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International trade, exit and entry: A cross-country and industry analysis

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Abstract
This paper examines the impact of globalisation, by means of growing international trade, on firm entry and exit at the industry level. The analysis is carried on the manufacturing industries of eight European countries, over the period 1997–2003. Our main findings suggest important entry-discouraging effects in the short run, following increased trade exposure. Using panel estimation techniques, the empirical evidence points to less creative replacement entry in industries characterised by substantial import intensity, and strong selection and higher entry barriers in industries characterised by higher openness through the export channel. The negative effects of trade openness are milder if the increasing trade exposure concerns intra-industry trade, coupled mainly with international sourcing of intermediates within the industry. The latter effects also show up in the model explaining the exit of firms, which we estimate jointly with entry.
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INTRODUCTION

There is growing evidence that the globalisation of markets and industries has fundamentally changed the competitive conditions facing firms. A number of recent studies in international economics, strategic management and international business have examined how globalisation has affected the strategy and structure of established firms in a wide variety of industries (Bernard, Jensen, Redding, & Schott, 2007; Bowen & Wiersema, 2005; Hutzschenreuter & Gröne, 2009; Wiersema & Bowen, 2008) and/or the exit or relocation of firms across countries (Benito, 2005; Bernard, Jensen, & Schott, 2006b; Coucke & Sleuwaegen, 2008; Greenaway, Gullstrand, & Kneller, 2008; Pennings & Sleuwaegen, 2006). Yet how globalisation has influenced the creation of new firms has largely been overlooked in the literature, in spite of the importance of new business ventures for the renewal and development of the economic tissue of countries and regions in response to rising global competition (Audretsch & Thurik, 2001). Our study contributes to the developing body of global competition research by studying the largely unexplored relationship between international trade and the start-up of new firms. This is done by focusing on firm entry in the manufacturing industries of eight European countries, where the level of trade exposure has been significantly increasing over the last 15 years.

Increasing economic openness implies higher competitive pressure for firms, but also more business opportunities on the international markets. The net effect on the creation of new firms is therefore *a priori* ambiguous, and calls for careful empirical investigation.

In international trade theory, an increase in trade openness is shown to be ultimately welfare enhancing. However, a costly adjustment process needs to be undergone in the short run in order for gains from trade to be realised. Resources in the economy need to be reallocated, across and within sectors, in such a way that efficiency is enhanced. Firms are key players in the latter process. Therefore the role of heterogeneity across firms has been receiving increased attention in the international trade literature, at both the empirical and theoretical level, as reviewed by Bernard et al. (2007) and Tybout (2003). This opens the way for interesting synergies with the international business approach, where firm heterogeneity has been the original cornerstone of the theory linking the international operations of firms to firm-specific advantages (FSAs), rooted in their technology and resource base (Dunning, 1980; Hymer, 1960). Rugman (1981) and Rugman and Verbeke (1992, 2002, 2003) have linked FSAs with country-specific advantages (CSAs), which interact with FSAs, thus developing the conceptual foundations of what has become known as the FSA–CSA framework. In a similar vein, Kogut (1985) related the comparative advantages of countries to the competitive advantages of firms and the spread of their activities across countries. Sleuwaegen (1987) and Sleuwaegen, Veugelers, and Yamawaki (1998) extended the FSA–CSA framework to explain inter-industry differences in international trade and inward/outward FDI flows of countries. In a recent paper, Hutzschenreuter and Gröne (2009) develop the competitive implications of the latter framework and show how import competition exerts a deep impact (differently from FDI) on the competitive environment of local firms.

There is no doubt that the removal of trade barriers in recent years has intensified foreign competition by means of international flows of goods and services. Trade integration has increased not only among industrialised countries, but also with respect to developing economies. Recent empirical studies have been linking these trade developments to the exit of firms. In particular, increasing trade exposure has been found to lower the likelihood of firm survival in the manufacturing industries of industrialised countries (Bernard et al., 2006a, b; Coucke & Sleuwaegen, 2008; Greenaway et al., 2008). Surprisingly, none of these studies has looked at the mirror image of this phenomenon: the impact of trade exposure on new firm creation.

The main contribution of our paper is to shed light on this topic. In particular we explore, at the empirical level, the short-run effects of changes in trade openness on firm creation. We do so by employing a new database recently released by Eurostat, which contains comparable figures on firm entry and exit for several EU countries and industries, over the time span 1997–2003. The data allow us to work on a panel where entry and exit rates for each industry–country pair are tracked over time. The multi-country nature of the data offers clear advantages in terms of the generality and robustness of the findings. The drawback is a somewhat higher level of industry aggregation (NACE subsections). This will be duly taken into account when interpreting the results.

In addition to investigating the impact of trade openness on entry dynamics, we separately explore the role of different dimensions of trade integration. First, following theoretical arguments, we separately look at import and export intensity channels. Second, we also study the effects of changes in the nature of trade at the industry level, as generated by international sourcing of intermediates.

Moreover, since entry cannot be seen in isolation from exit dynamics, we investigate at the same time the impact of trade integration on firm exit rates, in a consistent analytical framework. The modelling of exit dynamics follows existing studies, and is instrumental for a thorough understanding of firm entry in the same industries and countries. Moreover, it allows us to assess the validity of previous literature results on exit, for the first time, in a multi-country framework.

In the second section of the paper we develop our conceptual framework and posit the research hypotheses. The third section describes the data and the empirical model. Results are presented and discussed in the fourth and fifth sections, and the sixth section concludes.

CONCEPTUAL FRAMEWORK AND HYPOTHESES

The present study analyses inter-industry differences in entry rates, that is, the creation of new firms relative to the number of existing firms in an industry (within each of the analysed countries). Taking the "industry" as the unit of analysis to study entry and competition was originally proposed in

the industrial organisation literature (Bain, 1959), and has been successfully developed in the strategic management literature by Michael Porter (1980). Industry-level competition was also the focus of John Dunning when elaborating the eclectic framework of international production to explain import propensity rates and shares of production held by foreign firms in a wide set of industries and countries (Dunning, 1980).

While analysis of the structural characteristics of industries and the strategic responses of firms in relation to global competition has received broad treatment in the IB literature (e.g., Ghemawat, 2007; Yip, 2003), the deeper implications of growing trade exposure for industry dynamics have only recently been attracting attention. Following the latest developments in the literature, we can think about two different mechanisms of industry adjustment to trade. A first one works through firms' growth and strategy. For instance, Bernard et al. (2006b) show that the growth differential in favour of capital-intensive firms rises with the level of import competition in US manufacturing. Moreover, US firms are found to change their product mix systematically in response to import pressure, shifting to more capital- and skill-intensive activities. Rondi, Sleuwaegen, and Vannoni (2004), Bowen and Wiersema (2005) and Hutzschenreuter and Gröne (2009) find that firms narrow their scope of product diversification in response to rising import competition. International outsourcing is equally found to be a strategic reaction sheltering manufacturing firms from import competition (Coucke & Sleuwaegen, 2008). All this evidence points to a trade-related reallocation of resources among surviving firms towards higher value-added activities, consistent with the comparative advantages of developed countries (Acemoglu, Aghion, & Zilibotti, 2006).

