

# Small Firm Survival: An Australian Perspective

Vicar S. Valencia<sup>1</sup>

## Abstract

This paper analyzes the factors and conditions that potentially help enhance the likelihood of survival of small firms. The purported sub-optimal output scale of small firms runs counter to their seemingly invariable preponderance across time, industries, and countries. Three key findings are obtained. First, small firms, indeed, face a hazard in surviving, albeit the magnitude is not as dramatic as contended by other studies. This implies that a cohort of small firms do survive and constitute the backbone of the observed small firm asymmetry. Second, small firms which are organized as a family-run corporation, have extensive business linkages, use government small business advisory services, and innovate realize a greater likelihood of surviving. Third, the paper finds that employees and decision makers with tertiary qualifications in the allied fields of business are not indispensable conditions for lowering the hazard of survival of small firms. These findings are based from sample data of the Australian Business Longitudinal Survey.

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## 1 Introduction

It has been observed that across time, industries, and countries, small firms predominate in number, in what has been viewed as an asymmetric firm-size distribution biased toward small firms (Schaper, et.al., 2008; Cabral and Mata,

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<sup>1</sup> Indiana University South Bend, USA

2003). The Organisation for Economic Cooperation and Development (OECD, 1997; 2013), for instance, cites their continued globalization and the contribution they provide in spurring productive opportunities and transmitting the entrepreneurial spirit. For example, small firms in OECD countries such as Australia, France, and the United States account for over 90 percent of total businesses. In the United States, over the period 1990-2003, small firms accounted for almost 80 percent of net new jobs created, despite the fact these firms represented less than 20 percent of total employment in 2003 (Edmiston, 2007). Small firms in the Australian economy, in particular, have commanded a virtual archetype of marvel – accounting for almost 96 percent of total business establishments between 1995 and 2002 (Schaper, et.al., 2008). In 2011, in terms of industry value added, small Australian firms accounted for about 34 percent of total wages, salaries, and profits, which is an appreciable contribution relative to medium-sized firms (23 percent) and large firms (43 percent). Medium-sized firms, by definition, employ between 20 and 199 individuals, whereas large firms have at least 200 employees (Australian Small Business, 2012).

The large distribution of small firms has drawn considerable attention not only in academia but also in policy making to the extent that it has created a divergence of beliefs about their perceived importance in the economy; essentially, it is a *mélange* of optimism and pessimism. On the one hand, small firms are viewed as vehicles for growth and development, serving as channels for job creation or employment (OECD, 2005). Importantly, they encourage competition and innovation. They satisfy and actively provide market demands and preferences that are not catered to or insufficiently provided for by large establishments. They act as vent for releasing entrepreneurial talent and creative abilities. They, in other words, provide industry dynamism or vibrancy in an otherwise static world of product and service homogeneity. On the other hand, small firms face the cost disadvantage of generating minimum efficient scale (Audretsch, 1991). As such, studies show that despite having higher entry and growth rates, they also have higher failure and exit rates. Moreover, a majority do not experience appreciable growth (Audretsch and Mahmood, 1995; OECD, 2005). To provide perspective, annual exit rates for firms, in general, averaged to about 5 to 10 percent (Agarwal and Gort, 2002). In the case of small Australian firms, Bickerdyke, et.al., (2000) document cumulative exit rates of about 10 percent for the first year, 20 percent for the second year, and 35 percent for the fifth year of operations. Their tenacious commitment to enter the market appears to be matched by their predisposition to leave because of lackluster, sub-optimal performance. That is, despite the entrepreneurial dynamics they provide, small firms have low survival rates. As such, their net job creation capability and entrepreneurial leadership are viewed with cautious optimism.

In the context of the perceived significant role attached to small firms, the purpose of this paper is to examine the factors and conditions that determine the likelihood

of survival of small firms. In so doing, we provide an explanation to the observed empirical regularity of small firm distribution asymmetry. Assessing the post-entry performance of small firms merits attention, as the ultimate goal of any firm is to establish a profitable venture and remain in the industry. A reasonable premise is that a small firm may first experience operating sub-optimally. As it continues to build a comfortable place because of market viability and profitable performance, it necessarily expands and starts producing optimally. In contrast, the unsuccessful entrants remain small, stagnate due to sub-optimal production, and eventually cease operations and are forced to exit the industry.

