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Live or Let Die?

Alternative Routes to Industry Exit

by

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Abstract

Each year around 8 per cent of Swedish manufacturing firms leave an industry. Of the exit routes available, the least likely is firm closure. Firms are more likely to merge, become acquired or switch to a new industry. We investigate the importance of various firm and industry characteristics for the exit decision of Swedish firms from 1980-1996. From our analysis two patterns are evident. First, firms that close down appear to be the most distinct compared to those that remain within the sector. Second the same characteristic can have quite different associations with the different types of exit.

JEL classification: L10, L21, L25, L60

Keywords: Firm exit, productivity, resource reallocation

Outline

Non-Technical Summary

Each year, on average, around 8 per cent of Swedish manufacturing firms leave an industry. However, these firms do not die. Less than a quarter of this exit occurs because the firm ceases production altogether. Exit occurs in one of three ways. In addition to closure, some firms choose to switch production to a new industry (about 30 per cent of exit occurs through this option) whereas others merge or become acquired by new owners (this occurs in about 50 per cent of cases). Along with the destruction of assets, an important feature of industry dynamics is the reallocation of resources both within and across industries.

In this paper we consider these different exit forms and investigate whether the exit choices firms make can be predicted from their underlying characteristics, or the industry in which they operate. For example, is it low productivity firms that exit and are there differences in the exit pathway they choose? Or does the fact that the firm's assets still 'live' when exit occurs through merger/acquisition or industry switching make it likely these firms have higher productivity? Or are other characteristics of the firm or industry important: for example size or age? Are there differences in the rate of exit between domestic and foreign owned firms, or is exit clustered in specific industries?

This is the first time these three forms of exit decision have been modelled for Sweden, or more generally. There are a number of reasons why such an investigation is worthwhile. First, firm exit from an industry helps determine the nature of competition amongst firms that survive. Second, the data suggest that available exit choices are more complex than that generally allowed for in theory. This paper provides guidance on which dimensions of the problem are most pertinent. Third, exit is known to be an important source of aggregate productivity growth. The reallocation of resources from low productivity firms that close to firms with higher productivity helps raise aggregate productivity levels. However it is not as clear that firms which choose to exit by acquisition or industry switching are likely to have low productivity, and therefore that the net effect from this, within the industry at least, is still positive.

From our analysis two patterns are evident and which reinforce the view that just as exit modes are conceptually very different so too are the firms that are likely to choose them. First, amongst the three exit choices, firms that close down appear to be most distinct from those that remain within the sector. The set of significant firm and industry variables that predicts firm closure is greater in number than that which predicts firms that will be involved in mergers and acquisitions, which in turn is greater than that of the decision to switch industries. Indeed firms that switch do not appear to be different from firms that do not exit across a large number of dimensions, which includes age, size, capital intensity and productivity.

The second is that similar characteristics can have quite different relationships with different types of exit. For Sweden we find evidence that firms that are more productive are less likely to fail, but more likely to exit by merger and acquisition. This suggests an ordering of exit choices that is related to productivity. The least productive firms are more likely to exit the industry by closure, firms with intermediate productivity choose either to remain or to switch; while the most productive merge or become acquired. So, only the most productive remain in the industry. A similar ordering of firm choice is found for ownership. Foreign owners are more likely to close than domestically owned firms but less likely to exit by merger or acquisition or to reallocate resources into a new industry. Foreign multinationals are 'footloose' out of Sweden not within Swedish manufacturing.

With regard to particular firm and industry characteristics which are related to exit, these echo extent evidence from previous studies for other countries, albeit where that evidence is concentrated on the decision to close. There, current and expected future profits are a function of firm characteristics such as size, age, productivity, capital intensity and so on., as well as industry variables such as sunk costs and time specific events such as macroeconomic shocks The same set of variables have also been seen as important for exit by acquisition and industry switching.

I Introduction

Each year, on average, around 8 per cent of Swedish manufacturing firms leave an industry. However, these firms do not die. Less than a quarter of this exit occurs because the firm ceases production. Schumpterian creative destruction does not always occur through the destruction of firm assets and employment. Instead exit occurs in one of three ways. In addition to closure, some firms choose to switch production to a new industry[1] (about 30 per cent of exit occurs through this option) whereas others merge or become acquired by new owners[2] (this occurs in about 50 per cent of cases). Along with the destruction of assets, an important feature of industry dynamics is the reallocation of resources both within and across industries.

In this paper we consider different exit routes for the Swedish manufacturing sector and investigate whether exit choices can be predicted from firms' underlying characteristics, or the industry in which they operate. For example, is it low productivity firms that exit and are there differences in the exit pathway they choose? Or does the fact that the firm's assets still 'live' when exit occurs through merger/acquisition or industry switching make it likely these firms have higher productivity? Or are other characteristics of the firm or industry important: for example size or age? Are there differences in the rate of exit between domestic and foreign owned firms, or is exit clustered in specific industries?

As far as we are aware this is the first time these three forms of exit decision have been modelled for Sweden, or more generally, although there has been some recent development in simultaneous modelling of two of these choices (which we discuss below). There are a number of reasons why such an investigation is worthwhile. First, exit of firms from an industry helps determine the nature of competition amongst firms that survive. Second, the data suggest that exit choices available to firms are more complex than generally allowed for in theory. This paper provides guidance on which dimensions of the problem are most pertinent. Third, exit is known to be an important source of aggregate productivity growth (for cross-country evidence see Scarpatta at al., 2002). The reallocation of resources from

[1] Dunne, Klimek and Roberts (2004) label this as product line exit.
[2] Bhattacharjee, Higson, Holly and Kattuman (2002) have previously interpreted acquisition as exit and contrast it with the decision to cease production.

low productivity firms that close to firms with higher productivity helps raise aggregate productivity levels. However it is not as clear that firms which choose to exit by acquisition or industry switching are likely to have low productivity, and therefore that the net effect from this movement, within the industry at least, is still positive.

From our analysis two patterns are evident and which reinforce the view that just as exit modes are conceptually very different so too are the firms likely to choose them. First, amongst the three exit choices, firms that close appear to be most distinct from those that remain within the sector. The set of significant firm and industry variables that predicts closure is greater in number than that which predicts firms involved in mergers and acquisitions, which in turn is greater than that of the decision to switch industries. Indeed switchers do not appear to be different from firms that remain across a number of dimensions, including age, size, capital intensity and productivity.

The second is that similar characteristics can have different relationships with different types of exit. Perhaps the most interesting relate to productivity and foreign ownership. We find evidence that firms that are more productive are less likely to fail, but more likely to exit by merger and acquisition. This suggests an ordering of exit choices related to productivity. Least productive firms are more likely to exit by closure, firms with intermediate productivity choose either to remain or switch; while the most productive merge or become acquired. So, only the most productive remain in the industry. A similar ordering of firm choice is found for ownership. Foreign owners are more likely to close than domestically owned firms but less likely to exit by merger or acquisition or to reallocate resources into a new industry. Foreign multinationals are 'footloose' out of Sweden not within Swedish manufacturing.