Firm churning is the second complementary mechanism of industry adjustment to global competition, and constitutes the focus of our paper. Recent theoretical contributions (Audretsch, Grilo, & Thurik, 2007) interpret entry and exit decisions in a given industry and country as the result of various interacting demand and supply factors, of which the most important elements are summarised in Figure 1. From a demand perspective, entry involving the creation of new firms is driven by new business opportunities. The latter can be related to technological innovations and the development of new products and markets. Moreover, room for

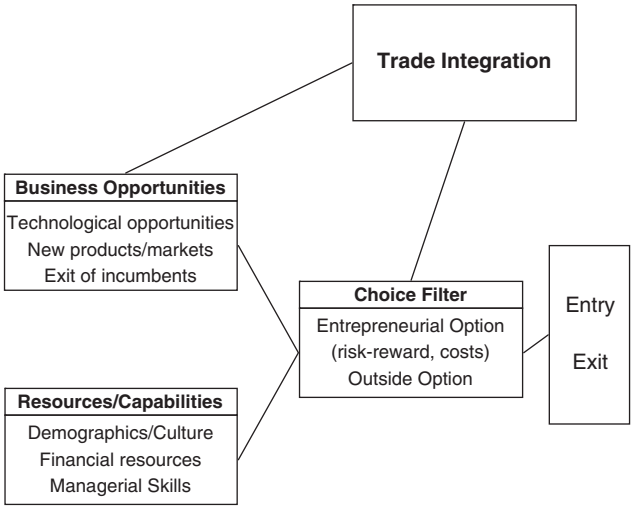

Figure 1 Trade integration, entry and exit.

new entrepreneurial ventures may be created by the exit of incumbent firms, as shown by the "carrying capacity" models of industry dynamics (Carree & Thurik, 1999). From the supply perspective, entry requires entrepreneurs. The effective supply of entrepreneurs is related to demographic and cultural determinants, the availability of financial resources, and managerial skills. Given the business environment, each entrepreneur decides whether to start up a new firm or exit the market, on the basis of risk–reward evaluations and the assessment of outside options, which are related to market wages and the scrap value of firms ("choice filter" in Figure 1).

Within this conceptual framework, international trade integration can be thought of as affecting entry in different ways, in terms both of business opportunities and of risk–reward conditions. On the one hand, trade liberalisation creates more business opportunities in the foreign markets for final goods, and for the sourcing of intermediate inputs. On the other hand, trade integration also implies an increase in the competitive pressure faced by domestic firms, and higher risks of doing business, as competition is broadened across borders in wider international markets. The net effects are *a priori* ambiguous, and might be expected to vary from the short to the long run, as firms and industries adjust to deeper trade integration.

Recently developed models of international trade with heterogeneous firms predict that, in the short-run adjustment, increasing openness to trade results in a sort of "Darwinian" market selection process (Bernard, Eaton, Jensen, & Kortum, 2003;

Melitz, 2003; Melitz & Ottaviano, 2008). When openness to trade increases, the minimum productivity level that is required to stay in business is bid up. As a result, the least productive firms are forced to exit, while the most efficient ones benefit from the liberalisation by entering the export markets and expanding. Thus, in the short run, an increase in openness to trade is expected to result in higher exit rates at the industry level. This prediction has been supported by firm-level empirical work on the US manufacturing sector by Bernard et al. (2006a), who find that falling trade costs are associated with lower survival probabilities at the plant level. The competitive effects and associated higher risks thus seem to outweigh the positive impact of an increase in business opportunities offered by having access to wider foreign markets.

Trade liberalisation forces entrepreneurs to think and act internationally from the outset in order to deal with the more complex and risky international environment in which firms have to compete. A focus on local niche markets becomes less obvious, as entrepreneurs can find themselves facing equally specialised global competition at any moment (Karra & Philips, 2004). The need to find sustainable niches on a wider relevant market stretching across borders has stimulated firms to internationalise faster, and has led to the growing importance of international new ventures or "born globals" (Rasmussen & Koed Madsen, 2002). Such enhanced internationalisation processes go hand in hand with the development of an "improved quality" entrepreneurship. Indeed, there is a supplemental need for specific entrepreneurial skills in order to identify business opportunities on the international markets, and for dealing with the complexities entailed by cross-border operations, cultural differences and networks of alliances (Autio, Sapienza & Almeida, 2000; Karra, Philips, & Tracey, 2008; Knight & Cavusgil, 2004). Unfortunately, recent evidence points to a limited availability of those competencies. According to an extensive survey by OECD (2006), a majority of small and medium-sized firms rated their limited internal capabilities as being more significant obstacles to internationalisation than the barriers related to the business environment.

The stronger competitive selection in an internationally open industry, in combination with the constraints to seize international opportunities in the short run, leads us to posit:

Hypothesis 1: An increase in an industry's openness to trade results in a lower entry rate.

The negative effect of increased trade openness on firm entry could be driven by two different channels, which refer to import and export intensity, respectively. Previous empirical studies have focused on the import channel of displacement, by analysing the impact of import intensity dynamics on firms' survival probabilities and industry exit rates. Increasing import penetration is found to result in lower probabilities of survival at the firm level and, consistently, in higher exit rates at the industry level (Bernard et al., 2006b; Coucke & Sleuwaegen, 2008; De Backer & Sleuwaegen, 2003; Greenaway et al., 2008). Also, large diversified firms facing increasing import displacement in some of their businesses have been found to react by exiting from industries in which they were unable to occupy a leading position, thereby concentrating their efforts on core activities and products, and extending their geographical scope (Bowen & Wiersema, 2005; Hutzschenreuter & Gröne, 2009; Rondi et al., 2004; Wiersema & Bowen, 2008).

Following the reviewed evidence on the influence of trade integration on firm exit, we might expect that the "negative" impact of increasing competitive pressure from imports would also prevail in discouraging entry in the short run. From a theoretical perspective, such an effect is put forward in a model by Grossman (1984). This model indeed predicts lower entrepreneurial rates in an open economy relatively to the autarky case, in the absence of efficient risk-sharing markets. As domestic industries are opened up to imports, the prices of traded goods are lowered, thus making the option of becoming an entrepreneur less appealing with respect to working for a wage, in an "occupational choice" setting. The increase in trade openness thus reduces the room for domestic firm creation through tougher "import-driven" market competition. Hence we posit:

Hypothesis 2a: An increase in import intensity results in lower entry rates.

More recent theoretical findings by Melitz (2003) and Costantini and Melitz (2008) suggest a similar negative effect of rising export intensity on the creation of new firms at the industry level. In fact, as trade exposure increases, the whole industry environment and structure change. The market selects the most productive incumbents, which emerge as successful exporters and grow by capturing new market opportunities abroad. Less efficient firms are increasingly crowded out on the factor

markets by the more productive companies expanding abroad. Indeed, as the latter grow and need more inputs, the net demand and the prices for factors are raised, thus undermining the profitability of the least productive producers. Such an effect, stemming from the self-selection of the most productive firms into exporting, might also be further reinforced through a "learning-by-exporting" channel. For instance, by investigating the export–productivity relationship, Aw, Roberts, and Winston (2007) found exporting to be an important source of productivity growth for manufacturing firms in Taiwan, especially when exporting is coupled with investments in R&D and workers' training. Such a positive correlation between R&D (or other productivity-improving investments) and exporting at the firm level has been recently emphasised by several studies (Aw, Roberts, & Yi Xu, 2008; Bustos, forthcoming; Costantini & Melitz, 2008; Lileeva & Trefler, 2007), and might be explained by the fact that R&D investments increase the returns to exporting, and vice versa. Overall, when trade openness increases, the relevant market for a potential new entrepreneur thus becomes more competitive, owing to the higher productivity of the incumbents, with crowding-out effects on the factor markets and increased sunk investments. This change in the industry structure is captured by an increase in the export intensity at the industry level, and implies higher barriers to entry, which are likely to result in lower creation of new firms. Hence we posit:

> **Hypothesis 2b**: An increase in export intensity results in lower entry rates.