We motivate the analysis through the estimation of the Cox proportional hazards regression, the econometric model through which survival analysis is carried out (Winkelmann and Boes, 2009). By modeling the potential hazards that confront small establishments, we can assess the dynamics of their post-entry performance. Also, under this framework, we are able to provide a reasonable understanding to the apparent paradox that despite sub-optimality, small firms constitute the bulk of establishments in industries. Extant research on small firm survival tends to focus on establishments located in the United States. That is, there has been a paucity of research into other countries, such as Australia. On the basis of available data and to achieve purposeful comparison, we use small Australian firms sampled from the 1994-1998 Business Longitudinal Survey. As such, this paper provides a useful international and comparative perspective into the survival of small firms.

The remainder of the paper is organized as follows. Section 2 presents some descriptive statistics and stylized facts about small Australian firms. Section 3 provides a review of the related literature on small firms. Section 4 describes the empirical framework of survival analysis. The estimation results and analysis are explained in Section 5. Section 6 concludes.

## **2 What are Small Australian Firms?**

Qualitatively, small firms are businesses with the following characteristics: (i) independently owned and operated, (ii) controlled by owners/managers who contributed much of the required operating capital, and (iii) owners/managers are the executive decision makers (Bickerdyke, et.al., 2000; Lattimore, et.al., 1998). The problem with this definition is that it is encompassing and does not provide a quantitative means of actually counting the number of small firms. As such, statistically, employment is often used as the measuring rod in most countries. In Australia, an enterprise that employs less than 20 individuals would be classified as a small firm.

Table 1 highlights the preponderance of small firms over the period from 1995 to 2002 (Schaper, et.al., 2008). On average, these firms accounted for 96 percent of the total number of private sector firms in Australia. In addition, the OECD (2005) documents that small firms provided 47 percent of total non-agricultural private sector employment between 2000 and 2001. In terms of employment growth, for the periods between 1983-84 and 2000-01, small firms accounted for a 3 percent average annual growth in employment, compared to 2.4 percent registered by other establishments (medium-sized and large firms).

Table 1: Distribution of Small Firms in Australia (%), 1995-2002

Firm Size	2002	1998-1999	1995-1996
Small Firms (less than 20 employees)	96.39	96.04	96
Medium-sized Firms (between 20 and 199 employees)	3.38	3.65	3.7
Large Firms (at least 200 employees)	0.24	0.27	0.29
Total	100	100	100

Source: calculations derived from Schaper, et.al, (2008)

Looking at industry or sectoral variation, Table 2 shows the conspicuous skewed distribution towards small firms in 2011, ranging from 89 percent in manufacturing to almost 98 percent in agriculture, forestry, and fishing (Australian Small Business, 2012). For the same year, the employment generated by small firms is also appreciable, with agriculture, forestry, and fishing recording the highest proportion (86 percent), followed by services (46 percent), manufacturing (31 percent), and mining (14.9 percent). Taken as a whole, in terms of business size, small firms accounted for 47 percent of total employment, followed by large firms with 30 percent, and medium-sized firms, with 23 percent (Reserve Bank of Australia, 2012). Of the total number of small establishments recorded in 2011, their industry value added accounted for 34 percent of the total wages, salaries, and profits recorded by all business establishments, small, medium, and large.

Table 2: Industry Share and Value Added of Small Firms in Australia (%), 2011

Industry	Industry Share	Valued Added Share
Agriculture, Forestry, and Fishing	97.9	80.2
Mining	92.1	9.1
Manufacturing	89.0	20.3
Services	96.0	38.7

Source: Australian Small Business (2012)

Bickerdyke, et.al., (2000) report that small firms have a relatively higher rate of cumulative exit relative to other enterprises. As Table 3 indicates, in the first year

alone, small firms already face an exit rate of almost 10 percent, while large firms experience a lower rate of about 8 percent. The discrepancy persists as the years progress. In 2011, the same scenario emerges: entry rates for small and large firms are 14.3 percent and 6.6 percent respectively, and one can reasonably note that small firms displayed aggressive entry. However, exit rates for small firms are correspondingly higher, 13.9 percent compared to 4.8 percent displayed by large firms (Australian Small Business, 2012).

