

# **ESSAYS ON DIVERSITY AND NEW VENTURE PERFORMANCE**

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by

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# ESSAYS ON DIVERSITY AND NEW VENTURE PERFORMANCE

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To my wife Smita and my children - Vaishnavi and Chaitanya.

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## **SUMMARY**

I analyze how various aspects of diversity impact new venture performance. In the first study, I find that credit riskiness and assets of a venture mediate the gap in performance, revenues and profits between Black and White owned ventures. In my second study, I examine diversity in same industry work experience and education. I find that same industry work experience diversity has no impact on venture survival but level of educational diversity has a non-monotonic effect on survival. Finally, in the third study, I find that use of adequate controls leads to no gap in performance between male versus female-owned ventures. However, certain owner characteristics such as same industry work experience and number of hours worked and venture level characteristics such as technology level and incorporation status lead to significant gaps in survival, revenues and profits between male and female-owned ventures. I utilize the confidential Kauffman Firm Survey, an extensive dataset of new ventures started in 2004 in the US and tracked till 2011, to conduct the analyses. I discuss implications of my findings for research, investors and entrepreneurs.

## **CHAPTER 1. INTRODUCTION**

Entrepreneurship is receiving increased attention from scholars and policy makers and much research has been done but there are still many open questions. My research agenda in entrepreneurship has an empirical focus. I study the role of diversity in demographics and human capital at the venture owner team level and its impact on new venture survival and performance. I focus on three dimensions of diversity – racial, work experience & education, and finally gender. Under the general theme of diversity, I focus on three primary research questions.

1. What mechanisms induce the difference in performance between Black and White owned ventures?
2. Is degree attainment of the owner team a predictor of new venture survival?  
Does diversity in work experience and education of the owner team impact its survival?
3. Are there endowment or other differences between male vs female-owned ventures, even though there are no differences in venture outcomes of the two groups?

I address these questions in several chapters of my dissertation. In the following, I provide a brief overview of each chapter.

The second chapter of my dissertation, “Black vs White owned new venture performance: A study of mediating effects”, analyzes the mechanisms that lead to differences in performance between Black and White owned ventures. Past studies show that Black ventures underperform White ventures, however they primarily focus on

individual owners and their characteristics. In my study, I utilize venture level constructs and focus on variables both external and internal to a venture. I study the role of three mediating mechanisms (a) demographic characteristics of a venture's location (b) venture's financial size (c) venture's credit riskiness. Location has been shown to affect ventures because of agglomeration, social networks and nearness to consumer base amongst other reasons. If location mediates the performance gap a more macro level integrated approach would have to be adopted to rejuvenate underprivileged (usually Black) neighborhoods. However, if this is not the case, more micro level intervention would be useful in narrowing the gap. The financial size of a venture acts as a buffer while a venture is trying to come to terms with the environment and getting over the 'liability of newness'. Similarly, the credit riskiness of a venture plays a pivotal role in its access to resources. Thus, it is important to study these mechanisms.

I utilize the confidential Kauffman Firm Survey (KFS) panel dataset from 2004 to 2011 to empirically test the above propositions. The dataset is unique on a few counts. KFS is representative of the new ventures started in the US in 2004, hence has general applicability. Most past studies observe ventures after they have attained a particular size or age, whereas KFS studies the 2004 cohort of ventures from inception. Thus, I can analyze truly nascent ventures. The geo coded nature of the data makes the location level analysis possible. Finally, detailed and granular information about the owners and venture financials provide adequate controls, thus alleviating endogeneity concerns. I find that location of a venture does not mediate the relationship, thus indicating that a more micro level intervention may be required for reducing the performance gap. The financial size and credit riskiness of the venture, both partially mediate the performance gap between

White and Black ventures. Thus, policies that would lead to an increase in the financial size such as subsidized credit, or availability of infrastructure etc., and policies that would help Black businesses develop better credit scores, such as coaching on better business practices or a discount in credit scores, should help the Black business outcomes to match White businesses.

In the third chapter, “Impact of owner team characteristics on new venture survival”, I analyze whether education and similar industry work experience of the owner team impacts new venture survival. I propose that same industry work experience and completion of a degree, over and above the years of education attained, impact new venture survival. Further, I utilize the typology developed by Harrison and Klein (2007) to analyze the impact of diversity in same industry work experience and education of the owner operator team on the survival prospects of new ventures. Utilizing the confidential Kauffman Firm Survey data, an 8 year panel of new ventures, similar to past studies, same industry work experience of owners positively impacts venture survival. Further, I find that it is the attainment of a degree and not the years of education that is correlated with venture survival. I also find that diversity in education reduces the probability of survival however, same industry work experience diversity has no such impact. Finally, educational diversity is correlated with survival non-monotonically. I conclude with implications for application and avenues of future research.

In the chapter four, “Gender Differences and New Venture Performance”, I compare the performance of female-owned ventures with male-owned ventures utilizing the confidential Kauffman Firm Survey data. Prior results are mixed with most studies showing female-owned ventures underperforming relative to male-owned ventures, however newer

studies with more extensive controls seem to find no difference in performance. I use regression and decomposition analysis, and find that there is no performance gap between male and female-owned ventures. However, owner characteristics such as work experience in similar industry, average hours worked and venture level characteristics such as technology level and incorporation status of the venture create a difference in performance of the two categories of ventures. These findings have implications for policy makers and entrepreneurs alike.

### 1.1 References

Harrison, D. A., & Klein, K. J. (2007). What's the difference? Diversity constructs as separation, variety, or disparity in organizations. *Academy of Management Review*, 32(4), 1199-1228.

## **CHAPTER 2. BLACK VS WHITE OWNED NEW VENTURE PERFORMANCE: A STUDY OF MEDIATING EFFECTS<sup>1</sup>**

### **2.1 Introduction**

New ventures have been touted as engines of growth for the economy. It is argued that new ventures contribute significantly to job growth. Decker et al. (2014) report that startups account for 20% of gross US jobs created annually. Research on new venture performance has spanned a few decades. However, analysis of performance outcomes of minority owned businesses and minority self-employment activities has received relatively scant attention (Bates, 1997; Fairlie, 1999; Fairlie & Robb, 2007). Most studies find that Black owned ventures have worse performance outcomes than White owned ventures. The availability of Census and other comprehensive datasets – such as the Characteristics of Business Owners, the Survey of Minority and Women Owned Businesses, the Panel Study of Income Dynamics has led to a number of studies analyzing the reasons for differences in outcomes between ventures owned by various races with focus on the White and Black communities (Bates, 1997; Fairlie & Robb, 2007; Robb, 2002). These studies are necessary since entrepreneurship is a crucial alternative to a regular job for making a living and alleviating the socio-economic conditions of the Black community (Fairlie & Robb, 2007). Studies have shown that one of the reasons for upward economic mobility of immigrant minorities has been through their ownership of small businesses (Bonacich & Modell, 1980; Light, 1972). Recent studies find that entrepreneurship aids in reducing the wealth disparity between Black and White households (Bradford, 2014) and Black entrepreneurs suffer lesser downward wealth mobility compared to Black workers (Bradford, 2003).

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Business creation is being used as a tool by many state and federal governments to bridge the socio-economic gap between different races and also to get families out of welfare and unemployment insurance rolls (Fairlie & Robb, 2007). Hence, it is important to understand what mechanisms are inducing the performance gap between Black and White owned ventures. In this exploratory study, I expand the scope of previous studies by exploring mechanisms at multiple levels. First, I focus on the mediating role of external factors such as the demographics of the location of the venture. Although external variables are relatively difficult to alter, entrepreneurs possess the ability to ‘choose’ locations which are endowed with certain characteristics. Next, I analyze factors at the venture level. Resources at the disposal of a new venture play a pivotal role in its performance. I focus on two variables – assets of a venture and the credit riskiness. Finally, I analyze the role of individual characteristics of the owners consolidated at the owner team level. Most past studies focus on a primary owner and her individual characteristics to explain the performance gap. I consolidate the individual characteristics of the team of owners and examine whether results of past studies that focused on primary owners are also applicable at the venture owner team level.

Understanding the role played by the location of a venture in the differential success of Black and White ventures may have profound policy implications. The prior literature focuses on the social networks of founders, abundance of resources and consumers, and agglomeration economies at the location, and ties it to performance (Dahl & Sorenson, 2012; Figueiredo et al., 2002; Florida, 1994; Marshall, 1920). Bates and Robb (2014b) report that small businesses serving minority clients face higher rates of closure and low profitability. If location is indeed a driver of success for a new venture, then it should be no surprise that more venture owners (both White and Black) want to set up shop in zip codes that are more favorable to new venture performance - the White majority areas, since Whites are known to possess better socio economic status than Blacks on average (Morgan,

2005; Western & Pettit, 2005)<sup>2</sup>. Furthermore, the flight of businesses from areas ‘inhospitable’ to new ventures (usually Black majority neighborhoods) would leave such neighborhoods in a vicious self-perpetuating cycle of even more blight with symptoms such as fewer services and less local employment. Thus, the solution to such a problem would require a multi-dimensional and macro level approach to rejuvenating the areas. On the other hand, if I find that location is not a driver of differential success, then policy makers could focus on venture level characteristics, which can be addressed through more nuanced policy intervention.

The second mechanism I investigate is the financial size of a venture and its mediating effects. The size of established firms has been linked to survival and performance (Dunne et al., 1989; Evans, 1987). Although most studies focus on the number of employees as an indicator of size, I propose instead to analyze the impact of financial size. Financial size could be considered more fundamental than the human resource size, since the former can be utilized to attract the latter. Performance of a venture is tied to internal attributes such as its resources and capabilities (Wernerfelt, 1984). Financial size is a proxy for the resources a venture has at its disposal, it also acts as a buffer while the new venture is struggling with liability of newness. Consumers may also prefer to deal with a business that is strong and vibrant and might be in operation down the road if the product they bought needs repair, maintenance or add ons. Finally, a bigger resource base could lead to more service and product offerings leading to better revenues and hence performance. Thus, I explore the impact of financial size as a mediator.

The third mediator - a venture’s credit riskiness - is crucial for attracting resources. It is an indicator of the ability of the venture to acquire resources in the future. Performance of a venture is dependent on access to resources (Mahoney & Pandian, 1992; Penrose,

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<sup>2</sup> There are exceptions to this approach for example some small businesses ‘choose’ to locate in high crime areas since surviving in such areas is one of their core capabilities (Bates & Robb, 2008).

1959; Peteraf, 1993; Wernerfelt, 1984). Suppliers, service providers and other members of the value chain might implicitly evaluate the prospects or riskiness of the venture before providing access to their resources or services to it (Stuart et al., 1999). Thus, I study the mediating role of a venture's credit riskiness.

Understanding these mechanisms gains further salience in the context of minority owned ventures since it is crucial to understand how policy makers, investors and other stakeholders should intervene to help these ventures, in light of scarce availability of both human and financial resources.

This study is based on the Kauffman Firm Survey (KFS), a confidential eight year panel dataset of new ventures representative of the new venture landscape of the US economy. Most past studies, using Census or survey data are able to observe ventures when they reach a certain size or age, however KFS captures venture data for firms started in 2004, from the inception stage. Hence I am able to conduct analyses on ventures from the nascent stage onwards. The dataset contains geo-coded data, which makes the analyses of location feasible. The abundance of variables in the dataset allows me to control for potential endogeneity issues. Since the data are exclusively based on new ventures (and do not utilize self-employment data as a proxy for entrepreneurship) and the variables capture data on the entire owner team, analysis using these fine-grained data can be conducted at the venture team level rather than restricting it to sole or primary owner.

The key findings of this study are that I do not find support for the mediating role of local demography in new venture performance. However, the financial size and credit riskiness of a venture mediate the relationship between race and performance. I use extensive controls and various other strategies detailed in the 'Robustness and Endogeneity' section to address endogeneity concerns. The structure of the paper is as follows – in the next section I discuss the theoretical underpinnings of the various

relationships described above. I follow up with a description of the data, variables used and research methods. Results are presented in the section after and I close with a discussion of the results.

## **2.2 Theory and Literature Review**

New venture performance has been a topic of study both theoretically and empirically over the past few decades. Availability of longitudinal data was a major constraint in studying outcomes but new panel datasets have alleviated the issue to a certain extent. Sexton and Robinson (1989) were one of the first to study demographic variables such as age, education, race of owners and their correlation with survival and performance. Cooper et al. (1994) utilized a panel dataset which also represented a broader set of industries and thus was more representative of an economy, to analyze the impact of race on performance. They found that minority owned businesses perform worse than non-minority owned ventures. Most previous studies account for race effects through two approaches. The older approach was to introduce a dummy variable for the race of the primary owner of the venture and interpret its coefficient, depending on the sign of the coefficient it was inferred whether race was systematically correlated with venture survival (Fairlie & Meyer, 1996). Newer studies (Fairlie, 2005a; Fairlie & Robb, 2007) conduct decomposition analyses wherein they calculate the contribution of endowments such as education, work experience etc. which explains the gap in performance metrics such as survival between White vs Black owned ventures. Most of these studies find that Black owned ventures fare much worse than White owned ventures on most measures of performance.

Multiple mechanisms were conjectured by studies for the poor performance of Blacks which included them possessing poor business contacts, poor location, more difficulty in obtaining insurance and credit, and access to 'desirable' customers. In the

following paragraphs, I explore the rationale of a few mechanisms that are the focus of this paper.

### *2.2.1 Demographics of new venture location*

The decision about where to set up a business is crucial and difficult to change. It can have significant consequences for new venture survival and performance. The phenomenon that location of a business in an area which has other similar businesses has the possibility of enhancing the focal venture's performance has been studied as far back as 1920 by Marshall (agglomeration economies). Other studies investigate the impact of output market characteristics in the decision to locate a venture. Woodward and Glickman (1991), Coughlin et al. (1991) and Florida (1994) show that foreign direct investment in manufacturing plants is attracted by states that have higher per capita incomes, higher density of manufacturing activity or higher concentration of upstream and downstream firms of the value chain.

Studies also show that entrepreneurs prefer a location since they are socially embedded in the location and hence can benefit from the resources and infrastructure of the area (Dahl & Sorenson, 2012). They further posit that a pivotal question is not whether a location is 'good' or 'bad' for a business but rather – “given my resources, do I have the greatest odds of success.” Thus, studies focus on both the resource endowments of a location and which entrepreneur is able to capitalize on those endowments.

Black dominated areas are known to possess fewer resources compared to White majority areas. Scarce availability of resources and infrastructure will adversely affect a new venture either by increasing the cost or decreasing the quality of services and products.

Similarly, a shallow or lower quality talent pool will also weigh down the performance of the venture. The income levels of the consumers are also lower in Black neighborhoods, further exacerbating the situation for a new venture in such areas. Given the above conditions, fewer owners would decide to locate their ventures in such areas than the ideal case. This should also lead to less opportunity for the remaining new ventures to ‘swap’ services and fewer mentorship opportunities for the new ventures in the area, depressing performance further.