Several empirical studies of industry dynamics have shown that firm entry tends to be positively related with previous exit (Caves, 1998; Dunne, Roberts, & Samuelson, 1988; Mata & Portugal, 1994; Siegfried & Evans, 1994). A theoretical interpretation is provided by the carrying capacity models, with the concept of replacement entry (Carree & Thurik, 1999; Geroski, 1995). The simple underlying idea is that, as incumbent firms exit, room for new entrepreneurs becomes available in the market. In a recent paper, Pe'er and Vertinsky (2008) show how such a process of creative replacement entry is associated with productivity growth at the local level. Indeed, they find that exit of incumbent firms (especially older ones) results in higher subsequent entry and aggregate efficiency gains, as new entrants are on average more productive than exiting firms. These findings suggest that new business ventures may take advantage of resources that are released by previous exit, and re-employ them in more productive ways, for instance by adopting new technologies. Pe'er and Vertinsky do not analyse how different drivers of exit affect these dynamics. However, as manufacturing firms are displaced in a context of increasing import intensity, we might expect the process of replacement entry to be less relevant. In fact, import penetration primarily displaces firms involved in activities that are at odds with a country's comparative advantages, and thus are not appealing to new potential entrepreneurs. Therefore we posit:

> **Hypothesis 3**: Less replacement entry takes place in industries characterised by substantial import intensity.

We have based our hypotheses on the traditional concepts of import and export intensity. Basically this means referring to the evolution of trade volumes relative to domestic production over time. However, there is reason to believe that changes in the composition and nature of trade also matter in explaining industry dynamics. Going back to our previous description of the first margin of industry adjustment to trade integration, Bernard et al. (2006b) have shown that US firms react to import competition by shifting to more capital- and skill-intensive products, which are less exposed to the latter competitive pressure. This suggests that foreign competition may act as a driver of innovation through an "escape-competition effect", as described by Aghion, Bloom, Blundell, Griffith, and Howitt (2005). At the same time, labour-intensive activities are increasingly offshored to low-wage countries. Firms in wealthier economies are actively facing the global competitive pressure by sourcing intermediates abroad and increasing their export sales (OECD, 2007). The cross-country fragmentation of production networks often involves two-way outward processing trade flows.

A measure that has been previously used to reflect both product differentiation and offshoring dynamics is the Grubel–Lloyd (1975) index of intra-industry trade (IIT: see next section). In fact, as shown by Caves (1981), the latter dynamics result in growing import–export overlap at the industry level, captured by an increase in the IIT index. Recent studies by Coucke and Sleuwaegen (2008) and Greenaway et al. (2008) show that firms in industries characterised by high levels of IIT are less

sensitive to import competition in terms of survival probabilities. This effect is attributed to product differentiation and foreign sourcing of intermediates by domestic producers: two strategies that attenuate the displacement potential of imports. By the same token, we can also expect to observe relatively higher entry rates in those sectors in which IIT is increasing. In fact, potential entrepreneurs are in principle more likely to enter those industries that are getting more "fit" with respect to the global competitive scenario, in terms of product mix and sourcing strategies. In particular, given the higher level of industry aggregation of our analysis with respect to previous studies (NACE subsections vs 3–4 digit industries), we hypothesise that an increase in the Grubel–Lloyd index is capturing mainly the international fragmentation of production chains, rather than traditional product differentiation. Thus we attribute the effects of IIT growth to changes in the intensity of foreign sourcing of intermediates, and in the empirical analysis we check for this through a refined application of the Grubel–Lloyd index, where the intensity of foreign sourcing is explicitly taken into account. Hence:

Hypothesis 4: Ceteris paribus, higher entry rates are associated with positive variations in IIT. For broadly defined industries, the effect derives from increased international sourcing of intermediates.

DATA AND EMPIRICAL MODEL

Entry, Exit and Trade

The empirical analysis is based on the new Business Demography Statistics database by Eurostat. The data cover industry entry and exit rates for eight European countries – Belgium, Denmark, Finland, Italy, the Netherlands, Spain, Sweden and the UK – over the period 1997–2003. Data are provided at the Eurostat NACE (Rev. 1.1) "subsection" level of industry aggregation for the manufacturing sector.[1] Subsections are identified by two-character alphabetical codes (from DA to DN), and correspond to two-digit industries or aggregations of them (see Table 1).[2]

Entry and exit rates are defined as the ratio of the number of enterprise births or deaths in the reference year over the number of enterprises active in the same period, for each industry–country pair. Data are comparable across countries, and are constructed to reflect "true" entry and exit of firms. Indeed, in Eurostat's words, enterprise births and deaths refer only to the real creation or dissolution of companies. In practice this is obtained by processing the full national business registers' data in order to identify and exclude those entries and exits that are due just to mergers, takeovers or break-ups of firms. Changes of activities at the firm level also do not result in exit from or entry into

Table 1 NACE (revision 1.1) manufacturing subsections

DA	Manufacture of food products, beverages and tobacco	
	15	Manufacture of food products and beverages
	16	Manufacture of tobacco products
DB	Manufacture of textiles and textile products	
	17	Manufacture of textiles
	18	Manufacture of wearing apparel; dressing and dyeing of fur
DC	19	Manufacture of leather and leather products
DD	20	Manufacture of wood and wood products
DE	Manufacture of pulp, paper and paper products; publishing and printing	
	21	Manufacture of pulp, paper and paper products
	22	Publishing, printing and reproduction of recorded media
DF	23	Manufacture of coke, refined petroleum products and nuclear fuel
DG	24	Manufacture of chemicals, chemical products and man-made fibres
DH	25	Manufacture of rubber and plastic products
DI	26	Manufacture of other non-metallic mineral products
DJ	Manufacture of basic metals and fabricated metal products	
	27	Manufacture of basic metals
	28	Manufacture of fabricated metal products, except machinery and equipment
DK	29	Manufacture of machinery and equipment n.e.c.
DL	Manufacture of electrical and optical equipment	
	30	Manufacture of office machinery and computers
	31	Manufacture of electrical machinery and apparatus n.e.c.
	32	Manufacture of radio, television and communication equipment and apparatus
	33	Manufacture of medical, precision and optical instruments, watches and clocks
DM	Manufacture of transport equipment	
	34	Manufacture of motor vehicles, trailers and semi-trailers
	35	Manufacture of other transport equipment
DN	Manufacturing n.e.c.	
	36	Manufacture of furniture; manufacturing n.e.c.
	37	Recycling

Table 2 Entry and exit rates (country averages)

Country	*Entry rate (%)*	*Exit rate (%)*
Belgium	4.8	5.7
Denmark	5.8	6.2
Finland	5.1	5.7
Italy	5.7	5.9
Netherlands	5.6	6.3
Spain	6.8	6.1
Sweden	4.7	4.8
UK	8.3	9.8
Mean	5.8	6.3

Data source: Eurostat Business Demography Statistics, manufacturing sector.