Table 3: Cumulative Exit Rates of Small Firms in Australia (%)

Years of Operation	Small Firms	Large Firms
1	9.6	8.2
2	18.3	15.7
5	34.9	28.5
10	55.3	47.7
15	65.6	56.1

Source: Bickerdyke, et.al., (2000)

In 2007, in terms of legal set-up, 32 percent of small firms are incorporated as companies, 31 percent are organized as sole proprietorships, and the rest are partnerships and trusts. Roughly the same percentage distribution of business organization are reported in 2011. The preference for the corporate structure appears to be instigated by the advantage of limited liability and lower tax rates (Reserve Bank of Australia, 2012).

### 3 Review of Literature

Jovanovic's (1982) pioneering work posits a theory of firm survival in the spirit of evolutionary economics. He shows that in a world of imperfect information and noisy selection, only those firms that not only are able to discover their efficiency but also, more importantly, are able to take advantage of their potential will survive in the long run. In this model of firm heterogeneity, market selection, and learning, costs are randomly distributed among firms, and no firm knows its true cost function. Although all firms are endowed with the same initial set of prior beliefs, such will change over time as they go through the process of learning and discovering. Small firms will have to learn and discover a robust technique or solution to circumvent the internal and external difficulties associated with operating a business for survival and profitability. The solution may come in the form of managerial talent, organizational set-up, and innovation, among others.

Dosi and Teece (1998) echo the same view, noting that while firms can initially have the same set of "competencies," such will change later on as these "...present a significant degree of inertia and firm-specificity" (p.285). Through learning

and discovery, each firm will have its own unique way of managing resources and governing its behavior, albeit all face the same environment. While all firms are capable of learning new economic knowledge, each will have a “distinctive competence,” a “set of differentiated skills, complementary assets and organizational routines which together allow a firm to coordinate a particular set of activities in a way that provides the basis for competitive advantage in a particular market or markets (Dosi and Teece, 1985, p. 284). In this context, we may therefore observe two small firms operating sub-optimally in the short run but only one surviving in the long run because its distinctive competence proved robust in the market.

In a series of econometric studies using U.S. data, Audretsch (1991) and Audretsch and Mahmood (1994, 1995) report that small firms do not survive in the long run and that the apparent skewed distribution towards small firms are not due to the same cohort of small firms surviving, but to the continual process of entry and exit of small firms. In particular, based on a logit regression of firm survival rates, Audretsch (1991) concludes that although small firms can be persistent entrants, their proneness to failure is considerably high. He identifies key variables which help enhance small firm survival: (i) own small firm innovation rate, (ii) industry growth rate, (iii) scale economies, and (iv) capital intensity. For instance, the ability of the firm to innovate reflects higher chances for growth and survival as innovation provides greater latitude for containing costs. That is, the implementation of low-cost production techniques among others. The presence of scale economies and high capital intensity, on the other hand, pose as deterrents for survival. In an environment of decreasing average costs over a wide range of output levels, small firms are burdened with low production at relatively high average costs.

Audretsch and Mahmood (1994, 1995) reach the same conclusion when the likelihood of survival is modeled using a hazard function. Using a ten-year longitudinal database which tracks the performance of over 12,000 U.S. manufacturing establishments established in 1976, the results closely follow Audretsch's (1991) logit regression. Scale economies and high capital intensity operate as significant hazards for small firm survival. Total industry innovation was also included as an explanatory variable and its positive sign highlights Winter's (1984) notion of technological regimes in that despite the prevalence of entry of small firms in highly innovative industries, their chance for survival per se is still uncertain. In the hazard model, the positive sign of total industry innovation suggests that a high degree of risk, turbulence, and firm exit is associated with highly innovative industries.

