

# The importance of industry to entrepreneurship

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This is a post-peer-review, pre-copyedit version of an article published in the Journal of Industry, Competition and Trade. The final authenticated version is available online at:  
<http://dx.doi.org/10.1007/s10842-019-00310-7>.

## ABSTRACT

Industries serve an important function in strategic entrepreneurship. By placing the industrial structure at the focal point of analysis, Porter's five forces model explains why some industries are more profitable than others. Yet, despite their importance in strategic entrepreneurship, studies often treat industries as something to be controlled rather than explicitly examined, and although some studies have considered the industry's important role in the entrepreneurship literature, they often examine particular industries or comparisons between a few select industries. Research, however, has seldom examined the importance of industries to entrepreneurship outcomes. We fill this void by conducting an empirical analysis of NAICS industry sectors using the Kauffman Firm Survey, which follows thousands of small and nascent businesses in the United States between 2004 and 2011. We uncover several important findings. Namely, we find that service industries—particularly the Professional, Technical, and Scientific services industry—has a higher rate of profit, higher sales revenue, and better rate of survival when compared to other industries. In contrast, we find that retail and manufacturing industries generally perform worse on these metrics, as they are less profitable and have lower rates of survival. We also find that industries with more connections to government—agricultural industry, public utilities, and public administration—have higher rates of survival and profitability, on average. Our evidence, thus, affirms the importance of industry for strategic entrepreneurship, which has important managerial and public policy implications.

**Keywords:** industries; strategic entrepreneurship; Porter's five forces; Kauffman Firm Survey

**JEL codes:** L22, L26, M13, M21

## Acknowledgements

The authors gratefully acknowledge funding and support from the Ewing Marion Kauffman Foundation and the NORC enclave at the University of Chicago. Certain data included herein are derived from the Ewing Marion Kauffman Foundation, Kansas City, MO. Any opinions, findings, and conclusions or recommendations expressed in the material are those of the authors and do not necessarily reflect the views of the Ewing Marion Kauffman Foundation. Any remaining errors are our own.

## INTRODUCTION

One of the most well-known examples of the importance of industry to firm strategy is captured in the five forces model, which describes how firms can exhibit superior performance due to their choice of industry (Ketels, 2006; Porter, 1979). Porter (1979) bases the strength of the industry according to five characteristics: threat of new entrants, bargaining power of suppliers, bargaining power of customers, threat of substitute products or services, and rivalry among existing competitors. Yet, despite this well-known model, scholarly studies often ignore the importance of the industry and instead opt to control for industry differences rather than highlight their importance<sup>1</sup>. In this stream, industries are often classified according to a few similar characteristics and dimensions but doing so forces the ensuing analysis to be selective to a few industries (Peneder 2003). Although this approach is logical when industries are of secondary importance, we argue that the literature has overlooked their importance in strategic entrepreneurship.<sup>2</sup> By ignoring the importance of the industry in analyses, important industry-level questions will continue to be ignored.

The purpose of this study is to examine empirically how different industry sectors affect entrepreneurs' performance according to several metrics—profit, sales revenues, firm survival

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<sup>1</sup> This is typically done by including industry-level dummy variables to control for differences between industries.

<sup>2</sup> An exception is the study by Hurst & Pugsley (2011) which recommends that entrepreneurship research should not focus on all industries. Rather, it should focus on growth-oriented industries exclusively.

rates, and competitive advantages. This is important because certain policies designed to stimulate entrepreneurship in some industries have been shown to be less effective in other industries (Gohmann, Hobbs, and McCrickard, 2008). By examining differences in entrepreneurial outcomes across industry sectors, we intend to acquire a deeper understanding of the ways industry structure affects strategic entrepreneurship. Uncovering differences among industries generates novel and interesting questions related to entrepreneurship via agency theory, institutional theory, sociology, or political economy, among others.

Our study utilizes a rich source of data, the Kauffman Firm Survey (KFS), which follows thousands of nascent and small businesses in the United States from 2004 to 2011. It includes a detailed source of information on geographical location, profitability, sales revenues, exit rates, sources of competitive advantage, credit risk, and firm and owner characteristics, among others. Most importantly, the KFS contains detailed industry information, which allows us to examine how the choice of industry affects entrepreneurial performance using three key indicators: firm survival, profitability, sales revenues, and sources of competitive advantage.

We uncover several important findings in our study. We find that the agricultural and forestry industry is relatively stable with a low rate of firm exit. Firms in the utility industry and public administration industry also face low rates of exit. This is unsurprising since utilities are heavily regulated by the government and do not face the same competitive forces that other industries may encounter. We also find that firms in service industries—particularly the professional, scientific, & technical service industry—are, on average, more profitable, have higher sales, survive longer, and the owners are more likely to perceive that they have a competitive advantage. In contrast, we find that the manufacturing and retail trade industries have

lower profits and firms in retail industries face lower rates of survival. Our findings, thus, illustrate the importance of industry to strategic entrepreneurship.

### **Related Literature Review**

Porter's (1979) five forces model indicates that some firms are more profitable than others merely because they are positioned in superior industries. That is, some firms will be more profitable than others due to the different factors associated with that industry. These factors include the threat of new entrants, the bargaining power of suppliers, the bargaining power of customers, the threat of substitute products or services, and rivalry among existing competitors. In all factors, competitiveness is key (Aiginger, 2006) since a firm can become more profitable and experience better prospects for survival if it reduces its competition and increases its bargaining strength. Thus, we use this framework as a rationale to facilitate our understanding of industry-based differences. To our knowledge, no study has conducted a comparative analysis of business industries, though some research has been conducted on entrepreneurship by comparing particular industries. We highlight these studies below.

#### **Sector studies**

Because some studies have examined how entrepreneurship varies by industry sector, it is important to mention these studies to situate our research in the literature. Scholars have found that there is more product innovation in manufacturing, knowledge-intensive services, and financial services industries compared to the construction, wholesale and transport, retail services and hotel and catering services (De Jong & Vermeulen 2006). Another study used the 1984 Survey of Income and Program Participation to examine self-employment decisions across industry sectors

and discovered major financial barriers to self-employment in manufacturing and wholesaling (Bates 1995). In another study, researchers examined how entrepreneurship and economic freedom varies within the service industry and found that economic freedom leads to growth in the number of firms and the level of employment in business and personal services but reduces growth and employment in health, social, and legal service industries (Gohmann et al. 2008). Sandberg and Hofer (1988) expand on the traditional venture capitalist model, based on the personality traits and strategies of the entrepreneur, by including a consideration of the industry. They find that industries matter to a much greater extent than the personality of the entrepreneur. Chatman and Jehn (1994) find that industry membership accounts for a larger variance than the individual firm in organizational culture and conclude that “future research should take industry contexts into account to fully explain the evolution and maintenance of organizational cultures.” Based on these studies, we conclude that industry analysis is very important, and a more comprehensive examination of the ways industries affect entrepreneurship is needed.

### **Entrepreneurial outcomes may differ based on the industry sector**

Industry structure, competition, institutions, and culture are all very important because of their interactive effect on entrepreneurship. Institutions and culture are important because they help define the rules (North 1991, Williamson 2000) of the industry. Some industries (e.g. agriculture and utilities) may be more politically connected, which in turn, affects entrepreneurial outcomes. McDougall, Robinson, and DeNisi (1992) found that industry specific factors are very important when assessing the success of new ventures. Specifically, they found that some new venture strategies were very effective in some industry settings but also ineffective in other settings. Dean & Meyer (1996) find that dynamic industries—those that experience high rates of

growth—experience higher rates of new venture formation. They also find that entry barriers greatly inhibit the formation of new ventures. Entry barriers, thus, help reinforce a culture of unproductive entrepreneurship (Baumol 1990). The industry setting also influences strategic entrepreneurship. McDougall et al. (1994) find that new ventures have high sales growth when entering high growth industries and engaging in a broad breadth strategy. All of these factors help explain how strategy and industry structure affect new venture internationalization through a complex and interactive relationship (Fernhaber, McDougall, and Oviart, 2007). In addition, findings from several studies (Shane, 2008; Hurst & Pugsley, 2011; 2017) indicate that all entrepreneurs are not created equal and, thus, some industries have more small business owners who are less interested in growth and innovation and are more interested in non-pecuniary factors (e.g., flexibility and autonomy). Based on this review, how competitive and profitable some industries are or whether entrepreneurs desire to expand their businesses largely depends on the choice of industry. Thus, the choice of industry becomes very important for analysis. Despite these findings, prior research has not comprehensively examined the ways industries affect entrepreneurial outcomes. We fill this void by performing an empirical analysis of entrepreneurial outcomes using the Kauffman Firm Survey (KFS) data in the United States.

