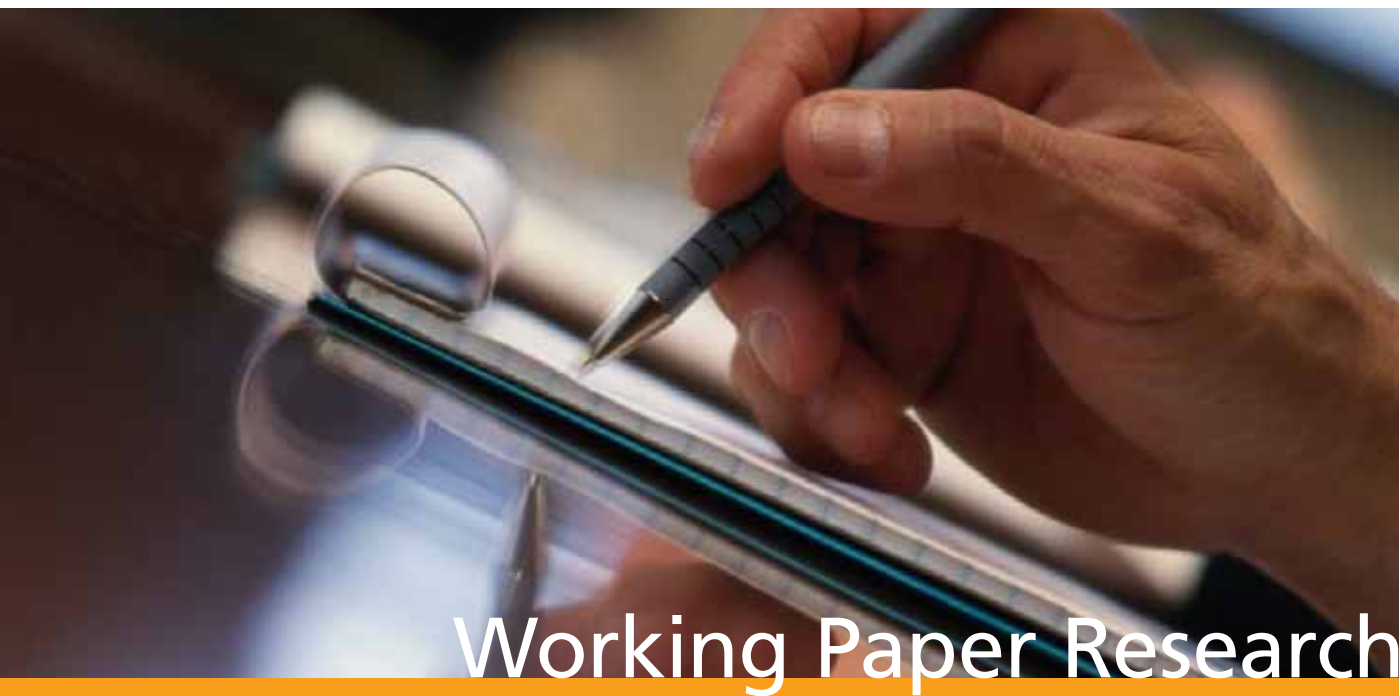


Job creation, job destruction and
firms' international trade involvement



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by Mauro Pisu

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Abstract

One of the most important predictions made in recent international trade literature based on heterogeneous firms concerns the within-industry job reallocation from firms not involved in international markets to those that are. This paper quantifies the extent of this reallocation using a dataset of Belgian manufacturing firms from 1998 to 2004 providing information on their international trading activities. The results suggest that, at three-digit industry levels, the shifts in employment between firms having different trading status account for 6 to 30 percent of total job reallocation. This effect is stronger for large than for small firms.

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Research results and conclusions expressed are those of the author and do not necessarily reflect the views of the National Bank of Belgium or any other institution to which the authors are affiliated. All remaining errors are mine.

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1. Introduction

The recent international trade literature based on heterogeneous firms has established that companies involved in international markets are different from purely domestic firms. Generally speaking, they are more productive and employ more workers.¹ An important prediction of this new class of models, starting with Melitz (2003) and all its various extensions, is that trade liberalisation will lead to within-industry reallocation of economic activity towards firms operating in international markets. In other words, firms engaging in international activities are more likely to expand and create jobs. Those unable to do so will contract, and some of them will exit altogether.

The aim of this paper is to quantify the extent of this job reallocation process. To do this, it focuses not on *average* employment changes, but on the contemporaneous *creation* and *destruction* of jobs. The dataset used covers all Belgian manufacturing firms from 1998 to 2004, and makes it possible to identify which firms are engaged in international markets and in what way, i.e. through exports, imports, and/or FDI. Firms entering or exiting international markets can also be singled out from the data, as well as their births and deaths.

Most of the empirical studies in international trade focusing on heterogeneous firms have considered average differences in firm-level variables, such as employment and productivity, between firms active and in foreign markets and those that are not. However, since the seminal work of Davis and Haltiwanger (1992) on gross jobs flows, it is well known that average employment changes hide a lot of heterogeneity among firms. Even in narrowly-defined industries and within groups of firms, defined according to various characteristics, such as age and size, there is contemporaneous job creation and destruction.

International trade models based on heterogeneous firms link this process of job creation and destruction, and the ensuing intra-industry job reallocation, to firm-level participation in international markets. Despite the importance that recent theories accord to the reallocation effect, there seems to be still little systematic empirical evidence on this. Levinsohn (1999) and Davis, Haltiwanger and Schuh (1996) have linked exports and

¹ For a recent survey of the firm-level literature on international trade, see Helpman (2006). For two other reviews focusing more on empirical studies, see Greenaway and Kneller (2007) and Wagner (2007).

imports to job creation, destruction and reallocation. However, they were only able to consider the trade orientation of industries and not firms. Therefore, their analyses focus on employment shifts between import- and export-oriented industries. Their findings suggest these employment shifts explain only a small part of the total job reallocation. Most of it, in fact, takes place within industries, whether import- or export-oriented.²

The main contribution of this study is to consider firm-level information about exports and imports, consistently with recent heterogeneous firm-based models. It also extends the analysis to inward and outward foreign direct investment in order to have full picture of the international activities of firms. The results suggest that, after controlling for size and industry-level characteristics, firms participating in international markets have higher growth rates of employment on average than purely domestic companies. However, these differentials mask a great deal of heterogeneity. All types of firms involved in international markets in different ways appear to create and destroy jobs simultaneously. Thus, international trade and FDI do not always seem to be associated with either employment expansions or contractions, but with both. Only entries into and exits from international markets seem to be clearly linked to job creation and destruction, respectively.

As far as the reallocation effect is concerned, the results suggest that the reshuffling of jobs among firms having different international status accounts for around 6 to 30 percent of the total reallocation, at three-digit industry level. Moreover, the reallocation effect is stronger for large firms than for small ones. Among the latter, participation in international markets accounts for just 2 to 5 percent of the total reallocation.

These results are consistent with the predictions of international trade models based on heterogeneous firms concerning the reallocation of resources towards enterprises active in international markets. Yet, at least for open and developed countries such as Belgium which have not experienced recent phases of dramatic trade liberalisation, the contribution of firm-level involvement in foreign markets to job reallocation appears to be limited.

² This runs against the popular belief that firms in exporting sectors will mostly create jobs whereas those in importing industries will destroy them. Using Chilean data, Levinsohn (1999) notes that firms in tradable sectors, whether import competing or export-oriented, behave similarly. They also react differently to aggregate shocks from firms in the non-tradable sectors. Thus, what appears to matter for employment dynamics is the link with international markets and not imports or exports *per se*.

The rest of the paper is organised as follow. Section 2 makes some theoretical considerations based on theories from heterogeneous firms. The dataset is described in Section 3, while Section 4 presents the main results and Section 5 concludes.

2. Theoretical considerations

Since the work of Davis and Hitiwanger (1990, 1992) on gross job flows, it has become evident that firms are greatly heterogeneous even within narrowly defined sectors.³ Davis and Hitiwanger (1990, 1992) have shown that the contraction or expansion of employment levels in US manufacturing plants is only weakly related to precisely defined firm- and industry-level characteristics. This results in most of the reallocation of jobs taking place within sectors rather than between them.⁴ Davis and Haltiwanger (1992) and Davis and Haltiwanger and Schuh (1996) link this phenomenon to firm-level idiosyncratic shocks. They show that the latter dwarf the effect of sectoral and macro-level shocks. Studies from different countries have mainly corroborated these findings, albeit with some differences.⁵

As a result of this large body of evidence, heterogeneous firms have also started to figure prominently in international trade. Bernard and Jensen (1995, 1999) and Aw and Hwang (1995) were the first to report a relationship between size and productivity, on the one hand, and participation in export markets, on the other. Their results and many successive studies show that the largest and most productive firms self-select into export markets. To explain these stylised facts, Melitz (2003) has proposed a general equilibrium model of heterogeneous firms in a monopolistic competitive setting. When trade is liberalised, the presence of sunk costs along with heterogeneous productivity levels lead the most productive firms to self-select into export markets.

One of the most important predictions made by Melitz (2003) concerns the reallocation effects caused by trade liberalisation. It claims that exporting firms will expand and generate jobs whereas those that do not will contract and destroy them. In any given

³ Sectors may either refer to industries or to groups of firms classified according to certain characteristics, such as size and age.

⁴ According to the evidence for the US, there are some groups of firms that experience higher rates of job reallocation than others, such as young and small companies. This is due to both higher job creation and destruction rates.

