



the Autonomous Management School of
Ghent University and Katholieke Universiteit Leuven

Vlerick Leuven Gent Working Paper Series 2006/14

EXIT IN GLOBALISING INDUSTRIES:

THE ROLE OF INTERNATIONAL (OUT)SOURCING

KRISTIEN COUCKE

LEO SLEUWAEGEN

Leo.Sleuwaegen@vlerick.be

**EXIT IN GLOBALISING INDUSTRIES:
THE ROLE OF INTERNATIONAL (OUT)SOURCING**

KRISTIEN COUCKE

Europese Hogeschool Brussel (EHSAL)

LEO SLEUWAEGEN

Vlerick Leuven Gent Management School

Contact:

Leo Sleuwaegen

Vlerick Leuven Gent Management School

Tel: +32 16 32 88 39

Fax: +32 09 32 35 80

Email: Leo.Sleuwaegen@vlerick.be

ABSTRACT

This paper studies the impact of globalisation on the exit behaviour of domestic and foreign firms in the manufacturing industries of Belgium, one of the most open economies in the world. The strongest effects are found to come from rising import growth and rising multinational firms penetration of the industry, which systematically increase the probability of exit of (inefficient) domestic firms. Product differentiation and international (out)sourcing moderate this impact and lower the risk of exit. Controlling for productivity differences across firms, exporting on itself does not lower the probability of exit. Subsidiaries of multinational firms are found to be subject to similar disciplinary forces from import competition as domestic firms but do not show exit to respond to the same passive learning process.

Keywords: Exit, Sourcing, International Competition

JEL Code: F1, F23, L2

1. INTRODUCTION

As a result of the ongoing liberalisation of trade and investment across countries an increasing number of industries have become increasingly global. The rise in trade flows and the strong cross-border flows of direct investment across the various regions of the world provide primary evidence of this globalisation process (see e.g. UNCTAD, 2004; Bowen and Sleuwaegen, 2004). There is a growing literature that relates the globalisation process to the dynamics of industries. Unfortunately, most of these studies focus on one or another globalisation dimension –import, export or foreign direct investment but provide no comprehensive model of the way the various dimensions may act together in shaping industries. Moreover, the fact that many firms may react to the growing global competitive pressure by spreading activities and/or internationally outsourcing part of their activities is often overlooked in the empirical models studying the link between international competition and industry dynamics. By analysing the various ways how firms are affected by global competitive pressure we show how firms may survive through international (out)sourcing part of their activities. We make a distinction between domestic firms and foreign firms that belong to a multinational enterprise who may source within their own international network.

We empirically test the model against data for the manufacturing industries of Belgium, one of the most open economies of the world characterized by strong inflows of foreign direct investment. The export rate defined as total exports divided by gross domestic product rose to 88.5 % in 2002 while the import rate rose to 78.6%. Similar to the mature economies of many other continental West European countries, Belgium has also witnessed a strong process of de-industrialisation of employment. Over the period 1970-2002, Belgium experienced the strongest decline of manufacturing employment in Europe. Total employment in Belgian manufacturing in 2002 decreased to almost one half¹ of the level in 1970 (Figure 1, left scale). The process of de-industrialisation in Belgium is characterized by the exit of many domestic manufacturing firms (Sleuwaegen and Dehandschutter, 1991).

¹ For most of the European countries the decrease in manufacturing employment was only one third over the same period.

Interestingly, over the same period, Belgium has attracted a strong flow of foreign direct investments as a result of its open economy, its central location in Europe and excellent infrastructure. Figure 1 (right scale) shows that especially since the mid-1980s, the growth rate of foreign investment flows into Belgium has increased more than the growth rate of GDP.

Insert Figure 1 About Here

In 2002 the share of manufacturing employment in foreign firms rose to more than 50 % and the share of value added rose to 60 %. Most of those foreign companies are part of an international network, characterised by operating flexibility using new capabilities and efficiencies in a global market.

The strong openness of the economy makes Belgium a very interesting case to test our model. The results of testing the model lead to some important novel findings. In industries characterised by increased import competition and local industry penetration by multinational enterprises, the probability of exit of domestic firms systematically increases. However, two special types of international trade moderate this impact. First, taking advantage of the globalisation of production, intra-firm trade coupled with international sourcing activities significantly lowers the probability of exit. Second, intra-industry trade reflecting product differentiation is also found to have a significant negative impact on the probability of exit. In contrast to earlier findings, after controlling for productivity differences and the various sources of global competition, the fact that the firm exports does not have a separate impact on the probability of exit. We find foreign firms to be more flexible and respond to the same competitive forces as domestic firms, but because of self-selection and experience in their home markets, we do not find them to be subject to the same passive learning process as the one we observed for domestic firms.

The remainder of the paper is structured as follows. Section 2 offers the theoretical considerations about the probability of exit and introduces the main hypotheses. Section 3 presents the statistical model. Section 4 discusses our main statistical findings. Section 5 concludes.

2. THEORETICAL CONSIDERATIONS AND HYPOTHESES

Rising global competition

Exit of firms in relation to international competition is still a poorly understood phenomenon given the heterogeneity of firms and the complexity of industry-specific environments. Recent theoretical as well as empirical models making the link between firm and industry heterogeneity and trade liberalisation (Head and Ries, 1999; Tybout, 2001; Pavcnik, 2002; Sleuwaegen and De Backer, 2003; Helpman, Melitz and Yeaple, 2003; Bernard, Redding and Schott, 2004), show that the cost of globalisation is felt disproportionately by less productive firms. As a result of the reallocation of resources, more productive firms expand while less productive firms contract or exit from the market. These models posit a clear relationship between falling trade cost, rising imports and rising firm death rates. In view of this we posit the following hypothesis:

***H1:** The probability of exit is higher in industries characterized by growing import penetration.*

The emphasis in received studies has been on exit or the survival of firms in relation to international trade. It is only in recent years that attention has been paid to the impact of foreign direct investment, the major exponent of the current globalisation wave (see Görg and Strobl 2003). Through removing the obstacles to enter foreign markets, foreign firms bringing in superior technologies increase the competitive pressure on domestic firms' activities. The effects run via the labour market where foreign firms pay higher wages, discourage domestic entrepreneurship and crowd out domestic firms, and via the product market where less efficient firms using inferior technologies are pushed out from the market (Sleuwaegen and De Backer, 2003). Aitken and Harrison (1999) argue that foreign firms producing at a lower marginal cost than domestic firms, gain market share at the expense of domestic firms. For domestic firms facing high fixed costs, the loss of market share raises the probability of exit.