## **METHODOLOGY**

### **Sample and Data Description**

We gathered data from several sources to conduct this study. Individual-level and firm-level data are taken from the Kauffman Firm Survey (KFS) (Ballou et al. 2008). The survey used a multi-mode design, including a web survey and computer-assisted telephone interviewing follow-up. The sample consists of 4,928 businesses starting in 2004 with annual follow-up through

2011. The baseline survey response rate was 43 percent with a follow-up response rate of over 80 percent. These data provide a perfect opportunity to observe firm survival, since researchers can easily ascertain when respondents go out of business. Because we are interested in comparing the performance of different industries, Table 1 reports the mean and standard deviations of each industry at the two-digit NAICS level.

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INSERT TABLE 1 ABOUT HERE  
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Table 1 reports that 29 percent of firms are positioned in the Professional, Scientific, & Technical service industry (NAICS 54). This industry comprises the largest proportion of the KFS dataset. The industry with the second largest proportion is one of the three manufacturing industries (NAICS 33) with ten percent of firms, and the third largest is the other services category (NAICS 81) with eight percent of firms.

### **Dependent variables**

Our first dependent variable is the rate of *firm survival*, which especially measures firm performance for young firms (Geroski, 1995; Stinchcombe, 1965) and self-employment (Block and Sandner, 2009). In our study, firm exits represent 7.1 percent of total observations, for which the exit variable is equal to 1 if the last year of activity reported for an entrant occurred on or before 2011, the last year of the Kauffman Firm Survey.

Our next dependent variables capture industry profitability. If entry barriers are sufficiently high, above normal rates of return are possible for an entire industry. This is one potential explanation of why pharmaceutical and R&D industries might experience higher levels of profitability (Froeb et al. 2015). Therefore, we employ two measures of profitability to record

these data: *profit and profit quartiles*. *Profit* is a dummy variable coded 1 if the firm earns a positive net profit and 0 otherwise. *Profit quartile* is a discrete measure that takes on a value of either 1, 2, 3, or 4, indicating the degree of profitability (4 = net profit > 75<sup>th</sup> percentile; 3 = 75<sup>th</sup> percentile > net profit > 50<sup>th</sup> percentile; 2 = 50<sup>th</sup> percentile > net profit > 25<sup>th</sup> percentile; 1 = net profit < 25<sup>th</sup> percentile.)

Relatedly, we also include a measure of sales revenues. This is important because some firms and industries might rely more heavily on sales in their formative years and less on profits, at least until they have grown to an optimal size. To account for this, we include a measure of sales revenues as an alternative dependent variable. *Sales revenue* is a continuous variable that measures the firm's sales revenue in a given year. We take the natural logarithm of this variable to account for a non-normal distribution.

Our last dependent variable is *competitive advantage perceptions*. This variable is a dummy variable with a value of 1 if a firm's owner or manager perceives at least one source of competitive advantage and 0 otherwise. Survey respondents listed the following reasons for their source of competitive advantage: cost, design, expertise, marketing, price, reputation, and speed. Porter (1979) and Barney (1991) describe the importance of competitive advantage to industrial and firm performance. In a nutshell, although competition is beneficial for economic activity overall, too much competition can drastically discourage investments in R&D (Aghion et al., 2005; Peneder & Wörter, 2014). In this sense, competitive advantages allow for entrepreneurs to insulate their business from the deleterious effects of competition on innovation and ultimately enhance profitability.

## **Independent variables**

While we are interested in examining key entrepreneurial outcomes between industries, we also acknowledge that other variables—particularly owner and regional characteristics—play an important role in entrepreneurial performance. We therefore include a robust set of controls to account for these differences. *Education* is a continuous variable that measures the number of years of formal higher education of the owner. *Work experience* is a continuous variable that measures the amount of work experience of the owner. Education and work experience are often used as proxies for human capital, which is associated with better entrepreneurial performance (Cooper et al., 1994; Martin et al., 2013; Bosma et al., 2004; Boudreaux & Nikolaev, 2018). *Age* is also a continuous variable that records the age of the owner. We include an entrepreneur's age to account for life cycle effects in entrepreneurship, particularly through occupational choice decisions (Lévesque & Minniti, 2011). These continuous variables are included to capture the degree of experience, and to some extent, the tacit knowledge of the firm owner. When owners are more experienced, older, and more educated, they may be in better positions to manage the firm. This is, however, not the only possibility, since younger owners may be better able to innovate and capture new market segments by thinking outside of the box.

We also include demographic variables to account for differences between entrepreneurs' gender and race. *Gender* is a dummy coded 1 if female and 0 if male. Fairlie & Robb (2009) find female-owned businesses have lower survival rates than male-owned businesses due to less start-up capital, social networks and work experience. Similarly, other studies (Fairlie & Robb, 2007; Robb & Robinson, 2014) find differences in funding sources and firm outcomes based on race and ethnicity. Because research suggests that gender may play an important role in entrepreneurship, we include this measure in our study. For race, *white* is dummy coded 1 if white and 0 otherwise.

Robb (2002) finds that minority owned businesses, particularly African Americans and Hispanics, face worse business outcomes than Caucasians.

We also include controls at the firm level. *Home Based* is a dummy coded 1 for owners who operate their business out of their home and 0 otherwise. *Sole Proprietorship* is a dummy with a value of 1 for businesses that are organized as a sole proprietorship and 0 otherwise. These variables might be important because home based businesses are more likely to rely on owner financing rather than from outside sources, which is more common in partnerships and LLCs (Robb & Robinson, 2014). These firms may also differ in their social networks leading to a variance in the liability of newness (Stinchcombe, 1965). *Have IP* is a dummy that is given a value of 1 if the owner or manager is the holder of any intellectual property and 0 otherwise. We include these variables in order to capture the strategic position of each firm. An industry's competitive advantage may allow firms to achieve above average rates of return in the market. Intellectual property (IP) is a related aspect of industry and firm strategy since IP may impose substantial barriers to entry and increase profitability and firm survival (Porter, 1979). *Credit risk* is a discrete variable measured on a scale from 1 to 5 where 1 indicates the firm has very little credit risk and five indicates the firm is at a very high risk based on its credit. Dun & Bradstreet provide the data for entrepreneurs' credit risk. *Assets(log)* is the natural logarithm of a firm's total assets, which accounts for firm size. These three firm variables are included to capture the risk and financial positions of the firm. Our a priori expectations are that firms with high a credit risk, low profits, and fewer assets are in a worse position to survive the competitive business environment. In addition to firm and owner characteristics, there is substantial geographical variation across the United States that may influence firm survival (Acs, Armington, & Zhang, 2007). *Income per capita* is the county-level per capita personal income provided by the U.S. Census Bureau. This

variable is included to capture the effect that income may have on the business climate. Higher disposable income and the demand for goods and services are positively correlated which should lead to more profitable opportunities for businesses to capture additional surplus. We present a correlation matrix and sample statistics in Table 2.