Table 3 Entry and exit rates (yearly averages)

Year	*Entry rate (%)*	*Exit rate (%)*
1997		6.2
1998	6.9	6.4
1999	6.0	6.4
2000	5.8	6.3
2001	5.8	6.1
2002	5.5	6.4
2003	5.4	6.5

Data source: Eurostat Business Demography Statistics, manufacturing sector.

a given industry. Moreover, a company is excluded from the count of deaths in a given period if it gets reactivated within 2 years. This kind of data processing also explains the time lag in the data release.

Table 2 provides some descriptive statistics referring to country-specific entry and exit rates, on average across industries and time. As we can see from the bottom row, entry and exit rates average 5.8% and 6.3%, respectively. The UK and Spain are the countries displaying the highest level of firm churning. Spain is also the only country for which entry rates are on average higher than the exit rates. In Table 3 we report the yearly average figures (across countries and industries). Two trends seem to emerge: exit rates are slightly increasing over time, while entry rates are significantly declining. For instance, the mean entry rate drops from 6.9% in 1998 to 5.4% in 2003.

Industry import and export flows are retrieved from the Eurostat COMEXT foreign trade database, from 1995 to 2003. We adopt the following measure of general openness to trade: the sum of industry imports and exports over the sum of domestic

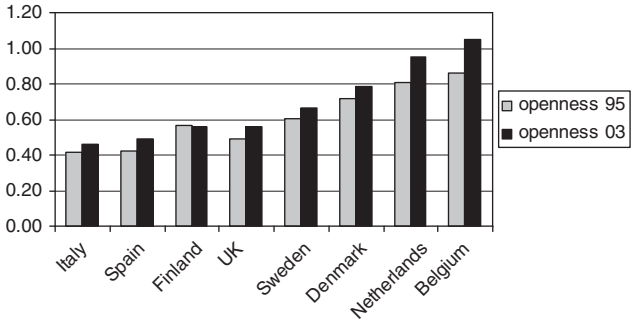

Figure 2 Variation in trade openness, overall manufacturing: 1995–2003.
Data source: Eurostat COMEXT and Structural Business Statistics.

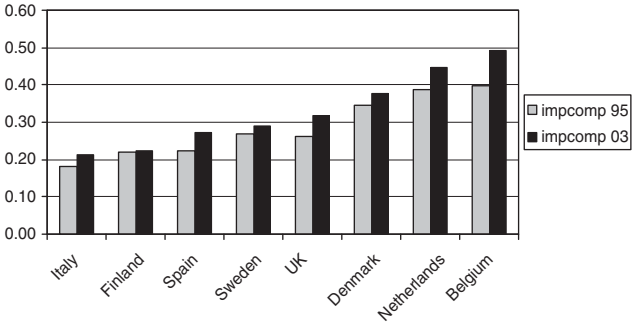

Figure 3 Variation in import intensity, overall manufacturing: 1995–2003.
Data source: Eurostat COMEXT and Structural Business Statistics.

production plus imports[3] (Klein, Schuh, & Triest, 2003). This index can be further decomposed into two components: import and export intensity. The former is defined as in Davis, Haltiwanger, and Schuh (1996): industry imports over the sum of domestic production plus imports. Export intensity is computed as the ratio of industry exports over the same denominator. Figure 2 shows the evolution of the general trade openness index from 1995 to 2003, at the country level, for the whole manufacturing sector. The level of trade exposure is increasing everywhere but in Finland. The average index growth is around 0.08, with Belgium showing the highest figure: 0.19. Figures 3 and 4 reveal that the increase in general openness is driven almost equally by the two components of import and export intensity. Indeed, they grow on average by 0.04 and 0.03, respectively. These descriptive statistics confirm the view that a trade integration process is going on, and is characterised by both increasing import and export intensity at the industry level.

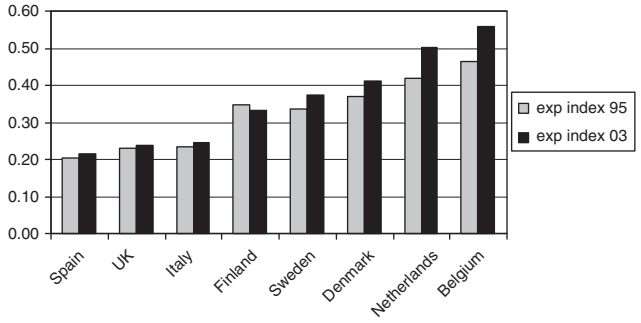

Figure 4 Variation in export intensity, overall manufacturing: 1995–2003.
Data source: Eurostat COMEXT and Structural Business Statistics.

Finally, in order to test for Hypothesis 4 we shall employ the Grubel–Lloyd (1975) index of IIT, which is computed as follows:

$$\mathrm{IIT}_{ijt} = 2\frac{\min(M_{ijt}, X_{ijt})}{M_{ijt} + X_{ijt}} \quad (1)$$

where M equals total imports and X stands for total exports of sector i, in country j, at time t.

The index ranges between 0 (no IIT) and 1 (imports=exports), and captures the level of trade overlap between each industry–country pair and the trading partners. As shown by Caves (1981), this index of IIT is likely to grow following firms' strategic reactions to global integration, in terms of product differentiation and production offshoring. For instance, there is evidence that companies adjust to increasing import pressure by changing their product mix towards higher value-added goods, characterised by higher export potential and lower intensity of cost-based foreign competition (Bernard et al., 2006b). At the same time, low value-added goods are increasingly imported, in particular from low-wage countries. Moreover, global sourcing of intermediate inputs and outward processing trade are also significantly growing (OECD, 2007). The first transactions-based evidence on trading activities shows that importing and exporting tend to be very correlated at the firm level. In the US, for instance, 79% of manufacturing importers also export and 41% of exporting firms also import (Bernard et al. 2007). This suggests that importing intermediates from abroad and spreading the supply chain at the global level might constitute a source of competitive advantage for firms in their final product markets, leading to higher exports.

When evaluated at our broad (NACE "subsection") level of industry aggregation, we expect the Grubel–Lloyd index to pick up mainly the effects of increasing foreign sourcing of intermediates, rather than product differentiation dynamics. In the empirical analysis we explicitly check for this by interacting the variations in IIT with two dummy variables, pointing at two groups of industry–country pairs. Group "high" includes those pairs for which the intensity of global sourcing is increasing between 1995 and 2000, and group "low" incorporates the remaining ones. This methodological choice is due to data availability on international sourcing, whose intensity is measured as the share of imported intermediates out of the total value of inputs that each industry is sourcing from itself (Feenstra & Hanson, 1996). In fact, this ratio is computed starting from Eurostat input–output data, which are available only for the years 1995 and 2000. Thus yearly variations cannot be computed. However, the changes over 5 years are still suggestive of the industry- (and country-) specific trends in terms of global sourcing, and allow us to explore the influence of offshoring on new firm creation.

The Empirical Model

The baseline econometric model that will be estimated in order to test for our hypotheses corresponds to

$$\begin{aligned}\mathrm{Exit(Entry)}_{ijt} = {} & \beta_0 + \beta_1 \mathrm{lag}(\Delta\mathrm{Trade\_Index}_{ij}) \\ & + \beta_2 \Delta\mathrm{IIT}_{ijt} + \beta_3 Z_{ij(t-1)} + \beta_i \\ & + \beta_j + \beta_t + \varepsilon_{ijt}\end{aligned} \quad (2)$$

where i indicates the industry, j stands for the country and t for the year.