Empirical studies on the small Australian firm are sparse. With a combined population data set from the 1983-84 and 1984-85 Australian Manufacturing Industry Censuses, Borland and Homes (1996) assess the average failure and

employment growth rates of Australian firms. They provide evidence that firm size is negatively related to failure and positively related to employment growth. For instance, for a class size of 10-49 employees, the average failure rate was  $-0.061$ , in contrast to  $-0.115$  for a class size of 250 or more employees (a “more” negative number implies lower likelihood of failing). Employment growth rate was  $0.098$  for 10-49 employee-firms and  $0.192$  for those with 250 or more employees.

In the same vein, Northwood (1999) essentially asks the question whether small Australian firms are at a disadvantage in attaining higher financial returns and, accordingly, lower chances for survival, relative to their large counterparts. Using return on equity, profit margin, and return on assets as various measures of financial performance, the study shows that firm size is not a significant determinant of financial performance, suggesting that the prospects for small firms in attaining higher financial returns and greater chances for survival are no more different from that of large firms.

## 4 Empirical Framework

The purpose of this paper is to assess the likelihood of survival of small firms. To do so, we employ the technique of survival or duration analysis. In particular, the post-entry survival times or duration of small firms in the market are expressed in terms of a hazard function. The hazard function, also known as conditional failure rate, gauges a firm’s proneness to exit the market due to poor financial performance, given that it has survived up to a certain time period. This hazard, in turn, can be viewed as a function of a set of predisposing factors.

Our paper employs the Cox (1972, 1975) semi-parametric hazard regression model to assess the plausible explanatory factors or covariates influencing small firm survival. The model is chosen as it provides a balance between parametric estimation procedures (which may unnecessarily impose arbitrary restrictions on the distribution of survival times) and purely non-parametric or distribution-free models, which may give rise to inconsistent estimators. In either case, a misspecification of the distribution of survival times can lead to misleading conclusions. The Cox model, in comparison, is acknowledged to be generally robust to potential misspecifications (Winkelmann and Boes, 2009).

Our regression model is specified as follows:

$$h(t, x_{it}) = h_o(t) \exp\left(\sum_{k=1}^K \beta_k x_{it}^k\right)$$

in which we denote  $h(t, x_{it})$  as the hazard faced by small firm  $i$  at a given time  $t$ . This hazard is dependent or conditional on a set of explanatory variables  $x_{it}^k$  as determined by the associated parameters  $\beta_k$ . The exponential is applied so that  $h(t, x_{it}) \geq 0$ . We notate  $h_o(t)$  as the baseline or “starting” hazard confronting any small firm for which all explanatory variables are equal to zero. As part of its statistical minimalism, a feature of the Cox model is that the baseline hazard is left unspecified. The regression is implemented via maximum likelihood.

The model is estimated using data from the Australian Bureau of Statistics (ABS) Business Longitudinal Survey, also termed as the Business Growth and Performance Survey. Four years of firm-specific information are culled, data permitting: 1994-95, 1995-96, 1996-97, and 1997-98. All establishments recorded in the ABS Business Register were used as survey data. The data exclude government-owned enterprises, non-employed businesses, and firms belonging to agriculture, education, health, and communication. There are a total of 9,732 firms.

Our explanatory variables are as follows: (i) small firm age, (ii) corporate structure, (iii) family business, (iv) goods or services innovation, (v) business links, (vi) equity finance, (vii) tertiary business qualification of staff, (viii) tertiary business qualification of decision maker, (ix) government advisory services, and (x) firm size.

For firm age, we posit that the likelihood of failure decreases as the small firm ages or matures. Dunne, Roberts, and Samuelson (1989) examine the post-entry performance of over 200,000 U.S. manufacturing plants for the period 1967-77 under the predictive lens of Jovanovic’s (1982) firm survival and industry evolution model. Their estimated model supports the proposition that failure rate is a decreasing function of age. At the onset, plants do not know their efficiency level but get to learn and discover the attributes of being efficient as time goes by, enhancing survival. We use indicator variables to capture firm variation in age, to wit: (i) 2 years to less than 5 years, (ii) 5 years to less than 10 years, (iii) 10 years to less than 20 years, and (iv) 20 years or more. The benchmark reference is less than 2 years.