Owners may locate businesses in ‘hospitable’ environments unless the benefits due to the synergy of endowments of ‘inhospitable’ areas and owner characteristics to utilize those endowments outweigh the costs to locate in ‘inhospitable’ locales. Bates and Robb (2014b) find that small businesses (mainly services and retail) located in urban minority areas serving minority clientele have worse performance outcomes. Situating new ventures in areas which have demographics similar to the majority owners of the venture should aid in its performance. The venture will benefit from the social networks of the owners which will help in accessing resources, credit, land & infrastructure and consumers (Zaheer et al., 2009; Zhou, 1996). In fact resources available through social ties may be difficult to imitate and lead to a sustainable competitive advantage (Zaheer et al., 2009). Extending the ‘liability of foreignness’ (Hymer, 1976) to the local level, owners who set up new ventures in locales not familiar to them, may face challenges at cultural, political and economic levels. White areas are generally better than Black areas on measures such as infrastructure and other economic factors such as average house value or household income. The White business owners would thus benefit from better resources, infrastructure as well as better networks. However, for the Black business owners this should lead to an inherent tension,

they may value social ties which may be in Black neighborhoods but the economic pull may drive them to situate in White areas. I utilize empirics to answer whether economic considerations trump social tie based effects in the decision to locate a venture (for Black entrepreneurs) and its performance thereof.

The demographics of an area can be used as a macro level indicator of the above mentioned characteristics of an area. Multiple studies have recorded the gap along above parameters between Blacks and Whites (Fusfeld & Bates, 1984), with Whites scoring better on all of the above criteria (LaVeist, 2005). Thus, ventures located in Black dominated areas will face a more hostile environment compared to ventures situated in White majority areas, which in turn should lead to worse performance by the former.

### *2.2.2 Financial size of the venture*

Strategy scholars have long posited that internal capabilities and characteristics of a venture are a source of competitive advantage and hence better performance (Penrose, 1959; Wernerfelt, 1984). One important internal characteristic studied at length is firm size. Gibrat's law was proposed in 1931, which stated that firm growth and size are not related. However, Dunne et al. (1989), Evans (1987), and other studies found that Gibrat's law does not hold in many instances. These studies reported that survival increases and growth decreases with business age and (employment) size. Size has been operationalized using different variables in the literature. Some common implementations include use of net worth, home ownership, and inheritance levels of the entrepreneur which measure static levels prior to venture starting and find that incorporating these variables does lead to an attenuation in the coefficient of race. Thornhill and Amit (2003) use assets of the firm as a proxy for size. Similar results are also obtained with decomposition analysis (Fairlie & Robb, 2007) – startup capital explains 30% to 40% of the explained gap in performance

between Black and White owned ventures. I propose to analyze the mediating role using a dynamic measure of financial size. This is especially pertinent in the context of a startup since the financial size of a venture changes over time and utilizing the initial conditions may not present a full picture of the impact of a time-varying variable such as financial size on new venture performance. I propose to explore the mediating role of financial size on the race ownership and performance relationship, while controlling for employee size.

In many prior studies, it has been shown that race of the majority of owner-operators impacts performance. However, I theorize that the above relationship is partially mediated by the financial size of the firm. The assets of a firm are one dynamic indicator of the size of a venture (Thornhill & Amit, 2003) and they can be thought of as a proxy for the resources that are accessible to the venture. New ventures suffer from liability of newness, size provides a buffer for entrepreneurs to learn and navigate problems (Cooper et al., 1994). Firms with bigger size will have resources to attract experts to provide advice on issues (Cooper et al., 1989). The size of a new venture may also represent more options to the consumer leading to more revenues and profits hence better performance. For example a bigger retail store may carry more selection of products which will lead to consumers finding more choices which in turn should lead to better sales. Finally, a small size may inhibit product development, product launch and access to markets which will all hamper performance and survival of a firm. Previous studies incorporate size by either using a financial measure or a human resource measure, I study the impact of financial size while controlling for employee size. Furthermore, for external resource providers financial size may be a clearer signal of vitality of a new venture compared to the number of employees. The various assets of a venture could be used as collateral and also provide relatively more confidence to the suppliers, vendors and other stakeholders, that in the event of a venture going out of business, they could hopefully recoup their investments partially through the sale of the financial assets. On the other hand, given the mobility



potential of the employees, the human resource base of a new venture may not inspire similar confidence amongst the resource providers.

Black owned ventures usually are smaller in size compared to White owned ventures (Fairlie & Robb, 2007; Robb, 2002). This may be due to multiple factors as shown in previous literature – Blacks may not be able to get similar amounts of loans as the Whites, due to discrimination, thus leading to undercapitalization of businesses leading to smaller asset bases (Bates & Robb, 2014a, 2016). Furthermore, Blacks on average have lower net worth than Whites. Thus they would have fewer possessions to serve as collateral for loans which would again lead to a smaller asset base (Fairlie & Robb, 2007). This smaller size of the Black ventures compared to the White ventures should lead to bleaker prospects for the Black owned ventures vis a vis the White owned ventures.

### *2.2.3 Credit Riskiness of a venture*

Young and small ventures face a liability of newness (Stinchcombe & March, 1965). New ventures usually have short track records and are fraught with risk, hence it is difficult for resource providers to assess their quality and provide resources to them (Stuart et al., 1999). Resource providers implicitly apply a ‘credit riskiness’ score (what is the probability of venture failure, what is the probability that the resource provided will not deliver the anticipated rent since the new venture may go out of business) to such new ventures. If certain sub populations get discriminated against on the assessment and others get favorable treatment in credit ratings, the net impact will be a systematic heterogeneous gap in the availability of financial and other resources based on the majority race ownership of the venture. The importance of credit scores in attaining resources is apparent, but the mechanism by which the scores are assessed is nebulous (Henderson et al., 2015; Spader, 2010). Discrimination in credit scores based on race, gender and other such ‘immutable’ characteristics has been outlawed. The Federal Reserve Board did find that the credit scores

are different for different races but are not biased against any race (Braunstein, 2010). Blanchflower et al. (2003) show that discrimination against Black owned ventures exists in the small business credit market. Henderson et al. (2015) find that Black owned ventures receive more adverse ratings compared to what they deserve whereas White owned ventures receive a more favorable rating. Finally, Bates and Robb (2016) find subtle unfavorable ‘nudges and shoves’ for minority loan seekers.

Fraser (2009) finds that, even though there is no discrimination in small business credit markets in the UK along ethnic lines, the Black businesses have adverse credit outcomes compared to Whites and Indians. These adverse outcomes are a result of less than sterling financial practices such as missed loan repayments and overdraft excesses associated with Black owned businesses. Bates (1973) also found erratic repayments and higher delinquency rates amongst Black business owners in the New York, Boston and Chicago areas.

Accumulation of resources is a pivotal activity for a new venture. Resources play an important role in enabling the entire value chain of the product in a firm. This point becomes especially salient in the context of new ventures which are generally ‘resource sparse’. Resources can be of multiple kinds – for example credit lines, supplier credit, provision of service by employees, credit by consumers, provision of valued or critical equipment etc. The provision of these resources to a new venture by the resource providers is a business decision. Resource providers need to evaluate the ‘riskiness’ and opportunity costs before deciding which ventures will receive the use of their assets. It is logical to infer that *ceteris paribus* resource providers will invest time, resources and effort in new ventures from which they expect to recoup their investment and a profit. Thus, they will invest in less risky ventures all else being equal.

Barter or ‘quid pro quo’ type arrangements are also common in general business situations (Winborg & Landström, 2001) and more so in new ventures. I argue, that even in such arrangements, amongst other aspects a key analysis partners are conducting is whether a particular counterparty will be a ‘going concern’ and possess the finances to pay the ‘dues’, when the time comes to collect on the favors it is owed.

Thus, I study the mediating role of credit riskiness of a venture on the majority race ownership and venture performance relationship. I predict that credit riskiness, which is a proxy for the ability of a venture to access resources in future, is most likely mediating the relationship between majority race ownership of the venture and performance.

## **2.3 Data, Measures and Methods**

### *2.3.1 Data Source and Sample*

The Kauffman Firm Survey (KFS) is a confidential dataset that has been used in prior studies such as Robb and Robinson (2012). It is a longitudinal dataset of approximately 5,000 new ventures started in 2004. The KFS started with an initial sample of 250,000 firms, provided by D&B. A business was defined as started in 2004 if it was a new independent business created by an individual or team, or purchase of an existing business or the purchase of a franchise. Businesses that paid state unemployment insurance, or Federal Social Security tax or had an EIN or had schedule C income prior to or after 2004 were excluded. Out of this sample, 4,928 firms were admitted with an oversampling of high-tech firms; weights have been provided by KFS in order to make the sample representative of all new ventures in the economy. These firms were surveyed annually in detail from 2004 to 2011, creating an eight-year panel. The KFS has a balanced panel of 3,140 firms, but since the focus of the current study was on majority ownership, hence I

restricted the study to ventures which had 50% or more of the owner team belonging to one race. I focused on ventures owned by Whites, Blacks and Asians since venture ownership by other races represented no more than 1% of ventures. This led to a sample size of 2,918 ventures. Furthermore, various variables such as profits or credit classification scores were not available for some ventures in some years. Hence, the number of observations in regressions may vary across models of survival, revenues and profits. The sample has information on up to 10 owners, initially and later 15 owners, including age, gender, race, ethnicity, education, and previous work experience. Detailed financial information about the ventures, location, revenues, expenses, number of employees, and profit/loss, among many other firm-level variables are also available in the dataset. The KFS dataset was merged with data at the zip code level from the Census, to develop measures of demographics.

### *2.3.2 Measures*

#### *2.3.2.1 Dependent Variables*

Survival – a venture was recorded as surviving each year it was in business as an independent entity. If the venture survived till the end of the survey period (year 2011) it was censored. In the data, failure is coded as 1 (to signify an event) and survival (status quo as 0).

Log Total Revenues – are the logarithm of leading total revenues of a venture. For computational purposes \$1 was added to the raw revenue numbers and then a log taken.

Log Net Profits – are the logarithm of leading net profits of a venture. \$1 is added to the absolute value of Net profits (as Net Profits can be zero), and then logarithms were taken. Finally, if the profits were negative, the log values were multiplied by -1.

#### *2.3.2.2 Independent Variables*

Majority race owners of firm – Similar to Bitler et al. (2001), a venture was deemed as belonging to a particular race if the number of active owner operators of a particular race in the venture were greater than or equal to 50% and all other races individually had representation that was less than 50%. Ventures which were owned equally by two or more races were dropped from analyses.

Demographics of a location – in order to capture the characteristics of a zip code, I use dummy variables indicating whether a zip code is White, Black or other race majority. A location is deemed as White majority if the population of Whites in the zip code is greater than 50%, similarly for Black and other races.

Assets of the firm – I operationalize size as the log of assets of a venture. This is a time varying measure as KFS collected various components of the assets of a venture annually. These mainly comprised - cash, accounts receivables, equipment, inventory, land and buildings, vehicles etc., which were added up to arrive at the total tangible assets of a venture. Logs of assets were used to control for skewness and high standard deviation.

Credit Risk Classification Score of a venture – The credit riskiness of a venture is captured by the Credit Score Classification of the venture. This is a categorical variable with a score of 1 indicating minimal risk and 5 representing high risk. Data were imputed for some

missing values for which logical imputation was possible<sup>3</sup>. Similar scores have been used by the Federal Reserve and in past studies (Henderson et al., 2015).

#### *2.3.2.3 Control Variables*

I controlled for a number of factors that might impact survival and performance.

Education - Previous research shows education impacts survival (Cooper et al., 1994) and performance thus variables indicating the proportions of various levels of education were introduced. However, education had minimal explanatory power in explaining the gap in performance between Black and White ventures (Fairlie & Robb, 2007).

Work experience in the same industry – Prior work experience in an industry provides networks and knowledge about customers and suppliers (Cooper et al., 1994; Delmar & Shane, 2004). I measure work experience in the same industry as the average number of years of such experience of the venture founding team. Similar to education, this variable too has been found to have minimal explanatory power for the gap in performance (Fairlie & Robb, 2007).

Age – the average age of owner operators was used in models since it will be correlated with higher levels of industry experience.

Number of active owner operators – The active owner operators of a new venture are human capital that could be crucial for the survival and performance of the venture. More owner operators will bring in more resources, human, social and financial capital and improve performance. Thus, I controlled for number of active owner operators.

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<sup>3</sup> Credit Risk Classification Scores were back or forward filled using the scores available for the nearest year. For example if credit classification score data was not available for a new venture for the year 2004, but was available for 2005, then the 2005 score was back filled for 2004.

Number of employees – I use a time varying measure to account for the employee based size of a venture. Previous research has shown that survival increases with number of employees since more employees implies more resources and scale (Bruderl & Schussler, 1990; Carroll & Hannan, 2000). I corrected for skewness by taking the log transformation.

Legal Form – Bruderl and Schussler (1990) show that hazard of failure of German new ventures when the ventures were incorporated is lower. Thus, I control for the legal form of a venture with a dummy variable equal to 1 if the venture is a sole proprietorship rather than a limited liability company.

Other controls - the ‘average’ gender of the venture since female led ventures have higher survival rates was controlled. The technology type of a venture – whether it was high, medium or low - may lead to different rates of survival and performance, and hence was controlled for. Controls for provision of service and product by the venture were also included. Average hours worked by the owner operators were also controlled for since this represents the effort put in by the founders in making the venture a viable enterprise. Proportion of US citizens – Oyelere and Belton (2013) found that intragroup heterogeneity based on country of citizenship of the entrepreneur or of her parents could impact survival of the venture. Hence, I control for citizenship by including a variable of the proportion of US citizens amongst the owner operators.

### *2.3.3 Model Choice*

The three key indicators of performance I study are survival, total revenues and net profits. Pooled models with clustered standard errors and time dummies, and accounting for the survey nature of the data were used in most of the specifications. Survival models were assessed using pooled Logit models (with time dummies). Alternatively, Cox Proportional Hazard models could also have been used but Logit was preferred since most of the mediation analyses such as Fairlie, and Marginal Structural Models use pooled Logit

in the analyses. Hence, a comparison of coefficients across models is feasible with Logit models for survival. However, Survival and Probit models were utilized for the base regression for robustness checks (with broadly similar results). The pooled OLS model was employed for Total Revenues and Net Profits since panel data models with fixed effects would drop out the time invariant variable coefficients such as majority race ownership, which is of primary interest in the current study.

Mediation effects were tested with three broad class of models – the decomposition approach (Blinder, 1973; Oaxaca, 1973) and its nonlinear extension (Fairlie, 1999, 2005b), the Baron and Kenny (1986) approach and finally the Marginal Structural Model (Lange et al., 2012).

The Oaxaca decomposition with time dummies was utilized for decomposition analyses of total revenues and net profits, in addition to the Baron & Kenny approach. I applied the Fairlie approach for survival decomposition. However, the Fairlie decomposition utilizes separate Logit regressions for Black and White groups, and the number of Black businesses are relatively small in the sample, which may lead to biased coefficient estimates (Nemes et al., 2009)<sup>4</sup>. As an alternative, I also employed, a Linear Probability Model (LPM) with Oaxaca decomposition. A couple of limitations of the LPM are that it does not constrain predicted values of probabilities between 0 and 1 and it introduces heteroskedasticity in error terms. The former is not a major concern since I am not predicting outcomes, but the latter could be a cause of concern in interpreting results.

