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versus Static Markets**

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The Survival of New Ventures in Dynamic *versus* Static Markets

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Abstract

The paper uses a unique dataset comprise almost the population of 179,306 new ventures who enter the UK market in 1998. The central hypothesis is that the survival function of new ventures has a different specification in dynamic compared to static markets. Estimation of a hazard function supports this hypothesis. In dynamic markets the survival of new ventures is positively related to industry concentration and negatively related to industry growth. The opposite is found to be true for static markets. The results shed new insights into the competitive dynamics of new ventures, optimal strategies for firm survival and also highlight some important effects for competition policy.

JEL classification: L110, M130, 6110

Keywords: new firms, start-ups, survival, turbulence, dynamic markets

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1. Introduction.

The aim of this paper is to investigate the determinants of the survival of new ventures in static and dynamic markets. We define dynamic markets as markets where the rate of churn of firms (firm entry *plus* exit) is high and where product and technological innovation are the main means through which firms compete (see Audretsch 1995a, 1995b and Geroski, 1995). By contrast static markets are characterised by a low churn rate and where price competition is more important. The main motivation for the paper is the view that since the competitive model can be so different between static and dynamic markets that in turn the specification of the survival function of new ventures is could also be different in each type of market. In the paper we argue that industry concentration and industry sales growth are likely to have opposite effects on the survival of new ventures in static compared to dynamic markets. Thus, we argue that that it may be inappropriate to estimate a survival function based on data which pools new ventures from static and dynamic markets.

In order to test this hypothesis we estimate hazard functions for new ventures using data from the UK Office of National Statistics (ONS) comprising of the population of VAT registered business from 1997-2002. We find that that the specification of the survival functions for new ventures in static and dynamic markets is indeed different. Furthermore, we find that industry concentration and industry growth do indeed have opposite effects on new venture survival in dynamic compared to static markets. Therefore, the existing empirical literature on the survival of new ventures hides an important difference in the environment in which new ventures find themselves when entering a dynamic compared to a static market. The results are important for competition policy and support the view of Audretsch, Baumol and Burke (2001) who argue that antitrust/competition policy, which historically has been largely motivated by economic analysis of static markets, is often inappropriate for dynamic markets. Our analysis highlights points consistent with this view but not

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identified by these authors. In contrast to static markets, we find that highly concentrated dynamic markets are not impediments to new venture survival (sustainable entry) and by contrast provide an easier environment for new ventures to survive. Thus, industry concentration is likely to be less of a long term problem of the kind that warrants antitrust intervention in dynamic industries as it actually promotes sustainable market entry. This is especially important as Audretsch (1995a and 1995) notes that it is firm survival rather than market entry that is the big challenge in terms of generating a future stock of viable entrants, as the variance in survival rates across industries is greater than entry rates. The results may also be important for economic growth in terms unearthing some heterogeneity in the determinants of new venture survival and as a consequence optimal industrial restructuring (Audretsch et al, 2002). Our analysis also indicates that new venture strategy is likely to be different between static and dynamic markets due to contrasting opportunities and threats for these ventures in these different competitive environments.

Geroski's (1995) discussion of some of the stylized facts about entrants indicates that entry rates vary across time rather than industries so that in the longer term no industry is more dynamic than another. Likewise, high rates of entry are normally associated with high levels of innovation and increases in efficiency. Thus, if these facts continue to hold then our study is more of a timing than an industry issue i.e. stage of industry evolution. In other words, it is more of an investigation of entering an industry when it is dynamic rather than static, as opposed to entering a dynamic rather than a static industry. In a similar vein it is about entering when most other firms enter and when the casualty rates (business failures) are high. Our analysis indicates that although dynamic markets are more risky because of the high degree of uncertainty and risk, that nevertheless the greater the presence of monopolistic (x-inefficient) incumbent firms the lower that risk will be. In contrast static markets are less uncertain but monopolistic incumbents firms pose a significant threat to survival.

The paper is structured as follows. In the next section we review the literature and set out the propositions which support the view that the specification of a new venture survival function is likely to be sufficiently different between static and dynamic markets in order to warrant separate estimation in each type of market. This is followed in section 3 by a discussion of the data set. The empirical analysis along with a summary concludes the paper.