However, in a somewhat longer run perspective the superior technology from foreign firms may spill over to domestic firms who then improve their productive efficiency as they learn from foreign firms (Blomstrom and Kokko, 1998; Görg and Strobl, 2003). Görg and Strobl (2003) demonstrate theoretically that this positive spillover effect may overcompensate the negative crowding out and displacement effect if domestic firms have important absorptive capacity. Such a process would eventually lead to a stabilisation of market shares or even to a regaining of market share by domestic firms.

H2: Domestic firms that operate in industries characterised by an increase in penetration of multinational firms are more likely to exit.

In industries where product differentiation allows firms to carve out niche positions in the market, there is less pressure from international competition (see e.g. Agmon and Drobnick, 1994). Moreover, as implied by modern international trade theory the combination of scale economies and product differentiation may lead to substantial intra-industry trade, i.e. cross-border trade in the same industry (Lancaster, 1980; Krugman, 1981; Helpman, 1987; Bergstrand, 1990). While also in this case trade liberalisation may reduce the number of varieties (Yeaple, 2005) the forces from successfully differentiating products from rivals may prevent the disappearance of complete industries as one might expect for homogeneous good industries in countries that comparatively offer less favourable factor cost conditions to locate those industries. Product differentiation is also seen as an important barrier to exit from the market as successful differentiation is most often the result of sunk investments in R&D or advertising (Sutton, 1991; Geroski, 1995).

H3: The probability of exit is lower for firms that operate in differentiated industries characterised by a high level of intra-industry trade.

There has been growing attention on the different patterns of exit behaviour of domestic versus foreign owned firms in the exit literature (see for instance, Mata and Portugal, 2002; Alvarez and Görg, 2005). Subsidiaries of foreign multinationals are typically less rooted in the local economy and, as a result may be quicker to close down production plants.

Exit may thus result from strategic changes and efficiency-seeking motives of larger multinational firms, rather than from simple profit considerations solely based on market conditions in one country (Pennings and Sleuwaegen, 2004). Moreover, multinational firms possess the option to source production from the least-cost production plant (Kogut and Kulatilaka, 1994). In general, multinational firms have more potential to gain from the process of globalisation as a result of their operating flexibility, especially through the rise in global production networks. Within those networks, multinational firms benefit from international factor price differences and supply conditions through their ability to shift production across countries. Intermediate goods and products are sourced on a global scale from their subsidiaries with the least cost of production or outsourced to third parties. In game-theoretical terms the global sourcing activities favourably shift the reaction curve of multinational firms to the disadvantage of domestic firms without such possibilities (Coucke, 2005). A domestic firm may try to benefit from the same international factor price differences through a network of independent firms and outsource activities. Sourcing and outsourcing activities have risen significantly the last five years reflected by increased intra-firm trade and increased imports of intermediate and quasi-final products (Feenstra and Hanson, 2001; UNCTAD, 2002). Typically the least efficient or most costly stages in the production process are sourced out to third parties abroad. In this way, domestic firms can survive the competitive pressure of multinational firms, even in industries characterised by strong import growth.

H4: International (out)sourcing activities lower the probability of exit.

Summarizing recent theoretical models about falling trade costs and industry restructuring, Bernard and Jensen (2005) point out that all the different models consistently predict that as trade costs fall, less productive non-exporting firms die, more productive non-exporting firms enter the export market and the most productive exporters gain export market share. Interestingly, the models predict that even if exporting itself does not enhance productivity, following this selection process, exporting firms are less likely to die. Recent papers by Blalock and Gertler (2004), De Loecker (2004) and Van Biesebroeck (2005) show that exporting to other countries may also involve an important learning process and yield substantial productivity differences, enhancing the chances of firms to survive in globalising industries.

H5: Exporting firms are less likely to exit.

Other sources of heterogeneity across firms and industries

Efficiency, scale economies, labour intensity

The disciplinary effects of competition are felt differently for firms and industries following their specific competitive profile. According to the recent heterogeneous firm models (Helpman, Melitz and Yeaple, 2003; Bernard, Redding and Schott, 2004), not all firms grow to the same efficiency level. Rising (global) competition exerts a strong disciplinary effect in driving less productive firms out of the market (Sleuwaegen and De Backer, 2003).

In addition to their impact on productivity, scale economies may yield firms a strategic advantage in integrating world markets allowing them to gain market share (Yip, 1989; Martin, 2001). Large firms are better equipped to take advantage of integrating world markets and hence should show a lower probability to exit.

Within the current wave of globalisation differences in factor conditions across countries continue to play an important role in determining the attractiveness of countries for locating technologically distinguished activities. Belgium, the country under study, has established a comparative advantage in capital-intensive activities (Tharakan and Waelbroeck, 1988; Sleuwaegen and De Backer, 2001). The gross wages are among the highest in the world. We therefore expect labour intensive firms facing strong international competition to show a higher probability to exit.

History of the firm

It has been argued from an evolutionary perspective, firms at the start do not know their true efficiency but learn from interacting in the market to which extent their business model is sustainable or not (Jovanovic, 1982). Old and large firms are therefore less likely to exit from the industry than young and small firms. This is supported in many studies on new firm survival (Mitchell, 1994; Mata and Portugal, 1994; Dunne et al, 1989). However, it is reasonable to assume that firms that go abroad have been subject to a market selection process in their home market and know their true efficiency when they move abroad. In so far that this advantage is

transferable to foreign markets, subsidiaries of multinational firms can therefore be assumed to be less subject to the passive learning process as the one we hypothesize for domestic firms. We expect young and small domestic firms to show a higher exit probability; for foreign firms this effect should be less marked.

In adopting this evolutionary approach we should, however, not overlook the fact that the economic context changes over time and may render the business models of well established larger firms obsolete. In reacting to this, large firms in financial distress often try to become more cost efficient through downsizing and laying off employees (Coucke, Pennings and Sleuwaegen, 2005). However, if firms cannot successfully adapt their business model and are unable to become more cost efficient through such a downsizing, their decline in employment is only a postponement of the exit decision and increases the probability of exit some years later.