In order to test for mediation effects using the Baron and Kenny (1986) approach, I followed the standard four step process. Although widely used, a few limitations have

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<sup>4</sup> This could be a possible reason why the Fairlie estimates over explain the difference (refer results section), even though they are directionally congruent with Baron & Kenny or Marginal Structural Models. However, another explanation could be that Black owned ventures would outperform White owned ventures if the Black ventures had endowments of the White ventures.



been highlighted with the use of Baron and Kenny (1986) approach to non-linear mediation such as it may give varying results as the sample size changes (Tein & MacKinnon, 2003) and may be unsuitable in the presence of interaction effects between the mediator and the treatment (VanderWeele & Vansteelandt, 2009). Thus, I use the Marginal Structural Modeling (MSM) approach as proposed by Lange et al. (2012) as a robustness check. This approach is based on counterfactual analysis with the use of Inverse Probability of Treatment Weighting technique. A limitation of the approach is that it uses only ‘base’ variables (variables from 2004). I include time dummies to the regressions to address this issue. MSM based mediation analysis is a topic of ongoing research and to the author’s best knowledge techniques that can handle time varying variables in unbalanced panels and non-linear dependent variables are yet to be developed.

## **2.4 Results**

I begin the analyses with simple cross tabulations and t-tests, which are aimed at an intuitive understanding of the differences in performance between White and Black owned ventures.

Table 2-1 shows endowment and other differences between White owned and Black owned new ventures for the year 2004 (note revenues and profits are leading hence are from 2005). I observe significant differences between the two groups, with Whites performing better on all measures and possessing more endowments. White owned businesses have average revenues of \$5,200 whereas Black owned ventures \$100. Furthermore, variables such as Assets, Credit Risk Classification Score, age and work experience show differences between the two groups and hence as discussed earlier are worth investigating. Table 2-2 explains that businesses have a higher proclivity of situating in White majority zip codes (97.5% of White owned and 61.3% of the Black owned ventures are situated in White majority zip codes). Table 2-3 confirms my assertion that

ventures in White majority zip code areas perform better than ventures in Black majority zip codes (the significance in t-tests for Net Profits and Survival is at 10.7% and 10.8%, respectively). Finally, Table 2-3 illustrates that for the areas in which KFS ventures are located, there are significant differences in the average household income and average house values in the White vs Black majority zip codes, with Black majority zip codes being less affluent.

**Table 2-1: Difference in mean endowments between White and Black owned ventures**

	<b>White owned</b>	<b>Black owned</b>	<b>Difference</b>	<b>Standard Error</b>	<b>T-stat</b>
<b>Revenues (USD)</b>	5,271.13	102.51	5,168.62	0.471	8.35
<b>Net Profits (USD)</b>	6.42	-2.54	8.96	0.799	3.50
<b>Life</b>	5.596	5.126	0.471	0.292	1.61
<b>Log Firm Assets</b>	9.093	7.007	2.086	0.345	6.05
<b>Credit Risk</b>	3.372	3.513	-0.141	0.062	-2.29
<b>Average Age Owners</b>	45.272	43.360	1.912	0.797	2.40
<b>Avg. Same Ind Work Ex</b>	11.661	10.014	1.646	0.714	2.30
<b>Avg Education</b>	6.050	5.920	0.130	0.158	0.82
<b>Provides Product</b>	0.527	0.406	0.121	0.041	2.95
<b>Provides Service</b>	0.851	0.903	-0.052	0.024	-2.13
<b>Sole Proprietor</b>	0.350	0.447	-0.097	0.041	-2.36
<b>Avg Hrs worked</b>	40.301	41.616	-1.315	2.005	-0.66
<b>Total Active Founders</b>	1.383	1.224	0.160	0.045	3.57
<b>Log Total Employees</b>	0.711	0.562	0.150	0.053	2.82

\*2004 values except for Revenues and Net Profits (for which 2005 values).

**Table 2-2: Location of ventures by majority race ownership**

	<b>White owned</b>	<b>Black owned</b>	<b>TOTAL</b>
<b>White majority zip code</b>	2435	125	2560
<b>Black majority zip code</b>	61	82	143
<b>TOTAL</b>	2496	207	2702

\*Figures may not add up due to rounding

**Table 2-3: White majority vs Black majority zip code**

	<b>White majority zip code</b>	<b>Black majority zip code</b>	<b>Difference</b>	<b>Standard Error</b>	<b>T-stat</b>
<b>Revenues (USD)</b>	4,129.87	266.94	3,862.93	0.651	4.21
<b>Net Profits (USD)</b>	5.38	-1.06	6.44	1.081	1.61
<b>Life</b>	5.596	5.126	0.471	0.292	1.61
<b>Avg Household Income (USD)</b>	49,551	36,470	13,081	1,751	7.06
<b>Avg House Value (USD)</b>	155,873	92,619	63,254	5,126	11.83

Summary statistics of the variables are provided in Table 2-4 (due to disclosure constraints maxima, minima and correlation values have been omitted). Ventures were started by an individual or a team with average work experience in the same industry of 11.5 years and 45 years of age. This points to the fact that businesses are usually started by mature and experienced individuals. Only 2% of the ventures are categorized as high technology, whereas 85% are low technology, that is, most of the business ventures are non-innovative businesses. 86% of the ventures provide services, which seems reasonable given that US is a service economy. A super majority (89%) of the new ventures were started by Whites, followed by Blacks (9%), which approximately reflects the demography of US. Finally, the new ventures are small with 1.4 active owner operators.

**Table 2-4: Descriptive statistics of variables in econometric models (2004 values used)**

	Mean	S.D.	N
Log Revenues	8.24	5.16	2548
Log Net Profits	1.64	9.10	2411
White Owned	0.89	0.32	2918
Black Owned	0.09	0.28	2918
Asian Owned	0.03	0.16	2918
Log Firm Assets	8.94	3.68	2911
Credit Risk	3.38	0.73	2898
White Majority zipcode	0.90	0.31	2918
Black Majority zipcode	0.05	0.22	2918
Other Race Majority zipcode	0.06	0.23	2918
Avg. Same Ind Work Ex	11.45	9.99	2916
Av. Ed. (yrs)	14.84	2.55	2883
Edu., HS or less	0.15	0.34	2917
Edu., Technical	0.07	0.24	2917
Edu., Some Clg	0.22	0.38	2917
Edu., Associate	0.09	0.27	2917
Edu., Bachelors	0.26	0.41	2917
Edu., Some Grad	0.05	0.21	2917
Edu., Masters	0.12	0.31	2917
Edu., PhDs/Prof.	0.04	0.19	2917
Avg. Age	44.98	10.31	2915
Hi Tech	0.02	0.13	2918
Med. Tech	0.13	0.34	2918
Low tech	0.85	0.36	2918
Sole Proprietor	0.36	0.48	2918
Provides Product	0.51	0.50	2918
Provides Service	0.86	0.35	2918
Prop. US Cit.	0.97	0.15	2917
Prop. Male	0.68	0.42	2918
Tot. Active Fndrs	1.37	0.71	2918
Log Total Employees	0.70	0.79	2854

\*Figures may not add up due to rounding

Table 2-5 tabulates the differences in some key variables between White and Black owned ventures in White and Black majority zip codes. In most cases the White owned ventures in White areas possess the most favorable attributes, and Black ventures in Black majority zip codes are the worst off. A similar pattern is observed in the outcome variables

such as Revenues and Profits. However, survival seems to be comparable across race and location, except for Black owned businesses in Black majority zipcodes.

Table 2-6, shows the results of decomposition analyses. Assets and Credit Riskiness are consistently significant and their coefficients indicate that these variables are sizeable contributors to the gap, across all three models – Survival, Revenues and Net Profits. Contributions of the Location variable are ambivalent, either coefficients are small or not statistically significant. Finally, individual level characteristics such as industry work experience, education and age are relatively small contributors or insignificant, echoing results similar to Fairlie and Robb (2007). Hence, the individual level variables are moved to controls and only the assets, credit riskiness and location are investigated further using other mediation techniques. It is worth noting that the Fairlie decomposition over explains the gap between Black and White owned ventures, which may indicate that if the endowments of White ventures were to be allocated to the Black owned ventures they would be more successful than the White ventures.

**Table 2-5: White owned vs Black owned ventures by location**

	White owned		Black owned	
	White Majority zipcode	Black Majority zipcode	White Majority zipcode	Black Majority zipcode
<b>Log Total Revenues</b>	8.58	6.48	5.05	4.66
<b>Log Net Profits</b>	1.86	1.72	-0.85	-1.25
<b>Survival</b>	5.61	5.68	5.68	4.80
<b>Log Total Assets</b>	9.10	7.68	6.99	6.89
<b>Credit Risk Classification Score</b>	3.38	3.39	3.46	3.50
<b>Avg Age Owners</b>	45.22	44.50	43.73	42.10
<b>Avg Same Ind Work Ex</b>	11.69	11.40	9.53	10.45
<b>Avg Education</b>	6.04	5.94	6.21	5.69
<b>Provides Product</b>	0.53	0.47	0.43	0.37
<b>Provides Service</b>	0.85	0.88	0.88	0.91
<b>Sole Proprietorship</b>	0.35	0.36	0.43	0.41
<b>Avg Hrs worked - owners</b>	40.38	40.67	39.66	44.06
<b>Log Total Size - Employees</b>	0.71	0.78	0.57	0.57
<b>Number of Owner Operators</b>	1.39	1.31	1.25	1.24

\*2004 values except for Log Total Revenues and Log Net Profits (2005 values)

**Table 2-6: Decomposition Analyses for Survival, Revenues and Net Profits**

	<b>Fairlie - Survival</b>	<b>Oaxaca - Revenues</b>	<b>Oaxaca - Net Profits</b>
<b>Black owned</b>	0.0822	6.2076	-0.6676
<b>White owned</b>	0.0655	9.4535	2.7621
<b>Difference</b>	0.0167	-3.2459	-3.4297
<b>Explained</b>		-1.3868	-1.0065
<b>Unexplained</b>		-1.8591	-2.4232

	<b>Coeff</b>	<b>T-stat</b>	<b>Coeff</b>	<b>T-stat</b>	<b>Coeff</b>	<b>T-stat</b>
<b>Log Firm Assets</b>	0.0135	5.61	-0.7295	-6.75	-0.6597	-5.34
<b>Credit Risk</b>	0.0088	4.81	-0.1306	-3.84	-0.3466	-4.22
<b>Race Location</b>	0.0037	0.84	-0.1914	-1.52	-0.3796	-1.42
<b>Avg. Same Ind Work Ex</b>	0.0016	3.31	-0.0263	-1.46	-0.0942	-1.80
<b>Education</b>	0.0000	-0.04	-0.0513	-1.29	-0.1300	-1.82
<b>Average Age Owners</b>	-0.0010	-1.59	0.0340	1.52	0.1079	1.61
<b>Provides Product</b>	0.0001	0.12	-0.0321	-1.67	0.1626	2.16
<b>Provides Service</b>	-0.0005	-1.09	0.0075	0.86	0.0282	1.09
<b>Sole Proprietor</b>	-0.0021	-2.51	-0.1057	-2.38	0.1944	2.30
<b>Avg Hrs worked</b>	0.0001	0.10	-0.0020	-0.04	-0.0029	-0.07
<b>Technology</b>	0.0000	-0.28	0.0098	0.63	0.0403	1.21
<b>Prop. US Cit.</b>	0.0001	0.77	0.0000	0.01	-0.0003	-0.11
<b>Prop. Male</b>	0.0000	-0.08	0.0001	0.02	-0.0032	-0.16
<b>Total Active Founders</b>	0.0009	1.43	-0.0044	-0.24	0.0341	0.77
<b>Log Total Employees</b>	-0.0003	-0.38	-0.1349	-2.66	0.0403	0.99
<b>Time</b>	-0.0007	-1.15	-0.0301	-1.35	0.0023	0.21
<b>TOTAL</b>	<b>0.0242</b>		<b>-1.3868</b>		<b>-1.0065</b>	

Tables 2-7 and 2-8 analyze the crucial steps for supporting Baron and Kenny's, (1986) mediation approach by showing that majority race ownership is correlated with assets or credit riskiness and that when assets or credit riskiness are included in the same model as majority race ownership, the coefficient of the majority race ownership for all three regressions – survival, total revenues and net profits decrease<sup>5</sup>. A negative coefficient

<sup>5</sup> Table 2-9 of the Appendix presents the regression model with controls only and controls and the categorical race variable, thus establishing the base relationship as echoed in many past studies that majority race

in survival regressions implies a reduction in the hazard of death (since failure is coded as 1 and survival as 0 in the data). The interpretation for revenue and net profit regressions are obvious. These tables support the mediation role of assets and credit riskiness. The other steps of the Baron, Kenny mediation analysis are covered in the Appendix Tables 2-11, 2-12 and 2-13. As an extra check, to ensure that assets and credit riskiness are acting as independent mediators, I incorporate them in the same model in Table 2-14 and find that the coefficients are independently significant. I also note that in some of the above models, the credit riskiness coefficients are marginally significant, but it can be observed that the sign of coefficients is broadly supporting the story.

**Table 2-7: Assets Mediation Pooled Regressions**

	Model 1: Survival coef/std err	Model 2: Survival coef/std err	Model 3: Revenues coef/std err	Model 4: Revenues coef/std err	Model 5: Profits coef/std err	Model 6: Profits coef/std err
White Owned	-0.333* (0.14)	-0.131 (0.14)	2.728*** (0.30)	2.143*** (0.28)	3.527*** (0.52)	2.987*** (0.52)
Asian Owned	-1.049** (0.34)	-0.825* (0.35)	2.993*** (0.49)	2.351*** (0.44)	4.248*** (1.05)	3.653*** (1.03)
Log Firm Assets		-0.086*** (0.01)		0.357*** (0.03)		0.336*** (0.04)
Controls included?	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies?	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	16284	16284	13117	13117	12799	12799
R-sq			0.2118	0.2566	0.0530	0.0641

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

ownership does indeed impact performance. Table 2-10 presents evidence which supports the view that location may not be having an independent effect on new venture performance.