2. The theoretical framework and hypotheses.

We draw on the work on firm entry and survival by Kihlstrom and Laffont (1979) and Evans and Jovanovic (1989) Holtz-Eakin et al (1994), Audretsch (1995b), Mata et al (1995), Taylor (1999, 2001) and allow for multiple entrepreneurs in a new venture so that the economic profit (Y) from a new venture is defined as

$$Y = h - nW \quad (1)$$

where h are expected accounting profits, n the number of entrepreneurs in the venture and W the industry wage rate. Survival in any time period for a firm requires $Y \geq 0$. Therefore, we assume any firm enters and survives when this inequality holds. We accept the likelihood that new ventures are not symmetric in terms of access to key resources (such as technology, human capital and finance) and that entrants may also differ in terms of their degree of risk aversion (van Praag and Cramer 1999 and Hartog et al 2002) and optimism (de Meza and Southey 1996) regarding survival. Accepting these as possibilities implies that the entry process may have very persistent periods of high entry rates even when high failure rates are also observable. Put differently, a market may be persistently dynamic in terms of entry and exit as long as entrants think they are unique and believe they can 'beat the odds' of survival currently in evidence. This is most likely to

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occur at the early stages of new innovation diffusion when there is uncertainty regarding the characteristics of winning firms and when there is also uncertainty regarding the characteristics of actual and potential entrants. Thus, our theoretical disposition is sufficiently agnostic to accommodate the empirical observation (e.g. Audretsch 1995a, 1995b and Mata et al 1995) that explain high rates of entry and exit are normally associated with high levels of technological change in an industry and that these high rates of churn may persist for some time i.e. high entry is not necessarily a short lived process that continues until $Y=0$.

Our primary focus is on the impact of monopoly power on the viability of new entrants. Therefore, we assume that new venture survival requiring $Y \geq 0$ is a positive function of expected accounting profits (h) which are defined as

$$h = h(MES, S, C, G, W) \quad (2)$$

where MES denotes minimum efficient scale, S is firm start-up size, C is industry concentration and G is the industry sales growth). High minimum efficient scale indicates that entrants need to be large in order to avoid a competitive disadvantage against incumbent firms. If there are significant sunk costs for entrants then high MES present a disadvantage for new entrants regardless of their start-up size so there is also justification for including MES on its own in a survival function. Firm start-up size is often justified as a determinant of firm survival without recourse to MES when there is uncertainty regarding entrepreneurs' assessment of the prospects of survival. As such, a higher start-up size should translate into higher predicted success probability or else these investments would be unlikely to be undertaken.

Hopenhayn's (1992) model of the firm's decision to exit confirms this intuition that size at start-up enhances survival. He describes how larger firms which are exposed to a productivity shock following entry are better equipped to deal with the shock than their poorer capitalised counterparts. Hopenhayn's model ties in with the intuition embedded in Gibrat's law that greater size implies a greater capability to capitalise on new opportunities. According to Sutton 'the probability that the next opportunity is taken up by any particular active firm is proportional to the current size of the firm' (Sutton, 1997, p.43). Analogously, in the 'learning models' first advanced by Jovanovic (1982) and developed by Pakes and Ericson (1998), hazard rates decline with firm size because larger firms have a higher rational expectation of survival. Thus, we include firm size at start-up (S) alongside MES in order to ascertain the impact of this factor. A significant body of the empirical literature on the survival of new entrants in manufacturing industries has found a positive effect of firms' start-up size on survival¹. Thus, it will be interesting to see how these results hold up for our data which is mainly comprised of service industry firms and relates to a later time period.

Industry concentration is associated with incumbent monopoly power and to this end can pose a significant competitive threat for new entrants i.e. higher C reduces h . However, the sign on $h'(C)$ and hence on survival is in fact ambiguous. Mata et al (1995) note that $h'(C)$ may in fact be expected to be zero for the firms in our sample which are up to 3 years old.

"First, although numerous, new competitors are in general small. When they start, they typically compete with other small (and in most cases also new) firms rather than dispute the dominant firm's market. Second, as a rule, their life is quite brief and, in most cases, entrants exit before they can really become a threat to market leaders. [Mata et al 1995 p 460]"

¹ Evans (1987), Hall (1987) and Audretsch (1991, 1995b) have found a positive relationship between survival and firm start-up size for US manufacturing industries. Mata, Portugal and Guimaraes (1995) find similar evidence for Portuguese manufacturing.

However, other studies indicate that new entrants are frequently bringing new innovation to the market and thus pose a threat to incumbent firms (for example, see Geroski 1995 and Audretsch, 1995a and 1995b). Depending on the nature of the new innovation high concentration could be either a good or a bad thing for new entrants. The usual supposition is that even if entrants can use innovation to enter a market their prospects would be better if they did not face competition from incumbents with unique resources furnishing them with monopolistic power (see Audretsch 1991). In this sense, we would expect $h'(C) < 0$. However, if we focus on the work of Leibenstein (1966) then things can be quite different. If incumbents are vulnerable to the innovation of new entrants and assuming that some level of monopolistic x-inefficiency (Leibenstein, 1966) has crept into these firms then high concentration may pose a competitive cushion for entrants to enter a market with out threat. In fact entry to a less concentrated industry with more efficient incumbents may pose a much harder environment for entrants. Examples abound, the new ventures launched by Richard Branson and his Virgin group of new ventures actually targeted highly concentrated industries where incumbents were not used to competition and were slow to respond (DTI, 1996). Likewise, the new entrants who introduced the 'low cost travel' innovation to the European airline industry benefited from the fact that incumbents were monopolistic x-inefficient firms (such as British Airways and Aer Lingus) who had relied on landing slots to block entry and had over time become highly cost inefficient and moreover, were sufficiently inflexible to take a very long time to bring their costs down to competitive levels (Creaton, 2004). This provided crucial breathing space for once small new entrants such as Ryanair and EasyJet to survive (and grow to become large firms). Thus, we propose that in circumstances such as these that $h'(C) < 0$ is possible so that survival is promoted by industry concentration.