With regard to particular firm and industry characteristics which are related to exit, these echo evidence from previous studies for other countries, albeit where that evidence is concentrated on the decision to close. There, current and expected future profits are a function of firm characteristics such as size, age, productivity, capital intensity and so on. (see for example Winter, 1999; Doms et al., 1995; Dunne, Klimek and Roberts, 2005; Bernard et al., 2003; while Caves 1998 provides a review of firm death), as well as industry variables such as sunk costs (Dunne et al. 1989) and time specific events such as

macroeconomic shocks (Bhatacharjee *et al*., 2002).[3] The same set of variables have also been seen as important for exit by acquisition and industry switching. Bernard *et al.* (2002) for example, consider both death and industry switches as the margin of adjustment and model both as a function of size, age, TFP, capital intensity and wages.[4]

The remainder of the paper is organised as follows. Section II briefly outlines the theoretical predictions from the Hopenhayn (1992) model and its extensions to determinants of exit. Given the absence of any discussion of determinants of acquisition we turn to the literature on the behaviour of multinationals to fill this gap. Section III provides details of the data and information about basic patterns for each exit route. The main results of the paper are presented in Section IV, Section V considers robustness while Section VI provides some conclusions.

II The Exit Decisions of Firms

The empirical analysis adopted in much of the applied literature on the decision to close a firm builds on the theoretical models of Hopenhayn (1992) and Ericson and Pakes (1995). In these models firms profits, and therefore their closure decision, is determined by current characteristics rather than past history (Dunne et al., 2005). Here we focus on the predictions of these models as they relate to firm characteristics[5], although they have recently been extended to include additional determinants of firm death, specifically those related to international trade and competition (Melitz, 2003; Helpman, Melitz and Yeaple, 2004; Bernard, Eaton, Jensen and Kortum, 2004, Yeaple, 2003). The key insight is that faced with identical market conditions firms make different decisions, some of which are about exit.

Hopenhayn (1992) assumes a perfectly competitive industry with an infinite number of firms producing a homogenous good. Each period firms face a productivity shock that affects the cost of producing in that period. Firms with a sufficiently large negative shock

[3] In a related literature, that builds on theoretical models such as Javanovic (1982) and Ericson and Pakes (1998) the past history of the firms is important. For studies within this vein see Dunne, Roberts and Samualson (1989), Klepper (2002) and Dunne, Klimek and Roberts (2004).
[4] See also Dunne, Roberts and Samuelson (1988) and Dunne, Klimek and Roberts (2004)
[5] In Greenaway, Gullstrand and Kneller (2005) we focus on the cross industry determinants.

cannot sell their output at a price that covers the fixed costs of staying in the industry and they make negative profits and cease operations. An additional insight concerns exit and the level of sunk-costs. High levels of entry costs lead to low levels of exit from the industry, where these sunk-costs might reflect the capital or skill intensity of the industry, because barriers to entry moderate the probability of firm closure as incumbent firms face less competition. [6]

Bernard, Redding and Schott (2003, 2004) develop the heterogeneous firm model to allow firms to switch between products with differing production technologies, where products differ in terms of the fixed and variable costs necessary to produce them. The model also provides an insight into two of the exit choices available to firms in this paper, firm closure and industry switching. According to the model the productivity of firms that self-select into the higher cost product and switch industries, is higher than that of firms that cease production altogether. The firms that close are again those with the lowest productivity levels.

These models are yet to be extended and the exit decision related to acquisition and merger. Here theories of multinationals provide some insights. Some emphasise the inherent firm-specific advantages that allow multinationals to overcome the higher costs of operating plants in more than one country (Hymer, 1976; Kindleberger, 1969). These advantages may be tangible, for instance an improved production process, product innovation or wider international distribution networks; or intangible, such as brand name, better management structures or human capital embodied in employees (Kogut, 1985; Grant, 1987; Gomes and Ramaswamey, 1999). Firms are likely to merge or to acquire other firms (also referred to as brownfield FDI) if the returns to these assets are expected to be high or if there is an under-exploited asset within the non-multinational (Markusen 1995; Dunning, 1993).

The characteristics of acquired firms are likely to depend on sunk costs in the post-acquisition period. These relate to establishing trust in the acquired firm and its employees and assimilation into the organisation of the parent company through adoption of new technology and other organisational changes (Buckely and Casson 1998; Harris and Robinson 2002). If these costs are expected to be large, MNEs will attempt to minimise

[6] Much of this work builds on the observation by Dunne, Roberts and Samuelson (1988, 1989) that industry entry and exit rates by plants are highly correlated.

them by targeting firms with higher, than average, productivity levels, with technology similar to their own and/or with international experience. If they are not large, then under-performing firms will be more likely to be acquired.

III Data Sources and Characteristics

Our underlying data source is from Statistics Sweden and includes information for all firms in the Swedish manufacturing sector with at least 20 employees. To reduce the data collection burden on small firms (those with less than 50 employees) only large firms are required to provide complete information. For this reason we restrict our sample to firms with more than 50 employees. Our final data set therefore consists of 3,570 firms over the period 1980-1996, a total of 34,988 firm-year observations.

The unit of analysis is the firm. In part this is driven by data considerations. While we can observe the number of plants any firm controls we cannot observe the detail of those plants such as capital stock, investment and exports. It is also driven by consideration of the types of industry exit being modelled: Dunne, Klimek and Roberts (2005) and Bhattacharjee et al. (2002) have previously argued that bankruptcy and merger are firm level episodes.[7] Although 75 per cent of firm observations in our sample are single plant this decision to focus on firms rather than plants may have some implications at the boundary of exit choices for some firms. For example, industry switching can be either within the exiting plant structure of the firm or by opening and closing plants. In our analysis this is captured as an industry-switch, whereas were plant level data used this would be classified as either an industry exit or plant death. We indicate in the text where this focus on firms is likely to yield differences with evidence elsewhere in the literature.

Industry exit takes one of three forms. We identify an industry exit as a closure of the firm in the data when both the firm identifier and all plant identifiers connected to this firm disappear from the sample. If the firm identifier disappears but one or several plant identifiers continue under a different firm identifier, the exit is defined as merger or

[7] For single plant firms the unit of adjustment modelled in this paper is identical to that modelled in for example Bernard and Jensen (2000).

acquisition (M&A exit henceforth).[8] Finally, firms may exit by switching to another industry, when the firm identifier moves to a new 2-digit industry code. In practical terms this occurs when the largest share of employees is found under a new 2-digit industry. We focus on the decision to switch 2-digit industries to maximise the size of the jump made by firms. This has several advantages: first, it makes it more likely that switching is not due to errors in completing the questionnaire that underlies data collection. Second, we presume that the investment necessary to switch 2-digit industries is greater than that necessary to switch, for example, 4-digit codes within any 2-digit industry. We can therefore feel more confident that we are capturing real shifts in the industry in which the firm is choosing to operate in, rather than just small changes in the composition of its output. The choice of 2-digit industry codes to identify industry switching is more aggregated than in Bernard, Redding and Schott (2003) who consider changes at the 5-digit level. We consider the robustness of the results to industry switches at a more disaggregated level below. As that section makes clear this assumption has an important effect on our results for this form of exit and is an obvious area for future investigation.