**Table 2-8: Credit Risk Mediation Pooled Regressions**

	Model 1: Survival coef/std err	Model 2: Survival coef/std err	Model 3: Revenues coef/std err	Model 4: Revenues coef/std err	Model 5: Profits coef/std err	Model 6: Profits coef/std err
White Owned	-0.333* (0.14)	-0.167 (0.14)	2.728*** (0.30)	2.588*** (0.30)	3.527*** (0.52)	3.215*** (0.52)
Asian Owned	-1.049** (0.34)	-0.859* (0.35)	2.993*** (0.49)	2.922*** (0.48)	4.248*** (1.05)	4.052*** (1.04)
Credit Risk = 1		-1.579*** (0.36)		1.460*** (0.34)		3.454*** (0.87)
Credit Risk = 2		-1.023*** (0.16)		0.766** (0.26)		2.430*** (0.60)
Credit Risk = 3		-0.697*** (0.13)		0.220 (0.25)		1.314* (0.55)
Credit Risk = 4		-0.514*** (0.14)		-0.319 (0.29)		0.774 (0.59)
Controls included?	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies?	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	16284	16284	13117	13117	12799	12799
R-sq			0.2118	0.2180	0.0530	0.0593

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

## 2.5 Robustness and Endogeneity

I conducted different robustness checks and found broad support for the results. I employ the Linear Probability Model with Oaxaca decomposition (Table 2-15) which over explains the gap if we focus on the coefficients of the three above mentioned variables (again Race of Location is insignificant). I thus employ the Marginal Structural Model, the results of which are reported in Tables 2-16 and 2-17 of the Appendix. For the survival regressions, Model 1 in both tables, I observe that the coefficients for direct and indirect effects are indicative of a mediation effect, however the significance levels are slightly lower.

I evaluated Cox and pooled Probit models for survival (Table 2-18 of the Appendix) and also conducted mediation analysis for demography of the location using the proportion

of populations of various races in the zip code and results were similar. Tein and MacKinnon (2003) observed that the results of mediation analyses using the product and difference approaches matched for Accelerated Failure Time models of survival but were divergent for Cox Proportional Hazard models. I compared the coefficients of AFT and Cox models and found them to be very similar, thus further bolstering confidence in the results.

There are multiple types of potential endogeneity possible in the current study and I do not claim to have addressed all of them. Survival bias may be a concern given that total revenues and net profits are not observed for ventures that went out of business. Thus, the above estimates condition on survival up to the point in time that the venture exists as an independent entity. An ideal solution to the issue would be the use of Heckman selection models, however I was unable to find a variable in the dataset which affects survival but not performance. I however, test the results using another alternative approach. I assess regression models on firms that survived till the end of the survey and find similar results. Secondly, the direction of the survival bias can be inferred with the available data. I find that the differences between Black and White owned ventures persist over long periods of time conditional on survival, thus if all the ventures were to survive, we should still observe similar directional results in the performance gaps and the mechanisms.

Another endogeneity concern could be regarding the quality of the idea of the venture. Higher quality ideas should on average lead to better performance. An ideal solution would be to develop a measure of quality of ideas (ensuring that it is highly correlated with performance), however the author is not aware of such a measure in the KFS data. I use level of education of the owners as a proxy for the quality of the idea and control for it in regressions, the implicit assumption being that highly educated teams will have better and more sophisticated ideas. It is a crude proxy but nonetheless captures the essence of this endogeneity concern.

## 2.6 Discussion

Past research suggests that performance of new ventures is related to the race of the primary owner(s). It is important to understand, how these differences in performance occur above and beyond the characteristics of a primary owner and at the level of a venture, so that policy intervention can be addressed correctly. Given that the Black community faces numerous obstacles to social and economic mobility, starting and successfully running one's own venture could be a ticket out of low socio-economic status for many a Black household. White owned ventures have been shown to possess better performance prospects than Black owned ventures (Robb, 2002). Decomposition analyses uses individual characteristic endowments of primary owners to explain the performance gap between the White and Black ventures. However, more venture level studies are required which focus on the mechanisms of how the survival gap between Black and White ventures is induced due to the external environment and internal venture level characteristics. In this research, I investigated mediators at multiple levels to understand their role on majority race ownership and performance relationship. I assessed how the demographics of the area where a venture is located, how the financial size of a new venture, the credit riskiness of a new venture and owner team characteristics mediate the above relationship.

I did not find support for the mediation by demography of the location of a venture. It seems entrepreneurs are savvy enough to understand and either tailor or open ventures which are demanded by an area. This points to the fact that policy should be focused on the internal characteristics of the venture which is a more micro level approach rather than following a more macro approach of ameliorating an area. The aforementioned implication is in the context of reducing the performance gap between White and Black owned ventures. There could be many others policy reasons for which underdeveloped areas need to be developed, which the author does not preclude. Black owned ventures are financially smaller than the White owned ventures, and this difference is path dependent, it does not

decrease over time. The difference in financial size has a profound impact on the outcomes of White vs Black ventures, thus developing innovative and subsidized approaches so that Black ventures get access to a similar level of asset base as the White owned ventures should be helpful in reducing the performance gap. Future studies could also explore what types of assets for example tangible vs intangible, are more relevant to reducing the performance gap. Studies and analyses on whether financial size could lead to the acquisition of human resource size in a short span of time and how that impacts performance could further our knowledge on “time compression diseconomies” (Dierickx & Cool, 1989) as well.

Finally, I found that credit riskiness of a new venture is an important mechanism in determining the difference between performances of Black and White ventures. Black owned ventures will have a lower probability of obtaining resources at a level similar to White owned ventures, due to the difference in credit ratings. I also find that these lower credit ratings in turn negatively impact the performance of Black owned ventures compared to White owned ventures. Thus, policies which bolster the credit scores of Black ventures either through provision of training to better manage their business or temporary boost to their credit scores to make them equivalent to White ventures’ scores should alleviate some of the performance differences.

With the study, I draw attention to the need of understanding the mechanisms involved in the differential performance of Black vs White owned ventures. More studies are required to understand what other social or economic constructs may be at play. Another fruitful avenue of research could be related to exploring under what conditions the performance differences exacerbate or reduce for example in high technology ventures or ventures in certain industries. I also contribute to the age old debate about resource acquisition and size and their relationship to performance.

## 2.7 References

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## 2.8 Appendix A

**Table 2-9: Pooled Regressions for New Ventures**

	Model 1: Survival coef/std err	Model 2: Revenues coef/std err	Model 3: Profits coef/std err	Model 4: Survival coef/std err	Model 5: Revenues coef/std err	Model 6: Profits coef/std err
White Owned				-0.333* (0.14)	2.728*** (0.30)	3.527*** (0.52)
Asian Owned				-1.049** (0.34)	2.993*** (0.49)	4.248*** (1.05)
Avg. Same Ind Work Ex	-0.014** (0.00)	0.017* (0.01)	0.063*** (0.02)	-0.015** (0.00)	0.015 (0.01)	0.060*** (0.02)
Edu., Technical	-0.304 (0.20)	-0.690 (0.41)	-1.746* (0.73)	-0.298 (0.20)	-0.529 (0.38)	-1.507* (0.70)
Edu., Some Clg	-0.368** (0.14)	-0.263 (0.31)	-0.927 (0.61)	-0.338* (0.14)	-0.182 (0.31)	-0.811 (0.60)
Edu., Associate	-0.383* (0.18)	-0.528 (0.37)	-2.147** (0.74)	-0.367* (0.18)	-0.339 (0.36)	-1.892** (0.73)
Edu., Bachelors	-0.506*** (0.13)	0.581* (0.29)	0.182 (0.57)	-0.436** (0.14)	0.565* (0.28)	0.162 (0.56)
Edu., Some Grad	-0.800*** (0.22)	0.040 (0.38)	-1.818* (0.80)	-0.775*** (0.22)	0.219 (0.37)	-1.601* (0.79)
Edu., Masters	-0.656*** (0.16)	0.428 (0.31)	-0.099 (0.65)	-0.604*** (0.16)	0.516 (0.31)	0.018 (0.65)
Edu., PhDs/Prof.	-1.032*** (0.24)	0.063 (0.45)	0.827 (0.87)	-0.926*** (0.24)	0.015 (0.45)	0.738 (0.86)
Avg. Age	-0.005 (0.00)	-0.010 (0.01)	-0.058*** (0.02)	-0.003 (0.00)	-0.012 (0.01)	-0.060*** (0.02)
Provides Product	-0.116 (0.09)	0.580*** (0.15)	-1.331*** (0.31)	-0.082 (0.09)	0.510*** (0.14)	-1.415*** (0.30)
Provides Service	-0.281* (0.11)	0.240 (0.23)	0.916 (0.47)	-0.231* (0.12)	0.252 (0.21)	0.928* (0.47)
Sole Proprietor	-0.288** (0.09)	-1.187*** (0.19)	1.138** (0.35)	-0.269** (0.09)	-1.103*** (0.18)	1.246*** (0.34)
Avg. Hours worked by owner/s	-0.009*** (0.00)	0.044*** (0.00)	0.035*** (0.01)	-0.009*** (0.00)	0.044*** (0.00)	0.035*** (0.01)
Hi Tech	-0.231 (0.12)	0.712*** (0.20)	0.104 (0.50)	-0.239* (0.12)	0.669*** (0.20)	0.056 (0.50)
Med. Tech	-0.240** (0.09)	0.282 (0.16)	0.862* (0.35)	-0.231* (0.09)	0.328* (0.16)	0.927** (0.35)
Prop. US Cit.	-0.700*** (0.18)	0.876 (0.65)	0.562 (1.22)	-0.701*** (0.20)	1.003 (0.65)	0.830 (1.23)
Prop. Male	-0.134 (0.10)	0.125 (0.21)	0.503 (0.39)	-0.105 (0.10)	0.138 (0.20)	0.528 (0.39)
Tot. Active Fndrs	-0.182* (0.08)	0.141 (0.11)	-0.032 (0.23)	-0.147 (0.08)	0.103 (0.11)	-0.082 (0.23)
Log Total Employees	-0.073 (0.06)	1.078*** (0.09)	0.111 (0.23)	-0.068 (0.06)	1.069*** (0.09)	0.104 (0.23)
Time dummies?	Yes	Yes	Yes	Yes	Yes	Yes
Intercept		4.598*** (0.84)	1.106 (1.57)		2.062* (0.88)	-2.340 (1.65)
Number of observations	16284	13117	12799	16284	13117	12799
R-sq		0.1903	0.0426		0.2118	0.0530

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Table 2-10: Assets, Credit Risk and Race Location based Pooled Regressions**

	Model 1: Survival coef/std err	Model 2: Revenues coef/std err	Model 3: Profits coef/std err	Model 4: Survival coef/std err	Model 5: Revenues coef/std err	Model 6: Profits coef/std err
White Owned				0.059 (0.17)	1.966*** (0.29)	2.543*** (0.57)
Asian Owned				-0.545 (0.36)	2.152*** (0.44)	3.268** (1.04)
Log Firm Assets	-0.077*** (0.01)	0.364*** (0.02)	0.339*** (0.04)	-0.078*** (0.01)	0.345*** (0.03)	0.312*** (0.04)
Credit Risk = 1	-1.425*** (0.36)	1.169*** (0.33)	3.242*** (0.86)	-1.436*** (0.36)	0.991** (0.32)	3.024*** (0.86)
Credit Risk = 2	-0.930*** (0.16)	0.639** (0.24)	2.356*** (0.59)	-0.931*** (0.17)	0.471 (0.24)	2.152*** (0.59)
Credit Risk = 3	-0.650*** (0.13)	0.165 (0.24)	1.287* (0.54)	-0.642*** (0.13)	0.059 (0.24)	1.150* (0.54)
Credit Risk = 4	-0.485*** (0.15)	-0.271 (0.27)	0.826 (0.58)	-0.478** (0.15)	-0.346 (0.26)	0.731 (0.58)
White maj. zip code	-0.237 (0.17)	1.415*** (0.41)	1.975* (0.80)	-0.234 (0.19)	0.561 (0.42)	0.887 (0.85)
Othr Race maj. zip code	-0.500 (0.26)	1.475** (0.48)	1.777 (1.02)	-0.445 (0.27)	0.949* (0.47)	1.078 (1.03)
Controls included?	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies?	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	16284	13117	12799	16284	13117	12799
R-sq		0.2515	0.0646		0.2609	0.0693

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Table 2-11: Race Location based Pooled Regressions**

	Model 1: Survival coef/std err	Model 2: Revenues coef/std err	Model 3: Profits coef/std err
White majority zip code	-0.540*** (0.16)	1.935*** (0.47)	2.573** (0.83)
Other Race majority zip code	-0.811** (0.26)	2.066*** (0.55)	2.425* (1.08)
Controls included?	Yes	Yes	Yes
Time dummies?	Yes	Yes	Yes
Number of observations	16284	13117	12799
R-sq		0.1969	0.0459

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Table 2-12: Assets and Credit Risk based Pooled Regressions**

	Model 1: Survival coef/std err	Model 2: Revenues coef/std err	Model 3: Profits coef/std err	Model 4: Survival coef/std err	Model 5: Revenues coef/std err	Model 6: Profits coef/std err
Log Firm Assets	-0.089*** (0.01)	0.385*** (0.03)	0.376*** (0.04)			
Credit Risk = 1				-1.607*** (0.36)	1.814*** (0.35)	3.878*** (0.87)
Credit Risk = 2				-1.064*** (0.16)	1.089*** (0.27)	2.813*** (0.60)
Credit Risk = 3				-0.740*** (0.12)	0.441 (0.26)	1.585** (0.56)
Credit Risk = 4				-0.552*** (0.14)	-0.160 (0.30)	0.967 (0.60)
Controls included?	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies?	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	16284	13117	12799	16284	13117	12799
R-sq		0.2436	0.0567		0.1988	0.0506

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Table 2-13: Assets and Credit Risk Mediation Pooled Regressions**

	Model 1: Assets coef/std err	Model 2: Assets with controls coef/std err	Model 3: Credit Risk coef/std err	Model 4: Credit Risk with controls coef/std err
White Owned	2.098*** (0.26)	1.678*** (0.21)	-0.463*** (0.06)	-0.405*** (0.06)
Asian Owned	2.609*** (0.43)	1.731*** (0.38)	-0.475*** (0.10)	-0.357*** (0.10)
Controls included?	No	Yes	No	Yes
Time dummies?	No	Yes	No	Yes
Number of observations	16581	16284	16581	16284
R-sq	0.0273	0.2351	0.0180	0.0798

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Table 2-14: Race Firm, Assets and Credit Risk Pooled Regressions**

	Model 1: Survival coef/std err	Model 2: Survival coef/std err	Model 3: Revenues coef/std err	Model 4: Revenues coef/std err	Model 5: Profits coef/std err	Model 6: Profits coef/std err
White Owned	-0.333* (0.14)	0.004 (0.15)	2.728*** (0.30)	2.060*** (0.28)	3.527*** (0.52)	2.746*** (0.52)
Asian Owned	-1.049** (0.34)	-0.663 (0.35)	2.993*** (0.49)	2.324*** (0.44)	4.248*** (1.05)	3.519*** (1.02)
Log Firm		-0.079***		0.347***		0.315***
Assets		(0.01)		(0.03)		(0.04)
Credit Risk = 1		-1.452*** (0.36)		1.028** (0.33)		3.067*** (0.86)
Credit Risk = 2		-0.945*** (0.16)		0.487* (0.24)		2.177*** (0.59)
Credit Risk = 3		-0.657*** (0.13)		0.076 (0.24)		1.177* (0.54)
Credit Risk = 4		-0.498*** (0.14)		-0.325 (0.26)		0.760 (0.59)
Controls included?	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies?	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	16284	16284	13117	13117	12799	12799
R-sq			0.2118	0.2600	0.0530	0.0690

