-statistic p-value	0.434	0.428
AR1 p-value	0.000	0.000
AR2 p-value	0.351	0.307

*Notes: Robust standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1.*
Models include also a constant, as well as country and time dummies.
Estimation method: Blundel - Bond (1998) GMM.

[29] Table 1 shows the evolution of profitability in 1999-2004 for the EU-10 countries. However, the estimation sample used in the paper is slightly different, e.g. it starts from 1995.

Table 5 - sector models

Dependent variable: profitability	(1) Total imports	(2) EME imports
Profitability (t-1)	0.7894***	0.7297***
	[0.1531]	[0.1401]
Productivity	0.4547**	0.5672**
	[0.1843]	[0.2229]
Size	-0.0914	-0.1807
	[0.1211]	[0.1127]
Domestic competition	-0.0312	-0.0142
	[0.0632]	[0.0625]
Labour union density	-0.0128	-0.0538
	[0.0582]	[0.0422]
Employment protection legislation	0.1322	-0.0525
	[0.1400]	[0.1249]
Product market regulation	-0.3875	-0.3118
	[0.3833]	[0.3207]
Import penetration	-0.1976**	-0.1666
	[0.1008]	[0.1685]
Import penetration x sector 1	0.3297	0.207
	[0.2134]	[0.2303]
Import penetration x sector 2	0.6096**	0.3717*
	[0.2427]	[0.1919]
Import penetration x sector 3	0.1523	0.2187
	[0.2281]	[0.3661]
Import penetration x sector 4	-0.0743	-0.2208
	[0.1180]	[0.2280]
Import penetration x sector 5	0.1548	0.0987
	[0.1576]	[0.1698]
Import penetration x sector 6	0.3205*	0.1669
	[0.1670]	[0.1625]
Import penetration x sector 7	0.5380**	0.3756*
	[0.2199]	[0.2254]
Import penetration x sector 8	0.1532	0.4358**
	[0.1395]	[0.2034]
Import penetration x sector 9	0.0999	0.0225
	[0.0999]	[0.2245]
Import penetration x sector 11	0.0929	0.0801
	[0.1910]	[0.3227]
Import penetration x sector 12	0.0755	0.0743
	[0.1630]	[0.2149]
Import penetration x sector 13	0.2454	0.0821
	[0.1799]	[0.2512]
Import penetration x sector 14	0.1423	0.1751
	[0.1745]	[0.1904]
Import penetration x sector 15	0.351	0.2773
	[0.2697]	[0.2066]
Observations	1040	1040
Number of sectors	144	144
Number of instruments	162	162
Hansen J-statistic p-value	0.979	0.937
AR1 p-value	0.000	0.000
AR2 p-value	0.282	0.294

*Notes: Robust standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1.*
Models include also a constant, as well as sector and time dummies.
Estimation method: Blundel - Bond (1998) GMM.

Instead, profitability of firms in Ireland and Belgium is estimated to have increased through imports, potentially due to outsourcing and cheaper intermediary inputs. Finally, similarly to the main models (specification in equation (5)), we find productivity to have a positive and statistically significant effect on profitability, while domestic competition, size, and product market regulation are estimated to have negative effects. The coefficients for the other control variables are estimated not to be statistically significant.

Regarding the sector analysis, we find a statistically significant negative effect for total import penetration for sector 'basic metals and fabricated metals' (elasticity -0.20). Instead, we estimate statistically significant and positive elasticities for the following sectors: 'tobacco products' (0.41), 'chemicals and chemical products' (0.34), and 'pulp and paper' (0.12). Regarding import penetration from emerging market economies, we find do not find a statistically significant coefficient for our reference sector 'basic metals and fabricated metals'. Given its effect is assumed to be zero, we find statistically significant and positive effects for sectors 'rubber and plastic products' (0.44), 'chemicals and chemical products' (0.38), and 'tobacco products' (0.37).

Looking at the developments in profitability over the sample period, 'tobacco products' is the sector where profitability has increased the most over the sample period (40%). In contrast, in the other sectors profitability has declined over the sample period: 'pulp and paper' (19%), 'basic metals and fabricated metals' (16%), 'chemicals and chemical products' (16%), and 'rubber and plastic products' (16%). As regards to the control variables, the coefficient for productivity is estimated to be statistically significant and positive as in the other specifications. However, the other control variables are estimated not to be statistically significant.

