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# Can Small Firms' Perceived Constraints Help Explain Survival Rates?

**Seán Lyons**

*Abstract*: Survey evidence on small firms' perceived constraints might provide useful information on the effects of institutional impediments, such as regulatory burdens, on post-entry performance. Using a new dataset that merges ENSR survey data on small firms' major constraints with Eurostat small firm demography data, we find that some perceived constraints are associated with significant differences in survival rates for new small firms. However, the constraints variables seem only weakly related to survival, and some prominent constraints including administrative regulations and availability of finance are not significant. We suggest refinements in survey design that might improve the usefulness of such data for inter-country comparisons.

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# Can Small Firms' Perceived Constraints Help Explain Survival Rates?

## 1. Introduction

This paper asks whether survey evidence on perceived constraints can help explain differences in new small firms' survival rates across countries, firm sizes and broad sectors within Europe. Such surveys are widely employed by governments, small business agencies and trade associations as an indicator of institutional impediments, but little research has been done into whether this type of evidence can provide accurate information on market conditions. To examine this issue, we construct and analyse a new dataset combining European Network for Social and Economic Research (ENSR) survey evidence on the perceived constraints on SMEs with Eurostat data on firm demography in ten European countries.

The results show that some reported constraints help to explain variations in post-entry performance of new firms, with (as expected) groups of firms that report constraints exhibiting lower survival rates. However, the relationship seems to be relatively weak and it is statistically significant for only a subset of perceived constraints (e.g. "Lack of skilled labour" and "Other"). Surprisingly, we find no significant effects of administrative regulation and access to finance constraints on survival rates, even over a three year period. Until more convincing evidence is found showing that this type of survey evidence helps explain market outcomes, using it in the assessment or design of public policy may be problematical. In the concluding section, we suggest refinements in survey design that might improve the usefulness of perceived constraints data for use in making inter-country comparisons of small business burdens.

## 2. Survey evidence as an indicator of small business burdens

Most governments try to favour small businesses in various ways. Common policy measures include VAT registration thresholds and exemption from regulations based on firm size (e.g. exemption from audit requirements). Asymmetrical treatment of this kind may be justified by reference to market failures and asymmetries in the impact of regulation, taxation or other

policies, but ultimately the question of whether welfare will be improved by giving small businesses different treatment from larger firms must be an empirical one.[1]

One frequently-used approach to identifying (and sometimes quantifying) the extent of burdens on small firms is to ask the affected parties. This involves including questions about perceived burdens in surveys of small businesses. Examples of European studies of this kind are EIM/ENSR (1995) and Kox (2005), which extrapolated estimates made of the costs of administrative burdens in the Netherlands to a pan-European basis.

Kingston University (2005) identified many studies employing this type of evidence and expressed concerns about a general failure to link perceived burdens with outcomes:

> "The major problem with this kind of survey data is that it only scratches the surface as to *how* regulation might generate adverse consequences for small business owners. It provides little evidence of the processes through which regulation has its effects, good and bad, on small businesses or *why* business owners are satisfied or dissatisfied with regulations."[2]

In principle, it is possible to test how far perceived constraints, as reported in such surveys, represent actual impediments to some aspect of small business performance, although few studies seem to have attempted this. One study that did is Bartlett and Bukvič (2001), a single-country study focusing on Slovenia. Estimating models of SME employment growth, they found significant negative effects on growth associated with indices of perceived bureaucracy, cost of credit and labour taxes. However, being a single-country study, this paper is open to the possible criticism that in the absence of significant cross-sample variation in the institutional environment, the institutional effects detected may have more to do with unobserved differences in firms' characteristics than real differences in barriers.

There seems to be little past research into the explanatory power of perceived small firm constraints across a range of countries, despite the apparent benefit of having additional variation in policies across national borders. Perhaps the nearest examples are studies, often using data from regulatory "scorecards" or indices,[3] that test the effects of regulatory

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[1] Storey (1994), pp.254-257.

[2] Kingston University (2005), p.8.

[3] For two examples, see OECD (2001) and the World Bank Doing Business database.

institutions on a range of market performance variables, e.g. Freeman (2002), Hemmings *et al.* (2002), Brandt (2004b) and Loayza *et al.* (2004).

This paper is related to empirical work both in the institutional theory tradition and in industrial organisation (and in particular, studies of the determinants of new firm survival).

A few recent studies have considered the interface between firms' perceptions and institutional arrangements. Pierre and Scarpetta (2006) considered how far measured levels of regulation are reflected in firms' reported perceptions, and Brunetti *et al.* (1998) examined how firms' reported perceptions of obstacles to doing business vary by country and region. Aidis (2005) looked at correlations among different types of institutional barriers perceived by firms in Lithuania, examining in particular the interactions between formal and informal barriers to growth.

There is, of course, a more extensive empirical literature concerning the relationship between structural features of industries and post-entry performance, at a level that tends to abstract from institutional arrangements (focusing instead on features such as presence of economies of scale, innovative behaviour, demand growth, or small firms' endowments of human or managerial capital). Contributions to this literature include Audretsch (1991, 1995), Audretsch and Mahmood (1994, 1995), Mata and Portugal (1994, 2002), Boeri and Bellman (1995); Mata *et al.* (1995), Storey and Wynarczyk (1996), Agarwal (1998), Harhoff *et al.* (1998), McCloughan and Stone (1998), Audretsch *et al.* (1999), Honjo (2000), Mahmood (2000), Tveterås and Eide (2000), KPMG *et al.* (2002), Bartelsman *et al.* (2003) and Persson (2004). One institutional feature that has received some attention is availability of financing (e.g. Åstebro and Bernhardt (2003)).

In the remainder of the paper, we describe and test a set of hypotheses about the relationships between perceived constraints on small firms and their survival prospects, controlling for other influences on survival.

## 3. Model Description

This section discusses the data and empirical models used in the paper. Modelling results are provided in the next section.

### 3.1 Data

To examine the effects of perceived business constraints on demographic outcomes, it was necessary to combine two unrelated[4] datasets. Evidence on perceived constraints was drawn from the 1999, 2001 and 2002 surveys conducted by the European Network for Social and Economic Research (ENSR) in the framework of the Observatory of European SMEs.