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Table 2-15: LPM Survival Decomposition**

	<b>LPM with Oaxaca - Survival</b>	
<b>Black owned</b>	0.0822	
<b>White owned</b>	0.0656	
<b>Difference</b>	0.0167	
<b>Explained</b>	0.0209	
<b>Unexplained</b>	-0.0043	

	<b>Coeff</b>	<b>T-stat</b>
<b>Log Firm Assets</b>	0.0123	4.87
<b>Credit Risk</b>	0.0081	4.20
<b>Race Location</b>	0.0032	0.72
<b>Avg. Same Ind Work Ex</b>	0.0013	1.78
<b>Education</b>	-0.0009	-0.80
<b>Average Age Owners</b>	-0.0007	-1.17
<b>Provides Product</b>	-0.0002	-0.26
<b>Provides Service</b>	-0.0002	-0.69
<b>Sole Proprietor</b>	-0.0020	-1.95
<b>Avg Hrs worked</b>	0.0000	0.02
<b>Technology</b>	-0.0003	-0.70
<b>Prop. US Cit.</b>	0.0000	0.26
<b>Prop. Male</b>	0.0000	0.09
<b>Total Active Founders</b>	0.0004	0.79
<b>Log Total Employees</b>	-0.0003	-0.49
<b>Time</b>	0.0001	0.16
<b>TOTAL</b>	<b>0.0209</b>	

**Table 2-16: Marginal Structural Model Assets**

	Model 1: Survival coef/z score	Model 2: Revenues coef/z score	Model 3: Profits coef/z score
White Owned - Direct Effect	-0.241 (-1.58)	2.245** (6.57)	3.307** (6.14)
White Owned - Indirect Effect	-0.066+ (-1.68)	0.576** (5.84)	0.542** (3.47)
Controls included?	Yes	Yes	Yes
Time dummies?	Yes	Yes	Yes
Number of observations	31376	25270	24634

+ p&lt;0.10, \* p&lt;0.05, \*\* p&lt;0.01

**Table 2-17: Marginal Structural Model Credit Risk**

	Model 1: Survival coef/z score	Model 2: Revenues coef/z score	Model 3: Profits coef/z score
White Owned - Direct Effect	-0.276+ (-1.85)	2.708** (8.27)	3.521** (6.72)
White Owned - Indirect Effect	-0.026** (-4.23)	0.034** (2.81)	0.015 (0.64)
Controls included?	Yes	Yes	Yes
Time dummies?	Yes	Yes	Yes
Number of observations	31398	25288	24650

+ p&lt;0.10, \* p&lt;0.05, \*\* p&lt;0.01

**Table 2-18: Pooled Regressions for New Ventures**

	Model 1: Survival - Logit coef/std err	Model 2: Survival - Probit coef/std err	Model 3: Survival - Cox coef/std err
White Owned	-0.333* (0.14)	-0.187** (0.07)	-0.220+ (0.13)
Asian Owned	-1.049** (0.34)	-0.554** (0.16)	-0.715* (0.32)
Controls included?	Yes	Yes	Yes
Time dummies?	Yes	Yes	No
Number of observations	16284	16284	16390

+ p&lt;0.10, \* p&lt;0.05, \*\* p&lt;0.01



## **CHAPTER 3.     IMPACT OF DIVERSE OWNER TEAM CHARACTERISTICS ON NEW VENTURE SURVIVAL<sup>6</sup>**

### **3.1    Introduction**

Ventures are increasingly being founded and run by teams (Watson, Stewart, & BarNir, 2003). Every year 400,000 – 500,000 startups are founded in the US and 50% of these survive five years or more (SBA, 2016). Lazear (2004) claimed that an entrepreneur is a ‘jack of all trades’, Harper (2008) posits that new ventures should be envisioned as ‘agent-neutral’ organizations. The locus of control and decision making could thus be an individual or a team, this has led to a call by scholars to focus on team-level constructs and analyses (Harper, 2008). Research on aforementioned is relatively sparse in the prevalent entrepreneurship literature. It has been shown that team-founded ventures perform better than those founded by sole entrepreneurs (Chandler & Hanks, 1998; Eisenhardt & Schoonhoven, 1990; Roberts, 1991). However, academic understanding of team level constructs and their impact on performance is still missing many fundamental pieces.

Interest in new venture survival is growing (Cefis & Marsili, 2006; Geroski, Mata, & Portugal, 2010; Gimmon & Levie, 2010; Helfat & Lieberman, 2002; Klapper & Richmond, 2011; Mata & Portugal, 1994). The antecedents related to venture success are likely different from antecedents of new venture survival (Dahl & Sorenson, 2012; Short, Ketchen, Palmer, & Hult, 2007). Past research has shown that similar industry work experience of the sole/primary owner is positively correlated with new venture survival

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<sup>6</sup> The author acknowledges the Ewing Marion Kauffman Foundation and the NORC Data Enclave for providing researcher support and access to the data used in this research.

(Dahl & Reichstein, 2007; Klepper & Sleeper, 2005). Does this relationship also hold when one looks at similar work experience of the team of owners? I argue that similar a relationship should be observed for a team owners. Furthermore, for educational attainment most past studies either focus on the number of years of education or the degree attained by the sole/primary owner, but these constructs may signify different aspects of learning and capabilities of individuals. Prior research treats them as close substitutes, however I posit that a degree may reflect intangible characteristics of the individual or a “sheepskin effect” or signal quality, and these aspects might be correlated with new venture survival rather than higher level of education. Thus, I empirically investigate whether survival differs when education is measured in different ways.

Team performance is impacted by diversity both of tangible and intangible characteristics associated with teams (Bantel & Jackson, 1989; Eisenhardt & Schoonhoven, 1990; Joshi & Roh, 2009; Kilduff, Angelmar, & Mehra, 2000). Research on diversity has been growing at a fast rate (Harrison & Klein, 2007), but, research on diversity in owner teams and how it impacts new venture survival is very limited (Davidsson & Wiklund, 2001; Lyon, Lumpkin, & Dess, 2000). New ventures have to continuously face varied challenges originating from markets, new technologies and evolving business processes. Compared to an individual, a team may be better equipped to handle these uncertainties (Vesper, 1990). A team may bring in more quantum of knowledge and a more diverse set of perspectives to resolve an issue. Hence, it is important to study diversity in teams and how it impacts new venture survival. In the organizational context findings about diversity have been inconsistent and ambivalent (Harrison, Price, & Bell, 1998; Pitcher & Smith, 2001; Webber & Donahue, 2001).

Team composition is suggested to be important for team effectiveness (Bantel & Jackson, 1989; Wanous & Youtz, 1986). Heterogeneous teams may result in improved creativity and innovativeness (Sethi, Smith, & Park, 2002). Diverse teams are suggested to be more effective in solving complex, idiosyncratic problems (Gladstein, 1984; Kulik, Oldham, & Hackman, 1987; Wanous & Youtz, 1986) and these are the kinds of problems faced by new ventures. However, a recent study by Chowdhury (2005) analyzes demographic diversity of teams and finds no relationship between performance and demographic diversity (age, gender and functional work experience). Team heterogeneity may lead to friction and conflict resulting in bad performance. Homophily is associated with more satisfaction in communication with team members, lower levels of intra-team conflict (Pearce & Ravlin, 1987) and lower turnover (Jackson et al., 1991). Thus, diversity may hinder team performance.

Harrison and Klein (2007) attribute the mixed results in diversity research to ambiguous and imprecise definition of diversity as a construct. They propose a typology of diversity, which deconstructs it into three categories – separation, variety and disparity. Each typology has its dominant logic but they may coexist. In the current article, I focus on utilizing this typology to assess the impact of diversity in owner teams on new venture survival. I specifically focus on diversity on two tangible dimensions – education and work experience in the same industry. These variables have been shown to impact new venture performance and hence understanding how diversity of the owner team along these variables would impact new venture performance is a logical next step.

Furthermore, past research has implicitly assumed a monotonic relationship between diversity and performance, which needs to be investigated. This is especially true in the

context of the Harrison and Klein (2007) diversity framework where multiple diversity logics can co-exist leading to non-monotonicity. It is also possible that different levels of within group diversity have different effects on the outcome variables. Thus, this study also explores the non-monotonic effects of diversity on survival.

The results of the current study have significant implications for research and practice. Echoing past studies, I find that same industry work experience increases the probability of survival of a new venture. The results of educational attainment of the owners are interesting – average years of education does not seem to be correlated with survival but degrees do. This result hints at the fact that intangible characteristics or the sheepskin degree effect or signaling effects of a degree may be important for venture survival. Focusing on the results of diversity of the owner team in education, I find that diversity decreases the survival probability of new ventures. However, I find that same industry work experience diversity does not impact survival. Future entrepreneurship research should focus on understanding under what situations does team diversity benefit survival? Research into whether it is diversity that is not helpful or the fact that new ventures are not organized to benefit from the diversity would have far reaching implications on policy and academic research. Finally, I find broad support for non-monotonicity of the educational diversity and venture survival relationship. Moderate levels of diversity in education is much worse than low or high levels of diversity. It seems to indicate that costs at moderate levels of diversity far outweigh the benefits.

The availability of confidential Kauffman Firm Survey data, which tracks a sample of new ventures started in the US in 2004 and follows them up to 2011, makes a detailed panel analysis of venture survival possible. The panel nature of the data lends itself to

survival analysis and the extensive variables captured in the survey help in controlling for various kinds of unobserved heterogeneity. Finally, since KFS ventures are a representative sample of new ventures started in the US in 2004, these results are broadly applicable to a typical new venture.

The paper is organized as follows – the next section draws out theories that link independent variables to new venture survival. Two variables – owners’ educational attainment and owners’ same industry work experience are analyzed. Owners’ age, education, the size of the venture amongst others have been controlled for in the analyses. The theory section is followed by an explanation of data, variables, and methods. I report the findings in the results section. Finally, the paper ends with conclusion and discussion of the results.

## **3.2 Theory**

### *3.2.1 Background*

Analysis of individual level characteristics of the (primary) owner and their correlation with survival of new ventures has received considerable attention, but analysis of team level characteristics and their impact on new ventures has started to receive more attention only recently (Chowdhury, 2005; Delmar & Shane, 2006). In the following sections, I first argue that characteristics such as same industry work experience and education of the sole/primary owner are crucial for the continuation of a new venture and should also be important for new venture success in the team level context as well (Section 2.1). I then conjecture about how the diversity of team members’ education and work experience in the same industry would impact new venture survival. Furthermore I debate,

if diversity is correlated with survival, whether the relationship should be non-monotonic (Section 2.2). I pursue an exploratory approach since there is limited extant evidence on team level constructs and their impact on new venture survival.

### *3.2.2 Role of Owner Team Work Experience in the Same Industry and Team Education on New Venture Survival*

I argue that the effect of work experience in the same industry would be similar on the survival of a new venture whether it is measured for the primary/sole owner or as a team level construct. Further, previous studies find that education of the primary/sole owner impacts performance of a new venture. I investigate whether it is the years of education or the degree attained that is correlated with survival.

#### 3.2.2.1 Work experience in the same industry

Work experience in the same industry as the current startup of the owners should lead to a positive effect on the outcome of the venture (Agarwal, Echambadi, Franco, & Sarkar, 2004; Dahl & Reichstein, 2007; Klepper & Sleeper, 2005). Delmar and Shane (2006) use a two year panel to show that industry experience of the owners positively effects performance of new Swedish firms and similar effects have also been found on the growth of new technology-based ventures in Italy (Colombo & Grilli, 2005). Working in an industry leads to the development of industry specific networks and contacts with vendors and buyers. When an employee starts a venture in the same industry, she can leverage these networks and contacts to improve the prospects of her venture. Work experience in an industry also leads to the development of tacit knowledge about the industry and the markets. Tacit knowledge is tough to imitate and rare to acquire (Mahoney

& Pandian, 1992) over short periods of time (Dierickx & Cool, 1989), hence leading to a sustainable competitive advantage for the startups whose owners possess it. Industry experience also provides an 'intuition' about profitable niches in an industry (Brüderl, Preisendörfer, & Ziegler, 1992). Specific industry experience leads to a better understanding of what is required to satisfy consumers in an industry (Knight, 1921; Von Mises & Mayes, 1990). Prior similar industry experience should also allow individuals to better understand the changes occurring in the customers, vendors, and other stakeholders, which should lead to a faster and more dynamic response to such changes resulting in the enhancement of prospects of survival of the new venture.

This leads to an explorative empirical question – *Would same industry work experience of the owner operators impact the chances of survival of a new venture?*

#### 3.2.2.2 Education

Higher level of education of the sole/primary owner is associated with higher survival rates of new ventures (Cooper, Gimeno-Gascon, & Woo, 1994). A team of founders can be thought of as a 'unit' working towards a common goal. Thus, the average level of education of the 'unit' should impact the venture survival in a similar way as would the education of the sole/primary owner.

Higher levels of education could be correlated with higher rates of survival of ventures due to the primary effect of education which is a reflection of the knowledge of the owners. Past studies usually find a small but positive effect of years of education on new venture performance (Colombo & Grilli, 2005; Cooper et al., 1994). Success in entrepreneurship has also been associated with personality traits such as need for

achievement, generalized self-efficacy, autonomy, persistence, determination, stress tolerance, and proactive personality (Caird, 1993; Kickul & Gundry, 2002; Rauch & Frese, 2007). The years of education is a direct measure of knowledge acquired whereas a degree may indicate other intangible characteristics (as discussed above), beyond knowledge acquisition, which may be related to venture survival. A degree holder may also benefit from the “sheepskin effect” (Jaeger & Page, 1996) – this effect posits that a person with a diploma would earn more than another person without one, but same years of education. I extend the logic to the context of new ventures and argue that a degree might open more doors and avenues of employment for an individual, thus increasing her opportunity cost of entering into entrepreneurship. It is known that unemployment rates vary across level of education with lower unemployment observed as the level of education increases (Ashenfelter & Ham, 1979). Thus, one might find more “necessity entrepreneurship” among owners with lower levels of education compared to individuals with higher levels of education. This could also lead to a selection bias wherein better quality ideas or ventures are pursued by degree holders (“choice based entrepreneurs”) compared to those without a degree (“necessity entrepreneurs”), thus leading to better survival of ventures owned by degree holders. However, necessity entrepreneurs may “stick it out” longer in a business since they do not have any other option (Gimeno et. al., 1997).

Furthermore, new ventures do not have a credible track record, thus resource providers and employees seek out signals of quality before committing resources to a venture. Stuart, Hoang, and Hybels (1999) and Vanacker and Forbes (2016) find that association with established players increases the credibility of startups. The completion of



a degree is another such quality signal which could allay the fears of resource providers and employees.