Data Characteristics: Around 8 per cent of all firm-year observations are of some kind of industry exit. Table 1 provides some detail on patterns of exit by year (expressed as a percentage of the total number of observations for each year). As can be seen from the top part of the table there is a noticeable increase in exit through industry switching over time and this peaks in 1988 and 1989, where they account for 5.4 and 13.8 per cent of total observations respectively. The large number of switches in 1988 is explained by a revision of industry codes at the firm level - 13 % of all plants change industry codes between 1988 and 1989 while this share is as low as 1-2 % all other years. The increase in switching in 1989 reflects a break in the Swedish industry classification system used by *Statistics Sweden* from SNI69 to SNI92. Although we focus on industry switches at the 2-digit level, which should minimise these classification changes contaminating the sample, we still exclude these years.

As Table 1 makes clear, exit by closure is the least common form of exit chosen by firms, on average less than 20 per cent of all firm-year observations are of this type. Industry exit

[8] Note that we have information about the plant and the firm identifier connected to it as long as it has more than four employees even though we do not have any firm level information for firms with less than 20 employees.

through merger and acquisition is the most common form of exit in the sample, on average 50 per cent of all firm-year observations are of this form; while the remaining 30 per cent are of firms switching industries. This holds for all years in the sample, with firm closure never accounting for more than 26 per cent (1986) of the total exits in a given year and as few as 8 per cent (1993). There is greater variability in the mix between industry switching and merger and acquisitions by year. Industry switching accounted for just 5 per cent of exits in 1987 but 50 per cent in 1990, a year in which it was the most common form of exit.

In Figure 1 we plot rates of exit against each other (excluding 1988 and 1989). Cross-time variation in all three forms is apparent, as is some cyclical pattern to exit through closure. There is a slight positive trend to industry switching and more exits through switching at the end of the period than the start (1.2 per cent of observations for 1982 were industry switches, whereas the corresponding figure for 1996 was 2.9 per cent).

As discussed in Sacrpetta et al. (2002) differences in the unit of analysis (firms versus plants), the use of census or sample data, differences in the definition of exit across datasets, and industry and country differences driven by changes in the policy environment can make comparisons of the exit rates for Sweden with those found for other countries problematic. In addition it is also not always possible to determine the extent to which the measure of exit used in previous studies is a complete or only partial aggregation of the different forms of exit considered here. Despite this, firm exit rates for Sweden look broadly comparable to that for other countries, although rates of firm death are somewhat lower. Scarpetta, Hemmings, Trerssel and Woo (2002) compare data on turnover (entry plus exit rates) from census data for 10 OECD countries. In the manufacturing sector these vary between 12 per cent in Western Germany to close to 24 per cent in France for the five-year period 1989-94. Given that exit and entry rates tend to co-vary strongly (Dunne et al., 1989) these figures (once halved) can crudely indicate exit rates by country.

Similarly from single country studies Bellone, Musso and Quéré (2004) find that about 10% of French firms die per year, while for Canada Baldwin (1998) estimate the same figure as around 5 per cent. For the US Bernard and Jensen (2000) report that in a 5-year period more than 35 percent of US manufacturing plants are closed. Finally using a sample of listed UK firms over a 34 year period Bhattacharjee et al (2002) have amongst 4300 companies 166 bankruptcies, an exit rate of 3.9 per cent over the sample. As noted already

one explanation for the lower rate of firm death in Sweden may due to differences in data, although another may be the size of the manufacturing sector which leads to higher entry costs.

Fewer cross-country comparisons are possible for exit by switching due to the small number of studies conducted for other countries. Bernard et al. (2003) note that over half of new products added by firms are outside of existing 4-digit industry codes, 35 per cent in new 3-digit SIC codes and 17 per cent in new 2-digit codes. More comparable to this study is that of Dunne, Klimek and Roberts (2005). They estimate that for 7 US manufacturing industries product line shifts account for 22 per cent of all exits. In Sweden the figure is 30 per cent.

Another important characteristic of industry dynamics is the transfer of resources by mergers and acquisitions. In the late 1970s and the early 1980s Baldwin (1998) finds an annual exit rate via divestiture of Canadian firms of around 1.7 per cent, which is comparable with our dataset. Bhattacharjee et al (2002) find that for quoted companies in the UK the exit rate is 43 per cent.[9]

Firm and Industry Characteristics: The discussion in Section II highlighted that in theory resource allocation within and between industries through firm death, industry switches or mergers and acquisitions occurs in part because of firm level characteristics, such as productivity levels, and in part because of industry characteristics, such as sunk costs. In Table 2 we report the overall mean and standard deviation of firm and industry variables along with the mean values for each of the different exit types separately. Statistically significant differences in mean values are indicated.

TFP is estimated using a method that controls for correlation between inputs levels and unobserved firm-specific productivity shocks (see Olley and Pakes, 1996; Levinsohn and Petrin, 2003). To control for the fact that industry and exit rates are highly correlated with sunk costs of entry and exit (Dunne, Roberts and Samuelson, 1988) we include a measure

[9] This figure is likely to be higher given the oversampling of large firms in their data, the fact that the data are all of listed companies and the long time period considered.

of sunk-costs due to Bernard and Jensen (2002).[10] This is the minimum of industry entry and exit rates at the 4 digit level.

A comparison of mean values across the firm and industry variables between any exit group and continuing firms in Table 2 indicates that the underlying characteristics of firms choosing these alternative forms of exit differ from firms that remain within the industry as well as from each other. A number of these differences are statistically significant. In general the evidence from the Table serves to reinforce the conclusion drawn from the econometric results below that firms that cease production differ across the greatest number of dimensions, whereas those that switch industries are much more similar to firms that remain in the industry. The sunk cost variable suggests that firms exit choices may also be strongly influenced by the industry in which they are embedded. Firms that quit production or switch to a new industry on average operate in industries with sunk-costs that are lower than for the sample as a whole; whereas firms involved in acquisitions are more likely to come from industries with high sunk-costs.

With regard to firms' characteristics: those that closedown are statistically significantly different in their mean value of TFP compared to firms that do not exit, although it is on average lower, whereas we do find that they are on average younger, less capital intensive as well as being less likely to export, to be foreign owned or to be an intermediate producer.

On average acquired firms are the more productive, evidence of cherry-picking of the best firms, and less likely to be foreign owned. Of the acquisitions that take place 90 per cent are between firms from the same 2-digit industry, where much of the transfer of ownership is also between domestically owned firms. 91 per cent of all acquisitions are cases where both acquirer and acquired are domestic. We find however, that foreign owners became more active during the second half of the sample period. Around 12 per cent of acquiring firms are foreign in the 1990s, compared to 8 per cent in the 1980s. This is likely in part to reflect policy changes regarding foreign ownership in Sweden and the approaching EU-membership. Perhaps surprisingly there has also been an increase in reverse acquisition. More foreign firms operating in Sweden were acquired over this period, in the 1980s 11 per cent of acquired firms were foreign, a figure that rose to 18 per cent in the 1990s.