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Furthermore the key motivation for our paper is to argue that $h'(C) < 0$ is more likely to occur when markets are dynamic and correspondingly that $h'(C) > 0$ is much more likely to occur when markets are static. It is relevant that the distinction between static and dynamic markets largely seeks to distinguish between different dominant forms of competition (see Audretsch, Baumol and Burke 2001). In particular, to differentiate situations where models of price competition dominate (static markets) the competitive process from those where product and technological innovation play more prominent roles (dynamic markets). As Geroski (1995) observes it is these latter markets which are characterised by high level of firm entry and exit. Thus, in more static environments where new entrants cannot shield themselves from price competition through product and technological innovation (differentiation), the market power of incumbents associated with high industry concentration is likely to pose a major threat to new entrants; implying $h'(C) > 0$. By contrast, in more dynamic markets where higher levels of innovation provide a means for entrants to circumvent the competitive advantages of incumbents and where incumbents have become x-inefficient, high industry concentration may in fact boost the viability of entrants so that $h'(C) < 0$. Thus, this possibility demands that the indirect test of equation (1) through a survival function indicates that the impact of industry concentration on firm survival may have contrasting effects depending on whether the market is dynamic and static. Therefore, it highlights that a pooled estimation of survival comprising an independent variable measuring concentration across both static and dynamic markets may yield misleading results as doing so in effect pools two very different competitive regimes.

Proposition 1: The impact of industry concentration on the survival of new entrants is more likely to be negative when markets are static and positive when markets are dynamic.

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Therefore, in the analysis section of the paper we test to see if this proposition is upheld by estimating competing models comprising pooled data and data split into samples of dynamic and static markets. However, the motivation to split the data also emanates from consideration of the role of industry sales growth on the survival of new ventures. In general, higher industry sales growth is normally regarded as a positive force for new entrants as it allows them to secure market segments overlooked by incumbents. Put differently, high industry sales growth may make incumbents lax as they need to exert less effort in order to achieve their profit targets. However, the impact of growth on entrants profits hinge crucially on the competitive process. In a shakeout environment industry growth may be negatively associated with survival when economies of scale or network externalities are important. In these cases high growth precipitates the shakeout process as faster growing firms gain a competitive advantage over their rivals as their size increases and hence reduce survival rates – so that $h'(G) < 0$ for most firms. By contrast, in a less turbulent situation industry growth can provide a life line to otherwise uncompetitive entrants so that $h'(G) > 0$. Thus, we again find a motivation to split the data along the lines of market dynamism.

Proposition 2: The impact of industry sales growth on the survival of new entrants is more likely to be positive when markets are static and negative when markets are dynamic.

In sum, our hypothesis is that the competitive model can be quite different in static and dynamic industries and that the impact of industry growth and concentration can have opposite effects on the survival of new entrants. We test our propositions by dividing the data set into dynamic and static markets and testing a survival function. We achieve this objective by estimating a firm's hazard function, $h_f(t)$ which is defined as

$$h_f(t) = h(t; x_f) = h_0(t) \exp(x_f' \beta) \quad (3)$$

where $h_0(t)$ represents the baseline hazard function which describes the probability of failure conditional on the firm having survived until time t following market entry, x_f comprises a vector of explanatory variables for the firm justified from equations 1 and 2 above, while f and β represent a vector of regression parameters. When interpreting the regression output, hazard ratios of less than 1 imply that the firm's survival chances are enhanced by increases in the covariate. Conversely, hazard ratios greater than 1 show an adverse effect of the covariate on firm survival. We argue that (i) separate estimation of the hazard function for static and dynamic markets will prove a superior fit and (ii) that if this proves to be true propositions 1 and 2 are likely to hold.

Before moving on to the data and estimation we make some remarks about other control variables. We note that because we examine the survival prospect of a cohort of UK firms (circa 179,306) entering the market in 1998, the age of these firms remains invariant and therefore does not feature in our analyses.