As evident from the discussion above, there seems to be an inherent tension regarding education of the owner team and survival, which lends itself to an empirical analysis. Hence, I investigate the research question – *whether survival of new ventures is correlated with the level of education or the years of education attained?*

### 3.2.3 Diversity and New Venture Survival

Teams are becoming an integral part of organizations and new ventures. Teams comprise individuals with varying skills, characteristics, and backgrounds, thus, studies in diversity and how it impacts performance have proliferated in the last couple of decades (Chowdhury, 2005; Harrison & Klein, 2007; Watson et al., 2003). However, the findings about the outcomes due to within unit diversity have been weak and inconsistent (Harrison & Klein, 2007; Webber & Donahue, 2001). Harrison and Klein (2007) propose that these inconsistencies are a result of imprecise definitions of and hence improper operationalization of diversity constructs. Harrison and Klein (2007) divide diversity into three broad categories – separation, variety and disparity. Separation alludes to differences in opinions, and attitudes; variety pertains to the different categories of a variable and finally, disparity pertains to the differential accumulation of socially valuable assets or resources by team members. Each of these types of diversity have their dominant logic, however they are not mutually exclusive. Depending on the context one type of diversity may bolster or undermine another type. In the following, I utilize the typology of Harrison and Klein to develop arguments about how diversity in work experience and education

would impact new venture survival. I further conjecture about the shape of the relationship, given the interactions of the various diversity types. I posit that this should lead to a non-monotonic relationship.

#### 3.2.3.1 Diversity in Same Industry Work Experience

Work experience in the same industry can be classified as a “disparity” diversity. Harrison and Klein (2007) define disparity as differences in concentration of valued social assets or resources among unit members. As discussed in section 2.1, work experience in the same industry is an important resource for a new venture. The unequal distribution of valuable resources within organizations is common, however there are very few studies that analyze the impact of such diversity on outcomes. Bloom (1999) studied pay diversity and reported that such diversity leads to negative outcomes for organizations. Similar negative outcomes have also been reported by Eisenhardt and Bourgeois (1988) for top management team decision making.

Following a similar logic to Harrison and Klein (2007), I posit that disparity in same industry work experience may lead to the poor survival probability of a venture. Watson et al. (2003) also hypothesized a similar relationship between differences in work experience and perceptions of owners about the growth and performance of their ventures. However, they did not find an empirically significant relationship. Disparity if not tempered with open communication may lead to a suppression of the voice of the junior members. Junior members may feel fearful of being ‘exposed’ due to their lack of knowledge and hence may not speak up, which in turn might lead to a loss of good ideas and insights for the betterment of the venture (Hollander, 1958; Pfeffer & Davis-Blake, 1990). Team members

with more experience might try to assert their authority over junior members, and the latter might focus on rebuffing such advances, leading to distractions from important tasks. Furthermore, previous research has found that high powered members may be involved in behaviour such as interrupting more, and speaking over people (Keltner, Gruenfeld, & Anderson, 2003) which might be detrimental to the efficient operation of a venture. These issues become especially salient in the context of new ventures, since they possess a very thin cushion for a mistake or misstep.

Harrison and Klein (2007) point out that diversity effects may be interdependent and the various types of diversity may co-occur, thus impacting results and outcomes. Above I have argued that the primary channel through which same industry experience operates is that of disparity thus leading to negative outcomes. However, in the current context disparity may be coexisting with variety (characterized by a unit comprising different kinds of relevant knowledge). Prior industry experience can be categorized into low, medium and high levels, in such a scenario, the individuals with high levels of experience might bring ‘tried and tested’ robust approaches to solve problems facing a venture whereas as members with low experience may bring new and innovative, ‘out of the box’ solutions. Thus, as reported in past studies variety may increase the breadth of cognition of a unit (Argote & Ingram, 2000; Austin, 2003; McGrath, Berdahl, & Arrow, 1995).

Furthermore, Harrison and Klein (2007) hypothesize that moderate levels of variety may lead to problems of “unshared information” (Gruenfeld, Mannix, Williams, & Neale, 1996; Morrison & Milliken, 2000; Stasser, Vaughan, & Stewart, 2000) which could lead to ‘siloeed’ decision making, thus hampering performance. Thus, we might observe a

relationship between similar industry work experience and survival which changes direction depending on whether disparity or variety based forces dominate at various levels of diversity or the relationship may not be observed at all due to both the effects canceling each other out at each level of diversity.

The discussion above leads to the set of questions – *Does diversity in work experience impact new venture survival? If yes, is the relationship non-monotonic?*

### 3.2.3.2 Diversity in Education Levels

Past studies have focused on how functional education such as in technology, business, finance etc. impacts new venture performance (Colombo & Grilli, 2005). Others have investigated the level of education such as high school, a bachelor's degree (Cooper et al., 1994) and its impact on performance. In a team context owners may possess different levels of education. This diversity may impact the performance of a new venture. I conjecture that there are variety, disparity and separation diversity constructs interacting in such a context (Harrison & Klein, 2007). Variety increases the repertoire of mental models to tap into for solutions (McGrath et al., 1995). Individuals with say a high school education may have more 'hands on' and practical experience whereas a person with a PhD in a field may bring more intellectual and analytical rigor to a decision. Thus, such individuals will most probably travel differing career paths which will afford them different experiences. Furthermore, the attitudes about say innovation or towards work will be divergent across individuals with different levels of education. I posit that difference in educational levels would shape individuals who are qualitatively different from each other. Harrison and Klein (2007) state about variety ... teams can translate greater information richness within

a unit into better choices, plans, or products. Thus, diversity in level of education should help new venture survival. However, the benefits of variety should be enhanced in a context where ventures encounter complex and new challenges with higher frequencies which is usually the case in high technology and innovative industries. New ventures in the US are mostly non-innovative and in stable mature industries (Hurst & Pugsley, 2011), thus this benefit of educational variety may be muted for most new ventures.

Difference in education levels can also be envisioned as disparity diversity, since a PhD degree will mostly be rated higher in educational attainment than an individual with less than high school education. As discussed earlier, disparity may lead to worse performance due to the various issues associated with such diversity. More educated members may view themselves as superior and the less educated might develop an inferiority complex, both of these would detract from open communication thus hurting a venture's survival. Disparity in the educational context may also foster the negative aspects of separation diversity (defined as composition of differences in position or opinion among unit members, primarily of value, belief, or attitude (Harrison & Klein, 2007)). For example more educated members of an owner team may hold very different opinions about the vision and mission of the venture compared to the views of the lesser educated members. For instance the former may focus more on the sustainability and 'green' aspects of the business whereas the latter may focus more on profitability. Dissonance amongst team members on such aspects of a venture may lead to sub optimal performance (McGrath et al., 1995).

It has been found that effects of high and low levels of diversity may be different from those at moderate levels (Harrison & Klein, 2007). For example high variety may

lead to unique and new viewpoints (Gibson & Vermeulen, 2003) (assuming smooth information flow and members not withholding viewpoints). Similarly, moderately disparate teams may conform more readily to norms than high or low disparate teams (Harrison & Klein, 2007). In the current context, moderate levels of educational diversity may enhance the negative aspects of diversity since there would be more contention amongst members to assert their viewpoints and superiority, whereas in low education diversity teams all members may think and act alike. Finally, in high diversity teams individuals may implicitly know and accept their roles such as a PhD is responsible for the data analyses and strategy - “brains” of the venture whereas a high school dropout may be the “brawn” behind it, thus leading to each group working in their own “specialties” and in fact collaborating since there is no contention. Thus, it is important to investigate whether the relationship between diversity in education and survival is non-monotonic.

The above discussion leads to the following set of empirical investigations - *Does diversity in education impact new venture survival? If yes, is the relationship non-monotonic?*

### **3.3 Data and Methods**

#### *3.3.1 Data Sources, Sample and Econometric Models*

The current study requires fine-grained panel data about new ventures and their owners. The Kauffman Firm Survey (KFS) is a relevant dataset for the study, since it is a longitudinal dataset of new ventures. The KFS started with an initial sample of 250,000 firms, provided by D&B, which started in 2004 in the US (fifty states and the District of Columbia). A business was defined as started in 2004 if it was a new independent business

created by an individual or team, or purchase of an existing business or the purchase of a franchise (Robb & Robinson, 2012). Businesses that paid state unemployment insurance, or Federal Social Security tax or had an EIN or had schedule C income prior to or after 2004 were excluded. Out of this sample, 4,928 firms were admitted with an oversampling of high-tech firms, weights have been provided by KFS in order to make the sample representative of all new ventures in the economy. These firms were surveyed annually in detail from 2004 to 2011, creating an eight-year panel. Firms which dropped out of the survey were not used in the regression models. This led to a total of 3140 firms and 18,286 firm year observations. Amongst this sample records that were missing data or reported no owner operators or total size were excluded from the models, leading to 17,658 firm year observations. The data have information on up to 10 owners, initially and later 15 owners, which includes age, gender, race, ethnicity, education, and previous experience. Detailed financial information about the ventures, location, revenues, expenses, number of employees, profit/loss, and industry classification, among many other firm-level variables are also available in the dataset.

Cox survival analysis was used in most of the regression models. Linear Probability Models were employed to compute confidence intervals for curvilinear relationships of diversity and survival.

### *3.3.2 Variables*

The performance of a new venture can be measured on multiple dimensions, I use survival as the dependent variable. The survival of new ventures will be measured as the number of years a new venture remains in business as an independent entity, with ventures

surviving till the end of the observation period (2011) as censored. Work experience in the same industry, was calculated as the average number of years of same industry work experience of the owner team. Education years are the average years of education of the owner team. Degree of Education is the proportion of owners with a particular educational attainment (for example less than high school, bachelor's etc.) in a team.

Coefficient of Variation Work Experience, measures the owner team diversity in similar industry work experience. Coefficient of Variation Education, measures the within owner team diversity in education. The measure captures diversity from the perspective of disparity (Harrison & Klein, 2007). The formula computing Coefficient of Variation (CV) is:

$$CV = \sigma/\mu$$

where  $\sigma$  represents standard deviation  $\mu$  represents the mean for the team. The standard deviation is measuring within unit diversity and not a population value, hence the denominator of the standard deviation contains  $n$  and not  $n-1$ . The CV captures the asymmetry in distribution of the resource which is pivotal to operationalizing the concept of disparity diversity (Harrison & Klein, 2007). CV captures the distance between unit members (through standard deviation). The mean accounts for relative level of the resource (Sørensen, 2002), for example a standard deviation of \$40K in income of a unit with average income of \$200K would be assessed as low disparity compared to the same standard deviation with average income of \$60K.

Blau Index Degree captures the within owner team diversity in education, measured with the lens of variety diversity (Harrison & Klein, 2007).



$$B = 1 - \sum_1^R p_i^2$$

where  $p_i$  represents the proportion of unit members in the  $i^{\text{th}}$  category. When members of a unit are qualitatively different rather than quantitatively, the Blau Index is an appropriate measure for diversity (Harrison & Klein, 2007). Blau Index traces its roots to Simpson (1949), who used it to measure species diversity in an ecosystem, it is also known as the Herfindahl (1950) and Hirschman (1964) index. Blau index captures the chance that two randomly selected unit members belong to dissimilar categories, which helps operationalize the idea that dissimilar members tap into varied information and other sources, hence operationalizing the variety disparity construct.

A detailed list of the independent variables used in the study is provided in Table 3-1. The KFS contains a wealth of information about the owners and the ventures themselves. This makes the use of multiple control variables possible. In order to manage unobserved heterogeneity, the following controls will be used – proportions of US citizen and gender of founders, the average age of the team, technology level of the venture, dummies for whether venture provides a product or a service, size of founder teams, and number of employees.

**Table 3-1: Description of variables**

Variable	Description
<b>MAIN VARIABLES</b>	
<i>Average Work Exp (Same Ind)(yrs)</i>	Average years of same industry work experience of active founder team (in years)
<i>Avg Education (yrs)</i>	Average years of education of the active founder team (in years)
<i>Ed., HS or less, Some Clg etc.</i>	Proportion of owners of the active founder team with various levels of education: 1. High school graduate or less 2. Technical trade or vocational degree 3. Some college, but no degree 4. Associate's degree 5. Bachelor's degree 6. Some graduate school but no degree 7. Master's degree 8. Professional School or Doctorate
<i>Coeff. of Var. - WE</i>	Coefficient of variance for years of work experience in the same industry for the active founder team
<i>Coeff. of Var – Ed. (yrs)</i>	Coefficient of variance for years of education of the active founder team
<i>Educ Blau Coeff</i>	Blau Index for education
<b>CONTROL AND MISC. VARIABLES</b>	
<i>Provides Product</i>	Business activity of the business is provision of product/s (Yes = 1)
<i>Provides Service</i>	Business activity of the business is provision of service/s (Yes = 1)
<i>Average Age (yrs)</i>	Average age of the active founders of the venture
<i>Hi Tech Business</i>	Dummy, 1= Yes if venture categorized as high tech (categorization done by KFS) <sup>+</sup>
<i>Medium Tech Business</i>	Dummy, 1= Yes if venture categorized as medium tech (categorization done by KFS) <sup>+</sup>
<i>Low Tech Business</i>	Dummy, 1= Yes if venture categorized as low tech (categorization done by KFS) <sup>+</sup>
<i>Prop US Cit.</i>	Proportion of US citizens amongst the founder team ( 1 = US citizen)
<i>Prop Male</i>	Proportion of males amongst the founders (1 = male)
<i>Prop Am. Indian</i>	Proportion of American Indians in founder team
<i>Prop Asian</i>	Proportion of Asians in founder team
<i>Prop Black</i>	Proportion of Blacks in founder team
<i>Prop Pac. Islndr</i>	Proportion of Pacific Islanders in founder team
<i>Prop Othr. Race</i>	Proportion of Other Races in founder team
<i>Prop White</i>	Proportion of Whites in founder team
<i>Tot Size</i>	Sum of active owners and employees (Full time and part time) of a venture
<i>Tot Act Fndrs</i>	Total active founders

+ Based on SIC classification developed by Bureau of Labor Statistics researchers. on Hadlock et al.

"High Technology Employment: Another View" Monthly Labor Review, July, 1991, pp. 26 - 30

### 3.4 Results

Summary statistics of the variables are provided in Table 3-2 (due to disclosure constraints correlations, maxima and minima values have been omitted). The average same industry work experience of the owner operator team is 11.5 years. Most owner operators have at least some college education. Only 2% of the ventures are categorized as high technology, whereas 85% are low technology thus, most of the business ventures are 'run of the mill' non-innovative businesses. Finally, the size and number of owner operators reflect the fact that most new ventures are small with 1.4 owner operators on average and average total size of 3.12 employees.