Industry growth and displacement

An important industry characteristic that is likely to affect the survival of firms, is the growth of the industry, reflecting the need for extra capacity. Several authors (Caves, 1998; Schmalensee, 1989) also showed that profits are in general larger in growing than in declining industries. A positive and significant effect of industry growth on the survival of new firms is found in several empirical studies including Mata and Portugal (1994), Audretsch and Mahmood (1995) and Görg and Strobl (2003).

Controlling for industry growth prospects, other studies have also reported a strong correlation between the flows of entry and exit across markets (Dunne, Roberts and Samuelson, 1988; Siegfried and Evans, 1994, Mata and Portugal, 1994). A recent interpretation of the positive relation between entry and exit rates is provided by the carrying capacity model and associated displacement principle (see Carree and Thurik, 1999). According to this principle new entry reflecting improved technologies or new products displaces established firms from the industry. Hence, recent entry of new firms can be expected to increase the exit probability of established firms.

3. STATISTICAL ANALYSIS

Specification

The decision to exit is modelled following a logit specification. The log likelihood can be written as

$$\log (L(\beta; y_i, x_i)) = \sum_{i; y_i=1} \log(F(x_i' \beta)) + \sum_{i; y_i=0} \log(1 - F(x_i' \beta))$$

where β is the vector of coefficients, $y_i = 1$ if the i -th firm chooses to exit, x_i' is the matrix of explanatory variables, and

$$F(x_i' \beta) = P(y_i = 1) = \frac{\exp(x_i' \beta)}{1 + \exp(x_i' \beta)}$$

We run the model for two successive time periods. In the model of the first time period, the dependent variable equals one if a firm that was active in 1998 and had exited the market by 2000. The probability of exit is related to a set of time-dependent firm, industry and macro-economic characteristics. In the model of the second time period, the dependent variable equals one if a firm that was active in 1999 and had exited the market by 2001. Using similar time-dependent characteristics, this two-period testing allows us to test the robustness of the results. The reasons for using a (discrete) logit model relative to an exit interval and not a continuous year to year hazard (survival) model are twofold. First, the data start from 1996 and this starting point is not related to the entry of firms. Firm-level data before 1996 are not available. Secondly, the data cover a period of 5 years. As such the life table to reflect the distribution of survival times is rather limited and contains many censored observations. Using year to year fluctuations is also likely to increase the measurement error in the dependent variable, while some independent variables may not show enough variation over the short period or have a delayed impact on the exit decision which requires the inclusion of various adjustment lags (Alvarez and Görg, 2005).

Over the years 1999, 2000 and 2001, 3.577 domestic firms had exited the market. At the same time, total employment in domestic firms had declined with 9%. During the observation period, exit rates of domestic firms in the different manufacturing industries ranged from 0% to 20%. On average, the exit rate, measured as the ratio of exiting firms to all firms active in the previous year², equalled 8%.

In the logit regression for the first time period, 13.167 domestic firms were active in 1998 in Belgian manufacturing and 2.883 of those firms had exited the market by 2000. In the logit regression for the second time period, 11.999 domestic firms were active in 1999 and 2.274 of those firms had exited the market by 2001. As to foreign firms, 1.612 affiliates of multinational firms were active in 1998 in Belgian manufacturing and 117 of those affiliates had exited the market by 2000. In the second time period, 1.594 affiliates were active in 1999 and 145 of those firms had exited the market by 2001.

Explanatory variables

By reasonably assuming a lagged adjustment, all explanatory variables included in the model are lagged for the period preceding the exit period. The descriptive statistics for industry variables are reported in Table 1. The industry variables refer to the NACE 3-digit industries (EU industry classification system). The manufacturing sector in our database comprises 103 NACE 3-digit industries. Table 2 and Table 3 report the firm level data, making a distinction for domestic and foreign firms. The data sources for these variables are provided in the Appendix.

Insert Table 1, 2 & 3 About Here

² exit rate is averaged over the years 1999, 2000 and 2001

Import competition, Multinational penetration

Import competition is measured as the growth of imports (IMPGROW) and equals the percentage growth in total import to total sales ratio in an industry in the three years prior to the decision to exit. Multinational penetration (MNEPEN) is measured as the relative growth in total sales of foreign-owned and Belgian multinational firms in an industry in the three years prior to the decision to exit.

Product differentiation and Intra-industry trade

Various studies have shown a very high correlation between product differentiation and intra-industry trade. A standard method to measure intra-industry trade (IIT) is the Grubel-Lloyd index (1975). The Grubel-Lloyd index measures the share of imports or exports (whichever is largest) that is 'covered' by exports or imports of similar types of goods. The index ranges from zero to one where an index of one reflects 100% intra-industry trade and an index of zero reflects 100% inter industry trade. The Grubel-Lloyd index at a NACE-3 digit industry level (Marvel and Ray, 1987) is defined as follows:

$$IIT = 2 \min (X_i, M_i) / (X_i + M_i)$$

where X_i equals total exports in industry i and M_i total imports in industry i averaged over the three years preceding the exit interval.

International sourcing and Export indicators

International sourcing (INTSOURC) is measured by a dummy variable indicating that the firm is importing goods and services from abroad. Exporting (EXP) is measured by a dummy variable indicating that a firm is exporting goods.

Productivity, Size and Labour intensity

The firm's labour productivity (PROD) is measured as the value added (value added is measured in 100.000 euro) per employee. Firm's size (SIZE) is taken as the logarithm of the reported number of employees. Labour intensity (LABINT) of the firm is measured by the ratio of employment to physical fixed assets (physical fixed assets is measured in 1.000 euro).

History of the firm: Firm age and Downsizing

The age of the firm (AGE) is a proxy for the importance of passive learning (Jovanovic, 1982). Firm's age is measured as the logarithm of the number of years the firm has been active in the industry. Downsizing (DOWNS) is modelled as the percentage decline in the number of employees in the three years preceding the possible exit period, reflecting the firm's recent history of downsizing.