[10] See Table 2 for a definition of the variables.

Finally, firms that switch industries tend to be significantly older and more likely to be multi-plant firms. In Table 3 we investigate the characteristics of firms that switch industries further by comparing the industry they are leaving to their destination industry. In the Table we report the ratio of capital-labour, wages-labour, R&D and labour productivity in the destination versus the origin industry. The Table also reports confidence intervals of a hypothesis test that the ratio of the means is equal to 1. All figures are greater than 1 and statistically significant implying that firms tend to switch towards more capital intensive (both physical and human), more R&D intensive and more productive industries. That the industries are those with higher levels of physical and human capital intensity suggests that this process may be related to aspects of globalisation (see Greenaway, Gullstrand and Kneller, 2005).

IV The Probability of Exit

Simple comparisons of firms that exit in Table 2 suggest their underlying characteristics are important to the choices they make, as are the industries they operate in. However, it is possible that these differences reflect the omission of other covariates not included in this analysis. They may, for example reflect unobserved fixed industry factors or time effects. In Tables 4, A1 and 5 we report the results from our econometric analysis, where we control for a range of firm level variables as well as (2-digit) industry and time effects. The empirical method is based on a multinomial logit that described the decision matrix facing each firm in each period: continue as before, switch to a new industry, merge with another firm or to cease production and close down. All of the reported coefficients are expressed relative to no change in the firm's status. The empirical model takes the form:

$$\text{Prob}(Y_{it} = j) = e^{\beta_j' x_{it}} \Big/ 1 + \sum_{k=1}^{3} e^{\beta_k' x_{it}},$$

where j equals 1 if firm i switches industry, 2 if it merges and 3 if it closes. The vector x_{it} consists of a number of firm and industry level characteristics as well as time and industry dummies.

The discussion in Section II highlights that resource allocation within and between industries through the death of firms, industry switches or from mergers and acquisitions occurs in part because of firm level productivity levels and in part because of industry sunk costs. We follow the literature in recognising that the relationships are likely to be more complicated and not fully captured by a single measure of firm performance such as productivity and therefore include measures of capital intensity and size also. Size is measured by the (log) of employment; the capital labour ratio as the estimated capital stock per employee. We also include dummy variables to measure whether the firm participates in export markets, is foreign owned or is multi-plant. To capture the cumulative pressures facing firms we include measures of demand shocks the firm faces (ratio of inventories to total sales) and reductions in firm size (change in employment). In addition to time invariant industry fixed effect we include three industry level variables, a measure of sunk costs, the level of competition in the industry (measured by the concentration of the 5 largest firms) and capital intensity of the industry. (Table 2 provides summary statistics on these variables).

Using a multinomial regression these Tables 4 displays each of the different forms of exit measured against the probability of no change in the status of the firm. Table A1 in the Appendix shows the marginal effects on the probability of exit while Table 5 shows the full matrix of odds ratios. In the last table the results indicate how exiting firms differ in their characteristics across the different forms of exit. The rows describe the variable assumed as the base case and the columns the exit form. The first row of the table, with continuing in the industry as the reference option , therefore mirrors the results presented in Table 4.

Before focusing on specific results we draw some general conclusions. Overall, the results tend to confirm these from simple tests of differences in mean reported above. There are significant differences between the exit choices available to firms, they depend on different sets of variables, and the same variable can be associated quite differently with the exit choices firms make. As before, using no-change in status as the base, then firms that cease production are the most different in their characteristics, followed by mergers and acquisitions. The type of firms making these exit choices are quite different in some dimensions and similar in others. These choices depend quite differently on levels of TFP and foreign ownership of the firm but move in the same direction for capital intensity and export status for example.

In comparison to these two choices firms that switch to a new industry are very similar across a large number of dimensions to those that continue: they differ only by the number of plants they own, their ownership status and the industry they operate in.

Of the results for specific firm level characteristics the determinants of firm choice in Melitz (2003) are clearest for productivity, the level of sunk-costs and age of the firm. As already noted the literature on the characteristics of firms that cease production is much larger than that on firms that switch. While differences in data sources and definition can lead to large changes in the results from exercises of this type (Scarpetta et al., 2002) an overall impression is that the results presented below support those found for other countries.

Firm level determinants of Exit – productivity, sunk-costs and age: According to our results in Table 3 total factor productivity of firms in the pre-exit period significantly predicts which will close and which will exit through M&A, albeit at the 10 per cent significance level for closure. These have opposite effects however. Relative to no-exit the probability of exit through closure declines as the productivity of the firm increases, whereas productivity increases with the probability of M&A. [11] The evidence from Table 4 suggests these effects are quantitatively important. For a 1 percentage point change in the level of TFP the standardised change in the odds ratio relative to no change is –18 per cent for closedown and 7 per cent for M&A exit.

Compared to results reported elsewhere, these for Swedish manufacturing match for closure, whereas the evidence of cherry-picking of the best firms for acquisition is more mixed. For example Dunne, Klimek and Roberts (2005) find evidence that higher relative productivity reduces the probability of firm closure in the US.[12] By contrast, results for acquisition appear more context specific. For example, Baldwin (1998) finds that for mergers productivity rises in both the acquired and acquiring plants in Canada, but no evidence that the productivity of these plants was higher before the merger. Similarly for the UK Griffith, Redding and Simpson (2004) find acquisitions by domestic firms tend to

[11] We do not look at the related question of whether entrants have higher or lower productivity than exitors and the resulting impact on aggregate productivity (see Disney, Haskel and Heden, 2003).

be of firms with low productivity, whereas Conyon, Girma, Thompson and Wright (2002), Harris and Robinson (2002) and Girma, Kneller and Pisu (2003) find that acquisitions are on average of high productivity firms.

The position of firms that switch industries in the productivity distribution is more complicated. Using the results in Tables 3 and 4 it appears that switching industries cannot be distinguished in this dimension from firms that remain within the industry, although it is possible to say that they generally lie to the left of firms that merge or are acquired. This contrasts with Bernard, Redding and Schott (2003) who find the level of total factor productivity in firms that switch industries is significantly different from those that cease production. In Sweden, we find that other firm and industry characteristics are more important, amongst them the level of sunk-costs.

Hopenhayn (1992) shows that barriers to entry moderate the probability of firm closure since incumbent firms face less competition. Results in Table 3 support this and match those from other studies including Dunne, Roberts and Samuelson (1988, 1989) and Bernard and Jensen (2000) for the US, and Geroski (1991a,b) for the UK.[13] Higher levels of sunk costs are associated with lower rates of industry exit (either by closure or switching). Quantitatively the industry in which the firm operates has the largest impact on the probability it will take one of these exit routes (Table A1). Industry characteristics are overwhelmingly important, which is interesting given the recent emphasis on the heterogeneous nature of firms.