⁵ Obviously, some of the results are country-specific. For instance, Konings (1995) claims that, in the UK, aggregate shocks are more important than firm-level idiosyncratic ones. However, he used a dataset largely biased towards large firms. This does not allow him to consider the large degree of variation in employment growth rates among small firms. Albaek and Sorensen (1998) report that job reallocation is not counter-cyclical for Denmark, in contrast to evidence for the US.

industry, this process generates contemporaneous job creation and destruction and a redistribution of jobs from non-exporting to exporting companies. Many researchers have extended the Melitz (2003) model in different directions. For the purpose of this paper, among the most relevant extensions are those of Helpman, Melitz and Yeapple (2004) and Kasahara and Laphan (2007), who considered, respectively, the two other main forms of participation in international markets, namely FDI and imports. What matters here is that the within-industry reallocation effect features in both of them. When trade is liberalised, there will be a reallocation of resources not only towards exporters, as in the Melitz model, but also towards firms engaged in FDI and importing.⁶ In Kasahara and Laphan's model (2007), the reallocation effect is even stronger than in the case with only exports and FDI.⁷ Thus, companies that import, export or that do both tend to expand and create new jobs whereas firms remaining purely domestic will destroy them.⁸

Despite the importance of the reallocation effect as a new gain from trade, there seems to be still little empirical evidence on it. Most of the empirical studies have concentrated on whether the superior firm-level characteristics of firms engaged in international markets precede or follow the start of their international activities.⁹ Levinsohn (1999) and Davis, Haltiwanger and Schuh (1996) have quantified the job reallocation caused by international trade. However, they classified sectors, and not firms, as export- or import-oriented. As a result, they were able to measure only the between-industry and not the within-industry job reallocation caused by international trade. Their findings suggest that sectoral exports and imports do not go very far to explain the contemporaneous job creation and destruction of firms. Moreover, they did not consider the role of FDI.¹⁰

⁶ Other important extensions of the basic set-up of Melitz (2003) are Bernard, Redding and Schott (2004), who integrate heterogeneous firms into the relative factor endowment framework of Heckscher and Ohlin, as well as Falvey, Greenaway and Yu (2004), who consider two countries with different wage levels, and Melitz and Ottaviano (2005), who use a demand structure generating variable mark-ups. The reallocation of resources and jobs from non-exporters towards exporters is a common prediction of all these models.

⁷ This stems from the fact that imports have a positive impact on firm-level productivity. In this setting, the reallocation effect will come from two sources. The first has to do with the intra-firm productivity improvements brought about by imports of intermediates, which alone will generate a reshuffle of capital and labour towards more productive importers. The second concerns the fact that import-induced productivity growth will lead some firms to start exporting. This in turn will allow these firms to expand in foreign markets and hire extra workers.

⁸ Because of the increase in demand for labour, the real wage will rise and the less productive firms will contract or exit as a result.

⁹ See Wagner (2007) and Greenaway and Kneller (2007) for recent reviews of the empirical evidence.

¹⁰ More recently, Muendler (2004) and Halpern, Koren and Szeidl (2005) have provided some estimates of the effect of imports on productivity growth through reallocation. Using Brazilian manufacturing firms, Muendler (2004) finds that this effect is small when compared to intra-firm productivity improvements and the exit of less productive companies. Focusing on Hungary, Halpern, Koren and Szeidl (2005) report that the contribution of imports to the total reallocation effect (which explains about half of the aggregate productivity rise) is around 25 percent.

As highlighted above, the recent trade theory based on heterogeneous firms emphasises that international trade will cause intra-sectoral reallocation because some firms will participate in international markets whereas others will not. Consistently with this body of theory, this study uses firm-level information about involvement in exports, imports and FDI to measure the actual job reallocation between these kinds of firms.

3. Methodology

This paper follows the example of David and Haltiwanger (1992) to compute employment growth, job creation and destruction rates. As explained in the next section, the dataset employed in this study also contains births and deaths of firms. This methodology allows them to be taken into account. The employment growth rates of enterprises i between time $t-1$ and t is calculated as:

$$g_{it} = \frac{e_{it} - e_{it-1}}{n_{it}}$$

where n_{it} is the size of the firm measured as the average number of employees across two consecutive time period, $n_{it} = (e_{it} + e_{it-1}) / 2$. The main advantage of computing the growth rate in such a way is that it is equal to -2 and 2 for firms' death and birth respectively. For small values, it will be approximately equal to the traditional growth rate.

The job creation and destruction rates for a firm belonging to sector s are computed respectively as a weighted average of the absolute value of positive and negative firm-level growth rates. The weights are given by size:

$$JC_{st} = \sum_i \frac{n_{it}}{N_{st}} g_{it} \quad \text{for } g_{it} > 0$$

$$JD_{st} = \sum_i \frac{n_{it}}{N_{st}} |g_{it}| \quad \text{for } g_{it} < 0$$

where $N_{st} = \sum_{i \in s} (e_{it} + e_{it-1}) / 2$ is the size of sector s computed over two time periods. s can be the whole manufacturing sector, an industry or any other type of group of firms classified in a different manner such as their international status. The job creation and

destruction rates computed as above are simply the total number of jobs created or destroyed over the size of sector s .

The net job creation rate (JN_{st}) is computed as the difference between job creation and destruction rates. It is equivalent to the net number of jobs created or destroyed over the size of the sector s and as such it is a measure of how much it expanded or contracted. The job reallocation rate (JR_{st}) is the sum of job creation and destruction rates and it is an overall measure of the turnover of jobs. The excess jobs reallocation rate, calculated as $JX_{st} = JR_{st} - |JN_{st}|$, is the rate of job reallocation over and above what is necessary to accommodate the net change.

To investigate the reallocation of jobs between different groups of firms, it is possible to decompose the surplus total job reallocation into the components of intra- and inter-group changes. If the groups of firms are defined according to their international status, the latter provides a measure of the reallocation of jobs between firms participating and not participating in international markets. The ‘between’ and ‘within’ components can be computed as:

$$\sum_s Sum_{st} - \left| \sum_s Net_{st} \right| = \underbrace{\sum_s |Net_{st}| - \left| \sum_s Net_{st} \right|}_{\text{Between}} + \underbrace{\sum_s [Sum_{st} - |Net_{st}|]}_{\text{Within}}$$

where the $\sum_s Sum_{st} - |\sum_s Net_{st}|$ is the excess job reallocation at time t .¹¹

4. Data

The primary data source used in this paper is the Belgian Balance Sheet Transaction Trade Dataset (BBSTTD) with additional information on multinational and foreign ownership status. The BBSTTD is the result of the merger between firm-level accounts and custom trade data. It is described in detail in Muûls and Pisu (2007), along with the sample coverage and the results of the merger between company-level and trade transaction data. Here, suffice it to note that firm-level accounts come from the Central Balance Sheet Office at the National Bank of Belgium (NBB), which collects the balance sheets of almost

¹¹ $Sum_{st} = \sum_{i \in s} |e_{it} - e_{it-1}|$ is the total number of jobs reallocated in sector s and $Net_{st} = \sum_{i \in s} e_{it} - e_{it-1}$ is the net change in employment.

all companies registered in Belgium.¹² Most limited liability enterprises, plus some other firms, have to file their annual accounts and/or consolidated accounts with the Central Balance Sheet Office every year. Large companies have to file the full-format balance sheet. Small companies may use the abbreviated format.¹³ For this study, we selected only firms operating in the manufacturing sector that filed a full-format or abbreviated balance sheet between 1996 and 2004. Consolidated balance sheets were not considered. Since all firms are obliged to file their annual accounts, with a few exceptions, I was able to identify in a consistent way firms' births and deaths. Every new VAT number is considered as a new firm's entry, whereas a VAT deregistration is treated as exit.

The information about exports and imports are collected separately at company level for intra-EU (Intrastat) and extra-EU (Extrastat) trade. These two sources of information were merged with the company-level data using the value added tax number identifying each firm. Only a minority of firms in the foreign trade dataset, between 7 and 5 percent of them in each year, were not merged with the balance sheet dataset.¹⁴ These are legal entities, which have a VAT number, but do not file any accounts with the Central Balance Sheet Office.¹⁵

The information concerning foreign ownership and multinational status comes from the Yearly Survey on Foreign Direct Investment. The National Bank of Belgium started this collection of data in 1997 to produce statistics on the balance of payments and foreign direct investment, in compliance with the provisions laid down by international organisations, namely the IMF, OECD and Eurostat. In this study, foreign direct investment is defined in the same way as in the IMF's Balance of Payments Manual

¹² The dataset does not cover firms in the financial sector. Also, some non-financial enterprises do not have to file any annual accounts. These include: sole traders; small companies whose members have unlimited liability: general partnerships, ordinary limited partnerships, cooperative limited liability companies; large companies whose members have unlimited liability, if none of the members is a legal entity; public utilities; agricultural partnerships; hospitals, unless they have taken the form of a trading company with limited liability; health insurance funds, professional associations, schools and higher education institutions.

¹³ Under the Belgian Company Code, a company is regarded as large if the annual average of its workforce exceeds 100 persons or more than one of the following criteria are exceeded: 1) annual average of workforce: 50; 2) annual turnover (excluding VAT): 7,300,000 euro; 3) balance sheet total: 3,650,000 euro. Note that these figures are subject to change.

¹⁴ These figures regards manufacturing and services.

¹⁵ These entities are most likely firms forming part of a larger group filing consolidated accounts or foreign firms having no production facilities in Belgium. In the first case, even with consolidated accounts, it would be extremely difficult to disentangle the data related to each single firms belonging to a group. Foreign firms having no production facilities do not pose a problem since this paper focuses on manufacturing.

(1993).¹⁶ The survey contains various information about both categories of companies. In the present study, I focus only on the ownership in order to identify foreign-owned firms and Belgian multinational enterprises. These data were merged with the balance sheet and trade datasets through the VAT number.

The FDI data start from 1997, so I am obliged to start the analysis in 1998 in order to identify those firms that changed their foreign or multinational status from 1997 to 1998. For continuous-status firms, I need two consecutive years of employment to compute the firm-level employment growth rate as described above.¹⁷ So, in this study, I could use only those firms reporting employment for two successive time periods and the rest of the observations had to be discarded. Obviously, this does not apply to company births and deaths since their growth rates are fixed at two and minus two by construction.

As can be seen from Table 1, the resulting dataset counts between 15,700 and 16,100 firms per year. Total employment in manufacturing went from around 580,000 to 534,000 full-time equivalent workers over the whole sample period. To check the representativeness of the data used in this study, Figure 1 compares the yearly total employment with that of official national statistics.¹⁸ Unsurprisingly, the total number of employees in the firm-level dataset is lower than what the official statistics report. The differences are in the order of 70,000 workers per year.¹⁹ However, the two series have virtually the same behaviour over time and they are highly correlated.²⁰ Since this exercise deals with firm-level employment changes, the data used are likely to represent the process of job creation and destruction quite adequately.

In Table 1, the yearly means and medians of the employment levels reveal that firms have become smaller over the sample period. The average number of employees was around 36 in 1998 and 34 in 2004. Figures for the median are notably lower since they are not

¹⁶ According to this definition, a foreign direct investment enterprise is one in which a foreign investor owns, either directly or indirectly, i.e. through other investors, 10 percent or more of its capital or voting power. All companies operating in Belgium which fall into this category are obliged to fill in the questionnaire by law. This applies to firms resident in Belgium in which a foreign investor holds a stake, i.e. foreign-owned firms, and to Belgian companies having a stake in enterprises operating abroad, i.e. Belgian multinationals.