Here is the wording of the business constraint question posed by the ENSR surveys, together with the variable name we will use later for each answer (in italics):

> "Which of the following factors has been the major constraint on your business performance over the last two years?
>
> (READ OUT; ONLY ONE ANSWER ALLOWED)

| | |
|---|---|
| *labour* | Lack of skilled labour |
| *finance* | Access to finance |
| *newtech* | Implementing new technology |
| *organisation* | Implementing new forms of organisation |
| *quality* | Quality management |
| *regulation* | Administrative regulations (on environment, health and safety etc.) |
| *infrastruct* | Infrastructure (road, gas, electricity, communication, etc.) |
| *other* | (DO NOT READ) Other. [NB: for the analysis in this chapter, we have included in this category two other responses: 'Introduction of the EURO' in the 2001 and 2002 surveys and 'Purchasing power of customers' in the 2003 survey.] |
| *noburden* | (DO NOT READ) None at all" |

Some descriptive statistics from the 2003 survey are shown in the Annex.[5] These surveys were sponsored by the European Commission, and the data are held by EIM in the Netherlands. [6] Observations were drawn from SMEs (enterprises with less than 250 employees) in 19 European countries. Each ENSR survey was stratified, with a target of about 8,000 total observations. The actual sample sizes varied; e.g. the 2001 survey covered 7,662 enterprises.

Business demography data, including information on enterprise birth and survival rates, is published by Eurostat as part of its "Business demography statistics" series. These data are based primarily on analysis of business registers by national statistical agencies, and according to Eurostat they are designed to capture "real enterprise births (and deaths), that is, enterprise births (deaths) that amount to the creation (dissolution) of a combination of

[4] In terms of design and implementation.

[5] See KPMG *et al.* (2004a) for more details of the survey.

[6] We are grateful to the European Commission and EIM for providing access to these data.

production factors and where no other enterprises are involved. In other words, enterprises created or closed solely as a result of e.g. restructuring, merger or break-up are not included in this data."[7] Coverage varies by time and country, but the best samples of firm survival data relate to 2000-2002, and these are used in this paper.

Although the variables in these two datasets were in most cases defined differently, it proved possible to identify a set of countries, time periods, firm size bands and industry sectors to which both datasets could be aggregated. The composite dataset covers 10 European countries, three years, eight sectors, and three firm size bands. Each combination of these dimensions defines a cell, hereafter referred to as a "firm type" and data on new firm survival rates, main constraints reported by firms, and firm birth rates represent cell mean values.

The variables used in our analysis are listed in Table 1 below, including sources where relevant. All numbers in this paper are rounded to three significant digits.

When combining the two datasets, judgement was required on how to match their various dimensions. Enterprises' countries of origin matched straightforwardly, and all countries that were represented in both datasets were included in the combined dataset. However, there were no observations of three-year survival rates for the Netherlands, Portugal and UK, so these countries were included only in the one- and two-year survival analyses.

The Eurostat demographic data cover 2000-2002, but matching ENSR surveys were available for the latter two years only. As a substitute for ENSR results from 2000, we used the 1999 survey.

While both source datasets have more disaggregated size bands, some aggregation was required to arrive at a common set. It includes three bands, covering firms with 1-4, 5-9 and 10+ staff. We omitted cells for which only partial coverage of a given band in either survey was available. In the ENSR results, these bands relate to the size of the firm in the preceding year, while in the Eurostat survey they refer to the current year.

[7] Eurostat metadata on the dataset: http://europa.eu.int/estatref/info/sdds/en/sbs/bus_demo_base.htm. See Brandt (2004a) for a more detailed discussion of this dataset.

## Table 1: Variables included in the combined dataset

| | |
|---|---|
| *Survival rates for firms of each type (Eurostat)* | |
| surv1 | One-year survival rate: Firms surviving since birth in year t-1 divided by total firms born in year t-1 |
| surv2 | Two-year survival rate: Firms surviving since birth in year t-2 divided by total firms born in year t-2 |
| surv3 | Three-year survival rate: Firms surviving since birth in year t-3 divided by total firms born in year t-3 |
| *Main constraint: % of firms of each type reporting the following as main constraint on business performance (ENSR 1999, 2001 and 2002). See the annex for the full text of this survey question.* | |
| labour | Lack of skilled labour |
| finance | Access to finance |
| newtech | Implementing new technology |
| organisation | Implementing new forms of organisation |
| qualmgmt | Quality management |
| regulation | Administrative regulations (on environment, health and safety etc.) |
| infrastruct | Infrastructure (road, gas, electricity, communication, etc.) |
| other | Other (incl. 'introduction of the EURO' in 2001 and 2002 and 'purchasing power of customers' in 2003) |
| noburden | None at all (unprompted) |
| *Birth rate of firms of each type (Eurostat)* | |
| birthrt | Number of births of enterprises in year divided by number of enterprises active in year |
| *Country dummies (1/0)* | |
| dk | Denmark |
| es | Spain |
| fi | Finland |
| it | Italy |
| lu | Luxembourg |
| nl | Netherlands |
| no | Norway |
| pt | Portugal |
| se | Sweden |
| uk | United Kingdom |
| *Year dummies (1/0)* | |
| y2000 | Year 2000 Eurostat and 1999 ENSR |
| y2001 | Year 2001 Eurostat and ENSR |
| y2002 | Year 2002 Eurostat and ENSR |
| *Main activity dummies (1/0)* | |
| manufact | ENSR: manufacturing industry; Eurostat: NACE D (manufacturing) |
| construction | ENSR: construction; Eurostat: NACE F (construction) |
| wholesale | ENSR: wholesale trade; Eurostat: NACE G51 (wholesale trade and commission trade, except of motor and motorcycles) |
| retail | ENSR: retail trade; Eurostat: NACE G52 (retail trade, except of motor vehicles, motorcycles; repair of personal and household goods) |
| hotels_cater | ENSR: hotels, catering; Eurostat: NACE H (hotels and restaurants) |
| transp_comms | ENSR: transport, communications; Eurostat: NACE I (transport, storage and communication) |
| finserv | ENSR: banking, finance and insurance; Eurostat: NACE J (financial intermediation); (1/0) |
| businserv | ENSR: business services; Eurostat: NACE 'K_not_K7415' (real estate renting and business activities excluding holding cos) |
| *Size of firm dummies (1/0)* | |
| empl_1_4 | Firms with 1-4 employees |
| empl_5_9 | Firms with 5-9 employees |
| empl_10p | Firms with 10 or more employees |

Table 4 in the annex provides descriptive statistics on all variables. Separate statistics are shown for three sets of observations, titled Samples A-C. These include all observations for which one-, two- and three-year survival rates were available, respectively, together with all explanatory variables.

Out of 720 possible cells,[8] missing data limited Sample A to 493 observations, Sample B to 364 observations and Sample C to 234 observations. Most of the missing cells arose from gaps in the Eurostat data.

### 3.2 Modelling approach

The standard approach in empirical studies of new firm survival since the early 1990s has been to estimate survival probabilities or hazard rates using micro data on specified firm or market characteristics to explain survival patterns among individual enterprises (e.g. Audretsch and Mahmood (1994)). However, the focus of this paper is on identifying the effects of institutional features that tend to vary more across national borders than within single jurisdictions, and only aggregate survival data are available on a pan-European basis.