Again there is evidence of differences across these two forms of exit however. While the probability of exit is decreasing as the level of sunk costs in the industry increases for both firm death and switching, Table 5 shows that switching is increasing in the level of sunk-costs relative to firm closure. That is, while the firms that make these choices are from industries that are in some senses similar, they have low sunk costs and are operating in distinct industries. An increase in industry sunk-costs decreases the probability that a firm will exit the industry but when they do this is more likely to be through switching than by

[12] Winter (1999) and Doms et al. (1991) Bellone, Musso and Quéré (2004) also model closure as dependent on the firms productivity, while see Caves (1998) for a more complete review.
[13] We do not consider the question of whether sunk-costs and exit are correlated with entry into the Swedish manufacturing sector (Dunne, Roberts and Samuelson, 1988, 1989). Or indeed whether there is a net rate of entry or exit into the industry.

closure.[14] For a 1 percentage point change in the level of sunk costs the standardised change in the odds ratio of industry switching relative to firm closure increases by close to 18 per cent.

The effect of high sunk costs on firm death are in line with those found in Baldwin (1998) if we compare M&A with firm failure. That is, higher sunk costs increase the probability of M&A exit compared to closedown, which is also true for exit by switching industry. This might reflect the fact that mergers or acquisitions are a way into industries with high barriers and that switching firms give up industries with low sunk costs first and focus their resources on high costs industries.

In models such as Hopenhayn (1992), Javanovic (1982) and Ericsson and Pakes (1995) it is the youngest firms within any industry that are most likely to cease production. In the Melitz (2003) extension to Hopenhayn, new firms are more likely to exit for two reasons. First, new firms draw their productivity level from a known productivity distribution only after the payment of the sunk-costs of entry into the industry. Only firms with a productivity draw above a cut-off sufficient to earn non-negative profits remain within the market. New firms with a productivity draw below this value exit. Second, in each time period the productivity of the firm is subject to a random shock. Since exit is more likely for low productivity firms it follows that the firms from any given cohort that remain within the market are likely to have had high productivity. Dunne, Roberts and Samuelson (1988, 1989) find empirical evidence consistent with this, as do Bernard and Jensen (2000).[15] If age is collinear with productivity as theory predicts then the age effects of firms should be fully captured by the productivity variable already discussed.

Age may still be significant however if for example, new firms embody more efficient technologies, or have a mix of capital that is closer to the optimum, such that the probability of exit might be lower (Deily, 1988). Or alternatively, information asymmetries may deny younger firms access to the same credit channels as more established firms increasing the probability of exit (Bhattacharjee, 2002).

[14] There is also a related question to this, the effect of competition on the rate of productivity growth within the firm (see for example Nickell, 1996). Whilst it is possible that a reduction in competitive pressures through higher sunk-costs have a negative subsequent impact on the rate of productivity growth within the firm we do not explore that effect here. With this in mind our results might be seen as lower bound on the effects of competition.

In our sample we find, conditional on the productivity of the firm, no relationship between exit and age. Firms of all ages exit. However there are differences in the likely form that exit takes. According to Table 5 older firms are more likely to exit by switching industries or merging rather than closing down altogether. Perhaps unsurprisingly experience, and possibly information to potential suitors, plays an important role when industry exit is of one of these forms.[16] According to Table 4 the magnitude of this effect is similar across these two forms of exit relative to closure of the firm at 22 per cent.

Size, capital intensity and participation in foreign markets: To the extent that new firms entering the industry are smaller than average (Scarpetta et al., 2002) we might expect that small firms are also more likely to cease production, though Ghemawat and Nalebuff (1985) show in a duoploy with Cournot competition that large firms are more likely to exit declining industries quicker than small firms. This result can be overturned if there are substantial cost advantages to the larger firm or if large firms have the possibility to shed employment (Whinston, 1986). We find, like a number of others (Dunne Roberts and Samuelson, 1989; Deily, 1988; Mata et al., 1995; Görg and Strobl, 2003; Liberman, 1990; Levinsohn and Petropoulos, 2000) evidence that the probability the firm will exit by closure is decreasing in the size of the firm. At the mean value of firm size in our sample a unit increase in the size of firms reduces the odds ratio of exit by 33 per cent.

In contrast to closure, exit through switching or acquisition does not appear to be affected by firm size, both small and large firms are acquired and switch relative to those that remain. This contrasts with Bhattacharjee et al (2002) who find that the probability of both acquisition and bankruptcy decrease sharply with size, while Bernard and Jensen (2000) find similar results for switching.

The capital-intensity of the firm, as measured by the capital-labour ratio is in line with the findings in Olley and Pakes (1996) report that low capital intensity plants are more likely to exit through this route. Our results suggest a 1 percentage point increase in the capital-labour ratio decreases the odds ratio of M&A exit relative to no change by the firm by 7 per

[15] Gibson and Harris (1996) find a similar result using data on New Zealand.

[16] This later result supports that of Dunne et al. (2004) for the US.

cent while the propensity to closedown decreases by 16 per cent. These are similar sized effects to those of TFP on each of these changes.

Participation in international markets through exports or FDI has contrasting effects on exit choices. Being an exporter decreases the odds of exiting by M&A or by closing down, by 23 and 26 per cent respectively (Table 5). This result is consistent with the idea that exporting firms are more productive (Bernard and Jensen, 1999; Greenaway and Kneller, 2007).

In contrast to exporting we find that foreign multinationals located in Sweden are more likely to exit by closing down production facilities, although they are less likely to choose one of the other exit forms. The observation by the media that foreign owned firms are 'footloose' and more likely to cease production than domestic firms, has support in this data. According to the odds ratio the probability of exit is about 16 per cent higher in foreign firms. Bernard and Jensen (2002) find similarly that foreign MNE's are more likely to close a plant, as do Bernard and Sjoholm (2003) for Indonesia and Görg and Alvarez (2005) for Chile.[17]

Additional Factors: Of the additional factors that we control for the first two give further description on the characteristics of firms: whether the firm is a producer of intermediate inputs, measured by the share of value added in total sales, and whether it has multiple plants. Our results show that intermediate producers are less likely to close down, whereas, perhaps unsurprisingly multi-plant firms are more likely to switch to new industries (see Dunne, Roberts and Samuelson, 1989 for similar evidence). This latter result suggests that firms operate in a number of different industries and therefore that further investigation into the structure of these firms is warranted. Unfortunately a lack of detailed information on each plant that the firm controls prevents such an investigation using current data.

Often the decision to quit an industry is not taken within a single observation period but instead builds up for the firm over time. This is sometimes known as the 'shadow of death' (Griliches and Regev, 1995). We might therefore expect that evidence of these pressures can be found in the data. To model these effects we include measures of the share of

[17] Gibson and Harris (1996) find in a regression that does not control for as many firm characteristics as here that foreign owned firms are less likely to close down.

inventories that the firm holds and change in the labour force. As in Griliches and Regev (1995) the 'shadow of death' manifests itself best in a prior loss of employment before the firm ceases production. An interpretation of 'shadow of death' for the share of inventories and the loss of employment for M&A activity, while possible, is perhaps less plausible and probably reflects changes to the book value of inventories and restructuring to employment as the acquisition takes place.