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INSERT TABLE 2 ABOUT HERE  
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### **Survey Design and Multiple Imputation**

Typical survival analysis relies on the assumption that each subject has the same chance of being selected into the sample. However, as is the case with the Kaufmann Firm Survey (KFS) data, the subjects were selected into the sample based on a complex survey design. The target population in the study is all new businesses started as an independent business in 2004 in the United States. The KFS, however, does not include new businesses started as a branch or subsidiary of an existing business. The KFS also does not include non-profit organizations in its study. The KFS was employed in response to the Kauffman Foundation's interest in high technology, medium technology, and woman-owned businesses. Thus, the KFS is a stratified sample based on industrial technology and gender. The KFS oversampled high-technology and medium-technology businesses in order to improve the precision of cross sectional and longitudinal analyses of these sub-groups. However, woman-owned businesses were not oversampled in the survey design. Sampling weights are employed due to this disproportionate stratified sampling procedure. Ignoring these weights may result in a stratum that is overrepresented or underrepresented, and this failure to account for survey design may lead to biased point estimates and underestimated standard errors. For these reasons, the empirical

analysis takes into consideration the survey design procedure described in the KFS.<sup>3</sup> In addition, for any missing data, we used Rubin's (1987) multiple imputation simulation-based procedure as suggested by the KFS design guide.

## **RESULTS AND ANALYSIS**

### **General comparisons**

The empirical analysis begins with a general comparison of all industries based on 2-digit NAICS levels with the agricultural and forestry industry (NAICS 11) as the omitted comparison group. All industries are included in the following five regression specifications: (1) profit dummy, (2) profit quartiles, (3) sales revenues, (4) firm survival, and (5) a dummy for competitive advantage perceptions. We estimate the profit dummy (1) and competitive advantage dummy (5) models using Logit with random effects to account for differences between firms. We estimate profit quartiles (2) using ordered Logit with random effects, and we estimate sales revenue (3) using Ordinary Least Squares (OLS) with random effects. Lastly, we illustrate firm survival models (4) using a cox semi-proportional hazard model. We report the estimates as hazard ratios, which are the exponential of the regression coefficients ( $e^{\beta}$ ). The results are broken down into four overall categories: profitability, sales revenues, firm survival, and competitive advantage perceptions. We present these findings in Table 3 below.

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 INSERT TABLE 3 ABOUT HERE  
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<sup>3</sup> For more information, see Cochran (1977), Levy & Lemeshow (2013), Korn & Graubard (2011), and Cleves et al. (2008). The latter is a useful guide for researchers using Stata.

## **Profitability**

First, we find that entrepreneurs in the public administration (NAICS 92) and utilities (NAICS 22) industries are more likely to earn a profit. Both industries exhibit positive and statistically significant relationships with the profit dummy. This indicates that these industries are more likely to record a profit than the omitted industry (NAICS 11 – Agriculture and Forestry). Only the public administration industry, however, has higher profits using the profit quartile dependent variable. This suggests that the public administration industry is not only more likely to record a profit, but it is also more likely to record a *larger* profit. This is not the case for the utility industry. Theory supports these findings since utility companies are highly regulated. In fact, utility companies are often structured as natural monopolies that are regulated to allow profits but monitor the size of the profit, since little competition exists in these markets. These results confirm our *a priori* expectations.

## **Sales Revenues**

While profits are an important indicator of the financial viability of the firm, one concern is that profitability can be a misleading measure of performance. Some industries require an optimal scale to be profitable, and it is possible that businesses incur losses during the first years of operation, while still being successful. An analysis entirely based on profits might overlook the possibility that these businesses might become more profitable in the future when the firms achieve

the optimal scale<sup>4</sup>. For these reasons, we also examine an alternative indicator of industry success—firms' sales revenues.

First, we find that entrepreneurs in the finance and insurance industry (NAICS 52) and health care and social assistance industry (NAICS 62) have lower average sales than the omitted category, the agricultural, forestry, and wildlife industry (NAICS 11). In contrast to the profit regressions, however, we do not find that the utilities (NAICS 22), and public administration (NAICS 92) have higher sales revenues. This suggests that the public administration industry and utilities industry are more likely to record a profit, but they are not more likely to have higher sales revenues. Theory supports these findings since utility companies are highly regulated. In fact, utility companies are often structured as natural monopolies that are regulated to allow profits but monitor the size of the profit, since little competition exists in these markets. These results confirm our *a priori* expectations. We do find some evidence that the scientific services (NAICS 54) and the management of companies industry (NAICS 55) have higher sales revenues, but the findings are only weakly statistically significant. We will examine these and other select industries later in the manuscript to assess their sales and profitability in more detail. Next, we turn to another important aspect of small business entrepreneurship—firm survival.

### **Firm Survival**

Profit and sales are not the only indicator of the success of an industry. How easily firms can survive in a competitive landscape also reveals important details about the industry. We used the Cox semi-proportional hazard model following prior work examining the survival of firms

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<sup>4</sup> We thank an anonymous reviewer for this suggestion.

(Audretsch & Mahmood, 1995; Delmar, McKelvie, Wennberg, 2013). These models follow the form,

$$h(t) = h_0(t) e^{(\beta X)} \quad (1)$$

where  $h(t)$  is the hazard rate for firm exit,  $h_0(t)$  is an unspecified baseline hazard function,  $X$  is a vector of regressors, and  $\beta$  is the estimated coefficient for these regressors. An advantage of the Cox proportional hazard model is that it requires no parametric assumptions for the hazard function. This is useful in new firms where the shape of hazard curve may not be monotonic in shape (e.g. Fichman, and Levinthal, 1991). This is particularly crucial since the dependent variable is a binary variable with a large percentage of non-events. Additionally, the Cox proportional hazard model can account for the lack of independence in the multiple-year firm observations. We used robust standard errors clustered at the organizational-level. Finally, the Cox models account for right-censoring issues in the data (i.e., some firms have not failed by the end of the study (Cleves, et al., 2008)). Estimates are reported as hazard ratios ( $e^\beta$ ) with numbers above 1 indicating an increased likelihood of firm exit and numbers below one indicate a reduced likelihood of exit.

We present the results from the firm survival regression in model 4 of Table 3. The results suggest that firms located in the agriculture and forestry industry (NAICS 11) and the utility industry (NAICS 22) have the highest odds of survival. Recall that the agriculture and forestry industry is the omitted comparison group. This is important because the coefficient on the utility industry is very close to zero, which is less than one. Thus, we find that firms in the utility industry are significantly more likely to survive when compared to firms in the agriculture and forestry industry. In contrast, many other industries possess statistically significant coefficients but their hazard rates all exceed one. These results suggest that these industries, in fact, face lower survival rates than the agriculture and forestry industry. In order to understand the magnitude of the

relationship, we take the absolute difference of the hazard ratio and 1. This difference is the associated effect of a 1-unit change in the regression coefficient. Hazard ratios exceeding one reduce a firm's survival rate and hazard ratios below one increase a firm's survival rate. Therefore, in terms of odds of survival, firms would find it easier to survive in the utility industry, followed by the agriculture and forestry industry, and then other industries.

It is unsurprising that firms in the utility industries (NAICS 22) and agriculture and forestry industries (NAICS 11) are the most likely to survive. This is because these industries are highly regulated. There also exists large farm subsidies which apply to the agriculture and forestry industry. These subsidies and regulations help support firms and increase their odds of survival.

### **Competitive Advantage Perceptions**

Another interesting aspect of industry competition is the concept of competitive advantage, which at the industry-level, Porter (1979) describes as the tendency for some industries to outperform others based on the threat of new entrants, the bargaining power of suppliers, the bargaining power of customers, the threat of substitute products or services, and rivalry among existing competitors. We therefore examine whether some industries are more likely to obtain a competitive advantage than other industries. This competitive advantage is self-reported by each firm manager and can arise from any of the five aspects of competitive advantage. Nonetheless, this dependent variable reports useful information that may help reveal important differences between industry performances.

We report the results for the owners' perception of competitive advantage in model 5 of Table 3. Our findings suggest that firms in the agriculture and forestry industry (NAICS 11) are

more likely to claim a source of competitive advantage than the construction, finance, real estate, and public administration industries.