Given the data limitations, a simple modelling strategy is employed. We aim to measure the average treatment effects of specified impediments to firms' likelihood of survival, using survey evidence on perceived performance constraints as a proxy for actual impediments, controlling for other factors suggested by the literature where data permit and relying on industry, country and year fixed effects to capture the remaining influences on post-entry survival. Our approach is thus more closely related to aggregate studies, e.g. Audretsch (1991) and Brandt (2004b), than to micro-data studies.

### 3.3 Dependent variable

The focus of this analysis is on survival of new firms. Questions about perceived constraints might also convey some useful information about other aspects of market performance such as entry rates. However, the questions in the ENSR survey were asked only of firms *in the market*, not potential entrants. We suspect such data are not well suited to explaining entry barriers; firms that did not enter are not represented in the surveys.

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[8] 720 cells = 10 countries X 3 years X 8 sectors X 3 firm size bands.

The survival variables for which reasonable numbers of observations are available from Eurostat are average one, two and three year survival rates for each firm type.

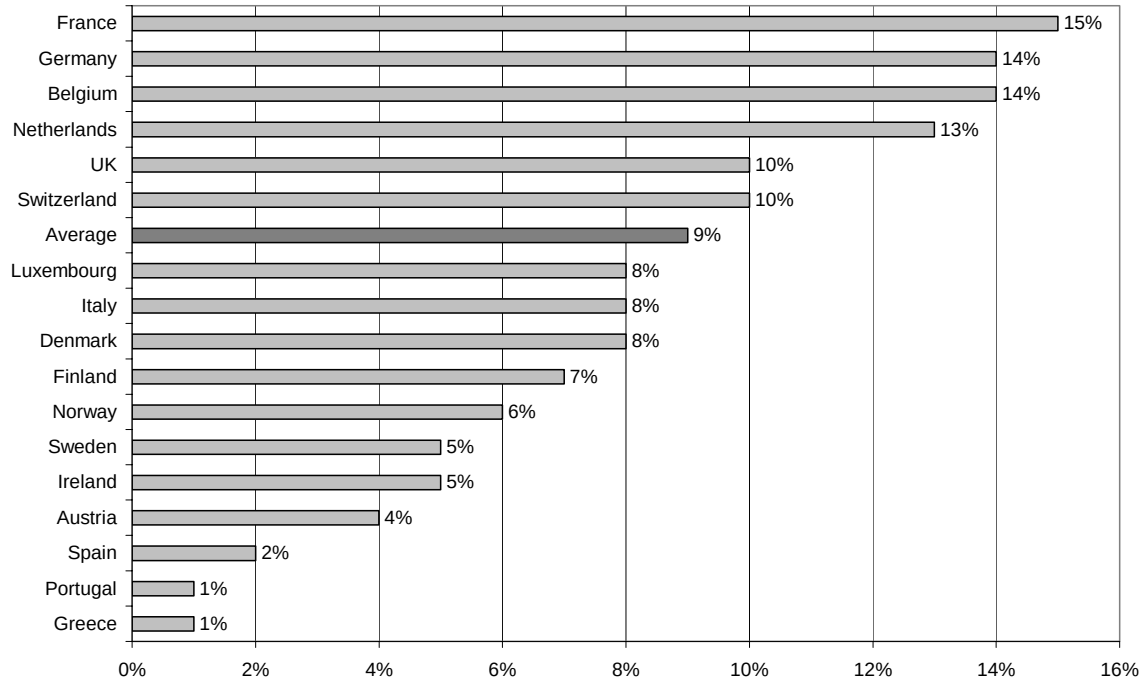
### 3.4 Explanatory variables

The main variables of interest are those capturing perceived constraints on businesses' performance. In particular, we expect to find that constraints associated with regulation and access to finance, which tend to elicit a policy response, are negatively associated with survival rates. Questions are included in the ENSR surveys on these and several other perceived constraints; the precise wording of these questions is included in the annex.

The ENSR questions address relatively broad classes of constraints, and respondents were asked to identify the single major constraint faced, rather than scoring the relative importance of constraints in parallel with one another. Nevertheless, there is considerable variation in the average propensity to cite a given major constraint, in particular across countries, but also (to a lesser extent) across sectors.

Figure 1 below illustrates this variation for the "administrative regulation" constraint; in 2003, 15% of enterprises in France reported that administrative regulation was the major constraint on their business performance over the previous two years, whereas only 1% of enterprises in Portugal and Greece did so.

**Figure 1: Proportions of SMEs in selected countries reporting administrative regulations as the major constraint on their business performance in 2003**




*Source: ENSR 2003 survey reported in KPMG et al. (2004b). Sample weighted to better reflect population distribution of enterprises. Sample of 7,459 SMEs; Liechtenstein and Iceland were in original sample but were omitted for brevity.*

The empirical literature on small firm survival cited in Section 1 above suggests a range of structural and institutional characteristics that might produce sector and country-level effects on survival rates in Europe. These include returns to scale, advertising intensity, rapidity of innovation, availability of financing and sectoral growth rates. Macroeconomic effects on survival (such as changes in real exchange rates or unemployment) are unlikely to be identifiable in the short time period over which data are available. Firm-level factors such as educational qualifications of directors are likely to be averaged away in the sample, but may have some influence on the fixed effects to the extent that there are major differences in the average incidence of such characteristics across the countries and sectors in the sample. There are also likely to be country-level policy effects that go beyond those captured by the survey evidence on perceived constraints.

Two effects suggested by theory can be incorporated directly using available data. These are the impact of entry on the survival prospects of earlier entrants and the effect of firm size on new entrant survival.

Several studies have reported a negative association between the rate of entry into a market in the current period and the survival prospects of firms that entered in earlier periods.

This is related to another common finding that entry and exit rates tend to be highly correlated. Siegfried and Evans (1994), in a survey of past empirical work on entry and exit, note that the causality behind these results may work both ways. An increase in entry may depress survival rates as "existing firms are displaced by aggressive, more efficient new entrants."[9] However, there may also be a "vacuum effect" as business failures leave former customers without a source of supply, creating opportunities for new entry.[10] Indeed, there is a further possibility: the characteristics of firms that succeed in entering a market despite high entry barriers might be different from those that enter markets with low barriers. For example, surmounting high entry barriers might indicate that firms have higher productivity than other candidate entrants. If this is so, low firm birth rates might be an indicator of high average entrant quality, leading to good survival prospects.

Available data will not permit us to determine which of these effects is most important, but we include the small business birth rate in each period as an explanatory variable to capture the net effect on survival of displacement, vacuum and firm selection. If more data were available (particularly in the time dimension), it would be interesting to explore the vacuum effect further, e.g. by including lagged exit rates as an instrument for entry rates.

Another common empirical finding is that survival rates are positively associated with start-up size.[11] As per Audretsch (1995), to the extent that a sector is subject to increasing returns to scale, firms that enter at a larger scale should possess a cost advantage over smaller competitors. If firms learn about their potential profitability only after entry, this cost advantage could imply that larger entrants are on average less likely to fail. Size effects can be incorporated to a limited extent in the model by including dummy variables for each size band in the dataset (1-4, 5-9 and 10+ employees).