¹⁷ The total employment used in this study is the average of full-time equivalent employees working for a company over the year. In Belgian annual accounts of companies, it is recorded under code 9087.

¹⁸ These are computed by the National Bank of Belgium and are publicly available in the Belgostat section of the NBB's website.

¹⁹ This is partly explained by the fact that this study considers only those firms reporting employment for *two* consecutive years.

²⁰ The Pearson correlation is 0.98.

affected by relatively few large firms. However, they show the same behaviour over time. The employment growth rates declined during the sample period. This is in contrast with the behaviour of the median of the employment growth rate, which was always zero. This suggests that relatively few large employment changes are responsible for the swings in the yearly mean of employment growth rates. Table 1 also shows the standard deviation and the interquartile ranges as measures of dispersion of employment levels and growth rates. These dwarf the mean and median of employment levels and growth rates, respectively. The standard error of employment is around six times its mean, that of the growth rate is more ten times. Interquartile ranges also suggests that the distributions of the levels of growth rates of employment are highly dispersed.

This study looks at the effect of firm-level participation in international markets on job reallocation by considering two classifications of firms based on their international trading status, one simple and the other more detailed. The categories of both classifications are mutually exclusive.

The simple classification, for any year t , distinguishes between purely domestic companies, those involved in international markets at time t and $t-1$ and those entering and exiting international markets. Purely domestic companies do not export, import or have any relationship with foreign firms. International firms may be involved in one or more international activities. Firms' births and deaths fall into two distinct categories. This is to keep their effects on job growth distinct from the process of entering and exiting international markets.

The detailed classification separates firms engaged in international markets according to the type of their international activities. It therefore distinguishes between exporters, importers, two-way traders, foreign and multinational enterprises.²¹ These are classified as such if they have the same status over two consecutive years. By the same token, firms entering and exiting international markets are broken down into different categories according to the international activities they started or stopped. Moreover, foreign-owned firms and Belgian multinationals form two distinct categories.

²¹ Importers and exporters are those that just import or export, respectively. Two-way traders both import and export. Also, foreign firms may or may not have subsidiaries abroad and export and/or import. Belgian multinationals may export and/or import or do neither. Both foreign and MNEs are likely to be highly export- and/or import-oriented since they are part of international production networks. Taking this into account will prevent any effect due to being foreign-owned or multinational being mistakenly attributed to imports or exports.

In both classifications, the entry into or exit from international markets are identified with respect to purely domestic companies only. For instance, new export firms are those that start exporting at time t and were purely domestic at time $t-1$; stop export firms are those that only exported at time $t-1$ and became purely domestic the following year. In the detailed classification, it is necessary to create an additional residual category of switchers. This identifies companies changing type of participation in international markets.²²

Table 2 and Table 3 exhibit,, for the simple and detailed classification respectively, the percentage of firms in each category and the respective share of employment for the 1998 to 2004 period. They also show the mean and median of employment levels and growth rates for each type of firm, along with the associated measures of dispersion, i.e. the standard deviation and the interquartile range.

It can be seen from Table 2 that purely domestic firms accounted for nearly 50 percent of the total number of firms, but only for 9 percent of total employment because of their small size. On the contrary, around 37 percent of firms had some form of engagement in international markets, but they employed about 82 percent of manufacturing-sector employees. Also, relatively few firms entered or exited international markets. This is consistent with the presence of sunk costs. The average employment rate of new international firms is larger than the manufacturing average whereas the opposite is true for firms that stopped being involved in foreign markets. In terms of job growth, there are important differences among different kinds of firms. Consistently with recent international trade models based on heterogeneous firms, companies entering or exiting international markets have the highest job change rates, in absolute value and excluding firms' births and deaths. This suggests that firms entering international markets expand and create jobs whereas those leaving them contract and destroy them.

Table 3 shows the same type of information using the detailed classification. Two-way traders are the most numerous types of international firms, representing around 19 percent of the total businesses.²³ Importing- and exporting-only firms are less frequent, accounting for around 5 and 4 percent of firms surveyed. Belgian multinationals and foreign-owned

²² These are, for instance, importers that become exporters or two-way traders that switch to imports or exports only.

²³ Note that these figures differ from those Pisu and Muïls (2007) because of different cleaning procedures and because they did not consider foreign and multinational enterprises.

firms employ slightly less than 50 percent of the workforce.²⁴ With regard to average size, foreign companies and Belgian multinational enterprises are the largest. They are followed by firms that either become or stop being foreign-owned or multinationals. Among importing and/or exporting companies, those that do both are the largest, followed by importing- and exporting-only enterprises.

In terms of job growth, there are important differences. From Table 3, it is possible to note that companies starting to be involved in international markets have a positive average employment growth rate. The opposite is true for companies that stop their international activities. Besides, companies starting to be involved in foreign markets in some way or another have higher employment growth rates than the corresponding category of companies engaged in international markets for two consecutive years. Importing, exporting or two-way trading firms have yearly growth rates ranging from three percent, for exporters, to 13 percent, for two-way traders. Firms stopping importing reduce employment at the rate of about two percent, whereas those that stop both exporting and importing have a negative job growth rate of 11 percent. Among continuous traders, only the average growth of exporters is negative. This is surprising since exporters are generally larger and are usually associated with higher employment growth rates. However, this may be because the literature has so far mainly neglected importing firms and two-way traders.²⁵ Companies that import along with those that import and export in fact have positive employment growth rates. Surprisingly, both foreign and multinational companies appear to be destroying jobs on average.

Perusing the figures on the dispersion of employment growth rates, it is possible to see that although enterprises with different types or extents of international trade involvement are markedly different in terms of employment levels and growth rates, a certain degree of heterogeneity remains within each category. It can be seen from Table 3 that the standard deviation from mean ratios of employment growth rates computed for the different types of firms, although smaller than that for the whole manufacturing sector, is still substantial. Even among firms entering or exiting international markets, the standard errors are around 10 times their respective means. This indicates that participation in international markets is not a perfect discriminant of expanding and contracting firms.

²⁴ It is worth noting that the residual category of switchers account for a minority of firms and workers.

²⁵ Another reason could be that the figures in Table 3 do not consider sectoral shocks. It is possible that Belgian exporters are concentrated in traditional sectors and are therefore hit by competition from low-cost foreign producers.

To explore the relationship between international trading activities and average job growth rates in more detail, I turn to simple regression analysis. The advantage of this approach is that it makes it possible to gauge the partial correlation between the indicators of international trading involvement we are using and the dependent variable after controlling for other factors, such as the size of firms along with industry and time-fixed effects. Its drawback is that it models the simple conditional mean of the dependent variable. So, from this exercise, one can not retrieve any information about gross job flows.

The employment growth rate, computed as described above, is regressed on dummies representing the trade status and the size of the firm. I consider four quartiles of the employment distribution to identify small, medium-small, medium-large and large companies.²⁶ The results for both simple and detailed classifications appear to confirm the main message emerging from Table 2 and Table 3 and, for this reason, they are reported in Table A1 in the Appendix.²⁷ Involvement in international markets, and in particular the start of international activities, is associated with larger net employment growth rate. The main difference with respect to Table 3 is that exporters now have higher employment growth rates than purely domestic firms. Firms starting to be involved in international markets have the highest employment growth rate, 7.3 percent above the reference category, whereas companies exiting foreign markets have an employment growth rate 2.2 percent below the reference category. International firms appear to have an employment growth rate 3.6 percent higher than purely domestic companies. Among firms having different forms of international involvement, importers grow the fastest. They are followed by two-way traders, multinationals, foreign firms and exporters. Firms that enter international markets either exporting, importing or doing both tend to enjoy higher employment growth rates than purely domestic firms. Stopping export and/or import trade is negatively associated with employment growth rates.

This simple analysis points to the fact that international status is related to the conditional mean of the net employment growth rate. These results also indicate that involvement in international markets can be a source of reallocation of jobs from firms not involved or

²⁶ The size of firms in any given year is determined using the employment figures of the previous year.

²⁷ The reference categories are respectively purely domestic and large firms. The regressions were run excluding entries and exits since they perfectly predict the dependent variable. Virtually identical results were obtained using them.

stopping their involvement in international markets to those involved in them. To quantify the extent of this reallocation, I now turn to the analysis on gross job flows.

The figures on gross job flows for the Belgian manufacturing sector year by year are shown in Table A2 in the Appendix. As expected, they point to contemporaneous job creation and destruction. This is consistent with the evidence from the literature on this topic. There is also a sizeable job reallocation rate, of around 12 percent for the whole manufacturing sector.²⁸ Also, the figures for excess reallocation suggest that more jobs are created or destroyed than is necessary to accommodate the net change.²⁹

5. Results

Figure 2 and Figure 3 show the job creation and destruction rates of different types of firms according to the simple and detailed classification from 1998 to 2004.³⁰ In these graphs, firms with equal rates of job creation and destruction will lie along the dashed line. Those with positive net job creation rates will be above the diagonal, whereas those having negative net creation rates will be below it. Also, in both figures, the size of each point is proportional to the employment share of each category. The figures used to draw these graphs are reported in Table A3 and Table A4 in the Appendix along with the contribution of the different kinds of firms to gross job flows.

It can be seen from Figure 2 and the accompanying Table A3 that over the period from 1998 to 2004, international firms created and destroyed jobs roughly at the same rate. The net creation rate was very close to zero. Thus, participation in international markets, at least at this level of aggregation, does not seem to be related to positive net creation of jobs. Also, international firms, because of their large share in total employment, were responsible for more than 50 percent of the total of jobs created and lost. This suggests that the behaviour of international firms will affect the whole manufacturing sector. The major contribution of company births and deaths to the process of job creation and

²⁸ This is lower than the corresponding figure for the US (Davis, Haltiwanger and Schuh 1996), UK (Koonings 1995) and Denmark (Albaek and Sorensen 1998). This is likely due to the fact that Belgium has a more rigid labour market.

²⁹ Note that in Table A2 the weighted average of the yearly excess jobs reallocation rates, $JX = \sum w_t JX_t$ is not the same as the excess jobs reallocation for the whole time period computed as $JR - |JN| = \sum w_t JR_t - |\sum w_t JN_t|$ where JR and JN are respectively the weighted averages of the yearly job reallocation rates and yearly job net growth rates. This is because the latter is a function of the net change in employment over the whole sample period, instead of the yearly net employment changes as $JX = \sum w_t JX_t$.