Corporate structure as an explanatory variable is included to ascertain whether there is a distinct advantage to be gained from being a small-firm corporation. On the one hand, the advantages of a corporate form of organization can clearly elevate the likelihood of survival of small firms. These include (i) the separation of ownership and control, (ii) professional management, (iii) limited liability, and (iv) greater access to finance. On the other hand, the sundry disadvantages of a corporate structure can pose as a hazard to survival. These include the issues of

heavy taxation and greater government regulation. The *Corporate structure* dummy variable = 1, if incorporated as a company and 0, if otherwise.

The variable *Family business* = 1, if the firm is family-owned and 0, if otherwise. This variable tests the likelihood of survival of being a small firm managed as a family business. On the one hand, such organizational set-up may elevate the likelihood of survival. When family members are directly involved in business activities (for instance, they may be “elected” as owner-managers or working directors under a corporate structure), there may be a faster response time to the decision making process. Bureaucratic delays, inflexibility in authority, and indecisiveness are therefore avoided. In addition, their direct involvement may mean that firm resources and expenditures will be heavily scrutinized. Presumably, preventing the wastage of family-owned resources is expected to be a prime concern. On the other hand, a family-owned organization may lower the prospects for survival. There is empirical evidence documenting family problems in business (Kellermanns and Eddleston, 2002). Such includes heavy and unnecessary capital withdrawals by family members and, to the extent that the separation of ownership and control becomes blurred, possible abuses in power and authority.

The prevailing body of research posits that innovation, in the sense of introducing a new good or service, provides the small firm the latitude to differentiate itself from the rest, capture niche markets, and thrive on customization (Acs and Audretsch, 1990). This is indicated by *Innovation in goods or services* = 1, if intended to produce new goods or services and 0, if otherwise.

We expect a negative relationship between the variable *Business links* and the hazard of failure. It is reasonable to assume that small firms having a link, network, alliance, or cooperative agreements with the business community will provide them greater opportunity to exploit market resources (Audretsch and Feldman, 2003). Business linkages potentially widen the small firm’s access to customers and information. Furthermore, it is an avenue where they can effectively compare, assess, and modify the suitability of their technical and entrepreneurial skills, the flexibility of their organizational structure, and the range, quality, pricing, and quantity of their goods or services. We gauge this using *Business links* = 1, if firm has linkages with other businesses and 0, if otherwise.

Equity finance. As a source of long-term financing, we expect small firms infused with equity capital to have greater chances of surviving (Carter and Van Auken, 2006). The variable is *Equity finance* = 1, if firm has equity finance and 0, if otherwise.

We create the indicator variable *Tertiary qualification of staff* = 1 if the managerial staff has tertiary qualification in business management, commerce, or

administration and 0, if otherwise. The tertiary qualification of staff in the allied fields of business tests the proposition that a pool of employees with college level business degrees necessarily lowers the hazards faced by small firms, owing to their formal academic training and managerial competence (Wally and Baum, 1994). Similarly, the tertiary qualification of decision-maker (that is, managers) in the allied fields of business examines the notion that those with formal academic training in the allied fields of business necessarily elevate the likelihood of survival of small firms. In the regression, this is denoted as *Tertiary qualification of decision-maker* = 1 if the decision maker has tertiary qualification in business management, commerce, or administration and 0, if otherwise.

We postulate that small firms which utilize advice or information offered by government small business agencies have greater prospects for diminishing the hazards of failure. Crucially, we expect these government agencies to provide small firms adequate and relevant information. Such will include government regulations, access to finance, and marketing opportunities. To evaluate this hypothesis, the indicator variables for seeking government advisory services are delineated into (i) 1-3 times and (ii) more than 3 times. The benchmark is the firm did not seek advisory services from the government.