No duration analysis would be complete without reference to how the new entrants' respective industry sectors exhibit variation in survival likelihoods. In our analysis, we treat each 2-digit SIC code as a separate stratum and allow the baseline hazard function to vary across these different strata. Although we constrain the coefficients of the covariates to act in a homogeneous way, we allow flexibility in this constraint by subsequently permitting the coefficients (or hazard ratios) to vary according to whether the industry is denoted as dynamic or not (in the split regressions). This latter part of the analysis represents an innovation from existing work in that no work so far has allowed the covariates to vary across this dimension.²

² Although Segarra and Callejón (2002) define turbulence as the summation of entry and exit rates, they opt to focus on entry rates in their estimations.

We should further note that the standard errors estimated in our analyses are allowed to cluster by individual firm by using the robust measure of variance in our estimations. In so doing, we recognise that any firm can be expected to behave in a systematic way, and that errors across years therefore, are correlated.

3. The Data and Descriptive Statistics

IDBR data

Our data is drawn from the Inter-Departmental Business Register (IDBR) database at the UK Office for National Statistics. This register captures VAT registered businesses and as such comprises about 98 percent of UK business activity.³ The advantage of using data from the register is twofold. Firstly it is highly representative, given that it covers almost the population of UK firms and does not suffer from biases induced by sampling. This latter point is especially important in duration studies, where over-sampling of large firms in comparison to small firms underestimates the real amount of movement in an economy, since entry and exit is mostly a small firm phenomenon. Secondly, the register identifies businesses at the *local unit* level. Barnes and Martin (2002) define this as the “individual site or workplace (factory, shop etc.) at which activity takes place (P.37)”.

Single-plant firms

Higher levels of aggregation (enterprise level) used to uniquely identify firms within the UK Annual Census of Production (drawn from mostly larger firms within the IDBR) has up to now made it difficult for researchers to pinpoint whether the exit of an establishment from the data was caused by the failure of all local units belonging to the enterprise. Alternatively, the exit of an

³ See Barnes and Martin (2002) for an overview of this data.

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establishment could be induced by the failure of a large and important local unit which in turn caused the whole enterprise to exit from the data. Notwithstanding the exit of the large and important local unit, any sister units could have remained operational if they had been independent entities rather than been part of an enterprise group. To put it simply: an examination of local units is the simplest and most useful way to examine entry and exit when we need to directly attribute entry and exit to the unit under examination.

Industry data from Annual Respondents' Database (ARD)

Representativeness and research relevance come at a cost however: While the IDBR contains a reasonably exhaustive listing of all firms from all sectors of the UK economy, knowledge about the features of these local units is limited to sectoral and employment information. To remedy this information shortfall, we import information at a *sectoral* level on productivity, wages and market structure from the ARD survey. This lets us describe the composition of the sector in which our local units operate and report inter alia industry concentration ratios.

Time Window and Censoring

We finally note that our data extends for a 6 year period, 1997 to 2002. However, this translates into a relatively short survival horizon for the cohort of firms who appear in the data for the first time. Data for 1997 is essentially used as a criterion that allows us to identify new entrants (present in 1998 but not in 1997) and data for 2002 allows us to identify real, uncensored exits (present in 2001 but not in 2002). Accordingly, we limit our duration analysis to a 3 year time window when we have accounted for left- and right-hand side censoring and represented failures that arise in 1998 (entry year) as happening at the beginning of the following year.⁴ Fortunately, given the high level of attrition of start-ups in the earliest phases of their operation (almost 50 percent failed within

⁴ As is customary in survival analyses of this type with 'simultaneous' entry and exit

these 3 years), even within a relatively short time span we manage to capture a high level of early stage exits. This pattern most likely arises from our ability to include low quality, under-capitalised, start-ups when using the IDBR data. Given the comprehensive nature of the data, we are confident that this data is representative.⁵

Since our analysis focuses on entry into and exit from industry sectors, we first report exit levels for the cohort of UK firms entering into self-employment in 1998, tracking the number of exits from 1998 until 2001 (**Table 1**).⁶

[**Table 1. here**]

The average number of exits across all firms in the database is about 5 percent per year. This means that only a minority of firms across the broad spectrum of UK industry will exit in any year. As such, dynamism at a sectoral level is something that happens at the fringes of industry in general, and an examination of all industry exits suggests a high amount of inertia.

This inertia seen across UK industry masks the dynamism that arises within cohorts of new ventures, however. Accordingly, we would expect that annual exit rates *within* the grouping of new ventures should be much higher, given the greater financial fragility and unproven track-record of new ventures. **Figure 1** and **Figure 2** trace the hazard rates for our 1998 cohort of UK firms as Kaplan-Meier functions. Attrition is recorded for 3 analysis times (where the function ‘steps’) and this corresponds to 1999, 2000 and 2001 respectively.⁷ We can see from the failure function that almost 25 percent of entrants have failed in the year of entry, culminating in a rate of almost 50 percent for the third year of existence. This is in line with other failure rates documented in UK

⁵ Our attrition rate for the 1998 cohort (1st three years), corresponds with other UK exit rates: 42 percent after 2 years cited by Scarpetta (2001) for the early 1990’s and 45 percent in Disney et al., (2003) for the period 1986 to 1991

⁶ We cannot calculate the value of exits for 2002 because firm’s survival is right censored at this date

failure studies (Scarpetta, 2001 and Disney et al., 2003). Moreover, we dichotomise our cohort depending on whether entry rates at a sectoral level exceed median sectoral entry rates. This allows us to capture possible differences in attrition accorded to firms who enter markets characterised by low and high levels of dynamism respectively.