³⁰ Job creation and destruction rates for the whole period are weighted averages of yearly rates. The figures exclude entries and exits since their job creation and destruction rates are 2 and -2 by construction.

destruction is also noteworthy. During the sample period, the former accounted for around 27 percent of all jobs created, whereas the latter were responsible for about 30 percent of all jobs destroyed.

Surprisingly, purely domestic companies appear to have created more jobs than they have destroyed. This is most likely due to the fact that most of them are small. These companies have been found to grow faster than large ones. However, they contribute little to the behaviour of the manufacturing sector because of the small share of workers they employ (around 9.2 percent of all employees in manufacturing). Consistently with theory, entries into and exits from international markets are more closely associated with job creation and destruction. Firms starting out in international markets have relatively high job creation rates and relatively low job destruction rates, whereas the opposite is true for companies that stop being involved abroad.

It is worth noting that companies with no involvement in international markets have higher job reallocation rates than those with some form of engagement. This suggests the fact that employment is more stable in the latter than the former. Apparently this is in contrast with what Levinshon (1999) finds using Colombian data. He reports that trade-oriented sectors experienced higher job creation and destruction rates following trade liberalisation than non-trade-oriented ones. He then concludes that trade is likely to involve a massive restructuring process, whereby a large number jobs are contemporaneously created and destroyed within sectors. The apparent difference between these results and those presented in this paper can be explained by the fact that Levinshon (1999) considered broad industrial sectors whereas this study focuses on individual firms. Participation in international markets in principle leads to less business volatility and more stable employment at firm level because of the diversification opportunities it offers. This will be more likely if shocks in foreign and domestic markets are negatively correlated. Therefore, whereas at sectoral level trade openness may be related to higher job reallocation rates, because of within-sector job reallocation from non-trading to trading companies, at firm level the opposite may be true.

If we look at engagement in international markets using the detailed classification, the picture is more complex, but the message is basically the same. From Figure 3 and Table A4, it appears that entries into and exits from international markets are related to job creation and destruction. All types of international firms, i.e. importing only, two-way

traders, foreign or multinational enterprises, lie close to the diagonal line. Also, all of them have a lower excess reallocation rate than purely domestic companies.

The findings presented so far indicate that different forms of engagement in international markets are associated not only with different average employment growth rates, but also with dissimilar patterns of job creation and destruction. To quantify more precisely the effect of different international status on job reallocation, Table 4 shows the ‘within’ and ‘between’ components of the excess job reallocation. If participation in international markets is an important determinant of the process of job creation and destruction, then a large fraction of the job reallocation should take place between firms with different types of involvement in international markets. The analysis is conducted for both the simple and detailed classification. Comparing the two sets of results allows us to gauge the additional reallocation effect due to shifts in employment between firms involved in international markets in different manners. By way of comparison, I carry out the same kind of analysis for firms in different sectors.

Table 4 shows for each year the percentage of the excess job reallocation due to between-group employment shifts. At the bottom of the table, the yearly figures are summarised using arithmetic and weighted means.³¹ Comparing columns one, three and six, it appears that reallocation of jobs among firms having different international status accounts for a non-negligible share of total excess job reallocation. For each year, this share is larger than the corresponding one obtained from dividing firms into different industries. Using the simple classification, participation in international markets accounts for around 31 percent of total reallocation, while this percentage rises to 36 using the detailed classification. The closeness of the two figures suggests that the reallocation of jobs due to international trade is driven by shifts of jobs between international and non-international firms (this is what the simple classification is capturing) rather than shifts between firms involved in international markets in different fashions (which are captured by the detailed classification).

However, the figures just discussed are likely to be inflated by the fact that deaths and births are considered as separate categories. As noted above, firms' deaths and births are responsible for a large portion of the total jobs created and destroyed. For this reason,

³¹ The aggregate yearly figures use alternatively, as weights, the number of employees and number of firms in each year.

columns two, four and seven of Table 4 show the ‘between’ shares of excess job reallocation considering only surviving firms. As can be seen, this lowers substantially the ‘between’ shares concerning firms involved in international markets, whereas those concerning industries are virtually unaffected. The average over time of the ‘between’ group is about 2.5 percent for the simple classification and 9 percent using the detailed classification. Two-digit industry figures are virtually unchanged. This suggests that the number of jobs created and lost because of the births and death of firms are evenly spread across sectors.³²

Since company births and deaths account for a large share of total job creation and destruction, it is important to take them into account correctly. Columns five and eight repeat the same exercise allocating firms' births and deaths to particular trade categories.³³ If new and dying firms have different international status, this methodology will produce larger between-group shares. For instance, if entries and exits have different trading status, let us say dying firms are more likely to be domestic companies whereas new enterprises are more likely to be involved in international markets, any jobs they reallocate will enter the between-group part of job reallocation. On the contrary, if births and deaths involve mostly or only purely domestic companies, or any other category, the ‘between’ share of the reallocation effect will not rise. This is because the additional job reallocation due to births and deaths will concern firms having the same international status. The results in columns five and eight of Table 4 show that treating births and deaths in this way leads to larger between-group shares. They rise to around 16 and 18 percent for the simple and detailed classifications, respectively.

We are also interested in quantifying the reallocation effect within precisely defined industries. In fact, the recent literature based on heterogeneous firms, unlike previous models, predicts that international trade will generate within-industry job reallocation. For this reason, Table 5 shows the between-group shares of job reallocation due to participation in international markets computed for each three-digit Nace industry. The yearly figures reported in Table 5 are weighted averages of three-digit industry values. This allows us to quantify the impact of trade on job reallocation within well-defined

³² If entries and exits were concentrated in different sectors, the job reallocation they would generate would enter the between-industry-group shifts. This would result in smaller between-group shares obtained when considering only surviving firms than those obtained including entries and exits.

³³ New firms are considered as purely domestic companies, if they have no involvement in international markets. They are classified as new exporters, if they export only, new importers if they import only and the same rule applies for other international links. Firms that die have the same trade status they had the year before they exited the market.

sectors. Two types of weights were used: the number of firms and employees in each year three digit industry cell. Table 5 reports only the results obtained using the number of firms as a weight. Those computed using the number of employees as weights are referred to Table A5 in the Appendix. Overall, the results appear to be robust to the change in weights. At such fine industry-level classification, participation in international markets appears to account for between 5 and 15 percent on average, using the simple classification, and between 20 and 26 percent using the more detailed one.³⁴

As Table A1 confirms, the expansion or contraction of firms is related to their size. It is also possible for the reallocation effect due to participation in international markets to differ across firms of different size. Table 6 investigates this issue by looking at the between-group shares of job reallocation across different size classes. One regularity emerging from Table 6 is that the between-group share of excess reallocation is increasing with size. This result is robust to different methods of treating firms' births and deaths and different weights to obtain the three-digit industry averages for each size-class year cell.³⁵ Comparing the results in Table 6 with those at three-digit industry level in Table 5, it is possible to infer that these are driven by large firms. Considering the detailed classification, we find that, among large businesses, around 30 percent of the excess job reallocation is due to changes in employment between firms having different international status. The corresponding figure for small enterprises is only six percent.

Overall, this finding suggests that the reshuffling of employees due to participation in international markets is stronger for large companies than for small ones. This fact is consistent with international trade models based on heterogeneous firms and sunk costs. In this setting, small firms, which also tend to be low-productivity firms, are far from the productivity cut-off points beyond which companies are able to start up international connections. Therefore, their population is likely to be dominated by purely domestic firms. In this scenario, the reallocation of jobs among them caused by participation in international markets will be limited. Small firms will still expand or contract, but for reasons other than involvement in international markets.

³⁴ I computed results at two-digit industry level too. They are not reported for the sake of brevity, but are available from the author upon request. In general, there is great heterogeneity across industry. The yearly averages of the between-group shares oscillate from five to 15 percent for the simple classification and 15 to 30 for the detailed one.

³⁵ The results obtained using employment as weights are shown in Table A5.

Thus far, the analysis has proceeded assuming one single foreign market where firms can export to or import from. In a multi-country environment, part of the job reallocation between firms will be caused by the gradual expansion into or retreat from foreign markets. In this context, considering only one foreign market would lead us to underestimate the job reallocation due to direct participation in international markets. Part of the variation in employment growth within the group of importers, exporters and two-way traders could in fact be generated by some firms increasing the number of countries they trade with whereas others are reducing them.

To take this fact into account, Table 7 and Table 8 show the same decomposition reported in Table 5 and Table 6 computed using an alternative classification. This considers companies that raised or reduced the number of export destinations or import origins from one year to another as new or 'stop' exporters, importers or two-way traders, accordingly.³⁶ A comparison of Table 7 with Table 5 and Table 8 with Table 6 shows that the change induced by multiple export and import markets is tiny. The between-group reallocation shares in Table 7 and Table 8 are only slightly larger than those in the previous two tables. The difference is in the order of 2-4 percentage points. This suggests the existence of additional employment reallocation from firms reducing the number of trading partners to those increasing them, but this is of limited economic importance. Table A7 and Table A8 in the Appendix report similar results aggregating three-digit industry figure by the number of employees instead of the number of firms.

The fact that exporters and/or importers entering additional export or import markets, or exiting from them, do not affect job reallocation much is explained by the fact that the high job creation (destruction) rates of new (stop) exporters, importers and two-way traders reported in Table A4 are caused by the first-time entrance into, or exit from, international markets rather than the gradual expansion into or retreat from them. The same type of results in Table A4 were generated considering the classification allowing for entries and exits into multiple export/import markets.³⁷ These findings reveal that, when using this classification, exporters, importers and two-way traders have very similar job creation and

³⁶ Exporters and importers that raised or reduced the number of export destinations or origins of imports are allocated to the new exporters or new importers categories, respectively. To avoid creating additional groups and to render the results in Table 7 and Table 8 comparable to those in Table 5 and Table 6, two-way traders that increased and decreased, respectively, the *sum* of the destinations of exports and origins of imports are considered as new two-way traders and stop two-way traders. Foreign firms and multinationals are still treated as separate categories.

³⁷ These results are not reported to save space, but are available upon request from the author.

destruction rates to those reported in Table A4. Also, the job creation (destruction) rates of new (stop) exporters, importers and two-way traders are lower than those in Table A4.