Industry growth and recent entry

Industry growth (INDGROW) is measured by the relative growth in sales in the industry over the period of three years before the exit interval. Entry (ENTRY) is measured by the ratio of new firms to the number of active firms, averaged over the three years before the decision to exit was taken.

4. STATISTICAL RESULTS

Exit Behaviour of Domestic Firms

Table 4 reports the logit estimation results including the marginal effects of the explanatory variables on the probability of exit for the two time periods. The positive effect of IMPGROW supports our first hypotheses. In industries characterised by a strong import growth relative to sales, domestic firms experience fierce international competition and are more likely to exit.

Insert Table 4 About Here

MNEPEN, measured as relative growth in sales of multinational firms in the industry, has a positive coefficient suggesting a strong crowding out and displacement effect of multinational firms. This result supports our second hypotheses and is in line with Sleuwaegen and De Backer (2003). In a set of related papers Görg and Strobl (2002, 2003) present evidence for the expanding high tech manufacturing sector in Ireland where they make a similar distinction between domestic and foreign firms and find positive spillovers to be more important than displacement effects. In the mature economy of Belgium we find a strong concentration of multinational firms in traditional industries, where they take advantage of the central location of the country in the high density markets of Western Europe. In those industries where demand is less growing the opening up of markets to global competition creates more pressure to restructure and rationalize industries. In connection to the latter finding it is interesting to note that MNEPEN is also strongly correlated³ with IMPGROW⁴. Multinational firms do not increase their local production activities in Belgium but gain market share over domestic firms through an increase in sourcing activities.

The negative and significant coefficient of INTSOURC points at the same effect and indicates that domestic firms with international outsourcing activities have a lower probability to exit. This empirical result supports our fourth hypotheses. If domestic firms can outsource abroad, they can gain from differences in international factor prices, similar to the sourcing activities of multinational firms. However, only 28 to 29 percent of the domestic firms in our sample are engaged in international outsourcing (cf. Table 2).

The negative and strong significant effect of IIT reflects that the higher the industry's level of product differentiation, the lower the probability to exit from that industry. This result supports our third hypotheses. A domestic firm can survive more easily the competitive pressure of multinational firms and rising import, if the industry offers possibilities to differentiate products and domestic firms can carve out niches in the market⁵.

³ Significant positive correlation coefficient $R=0,32$ ($P<0,01$) for the first and $R=0,29$ ($P<0,01$) for the second time period.

⁴ No significant interaction term $MNEPEN*IMPGROW$ is found.

⁵ No correlation is found between product differentiation, measured as an averaged variable (IIT) and import growth (IMPORTGROW) which is measured as a growth variable over the last three years before a possible exit.

The productivity coefficient PROD is significant and negative as expected. Less productive firms are more likely to exit. The coefficient on AGE is negative, suggesting that younger domestic firms are more likely to exit, consistent with the theory of selection effects associated with passive learning. The SIZE coefficient suggests a strong negative impact, indicating that larger plants are less likely to exit.

The positive significant LABINT coefficient is consistent with the comparative advantage capital-intensive firms enjoy in Belgium. As a result of the high wage costs, Belgian firms are forced to substitute labour by capital in order to survive. An employee lay-off in the recent history of the firm, measured by the variable DOWNS has a positive and significant impact on the firm's exit behaviour. This result is in line with the finding that downsizing operations to improve the profitability of the firm do not always succeed, but are risky operations that enhance the probability of exit in subsequent periods (Hannan and Carroll, 1992; Coucke, Pennings and Sleuwaegen, 2005). Exit will occur if the restructuring fails to generate sufficient profits.

The industry characteristics have the expected signs: firms are less likely to exit the higher the industry's growth, INDGROW, and the lower recent entry into the industry, ENTRY, suggesting an important displacement effect by younger successful firms.

Interestingly, we do not find a negative effect of the exporting variable (EXP) when the other globalisation variables are in the model, and hence no support for our last hypotheses. Excluding the latter from the model as is done in the second column of Table 4 (Restricted Model), the coefficient of EXP is negative and significantly different from zero. This finding suggests that firms react to rising global competitive pressure in a way that the surviving firms turn into exporting firms or enlarge their export markets. However, exporting, on its own, does not appear to have a separate influence on the probability to exit. This result is in line with the finding of Arnold and Hussinger (2005) who could not identify learning effects from exporting on productivity improvements of German manufacturing firms in the period 1992-2000.

The results of the logit regression for the second time period in the last column of Table 4 are very similar to the first time period, and provide support for the robustness of the results across the two time periods.

Exit Behaviour of Foreign Firms

We ran logit regressions for the exit behaviour of foreign firms, similar⁶ to the model used for domestic firms. Table 5 presents the results. The descriptive statistics of the explanatory variables for foreign firms (Table 3) reveal that on average plants of multinational firms are more productive, larger and more capital intensive than domestic firms. At the same time, we found that the industries where foreign firms operate, experience a stronger industry growth. This growth goes together with a strong growth of imports in those industries.

Insert Table 5 About Here

This latter result suggests that the growth in sales in industries is mainly due to the growth in sales of foreign firms through an increase in their sourcing activities. Only 15% of the foreign firms have no international sourcing activities.

The results of global competitive pressure on exit of foreign firms are very similar to those found for domestic firms. Import growth has a significant strong positive impact on the probability to exit, while international sourcing activities have a significant and strong negative impact on the probability to exit. Subsidiaries of multinational firms that are not sourcing abroad are more vulnerable to possible exit. In some heavily regulated industries, international sourcing is made difficult and multinational firms cannot fully benefit from their operating flexibility (for instance in the pharmaceutical industry). It follows that for those firms, despite their multinational network but as a result of governmental regulations or inefficient co-ordination of their global activities, an increase in international competition leads to a higher likelihood of exit. The fact that multinational firms have to co-ordinate their production activities in the most cost efficient way through global sourcing in order to survive, can also explain the increased importance of vertical FDI (versus horizontal FDI) during the last two decades (see e.g. Hanson, Mataloni and Slaughter, 2001). The negative and significant coefficient of product differentiation IIT in Table 5 indicates that also the competitive pressure between multinational firms is lowered if those global firms are able to differentiate their products. However, the negative impact of

⁶ We find a strong positive significant correlation ($R=0,61$ ($P<0,01$) for the first and $R=0,73$ ($P<0,01$) for the second time period) between MNEPEN and INDGROW.

product differentiation on the exit behaviour of subsidiaries of multinational firms shows up less strong than for domestic firms. Different from domestic firms, the growing presence of foreign firms does not exert pressure on foreign firms to exit. On the contrary, the positive effect suggests cluster advantages and signals new opportunities for foreign firms to operate in globalising industries.