We see from **Figure 1** that firms entering industries with above average entry rates of at least 11 percent (*'high_entry'* = 1) appear *less* likely to survive than their counterparts. This pattern is reflected in the Kaplan-Meier function which formulates entry as a discrete variable.⁸ However, we should note that the Kaplan-Meier does not take account of the auxiliary role of other covariates in influencing survival and hence is merely illustrative.

[**Figure 1 here**]

Figure 2, on the other hand, reports the hazard rates for firms entering industries marked by high levels of churn (summation of entry and exit rates), where *'high_churn'* is set at the 75th percentile (churn greater than and equal to 20 percent). Here we see that higher hazard rates are registered by firms entering industries with higher churn rates, a pattern most likely induced by the dominance of industry exit within the churn measure. This pattern is also borne out in the positive bivariate correlation coefficient between the variable *'churn'* and *'fail'* in **Appendix 1**.

Table 2 shows the breakdown of the covariates used in our analysis. While overall growth rates for UK firms in the Annual Respondents' Database (ARD) are shown to be volatile across the years, the variables minimum efficient scale, *'mes'* (average output of the leading 5 firms in the sector)

⁷ A convention in duration analyses of this type is to treat all failures in the year of entry as having occurred at the beginning of the next year. Accordingly all failure times for entry at time t are treated as failures arising in $t+1$.

⁸ We should note however, the negative correlation coefficient between failure and entry rates (Appendix 1) when firm entry rates are formulated as a continuous variable.

and median wage rates, '*wage_med*' show less variation. Our key variable measuring industry dynamism, '*churn*' is pretty invariant across the years and its median value of 0, brings out a point made earlier that many industries at a 3-digit sectoral level do not demonstrate any activity at all. It follows that at least half of all industries register 0 entry and exit and accordingly 0 churn rates.

4. Analysis

Table 3 summarises the results of our Cox duration analysis which investigates the failure likelihoods of firms in the 1998 cohort as a function of key industry concentration, growth, cost and optimal output variables. We first analysed all firms in a pooled framework before going on to explore possible interactions as markets exhibit higher or lower levels of dynamism.

Although the size of firm at the time of start-up and the level of industry concentration do not appear to affect failure probabilities, the level of industry growth does. We find that firms entering growing industries are less likely to fail and that this result is highly significant. This result appears in line with the stylised facts of survival, where growing industries exhibit a higher capacity to absorb new entrants (See Caves, 1998). We also note that higher cost industries, all things equal, denoted by higher median wages are less advantageous to new entrants. Here new ventures perform less strongly, as evidenced by their significantly higher failure rates. We do not find any evidence of variation in survival across industries of varying optimal output levels (*'mes'*).⁹

We ran the duration analysis again but this time excluded the industry output level variable, '*mes*' in order to see whether the results remained robust to its omission. In line with what we expect given its collinearity with the market concentration variable, '*m_hirsh*', the significance of the

⁹ Due to the collinearity of this variable, '*mes*' with our market concentration measure, '*m_hirsh*' and insignificance in initial duration analyses, we omitted this variable from subsequent analyses.

latter improves, although the signs and significance levels of the remaining variables remain unchanged.

Our next step was to check whether the coefficients on each of the controlling covariates are sensitive to whether the industry into which new ventures entered was denoted as dynamic or stable. Accordingly, we interact each of our covariates with the ‘*churn*’ dummy and note the resulting F-test for this modification. Interestingly, start-up size and concentration, both of which showed no significance in the pooled regression show themselves highly sensitive to industry dynamism, as evidenced by the high significance of their hazard ratios on the interactive term. The χ^2 value on the industry growth-dynamism interaction is also highly significant, and although the interaction term for our cost interaction variable is insignificant, the overall F-test for joint significance of the interaction terms suggests that we depart from the pooled framework and opt instead for a split framework.