6. Discussion

The evidence presented so far points to the fact that direct participation in international markets is a source of employment reallocation among firms. However, its contribution to total job reallocation seems to be small. This could appear to be inconsistent with recent international trade models based on heterogeneous firms reviewed in Section 2, where trade is the main force of job shifts among companies. However, one limitation of these models is that they are mainly static or have very simple firms dynamics. Melitz (2003) draws on Hopenhayn (1992a, 1992b) who models the evolution of industries with heterogeneous firms. However, in Melitz (2003), the dynamic analysis is simplified by assuming, unlike Hopenhayn (1992a, 1992b), that the productivity level of firms is randomly drawn only at their birth and stays fixed until exit. Conclusions about the reallocation effect between traders and non-traders are based on comparisons between the two states of autarky and free trade. Extending these models to include true firms' dynamics as in Hopenhayn (1992a, 1992b), Ericson and Pakes (1995) and Pakes and Ericson (1998) might provide a useful framework to generate more realistic reallocation effects based not on any sudden trade liberalisation event, but on the possibility of expanding into foreign markets in any given period.

Pedersen (2007) is an interesting example of analysis moving in this direction. He merges the model of Melitz (2003) with the firm-level innovation and dynamics features of Klette and Kortum (2004). In this setting, firms start out small and may invest in costly and risky research activities which may or may not lead the firm to expand and therefore start exporting. In a true dynamic framework, in any given period, firms would be subjected to positive/negative productivity shocks, or success/no success in their research activities, as in Pedersen (2007). Whether or not this will result in expansion in or retreat from international markets would depend on the position of the firm within the productivity distribution relative to the productivity cut-off points.

For firms that are far from the productivity cut-off points, the productivity shocks they are subjected to would lead them to expand or contract in the markets they are already in, therefore to increase or decrease employment accordingly, without any change in their

trading status. This would generate contemporaneous job creation and destruction within each category, as the results presented above show.

Whether the ‘between’ or ‘within’ component of the job reallocation prevails is likely to depend on a host of parameters concerning the shape of the productivity distribution and the cut-off points. For instance, one of the clearest results presented above links, respectively, high job creation or destruction rates to firms starting or ceasing to trade internationally. Yet, these firms are a minority and employ only a small share of workers. For this reason, their employment shifts contribute little to the reallocation of jobs among different types of firms.³⁸ It is possible to envisage that countries whose productivity cut-off points are positioned around the high density point of the productivity distribution scale will experience larger between-group shares of job reallocation due to direct participation in international markets.

The dynamics of the firms in question might also offer an explanation for the results concerning the ranking of the between-group shares of job reallocation across firms of different size. In fact, as shown in Hopenhayn (1992a, 1992b), Ericson and Pakes (1995) and Pakes and Ericson (1998), age is positively related to productivity and size. This implies that small firms are mostly to be found at the lower end of the productivity distribution scale and therefore not involved in international trade because they are far from the productivity cut-off points. Therefore, most of the employment changes, including births and deaths, of this class of enterprises are due to causes other than direct involvement in international markets. As firms become older, some of them will be able to participate in international markets, whereas others will not. The expansion and retreat from foreign markets that this process involves will affect the process of creation and destruction of jobs and thus the job reallocation among firms.

7. Conclusion

One of the most important predictions made in recent international trade literature based on heterogeneous firms (see Helpman (2006) for a review of the literature) concerns the reallocation of resources, in general, and workers, in particular, from firms not participating in international markets towards firms that trade across national borders.

³⁸ Note that this is also evident from the small increases in the between-group reallocation obtained considering multiple foreign markets, in Table 7, with respect to those computed assuming one foreign market, as in Table 5.

That is, companies involved or starting to be involved in international markets will create jobs. Those unable to do so will contract, and some of them will exit.

To date, empirical studies on this issue have focused mainly on comparisons of means or conditional means of firm-level variables such as employment and productivity between these two kinds of firms. The evidence, reviewed by Wagner (2007) and Greenaway and Kneller (2007), generally points to the fact that firms having activities in foreign markets are larger and grow faster than those having none.

Job reallocation is important since it is a new gain from trade. It does not feature in either classic trade theory, Ricardian or Heckscher-Ohlin type, or the new trade theory of Helpman and Krugman (1995). Yet, despite its importance, it has received little systematic empirical attention. Levinsohn (1999) and Davis, Haltiwanger and Schuh (1996) have investigated the impact of exports and imports at sectoral level on job creation, destruction and reallocation. Because they considered sectoral data, their analyses have captured the reallocation between import- and export-oriented industries and not between firms involved and not involved in international markets.

This paper has used information about exports, imports and FDI of Belgian manufacturing firms from 1998 to 2004 to measure the effect of firm-level participation in international markets on within-sector job reallocation. The evidence emerging from this analysis generally suggests that direct involvement in international markets is a source of job reallocation, as the theoretical model of Melitz (2003) and its modifications predict. Yet even in very narrowly defined sectors and class size, the share of total job reallocation due to shifts in employment between firms having different international status accounts for 6 to 30 percent. Also, the findings point to the fact that the reallocation effect is higher among large firms than among small ones.

Overall, these results cast some doubt over the dramatic effects on job reallocation caused by involvement in international markets, at least for developed countries such as Belgium which have not been through any radical bout of trade liberalisation during the sample period. One way to rationalise these findings into the recently-developed international trade models based on heterogeneous firms might be to extend them into more realistic dynamic settings, as in Pedersen (2007). This may help explain the contemporaneous job

creation and destruction of firms involved in international trade in the same fashion and throw more light on the link between foreign trade and job reallocation between firms.

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Table 1: Number of firms, average employment levels and growth rates

Year	Firms	Employment level		Employment growth	
		Mean	Med	Mean	Med
1998	16,011	36.185 (204.417)	6.4 (18.4)	0.076 (0.635)	0.000 (0.197)
1999	16,408	35.178 (189.800)	6.1 (18.1)	0.047 (0.609)	0.000 (0.179)
2000	16,568	35.161 (188.189)	6 (17.65)	0.031 (0.615)	0.000 (0.192)
2001	16,313	35.539 (188.470)	6 (17.7)	0.013 (0.607)	0.000 (0.179)
2002	15,927	34.932 (180.293)	6 (17.3)	-0.035 (0.592)	0.000 (0.177)
2003	15,669	34.515 (175.380)	5.9 (16.8)	-0.015 (0.572)	0.000 (0.167)
2004	15,725	33.955 (173.648)	5.8 (16.3)	-0.007 (0.592)	0.000 (0.167)
Total	112,621	35.073 (186.090)	6 (17.4)	0.016 (0.605)	0.000 (0.180)

Notes: Standard errors and interquartile ranges in parentheses for means and medians respectively. Growth rates computed as in Davis and Haltiwanger (1992) as $(e_{it} - e_{it-1}) / n_{it}$ where e_{it} is the employment of firm i at time t and n_{it} is the average number of employees across two consecutive time periods, $n_{it} = (e_{it} + e_{it-1}) / 2$.

Table 2: Number and share of firms of different status (simple classification, 1998-2004)

	Firms	%		Employment levels		Employment growth	
		Firms	Employment	Mean	Med	Mean	Med
Purely domestic	48.73%	9.29%	6.685 (12.419)	3.200 (5.800)	0.006 (0.376)	0.000 (0.188)	
International firms	36.56%	81.61%	78.289 (293.115)	21.600 (43.000)	0.002 (0.250)	0.000 (0.129)	
New international firms	4.35%	4.99%	40.275 (180.673)	8.200 (18.300)	0.060 (0.357)	0.000 (0.163)	
Stop international firms	3.77%	2.51%	23.310 (100.704)	6.700 (13.300)	-0.038 (0.363)	0.000 (0.177)	
Births	3.57%	1.60%	15.664 (76.108)	2.100 (4.700)	2.000 (0.000)	2.000 (0.000)	
Deaths	3.01%	0.00%	0.000 (0.000)	0.000 (0.000)	-2.000 (0.000)	-2.000 (0.000)	
Total	100.00%	100.00%	35.073 (186.090)	6.000 (17.400)	0.016 (0.605)	0.000 (0.180)	

Notes: Standard errors and interquartile ranges in parentheses for means and medians respectively. Growth rates computed as in Davis and Haltiwanger (1992) as $(e_{it} - e_{it-1}) / n_{it}$ where e_{it} is the employment of firm i at time t and n_{it} is the average number of employees across two consecutive time periods, $n_{it} = (e_{it} + e_{it-1}) / 2$. Means and medians are computed over the whole sample period.

Table 3: Number and share of firms of different status (detailed classification, 1998-2004)

	Firms	% Employment	Employment levels		Employment growth	
			Mean	Med	Mean	Med
Purely domestic	48.73%	9.29%	6.685 (12.419)	3.200 (5.800)	0.006 (0.376)	0.000 (0.188)
Exporters	3.81%	1.40%	12.910 (14.361)	8.600 (13.700)	-0.009 (0.296)	0.000 (0.155)
Importers	4.84%	2.74%	19.837 (28.737)	11.100 (19.500)	0.021 (0.255)	0.000 (0.144)
Two-way traders	18.62%	25.89%	48.768 (79.628)	27.800 (43.000)	0.003 (0.223)	0.000 (0.128)
Foreign	3.23%	38.67%	419.536 (782.328)	178.200 (331.100)	-0.015 (0.193)	-0.004 (0.084)
MNEs	0.91%	9.92%	382.998 (748.064)	145.600 (323.700)	-0.011 (0.191)	-0.001 (0.094)
New export	1.70%	0.50%	10.265 (16.490)	6.050 (10.150)	0.031 (0.354)	0.000 (0.165)
Stop export	1.53%	0.42%	9.709 (16.256)	5.600 (9.800)	-0.036 (0.337)	0.000 (0.173)
New import	1.64%	0.61%	13.075 (21.984)	6.700 (12.300)	0.086 (0.361)	0.016 (0.188)
Stop import	1.47%	0.49%	11.683 (17.194)	6.300 (11.800)	-0.017 (0.363)	0.000 (0.185)
New two-way traders	0.45%	0.31%	23.825 (59.647)	10.900 (22.400)	0.129 (0.444)	0.000 (0.173)
Stop two-way traders	0.52%	0.21%	13.877 (20.064)	7.750 (15.100)	-0.107 (0.439)	0.000 (0.221)
New foreign	0.41%	2.72%	233.202 (503.985)	123.900 (186.200)	0.018 (0.245)	0.005 (0.106)
Stop foreign	0.17%	1.04%	216.838 (375.292)	115.000 (176.600)	-0.023 (0.345)	-0.006 (0.150)
New mne	0.15%	0.86%	206.151 (301.967)	95.100 (184.150)	0.012 (0.246)	0.003 (0.103)
Stop mne	0.08%	0.35%	157.852 (267.429)	72.000 (138.200)	-0.023 (0.293)	0.000 (0.138)
Births	3.57%	1.60%	15.664 (76.108)	2.100 (4.700)	2.000 (0.000)	2.000 (0.000)
Deaths	3.01%	0.00%	0.000 (0.000)	0.000 (0.000)	-2.000 (0.000)	-2.000 (0.000)
Switchers	5.15%	3.00%	20.397 (32.309)	11.800 (20.100)	-0.001 (0.330)	0.000 (0.163)
Total	100.00%	100.00%	35.073 (186.090)	6.000 (17.400)	0.016 (0.605)	0.000 (0.180)

Notes: Standard errors and interquartile ranges in parentheses for means and medians respectively. Growth rates computed as in Davis and Haltiwanger (1992) as $(e_{it} - e_{it-1}) / n_{it}$ where e_{it} is the employment of firm i at time t and n_{it} is the average number of employees across two consecutive time periods, $n_{it} = (e_{it} + e_{it-1}) / 2$. Means and medians are computed over the whole sample period.