The age effect does not show up in the results, suggesting that subsidiaries of multinational firms are not subject to the same passive learning process as the one observed for domestic firms. Multinational firms self-select to go abroad and to transfer their proven efficiency to other countries. Table 2 and Table 3 reveal that productivity of foreign firms is indeed substantially higher than for domestic firms. This may explain why productivity does not have a significant effect on the probability to exit for foreign firms. Moreover, production plants that are part of a multinational network are often found to be footloose and subject to the global strategy of the firm (Görg and Strobl, 2003).

Multinational firms optimise across countries and are therefore less subject to technological rigidities concerning factor intensity choice, including labour intensity. Table 3 shows that foreign firms are substantially less labour intensive than domestic firms. For those firms the relevant markets and competitive arena is also typically larger than the market of a particular host country. Hence, the competitive pressure from local entrants will be less relevant, explaining the non-significance of the entry variable or the local industry growth variable. Size matters for foreign firms and lowers the exit probability, which suggests that subsidiaries of multinational firms should also optimally exploit scale economies in integrating world markets. Parallel to the findings for domestic firms, downsizing in the recent past increases the probability of exit over the interval period, reflecting the high risk of using such restructuring operations to redress profitability.

5. CONCLUSIONS

This paper has examined the exit behaviour of firms facing growing international competition. To this end we developed an empirical model of the exit decision and tested it against firm-level data covering all Belgian manufacturing industries for the period 1996-2002. During this period Belgium, one of the most open economies of the world, experienced a further growth of international trade and a growing penetration of its economy by foreign firms.

Our statistical results indicate that the growing penetration of multinational firms exerts a strong crowding out and displacement effect with respect to domestic firms.

Görg and Strobl (2002, 2003) found for the rapidly developing high tech industries of Ireland that these forces are overcompensated by positive technological spillovers. Different from Ireland, the Belgian economy shows a strong specialisation in traditional industries, and has known a strong de-industrialisation since 1970, two contextual factors that may account for the difference. The empirical results also found import competition to have a strong impact on the probability to exit, especially if those imports concern little differentiated goods. Product differentiation proxied by the degree of intra-industry trade, is found to moderate this impact and lowers the probability of exit. The intra-firm trade part of intra-industry trade is looked at separately by including a variable measuring firm's imports or sourcing of goods from abroad. We find that international (out)sourcing significantly reduces the probability of exit.

Firms that are not part of a multinational network and/or have no outsourcing activities through a network of independent firms, are most vulnerable to the strong competitive pressure of global firms. This finding also carries over to subsidiaries of multinational firms that do not source from abroad and do not use their operating flexibility to improve their cost efficiency. The finding that also multinational firms have to specialise their production processes through increased sourcing of sideline or less cost efficient activities, reflects the increased importance of vertical foreign direct investment and international fragmentation of production during the last decade.

Our findings emphasize the importance of global sourcing as a competitive weapon to survive in a globalising industry. It can be reconciled with the finding that sourcing cannot be held directly responsible for the losses of employment observed in many industrialized economies (see e.g; Mankiw and Swagel, 2005). On the contrary, where global competition grows and no offshoring of activities or international outsourcing occurs, firms are more prone to exit and/or to substantially lay off workers. Firms that are able to upgrade their domestic activities and benefit from global sourcing cannot only survive but can also be expected to create new jobs. Different from some earlier research, we found no separate effect from exporting on the exit probability of the firm once the various sources of global competition were taken into account, a finding that refutes the assumed underlying learning process

In testing the model separately for domestic firms and foreign firms we also found that the passive learning process from interacting in the market as hypothesized for domestic firms did not occur for foreign firms. While recently established firms still have to experience their true efficiency and hence are more subject to failure hazard, multinational firms appear to transfer their proven efficiency to other countries.

We believe that our results have some important implication for economic policies trying to cope with the undesirable effects of globalisation. First of all, growing global competition will continue to lead to strong restructuring within and across industries. Institutions should therefore adapt themselves to ensure that the reallocation of resources to new activities can smoothly happen. Secondly, negative competitive effects from increasing presence of foreign firms should be compensated by stimulating domestic firms to absorb technological spillovers. Third, the best defence against the negative effects of globalisation appears to lie in adopting offensive strategies and exploit new possibilities in globalising industries.

From a policy point of view, this would imply that firms are stimulated to better exploit the opportunities accruing from the globalisation process in spreading their activities and/ or source goods and services from different regions of the world. While most of the above recommendations may sound familiar to the better performing economies in the world, for many continental EU countries the implementation of such policies would still mean a radical change from traditional industrial policies. .

REFERENCES

Agmon, T. and R. Drobnick (1994), "Small Firms in Global Competition", Oxford University press, NY.

Aitken, B. J. and E. Harrison (1999), "Do domestic firms benefit from direct foreign investment? Evidence from Venezuela", *American Economic Review*, 89, 605-618.

Alvarez R. and H. Görg (2005), "Multinationals and Plant Exit: Evidence from Chile", Research Paper Series, 2005/16, The University of Nottingham.

Arnold, J. M. and K. Hussinger (2005), "Export Behavior and Firm Productivity in German Manufacturing: A Firm-Level Analysis", *Review of World Economics*, 141(2), 219- 243.

Audretsch, D. B. and T. Mahmood (1995), "New-Firm Survival: New Results Using a Hazard Function", *Review of Economics and Statistics*, 7, 97-103.

Bergstrand, J.H. (1990), "The Heckscher-Ohlin-Samuelson Model, the Linder Hypothesis and the Determinants of Bilateral Intra-Industry Trade", *Economic Journal*, 100, 1216-1229.

Bernard, A. B., Redding S. and P. Schott (2004), "Product Choice and Product Switching. Tuck School of Business Mimeo", revision of NBER Working Paper 9789.