The final two columns document our results according to whether new entrants enter industries characterised by churn of at least 20 percent (75 percentile and denoted as ‘*high_churn*’) or enter more static industries. We see that the size of a new venture on starting up is only important in enhancing survival when the industry is static. This result may suggest that new entrants in more risky industries may have to ‘test the water’ and minimise sunk costs when entering a new market in order to enable a quick withdrawal and that this strategy promotes their chances of survival. Where risk of failure is lower, entrants can commit higher specialised resources to the new venture and in so doing augment their survival chances.¹⁰

¹⁰ This result may need to be examined further in the context of differential sunk costs, a possibility for future research

Growing industries are likely to be marked by high numbers of ‘pre-shakeout’ firms which have yet to undergo the natural selection and the weeding out process that arises when demand slows down. On the other hand, more mature industries are expected to be more concentrated, as firms concentrate more on becoming low cost producers and put their efforts into competing on the basis of price. Perhaps this dichotomy between concentration and growth underpins the difference in survival prospects of new entrants in dynamic and less dynamic industries. New entrants into dynamic industries fare better when the industry is characterised by higher concentration and lower growth while the reverse appears to hold true for new entrants into more stable markets.¹¹

5. Conclusions

The paper constructed and used a unique dataset comprising almost the population of 179,306 new ventures who enter the UK market in 1998. The data spans a wide range of industries and is therefore, not confined to manufacturing industries which so far have dominated empirical analyses of firm survival. We observed that new ventures who enter markets with higher entry rates as well as markets which are more dynamic (i.e. high churn rates of entry and exit) manifest lower survival rates. The central hypothesis is that the survival function of new ventures has a different specification in dynamic rather than static markets. Our estimation of a pooled and split (separated into static and dynamic markets) sample hazard functions support this hypothesis. In dynamic markets the survival of new ventures is positively related to industry concentration and negatively related to industry growth. The opposite is found to be true for static markets. The results shed new insights into the competitive dynamics of new ventures. In static markets new ventures face less risk and uncertainty but greater competition from incumbents. In this environment industry growth promotes new firm survival as it is likely to lesson the competition faced by incumbents and other new ventures. By contrast in dynamic markets monopolistic incumbents actually boost the

¹¹ We qualify this observation by adding that although the p-value for industry growth in stable markets is insignificant, the hazard ratio is lower than 1 as expected.

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chances of survival of new entrants by providing a vulnerable, or perhaps unresponsive, stock of x-inefficient firms who are less relevant to the innovation-led competition which characterises dynamic markets. Also by contrast industry growth in dynamic markets does not support new venture survival which seems consistent with a view that such markets are subject to business shakeouts associated with inherent economies of scale and/or network externalities. Market growth increases the importance of these scale effects and favour emerging winners among new entrants who already have acquired scale advantages

Thus, while dynamic markets are more risky for new ventures than their static counterparts, our analysis indicates that the source of the threat to survival for these businesses is very different. It follows that the strategic priorities for new ventures differs between static and dynamic markets. Being able to survive competition from incumbents is the key in static markets and as a result high industry concentration poses a problem for new ventures. In dynamic markets the market power of incumbents appears less relevant as new ventures avoid intense price competition by using innovation as means of market entry. These incumbent firms are likely to exhibit the hallmarks of x-inefficiency which allows smaller scale innovative ventures a double advantage but ultimately providing a boost to firm survival. Thus, from a new venture strategy perspective, in dynamic markets they need to think more about the capabilities of other new ventures while in static markets incumbents pose the main threat.

From a competition policy perspective, our analysis implies that industry concentration only poses a threat to the viability of new firms in static markets. By contrast industry concentration actually helps new ventures overcome other impediments to survival such as high risk in dynamic markets. Thus, from an antitrust perspective, the paper provides some key empirical support to the central hypothesis of Audretsch, Baumol and Burke (2001) who contend that competition policy frequently

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needs to be different in its form and conduct when moving from static and dynamic markets.

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Table 1 Exit Rates by Year

Year	Exit Rate		
	Mean	Sd	N
1998	5	6	270,342
1999	5	7	226,180
2000	5	7	185,625
2001	5	7	153,719
2002	N/A	0	130,256
Total	4	6	966,122

Source: ONS, UK

Table 2 Descriptive Statistics

	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999
	ind_	ind_	mes	mes	wage_	wage_	m_hirsh	m_hirsh	churn	churn
	growth	growth			med	med				
mean	12	30	8,079	9,303	195	184	0.00205	0.008094	11	11
median	9	16	3,489	3,908	45	32	0.000248	0.000418	0	0
sd	214	55	13,584	14,321	574	555	0.009735	0.067305	16	16
N	191,149	176,787	270,334	226,168	270,342	226,178	270,342	226,180	250,729	226,178
	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001
	ind_	ind_	mes	mes	wage_	wage_	m_hirsh	m_hirsh	churn	churn
	growth	growth			med	med				
mean	10	18	9,633	10,418	200	218	0.001417	0.001292	10	10
median	6	16	4,178	5,107	37	60	0.000208	0.000224	0	0
sd	24	24	14,905	15,913	586	614	0.007671	0.006217	14	13
N	145,230	119,977	185,620	153,715	185,623	153,719	185,625	153,719	185,612	153,707
	2002	Total	2002	Total	2002	Total	2002	Total	2002	Total
	ind_	ind_	mes	mes	wage_	wage_	m_hirsh	m_hirsh	churn	churn
	growth	growth			med	med				
mean	6	16	10,483	9,361	223	201	0.001235	0.003113	N/A	10
median	2	9	5,093	4,024	64	45	0.000244	0.000257	0	0
sd	20	114	16,466	14,832	627	586	0.005711	0.033415	6	14
N	101,269	734,412	130,254	966,091	130,256	966,118	130,256	966,122	130,256	946,482