Depending on the regression, the dependent variable can be either the industry-level exit rate or the entry rate (both defined as explained in the previous subsection). ΔTrade_Index represents the variation in the considered trade exposure index. We shall always start with the overall trade openness index, and then separately consider its two components: import and export intensity (see the previous subsection). Intuitively, and consistent with previous studies on exit (Bernard et al., 2006b; Coucke & Sleuwaegen, 2008; Greenaway et al., 2008), we allow for a lagged adjustment to the growth in trade exposure. Without having a prior on the exact lag structure, we shall begin the analysis by including both the first and second lagged variations in overall trade openness, thus accounting for changes both between $t-1$ and $t-2$, and between $t-2$ and $t-3$.

ΔIIT represents the change in the Grubel–Lloyd (1975) index of IIT, as defined in the previous subsection. Hypothesis 4 is tested for by including the lag one variation of IIT in the entry regressions. The contemporaneous IIT change (between t and $t-1$) is included in the exit rate regressions in order to test for the presence of a negative relation between an increase in trade overlap and the exit rate at the industry level.

β_i, β_j and β_t stand for industry, country and year fixed effects. They are included to control for unobserved heterogeneity and cyclical effects. $Z_{ij(t-1)}$ represents a vector of industry/country control variables, lagged 1 year, which are suggested by the theory and empirical evidence on industry dynamics. The vector includes the following.

Displacement and replacement. Many papers have shown the presence of a positive correlation between entry and exit flows in subsequent periods (Caves, 1998; Dunne et al., 1988; Mata & Portugal, 1994; Siegfried & Evans, 1994). Higher entry in a year is found to raise exit in the following one, and vice versa. A conceptual explanation is provided by the carrying capacity models, with the concepts of displacement and replacement entry (Carree & Thurik, 1999; Geroski, 1995). New firms tend to displace the sales of existing firms, forcing the marginal ones out of the industry. Conversely, past exits create room for replacement, and release resources for new business ventures (Pe'er & Vertinsky, 2008). Consistent with the carrying capacity concept, we control for lagged entry and exit rates in our regressions.

Total factor productivity. Technological improvement has been found to be an important determinant of industry change and firm survival. More productive firms are found to be less likely to exit (Bernard et al., 2006a, b). This is consistent with the theoretical predictions on survival emerging from the new models of international trade with heterogeneous firms (Bernard et al., 2003; Melitz, 2003; Melitz & Ottaviano, 2008). Throughout our analysis, we control for total factor productivity (%) growth at the industry level (TFP Growth). However, given the industry focus of our study, the expected effect on the exit rate is not obvious: it will depend on the distribution of firm-level changes in TFP. For instance, if the productivity growth is not homogeneous across companies, then the effects on firm-level survival could cancel out at the industry level. On the contrary, we might expect industry productivity growth to lower future entry rates. Indeed, an increase in productivity at the industry level results in a more competitive environment for a new entrepreneurial venture. The minimum efficiency level that is required to enter the market is likely to increase, thus resulting in higher barriers to entry. Data on industry level total factor productivity are sourced from the EU KLEMS database (March 2007 version).[4] TFP is estimated through a growth accounting exercise, by taking into account various categories of capital, labour, energy, material and service inputs.[5]

Capital/labour intensity. We also incorporate a second control for the evolution of barriers to entry: the (%) growth in the physical capital services per hour worked (K/L Growth), also retrieved from the EU KLEMS database.[6] The inclusion of this variable is motivated by capital intensity being identified as an important factor affecting entry and exit decisions (Geroski, 1995).

Investment/turnover. As a last control, we include the logarithm of the net investment in tangible assets over turnover at the industry level (Investment). This variable is computed from Eurostat Structural Business Statistics data, and constitutes a proxy for the extent of restructuring, capacity building and investment opportunities in the industry. As such, it is expected to have a positive impact on both exit and entry, since restructuring waves are normally characterised by higher firm churning (Geroski, 1995).

RESULTS

This section reports the econometric results. The model is estimated through least squares dummy variables regressions. Standard errors are robust to heteroskedasticity, and are clustered at the industry–country level, in order to allow for possible correlation of disturbances within the observational units. Since the results on exit are instrumental for the analysis of entry, we first discuss the outcome of the exit rates' regressions, and then test the hypotheses relative to entry.

Trade Integration and Exit

Table 4 reports the outcome of the exit regressions, estimated by standard least squares. Results in the first column refer to the control model, from which trade-related regressors are excluded. The dependent variable is the exit rate at the industry–country

Table 4 Results from exit regressions, standard least squares

Dependent variable: industry–country-specific exit rate

	(1)	(2)	(3)	(4)	(5)	(6)
Entry Rate ($t-1$)	0.2538***	0.2505***	0.2512***	0.2484***	0.2473***	0.2497***
	(0.049)	(0.049)	(0.049)	(0.048)	(0.048)	(0.050)
TFP Growth ($t-1$)	0.0292	0.028	0.0278	0.0277	0.0217	0.02
	(0.028)	(0.028)	(0.027)	(0.028)	(0.027)	(0.027)
K/L Growth ($t-1$)	−0.001	0.0025	−0.0018	0.0009	−0.001	−0.0009
	(0.013)	(0.014)	(0.013)	(0.013)	(0.013)	(0.013)
Investment ($t-1$)	0.0028*	0.0027*	0.0030*	0.0027	0.0026*	0.0026*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
ΔOpenness ($t-1$)		0.0362*				
		(0.022)				
ΔOpenness ($t-2$)		−0.0185				
		(0.022)				
ΔImp Intensity ($t-1$)			0.0584	0.0495	0.0604*	0.0641*
			(0.036)	(0.034)	(0.035)	(0.035)
ΔExp Intensity ($t-1$)				0.0355	0.0235	0.0247
				(0.025)	(0.025)	(0.025)
ΔIIT Index					−0.0477**	
					(0.021)	
ΔIIT Index × High						−0.0579**
						(0.023)
ΔIIT Index × Low						−0.0113
						(0.053)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	331	331	331	331	331	331
R^2	0.86	0.87	0.87	0.87	0.87	0.87

"High" and "Low" refer, respectively, to increasing and decreasing global sourcing intensity. Fixed effects are not reported.
Robust standard errors in parentheses, clustered by industry–country.
*Significant at 10%; **significant at 5%; ***significant at 1%.

level. From the control model, we start exploring the impact of trade integration on exit. This is done by including in the model the lagged variation of the sectoral trade openness index. Changes in the index at both a 1-year and a 2-year lag are included. Results are reported in column 2. In columns 3–6 we separately investigate the role of import and export intensity, together with variations in IIT and their interaction with the indicators of foreign sourcing dynamics. In order to trace differential effects, these variables are added progressively in an incremental model specification.