**Table 3-2: Descriptive statistics of variables in econometric models**

	Mean	S.D.	N
Life	5.57	2.70	3140
Average Work Exp (Same Ind) (yrs)	11.45	9.98	3137
Coeff. of Var. - WE	0.13	0.30	3134
Avg Education (yrs)	14.68	2.94	3134
Coeff. of Var – Ed. (yrs)	0.02	0.08	3134
Ln Coeff. of Var – Ed. (yrs)	0.02	0.06	3104
Educ Blau Coeff	0.10	0.20	3139
Ed., HS or less	0.15	0.34	3139
Ed., Technical	0.07	0.24	3139
Ed., Some Clg	0.22	0.39	3139
Ed., Associate	0.09	0.27	3139
Ed., Bachelors	0.25	0.41	3139
Ed., Some Grad	0.05	0.21	3139
Ed., Masters	0.12	0.30	3139
Ed., PhDs/Prof.	0.05	0.20	3139
Average Age	44.80	10.38	3136
Hi Tech Business	0.02	0.13	3140
Medium Tech Business	0.13	0.34	3140
Low Tech Business	0.85	0.36	3140
Provides Product	0.51	0.50	3140
Provides Service	0.86	0.35	3140
Prop US Cit.	0.97	0.16	3139
Prop Male	0.68	0.42	3140
Prop Am. Indian	0.01	0.09	3136
Prop Asian	0.03	0.16	3136
Prop Black	0.08	0.27	3136
Prop Pac. Islr.	0.01	0.07	3136
Prop Otr. Race	0.04	0.19	3136
Prop White	0.83	0.37	3136
Tot Act Fndrs	1.38	0.70	3140
Tot Size	3.12	5.26	3069
Log Tot Size	0.70	0.79	3069

Relationships between variables were examined by starting with a basic model in Table 3-3, which included controls and average work experience in the same industry. As expected an increase in same industry work experience of the team leads to a decrease in the probability of failure. Failure is coded as 1, hence a negative coefficient implies

decrease in failure or better chances of survival. Interestingly, the average years of education of the team do not seem to impact survival, however degrees do have a significant impact on survival. This result supports my argument that degree attainment could represent intangible characteristics of the entrepreneurs, or a sheepskin effect or a combination of such factors. Unfortunately, due to data limitations I am unable to identify the contributions by each effect. As a post hoc analyses, when years of education and degrees are incorporated in the same model, I find that degrees still impact survival positively whereas average years of education is detrimental to survival. This result supports the view that degrees have an effect above and beyond the years of education and controlling for degrees attained, individuals who take more years in degree attainment are associated with higher business failures. This seems plausible since individuals who take more time to complete a degree on average may possess lower abilities than those who finish on time, and lower abilities may be related with either lower quality ideas or worse management of a business which would both lead to lower survival rates on average. The control variables are either congruent with past findings or statistically insignificant.

**Table 3-3: Work Experience, Average Education and Degree of Education**

	Work Exp	Work Exp & Edu	Work Exp &
	(yrs)	Degree	
	coef/std err	coef/std err	coef/std err
Average Work Exp (Same Ind)	-0.016*** (0.00)	-0.016*** (0.00)	-0.016*** (0.00)
Avg Education		0.000 (0.01)	
Ed., Technical			-0.191 (0.17)
Ed., Some Clg			-0.174 (0.12)
Ed., Associate			-0.147 (0.15)
Ed., Bachelors			-0.266* (0.12)
Ed., Some Grad			-0.547** (0.19)
Ed., Masters			-0.372** (0.14)
Ed., PhDs/Prof.			-0.503* (0.20)
Average Age	0.003 (0.00)	0.003 (0.00)	0.004 (0.00)
Provides Product	-0.071 (0.08)	-0.071 (0.08)	-0.088 (0.08)
Provides Service	-0.198 (0.10)	-0.198 (0.10)	-0.211* (0.10)
Hi Tech Business	-0.248* (0.10)	-0.248* (0.10)	-0.215* (0.10)
Medium Tech Business	-0.255** (0.08)	-0.256** (0.08)	-0.188* (0.08)
Prop US Cit.	-0.134 (0.23)	-0.134 (0.23)	-0.149 (0.23)
Prop Male	-0.000 (0.08)	-0.000 (0.08)	-0.011 (0.08)
Tot Act Fndrs	-0.047 (0.06)	-0.047 (0.06)	-0.042 (0.06)
Tot Size	-0.009 (0.01)	-0.009 (0.01)	-0.008 (0.01)
Prop Am. Indian	0.280 (0.29)	0.280 (0.29)	0.243 (0.29)
Prop Asian	-0.612* (0.29)	-0.612* (0.29)	-0.536 (0.29)
Prop Black	0.197 (0.12)	0.197 (0.12)	0.198 (0.12)
Prop Pac. Isldr.	0.352 (0.54)	0.352 (0.54)	0.323 (0.55)
Prop Otr. Race	0.166 (0.18)	0.166 (0.18)	0.174 (0.18)
Number of observations	17658	17658	17658

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

In Table 3-4 we find that the Coefficient of Variance of years of work experience in the same industry is insignificant. This suggests that diversity in work experience either does not correlate with survival or the positive and negative aspects of diversity cancel each other out. The Coefficient of Variance for years of education is statistically significant and same is the case for Blau Index. However, educational diversity increases the probability of failure in both cases. This supports the idea that the effects of disparity diversity (negative effects) are overwhelming the effects of variety diversity (positive effects). Finally, when squared terms of educational diversity measures are included in the regressions Table 3-5, I find that both linear terms are still significant in both the Survival or LPM models. The squared terms are significant in the Linear Probability Models at or below 10% levels except for the Blau squared coefficient which is significant at 12.7% level in the survival model. The signs of the linear and squared terms are opposite thus indicating that a non-monotonic relationship exists between survival and diversity. This could be the result of say disparity diversity having different effects at low, medium and high levels or it could be that disparity diversity overwhelms variety diversity at some levels but not all or it could be a combination of the two factors. Figures 3-1 and 3-2 graph the confidence intervals with respect to survival for diversity. A non-monotonic relationship can be observed in both the Coefficient of Variance and Blau Index graphs. Most observations of the Coefficient of Variance for education fall below 1.0 (approximately 45 observations are above 1.0) and a non-linear relationship with an inflection point before 1.0 can be observed from the graphs.

**Table 3-4: Diversity - Work Experience, Degree of Education and Average Education**

	Work Exp Div coef/std err	Edu Div - Blau coef/std err	Edu Div - CV coef/std err
Coeff. of Var. - WE	0.189 (0.14)		
Educ Blau Coeff		0.530* (0.21)	
Coeff. of Var – Ed			1.182*** (0.30)
Average Work Exp (Same Ind)	-0.016*** (0.00)	-0.016*** (0.00)	-0.016*** (0.00)
Avg Education			-0.002 (0.01)
Ed., Technical	-0.195 (0.17)	-0.201 (0.17)	
Ed., Some Clg	-0.168 (0.13)	-0.176 (0.13)	
Ed., Associate	-0.137 (0.15)	-0.148 (0.15)	
Ed., Bachelors	-0.264* (0.12)	-0.263* (0.12)	
Ed., Some Grad	-0.542** (0.19)	-0.553** (0.19)	
Ed., Masters	-0.368* (0.14)	-0.371* (0.14)	
Ed., PhDs/Prof.	-0.499* (0.20)	-0.499* (0.20)	
Controls included?	Yes	Yes	Yes
Number of observations	17658	17658	17658

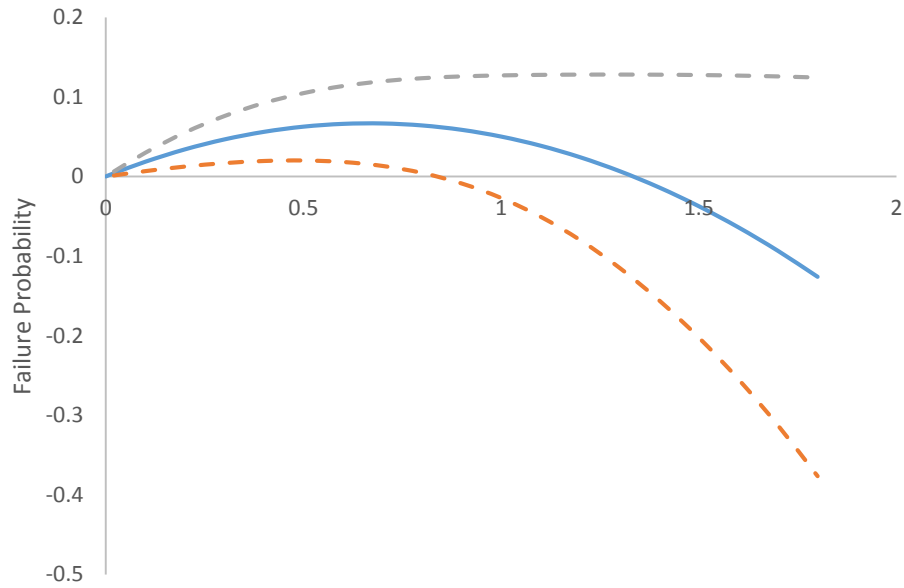
\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$



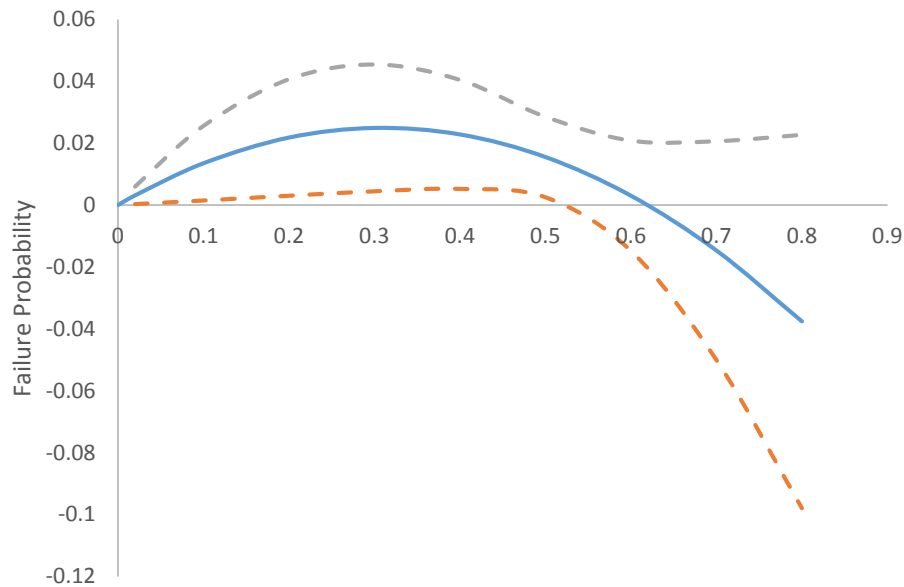
**Table 3-5: Diversity - Non Linear: Degree of Education and Average Education**

	Edu Div Nonlinear - Cox coef/std err	Edu Div CV Nonlinear - Cox coef/std err	Edu Div Nonlinear - LPM coef/std err	Edu Div CV Nonlinear - LPM coef/std err
Educ Blau Coeff	2.420+		0.161*	
	(1.26)		(0.08)	
Educ Blau Coeff Sq	-3.639		-0.260+	
	(2.40)		(0.14)	
Coeff. of Var – Ed		3.146**		0.168**
		(0.99)		(0.06)
Coeff. of Var – Ed Sq		-3.043*		-0.104+
		(1.44)		(0.06)
Average Work Exp (Same Ind)	-0.016**	-0.015**	-0.001**	-0.001**
	(0.00)	(0.00)	(0.00)	(0.00)
Avg Education		-0.006		-0.000
		(0.01)		(0.00)
Ed., Technical	-0.202		-0.005	
	(0.17)		(0.01)	
Ed., Some Clg	-0.179		-0.004	
	(0.13)		(0.01)	
Ed., Associate	-0.147		-0.002	
	(0.15)		(0.01)	
Ed., Bachelors	-0.263*		-0.011	
	(0.12)		(0.01)	
Ed., Some Grad	-0.552**		-0.030*	
	(0.19)		(0.01)	
Ed., Masters	-0.367*		-0.017+	
	(0.14)		(0.01)	
Ed., PhDs/Prof.	-0.491*		-0.023+	
	(0.20)		(0.01)	
Controls included?	Yes	Yes	Yes	Yes
Year dummies			Yes	Yes
Number of observations	17658	17658	17658	17658

+ p&lt;0.1, \* p&lt;0.05, \*\* p&lt;0.01



**Figure 3-1: Confidence Interval - Coefficient of Variance - Education**



**Figure 3-2: Confidence Interval - Blau Index – Education**

### 3.5 Conclusion and Discussion

In this paper, I investigated whether team level characteristics of the owner operator team impact survival. I use the confidential Kauffman Firm Survey to show that same industry work experience positively impacts survival. For educational achievement, it is important to understand whether it is the direct effect of education or other aspects above and beyond education which lead to better performance of a venture. I find support for the idea that the degrees attained by the owner operator team matter and not the years of education. Finally, diversity in education levels increases the chances of failure of a venture but, diversity in same industry work experience does not seem to correlate with survival.

The above results provide insights for two strands of literature. First, past research has investigated how educational attainment impacts new venture performance. I further this work, by analyzing whether it is the average years of education or the degrees attained by the owner team. This dichotomy helps surface an underlying argument on education. I find degrees attained impact survival thus indicating the effect of characteristics of owners associated with educational attainment or signaling power of a degree or sheepskin effects or a combination of such phenomenon. However, I am unable to parse out the contribution by each phenomenon separately, due to limitations of data. Future research could focus on understanding the effects of these phenomenon in isolation. Further, future research could also assess contingency conditions under which the effects are pronounced or subdued. Another potential avenue of interest could be understanding the mediating role of characteristics such as self-efficacy, autonomy, persistence etc. in the education and venture survival relationship.

My results also contribute to the broader literature of diversity. I utilize the typology developed by (Harrison & Klein, 2007) to assess the impact of diversity in education and similar industry work experience of the owner team on new venture performance. I find that education diversity viewed as disparity plays a more dominant role compared to variety diversity at the average levels. However, these results change depending on the level of diversity. These results are an extension to those found by (Chowdhury, 2005) who finds that gender, age and functional diversity are not important for entrepreneurial team effectiveness. In a similar vein, I find that similar work experience diversity does not impact venture survival. Furthermore, Watson et. al., (2003), found that perceptions about success of the ventures are not correlated with differences in partners (founders) in terms of education and work experience. However, I find that the perceptions about performance and the actual outcomes converge with respect to similar industry work experience however, they diverge for educational diversity perceptions. This finding implies that psychological perceptions of the interviewees may not always be a gauge of the actual outcome, where possible perception based findings should be checked with actual outcomes. This also points to a potential avenue for future research about why there is a gap between the perceived outcome and the actual outcome – is it due to the choice of outcome variables, a gap due to biases etc. between perceptions and outcomes or some other reason.

As with most other empirical studies, this study too has limitations. The new ventures under consideration were started in 2004 while there does not seem to be any major shock to the economic ecosystem in that year, the results would be more robust if ventures of different vintages could be analyzed. This would require future data collection efforts to

develop datasets across vintages of new ventures. Secondly, diversity may be endogenously related to the quality of the idea of a venture. For instance, if an experienced engineer thought of a novel product idea, which was of high quality, he might be able to attract engineers and other professionals of similar caliber as him. On the other hand, the same engineer may have to make do with lesser experienced professionals if the latter believe that the idea does not have strong business potential. Furthermore, individual-level heterogeneity in unobservables such as strong leadership quality may impact the diversity of teams differently. These analyses are potential topics for future research if new datasets could incorporate the ‘soft’ characteristics of the venture such as quality of the idea and owners such as leadership ability, and interpersonal skills more fine-grained analyses could be conducted.