Robustness of the results

To test the robustness of the results, the following tests were applied. First, when the estimation sample is changed to 1999-2004, all results remain qualitatively the same as in the benchmark model, with the exception that the estimated coefficients for import penetration from emerging market economies (table 5, column 2) and for the import penetration from China (table 5, column 3), are not statistically significant. Similarly, when the estimation sample is changed to 1995-2001, all results remain qualitatively the same as in the benchmark model, with the exception that the coefficients for total import penetration (table 5, column 1) and import penetration from China (table 5, column 3) are not statistically significant. Second, the estimated coefficients are robust for inclusion of the three non-euro area countries (United Kingdom, Denmark, and Sweden) regarding the statistical significance of coefficients for import penetration from the United States, Russia, and Latin America. Third, the results are robust for changing the instrument structure to only include the second lags of the independent variables. However, in this case, the coefficient for import penetration from emerging market economies (table 5, column 2) is not statistically significant.

However, the estimated coefficients for the import penetration from the United States and Russia are statistically significant. Finally, the results are robust for removal of the control variables: product market regulation, labour unionisation, and employment protection legislation from the models. In this case, however, the estimated coefficient for import penetration from advanced economies (table 5, column 2) is statistically significant at 10% level, while the coefficient for import penetration from emerging market economies is not statistically significant. Moreover, only the coefficient for import penetration from the United States is statistically significant in the model with import penetration breakdown by regions (table 5, column 3).

6. Conclusions

The paper investigates the role of emerging market economies' exports for the profitability of companies in the euro area manufacturing sector in 1995-2004. It has been inspired by the significant changes in the euro area's import structure over the past few years, the associated growing share of emerging market economies, especially of China, and the evidence of moderate output price increases in high technology and import-intensive manufacturing sectors. Contrary to popular reasoning, which postulates a negative impact of globalisation on profitability only, we underline two opposing effects: Imports can trigger *pro-competitiveness* effects on companies and *pro-competitive* effects on markets, i.e. they can exert positive and negative effects on profitability. The former effect is associated with cheaper intermediary inputs or final goods, whereas the latter effect is linked to enhanced market discipline through increased competition. The aim of the paper is to empirically quantify these effects of trade on profitability of companies. The analysis is conducted in the dynamic panel data framework, using the methods by Blundell and Bond (1998).

The paper led to several results: First, we find statistically significant and negative effects of total imports on profitability in the euro area manufacturing sector for the sample period: A 10 percent increase in the total import penetration is estimated to decline profitability by 0.9 percent, conditional on productivity, domestic competition, regulation and labour market conditions. Second, the same holds true for imports from emerging market economies as a whole. In this case, the estimated elasticity is slightly lower at -0.07. Third, in the further breakdown of import origins into eight consolidated regions, we find statistically significant negative elasticities for imports from the United States (elasticity -0.09), China (-0.07), and Russia (-0.05), whereas imports from Latin America (0.05) are estimated to have a positive effect on profitability. Fourth, regarding country heterogeneity within the euro area, we estimate negative and statistically significant elasticities for imports from emerging market economies on profitability for the following countries: Austria (elasticity -0.55), France (-0.20), Portugal (-0.09), and Germany (-0.03), while positive elasticities are estimated for Ireland (0.07), Italy (0.06), Belgium (0.06), Finland (0.06), and the Netherlands (0.03). Fifth, the sector analysis shows that the imports from emerging market economies have

had asymmetric effects on profitability across sectors in the euro area manufacturing industry: While statistically significant and positive elasticities are estimated for sectors 'rubber and plastic products' (elasticity 0.44), 'chemicals and chemical products' (0.38), and 'tobacco products' (0.37). For the other sectors, the estimated elasticities for the emerging market import penetration are not statistically significantly different from zero.

As a caveat, this study was not aimed at tackling the issue of intra-firm trade or the role of imported intermediary inputs in the production process, which are potential factors that can lead to a positive impact of import penetration on profitability. These issues are left to future research.