In addition to the level of sunk-costs in the industry, we also control for unobserved industry effects (using industry dummies), for the degree of industry concentration (measured using the output of the 5 largest firms) and factor intensity (physical capital) of the industry. Outside of the effect of market concentration on the probability of stopping production and closing the firm these variables add little explanatory power to our model.

V Robustness

Finally, we briefly report on results that consider the robustness of the findings presented in Table 4 and 5. First, we split the sample into the 1980's and 1990's. During the latter, as a consequence of the decision to join the EU, there were a number of policy changes in Sweden that might be expected to change the economic environment. These include liberalisation of the rules allowing ownership of domestic firms, finance and trade. These regressions are reported in Table 6.

We find some limited impact on the results. Of the noticeable changes one relates to TFP. Its coefficient is insignificant in both periods, although signs are unchanged.[18] We also find that age is significant for the 1990s for the decision to closedown. This may reflect the construction of this variable; age is set to one at the first year of observation in 1980. The period of the 1990's may therefore better reflect the true variation in ages across firms in the sample.

Foreign ownership grew markedly following the changes in the rules of ownership and the recession of the early 1990's (Karpaty, 2004). We find this may have had some impact on

[18] If we use labour productivity instead of TFP, the productivity measure is highly significant and negative in all regressions and for all exit decisions.

firm decisions, foreign owned firms do not differ in their exit behaviour compared to domestic owned firms during the 1980s. The significance of the foreign ownership indicator in Table 4 therefore owes itself completely to its effect in the 1990s.

We also consider robustness to inclusion of additional explanatory variables. Table 7 reports results of a multinomial regression following the inclusion of a measure of human capital intensity of the firm (measured using average wages) relative to the industry average. Inclusion of this variable does not affect other variables and is highly significant. It suggests that firms that are highly intensive in human capital are less likely to exit, which is in line with our finding for highly physical capital intensive firms. This same result is found if we use an R&D dummy to replace the human capital indicator (which restrict our sample to 1985-96 due to missing values).

Finally we check the robustness after a redefinition of an industry switch to a change to a new 4-digit industry. These are reported in Table 8. Allowing the change in industry code to be much smaller before it is defined as an industry switch has some noticeable impact on the results for industry switches, whereas the results for the other exit forms are robust to this change. Perhaps most obviously for industry switches is the number of significant coefficients compared to the same column in Table 4. It now becomes much easier to describe differences in the firms that switch industries compared to those that remain. Previously these firms differed from firms that remained in the industry only in that they were more likely to be multi-plant, less likely to be foreign and more likely to operate in industries with low sunk cots. Now, foreign ownership and the multi-plant indicator still matter but in addition they are more likely to be smaller, younger and are less likely to export.

The loss of significance of the sunk-cost variable and gain in the significance of a number of the firm level characteristics suggests that further investigation of this dimension of exit is warranted. There are much clearer firm differences in a switch to a new 4-digit compared to a new 2-digit code, where industry characteristics appear more important. Presumably further differences can be found at finer levels of disaggregation. Such an investigation is beyond the scope of the current paper.

VI Conclusions

This paper simultaneously analyses different choices about industry exit that firms can make in Swedish manufacturing industry over two decades. The different dimensions considered are exit by closing all operations, switching production to a new industry, and the merger or acquisition by other firms.

We find that compared to firms that do not exit, firms which closedown are on average smaller, less productive, less capital intensive and less likely to export and are producers of intermediate goods. In line with the idea that multinationals are 'footloose', they are also more likely to be foreign. Firms that exit through M&A are more likely to have higher TFP but lower capital intensity or export than firms that continue in the industry. This time they are less likely to be foreign. Compared to these exit choices the firm's decision to switch industries is much less dependent on firm level characteristics, at least between the 2-digit industries. The sensitivity of these results to the size of the assumed change in industry code before this variable is classed as a switch suggests a promising and fruitful line of future inquiry.

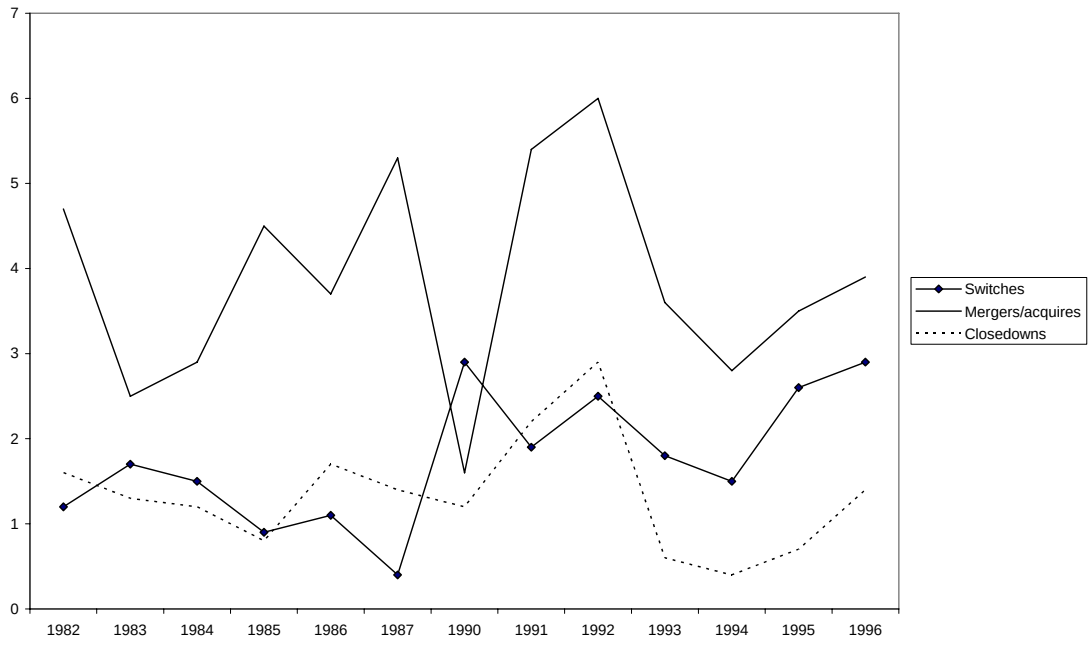
Tables

Table 1: Industry exits by year. (as a share of total observations)

Year	Switches	Mergers/acquires	Closedowns
1982	1.2	4.7	1.6
1983	1.7	2.5	1.3
1984	1.5	2.9	1.2
1985	0.9	4.5	0.8
1986	1.1	3.7	1.7
1987	0.4	5.3	1.4
1988	5.4	3.8	1.3
1989	13.8	4.4	2.0
1990	2.9	1.6	1.2
1991	1.9	5.4	2.2
1992	2.5	6.0	2.9
1993	1.8	3.6	0.6
1994	1.5	2.8	0.4
1995	2.6	3.5	0.7
Full sample	2.9	3.9	1.4
Sample excluding 1988/89	1.7	3.9	1.3

Notes: [a] A differences of means test between a group of exiting firms (switches, M&A or closedowns) and continuing firms for the whole period. Each figure represents, expressed in percentage, how the mean of an exit group differs from the mean of continuing firms, and * indicates if the means are significantly unequal at, at least, a 10 % level.