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[9] Siegfried and Evans (1994), p.144.

[10] *Ibid*, p.147.

[11] However, this is not an unchallenged result: Audretsch *et al.* (1999), using a probit model on Italian longitudinal data, found no evidence of a size effect on survival rates. Tveterås and Eide (2000) found evidence that size effects are less important for new small firms (such as those being modelled here) than for new plants of existing firms. McCloughan and Stone (1998) found that firm size at birth was not an important factor in survival of foreign-owned plants in Northern Ireland, although average size over a firm's lifetime was positively associated with survival.

### 3.5 Regression models

The model posits that the probability of survival over a given term (e.g. one year) for a given firm in year *t*, country *c*, size band *s* and activity *a* is a function of its size (proxied by number of employees), the average birth rate ($\bar{b}$) of firms of its type during year *t*, the presence or absence of institutional constraints included in vector (**I**) and a range of sectoral, institutional, macroeconomic and firm level characteristics. These latter characteristics are proxied by sector, country and time dummies. The one-year probability of survival for firm *i* ($s1^i$) can be expressed as

**(1)** $$s1^i = f\left(\bar{b}, \mathbf{I}, c, s, a, t\right)$$

Since only aggregate data are available, the model is transformed to one describing the one-year survival rate ($S1$) for all firms of a given type $\{c, s, a, t\}$:

**(2)** $$S1_{csat} = \frac{\sum_i s1^i_{csat}}{N_{csat}} = g\left(\bar{b}, \bar{\mathbf{I}}, c, s, a, t\right)$$

where $N$ is the total number of firms of a given type and the institutional constraints are measured by the average incidence of perceived constraints for the firm type. Two-year ($S2$) and three-year ($S3$) survival rates for each firm type are constructed in the same way.

Using sets of dummy variables for *c*, *s*, *a* and *t* and allowing for measurement error, a regression equation can be constructed for survival rates over any term. Given available data, 1, 2 and 3 year survival rates are of interest. These equations (omitting multiplicative coefficients) are shown below:

**(3)** $$S1_{csat} = \alpha + BIRTHRT_{csat} + \mathbf{CONSTRAINTS}_{csat} + \mathbf{COUNTRY}_c + \mathbf{SIZE}_s + \mathbf{ACTIVITY}_a + \mathbf{TIME}_t + \varepsilon_{csat}$$

**(4)** $$S2_{csat} = \alpha + BIRTHRT_{csat} + \mathbf{CONSTRAINTS}_{csat} + \mathbf{COUNTRY}_c + \mathbf{SIZE}_s + \mathbf{ACTIVITY}_a + \mathbf{TIME}_t + \varepsilon_{csat}$$

and

**(5)** $$S3_{csat} = \alpha + BIRTHRT_{csat} + \mathbf{CONSTRAINTS}_{csat} + \mathbf{COUNTRY}_c + \mathbf{SIZE}_s + \mathbf{ACTIVITY}_a + \mathbf{TIME}_t + \varepsilon_{csat}$$

where $BIRTHRT_{csat}$ is equal to the cell mean new firm entry rate (firm births/total firms) for each firm type; and we include a classical disturbance term $\varepsilon_{csat} \sim N(0, \sigma^2)$ $\forall$ $c = 1,\ldots,C$; $s = 1,\ldots,S$; $a = 1,\ldots,A$; and $t = 1,\ldots,T$. **CONSTRAINTS** is a vector containing the shares of firms within each type reporting a given constraint as the major one affecting business performance and **COUNTRY**, **SIZE**, and **ACTIVITY** are vectors of 1/0 dummy variables

containing all but one category of each type in the data. When these models are estimated, the omitted categories in all cases are Constraint = "No major constraint", Country = Spain, Size = 1-4 staff and Year = 2002.

### 3.6 Expectations about coefficient values

Our main hypothesis is that coefficients on each of the constraint variables should be negative, since the omitted constraint category contains firms that report no major constraint. In particular, the subset of constraints that seem likely to materially increase firms' costs or limit their capacity for growth, including administrative regulations, access to finance and availability of skilled labour, should have a significant negative effect on survival rates.

We also expect that the coefficients on *BIRTHRT* will be negative. There may be added competitive pressure on recent entrants in markets where there are many subsequent entrants, and firms that successfully enter markets with high entry barriers (which might well be correlated with the constraints we are measuring) might be "fitter" than those that enter markets with low entry barriers.

Recall that survival rates are likely to increase with size of firm. The two coefficients relating to size bands (empl_5_9 and empl_10p) should be positive, since the baseline contains the smallest firms. Moreover, the coefficient relating to the largest firms (with 10 or more employees) should be larger than the one for firms with 5-9 employees.

There is no theoretical basis for expecting a particular pattern of country or activity coefficients, except to say that there are likely to be significant differences among them reflecting omitted factors that have an impact on survival rates. Similarly, the time dummies will only be significant if there is a trend in survival rates of European micro firms generally.

Finally, we expect to see a decline in the average survival rate as firms' ages rise (i.e. from the one-year to the two- and three-year models). This should be reflected in the intercept terms, which should be positive, but less than 1.

### 3.7 Estimation strategy

The dependent variable in each of the regressions is fractional (i.e. survival rates fall in the interval [0,1]). OLS suffers from well-known shortcomings when applied to such data. Since some observations take a value of 1, the option of applying a logistic transformation to these variables is not available. However, the GLM quasi-likelihood estimator introduced in Papke and Wooldridge (1996) (hereafter referred to as "P-W") for use with fractional

response data does accommodate 0 and 1 cases, and we include this as a second estimator to ensure that the results are robust.[12]

## 4. Results

This section provides estimation results for the models set out in Section 3 above. The OLS and P-W results proved to be similar in both levels and significance of variables.

Separate regressions were carried out on the pooled data explaining one-, two- and three-year survival rates (i.e. Equations 3-5 above). Samples A, B and C respectively were used for these regressions, and the results are shown in Table 2 (using OLS) and Table 3 (using P-W) below. In the latter case, we show estimated marginal effects evaluated at the means of the independent variables in order to facilitate comparison with the OLS results. Regression results for this model are shown in Table 5 in the annex.

[12] Estimation was carried out in Stata 8, using the reg and glm commands, the latter with the following switches: family(binomial) link(logit) scale(x2).