Bernard, A.B. and J. B. Jensen (2005), "Firm structure, multinationals, and manufacturing plant deaths", *Review of Economics and Statistics*, forthcoming.

Bernard, A. B., Eaton, J., Jensen, J. B. and S. Kortum (2003), "Plants and Productivity in International Trade", *American Economic Review*, 93, 1268-1290.

Blalock, G. and P. Gertler (2004), "Learning from Exporting Revisited in a Less Developed Setting", *Journal of Development Economics*, 75, 397-416.

Blomström, M. and A. Kokko (1998), “Multinational Corporations and Spillovers”, *Journal of Economic Surveys*, 12, 247-277.

Bowen, H. and L. Sleuwaegen (2004), “European Integration: The Third Step”, *Vlerick Leuven Gent Working Paper Series* 2004/19.

Carree, M.A., and A.R. Thurik (1999), *Industrial structure and economic growth*. In: D.B. Audretsch and A.R. Thurik, *Innovation, industry evolution and employment*, Cambridge; Cambridge University Press.

Caves, R.E. (1998), “Industrial Organization and New Findings on the Turnover and Mobility of Firms”, *Journal of Economic Literature*, 36, 1947-1982.

Comanor, W. and T. Wilson (1967), “Advertising Market Structure and Performance”, *Review of Economics and Statistics*, 49, 423-440.

Coucke, K., Pennings E. and L. Sleuwaegen (2005), “Employee Lay-off under different Modes of Restructuring: Exit, Downsizing or Relocation”, *Vlerick Leuven Gent Working Paper Series* 2005/13

Coucke, K. (2005), “Global Sourcing by MNE’s: Impact on Domestic Firms”, *Vlerick Leuven Gent Working Paper Series* 2004/7

De Loecker, J. (2004), “Do Exports Generate Higher Productivity? Evidence from Slovenia”, *revision of LICOS Discussion Paper* 151, Leuven.

Dixit, A. and R. Pindyck (1994), “Investment under Uncertainty”, Princeton: Princeton University Press.

Dunne, T., M. J. Roberts and L. Samuelson (1988), “Patterns of Firm Entry and Exit in U.S. Manufacturing Industries”, *Rand Journal of Economics*, 104, 671-698.

Dunne, T., M. J. Roberts and L. Samuelson (1989), "The Growth and Failure of U.S. Manufacturing Plants", *The Quarterly Journal of Economics*, 104, 671-698.

Eaton, B. and R. Lipsey (1980), "Exit barriers are Entry Barriers: the Durability of Capital as Barrier to Entry", *Bell Journal of Economics*, 11, 721-729.

Feenstra, R.C., and G.H. Hanson (2001), "Global Production Sharing and Rising Inequality: A Survey of Trade and Wages", NBER Working Paper 8372.

Feenstra, R.C., and G.H. Hanson (2003), *Vertical Production Networks in Multinational Firms*, NBER Working Paper 9723.

Geroski, P. A. (1995), "What Do We Know about Entry?", *International Journal of Industrial Organization*, 13, 421-440.

Görg, H. and E. Strobl (2002), "Multinational Companies and Indigenous Development: An Empirical Analysis", *European Economic Review*, 46, 1305-1322.

Görg, H. and E. Strobl (2003a), "Footloose Multinationals", *Manchester School*, 71, 1-19. Görg, H. and E. Strobl (2003b), "Multinational Companies, Technology Spillovers, and Plant Survival", *Scandinavian Journal of Economics*, 105, 581-595.

Grubel, H.G. and P.J. Lloyd (1975), "Intra-Industry Trade: the Theory and Measurement of International Trade in Differentiated Products". John Wiley & Sons, London.

Hannan M. and G. Carroll (1992), "Dynamics of Organizational Populations", Oxford University Press: Oxford.

Hanson G., Mataloni R. and M. Slaughter (2001), "Expansion Strategies of US Multinational Firms", NBER Working Papers W8433.

Head, K. and J. Ries (1999), "Rationalization effects of tariff reductions", *Journal of International Economics*, 47, 295-320.

Helpman E. (1987), "Imperfect Competition and International Trade: Evidence from Fourteen Economies", *Journal of the Japanese and International Economies*, 1, 62-81.

Helpman, D., M.J. Melitz and S.R. Yeaple (2003), "Export versus FDI", NBER Working Paper 9439.

Jovanovic, B. (1982), "Selection and the Evolution of Industry", *Econometrica*, 50, 649-670.

Kogut, B. and N. Kulatilaka (1994), "Operating Flexibility, Global Manufacturing, and the Option Value of a Multinational Network", *Management Science*, 40, 123-139.

Krugman, P. (1981), "Intraindustry Specialization and the Gain from Trade", *Journal of Political Economy*, 89, 959-973.

Lancaster, K. (1980), "Intra-Industry Trade Under Perfect Monopolistic Competition", *Journal of International Economics*, 10, 151-175.

Mankiw, G. N. and P. Swagel (2005), "The Politics and Economics of Offshore Outsourcing", Working papers AEI Online, December 7 2005, 1-49.

Martin, S. (2001), "Industrial Organization; A European Perspective", Oxford University Press.

Marvel, H.J. and E.J. Ray (1987), "Intra-industry Trade: Sources and Effects on Protection", *Journal of Political Economy*, 95, 1278-1291.

Mata, J. and P. Portugal, (1994), "Life Duration of New Firms", *The Journal of Industrial Economics*, 42, 227-245.

Mata, J. and P. Portugal, (2002), “The Survival of new Domestic and Foreign-owned Firms”, *Strategic Management Journal*, 23, 323-343.

Mitchell, W. (1994), “Effects of Business Sales and Age on the Dissolution and Divesture of Start up Firms and Diversifying Entrants”, *Administrative Science Quarterly*, 39, 575-602.

Pavcnik, N. (2002), “Trade Liberalization, exit, and productivity improvements: Evidence from Chilean plants”, *Review of Economic Studies*, 69, 245-276.

Pennings, E. and L. Sleuwaegen (2000), “International Relocation: Firm and Industry Determinants”, *Economics Letters*, 67, 179-186.