From the dataset, *Firm size* refers to the full time equivalent employment of the firm. Following Dunne, et.al. (1989), a larger firm presumably allows it to operate along the neighborhood of its minimum efficient scale. This elevates firm survival.

## 5 Estimation Results

Table 4 presents the parameter estimates of the hazard function. A negative sign in the parameter estimates indicates that the covariate is associated with lowering the hazard of failure, or, equivalently, increasing the likelihood of firm survival.

With the exception of the age of the firm from 2 years to less than 5 years, the negative and statistically significant coefficient of the age indicator variables reinforces the postulate that the likelihood of failure decreases as the small firm “matures.” Crucially, this suggests that those firms that manage to survive, indeed, survive longer and can recognizably become incumbents in the market. In the case of business structure, a small firm incorporated as a corporation appears to have a greater likelihood of survival. Presumably, the virtues of a corporate form of organization, which include greater access to finance and professional management are well-suited for the small firm.

For family business, its statistical significance and negative sign displayed by the coefficient invites us to conclude that there is a distinct advantage to be gained from being a family business. That is, being a small firm-family business tends to reduce the hazard of failure. This comes from their purported efficiency and flexibility in handling business transactions. In the case of innovation, the result reinforces the stylized fact that innovation allows the small firm to elevate its likelihood of survival. Presumably, this is suggestive of the fact that innovation in goods or services (i) acts as strategic tool for the firm to be distinctly recognized as a market participant/seller and (ii) provides the firm greater latitude to capture niche markets.

In addition, having a linkage or network with the business community significantly enhances the small firm's survival. As previously explained, this makes intuitive sense as a small firm which has links with other enterprises potentially acquires wider access to distribution channels, better information on what its competitors are doing, and greater knowledge of market trends and conditions.

Table 4: Estimation Results

Variable	Coefficient	<i>p</i> -value
Age of the small firm:		
2 years to less than 5 years	-0.005	0.306
5 years to less than 10 years	-0.020	0.000
10 years to less than 20 years	-0.027	0.000
20 years or more	-0.030	0.000
Corporate structure	-0.339	0.000
Family business	-1.426	0.000
Innovation in goods or services	-0.012	0.000
Business links	-0.035	0.000
Equity finance	-0.677	0.000
Tertiary qualification of staff	0.0002	0.589
Tertiary qualification of decision-maker	0.0031	0.486
Sought government advisory services		
1-3 times	-0.038	0.000
More than 3 times	-0.027	0.038
Firm size	-0.002	0.088
-2 log likelihood: 15 916.835		

The parameter estimate for equity finance is negative and statistically significant. This is consistent with the notion that equity infusions generally pose as a stable source of long-term financing, through lower financial risks and interest rates. Interestingly, parameter estimates for the tertiary qualification variables are trivially low and not statistically significant. At first blush, staff and decision-makers with university or college level degrees in business management,

commerce, or administration do not appear to form part of the small firm's recipe in enhancing survival. Presumably, what this suggests is that small firms need not necessarily have employees with tertiary education in the allied areas of business in order to exploit the purported advantage of managerial competence. In the first place, what is termed as managerial competence may actually be expanded to include training and education that are not automatically in business and not necessarily formally, academically acquired. In addition, to the extent that innovation in goods and services is found to be a significant mechanism for survival, it may very well be the case that employees trained in the STEM fields (science, technology, engineering, and mathematics) are centrally important to managerial competence.

The coefficients for seeking government services are negative and statistically significant, suggesting that small firms can expect to have greater chances of surviving by utilizing advice or information from government small business agencies. The negative sign and statistical significance displayed by the firm size variable suggest two things. First, it conforms to the economic theory that small firms face a distinct disadvantage in exploiting scale economies and such tends to elevate their hazard of failing. Second, although the estimate is statistically significant, the magnitude is relatively low, implying that small firms, at least in the context of the Australian environment, tend to survive "longer" than is expected. It dispels the idea that small firms necessarily experience failure and exit the market. The result permits us to support the idea that the asymmetric small firm size distribution is partly due to an appreciable cohort of small firms poised for growth and survival.