Source: ONS, UK

Table 3 Effect of Industry Characteristics on Survival for Dynamic and Stable Markets

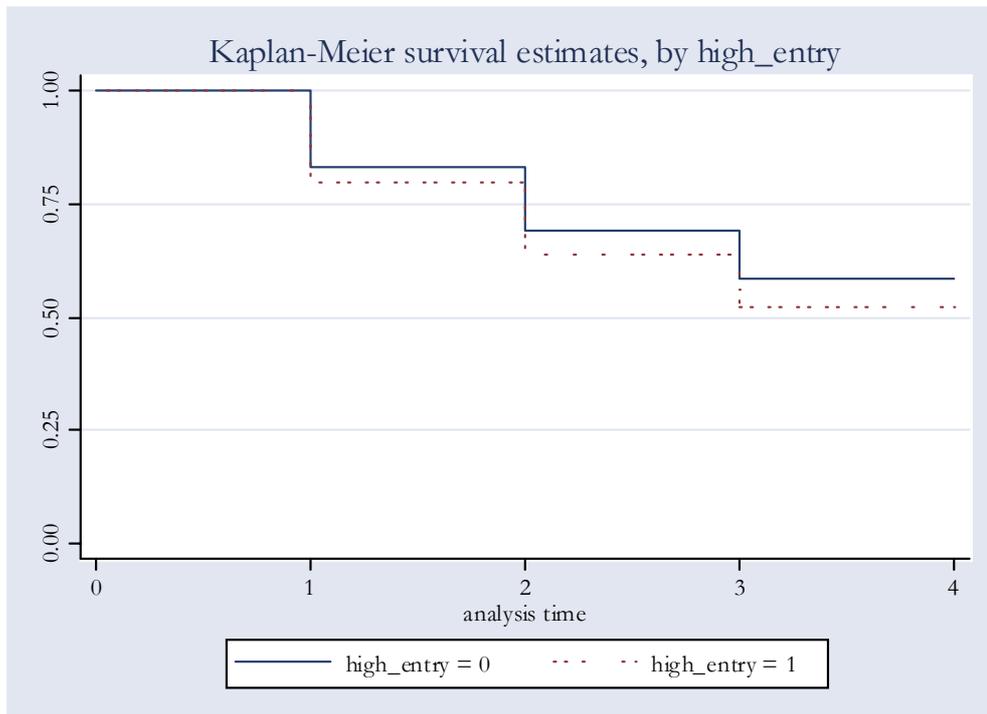
	Pooled Sample		With Interactions	Split by Industry Dynamism	
	Hazard ratio (p-value)	Hazard ratio (p-value)		Dynamic Market Hazard ratio (p-value)	Stable Market Hazard ratio (p-value)
Size at start-up (start_size)	0.9999055 (0.317)	0.999909 (0.332)	0.9984433*** (0.000)	1.000124 (0.186)	0.9990968 (0.003)
Hirschman-Herfindahl mkt conc. (m_hirsh)	0.9125048 (0.340)	0.883157 (0.148)	0.1424652 (0.286)	0.8660405* (0.095)	474.6975*** (0.003)
Growth in 3-digit industry (ind_growth)	0.9994371*** (0.000)	0.999435*** (0.000)	0.9983317*** (0.000)	1.000828*** (0.000)	0.9998109 (0.239)
Median wage in 3-digit industry (wage_med)	1.000055*** (0.000)	1.000055*** (0.000)	0.9999379*** (0.010)	1.000035*** (0.000)	1.000017 (0.387)
Minimum efficient scale in 3-digit industry (mes)	0.999999 (0.502)
start_size * dynamic industry			1.001637*** (0.000)		
m_hirsh * dynamic industry			1.003419*** (0.000)		
ind_growth* dynamic industry			1.000115*** (0.000)		
wage_med * dynamic industry			6.511264 (0.306)		
Number of firms (count of IDs)	179,306	179,311	179,311	61,720	151,367
Wald χ^2	103.12			46.24	23.88
Prob. > χ^2	(0.0000)			(0.0000)	(0.0000)
F-test for joint sig. of covariates H ₀ : covariates jointly = 0		$\chi^2 = 103.96$ (0.0000)	$\chi^2 = 453.47$ (0.0000)		

Source: Observations calculated from Inter-Department Business Register (IDBR) data at UK Office for National Statistics. Industry level data calculated from Annual Respondents' Database (ARD) at same source.