**Table 2: OLS Regression Results for New Entrant Survival Rates**

| **Dep Var.** | ***SURV1*** | | ***SURV2*** | | ***SURV3*** | |
|---|---|---|---|---|---|---|
| | *One-year survival rate* | | *Two-year survival rate* | | *Three-year survival rate* | |
| **Variables** | **Coef.** | ***t-stat.*** | **Coef.** | ***t-stat.*** | **Coef.** | ***t-stat.*** |
| Constant | 0.924 | *84.46**** | 0.868 | *43.14**** | 0.851 | *25.94**** |
| labour | -0.00294 | *-0.27* | -0.0207 | *-0.91* | -0.105 | *-2.87**** |
| finance | 0.0149 | *1.03* | -0.00907 | *-0.35* | 0.00338 | *0.08* |
| newtech | 0.00796 | *0.37* | -0.0160 | *-0.42* | -0.0413 | *-0.55* |
| organisation | 0.0361 | *1.17* | -0.103 | *-1.8** | -0.123 | *-1.48* |
| qualmgmt | 0.0310 | *1.28* | -0.0129 | *-0.32* | -0.0237 | *-0.31* |
| regulation | -0.00773 | *-0.59* | 0.0178 | *0.79* | -0.0395 | *-0.94* |
| infrastruct | 0.0207 | *0.97* | -0.0934 | *-1.88** | -0.133 | *-1.83** |
| other | -0.0175 | *-1.52* | -0.00430 | *-0.21* | -0.133 | *-3.4**** |
| birthrt | -0.327 | *-3.73**** | -0.564 | *-3.44**** | -0.867 | *-2.97**** |
| dk | 0.0271 | *3.42**** | -0.0230 | *-1.52* | -0.0706 | *-2.87**** |
| fi | 0.0426 | *5.06**** | 0.0382 | *2.48*** | 0.0416 | *1.73** |
| it | 0.0483 | *6.74**** | 0.0269 | *1.98*** | 0.0319 | *1.61* |
| lu | 0.0343 | *4.99**** | 0.0240 | *1.67** | -0.00795 | *-0.42* |
| nl | -0.0573 | *-7.53**** | -0.117 | *-6.47**** | | |
| no | -0.00172 | *-0.21* | -0.0316 | *-2.07*** | -0.0285 | *-1.09* |
| pt | 0.0664 | *8.67**** | 0.0831 | *4.81**** | | |
| se | 0.0646 | *8.87**** | 0.0542 | *3.27**** | 0.0580 | *2.69**** |
| uk | 0.0240 | *2.54*** | -0.0654 | *-3.84**** | | |
| y2000 | 0.00854 | *1.72** | 0.0177 | *1.72** | | |
| y2001 | 0.00844 | *1.73** | 0.0145 | *1.41* | 0.0282 | *2.27*** |
| construction | -0.00407 | *-0.59* | -0.0275 | *-2.12*** | -0.0563 | *-2.55*** |
| wholesale | -0.00459 | *-0.68* | -0.0209 | *-1.76** | -0.0302 | *-1.38* |
| retail | -0.00603 | *-0.9* | -0.00654 | *-0.56* | -0.0502 | *-2.36*** |
| hotels_cater | -0.0105 | *-1.49* | -0.0226 | *-1.61* | -0.0346 | *-1.55* |
| transp_comms | -0.00989 | *-1.49* | -0.0135 | *-1.16* | -0.0436 | *-2.02*** |
| finserv | 0.00287 | *0.37* | 0.00890 | *0.63* | 0.0214 | *0.86* |
| businserv | -0.00198 | *-0.3* | -0.00275 | *-0.23* | -0.0132 | *-0.62* |
| empl_5_9 | 0.0134 | *2.66**** | 0.0430 | *4.71**** | 0.0574 | *3.67**** |
| empl_10p | 0.00666 | *1.1* | 0.0393 | *3.45**** | 0.0653 | *3.26**** |
| Observations | 493 | | 364 | | 234 | |
| Adjusted $R^2$ | 0.498 | | 0.497 | | 0.339 | |
| F-test (29,463) | 17.8 [0.000] | | | | | |
| F-test (29,334) | | | 13.4 [0.000] | | | |
| F-test (25,208) | | | | | 5.78 [0.000] | |
| Heterosced-asticity | $\chi^2(1) = 2.87$ [0.0900] | | $\chi^2(1) = 0.25$ [0.617] | | $\chi^2(1) = 0.02$ [0.889] | |
| RESET | F(3,460) = 5.29[0.0014] | | F(3,331) = 1.76 [0.155] | | F(3,205) = 0.94 [0.424] | |
| linktest hatsq | t = -1.22 [0.222] | | t = -0.47 [0.637] | | t = -0.02 [0.988] | |

*Note: *, ** and *** denote significant at the 10%, 5% and 1% level respectively. Numbers in brackets are p-values. Heteroscedasticity test is Breusch-Pagan/Cook-Weisberg and specification tests are Ramsay RESET test and STATA's linktest. Data sources: see Table 1 above.*

**Table 3: Papke-Wooldridge Estimator Marginal Effects Results for New Entrant Survival Rates, Evaluated at Sample Means**