To capture plausible industry variations, we also estimated hazard functions for the goods-producing sector (referring to manufacturing, for instance) and services-producing sector (that is, for example, wholesale and retail trade). As depicted in Table 5, overall, parameter estimates were generally statistically significant and yielded the same signs as those displayed. For the case of the goods-producing sector, innovation, business linkage, use of government small business advisory services, and equity finance appear as crucial determinants of survival. Furthermore, small firm-companies and those that are managed by family members are likely to face lower failure hazards. Once again, the respective coefficients for the tertiary qualification of staff and decision-maker in business courses proved insignificant. Firm size carries a negative sign, albeit not significant. For the case of the services-producing sector, firm size appears marginally important. However, the same scenario also emerges: innovation, business linkage, use of government small business advisory services, and equity finance tend to elevate the likelihood of survival of small firms.

Table 5: Estimation Results, Industry

Variable	Goods-producing sector		Services-producing sector	
	Coefficient	<i>p</i> -value	Coefficient	<i>p</i> -value
Age of the small firm:				
2 years to less than 5 years	-0.006	0.408	-0.004	0.488
5 years to less than 10 years	-0.025	0.001	-0.017	0.003
10 years to less than 20 years	-0.027	0.001	-0.027	0.000
20 years or more	-0.024	0.004	-0.035	0.000
Corporate structure	-0.418	0.000	-0.300	0.000
Family business	-1.560	0.000	-1.342	0.000
Innovation in goods or services	-0.012	0.015	-0.012	0.006
Business links	-0.049	0.001	-0.029	0.001
Equity finance	-0.951	0.001	-0.544	0.005
Tertiary qualification of staff	0.00005	0.971	0.0004	0.433
Tertiary qualification of decision-maker	0.0002	0.976	0.0047	0.398
Sought government advisory services				
1-3 times	-0.057	0.000	-0.025	0.004
More than 3 times	-0.027	0.185	-0.025	0.126
Firm size	-0.001	0.492	-0.003	0.078
-2 log likelihood: 15 916.835				

## 6 Conclusion

The fundamental research theme of this paper is the exploration of the dynamics of small firm survival. Through the estimation of the Cox hazard regression model, our empirical evidence posits that a distinct set of small firms can elevate their survival through innovation, business networks, and government advisory services. Crucially, by becoming established as a small firm-corporation, they elevate their likelihood of survival. When small firms are organized as a family business, there is greater potential to lower the likelihood of failure.

Moreover, small firms do not necessarily draw their managerial competence from employees formally academically trained in the cognate fields of business, de-linking the purported positive relationship between small firm viability and management training. In essence, our results adhere to the idea that while some small firms fail, some do survive, thus, potentially creating employment, establishing innovation, and promoting the entrepreneurial spirit.

The task on hand is to identify the appropriate policy mechanisms and structural programs that should be implemented to support their growth and survival. Based from our results, this would involve designing mechanisms for spurring innovation, business linkages, and the utilization of government small business advisory services. Issues of obtaining long-term financing and regulating small firm-companies and family businesses would also fall under this spectrum. The motivating line of question is: how do we create a supportive and vibrant environment for small firms? Formulating small business policies is not a one-size-fits-all strategy. The fact that there are several thousands of small firms means that differences in intent and strategy will necessarily emerge. What is a reasonable policy for one may result in an unavoidable disadvantage for the other. All in all, this would require a policy framework which can broadly assist small firms and at the same time cater to specific needs.