In view of the fact that entry and exit are related and to some extent simultaneously determined, standard least squares estimation may produce biased results. Accounting for the possible endogeneity of the lagged entry rate, we have re-estimated all the models of Table 4 through instrumental variable (IV) regressions, in which lagged entry has been instrumented.[7] The results are presented in Table 5, and do not substantially differ from those obtained by using standard least squares, except for a somewhat lower coefficient for lagged entry. As expected, exit is positively related to previous entry: a 1 percentage point increase in the lagged entry rate results in higher current exit by around 0.18 percentage points. Changes in capital intensity and total factor productivity are not significant at conventional levels. The result for productivity is not surprising, given the industry-level scope of the analysis, as already explained in the previous section. The variation in trade openness between $t-1$ and $t-2$ has a positive and significant impact on the exit rate, while the second lag is not significant. From the results in column 2 of Table 5, we can infer that a 0.1 growth in the openness index results in a 0.47 percentage point increase in the exit rate in the next period. This result is in

Table 5 Results from exit regressions, instrumental variables

Dependent variable: industry–country-specific exit rate

	IV	*IV*	*IV*	*IV*	*IV*	*IV*	*System*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Entry Rate (t−1)	0.1934**	0.1899**	0.1799*	0.1702*	0.1715**	0.1750**	0.1804**
	(0.095)	(0.089)	(0.095)	(0.091)	(0.084)	(0.085)	(0.090)
TFP Growth ($t-1$)	0.027	0.023	0.0261	0.021	0.0176	0.0154	0.0250
	(0.024)	(0.025)	(0.024)	(0.025)	(0.024)	(0.024)	(0.028)
K/L Growth ($t-1$)	0.0036	0.0061	0.0027	0.0048	0.0029	0.0027	−0.0024
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Investment ($t-1$)	0.0014	0.001	0.0016	0.0012	0.0011	0.0012	0.0019
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)
ΔOpenness ($t-1$)		0.0470**					
		(0.021)					
ΔOpenness ($t-2$)		0.0065					
		(0.021)					
ΔImp Intensity ($t-1$)			0.0770**	0.0668**	0.0722**	0.0723**	0.0691*
			(0.036)	(0.034)	(0.036)	(0.034)	(0.039)
ΔExp Intensity ($t-1$)				0.0375*	0.0281	0.0292	0.0348
				(0.022)	(0.023)	(0.023)	(0.025)
ΔIIT Index					−0.0422**		
					(0.020)		
ΔIIT Index × High						−0.0479**	−0.0497**
						(0.022)	(0.021)
ΔIIT Index × Low						−0.0213	−0.0210
						(0.054)	(0.056)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	300	300	300	300	300	300	300
R^2	0.86	0.86	0.86	0.86	0.86	0.86	0.86
First-stage *F*-stat	22.65	22.17	22.37	22.14	22.04	21.94	
Hansen-*J*	6.036	6.337	5.479	5.392	5.195	5.112	
p-value	(0.303)	(0.275)	(0.242)	(0.37)	(0.393)	(0.402)	

"High" and "Low" refer, respectively, to increasing and decreasing global sourcing intensity.
Fixed effects are not reported. First-stage *F*-stat refers to the first-stage regression for Entry Rate ($t-1$).
Robust standard errors in parentheses, clustered by industry–country.
*Significant at 10%; **significant at 5%; ***significant at 1%.

line with previous empirical evidence pointing to a negative impact of increasing trade openness on firm survival (Bernard et al., 2006a). From the results of the extended model in column 5 (Table 5), the openness effect on exit seems basically to be driven by the import channel. A 0.1 growth in import intensity results in an increase in the exit rate in the following period by around 0.7 percentage points, which represents about 10% of the average exit rate. By contrast, export intensity is not found to have a significant effect on exit. As expected, exit rates are negatively related to positive variations in the IIT index. Following the arguments in the previous section, we expect the Grubel–Lloyd index to be capturing mainly the effects of increasing fragmentation of the production chain across countries. In column 6 we test for this by interacting the change in IIT with two dummies ("high" and "low"), pointing to increasing vs decreasing intensity of international sourcing (as introduced in the previous section). The results confirm our expectations. Indeed, only the coefficient for the "high" interaction is significantly different from zero. This suggests that the negative relation between IIT variations and firm exit rates is driven by industries in which the intensity of global sourcing has been increasing over time.

Table 6 Results from entry regressions, standard least squares

Dependent variable: industry–country-specific entry rate

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Exit Rate ($t-1$)	0.1803***	0.1879***	0.1808***	0.1895***	0.1953***	0.2006***	0.2870***
	(0.067)	(0.066)	(0.067)	(0.067)	(0.066)	(0.066)	(0.081)
TFP Growth ($t-1$)	−0.0288	−0.0288	−0.0284	−0.0291	−0.0238	−0.0246	−0.0208
	(0.021)	(0.022)	(0.021)	(0.022)	(0.021)	(0.022)	(0.024)
K/L Growth ($t-1$)	−0.0486**	−0.0468**	−0.0476**	−0.0469**	−0.0472**	−0.0477**	−0.0494***
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.018)
Investment ($t-1$)	0.0034*	0.0034*	0.0033*	0.0035*	0.0036*	0.0036*	0.0040**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
ΔOpenness ($t-1$)		0.006					
		(0.017)					
ΔOpenness ($t-2$)		−0.0441**					
		(0.018)					
ΔImp Intensity ($t-2$)			−0.0484	−0.0339	−0.0335	−0.0369	−0.0249
			(0.035)	(0.039)	(0.037)	(0.037)	(0.038)
ΔExp Intensity ($t-2$)				−0.0511*	−0.0458*	−0.0460*	−0.0512**
				(0.027)	(0.025)	(0.024)	(0.025)
ΔIIT Index ($t-1$)					0.0331*		
					(0.018)		
ΔIIT Index ($t-1$) × High						0.0448**	0.0356*
						(0.022)	(0.021)
ΔIIT Index ($t-1$) × Low						−0.0129	−0.0064
						(0.025)	(0.026)
Exit ($t-1$) × Imp_Open							−0.0982*
							(0.050)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	434	434	434	434	434	434	434
R^2	0.71	0.71	0.71	0.71	0.71	0.72	0.73

"High" and "Low" refer, respectively, to increasing and decreasing global sourcing intensity. Fixed effects are not reported.
Robust standard errors in parentheses, clustered by industry–country.
*Significant at 10%; **significant at 5%; ***significant at 1%.

Finally, as entry and exit rates are determined in the same business environment, some common shocks might have an effect on both dependent variables at the same time. In order to take this possible correlation across equations into account, a system estimation has been carried out. Particularly, for the final specification in column 6, the IV procedure has been repeated jointly with the equation in column 8 of Table 7, which has the entry rate as a dependent variable (discussed in the next subsection). The results are displayed in column 7 of Table 5, and do not substantially differ from the ones in column 6, without suggesting real efficiency gains.