### **Specific Industry Examinations**

While we have uncovered important differences between industries, we believe it is also important to examine these outcomes for specific groups of industries. This will hopefully provide more nuance to our conclusions. As such, Table 4 and Table 5 report the findings for select industries. It is important to note that because the utility industries, public administration, and the agriculture and forestry industries are typically more profitable, have higher sales, and have better odds of survival than the other industries, we report the examination of specific industries by examining the remaining industries. We report these findings in Table 4 and Table 5. First, we begin our examination with the manufacturing industry.

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INSERT TABLE 4 ABOUT HERE  
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### **Manufacturing Industries**

Manufacturing industries are classified as the 31, 32, and 33 NAICS codes. Overall, when comparing the manufacturing industries to non-manufacturing industries, we find that the manufacturing industry is less profitable than the other industries. This is true whether our measure of profitability is the likelihood of earning a profit (model 1 of Table 4) or the amount of the profit (models 3 of Table 4). In fact, firms in manufacturing industries are nine percent less likely to record a profit when compared to non-manufacturing industries. However, while the

manufacturing industry is less profitable, this does not translate into a lower firm survival rate or lower sales revenues.

Firms in the manufacturing industry do not have a significantly different survival rate than other industries, nor do they have statistically different sales revenues than other industries. Thus, while manufacturing firms have lower profits and are less likely to earn a profit, on average, this does not translate into higher exit rates. While survival rates of the manufacturing industry are not different from non-manufacturing industries, there does appear to be a relationship between manufacturing industries and competitive advantage perceptions.

Interestingly, firms in the manufacturing industry are more likely to perceive they have a competitive advantage than firms in non-manufacturing industries. One might expect that if firms are truly more likely to possess a competitive advantage in the manufacturing industry than this should translate to increased survivability and more profits. However, as we have reported, manufacturing firms have lower profits and are not more likely to survive (or fail) than non-manufacturing industries. Because competitive advantages are self-reported in the data, this implies that firm owners and managers in the manufacturing industry overestimate their ability to acquire a competitive advantage. In summary, firms in manufacturing industries are less profitable and face roughly the same rates of survival as non-manufacturing industries. We now turn our attention to the retail industry.

### **Retail Industries**

The next specific category of industries examined in Table 4 is the retail industry. Overall, we find that firms in the retail industry are less profitable than firms in non-retail industries. Specifically, we find that retail firms are five percent less likely to earn a profit than non-retail firms. We also find some evidence that the size of the profit is smaller in the retail industry, since

the profit quartile measure is negative and statistically significant. In contrast to the findings in the analysis of the manufacturing industry, there appears to be some evidence that firms' survival rates are different in the retail industry compared to other industries.

When examining survival odds in the retail industry, we find that firms in the retail industry face a 24 percent lower rate of survival as compared to non-retail industries. This conforms to our expectations, since profitability also appears to be lower in the retail industry. While we cannot reject the null hypothesis that survival rates are not different between the retail and non-retail industry, the p-value only just misses this criterion ( $t\text{-stat}=1.89$ ). Therefore, we believe there is enough evidence to argue that the retail industry also faces lower rates of survival. However, unlike the manufacturing industry, firm managers and owners in the retail industry are no more (or less) likely to perceive they have a competitive advantage than firms in non-retail industries. We now turn our attention to firms in service industries.

### **Service Industries**

We begin our examination of the service industry by aggregating all industries that qualify as service sectors. This includes the following industries: Professional, Scientific, & Technical Services (NAICS 54), Administrative and Support and Waste Management and Remediation Services (NAICS 56), Educational Services (NAICS 61), Health Care and Social Assistance (NAICS 62), Accommodation and Food Services (NAICS 72), and Other Services (NAICS 81). While we begin our analysis by creating a dummy for all of these service industries, we later examine each individual service category independently and report selected results. First, we examine all services, which we report in Table 5.

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INSERT TABLE 5 ABOUT HERE  
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Firms in service industries are five percent more likely to earn a profit than those in non-service industries. Not only are firms in the service industry more likely to record a profit, but there is also some evidence that the size of the profit is larger in the service industry as the relationship between the service industry dummy and the profit quartile dependent variable is positive and statistically significant. Firms in the service industry, however, do not report higher sales revenues on average when compared to firms in non-service industries.

Firm owners and managers are also six percent more likely to perceive they have a competitive advantage in service industries when compared to non-service industries. Since profits are five percent more likely in the service industry, some evidence suggests that profits are higher in the service industry, and firm managers are six percent more likely to claim a competitive advantage in the service industry, one might expect that survival rates are higher in the service industry. The data do, in fact, support this logic. The hazard ratio is 0.87, which suggests that firms in the service industry face a 13 percent higher rate of survival than those in non-service industries. However, the t-statistic fails to reject at the 5% level of significance and is only enough to reject at the 10% level ( $t=1.64$ ). Because the service industry is aggregated, this finding indicates that there are some differences between service industries. We now turn our attention to examine one specific service industry, that helps illustrate these differences between service industry firms.

### **Professional, Scientific, & Technical Service Industries**

The Professional, Scientific, & Technical service industry (NAICS 54) appears to be driving the results found in the aggregated services industry. The results suggest that the

professional, scientific, & technology service industry is more profitable, has higher sales revenues, its owners are more likely to perceive they have a competitive advantage, and has a higher survival rate than the other industries. First, we discuss profitability.

Firms in the professional, scientific, & technical service industry are seven percent more likely to earn a profit when compared to firms in other industries. In addition, the size of the profit also appears to be larger in the professional, scientific, & technical service industry as the coefficient on the profit quartiles regression is positively and statistically significant at conventional levels. In addition, firms in the professional, scientific, & technical service industry have higher sales revenues on average when compared to other industries. Taken together, the evidence supports the claim that firms in the professional, scientific, & technical service industry are both more likely to earn a profit, have larger profits, and larger sales revenues than firms in other industries.

Firms in this industry also experience higher rates of survival. When compared to firms outside of the professional, scientific, & technical service industry, firms within this industry face a 21 percent higher rate of survival (1.00-0.79), which is statistically significant at conventional levels. Intuitively, this makes sense because firms within this industry are seven percent more likely to record a profit, face larger profit amounts, and are six percent more likely to perceive they have a competitive advantage when compared to firms not in the professional, scientific, & technical service industry. This strong evidence points towards the professional, scientific, & technical service industry driving the results of the aggregated service industry examined in the previous section.

We also examined each of the other service industries: health and social services, other services, educational services, accommodation and food services, and administrative and support

and waste management and remediation services. Although most of these service industries are also more likely to record a profit and obtain larger profits, no other service industry also faces a higher rate of survival. In fact, the health care, social assistance, and education service industries do not face larger profits than others, even though this is a common finding for the other service industry categories. This helps to serve as a reminder that service industries should be examined in greater detail as substantial variation may occur between services (Gohmann et al. 2008).

## **DISCUSSION AND CONCLUDING REMARKS**

In this study, we conducted an empirical examination of entrepreneurial outcomes across industry sectors, which highlighted several important findings. We found that firms in the utility industry (NAICS 22) and the public administration industry (NAICS 92) are more likely to earn a profit when compared to other industries. We also found that firms in the utility industry and the agriculture and forestry industry have higher rates of survival than firms in other industries. Because utilities and public administration industries are often more intertwined with government and because the agricultural industry is a large recipient of farm subsidies from the government, these findings suggest that firms that interact more with the government are in better positions to earn a profit and survive in a competitive landscape. This is consistent with Porter's five forces analysis (Porter, 1979). Porter (1979) argues that some industries are in a better position due to the threat of new entrants, the bargaining power of suppliers, the bargaining power of customers, the threat of substitute products or services, and rivalry among existing competitors. Public utilities, agricultural industries, and public administration industries all face low threats of entry and low degrees of industry rivalry, largely because they are all regulated monopolies supported by the government or supported heavily with government subsidies and transfers. These relationships

provide competitive advantages to these industries. However, because these industries are very different from the other industries, it behooved us to compare the outcomes between the remaining industries that interact with government less. Thus, we dropped the utility, public administration, and agriculture and forestry industries in our data and examined the other industries in more detail. We then reported the findings from our examination.