## References

- [1] Schaper, M.T., Dana, L., Anderson, R. and Moroz, P. (2008). Distribution of Firm by Size: Observations and Evidence from Selected Countries. *International Journal of Entrepreneurship and Innovation Management*, 8(6), 718-726.
- [2] Cabral, L. M. B., and Mata, J. (2003). On the Evolution of the Firm Size Distribution: Facts and Theory. *American Economic Review*, 93(4), 1075–1090.
- [3] Organisation for Economic Cooperation and Development. (1997). *Globalisation and Small and Medium Enterprises (SMEs) Vols. I and II*.
- [4] Organisation for Economic Cooperation and Development. (2013). *Enterprises by Class Size*.
- [5] Edmiston, K. (2007). *The Role of Small and Large Businesses in Economic Development*. Federal Reserve Bank of Kansas City.
- [6] *Australian Small Business*. (2012). Commonwealth of Australia.
- [7] Organisation for Economic Cooperation and Development. (2005). *SME and Entrepreneurship Outlook*.
- [8] Audretsch, (1991). New Firm Survival and The Technological Regime. *Review of Economics and Statistics*, 73(3), 441-450.
- [9] Audretsch, D. B. and Mahmood, T. (1994). “Entry, Growth, and Survival: The New Learning in Firm Selection and Industry Evolution.” In K. Aiginger and J. Finsinger (eds.) *Applied Industrial Organization*. Dordrecht: Kluwer Academic Publishers.
- [10] Agarwal, R. and Gort, M. (2002). Firm and Product Life Cycles and Firm Survival. *American Economic Review*, 92(2), 184-190

- [11] Bickerdyke, I., Lattimore, R. and Madge, A. (2000). Business Failure and Change: An Australian Perspective. Staff Research Paper, Productivity Commission.
- [12] Winkelmann, R. and Boes, S. (2009). Analysis of Microdata, 2nd ed. Berlin, Heidelberg: Springer-Verlag.
- [13] Australian Bureau of Statistics. (1999). Business Longitudinal Survey, 1994-98.
- [14] Australian Bureau of Statistics. (1994-1998). Confidentialised Unit Record File Draft Documentation. Catalog No. 8141.0.30.001
- [15] Lattimore, R. Madge, A., Martin, B. and Mills, J. (1998). Design Principles for Small Business Programs and Regulation 1998. Staff Research Paper. Productivity Commission.
- [16] Reserve Bank of Australia (2012). Small Business Finance Roundtable.
- [17] Jovanovic, B. (1982). Selection and Evolution of Industry. *Econometrica*, 50(2), 649- 670.
- [18] Dosi, G. and Teece, D. (1998). Organizational Competencies and the Boundaries of the Firms. In R. Arena and C. Longhi (eds.), *Markets and Organization*. Berlin: Springer Verlag.
- [19] Audretsch, D. B. and Mahmood, T. (1995). New Firm Survival: New Results Using a Hazard Function. *Review of Economics and Statistics*, 44, 97-103.
- [20] Borland, J, and Homes, R. (1996). Growth and Failure of Manufacturing Establishments in Australia. *Australian Economic Papers*, 69 (December), 334-347.
- [21] Northwood, K. (1999) Longitudinal Analysis of Firm Performance Using Longitudinal Data from the Business Longitudinal Survey. *Australian Bulletin of Statistics* 28th Annual Conference of Economists, September,1-31.
- [22] Cox, D. (1972). Regression Models and Life Tables. *Journal of the Royal Statistical Society*, B, 74, 187-220.
- [23] Cox, D. (1975). Partial Likelihood. *Biometrics*, 62(3): 269-275.
- [24] Dunne, T., Roberts, M. and Samuelson, L. (1989). The Growth and Failure of U.S. Manufacturing Plants. *Quarterly Journal of Economics* 104(4), 671-698.
- [25] Kellermanns, F.W. and Eddleston, K. (2004). Feuding Families; When Conflict does a Family Firm Good. *Entrepreneurship Theory and Practice*, 28(3), 209-228.
- [26] Acs Z.J. and D. Audretsch (1990). *Innovation and Small Firms*. Cambridge: The MIT Press.
- [27] Audretsch, D.B. and Feldman, M.P. (2003). Small-Firm Strategic Research Partnerships: The Case of Biotechnology. *Technology Analysis and Strategic Management*, 15(2), 273-288.
- [28] Carter, R. and Van Auken, H. (2006). Small Firm Bankruptcy. *Journal of Small Business Management*, 44(4), 3-512.

- [29] Wally, S. and Baum, J. (1994). Personal and Structural Determinants of the Pace of Strategic Decision Making, *Academy of Management Journal*, 37, 932-956.