Trade Integration and Entry

Table 6 shows the standard least squares results concerning our core hypotheses on entry. The dependent variable is the entry rate at the industry–country level. Column 1 displays the results from the estimation of the control model, where no trade-related regressors are included. In column 2 we test for the first hypothesis, which states that an increase in openness to trade should result in lower entry rates at the industry level. Proceeding in the same way as for the exit regressions, both lags of the change in overall trade openness are added to the basic specification. In columns 3–6 the impacts of import and export intensity on firm entry are separately explored, together with variations in IIT and their interaction with foreign sourcing indicators. The variables are added incrementally, in order to track differential effects. Finally, in column 7 we test for the third hypothesis by interacting Exit Rate$_{(t-1)}$ with a dummy "Imp_Open", which takes the value 1 for

Table 7 Results from entry regressions, instrumental variables

Dependent variable: industry–country-specific entry rate

	IV	*IV*	*IV*	*IV*	*IV*	*IV*	*IV*	*System*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Exit Rate ($t-1$)	0.7069***	0.7104***	0.7090***	0.7071***	0.7277***	0.7384***	0.8080***	0.7022**
	(0.072)	(0.072)	(0.072)	(0.073)	(0.072)	(0.072)	(0.072)	(0.326)
TFP Growth ($t-1$)	−0.0347	−0.0335	−0.0332	−0.0349	−0.0292	−0.0279	−0.0177	−0.0174
	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.027)	(0.023)
K/L Growth ($t-1$)	−0.0495**	−0.0480**	−0.0474**	−0.0478**	−0.0442**	−0.0444**	−0.0331	−0.0422**
	(0.020)	(0.020)	(0.020)	(0.020)	(0.021)	(0.021)	(0.021)	(0.019)
Investment ($t-1$)	0.0021	0.0025	0.0021	0.0023	0.0021	0.0022	0.0023	0.0033*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
ΔOpenness ($t-1$)		−0.0325						
		(0.020)						
ΔOpenness ($t-2$)		−0.0608***						
		(0.017)						
ΔImp Intensity ($t-2$)			−0.0558*	−0.0347	−0.03	−0.0347	−0.0261	−0.0233
			(0.032)	(0.039)	(0.038)	(0.037)	(0.039)	(0.032)
ΔExp Intensity ($t-2$)				−0.0628**	−0.0632**	−0.0670**	−0.0753***	−0.0680**
				(0.031)	(0.029)	(0.028)	(0.029)	(0.028)
ΔIIT Index ($t-1$)					0.0521**			
					(0.024)			
ΔIIT Index ($t-1$) × High						0.0750***	0.0748***	0.0588**
						(0.027)	(0.027)	(0.025)
ΔIIT Index ($t-1$) × Low						−0.0218	−0.0205	−0.0361
						(0.045)	(0.045)	(0.040)
Exit ($t-1$) × Imp_Open							−0.0886*	−0.0892*
							(0.048)	(0.050)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	349	349	349	349	349	349	349	349
R^2	0.61	0.61	0.61	0.61	0.61	0.61	0.63	0.63
First-stage *F*-stat	45.75	46.20	45.54	44.36	45.59	44.39	44.39	
Hansen-*J*	4.495	4.461	4.447	4.532	4.654	4.499	1.708	
p-value	0.343	0.347	0.349	0.339	0.325	0.343	0.635	

"High" and "Low" refer, respectively, to increasing and decreasing global sourcing intensity.
Fixed effects are not reported. First-stage *F*-stat refers to the first-stage regression for Exit Rate ($t-1$).
Robust standard errors in parentheses, clustered by industry–country.
*Significant at 10%; **significant at 5%; ***significant at 1%.

those industry–country pairs witnessing a significant level of import intensity. For this purpose, the control group is constituted of the observational units witnessing the lowest levels of import intensity: that is, below 0.20, on average over the time span.[8]

Similar to the procedure adopted for estimating the exit equations, in Table 7 we have accounted for the potential endogeneity of Exit Rate$_{(t-1)}$ (and its interaction with Imp_Open) by re-estimating all the models of Table 6 through IV regressions.[9] Entry rates are found to respond positively to exit in the previous period. The estimated coefficient for Exit Rate$_{(t-1)}$ in the instrumented regressions suggests a downward bias in the original least squares estimation. In fact, the coefficient rises from 0.29 up to around 0.7–0.8, in line with recent findings by Pe'er and Vertinsky (2008) on replacement entry dynamics in manufacturing. As expected, entry is also positively associated with sectoral investments, while entry rates are significantly lowered by increasing capital intensity. The coefficient on TFP growth has the expected sign, but it is not significant at conventional levels.

Consistent with Hypothesis 1, entry is found to be reduced by an increase in trade exposure with

a lagged adjustment. In particular, according to the results in column 2 of Table 7, a 0.1 increase in trade openness between $t-2$ and $t-3$ results in lower entry rates at time t by 0.6 percentage points. The difference in timing between entry and exit adjustment dynamics is not surprising, considering the planning process and administrative procedures that are required for a new entrepreneurial venture to start operating (Djankov, La Porta, Lopez-De-Silanes, & Shleifer, 2002). When looking at the extended model in column 5, the results suggest that the openness effect on entry is basically driven by export dynamics. This supports Hypothesis 2b, which states that an increase in export intensity results in lower entry rates at the industry level. The empirical evidence is consistent with recent theoretical work that points to the role of trade integration in raising barriers to entry through the selection and growth of the most efficient exporting firms, as captured by growing export intensity at the industry level (Costantini & Melitz, 2008).

In line with the expectations, growing IIT is found to stimulate firm entry. In particular, a 0.1 increase in the Grubel–Lloyd IIT index results in higher entry rates by around 0.52 percentage points. At our broad level of industry aggregation, this result is expected to pick up the effects of increasing international fragmentation of the production chains. In order to explicitly test for this, in column 6 the change in IIT has been interacted with the two dummies pointing at increasing ("high") vs decreasing ("low") global sourcing of intermediates. Results from this exercise are qualitatively similar to the ones obtained for firm exit. In fact, only the interaction with dummy "high" is positive and statistically significant, suggesting that global sourcing dynamics are driving the impact of IIT on firm entry. Hence Hypothesis 4 is also supported by empirical evidence.

The import intensity variable appears not to play a significant direct role in entry dynamics, against Hypothesis 2a. However, our third hypothesis states that relatively less replacement entry takes place with respect to exit in industries characterised by substantial import intensity. This hypothesis is supported by the results in column 7. In fact, the coefficient for the interaction of Exit Rate$_{(t-1)}$ and Imp_Open is negative, and statistically different from zero. Thus, less replacement entry seems to take place with respect to previous exit in industries facing substantial levels of import intensity.

The final specification in column 7 has been re-estimated jointly with the exit equation in column 7 of Table 5. Results are reported in column 8 of Table 7 and do not display substantial differences with respect to the ones in column 7, without suggesting real efficiency gains.

DISCUSSION

Our body of empirical evidence suggests that the evolution of trade exposure, in the short run, affects both sides of firm turnover: exit and entry. First, following an increase in openness to trade, European firms are more at risk of failure. The displacement seems to occur through higher import intensity. This is consistent with the findings of previous literature studies that have looked at single countries (Bernard et al., 2006b, on the US; Coucke & Sleuwaegen, 2008, on Belgium; and Greenaway et al., 2008, on Sweden). However, we have also explicitly controlled for the export intensity channel, without finding a significant impact on industry exit rates. This suggests that higher competition on the product markets (Melitz & Ottaviano, 2008) rather than displacement on the factor markets (Melitz, 2003) is driving the effect. Industry-level exit rates are negatively related with IIT growth, as captured by an increase in the Grubel–Lloyd (1975) index. All else equal, relatively fewer firms exit from industries in which an adjustment is going on in terms of rising trade overlap with respect to the partner countries. When explicitly controlling for the intensity of global sourcing of intermediates, the latter relation seems to be determined by offshoring dynamics. This result is consistent with the firm-level findings by Coucke and Sleuwaegen (2008), pointing to international sourcing as a survival strategy in industries characterised by increasing trade exposure.