In this additional examination, we discovered other important findings. Namely, that the manufacturing and retail industries are less profitable on average and the service industry—particularly the professional, scientific, & technical service industry—is more profitable on average. Not only do firms in the manufacturing and retail industries face lower odds of earning a profit and smaller profits overall, but they also face lower survival rates, although this evidence is stronger in the retail industry than in the manufacturing industry. In contrast, firms in the service industry are more likely to record a profit and experience larger profits than firms in non-service industries. In addition, firms in the professional, scientific, & technical service industry are even more likely to survive due to a 21 percent higher rate of survival when compared to firms outside the industry.

One potential explanation for these disparities between industries is the concept of competitive advantage. We examined whether firm owners and managers were more likely to perceive that they have competitive advantage in some industries due to the idea that a competitive advantage may facilitate firm survival and firm profitability. Overall, the results support this relationship and support Porter's five forces analysis. In industries where owners were more likely to perceive they have a competitive advantage, they were also more likely to either earn higher profits and experience a higher rate of firm survival. The exception was the manufacturing industry, where firms were less likely to record a profit, firms faced smaller profits, but they were

also more likely to perceive they have a competitive advantage. Our only explanation for this inconsistency is that firm managers in manufacturing industries overestimate their ability to obtain competitive advantages, since the evidence reports that the manufacturing industry has worse outcomes overall.

Future studies may desire to examine these industries in more detail. Because of the broad nature of this study, we limited our analysis to 2-digit NAICS codes. Future studies may examine entrepreneurial outcomes at a more granular level. Of course, these studies would need to be limited to fewer industries to remain manageable but useful industry information may be extracted from such a detailed level of analysis. For instance, we have found that the professional, scientific, & technical service industry appears to be one of the best industries for firms to enter. A more detailed theoretical or empirical analysis may uncover which sub-sectors outperform others and the reasons for their superior performance. Alternatively, future studies may also desire to examine other entrepreneurial outcomes.

We have mainly focused on profits, firm survival rates, sales revenues, and competitive advantage perceptions. Future research may want to expand these outcomes to examine strategic alliances, debt, market share, and other indicators of interest. Finally, our research has been limited to nascent small businesses. Therefore, while exit decisions can be analyzed, entry decisions cannot be examined in any detail. Future research may expand upon our findings by examining entry decisions for small firms. Conversely, scholars might also desire to examine outcomes between sectors with more mature firms—a feature that our study cannot perform.

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**Table 1.** Mean and Standard Deviation of Industries

| <b>NAICS</b>                                     | <b>Mean</b> | <b>Standard Deviation</b> |
|--|-------------|---------------------------|
| Agriculture, forestry, fishing, and hunting      | 0.001       | 0.025                     |
| Mining, Quarrying, and Oil and Gas Extraction    | 0.001       | 0.033                     |
| Utilities  | 0.001       | 0.033                     |
| Construction                                     | 0.071       | 0.026                     |
| Manufacturing                                    |             |                           |
| 31   | 0.110       | 0.103                     |
| 32   | 0.026       | 0.159                     |
| 33   | 0.098       | 0.297                     |
| Wholesale  | 0.057       | 0.212                     |
| Retail trade                                     |             |                           |
| 44   | 0.052       | 0.222                     |
| 45   | 0.050       | 0.218                     |
| Transportation                                   |             |                           |
| 48   | 0.019       | 0.137                     |
| 49   | 0.002       | 0.045                     |
| Information                                      | 0.037       | 0.190                     |
| Finance and insurance                            | 0.034       | 0.181                     |
| Real estate and rental and leasing               | 0.040       | 0.196                     |
| Professional, scientific, and technical services | 0.278       | 0.448                     |
| Management of companies and enterprises          | 0.001       | 0.028                     |
| Administrative and support and waste management  | 0.073       | 0.261                     |
| Educational services                             | 0.008       | 0.088                     |
| Healthcare and social assistance                 | 0.021       | 0.142                     |
| Arts, entertainment, and recreation              | 0.023       | 0.149                     |
| Accommodation and food services                  | 0.016       | 0.125                     |
| Other services                                   | 0.082       | 0.274                     |
| Public administration                            |             |                           |
| 91   | 0.0001      | 0.007                     |
| 92   | 0.001       | 0.026                     |

**Table 2.** Summary Statistics and Correlation Matrix

| Variables                      | Mean  | Std.  | [1]  | [2]          | [3]          | [4]          | [5]          | [6]          | [7]         | [8]         | [9]          | [10]         | [11]        | [12]         | [13]         | [14]        |   |
|--------------------------------|-------|-------|------|--------------|--------------|--------------|--------------|--------------|-------------|-------------|--------------|--------------|-------------|--------------|--------------|-------------|---|
| <i>Firm</i>                    |       |       |      |              |              |              |              |              |             |             |              |              |             |              |              |             |   |
| Sole Proprietorship            | 0.32  | 0.47  | [1]  | 1            |              |              |              |              |             |             |              |              |             |              |              |             |   |
| Comp advantage perceptions     | 0.58  | 0.50  | [2]  | <b>-0.05</b> | 1            |              |              |              |             |             |              |              |             |              |              |             |   |
| Have IP                        | 0.21  | 0.41  | [3]  | <b>-0.10</b> | <b>0.19</b>  | 1            |              |              |             |             |              |              |             |              |              |             |   |
| Home Based                     | 0.54  | 0.50  | [4]  | <b>0.22</b>  | <b>-0.11</b> | <b>-0.06</b> | 1            |              |             |             |              |              |             |              |              |             |   |
| Credit risk                    | 3.03  | 0.92  | [5]  | <b>0.11</b>  | <b>0.02</b>  | <b>-0.01</b> | <b>0.07</b>  | 1            |             |             |              |              |             |              |              |             |   |
| Profit                         | 0.62  | 0.49  | [6]  | <b>0.02</b>  | <b>0.04</b>  | <b>-0.07</b> | -0.00        | <b>-0.10</b> | 1           |             |              |              |             |              |              |             |   |
| Assets <sup>a</sup>            | 609   | 1,340 | [7]  | <b>-0.25</b> | <b>0.14</b>  | <b>0.09</b>  | <b>-0.30</b> | <b>-0.15</b> | <b>0.09</b> | 1           |              |              |             |              |              |             |   |
| Sales Revenues <sup>a</sup>    | 674   | 8,873 | [8]  | <b>-0.20</b> | <b>0.12</b>  | <b>0.05</b>  | <b>-0.24</b> | <b>-0.14</b> | <b>0.28</b> | <b>0.44</b> | 1            |              |             |              |              |             |   |
| <i>Owner</i>                   |       |       |      |              |              |              |              |              |             |             |              |              |             |              |              |             |   |
| Education                      | 0.53  | 0.50  | [9]  | <b>-0.11</b> | <b>0.06</b>  | <b>0.12</b>  | 0.00         | <b>-0.08</b> | <b>0.02</b> | <b>0.03</b> | <b>0.05</b>  | 1            |             |              |              |             |   |
| Work experience                | 13.04 | 10.23 | [10] | <b>-0.04</b> | <b>0.02</b>  | <b>0.01</b>  | 0.01         | <b>-0.06</b> | <b>0.08</b> | <b>0.05</b> | <b>0.06</b>  | <b>0.04</b>  | 1           |              |              |             |   |
| Age                            | 47.85 | 10.54 | [11] | <b>0.04</b>  | <b>-0.05</b> | <b>0.01</b>  | <b>0.05</b>  | <b>-0.08</b> | -0.00       | <b>0.01</b> | <b>-0.02</b> | <b>0.09</b>  | <b>0.38</b> | 1            |              |             |   |
| White                          | 0.85  | 0.35  | [12] | <b>-0.03</b> | <b>0.02</b>  | -0.00        | 0.00         | <b>-0.10</b> | <b>0.06</b> | <b>0.09</b> | <b>0.10</b>  | <b>-0.03</b> | <b>0.06</b> | <b>0.11</b>  | 1            |             |   |
| Gender                         | 0.72  | 0.40  | [13] | <b>-0.10</b> | -0.00        | <b>0.04</b>  | <b>-0.04</b> | <b>-0.01</b> | <b>0.04</b> | <b>0.10</b> | <b>0.08</b>  | <b>0.05</b>  | <b>0.18</b> | <b>-0.02</b> | <b>0.03</b>  | 1           |   |
| <i>County</i>                  |       |       |      |              |              |              |              |              |             |             |              |              |             |              |              |             |   |
| Income per capita <sup>a</sup> | 38.40 | 11.88 | [14] | <b>0.07</b>  | <b>0.01</b>  | <b>0.05</b>  | <b>0.02</b>  | <b>-0.06</b> | <b>0.04</b> | <b>0.02</b> | <b>0.06</b>  | <b>0.21</b>  | <b>0.05</b> | <b>0.05</b>  | <b>-0.04</b> | <b>0.01</b> | 1 |