Figure 1: Rates of Firm Exit 1982-1996



Notes: 1988 and 1989 are excluded from this figure.

Table 2: Definitions and descriptive statistics [a]

Variables	Mean	*Stand. dev.*	Mean Switch.	Mean M&A	Mean Closed.
Firm Level Variables					
Size (No. employees)	287	*1058*	398	257	189
Age (No. years in sample)	7.38	*4.05*	8.02*	7.31	6.69*
TFP (Total factor productivity) [b]	-0.28	*2.73*	-0.52	0.03*	-0.37
Capital per employee (In hundred of thousands Swedish crowns, constant 1980 prices).	1.47	*5.57*	1.63	1.34	1.10*
Export dummy (one if the firm is exporting)	0.77	*0.42*	0.79	0.67	0.63*
Multiplant dummy (One if the firm has more than one plant)	0.25	*0.43*	0.36*	0.23	0.15*
Foreign owner dummy (One if the firm is owned by a foreign company)	0.17	*0.38*	0.14	0.13*	0.18
Intermediate producer (Value added as share of total sales)	0.37	*0.13*	0.37	0.37	0.34*
Industry Level Variables					
Sunk costs (-Minimum of industry entry and exit rates) [c d]	-0.004	*0.008*	-0.005*	-0.003*	-0.007*
Number of firm-year observations: 17136	17136		285	668	230

Notes: [a] All variables originates from Statistics Sweden and nominal values are deflated with industry specific producer price indices (SNI92 2-digit level). [b] As in Olley and Pakes (1996) and in Levinsohn and Petrin (2003), we control for unobservables (using investments) when calculating firm level TFP (note that around 93% of the firm-year observations have non-zero investment). [c] Industry exit (entry) rates is defined as the number of firms exiting (entering) an industry each year divided by the total number of firms each year and industry. See Bernard and Bradford Jensen (2002). [d] Industry and trade variables are calculated at a SNI69 5-digit level before 1995, and at a SNI92 4-digit level after 1994. The reason for this is that the key used to transform SNI69 to SNI92 becomes less reliable at a disaggregated level. * Indicates if the mean of the exiting group differs, at a 5 per cent probability level, from the mean of continuing firms.

Table 3: Industry exits.

Differences between the destination and the origin industry of firms switching industries [a]			
Variable	**Mean**		**95-% confidence interval**
Average capital-labour ratio of the destination industry relative to the origin	1.21	Normal distribution	1.07 – 1.35
		Bootstrapped [b]	1.11 – 1.40
Average wage-labour ratio of the destination industry relative to the origin	1.04	Normal distribution	1.01 – 1.08
		Bootstrapped [b]	1.01 – 1.08
Average labour productivity of the destination industry relative to the origin	1.06	Normal distribution	1.01 – 1.11
		Bootstrapped [b]	1.02 – 1.12
Average number of firms with R&D of the destination industry relative to the origin [c]	1.14	Normal distribution	1.04 – 1.22
		Bootstrapped [b]	1.05 – 1.21
Notes: See Table 2			

Table 4: Multinomial regression (continuing firm as base). [a]

Variables	**Switch**	**Merged or Acquired**	**Closedown**
Proportion of total sample	*1.7%*	*3.9%*	*1.3%*
Firm Variables			
Size	-.20 (*.25*)	.07 (*.57*)	**-1.01** (*.00*)
Age	.18 (*.55*)	.22 (*.29*)	-.49 (*.14*)
TFP	-.01 (*.80*)	**.02** (*.04*)	**-.07** (*.10*)
Capital per employee	.05 (*.73*)	**-.14** (*.05*)	**-.36** (*.00*)
Export dummy	-.24 (*.13*)	**-.61** (*.00*)	**-.70** (*.00*)
Foreign owner dummy	**-.42** (*.02*)	**-.31** (*.01*)	**.40** (*.03*)
Multiplant dummy	**.61** (*.00*)	-.07 (*.52*)	-.27 (*.17*)
Intermediate producer	-.01 (*.97*)	-.43 (*.20*)	**-2.33** (*.00*)
Inventories	.34 (*.36*)	**-.99** (*.00*)	0.27 (*.49*)
Changes in labour force	-.36 (*.64*)	**-2.88** (*.00*)	**-4.17** (*.00*)
Industry Variables			
Sunk costs	**-11.27** (*.08*)	6.94 (*.27*)	**-32.99** (*.00*)
Concentration ratio (5-firms)	-2.41 (*.80*)	.55 (*.91*)	**11.28** (*.09*)
Capital intensity of industries	0.58 (*.16*)	-.25 (*.38*)	-.01 (*.98*)
Percent correctly predicted: 93%			
McFadden's pseudo R^2: 0.06			

Notes: [a] Definitions of variable are found in Table 2 (the constant is not reported in order to save space). Year and 2-digit industry dummies are included in the regression. Figures between parentheses are p-values, and bold coefficients are significant at, at least, a 10 % level.

Table 5: Significant logit effect coefficients (standardised % change) [a]

Exit *vs* Base	Switch	M&A exit	Closdown
Continue	MPL(30.0), FOR(-13.4), SUN(-7.8)	TFP(6.8), KPL(-6.8), EXP(-22.6), FOR(-11.1), STO(-13.8), DLA(-19.1)	SIZ (-33.2), TFP(-18.5), KPL(-16.4), EXP(-25.8), FOR(+16.4), INP(-26.4), DLA(-26.7), SUN(-31.2), CON(6.8)
Cosedown	SIZ(37.9), AGE (22.6), KPL(23.4), EXP(22.1), MPL(46.8), FOR(-25.6), INP(34.4), DLA(34.6), SUN(17.9)	SIZ(53.9), AGE(21.1), TFP(31.0), KPL(11.4), FOR(-23.6), INP(28.3), STO(-17.3), DLA(10.4), SUN(27.9)	
M&A exit	EXP(+), MPL(+), STO(+), DLA(+), SUN(-), KII(+)	-	

Notes: [a] Based on the results from the regression in Table 3. Each variable in the table is significant at, at least, a 10 % level and shows if it increases (+) or decreases (-) the propensity to belong in the exit group (columns) when we use different normalisations (rows). The inverse relationship has the same significance, but the sign changes. The abbreviations stand for: SIZ=size, AGE=age, TFP=total factor productivity, KPL=capital per employee, EXP=export dummy, MPL=multiplant dummy, FOR=foreign owner dummy, INP=intermediate producer, STO=demand shock, DLA=changes in labour force, SUN=sunk costs, CON=concentration ratio, KII=capital intensity of industries.