Table 4: Percentage of excess job reallocation due to between-group changes

Year	Groups							
	Two-digit industry		International status					
	(1)	(2)*	Simple classification			Detailed classification		
(3)			(4)*	(5) ⁺	(6)	(7)*	(8) ⁺	
1998	16.04%	13.96%	28.52%	0.60%	9.50%	39.40%	15.73%	19.06%
1999	14.63%	18.76%	30.14%	7.31%	22.63%	43.47%	25.00%	24.68%
2000	9.51%	5.88%	40.50%	0.76%	21.35%	45.23%	8.65%	21.35%
2001	14.13%	5.89%	39.11%	0.00%	22.28%	40.55%	2.37%	23.30%
2002	1.63%	5.21%	28.32%	1.03%	4.83%	28.57%	1.38%	10.45%
2003	8.33%	9.18%	22.18%	2.40%	10.72%	22.42%	2.70%	10.72%
2004	19.17%	20.07%	29.38%	4.95%	18.18%	32.01%	8.49%	19.20%
Mean	11.92%	11.28%	31.16%	2.44%	15.64%	35.95%	9.19%	18.40%
Weighted mean [§]	11.93%	11.23%	31.30%	2.41%	15.73%	36.17%	9.29%	18.51%
Weighted mean [#]	11.93%	11.25%	31.26%	2.43%	15.73%	36.09%	9.25%	18.47%

Notes: * figures computed considering only surviving firms (i.e. dropping entries and exits); ⁺ figures computed allocating births and deaths to specific types of firms according to their trade status the year they entered and the year before they exited; [§] weights are the number of employees in each year; [#] weights are the number of firms in each year.

Table 5: Between share of excess job reallocation at three-digit industry level

Year	Groups: International status			
	Simple classification		Detailed classification	
	(1) ^a	(2) ^b	(3) ^a	(4) ^b
1998	11.30%	20.17%	24.99%	32.17%
1999	2.93%	13.24%	20.64%	29.20%
2000	5.22%	16.67%	13.79%	27.95%
2001	5.88%	11.59%	15.69%	19.91%
2002	3.44%	9.25%	13.16%	17.46%
2003	6.14%	13.03%	25.66%	30.02%
2004	10.28%	16.68%	23.77%	26.13%
Mean	6.46%	14.38%	19.67%	26.12%

Notes: Yearly figures are weighted averages of the between shares computed for each three-digit Nace sector; the weights used are the number of firms in each three-digit industry-year cell; ^a figures computed considering only surviving firms (i.e. dropping entries and exits); ^b figures computed allocating births and deaths to specific types of firms according to their trading status the year they entered and the year before they exited.

Table 6: Between share of excess job reallocation for each size class at three-digit industry level

Groups: International status								
	1998	1999	2000	2001	2002	2003	2004	Mean
Panel A ^a								
Simple classification								
Small	1.88%	1.69%	1.89%	1.58%	2.02%	2.31%	2.61%	2.00%
Med-small	4.15%	8.91%	14.97%	3.21%	12.67%	8.24%	6.56%	8.39%
Med-large	4.57%	8.01%	4.94%	8.65%	8.20%	7.82%	6.10%	6.90%
Large	16.19%	6.00%	11.50%	12.20%	4.09%	5.74%	9.95%	9.38%
Detailed classification								
Small	5.59%	3.19%	5.22%	5.04%	4.98%	5.40%	5.25%	4.95%
Med-small	6.74%	13.32%	15.72%	9.63%	17.09%	12.78%	11.23%	12.36%
Med-large	12.56%	17.41%	12.67%	15.00%	15.23%	16.52%	13.95%	14.76%
Large	32.64%	27.10%	25.89%	28.14%	19.27%	34.29%	32.84%	28.60%
Panel B ^b								
Simple classification								
Small	2.47%	2.22%	1.37%	4.19%	2.10%	5.31%	3.75%	3.06%
Med-small	7.20%	15.87%	9.18%	7.17%	9.22%	8.86%	6.85%	9.19%
Med-large	10.03%	7.61%	9.69%	10.79%	9.93%	10.09%	6.13%	9.18%
Large	8.35%	5.53%	11.08%	16.23%	9.64%	4.96%	12.09%	9.70%
Detailed classification								
Small	6.49%	5.34%	5.34%	7.91%	5.00%	7.80%	8.00%	6.55%
Med-small	10.70%	21.40%	13.46%	10.86%	16.07%	14.33%	11.71%	14.08%
Med-large	17.64%	18.27%	18.98%	16.08%	18.78%	19.20%	12.44%	17.34%
Large	27.23%	25.51%	29.94%	29.35%	22.91%	34.78%	31.35%	28.72%

Notes: Yearly figures are weighted averages of the between shares computed for each three-digit Nace sector and size class; the weights used are the number of firms in each three-digit industry-year-size class cell; firms' size class is determined considering four quartiles of the employment distribution of all firms in the previous year; ^a figures computed considering only surviving firms (i.e. dropping entries and exits); ^b figures computed allocating births and deaths to specific types of firms according to their trading status the year they entered and the year before they exited.

Table 7: Between share of excess job reallocation at three-digit industry-level

Groups: International status considering multiple export and import markets		
	(1) ^{a#}	(2) ^{b#}
1998	28.04%	33.72%
1999	22.74%	28.00%
2000	21.10%	33.62%
2001	21.65%	24.11%
2002	17.91%	19.70%
2003	27.30%	30.26%
2004	26.16%	26.61%
Mean	23.56%	28.00%

Notes: Yearly figures are weighted averages of the between shares computed for each three-digit Nace sector; the weights used are the number of firms in each three-digit industry-year cell; ^a figures computed considering only surviving firms (i.e. dropping entries and exits); ^b figures computed allocating births and deaths to specific types of firms according to their trading status the year they entered and the year before they exited.

Table 8: Between share of excess jobs reallocation for each size class at three-digit industry level

Groups: International status considering multiple exports and imports markets								
	1998	1999	2000	2001	2002	2003	2004	Mean
	Panel A ^a							
Small	5.64%	3.37%	4.76%	5.42%	4.96%	6.32%	4.80%	5.04%
Med-small	6.86%	12.99%	15.38%	9.12%	18.18%	13.30%	13.16%	12.71%
Med-large	11.84%	18.91%	13.80%	18.06%	18.89%	19.53%	18.16%	17.03%
Large	38.13%	32.69%	36.54%	35.67%	28.56%	36.66%	36.21%	34.92%
	Panel B ^b							
Small	5.95%	5.74%	5.94%	8.69%	5.64%	8.63%	8.19%	6.97%
Med-small	10.27%	21.68%	14.47%	11.50%	18.66%	15.22%	14.25%	15.15%
Med-large	17.57%	21.79%	20.29%	19.49%	21.30%	23.38%	16.00%	19.97%
Large	32.76%	34.16%	39.17%	36.89%	29.23%	36.41%	34.23%	34.69%

Notes: Yearly figures are weighted averages of the between shares computed for each three-digit Nace sector and size class; the weights used are the number of firms in each three-digit industry-year-size class cell; firms' size class is determined considering four quartiles of the employment distribution of all firms in the previous year; ^a figures computed considering only surviving firms (i.e. dropping entries and exits); ^b figures computed allocating births and deaths to specific types of firms according to their trading status the year they entered and the year before they exited.