| **Dep Var.** | ***SURV1*** | | ***SURV2*** | | ***SURV3*** | |
|---|---|---|---|---|---|---|
| | *One-year survival rate* | | *Two-year survival rate* | | *Three-year survival rate* | |
| **Variables** | **Marg. Eff.** | ***Z-stat.*** | **Marg. Eff.** | ***Z-stat.*** | **Marg. Eff.** | ***Z-stat.*** |
| Constant | 0.957 | *10.52*** | 0.881 | *9.96*** | 0.802 | *8.04*** |
| labour | -0.00451 | *-0.46* | -0.0197 | *-0.88* | -0.113 | *-2.92*** |
| finance | 0.0145 | *1.06* | -0.00487 | *-0.18* | 0.00329 | *0.07* |
| newtech | 0.00577 | *0.29* | -0.0131 | *-0.36* | -0.0532 | *-0.68* |
| organisation | 0.0418 | *1.2* | -0.111 | *-1.94** | -0.129 | *-1.47* |
| qualmgmt | 0.0277 | *1.14* | -0.00454 | *-0.12* | -0.0233 | *-0.32* |
| regulation | -0.00514 | *-0.45* | 0.0200 | *0.88* | -0.0421 | *-0.96* |
| infrastruct | 0.0139 | *0.67* | -0.0912 | *-1.95** | -0.141 | *-1.89** |
| other | -0.0150 | *-1.27* | 0.00512 | *0.23* | -0.144 | *-3.42**** |
| birthrt | -0.195 | *-2.74**** | -0.445 | *-2.85**** | -0.706 | *-2.5*** |
| dk | 0.0153 | *2.55*** | -0.0223 | *-1.44* | -0.0749 | *-2.76**** |
| fi | 0.0269 | *4.48**** | 0.0391 | *2.79**** | 0.0469 | *2*** |
| it | 0.0313 | *6**** | 0.0251 | *1.97*** | 0.0331 | *1.69** |
| lu | 0.0201 | *4.11**** | 0.0214 | *1.6* | -0.00796 | *-0.42* |
| nl | -0.0328 | *-4.81**** | -0.107 | *-5.14**** | | |
| no | -0.00164 | *-0.25* | -0.0278 | *-1.79** | -0.0293 | *-1.07* |
| pt | 0.0377 | *7.01**** | 0.0785 | *5.03**** | | |
| se | 0.0436 | *7.9**** | 0.0513 | *3.41**** | 0.0560 | *2.7**** |
| uk | 0.0121 | *1.72** | -0.0593 | *-3.27**** | | |
| y2000 | 0.00872 | *1.77** | 0.0160 | *1.51* | | |
| y2001 | 0.00816 | *1.76** | 0.0140 | *1.33* | 0.0300 | *2.29*** |
| construction | -0.00521 | *-0.77* | -0.0290 | *-2.08*** | -0.0642 | *-2.58**** |
| wholesale | -0.00526 | *-0.77* | -0.0221 | *-1.74** | -0.0360 | *-1.47* |
| retail | -0.00591 | *-0.87* | -0.00785 | *-0.64* | -0.0571 | *-2.37*** |
| hotels_cater | -0.0105 | *-1.47* | -0.0246 | *-1.6* | -0.0384 | *-1.54* |
| transp_comms | -0.0103 | *-1.51* | -0.0154 | *-1.24* | -0.0513 | *-2.1*** |
| finserv | 0.00197 | *0.26* | 0.00861 | *0.59* | 0.0209 | *0.79* |
| businserv | -0.00384 | *-0.58* | -0.00446 | *-0.36* | -0.0168 | *-0.72* |
| empl_5_9 | 0.0121 | *2.66**** | 0.0418 | *4.69**** | 0.0601 | *3.88**** |
| empl_10p | 0.00709 | *1.36* | 0.0366 | *3.48**** | 0.0644 | *3.41**** |
| Observations | 493 | | 364 | | 234 | |
| Log likelihood | -73.6 | | -97.2 | | -80.9 | |
| AIC | 0.420 | | 0.699 | | 0.914 | |
| Specification: linktest hatsq | Z = 0.72 [0.474] | | Z = 1.44 [0.150] | | Z = 1.23 [0.218] | |

*Note: *, ** and *** denote significant at the 10%, 5% and 1% level respectively. Standard errors scaled using square root of Pearson $\chi^2$-based dispersion. Numbers in brackets are p-values. Specification test is STATA's linktest. Data sources: see Table 1 above.*

### 4.1 Baseline case and survival rate trend

As noted earlier, the omitted categories (and thus baseline case) for all three regressions describes the set of enterprises in 2002 that were based in Spain, had 1-4 staff, reported manufacturing as principal activity, and said that they faced no major constraint on business performance. The likelihood of a firm from this baseline group surviving the relevant number of years is represented by the intercept term in each model. These coefficients are highly significant and reflect the usual declining cumulative probability of post-entry survival: 95.7% for at least one year, 88.1% for at least two years and 80.2% for at least three years (using the P-W estimates). Of course, given that the dependent variable has an upper bound of 1, these intercept values imply that there is little variation in survival rates for our other variables to explain, particularly in the one-year survival model.

### 4.2 Constraint coefficients

As expected (since the baseline case reported no major constraint on performance), the constraint coefficients these coefficients tend to be negative. Indeed, all the constraint coefficients that approach statistical significance in any of the models are negative. A second encouraging result is that most of the constraint coefficients in the two-year model are smaller in absolute terms than their three-year counterparts. If perceived constraints represent real burdens on firms, it seems likely that they should have a cumulative effect over time.

However, few of the constraint effects are statistically significant. None is significant in the one-year model, and only "Lack of skilled labour" and "Other" are highly significant (both in the three-year model). The coefficients on "Infrastructure (road, gas, electricity, communication, etc.)" and "Implementing new forms of organisation" show similar patterns of marginal significance and rising absolute values in the two- and three-year models.

Surprisingly, classes of constraint that are given a great deal of attention in both policy circles and the academic literature do not approach significance in any of the models: "Administrative regulations (on environment, health and safety etc.)" and "Access to finance."

The magnitude of these effects can be illustrated by simulating the impact of a hypothetical change in one of the perceived constraints on firms in a particular country. For example, the estimates imply that if the share of firms in Luxembourg reporting "Lack of skilled labour" as their major constraint fell from its sample average level of 29.3% (highest in the sample) to the 18.5% level prevailing in Italy (lowest), and all of the affected firms

moved to the "no major constraint" category, the three-year survival rate in Luxembourg should rise by about 1.4 percentage points, from 76.6% to 78.0%.[13]

Inspection of correlation matrices for the constraint variables shows that we need not be concerned about multicollinearity among the constraints variables; their pairwise correlations are low.

### 4.3 Other results

The birth rate coefficients are highly significant and have the expected (negative) sign in all three models. The effect also seems to strengthen the longer a firm is in the market. This supports the prior expectation that current high rates of entry would be associated with lower post-entry survival prospects for earlier entrants.

Many of the country dummies are also significant, implying that national effects beyond those affecting entry rates and perceived constraints are important to survival rates. Sweden, Finland and Portugal are noteworthy in having significant positive coefficients in all models, while the Netherlands coefficient is negative in both years for which we have data. In most cases, the signs associated with individual country effects are broadly consistent across the three models; however, the Denmark, Luxembourg and UK dummies change sign between models.

Sector dummies seem to have less explanatory power than national ones. The construction sector shows significantly lower two- and three-year survival prospects than the baseline (manufacturing), and there is some evidence of specific negative effects for wholesaling, retailing and the transport and communications sector.

As expected, there is evidence that survival rates increase with firm size. Enterprises with more than four employees seem to have about a 6-7% greater chance of surviving three years than smaller firms. This effect also seems to strengthen as duration from birth increases. There is no significant difference in the coefficients for firms with 5-9 employees

[13] This is based on the P-W results. For this illustration, I also assume that firm birth rates would not be affected by the improved availability of skilled labour. If they were (positively) affected, this would reduce the predicted improvement in survival rates.

and those with 10 or more, suggesting either that the size bands are too narrow to detect a difference or the size penalty is restricted to the smallest firms only.[14]

All the year dummies have positive coefficients, implying that 2000 and 2001 had lower survival rates than 2002, but levels of significance vary. It would probably require more time observations to detect substantial changes in survival rates from time-related factors such as changes in macroeconomic conditions.

The two- and three-year survival models pass specification tests even when estimated via OLS, but the one-year OLS model appears to be less robust.

## 5. Conclusions and Discussion

The average incidence of different perceived major constraints on small businesses' performance, as recorded by surveys, varies depending upon the country and sector surveyed. In this chapter, we have tested the hypothesis that types of small firms (defined by size, country and sector) reporting a higher incidence of major constraints should have worse survival prospects.