Pennings, E. and L. Sleuwaegen (2004), “The choice and timing of foreign market entry under uncertainty”, *Economic Modelling*, 21, 1101 - 1115.

Schmalensee R. (1989), “Inter-Industry Studies of Structure and Performance”, in Schmalensee and Willig, *Handbook of Industrial Organization*, Amsterdam.

Siegfried J.J. and L. Beth Evans (1994), “Empirical Studies of Entry and Exit: A Survey of the Evidence”, *Review of Industrial Organization*, 9, 121-155.

Sleuwaegen, L. and K. De Backer (2001), “Multinational Enterprises, Market Integration and Trade Structure: What Remains of the Standard Goods Hypothesis”, *Weltwirtschaftliches Archiv*, 137, 379-403.

Sleuwaegen, L. and K. De Backer (2003), “Foreign Ownership and Productivity Dynamics”, *Economics Letters*, 79, 177-183.

Sleuwaegen, L. and W. Dehandschutter (1991), “Entry and Exit in Belgian Manufacturing”, in P.A. Geroski and J. Schwalbach, *Entry and Market Contestability, An International Comparison*, Basil Blackwell (Oxford).

Sutton, J. (1991), "Sunk Costs and Market Structure", MIT Press, Cambridge M.A.

Tharakan, P. and J. Waelbroeck (1988), "Has Human Capital Become a Scarce Factor in Belgium", *Cahiers Economiques de Bruxelles*, 118, 159-179.

Tybout, J. (2001), "Plant- and Firm-level Evidence on New Trade Theories", NBER Working paper 8418.

United Nations (2002), *World Investment Report: Transnational Corporations and Export Competitiveness*, Geneva.

United Nations (2004), *Development and Globalization: Facts and Figures*, Geneva.

Van Biesebroeck, J. (2005), "Exporting raises Productivity in sub-Saharan African Manufacturing Firms", *Journal of International Economics*, forthcoming.

Yeaple, S. (2005), "A simple model of firm heterogeneity, international trade, and wages", *Journal of International Economics*, 65, 1-20.

Yip, K. (1989), "Global Strategy... in a World of Nations", *Sloan Management Review*, 31, 29-41.

APPENDIX: DATA SOURCES

Firm level data were obtained for all firms that report employment in Belgium during the period 1996-2002. Information on foreign ownership was gathered by the Federal Planning Bureau and linked with the files of the “Centrale des Bilans” of the National Bank of Belgium. We classified foreign owned firms as those firms having foreign ownership of 10 % or more. The 10 % threshold is used to distinguish foreign direct investment from portfolio investment. We located the moment of firm’s exit by searching the files for the first year the firm ceases to report financial data. To be on the safe side in computing life-spans, we performed additional controls before classifying the absence of report as a firm exit. We required that a firm be absent from the file for at least 2 years in order to be classified as an exit. For this reason, in our subsequent analysis we used data only until 2001, although our data files go up to the year 2002. Data on industry production, imports and exports at the 3-digit NACE level were obtained from the industrial statistics published by the National Bank of Belgium.

TABLE 1

Descriptive statistics of industry variables

Time period	1999-2000		2000-2001	
Variable	Mean	Std Dev	Mean	Std Dev
INDGROW	0.2534210	1.2124653	0.2237096	1.1832074
ENTRY	0.0410389	0.0311757	0.0398866	0.0287891
MNEPEN	0.1327891	0.5251552	0.1339049	0.5142194
IMPGROW	0.1721582	0.4147783	0.1862157	0.4240073
IIT	0.8423884	0.3124785	0.8505112	0.3765733

TABLE 2**Descriptive statistics of explanatory variables for domestic firms**

Time period	1999-2000		2000-2001	
Variable	Mean	Std Dev	Mean	Std Dev
AGE	2.6015617	0.7085738	2.6173281	0.6851898
SIZE	1.9420470	1.1583887	2.0681363	1.1123690
LABINT	0.1973692	1.2372937	0.1966098	1.4429670
DOWNS	0.0848587	0.1865879	0.0591093	0.1522825
PROD	0.6545303	1.4235837	0.5582214	0.6368738
INTSOURC	0.2801909	0.4491081	0.2966030	0.4567775
EXP	0.2820855	0.4500305	0.2952228	0.4561603

TABLE 3**Descriptive statistics of explanatory variables for foreign firms**

Time period	1999-2000		2000-2001	
Variable	Mean	Std Dev	Mean	Std Dev
AGE	2.8660496	0.6844804	2.8645014	0.6712493
SIZE	4.0495074	1.6092420	4.1001624	1.5611192
LABINT	0.1137552	0.5111856	0.1034463	0.4795674
DOWNS	0.0597542	0.1588397	0.0479010	0.1323036
PROD	0.9919759	2.7769047	0.8638485	1.9121470
INTSOURC	0.8363743	0.4491081	0.8417011	0.3651289
EXP	0.7686875	0.4217959	0.7696397	0.4211879

TABLE 4

Results from the logit regression for the restricted and extended model of domestic firm's exit for the first and second time period

	Extended Model Period 1	Restricted Model Period 1	Extended Model Period2
INTERCEPT	0,63*** (3,58) <i>0,085</i>	0,23** (2,29) <i>0,03</i>	0,86*** (4,12) <i>0,122</i>
AGE	- 0,17*** (-4,35) <i>-0,023</i>	- 0,17***(- 4,31) <i>-0,022</i>	- 0,11*** (-4,35) <i>-0,015</i>
SIZE	-0,60***(-23,7) <i>-0,081</i>	- 0,63***(- 28,3) <i>-0,084</i>	-0,48***(-19,7) <i>-0,068</i>
LABINT	0,26*** (8,00) <i>0,035</i>	0,27*** (8,35) <i>0,036</i>	0,08*** (9,2) <i>0,011</i>
DOWNS	1,19*** (5,88) <i>0,161</i>	1,17***(6,07) <i>0,183</i>	1,4*** (8,82) <i>0,20</i>
PROD	- 0,19*** (-5,92) <i>-0,025</i>	- 0,19***(-6,47) <i>-0,025</i>	- 0,81*** (-7,92) <i>-0,115</i>
INDGROW	- 0,54*** (-3,49) <i>-0,073</i>	- 0,83***(-5,98) <i>-0,111</i>	- 0,45*** (-5,3) <i>-0,064</i>
ENTRY	0,26* (1,87) <i>0,035</i>	0,35***(2,72) <i>0,046</i>	0,20 (1,15) <i>0,028</i>
EXP	- 0,01 (-0,59) <i>-0,001</i>	- 0,12** (-2,59) <i>-0,016</i>	- 0,03 (-0,47) <i>-0,004</i>
INTSOURC	- 0,24*** (-3,80) <i>-0,032</i>		- 0,28*** (-3,9) <i>-0,04</i>
MNEPEN	0,38** (2,14) <i>0,051</i>		0,22 (0,84) <i>0,031</i>
IMPGROW	0,25** (2,44) <i>0,034</i>		0,32*** (4,51) <i>0,045</i>
IIT	- 0,59***(-2,79) <i>-0,08</i>		- 1,01***(-3,8) <i>-0,144</i>
Log Lik	- 6167	- 6256	- 5329