Note – <sup>a</sup> (\$ thousands). Numbers in bold are statistically significant ( $p < 0.05$ ).

**Table 3.** An examination of firm profitability, survival rates, sales revenues and the perception of competitive advantages

| Dependent Variable                        | Profit dummy |        | Profit quartiles |        | Sales (log) |         | Survival   |         | Comp. advantage |         |
|---|--------------|--------|------------------|--------|-------------|---------|------------|---------|-----------------|---------|
| Method                                    | Logit RE     |        | Ordered Logit    |        | OLS RE      |         | Cox-hazard |         | Logit RE        |         |
| Model                                     | (1)          | (2)    | (3)              | (4)    | (5)         | (6)     | (7)        | (8)     | (9)             | (10)    |
| <i>Firm characteristics</i>               |              |        |                  |        |             |         |            |         |                 |         |
| Home Based                                | -0.003       | (0.17) | -0.03            | (0.87) | -1.12***    | (8.95)  | 0.94       | (0.68)  | -0.06***        | (3.86)  |
| Sole Proprietorship                       | 0.08***      | (4.30) | 0.18***          | (4.18) | -0.96***    | (7.32)  | 0.72***    | (3.24)  | -0.01           | (0.33)  |
| Comp advantage perceptions                | 0.07***      | (4.67) | 0.19***          | (5.71) | 0.42***     | (4.19)  | 0.77***    | (2.89)  | ---             | ---     |
| Have IP                                   | -0.07***     | (3.39) | -0.16***         | (3.45) | 0.10        | (0.79)  | 0.90       | (0.91)  | 0.17***         | (10.28) |
| Credit risk                               | -0.03***     | (4.29) | -0.09***         | (4.56) | -0.24***    | (4.21)  | 1.35***    | (5.43)  | 0.014*          | (1.77)  |
| Profit                                    | ---          | ---    | ---              | ---    | 1.93***     | (20.28) | 0.69***    | (4.14)  | 0.06***         | (4.67)  |
| Assets (log)                              | 0.01***      | (3.04) | 0.04***          | (7.93) | 0.40***     | (24.61) | 0.95***    | (4.94)  | 0.02***         | (6.74)  |
| <i>Owner characteristics</i>              |              |        |                  |        |             |         |            |         |                 |         |
| Education                                 | -0.005       | (0.29) | -0.01            | (0.29) | 0.24**      | (1.95)  | 0.93       | (0.73)  | 0.04***         | (2.65)  |
| Work experience                           | 0.003***     | (4.14) | 0.01***          | (3.74) | 0.01*       | (1.78)  | 0.99       | (1.71)  | 0.001           | (1.33)  |
| Age                                       | -0.00        | (1.34) | -0.004**         | (2.41) | -0.01       | (1.41)  | 1.00       | (0.64)  | -0.003***       | (4.03)  |
| Race White                                | 0.05**       | (2.25) | 0.11**           | (1.99) | 1.30***     | (7.18)  | 1.20       | (1.38)  | 0.06**          | (2.34)  |
| Gender                                    | 0.02         | (1.13) | 0.06             | (1.35) | 0.18        | (1.20)  | 0.94       | (0.54)  | -0.05**         | (2.23)  |
| <i>County characteristics</i>             |              |        |                  |        |             |         |            |         |                 |         |
| Income per capita <sup>a</sup>            | 1.0*         | (1.91) | 5.0***           | (2.71) | -0.0002***  | (4.06)  | 0.99       | (0.17)  | 0.0002          | (0.31)  |
| <i>Industries(2 digit)</i>                |              |        |                  |        |             |         |            |         |                 |         |
| Mining                                    | -0.01        | (0.03) | 0.18             | (0.23) | -1.51       | (0.85)  | 8.97       | (1.64)  | -0.08           | (0.87)  |
| Utilities                                 | 0.35***      | (3.32) | 0.65             | (1.53) | -1.73       | (1.15)  | 0.00***    | (30.13) | -0.15           | (0.70)  |
| Construction                              | 0.08         | (0.97) | 0.20             | (0.98) | 0.12        | (0.18)  | 6.62**     | (2.30)  | -0.17**         | (2.43)  |
| Manufacturing                             |              |        |                  |        |             |         |            |         |                 |         |
| 31  | -0.12        | (1.19) | -0.24            | (0.96) | 0.29        | (0.35)  | 7.45**     | (2.20)  | 0.02            | (0.22)  |
| 32  | 0.01         | (0.14) | 0.03             | (0.15) | -0.36       | (0.52)  | 9.43***    | (2.62)  | 0.02            | (0.29)  |
| 33  | -0.02        | (0.28) | -0.10            | (0.51) | 0.34        | (0.54)  | 4.39*      | (1.75)  | -0.03           | (0.43)  |
| Wholesale Trade                           | 0.08         | (0.96) | 0.25             | (1.18) | 0.80        | (1.24)  | 5.17**     | (1.95)  | -0.04           | (0.48)  |
| Retail Trade                              |              |        |                  |        |             |         |            |         |                 |         |
| 44  | 0.04         | (0.46) | 0.13             | (0.63) | 0.33        | (0.51)  | 6.70**     | (2.31)  | -0.05           | (0.69)  |
| 45  | -0.03        | (0.38) | -0.08            | (0.37) | -0.09       | (0.15)  | 6.42**     | (2.25)  | -0.04           | (0.57)  |
| Transportation and warehousing            |              |        |                  |        |             |         |            |         |                 |         |
| 48  | 0.11         | (1.27) | 0.34             | (1.59) | 0.31        | (0.43)  | 7.93**     | (2.46)  | -0.11           | (1.33)  |
| 49  | 0.11         | (0.63) | 0.24             | (0.69) | 0.38        | (0.30)  | 1.28       | (0.19)  | -0.11           | (0.71)  |
| Information                               | 0.001        | (0.01) | -0.02            | (0.11) | 0.09        | (0.14)  | 5.23**     | (1.96)  | -0.05           | (0.67)  |
| Finance and Insurance                     | 0.04         | (0.44) | 0.20             | (0.94) | -1.39**     | (2.07)  | 5.19**     | (1.98)  | -0.22***        | (2.85)  |
| Real estate                               | 0.03         | (0.42) | 0.07             | (0.33) | -0.77       | (1.17)  | 5.12**     | (1.96)  | -0.26***        | (3.50)  |
| Scientific services                       | 0.11         | (1.54) | 0.33*            | (1.70) | 0.33        | (0.54)  | 4.48*      | (1.84)  | -0.03           | (0.48)  |
| Management of comp                        | 0.29         | (1.47) | 1.03*            | (1.92) | -4.39       | (2.57)  | 9.26*      | (1.85)  | 0.18            | (1.18)  |
| Administrative and Support of             | 0.08         | (1.00) | 0.23             | (1.17) | -0.14       | (0.22)  | 5.00**     | (1.96)  | -0.07           | (0.97)  |
| Educational Services                      | 0.09         | (0.89) | 0.18             | (0.71) | -0.12       | (0.14)  | 6.38**     | (1.97)  | 0.02            | (0.23)  |
| Health care and social                    | 0.14         | (1.65) | 0.28             | (1.32) | -1.67**     | (2.32)  | 4.86*      | (1.85)  | -0.07           | (0.87)  |
| Arts, Entertainment                       | -0.04        | (0.48) | -0.14            | (0.67) | -0.31       | (0.45)  | 2.08       | (0.80)  | 0.002           | (0.03)  |
| Accommodation and food services           | -0.01        | (0.14) | 0.004            | (0.02) | 0.32        | (0.43)  | 8.62**     | (2.56)  | 0.02            | (0.23)  |
| Other services                            | 0.05         | (0.59) | 0.06             | (0.28) | -0.16       | (0.26)  | 5.17**     | (1.99)  | -0.04           | (0.57)  |
| Public admin                              | 0.45***      | (5.61) | 1.04***          | (2.86) | 1.49        | (0.81)  | 4.57       | (1.09)  | -0.40***        | (2.66)  |
| Number of observations                    | 9840         |        | 9840             |        | 9659        |         | 9840       |         | 9327            |         |
| F-test of joint significance <sup>b</sup> | 10.62***     |        | 8.83***          |        | 1976***     |         | 114***     |         | 2.38***         |         |