Notes: Stratified by industry sector (SIC92 2-digit). Robust standard errors: errors clustered within plants across time

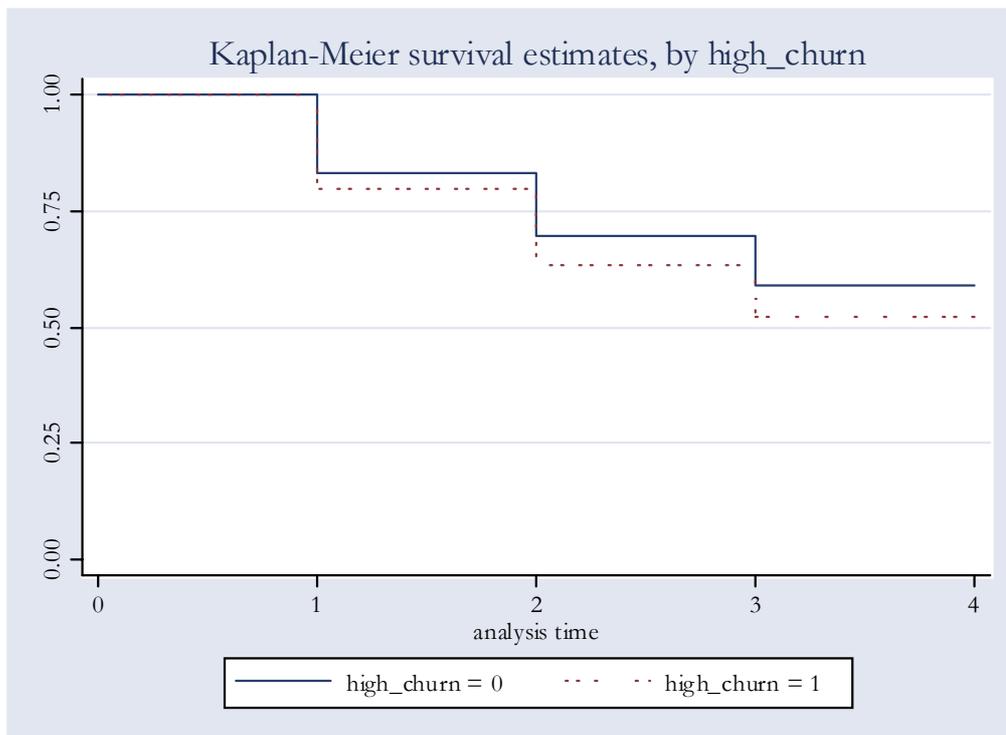
Estimated using data from ONS, UK

Figure 1



Estimated using data from ONS, UK

Figure 2



Estimated using data from ONS, UK

Appendices

Appendix 1 Correlation matrix

	fail	start_~e	m_hirsh	ind_gr~h	mes	wage_med	sales_~d
fail	1						
start_size	0.0066*	1					
m_hirsh	0.0105*	0.0124*	1				
ind_growth	0.0066*	-0.0054*	-0.0023	1			
mes	-0.0030*	-0.0059*	0.1048*	-0.0053*	1		
wage_med	0.0098*	0.1107*	0.0681*	-0.0260*	-0.0755*	1	
sales_med	0.0246*	0.1221*	0.1014*	-0.0272*	0.0153*	0.5912*	1
entry_r	-0.0135*	0.0228*	0.0889*	-0.0079*	-0.1486*	0.1573*	0.0965*
churn	0.0503*	0.0388*	0.1706*	-0.0099*	-0.1937*	0.3295*	0.2822*

Estimated using data from ONS, UK

Appendix 2 List of Variables

fail = 1	Enterprise is a failure
start_size	Employment size at time of start-up
m_hirsh	Sum of squared employment shares from ARD within 3-digit sector
ind_growth	Annual growth from ARD of 3-digit sector
mes	Average turnover from ARD of 5 largest firms in 3-digit sector
wage_med	Median wage from ARD in 3-digit sector
sales_med	Median turnover from ARD in 3-digit sector
entry_r	Entry rate from IDBR in 3-digit sector
churn	Entry and exit rates from IDBR in 3-digit sector
high_churn =1	Churn greater than 20 percent
high_entry =1	Entry rate greater than 11 percent
id	Local unit identifier (single-plant)

Source: Estimated using data from ONS, UK

Notes:

ARD denotes that the variable (an aggregate variable matched on sector) was calculated from selected firms within the data captured from the annual survey of respondents (selected sample). IDBR denotes the wider frame of data comprising firms from within the selected as well as non-selected database.