Our econometric models provide some evidence in support of this hypothesis, but it is not conclusive. Groups of firms reporting constraints have lower survival rates after controlling for other factors, and this effect seems to become more pronounced (both in magnitude and statistical significance) as the time since entry rises. However, the estimated effects are modest in absolute terms and appear to be restricted to only a few constraints included in the ENSR surveys; in particular, "Lack of skilled labour" and "Other". Surprisingly, we find no significant effects of administrative regulation and access to finance constraints on survival rates, despite strong priors on these variables.

While these results suggest that survey evidence on business perceptions captures some useful information on particular threats to post-entry performance, most perceived major constraints show no statistically significant relationship to survival rates, even over three years. Until more convincing evidence is available linking this type of survey evidence to outcomes, we should be cautious about using it in the assessment or design of public policy.

There seem to be possible explanations for why most perceived constraints seem to lack predictive power as to small firms' survival prospects.

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[14] Equality of the empl_5_9 and empl_10p coefficients was not rejected. Using the P-W estimates, the results were $\chi^2(1) = 0.27$ [P=0.601] for the two-year survival model and $\chi^2(1) = 0.20$ [P=0.656] for the three-year model.

First, firms' views on the main constraints they face may simply not be a good reflection of the institutional and other barriers to their survival. It would be surprising if firms under considerable stress could not perceive this, but it might be more plausible that such firms would find it hard to specify the precise sources and relative significance of their difficulties.

Second, perhaps the results are an accurate reflection of both the perceptions and the effects of major constraints. This would imply that the sorts of burdens on small businesses that tend to get the most attention in academic research and policy initiatives, excessive red tape and limited access to finance, may not be significant burdens at all. This could be either because they never were significant (which seems unlikely, given the weight of existing theoretical and empirical evidence), or because the jurisdictions included in this sample have succeeded in mitigating their potential effects through policy. For example, excessive regulatory burdens on small firms may have been successfully offset through the use of thresholds or other policy measures. This explanation also seems unlikely, given the wide country-level variations in perceived regulatory constraints across the sample.

Finally, there may be a problem with the data. This seems the most likely explanation for our results. Two possible sources of error are worth considering.

One possibility is that the survey questions that were used may have failed to reveal the actual relationship between some perceived constraints and market conditions. Perhaps respondents are expressing a generalised level of competitive stress, rather than focusing on identifying the most onerous burden faced. This could explain why the regressions show the "right" signs but limited statistical significance for individual coefficients. It is also possible that the broad nature of the specified constraints or the backward-looking focus of the questions may have led to imprecise responses. A more serious potential problem (in the sense that it would be difficult to correct) is that of selection bias. For example, firms under serious pressure from excessive administrative regulation might be less likely to respond to surveys, which could tend to bias the regression coefficients on this constraint downwards.

Alternatively, the problem may lie with the set of firm types that remained after matching survey evidence with demographic data. We have already noted the limited variation in the dependent variable due to the availability of survival data up to only three years. Data availability may also have limited the variation in our perceived constraints variables. Although there was substantial variation across countries and sectors in these data, some of the most interesting countries could not be included in the analysis due to a lack of matching demographic data. For example, the countries shown in Figure 1 above with both

the highest (France, Germany, Belgium) and lowest (Greece) tendency to report administrative regulation as the major constraint were omitted for this reason.

We conclude with some possible avenues for further research to help clarify if some aspect of the survey questions can account for these results or if one of the more fundamental explanations is correct.

It might be helpful to ask more specific questions about perceived constraints (e.g. about different sorts of regulations rather than administrative regulation in general). This could serve to reduce the "noise" associated with different firms interpreting the named constraints in different ways.

Another option is to ask survey questions about firms' current constraints, rather than backward-looking questions. One problem with relating backward-looking survey evidence to survival data is that it may impart a survivorship bias. For example, if all firms facing a particular major constraint were to exit the market, later backward-looking surveys would find few firms reporting this as a constraint. The apparent relationship of that constraint to survival rates would be biased downwards.

Asking questions that allow firms to indicate the perceived importance or intensity of particular burdens might be helpful.[15] The single major constraint formulation rules out interactions between different types of constraints and implicitly assumes that quite different types of burdens can be compared meaningfully by respondents. On the other hand, a question about the single major constraint is probably easier to answer than a series of more complex questions. An intermediate option might be to ask firms about a small number (e.g. 3) of most important constraints they face.

Most obviously, a broader set of outcomes data with a structure matched to that of the perceptions data would be useful (e.g. a longer time series, more disaggregated industrial classifications, and additional countries).

[15] For example, questions of this kind are asked in the IMD/World Economic Forum World Competitiveness Report and World Bank Investment Climate Surveys.

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## Annex: Further Information on Dataset