Note – <sup>a</sup> reported in thousands. <sup>b</sup> Sales regression in Column 3 uses a Wald chi-squared test. Survival estimates use the hazard ratio ( $e^{\beta}$ ). Omitted industry is agriculture, forestry, and wildlife (NAICS 11). |t-stat| in parenthesis. \*p<0.10; \*\*p<0.05; \*\*\*p<0.01 (two-tailed)

**Table 4.** Entrepreneurial Outcomes for Manufacturing and Retail Industries: Profits, Firm Survival, Sales Revenues, and the perception of Competitive Advantages

| Dependent Variable<br>Method<br>Model | Profit dummy       |                    | Profit quartiles   |                     | Sales (log)        |                    | Survival          |                   | Competitive advantage |                     |
|---------------------------------------|--------------------|--------------------|--------------------|---------------------|--------------------|--------------------|-------------------|-------------------|-----------------------|---------------------|
|                                       | Logit RE           | Logit RE           | Ordered Logit RE   | Ordered Logit RE    | OLS RE             | OLS RE             | Cox-hazard        | Cox-hazard        | Logit RE              | Logit RE            |
|                                       | (1)                | (2)                | (3)                | (4)                 | (5)                | (6)                | (7)               | (8)               | (9)                   | (10)                |
| <i>Firm characteristics</i>           |                    |                    |                    |                     |                    |                    |                   |                   |                       |                     |
| Home Based                            | 0.01<br>(0.81)     | 0.01<br>(0.46)     | 0.01<br>(0.29)     | -0.001<br>(0.03)    | -1.05***<br>(8.61) | -1.04***<br>(8.44) | 0.92<br>(0.87)    | 0.95<br>(0.55)    | -0.08***<br>(4.66)    | -0.07***<br>(4.39)  |
| Sole Proprietorship                   | 0.07***<br>(4.08)  | 0.07***<br>(4.15)  | 0.16***<br>(3.75)  | 0.16***<br>(3.01)   | -0.95***<br>(7.24) | -0.95***<br>(7.25) | 0.74***<br>(3.08) | 0.73***<br>(3.17) | 0.01<br>(0.63)        | 0.01<br>(0.59)      |
| Comp advantage perceptions            | 0.07***<br>(4.70)  | 0.07***<br>(4.67)  | 0.19***<br>(5.72)  | 0.19***<br>(5.68)   | 0.45***<br>(4.46)  | 0.45***<br>(4.46)  | 0.76***<br>(3.06) | 0.76***<br>(3.07) | ---                   | ---                 |
| Have IP                               | -0.07***<br>(3.67) | -0.07***<br>(3.91) | -0.17***<br>(3.71) | -0.19***<br>(3.94)  | 0.15<br>(1.23)     | 0.16<br>(1.26)     | 0.87<br>(1.15)    | 0.88<br>(1.10)    | 0.20***<br>(12.02)    | 0.20***<br>(12.20)  |
| Credit risk                           | -0.04***<br>(4.91) | -0.04***<br>(4.68) | -0.10***<br>(5.32) | -0.10***<br>(5.11)  | -0.26<br>(4.60)    | -0.26***<br>(4.63) | 1.36***<br>(5.59) | 1.35***<br>(5.41) | 0.02**<br>(2.27)      | 0.017**<br>(2.11)   |
| Profit                                | ---                | ---                | ---                | ---                 | 1.93***<br>(20.33) | 1.93***<br>(20.34) | 0.69***<br>(4.15) | 0.69***<br>(4.13) | 0.06***<br>(4.70)     | 0.06***<br>(4.68)   |
| Assets (log)                          | 0.01***<br>(2.83)  | 0.01***<br>(2.81)  | 0.04***<br>(7.81)  | 0.04***<br>(7.77)   | 0.40***<br>(24.87) | 0.40***<br>(24.87) | 0.95***<br>(4.57) | 0.95***<br>(4.57) | 0.01***<br>(6.23)     | 0.01***<br>(6.24)   |
| <i>Owner characteristics</i>          |                    |                    |                    |                     |                    |                    |                   |                   |                       |                     |
| Education                             | 0.004<br>(0.22)    | 0.002<br>(0.13)    | 0.01<br>(0.37)     | 0.01<br>(0.29)      | 0.24***<br>(2.02)  | 0.25***<br>(2.05)  | 0.88<br>(1.48)    | 0.88<br>(1.41)    | 0.05***<br>(3.08)     | 0.05***<br>(3.13)   |
| Work experience                       | 0.004***<br>(4.91) | 0.004***<br>(4.81) | 0.01***<br>(4.48)  | 0.01***<br>(4.48)   | 0.02***<br>(2.45)  | 0.02***<br>(2.49)  | 0.99**<br>(2.00)  | 1.00*<br>(1.84)   | 0.001<br>(1.59)       | 0.001<br>(1.64)     |
| Age                                   | -0.001*<br>(1.65)  | -0.001<br>(1.59)   | -0.01***<br>(2.64) | -0.005***<br>(2.60) | -0.01<br>(1.47)    | -0.10*<br>(1.85)   | 1.00<br>(0.52)    | 1.00<br>(0.61)    | -0.003***<br>(3.90)   | -0.003***<br>(3.94) |
| Race White                            | 0.05**<br>(2.07)   | 0.05**<br>(2.11)   | 0.09*<br>(1.72)    | 0.09*<br>(1.76)     | 1.26***<br>(6.94)  | 1.25***<br>(6.91)  | 1.18<br>(1.23)    | 1.17<br>(1.18)    | 0.05**<br>(2.15)      | 0.05**<br>(2.14)    |
| Gender                                | 0.03<br>(1.63)     | 0.03<br>(1.52)     | 0.10**<br>(2.14)   | 0.09**<br>(2.03)    | 0.27*<br>(1.83)    | 0.28*<br>(1.85)    | 0.97<br>(0.31)    | 0.98<br>(0.22)    | -0.06***<br>(3.08)    | -0.06***<br>(3.02)  |
| <i>County characteristics</i>         |                    |                    |                    |                     |                    |                    |                   |                   |                       |                     |
| Income per capita<br>(\$ thousands)   | 0.001**<br>(2.15)  | 0.001**<br>(2.15)  | 0.005***<br>(3.01) | 0.005***<br>(3.02)  | 0.02***<br>(3.96)  | 0.02***<br>(3.96)  | 1.00<br>(0.22)    | 1.00<br>(0.21)    | 0.0002<br>(0.25)      | 0.0002<br>(0.25)    |
| <i>Industries(2 digit NAICS)</i>      |                    |                    |                    |                     |                    |                    |                   |                   |                       |                     |
| Manufacturing                         | -0.09***<br>(3.27) |                    | -0.25***<br>(4.08) |                     | 0.23<br>(0.58)     |                    | 1.18<br>(0.92)    |                   | 0.07***<br>(2.83)     |                     |
| Retail                                |                    | -0.05**<br>(2.21)  |                    | -0.12**<br>(2.13)   |                    | 0.12<br>(0.67)     |                   | 1.24*<br>(1.89)   |                       | 0.03<br>(1.41)      |