Table 6: The 80s and the 90s - Multinomial regression (continuing firm as base).[a]

Variables	**Switch**		**Merged or Aquired**		**Closedown**	
	1980s	1990s	1980s	1990s	1980s	1990s
Size	.02	**-.44**	-.15	.25	**-1.92**	-.37
Age	.49	.11	**1.38**	.02	.61	**-.67**
TFP	**-.25**	.12	.02	.04	-.18	-.05

Capital per employee	-.14	.11	**-0.18**	-.14	**-0.43**	**-.34**
Export dummy	-.17	-.26	**-0.36**	**-.89**	**-0.63**	**-.80**
Multiplant dummy	**.84**	**.52**	.20	**-.26**	.20	**-.64**
Foreign owner dummy	-.28	**-.49**	**-0.55**	-.18	.05	**.54**
Intermediate producer	-1.11	.58	-.36	-.49	**-2.30**	**-2.11**
Demand shock	-.41	**.94**	**-1.44**	-.47	.14	-.10
Changes in labour force	.56	-.83	**-3.47**	**-2.46**	**-5.84**	**-3.19**
Sunk costs	-4.35	**-13.88**	**19.26**	-5.51	**-38.97**	**-34.35**
Concentration ratio (5-firms)	-5.05	6.08	.57	7.27	6.31	19.21
Capital intensity of industries	1.21	.72	-.38	.02	.13	.77
Number of observations: 1980s: 8947, 1990s: 8189						
McFadden's pseudo R^2: 1980s: 0.06, 1990s: 0.07						

Notes: [a] See Table 3. Note that we only report if the coefficient is significant at, at least, a 10 % level (bald figures) and we choose to exclude the p-values in order to conserve space (they are obtainable from the authors upon request).

Table 7: Adding Human capital - Multinomial regression (continuing firm as base). [a]

Variables	**Switch**	**Merged or Aquired**	**Closedown**
Proportion of total sample	*1.7%*	*3.9%*	*1.3%*
Size	-.15 (*.38*)	.09 (*.37*)	**-.96** (*.00*)
Age	.12 (*.68*)	.21 (*.34*)	-.52 (*.13*)
TFP	-.01 (*.81*)	**.02** (*.04*)	**-.07** (*.09*)
Capital per employee	.11 (*.51*)	**-.12** (*.10*)	**-.34** (*.00*)
Human capital intensity	**-1.59** (*.07*)	**-1.37** (*.02*)	**-1.87** (*.05*)
Export dummy	-.22 (*.16*)	**-.59** (*.00*)	**-.70** (*.00*)
Multiplant dummy	**.61** (*.00*)	-.06 (*.59*)	-.27 (*.19*)
Foreign owner dummy	**-.39** (*.02*)	**-.29** (*.02*)	**.43** (*.02*)
Intermediate producer	-.10 (*.84*)	-.51 (*.13*)	**-2.45** (*.00*)
Demand shock	.28 (*.46*)	**-1.04** (*.00*)	0.23 (*.56*)
Changes in labour force	-.48 (*.54*)	**-3.01** (*.00*)	**-4.37** (*.00*)
Sunk costs	**-11.80** (*.07*)	7.26 (*.26*)	**-32.71** (*.00*)
Concentration ratio (5-firms)	-1.17 (*.90*)	.88 (*.87*)	**12.14** (*.08*)
Capital intensity of industries	0.56 (*.22*)	-.45 (*.14*)	-.27 (*.62*)

Human capital intensity of industries	0.62 (*.66*)	**2.12** (*.03*)	**2.87** (*.08*)
Percent correctly predicted: 93%			
McFadden's pseudo R^2: 0.06			

Notes: [a] See Table 3.

Table 8: Switching at a 4-digit industry level - Multinomial regression (continuing firm as base). [a]

Variables	**Switch**	**Merged or Aquired**	**Closedown**
Proportion of total sample	*9.4%*	*3.9%*	*1.3%*
Size	**-.32** (*.00*)	.07 (*.57*)	**-1.09** (*.00*)
Age	**-.23** (*.08*)	.25 (*.26*)	-.49 (*.16*)
TFP	-.03 (*.23*)	**.02** (*.04*)	**-.08** (*.07*)
Capital per employee	.01 (*.87*)	-.12 (*.13*)	**-.35** (*.00*)
Export dummy	**-.20** (*.01*)	**-.63** (*.00*)	**-.67** (*.00*)
Multiplant dummy	**.68** (*.00*)	-.03 (*.77*)	-.20 (*.32*)
Foreign owner dummy	**-.22** (*.01*)	**-.32** (*.01*)	**.39** (*.04*)
Intermediate producer	**.41** (*.09*)	-.30 (*.37*)	**-2.27** (*.00*)
Demand shock	**.33** (*.10*)	**-.90** (*.02*)	.33 (*.39*)
Changes in labour force	.14 (*.72*)	**-2.90** (*.00*)	**-3.91** (*.00*)
Sunk costs	-3.60 (*.31*)	4.74 (*.46*)	**-33.92** (*.00*)
Concentration ratio (5-firms)	2.56 (*.59*)	.25 (*.96*)	**11.61** (*.09*)
Capital intensity of industries	.23 (*.27*)	-.21 (*.48*)	.07 (*.90*)
Percent correctly predicted: 86%			
McFadden's pseudo R^2: 0.12			

Notes: [a] See Table 3.

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Appendix

Table A1: Marginal effects on probability to exit. [a]

Variables	**Probability to switch**	**Probability to M&A exit**	**Probability to closedown**
Size	-.002 (*.27*)	.002 (*.50*)	**-.008** (*.00*)
Age	.002 (*.57*)	.007 (*.28*)	-.004 (*.14*)
TFP	-.0001 (*.80*)	**.001** (*.03*)	**-.001** (*.10*)
Capital per employee	.001 (*.69*)	**-.005** (*.05*)	**-.003** (*.00*)
Export dummy	-.003 (*.18*)	**-.019** (*.00*)	**-.005** (*.00*)
Multiplant dummy	**.007** (*.00*)	-.002 (*.48*)	-.002 (*.16*)

Foreign owner dummy	**-.005** (*.02*)	**-.010** (*.01*)	**.003** (*.03*)
Intermediate producer	-.0002 (*.97*)	-.014 (*.22*)	**-.018** (*.00*)
Demand shock	.004 (*.32*)	**-.033** (*.00*)	.002 (*.44*)
Changes in labour force	-.002 (*.77*)	**-.093** (*.00*)	**-.032** (*.00*)
Sunk costs	**-.138** (*.08*)	.242 (*.25*)	**-.260** (*.00*)
Concentration ratio (5 firms)	-.031 (*.79*)	.016 (*.92*)	**.089** (*.10*)
Capital intensity of industries	.007 (*.15*)	-.008 (*.37*)	.0001 (*.98*)

Notes: [a] Based on the results from Table 2, and they are computed at the means of each variable. We have excluded marginal effects on the probability of continue.