Regarding firm entry – the main and original focus of this paper – we find that an increase in trade openness results in lower entry rates (with a lagged adjustment), through both drivers of export and import intensity. First, export intensity has a direct negative impact on firm entry, in line with the following interpretation: as trade exposure increases, the market selects the most efficient firms, which grow by expanding in the export markets (Bernard et al., 2003; Melitz, 2003; Melitz & Ottaviano, 2008). This market consolidation process is captured by an increase in the export intensity index, and results in higher barriers to entry for new business ventures. The relevant market for a potential entrepreneur in fact becomes

more competitive, inducing a decline in entry rates, in line with recent theoretical findings by Costantini and Melitz (2008). Import intensity has instead an indirect effect on entry rates through the replacement entry channel, that is, the component of entry that is directly related to previous exit. Indeed, we find that relatively less replacement entry takes place with respect to exit in industries characterised by a substantial import intensity. Many studies have shown that firm entry is positively related with exit in earlier periods, as new business ventures may take advantage of market shares and resources that are released by exiting incumbents (Caves, 1998; Dunne et al., 1988; Mata & Portugal, 1994; Siegfried & Evans, 1994). Pe'er and Vertinsky (2008) show that such a process of replacement entry also leads to aggregate productivity growth, as new entrants re-employ existing resources in more productive ways. Our results warn that these dynamics might be less relevant in a context of increasing import penetration. In fact, import-displaced firms are more likely to be involved in activities that are at odds with a country's comparative advantages, and thus are not appealing to potential new entrepreneurs. Finally, relatively more firms enter those sectors in which the level of IIT is increasing. Also in this case the effect seems to be driven by international offshoring dynamics.

In uncovering the relationship between international trade and firm entry and exit, this study provides original insights into the development and evolution of globalising industries in relation to trade competition. Our findings add to a recent developing body of international business research, looking at the implications of increasing global competition for firm strategy and structure (Bowen & Wiersema, 2005; Coucke & Sleuwaegen, 2008; Hutzschenreuter & Gröne, 2009; Wiersema & Bowen, 2008). Rather than focusing on the restructuring of large diversified firms, the present study has analysed the implications of enhanced trade integration for industry change processes, as stemming from the birth and death of firms. Past research has studied these processes too much in isolation from international competitive forces, in spite of their growing relevance. Indeed, as put forward by Majocchi and Zucchella (2003), when markets become increasingly integrated across borders, all firms might be broadly seen as international to some extent, as global competition has an impact on their business models and performance. From a strategy perspective, firms should understand how the process of trade integration affects the different forces of competition by widening the relevant market on which they operate and compete. Obviously, as the international dimension of competition cannot be ignored in the strategic management of any firm, it should also become an essential element in the business plan of potential new entrepreneurs who consider entering a globalising industry. In particular, for small open economies few industries would make an exception to this necessity.

Our findings also have some important public policy implications. Fostering entrepreneurship has become a policy priority in many industrial countries, as they are witnessing a shift from the "managed" to the "entrepreneurial" economy, characterised by a central role of entrepreneurs for innovation and growth (Audretsch & Thurik, 2001). The results of this paper convey important implications for entrepreneurship policy in a globalising context. First, public authorities should verify and improve the consistency of the various policy measures against the logic of the competitive selection and restructuring processes following increased trade integration. The role of institutions in allocating entrepreneurial effort should also be targeted more at stimulating effective international entrepreneurship (Bowen & De Clercq, 2008).

Second, there is evidence that globalisation is associated with higher risk, tougher competitive pressure, and increasing barriers to entry for potential entrepreneurs, resulting in declining entry rates in the analysed countries. In this context, an effective entrepreneurship policy should focus on lowering structural barriers to entry, and help entrepreneurs in identifying the new opportunities that become available on the international markets. In particular, a major effort should be directed towards improving entrepreneurial capabilities to seize international opportunities and develop competencies for organising business across national borders.

CONCLUSIONS

This study presents an original contribution in analysing the effects of trade integration on the creation of new firms in globalising industries. The main findings suggest that increasing openness to trade leads to a stronger selection at the industry level, thus discouraging the entry of new firms in the short run. This result is in line with earlier findings on the exit of firms and the restructuring of large companies in globalising industries. It also supports the notion of a severe "Darwinian"

selection process following the opening up of industries to more global competition, as suggested by several theoretical models.

From a more general perspective, our findings indicate that changing comparative advantages have an effect on industries' structure through firm entry and exit dynamics. In particular, international trade integration is found to determine higher exit and lower entry rates in the manufacturing sector of industrialised countries. This is consistent with the evolution of comparative advantages and the global trends of reallocation of economic activities across countries.

We should stress, however, that our results relate to the number of firms and to short-run effects. They cannot reveal the extent to which increased trade integration leads to a different and possibly qualitatively improved entrepreneurship. Other studies, looking at the effects of trade integration on productivity developments within industries, suggest that such positive effects might occur. However, future studies should analyse these dynamics in a precise and direct way, by focusing on the characteristics and post-entry behaviour of new ventures.

Further research efforts should also investigate the extent to which our results carry over to services industries, for which industrial countries are gaining comparative advantage. Moreover, as different institutional settings across countries might possibly moderate some of the effects found in our study, attention should also be paid to their role in future work.

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NOTES

[1]NACE (Rev. 1.1) is the European classification of economic activities corresponding to ISIC (Rev. 3.1).

[2]Two industries have been excluded from the analysis: "manufacturing of coke, refined petroleum products and nuclear fuels" (DF) and "manufacturing n.e.c." (DN). In the former case, the choice is due to the peculiar nature of the sector, whose industry dynamics are more likely to be related to legal changes and natural factors rather than trade. "Manufacturing n.e.c." is instead a residual category for relatively heterogeneous activities (from the manufacturing of furniture to recycling), which would evidently raise problems in analysing the relation between industry-level trade openness and firm dynamics.

[3]Domestic production figures are available in the Eurostat Structural Business Statistics database.

[4]The EU KLEMS database is the outcome of a project financed by the European Commission for the analysis of productivity and growth. It has been produced by a consortium of 15 organisations across the EU, with support from Eurostat, OECD, the Groningen Growth and Development Centre and various national statistical institutes. More details are available on the EU KLEMS website: http://www.euklems.net/index.html.

[5]The methodology and variables are described in Timmer, van Moergastel, Stuivenwold, Ypma, O'Mahony, and Kangasniemi (2007).

[6]See the previous footnote for a methodological reference.

[7]We have employed as instruments the first and second lags of the number of firms, together with the second lags of average employment, average profitability and intra-industry trade, and the third lag of the change in export intensity in each industry–country pair. Data on the latter variables are provided by the EUROSTAT Comext and Structural Business Statistics Database. The average profitability index is computed as the ratio of gross operating surplus over turnover, at the industry–country level. The reported Hansen-*J* test for over-identifying restrictions always supports the validity of our instrumentation strategy. Moreover, the *F*-statistic at the first stage is always around 22, thus pointing to a good strength of the employed instruments.

[8]The choice of this threshold is motivated by the literature on relevant geographic markets (e.g., the Elzinga–Hogarty LIFO test; Elzinga & Hogarty, 1973).

[9]We have employed as instruments the second lags of average employment, number of firms, average profitability and capital/labour intensity, as well as the dummy Imp_Open and the country-specific value of GDP in the first year of the considered time-span. Capital/labour intensity is proxied by physical capital services per hour worked, as retrieved from the EU KLEMS database (see the third section for more details).

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