Figure 1: Comparison of employment figures in manufacturing

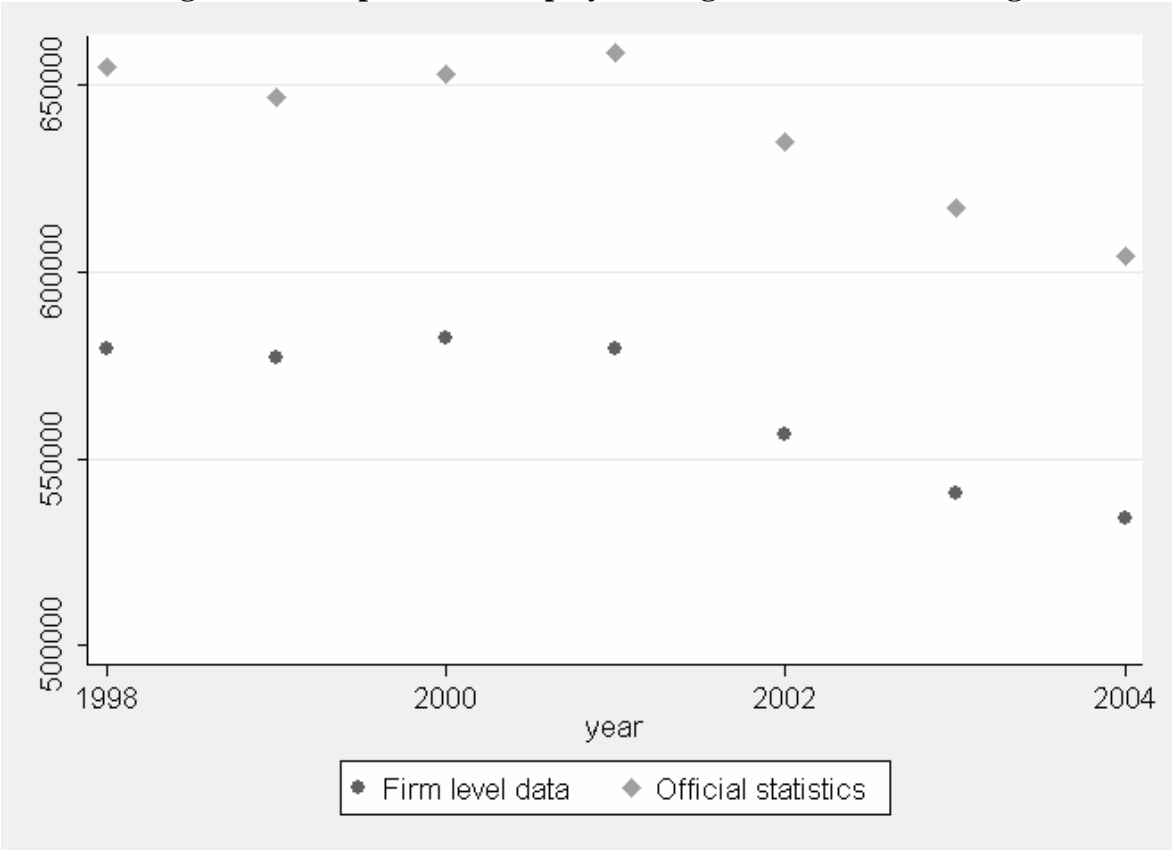
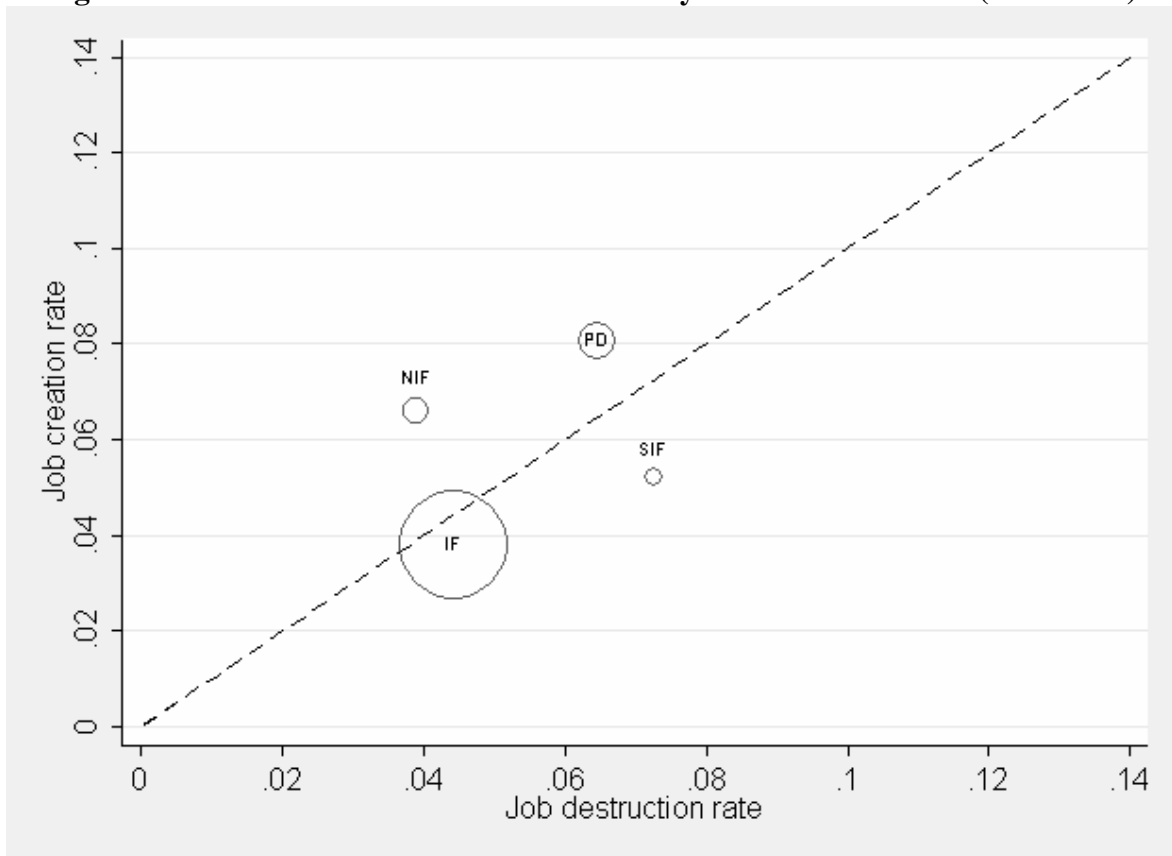
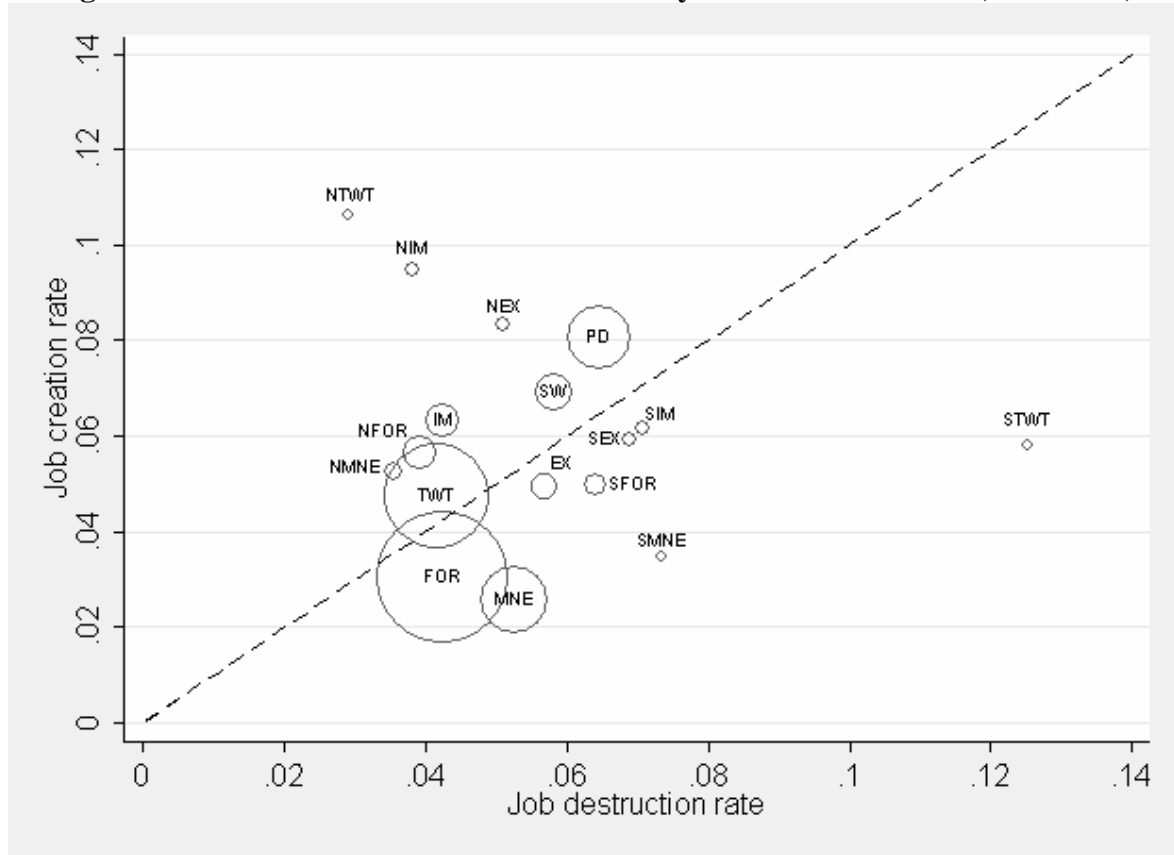


Figure 2: Job creation and destruction rates by international status (1998-2004)



Notes: PD are purely domestic firms, IF are international firms (i.e. exporters, importers, two-way traders, foreign and multinational enterprises), NIF are new international firms and SIF stop international firms.

Figure 3: Job creation and destruction rates by international status (1998-2004)



Notes: PD are purely domestic firms, EX exporters, IM importers, TWT two-way traders, FOR foreign-owned firms, MNE Belgian multinationals, NEX new exporters, NIM new importers, NTWT new two-way traders, NFOR new foreign-owned firms, NMNE new Belgian multinationals, SEX stop exporters, SIM Stop importers, STWT stop two-way traders, SFOR stop foreign-owned firms, SMNE stop Belgian multinationals.

Appendix

Table A1: Regression of growth rates of employment

Dependent variable	Employment growth rate	
	(14)	(2)
Traders	0.036 (0.003)**	
New traders	0.073 (0.005)**	
Stop traders	-0.022 (0.006)**	
Exporters		0.014 (0.005)**
Importers		0.050 (0.004)**
Two-way traders		0.044 (0.003)**
Foreign		0.022 (0.006)**
MNEs		0.031 (0.008)**
New export		0.039 (0.008)**
Stop export		-0.024 (0.008)**
New import		0.098 (0.008)**
Stop import		-0.001 (0.009)
New two-way traders		0.144 (0.019)**
Stop two-way traders		-0.092 (0.018)**
New foreign		0.052 (0.012)**
Stop foreign		0.019 (0.025)
New mne		0.045 (0.019)*
Stop mne		0.021 (0.032)
Switchers		0.026 (0.005)**
Small	0.101 (0.004)**	0.102 (0.004)**
Mid-small	0.023 (0.003)**	0.024 (0.003)**
Mid-large	0.013 (0.002)**	0.014 (0.002)**
Observations	105206	105206
R-squared	0.02	0.02

Notes: Robust standard errors in parentheses; * significant at 5%; ** significant at 1%. The regression include year and three-digit industry dummies.

Table A2: Gross job flows

Year	JC	JD	JR	JN	JX	Share
1998	0.068	0.062	0.130	0.007	0.123	0.146
1999	0.058	0.062	0.119	-0.004	0.115	0.146
2000	0.077	0.061	0.139	0.016	0.123	0.146
2001	0.062	0.060	0.121	0.002	0.119	0.146
2002	0.045	0.084	0.129	-0.040	0.089	0.143
2003	0.046	0.071	0.117	-0.026	0.091	0.138
2004	0.055	0.069	0.124	-0.014	0.110	0.136
Total weighted	0.059	0.067	0.126	-0.008	0.110	

Notes: JC and JD are respectively the job creation and job destruction rates, JR the job reallocation rate ($JC + JD$), JN the job net growth rate ($JC - JD$) and JX the excess job reallocation rate ($JR - |JN|$). Share is the employment share of year t on total employment over the whole sample period.