**Table 4: Summary statistics**

| | Sample A (used in surv1 regression) | | | | Sample B (used in surv2 regression) | | Sample C (used in surv3 regression) | |
|---|---|---|---|---|---|---|---|---|
| **Variable** | **Mean** | **Std. Dev.** | **Min.** | **Max.** | **Mean** | **Std. Dev.** | **Mean** | **Std. Dev.** |
| surv1 | 0.946 | 0.0525 | 0.667 | 1 | | | | |
| surv2 | | | | | 0.870 | 0.0813 | | |
| surv3 | | | | | | | 0.795 | 0.0994 |
| labour | 0.202 | 0.201 | 0 | 1 | 0.178 | 0.182 | 0.238 | 0.210 |
| finance | 0.116 | 0.135 | 0 | 1 | 0.126 | 0.138 | 0.123 | 0.145 |
| newtech | 0.0380 | 0.0851 | 0 | 1 | 0.0412 | 0.0853 | 0.0364 | 0.0791 |
| organisation | 0.0210 | 0.0576 | 0 | 0.5 | 0.0223 | 0.0570 | 0.0243 | 0.0710 |
| qualmgmt | 0.0194 | 0.0734 | 0 | 1 | 0.0196 | 0.0807 | 0.0179 | 0.0767 |
| regulation | 0.0999 | 0.155 | 0 | 1 | 0.108 | 0.166 | 0.0940 | 0.164 |
| infrastruct | 0.0383 | 0.0846 | 0 | 1 | 0.0357 | 0.0651 | 0.0371 | 0.0808 |
| other | 0.200 | 0.187 | 0 | 1 | 0.213 | 0.195 | 0.156 | 0.187 |
| noburden | 0.266 | 0.222 | 0 | 1 | 0.257 | 0.224 | 0.274 | 0.218 |
| birthrt | 0.0396 | 0.0334 | 0 | 0.250 | 0.0371 | 0.0332 | 0.0367 | 0.0338 |
| dk | 0.0913 | 0.288 | 0 | 1 | 0.124 | 0.330 | 0.0983 | 0.298 |
| es | 0.132 | 0.339 | 0 | 1 | 0.0879 | 0.284 | 0.184 | 0.388 |
| fi | 0.0892 | 0.285 | 0 | 1 | 0.118 | 0.323 | 0.132 | 0.340 |
| it | 0.138 | 0.345 | 0 | 1 | 0.184 | 0.388 | 0.192 | 0.395 |
| lu | 0.130 | 0.336 | 0 | 1 | 0.121 | 0.326 | 0.179 | 0.385 |
| nl | 0.0913 | 0.288 | 0 | 1 | 0.0604 | 0.239 | n/a | n/a |
| no | 0.0690 | 0.254 | 0 | 1 | 0.0989 | 0.299 | 0.0726 | 0.260 |
| pt | 0.0872 | 0.282 | 0 | 1 | 0.0604 | 0.239 | n/a | n/a |
| se | 0.124 | 0.330 | 0 | 1 | 0.0824 | 0.275 | 0.141 | 0.349 |
| uk | 0.0487 | 0.215 | 0 | 1 | 0.0632 | 0.244 | n/a | n/a |
| y2000 | 0.420 | 0.494 | 0 | 1 | 0.467 | 0.500 | n/a | n/a |
| y2001 | 0.323 | 0.468 | 0 | 1 | 0.349 | 0.477 | 0.577 | 0.495 |
| y2002 | 0.258 | 0.438 | 0 | 1 | 0.184 | 0.388 | 0.423 | 0.495 |
| empl_1_4 | 0.371 | 0.484 | 0 | 1 | 0.387 | 0.489 | 0.397 | 0.490 |
| empl_5_9 | 0.339 | 0.474 | 0 | 1 | 0.349 | 0.477 | 0.372 | 0.484 |
| empl_10p | 0.290 | 0.454 | 0 | 1 | 0.264 | 0.441 | 0.231 | 0.422 |
| manufact | 0.128 | 0.334 | 0 | 1 | 0.135 | 0.342 | 0.128 | 0.335 |
| construction | 0.132 | 0.339 | 0 | 1 | 0.110 | 0.313 | 0.137 | 0.344 |
| wholesale | 0.128 | 0.334 | 0 | 1 | 0.135 | 0.342 | 0.124 | 0.330 |
| retail | 0.128 | 0.334 | 0 | 1 | 0.140 | 0.348 | 0.128 | 0.335 |
| hotels_cater | 0.114 | 0.318 | 0 | 1 | 0.0852 | 0.280 | 0.120 | 0.325 |
| transp_comms | 0.134 | 0.341 | 0 | 1 | 0.143 | 0.350 | 0.124 | 0.330 |
| finserv | 0.0933 | 0.291 | 0 | 1 | 0.0962 | 0.295 | 0.0940 | 0.292 |
| businserv | 0.144 | 0.351 | 0 | 1 | 0.157 | 0.364 | 0.145 | 0.353 |

*Source: analysis of data identified in Table 1.*

**Table 5: Papke-Wooldridge Estimator regression results for new entrant survival rate**

| **Dep Var.** | ***SURV1*** | | ***SURV2*** | | ***SURV3*** | |
|---|---|---|---|---|---|---|
| | *One-year survival rate* | | *Two-year survival rate* | | *Three-year survival rate* | |
| **Variables** | **Coef.** | ***Z-stat.*** | **Coef.** | ***Z-stat.*** | **Coef.** | ***Z-stat.*** |
| Constant | 2.46 | *10.52*** | 1.86 | *9.96*** | 1.72 | *8.04*** |
| labour | -0.110 | *-0.46* | -0.187 | *-0.88* | -0.709 | *-2.92*** |
| finance | 0.355 | *1.06* | -0.0464 | *-0.18* | 0.0207 | *0.07* |
| newtech | 0.141 | *0.29* | -0.125 | *-0.36* | -0.3342 | *-0.68* |
| organisation | 1.02 | *1.2* | -1.05 | *-1.94** | -0.814 | *-1.47* |
| qualmgmt | 0.676 | *1.14* | -0.0432 | *-0.12* | -0.147 | *-0.32* |
| regulation | -0.126 | *-0.45* | 0.191 | *0.88* | -0.265 | *-0.96* |
| infrastruct | 0.339 | *0.67* | -0.868 | *-1.95** | -0.890 | *-1.89** |
| other | -0.367 | *-1.27* | 0.0487 | *0.23* | -0.903 | *-3.42**** |
| birthrt | -4.77 | *-2.74**** | -4.24 | *-2.85**** | -4.44 | *-2.5*** |
| dk | 0.438 | *2.55*** | -0.200 | *-1.44* | -0.427 | *-2.76**** |
| fi | 0.902 | *4.48**** | 0.420 | *2.79**** | 0.317 | *2*** |
| it | 1.05 | *6**** | 0.254 | *1.97*** | 0.217 | *1.69** |
| lu | 0.594 | *4.11**** | 0.217 | *1.6* | -0.0496 | *-0.42* |
| nl | -0.629 | *-4.81**** | -0.788 | *-5.14**** | | |
| no | -0.0394 | *-0.25* | -0.245 | *-1.79** | -0.176 | *-1.07* |
| pt | 1.54 | *7.01**** | 1.06 | *5.03**** | | |
| se | 1.79 | *7.9**** | 0.589 | *3.41**** | 0.384 | *2.7**** |
| uk | 0.338 | *1.72** | -0.482 | *-3.27**** | | |
| y2000 | 0.216 | *1.77** | 0.153 | *1.51* | | |
| y2001 | 0.206 | *1.76** | 0.135 | *1.33* | 0.187 | *2.29*** |
| construction | -0.122 | *-0.77* | -0.256 | *-2.08*** | -0.373 | *-2.58**** |
| wholesale | -0.123 | *-0.77* | -0.199 | *-1.74** | -0.216 | *-1.47* |
| retail | -0.1383 | *-0.87* | -0.0732 | *-0.64* | -0.334 | *-2.37*** |
| hotels_cater | -0.236 | *-1.47* | -0.219 | *-1.6* | -0.229 | *-1.54* |
| transp_comms | -0.232 | *-1.51* | -0.141 | *-1.24* | -0.302 | *-2.1*** |
| finserv | 0.0491 | *0.26* | 0.0841 | *0.59* | 0.136 | *0.79* |
| businserv | -0.0910 | *-0.58* | -0.0419 | *-0.36* | -0.103 | *-0.72* |
| empl_5_9 | 0.308 | *2.66**** | 0.417 | *4.69**** | 0.390 | *3.88**** |
| empl_10p | 0.179 | *1.36* | 0.372 | *3.48**** | 0.435 | *3.41**** |

*Note: *, ** and *** denote significant at the 10%, 5% and 1% level respectively. Standard errors scaled using square root of Pearson $\chi^2$-based dispersion. Numbers in brackets are p-values. Data sources: see Table 1 above.*

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