- t-values are between brackets,
- *significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level,
- mean marginal effects are in italics

TABLE 5

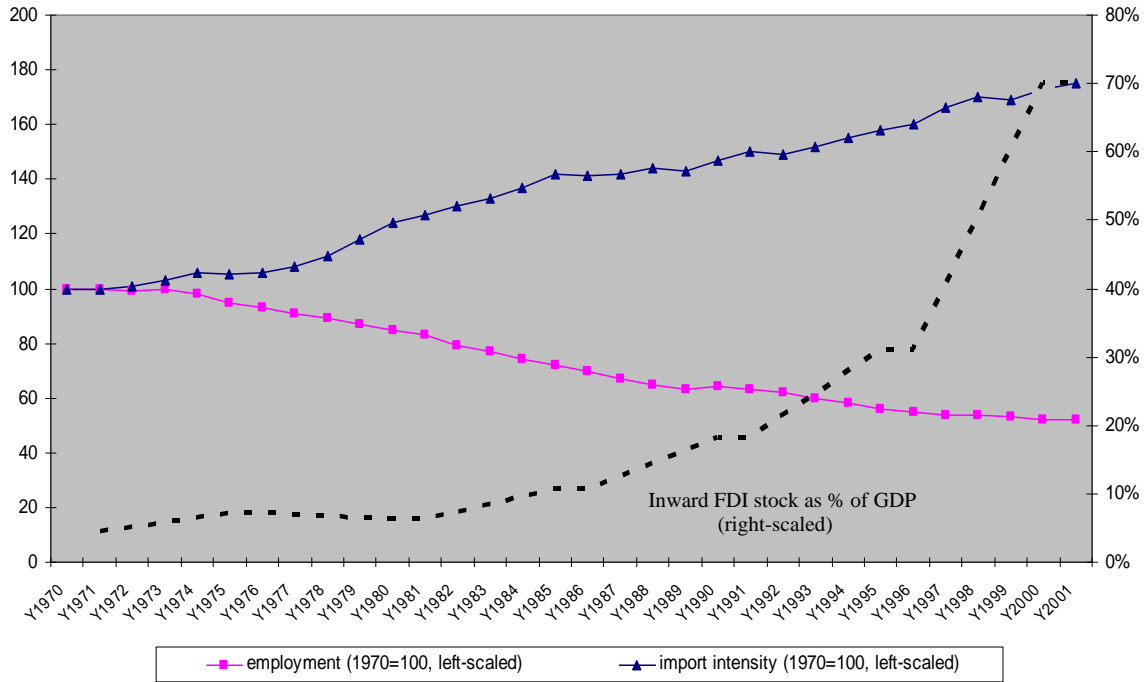
Results from the logit regression for the restricted and extended model of foreign firm's exit for the first and second time period

	Extended Model Period 1	Restricted Model Period 1	Extended Model Period2
INTERCEPT	-0,81 (-0,78) <i>-0,117</i>	-1,26*** (-3,9) <i>-0,182</i>	0,15 (0,58) <i>0,021</i>
AGE	- 0,17 (-0,65) <i>-0,024</i>	- 0,17 (-0,61) <i>-0,024</i>	0,10 (1,25) <i>0,014</i>
SIZE	-0,07 (-0,87) <i>-0,010</i>	- 0,13* (- 1,83) <i>-0,0188</i>	-0,19*** (-3,87) <i>-0,026</i>
LABINT	0,05 (0,56) <i>0,0072</i>	0,13 (1,35) <i>0,0188</i>	0,21 (1,1) <i>0,029</i>
DOWNS	2,23*** (6,5) <i>0,323</i>	2,15***(7,8) <i>0,311</i>	1,71*** (8,2) <i>0,239</i>
PROD	- 0,02 (-0,12) <i>-0,0029</i>	- 0,02 (-0,07) <i>-0,002</i>	- 0,12 (-1,2) <i>-0,016</i>
INDGROW	- 0,19 (-0,39) <i>-0,027</i>	- 0,9*(-1,89) <i>-0,13</i>	0,06 (0,24) <i>0,008</i>
ENTRY	-0,18 (-0,27) <i>-0,026</i>	-0,05 (-0,07) <i>-0,007</i>	-0,6 (-1,33) <i>-0,084</i>
EXP	- 0,006 (-0,59) <i>-0,0008</i>	- 0,41* (-1,9) <i>-0,059</i>	- 0,02 (-0,17) <i>-0,002</i>
INTSOURC	- 1,19*** (-5,1) <i>-0,172</i>		- 0,75*** (-4,78) <i>-0,078</i>
MNEPEN	-1,72* (-1,85) <i>-0,249</i>		-1,72** (2,55) <i>-0,24</i>
IMPGROW	1,4*** (4,14) <i>0,203</i>		0,53* (1,85) <i>0,074</i>
IIT	- 0,46* (-1,89) <i>-0,066</i>		- 1,56* (-1,95) <i>-0,218</i>
Log Lik	- 375	- 389	- 452

- t-values are between brackets,
- *significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level,
- mean marginal effects are in italics

FIGURE 1

Evolution of employment in belgian manufacturing, import intensity and inward fdi stock as percentage of gdp (1970-2002).



Source: Federal Planning Bureau, Eurostat, NBB