Table A3: Gross job flows by international status, simple classification (1998-2004)

	JC	JD	JR	JN	JX	Share
Purely domestic	0.081	0.065	0.145	0.016	0.129	0.092
	12.59%	8.86%	10.61%	-18.73%	14.75%	
Traders	0.038	0.044	0.082	-0.006	0.076	0.815
	52.65%	53.96%	53.34%	63.64%	77.20%	
New traders	0.066	0.039	0.105	0.027	0.078	0.049
	5.51%	2.86%	4.10%	-16.71%	4.77%	
Stop traders	0.052	0.073	0.125	-0.021	0.104	0.025
	2.24%	2.75%	2.51%	6.51%	3.28%	
Births	2.000	0.000	2.000	2.000	0.000	0.008
	27.02%	0.00%	12.66%	-200.11%	0.00%	
Deaths	0.000	2.000	2.000	-2.000	0.000	0.011
	0.00%	31.57%	16.78%	265.39%	0.00%	
Total weighted	0.059	0.067	0.126	-0.008	0.080	
	100.00%	100.00%	100.00%	100.00%	100.00%	

Notes: JC and JD are respectively the job creation and job destruction rates, JR the job reallocation rate ($JC + JD$), JN the job net growth rate ($JC - JD$) and JX the excess job reallocation rate ($JR - |JN|$). Share is the employment share of each type of firms on total employment. [§] correlation is computed without considering entries and exits.

Table A4: Gross job flows by international status, detailed classification (1998-2004)

	JC	JD	JR	JN	JX	Share
Purely domestic	0.081	0.065	0.145	0.016	0.129	0.092
	12.59%	8.86%	10.61%	-18.73%	15.69%	
Exporters	0.049	0.057	0.106	-0.007	0.099	0.014
	1.18%	1.19%	1.19%	1.29%	1.84%	
Importers	0.063	0.042	0.105	0.021	0.085	0.027
	2.89%	1.71%	2.26%	-7.03%	3.03%	
Two-way traders	0.048	0.042	0.089	0.006	0.083	0.257
	20.77%	16.03%	18.25%	-19.08%	28.38%	
Foreign	0.030	0.042	0.073	-0.012	0.061	0.388
	19.94%	24.55%	22.39%	58.70%	31.10%	
MNEs	0.026	0.053	0.078	-0.027	0.051	0.100
	4.38%	7.88%	6.24%	33.82%	6.83%	
New export	0.083	0.051	0.134	0.032	0.102	0.005
	0.69%	0.37%	0.52%	-1.99%	0.66%	
Stop export	0.059	0.069	0.128	-0.010	0.119	0.004
	0.43%	0.44%	0.43%	0.51%	0.67%	
New import	0.095	0.038	0.133	0.057	0.076	0.006
	0.95%	0.34%	0.63%	-4.23%	0.60%	
Stop import	0.061	0.071	0.132	-0.009	0.123	0.005
	0.51%	0.52%	0.52%	0.57%	0.80%	
New two-way traders	0.106	0.029	0.135	0.077	0.058	0.003
	0.53%	0.13%	0.32%	-2.86%	0.22%	
Stop two-way traders	0.058	0.125	0.183	-0.067	0.116	0.002
	0.21%	0.40%	0.31%	1.81%	0.33%	
New foreign	0.056	0.039	0.096	0.017	0.078	0.027
	2.58%	1.58%	2.05%	-5.80%	2.79%	
Stop foreign	0.050	0.064	0.114	-0.015	0.099	0.010
	0.88%	1.00%	0.94%	1.90%	1.37%	
New mne	0.053	0.035	0.088	0.017	0.071	0.008
	0.76%	0.45%	0.59%	-1.83%	0.79%	
Stop mne	0.035	0.074	0.108	-0.039	0.070	0.004
	0.21%	0.39%	0.30%	1.72%	0.33%	
Births	2.000	0.000	2.000	2.000	0.000	0.008
	27.02%	0.00%	12.66%	-200.11%	0.00%	
Deaths	0.000	2.000	2.000	-2.000	0.000	0.011
	0.00%	31.57%	16.78%	265.40%	0.00%	
Switchers	0.069	0.058	0.127	0.011	0.116	0.030
	3.48%	2.58%	3.00%	-4.06%	4.58%	
Total weighted	0.059	0.067	0.126	-0.008	0.075	
	100.00%	100.00%	100.00%	100.00%	100.00%	

Notes: JC and JD are respectively the job creation and job destruction rates, JR the job reallocation rate (JC + JD), JN the job net growth rate (JC - JD) and JX the excess job reallocation rate (JR - |JN|). Share is the employment share of each type of firm on total employment. [§] correlation is computed without considering entries and exits.

Table A5: Between share of excess job reallocation at three-digit industry level

Year	Groups: International firms			
	Simple classification		Detailed classification	
	(1) ^a	(2) ^b	(3) ^a	(4) ^b
1998	12.55%	15.81%	27.93%	30.77%
1999	5.47%	14.57%	25.75%	32.23%
2000	5.02%	19.44%	18.86%	33.69%
2001	10.20%	18.30%	25.37%	29.89%
2002	4.02%	20.92%	16.05%	31.10%
2003	7.07%	19.02%	24.89%	34.30%
2004	9.02%	28.10%	29.26%	40.51%
Mean	7.62%	19.45%	24.01%	33.21%

Notes: Yearly figures are weighted averages of the between shares computed for each three-digit Nace sector; the weights used are the number of employees in each three-digit industry-year cell; ^a figures computed considering only surviving firms (i.e. dropping entries and exits); ^b figures computed allocating births and deaths to specific types of firms according to their trading status the year they entered and the year before they exited.

Table A6: Between share of excess jobs reallocation for each size class at three-digit industry level

	Groups: International status							
	1998	1999	2000	2001	2002	2003	2004	Mean
Panel A ^a								
Simple classification								
Small	1.85%	1.49%	1.87%	1.68%	2.03%	2.31%	2.70%	1.99%
Med-small	3.90%	8.77%	12.59%	3.22%	12.61%	8.08%	6.57%	7.96%
Med-large	4.35%	7.93%	4.79%	8.65%	8.29%	7.98%	6.19%	6.88%
Large	13.51%	7.44%	6.77%	15.51%	3.92%	6.51%	8.43%	8.87%
Detailed classification								
Small	5.56%	3.06%	5.36%	5.16%	5.05%	5.58%	5.34%	5.02%
Med-small	6.66%	13.25%	15.33%	9.63%	17.08%	12.59%	11.27%	12.26%
Med-large	12.47%	17.51%	12.86%	14.98%	15.27%	16.72%	14.13%	14.85%
Large	30.75%	30.18%	25.01%	34.39%	19.76%	27.75%	35.22%	29.01%
Panel B ^b								
Simple classification								
Small	2.55%	2.28%	1.45%	4.40%	2.14%	5.21%	3.83%	3.12%
Med-small	6.99%	15.48%	9.12%	7.16%	9.25%	8.84%	6.92%	9.11%
Med-large	10.11%	7.76%	9.77%	10.74%	10.21%	10.21%	6.31%	9.30%
Large	8.28%	6.66%	11.25%	19.79%	10.37%	5.95%	14.10%	10.92%
Detailed classification								
Small	6.54%	5.45%	5.49%	8.21%	5.10%	7.85%	8.07%	6.67%
Med-small	10.50%	21.04%	13.22%	10.91%	16.14%	14.16%	11.75%	13.96%
Med-large	17.62%	18.55%	19.10%	16.04%	18.99%	19.39%	12.74%	17.49%
Large	26.34%	28.26%	30.84%	34.67%	23.44%	27.89%	35.37%	29.54%

Notes: Yearly figures are weighted averages of the between shares computed for each three-digit Nace sector and size class; the weights used are the number of employees in each three-digit industry-year-size class cell; firms' size class is determined considering four quartiles of the employment distribution of all firms in the previous year; ^a figures computed considering only surviving firms (i.e. dropping entries and exits); ^b figures computed allocating births and deaths to specific types of firms according to their trading status the year they entered and the year before they exited.

Table A7: Between share of excess job reallocation at three-digit industry level

	Groups: International status considering multiple export and import markets	
	(1) ^a	(3) ^b
1998	32.03%	33.53%
1999	29.14%	34.63%
2000	24.85%	37.79%
2001	30.01%	32.78%
2002	23.07%	33.38%
2003	26.84%	34.95%
2004	31.89%	40.95%
Mean	28.26%	35.43%

Notes: Yearly figures are weighted averages of the between shares computed for each three-digit Nace sector; the weights used are the number of employees in each three-digit industry-year cell; ^a figures computed considering only surviving firms (i.e. dropping entries and exits); ^b figures computed allocating births and deaths to specific types of firms according to their trading status the year they entered and the year before they exited.

Table A8: Between share of excess jobs reallocation for each size class at three-digit industry level

	Groups: International status considering multiple export and import markets							
	1998	1999	2000	2001	2002	2003	2004	Mean
	Panel A ^a							
Small	5.61%	3.33%	4.80%	5.54%	5.08%	6.50%	4.92%	5.11%
Med-small	6.85%	12.95%	14.98%	9.15%	18.16%	13.14%	13.21%	12.63%
Med-large	11.74%	19.15%	13.86%	18.10%	18.91%	19.93%	18.30%	17.14%
Large	36.70%	36.18%	32.12%	39.69%	30.01%	30.10%	38.21%	34.72%
	Panel B ^b							
Small	5.92%	5.84%	6.02%	8.96%	5.77%	8.66%	8.26%	7.06%
Med-small	10.12%	21.28%	14.09%	11.56%	18.72%	15.14%	14.27%	15.03%
Med-large	17.49%	22.18%	20.31%	19.53%	21.60%	23.75%	16.23%	20.16%
Large	32.26%	37.77%	37.81%	40.04%	30.63%	29.74%	37.62%	35.12%

Notes: Yearly figures are weighted averages of the between shares computed for each three-digit Nace sector and size class; the weights used are the employees of firms in each three-digit industry-year-size class cell; firms' size class is determined considering four quartiles of the employment distribution of all firms in the previous year; ^a figures computed considering only surviving firms (i.e. dropping entries and exits); ^b figures computed allocating births and deaths to specific types of firms according to their trading status the year they entered and the year before they exited.

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