Note - Survival estimates use the hazard ratio ( $e^{\beta}$ ). Omitted industries are agriculture, forestry, and wildlife (NAICS 11), utilities (NAICS 22) and public administration (NAICS 92). | t-stat | in parenthesis. \*p<0.10; \*\*p<0.05; \*\*\*p<0.01 (two-tailed)

**Table 5.** Entrepreneurial Outcomes for Service Industries: Profits, Firm Survival, Sales Revenues, and the perception of Competitive Advantages

| Dependent Variable<br>Method<br>Model             | Profit dummy       |                    | Profit quartiles    |                     | Sales (log)        |                    | Survival          |                   | Competitive advantage |                     |
|---|--------------------|--------------------|---------------------|---------------------|--------------------|--------------------|-------------------|-------------------|-----------------------|---------------------|
|   | Logit RE           |                    | Ordered Logit RE    |                     | OLS RE             |                    | Cox-hazard        |                   | Logit RE              |                     |
|   | (1)                | (2)                | (3)                 | (4)                 | (5)                | (6)                | (7)               | (8)               | (9)                   | (10)                |
| <i>Firm characteristics</i>                       |                    |                    |                     |                     |                    |                    |                   |                   |                       |                     |
| Home Based  | 0.007<br>(0.43)    | 0.01<br>(0.73)     | -0.007<br>(0.16)    | 0.01<br>(0.23)      | -1.10***<br>(8.98) | -1.06***<br>(8.62) | 0.94<br>(0.66)    | 0.93<br>(0.83)    | -0.08***<br>(5.00)    | -0.08***<br>(4.86)  |
| Sole Proprietorship                               | 0.07***<br>(4.07)  | 0.07***<br>(3.89)  | 0.16***<br>(3.73)   | 0.15***<br>(3.54)   | -0.93***<br>(7.11) | -0.95***<br>(7.23) | 0.73***<br>(3.09) | 0.74***<br>(2.99) | 0.013<br>(0.69)       | 0.01<br>(0.52)      |
| Comp advantage perceptions                        | 0.06***<br>(4.41)  | 0.06***<br>(4.35)  | 0.18***<br>(5.38)   | 0.18***<br>(5.35)   | 0.44***<br>(4.37)  | 0.45***<br>(4.44)  | 0.77***<br>(2.94) | 0.77***<br>(2.91) | ---                   | ---                 |
| Have IP   | -0.08***<br>(3.98) | -0.07***<br>(3.84) | -0.19***<br>(4.03)  | -0.18***<br>(3.08)  | 0.16<br>(1.26)     | 0.16<br>(1.26)     | 0.88<br>(1.07)    | 0.87<br>(1.11)    | 0.20***<br>(12.07)    | 0.20***<br>(12.14)  |
| Credit risk                                       | -0.04***<br>(4.52) | -0.04***<br>(4.90) | -0.10***<br>(4.86)  | -0.10***<br>(5.28)  | -0.25***<br>(4.40) | -0.26***<br>(4.61) | 1.35***<br>(5.40) | 1.36***<br>(5.58) | 0.02**<br>(2.48)      | 0.02**<br>(2.16)    |
| Profit  | ---                | ---                | ---                 | ---                 | 1.92***<br>(20.17) | 1.93***<br>(20.27) | 0.70***<br>(4.12) | 0.70***<br>(4.11) | 0.06***<br>(4.42)     | 0.06***<br>(4.35)   |
| Assets (log)                                      | 0.007***<br>(2.97) | 0.01***<br>(3.15)  | 0.04***<br>(8.01)   | 0.04***<br>(8.08)   | 0.40***<br>(25.07) | 0.40***<br>(24.83) | 0.95***<br>(4.65) | 0.95***<br>(4.72) | 0.01**<br>(6.44)      | 0.02***<br>(6.73)   |
| <i>Owner characteristics</i>                      |                    |                    |                     |                     |                    |                    |                   |                   |                       |                     |
| Education   | -0.005<br>(0.32)   | -0.003<br>(0.16)   | -0.01<br>(0.28)     | 0.0004<br>(0.01)    | 0.17<br>(1.43)     | 0.23*<br>(1.94)    | 0.90<br>(1.21)    | 0.89<br>(1.32)    | 0.04**<br>(2.50)      | 0.04**<br>(2.54)    |
| Work experience                                   | 0.004***<br>(4.68) | 0.004***<br>(4.78) | 0.01***<br>(4.21)   | 0.01***<br>(4.39)   | 0.01**<br>(2.03)   | 0.02**<br>(2.37)   | 1.00*<br>(1.85)   | 0.99*<br>(1.91)   | 0.001<br>(1.22)       | 0.001<br>(1.23)     |
| Age   | -0.001*<br>(1.67)  | -0.001*<br>(1.67)  | -0.005***<br>(2.67) | -0.005***<br>(2.68) | -0.01<br>(1.36)    | -0.01<br>(1.44)    | 1.00<br>(0.53)    | 1.00<br>(0.54)    | -0.003***<br>(3.79)   | -0.003***<br>(3.78) |
| Race White  | 0.05**<br>(2.14)   | 0.05**<br>(2.13)   | 0.10*<br>(1.81)     | 0.09*<br>(1.77)     | 1.27***<br>(7.02)  | 1.26***<br>(6.95)  | 1.18<br>(1.21)    | 1.17<br>(1.21)    | 0.05**<br>(2.24)      | 0.05**<br>(2.24)    |
| Gender  | 0.03<br>(1.56)     | 0.04*<br>(1.81)    | 0.09**<br>(2.05)    | 0.10**<br>(2.32)    | 0.26*<br>(1.77)    | 0.28*<br>(1.84)    | 0.97<br>(0.25)    | 0.96<br>(0.39)    | -0.06***<br>(3.16)    | -0.06***<br>(2.92)  |
| <i>County characteristics</i>                     |                    |                    |                     |                     |                    |                    |                   |                   |                       |                     |
| Income per capita<br>(\$ thousands)               | 0.001**<br>(2.08)  | 0.001***<br>(2.08) | 0.005***<br>(2.92)  | 0.01***<br>(2.95)   | 0.02***<br>(3.81)  | 0.02***<br>(3.92)  | 1.00<br>(0.19)    | 1.00<br>(0.19)    | 0.00008<br>(0.12)     | 0.00006<br>(0.10)   |
| <i>Industries(2 digit NAICS)</i>                  |                    |                    |                     |                     |                    |                    |                   |                   |                       |                     |
| Professional, Scientific,<br>& Technical Services | 0.07***<br>(3.81)  |                    | 0.20***<br>(4.55)   |                     | 0.41***<br>(3.00)  |                    | 0.79**<br>(2.04)  |                   | 0.06***<br>(3.08)     |                     |
| All Services                                      |                    | 0.05***<br>(3.37)  |                     | 0.13***<br>(3.28)   |                    | 0.06<br>(0.54)     |                   | 0.87*<br>(1.64)   |                       | 0.06***<br>(3.80)   |

Note - Survival estimates use the hazard ratio ( $e^{\beta}$ ). Omitted industries are agriculture, forestry, and wildlife (NAICS 11), utilities (NAICS 22) and public administration (NAICS 92) |t-stat| in parenthesis. \*p<0.10; \*\*p<0.05; \*\*\*p<0.01 (two-tailed test).