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7. Annex

Table 1: Manufacturing sectors

	Sector	SBS (NACE / ISIC Rev. 3)	COMEXT (SITC)
1	Food products and beverages	15	0+11
2	Tobacco products	16	12
3	Wearing apparel	18	84+85
4	Leather and leather products	19	61
5	Wood and cork	20	63
6	Pulp and paper	21	64+25
7	Chemicals and chemical products	24	5
8	Rubber and plastic products	25	62+58
9	Non-metallic minerals	26	66
10	Basic metals and fabricated metals	27+28	69
11	Office machinery	30	75
12	Electrical machinery	31	77
13	Medical and optical instruments	33	87+885
14	Motor vehicles and trailers	34	78
15	Other transport equipment	35	79

Table 2: Import groups

	Group	Countries
1	Advanced Europe	EU-15, Malta, Cyprus, Switzerland, Norway, Iceland, and Liechtenstein
2	United States	
3	Japan	
4	China	
5	Emerging Asia outside China	Hong Kong, India Indonesia, Korea, Malaysia, Philippines, Singapore, Taiwan, Thailand, and Vietnam
6	Central and Eastern Europe (Emerging Europe)	Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia
7	Latin America	Argentina, Brazil, Chile, Colombia, and Mexico
8	Russia	

Table 3: Concepts and variables

Concept	Variables	Sources
Profitability	Gross Operating Rate (Value added at factor cost – personnel costs) / turnover)	Eurostat SBS
Import penetration	Imports / domestic production + imports	Eurostat COMEXT and SBS
Import origin	(Imports from region i / total imports) * import penetration of the sector	Eurostat COMEXT and SBS
Domestic competition	Share of large firms (>50 employees) of the total domestic turnover	Eurostat SBS
Productivity	Gross Value Added at Basic Prices / number of employees	Eurostat SBS
Size	Turnover / number of firms	Eurostat SBS
Product market regulation	A broad indicator that measures the economy-wide regulatory and market environment	STATS.OECD.ORG
Strictness of employment protection legislation	An indicator that measures the strictness of employment protection legislation	STATS.OECD.ORG
Degree of labour union membership	Share of union members of the total employment	STATS.OECD.ORG

Table 4: Panel unit root tests

	Constant				Constant and trend			
	LLC		IPS		LLC		IPS	
Series	Test stat	P-value	Test stat	P-value	Test stat	P-value	Test stat	P-value
Profitability	-21.475	0.000	-4.803	0.000	-63.660	0.000	-2.384	0.009
Productivity	-6.507	0.000	2.003	0.977	-143.336	0.000	-7.176	0.000
Size	-4.430	0.000	-2.727	0.003	-39.124	0.000	-0.933	0.175
Domestic competition	-51.024	0.000	-1.792	0.037	-25.071	0.000	-0.612	0.270
Labour union density	-11.813	0.000	-0.131	0.448	-96.056	0.000	-8.241	0.000
Employment protection legislation	-33.357	0.000	-138.336	0.000	-64.586	0.000	-105.238	0.000
Product market regulation	-79.640	0.000	-181.095	0.000	-67.133	0.000	-103.587	0.000
Import penetration	-21.048	0.000	-7.460	0.000	-36.661	0.000	-2.685	0.004
Import penetration (Advanced)	-13.128	0.000	-3.061	0.001	-16.621	0.000	0.194	0.577
Import penetration (EMEs)	-11.350	0.000	-1.349	0.089	-36.204	0.000	-3.067	0.001
Imports from advanced Europe	-16.940	0.000	-4.005	0.000	-9.423	0.000	-0.132	0.447
Imports from USA	-109.593	0.000	-6.807	0.000	-22.010	0.000	-1.213	0.113
Imports from Japan	-24.903	0.000	-5.078	0.000	-524.050	0.000	-178.918	0.000
Imports from China	-4.335	0.000	2.575	0.995	-664.093	0.000	-18.220	0.000
Imports from other emerging Asia	-15.265	0.000	-3.815	0.000	-54.615	0.000	-3.898	0.000
Imports from emerging Europe	-16.442	0.000	-3.443	0.000	-62.015	0.000	-1.746	0.040
Imports from Latin America	-14.685	0.000	-2.544	0.006	-19.159	0.000	-1.918	0.028
Imports from Russia	-93.715	0.000	-10.035	0.000	-78.747	0.000	-5.293	0.000

Note: LLC denotes the panel unit root test by Levin et al. (2002), while IPS denotes the panel unit root test by Im et al. (2003). Schwartz information criteria (SIC) was used to determine the lag length either to be 0 or 1 lag.

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