However, in spite of these limitations, this study has important implications for entrepreneurs and investors. Investors and entrepreneurs may improve the chances of survival of their ventures if they fund or team up with others who have experience in the industry and have attained degrees rather than attended school without completing the level. Diversity in same industry work experience may not be a crucial criteria when developing the founding team. However, a venture team may be better off with low or high levels of educational diversity rather than moderate levels, thus, it might be better for the prospects of a venture to have a founder team comprising a PhD and a high school graduate rather than two owners with a master’s degree. Similarly, investors may want to focus their resources on supporting low or high educationally diverse teams. I hope that these results help with the survival prospects of new ventures.

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## **CHAPTER 4. GENDER DIFFERENCES AND NEW VENTURE PERFORMANCE<sup>7</sup>**

### **4.1 Introduction**

Females are entering the workforce in ever increasing numbers and the inequality in pay has also been declining over the past few decades (ILO, 2017), similar trends have been observed in business ownership by women (American Express OPEN, 2016). Fields such as management, professional and related occupations now employ more female than male workers and females comprise 47% of the US workforce (US Bureau of Labor Statistics, 2015). However, only 38% of businesses in the US are owned by females (US Bureau of Labor Statistics, 2015). Most large sample studies comparing male and female-owned ventures have found that female-owned ventures perform worse on measures of survival, revenues and income (Fairlie & Robb, 2009; Kalleberg & Leicht, 1991; Robb, 2002; Rosa, Carter, & Hamilton, 1996). However, Robb and Watson (2012) show that if adequate controls are used there is no difference in performance between the two categories.

In the current study, I analyze whether there is a gap in performance between male and female-owned ventures, this is pertinent for targeted policy intervention. If there is indeed a gap, then the causes of the gap need to be identified and addressed through appropriate programs. On the other hand, if no gap is found, it should lead to further investigation of why there is no gap? Are female and male-owned ventures similar in

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<sup>7</sup> The author acknowledges the Ewing Marion Kauffman Foundation and the NORC Data Enclave for providing researcher support and access to the data used in this research.

characteristics which leads to similar performance or are they different but lead to similar results, since some characteristics support better performance by females and others by males and these effects cancel each other out. An assessment along these lines could be informative for policy makers in deciding how to enhance the participation of women and success of women-owned ventures.

Previous studies posit that work experience, education and startup capital may be important factors in explaining the gender performance gap. Fairlie and Robb (2009) use the Characteristics of Business Owners dataset to assess some of these factors. I extend this line of research by studying more variables both at the owner team and venture level that have been associated with venture performance and survival. I use the confidential Kauffman Firm Survey, an eight year panel study of new ventures started in 2004.

I utilize Logit and OLS regressions, followed by decomposition analysis to assess the contribution of individual variables in explaining the gender performance gap. I find that if adequate controls are used there is no gap in performance between male and female-owned ventures. Decomposition analysis shows that certain variables are correlated with the performance gap. Similar to past studies, work experience in a similar industry is important in explaining a part of the gap. I also find that differences in average hours worked and technology levels of a venture lead to a performance gap. The incorporation status of the venture impacts revenues vs survival and net profits in different ways.

In the next section, I provide theoretical underpinnings for the variables that I consider for decomposition analyses. In section 4.3, I explain the data sample and the decomposition methodology. In section 4.4, I discuss results and in section 4.5, I explain

the various robustness checks and discuss endogeneity concerns. Finally, in section 4.6, I discuss the implications of the research.

## 4.2 Theory

### 4.2.1 Background

Considerable prior research has been conducted to examine gender based firm performance gaps (Bosma, Van Praag, Thurik, & De Wit, 2004; Fairlie & Robb, 2009; Fasci & Valdez, 1998; Honig, 1998; Loscocco, Robinson, Hall, & Allen, 1991; Robb, 2002; Rosa et al., 1996). Most studies focus on outcomes such as survival, revenues and profits. There is in this literature a general consensus that female-owned ventures underperform male-owned ventures. However, there are exceptions such as Kalnins & Williams (2014), who find that in certain contexts female-owned ventures may last longer than male-owned ventures.

Studies have also found that female-owned ventures are smaller on average compared to male-owned ventures (Cliff, 1998; Sabarwal & Terrell, 2008). Robb and Watson (2012) argue that the omission of firm age, size, scale, and owner risk and demographic controls may have led to the performance gap. Similar to the current study, they also used the Kauffman Firm Survey dataset, but utilized a shorter panel to show that when controls are used the performance gap disappears. In this paper, I investigate whether male and female-owned ventures differ on observables, and if they do, how the differences impact the performance gap. Fairlie and Robb (2009) have done similar work using decomposition analysis, using the Characteristics of Business Owners database from the Census Bureau, which comprises two cross sections from 1992 – 1996. In the current

work, I use the Kauffman Firm Survey, which is an 8 year panel. Thus, an important difference is that I am able to control for the age of the venture. Robb and Watson (2012) argue that using this variable changes the results substantially (most prior studies usually find women owned ventures performing worse than male-owned but Robb and Watson (2012) find that there is no difference). I am also able to utilize different variables such as sole proprietorship, technology level of the company, usage of technology etc. Furthermore KFS affords more granular variables such as actual profits. Thus, the current study adds to the previous work by Fairlie and Robb (2009).

Using an exploratory approach, I first outline the various owner and venture-level characteristics that have been associated with venture performance and survival. I then propose to investigate whether male and female-owned ventures differ significantly on these variables. Finally, I will analyse whether these differences lead to a differential in performance.

#### *4.2.2 Owner-level characteristics*

##### *4.2.2.1 Prior industry work experience*

Bosma et al. (2004), Klepper and Sleeper (2005) and Dahl and Reichstein (2007) report that past industry experience positively impacts new venture survival, revenues and profits. Becker's theory of human capital (Becker, 1964) proposes that specific investments are justified only when the benefits far outweigh the costs of making those investments. Industry specific work experience has a higher probability of being inimitable since exclusive investments have to be made in order to develop such a resource, hence it should



also lead to above average returns. Thus, I investigate the role of this variable on performance gap between male and female-owned ventures.

#### 4.2.2.2 Average education / degree earned

In a meta-analysis of the impact of education on new venture performance Van Der Sluis, Van Praag, & Vijverberg (2008) found that education has a positive impact on performance. It may be associated with the ability to solve problems, skills that are useful for running a start-up and other characteristics such as self-confidence, motivation and discipline which may be associated with better performance (Cooper et al., 1994). Higher levels of education may also provide a signal of quality about the venture thus, resource providers may be more amenable to providing resources to ventures of better educated owners (Stuart, Hoang, & Hybels, 1999; Vanacker & Forbes, 2016). Given the above arguments, I have incorporated education levels in the analyses.

#### 4.2.2.3 Average hours worked

Recent research has highlighted the strong and complex relationship between the business and family life of the entrepreneurs. The work-family interface literature suggests that achieving and maintaining a balance between business and family life is of prime importance to both male and female venture owners. Jennings and McDougald (2007) state that women are still typecast as the primary caregivers and nurturers of the family, and therefore there is a high probability that they will be able to devote less time to entrepreneurship than their male counterparts. Hours spent at work on a new venture could help in its survival and performance since more time would lead to benefits such as being able to keep the 'shop' open for more time, more time to network and lower costs since a

hired replacement will not be required to operate the business. Thus, it is important to study how a gap in hours worked impacts new venture performance.

#### *4.2.3 Venture-level characteristics*

While, owner characteristics are important in understanding the performance gap, there are other venture level characteristics which are known to impact new venture performance. In the following text, I explain some important variables which will be investigated for their contribution to the gender performance gap.

##### *4.2.3.1 Sole Proprietorship*

Kalleberg and Leicht (1991) suggest that incorporation is beneficial for the survival of a venture since incorporation lends the business an institutional identity and thus affords a business, relative financial and legal security against dissolution. However, owners of unincorporated businesses may manage their businesses better since losses could involve material impact on their personal financial well-being. On the other hand, incorporation may be correlated with multiple owners who may bring varied and diverse skills and networks to the table, thus enhancing revenues and profits. The decision to incorporate may also be impacted by the expectations of future growth of the business by the entrepreneur(s). Thus, it may be challenging to interpret the results causally. Given these counter logics and past research which proposes that incorporation status is an important variable to study to understand performance, I explore its ramifications in this study.

##### *4.2.3.2 Home based*

Two important views are prevalent in the literature on where to locate a venture – the first one focuses on businesses deciding based on the least cost alternative and the second approach focuses on the quality of life and infrastructure of the area (Blair & Premus, 1987). As discussed above, women are perceived as primary caregivers in the family, thus women may choose to locate their ventures in the home or closer, which may not be optimal for a business. Thus, it is important to understand how location impacts the performance gap.

#### 4.2.3.3 Technology level of the venture and technology usage by the venture (Website and Email)

The role of IT and technology in new venture performance has been increasing over the past few decades. Ventures associated with new and cutting edge technology should be more volatile in their performance. New technologies are uncharted waters for the ventures and the consumers, if the technologies are value accretive and ‘catch on’ it may lead to a significant upside for the ventures. On the other hand if the technologies fade out so would the ventures working on them. Similarly, the use of IT tools such as a website and email address should lead to enhanced sales through the web and would also send a positive signal to the consumers and resource providers that the business is ‘dynamic’. Hence, I include the technology level of the venture and usage of technology by the venture in my analysis.

#### 4.2.3.4 Age of the venture

Stinchcombe and March (1965) propose that nascent firms suffer from liability of newness. Early in their life, new ventures have not developed processes and roles to deal

with negative circumstances and situations. Freeman, Carroll and Hannan (1983) empirically show that younger firms in industries such as semiconductors and newspapers, have a higher propensity to fail while they learn about their industry and gain management capabilities. Thus, it is important that age of the venture be considered in performance analyses, incidentally since all the ventures in the dataset are from the same cohort, no explicit variable is used to control for the age and neither its effects can be separated out in this study. One could argue that performance outcomes might differ between males and females depending on the age of the venture, for example females might enter business venturing as a lifestyle business and hence may continue to support businesses with low profits which may not be the case for men. Thus, we might find higher business survival and lower profits for female owned ventures compared to male owned ventures.

#### 4.2.3.5 Total size

Cliff (1998) and Sabarwal and Terrell (2008) report that female-owned ventures are smaller in size compared to male-owned ventures. Gibrat's Law asserted that firm size and firm growth are independent. However, empirical reviews of the literature conducted by Sutton (1997) and Geroski (1995) assert that firm size and survival are not independent. Furthermore, Dunne, Roberts, and Samuelson (1989) find that smaller firms are more profitable and bigger firms have a higher probability of survival. Given these arguments, I incorporate the size of a venture in my analysis.

#### 4.2.3.6 Number of owner operators

The number of owner operators may impact a business over and above the total size, since owners have more of a vested interest in the performance of a venture compared

to employees. More owners could bring more cumulative experience to deal with adverse problems and situations and different ideas to grow the business. A venture would also benefit from the different expertise the owners would bring to the table. More owners may also bring in more social networks which would again benefit pivotal aspects of running a business such as raising capital, sales etc. On the other hand, too many owners may lead to ‘diseconomies of scale’ and conflict. Thus, number of owner operators are also considered in the analyses.

### **4.3 Data and Methods**

#### *4.3.1 Data*

The confidential longitudinal Kauffman Firm Survey (KFS) of new ventures has been utilized for the analyses. The initial sample contained 250,000 US firms which were started in 2004. The list was provided by D&B, and comprised ventures from fifty states and the District of Columbia. A business was defined as started in 2004 if it was a new independent business created by an individual or team, or purchase of an existing business or the purchase of a franchise (Robb & Robinson, 2012). Businesses that paid state unemployment insurance, or Federal Social Security tax or had an EIN or had schedule C income prior to or after 2004 were excluded. Out of this sample, 4,928 firms were admitted with an oversampling of high-tech firms; weights have been provided by KFS in order to make the sample representative of all new ventures in the economy. These firms were surveyed annually in detail from 2004 to 2011, creating an eight-year panel. Firms which dropped out of the survey were not used in the regression models. Thus, there were 3,140 firms in 2004 which had completed the survey each year till the end of the survey period

or ceased to exist as independent entities. Out of these, I considered firms that had a majority of either female or male owners which led to 2,756 firms (firms with equal number of male and female owners were discarded). Revenue, profit and some other data such as total size were missing for some firms in some years (the revenues and profits are leading hence, 2004 revenue and profit observations were not utilized, also firms sometimes did not report the revenue and profit for the partial year in which they exited). Thus, the 2,756 firms generated 15,013 firm-year observations for survival, 12,041 for revenues and 11,753 for net profits analyses.

The data have information on up to 10 owners, initially and later 15 owners, which includes age, gender, race, ethnicity, education, and previous experience. Detailed financial information about the ventures, location, revenues, expenses, number of employees, profit/loss, and industry classification, among many other firm-level variables are also available in the dataset. OLS and decomposition analyses were utilized to analyse the relationships between outcomes and predictor variables.

#### *4.3.2 Blinder Oaxaca Decomposition and OLS analysis*

In the current study, I propose to understand how much of the mean gap in outcomes can be explained by the variation in observable characteristics in between two groups. Blinder (1973) and Oaxaca (1973) developed a seminal approach to separate the total gap in the outcome variable into explained and unexplained components.

The “Blinder-Oaxaca” decomposition is based on two separate regressions for the groups. It decomposes the average difference in the outcome variable into “explained” differences, which can be attributed to group differences in observable productivity related

to characteristics such as work experience or education and “unexplained” differences which are effects due to discrimination and group differences on unobservable characteristics. Using the coefficients of ordinary least squares regressions for each group separately, the difference in mean outcome can be written as (Jann, 2008):

$$\text{Total Gap} = G = E(Y_A) - E(Y_B) = E(X_A)^T \beta_A - E(X_B)^T \beta_B \quad \text{----- (1)}$$

where  $E(Y_L)$  is the expected value of the outcome and  $E(X_L)$  represents the vector of means of observable variables for group L (here A and B), and  $\beta_L$  represents the vector of OLS coefficients for each group separately.

Equation 1 above, can be rewritten as under to express the contribution of independent variables to the difference in outcome variable as follows (Daymont & Andrisani, 1984; Jones & Kelley, 1984; Winsborough & Dickinson, 1971).

$$G = \underbrace{\{E(X_A) - E(X_B)\}^T \beta_B}_E + \underbrace{E(X_B)^T (\beta_A - \beta_B)}_C + \underbrace{\{E(X_A) - E(X_B)\}^T (\beta_A - \beta_B)}_I \quad \text{---- (2)}$$

The above expression is a “threefold decomposition”. The first expression, E on the RHS, represents the part of the Total Gap that is due to the average group differences of predictors, it is termed as the “endowment effect”. The second and third terms measure the differences due to coefficients and the interaction effects. The expression above utilizes the coefficients of group B to determine the endowment effects. I could also have expressed the above using the coefficients of group A as weights as well, in which case the equation would become:

$$G = \{E(X_A) - E(X_B)\}^T \beta_A + E(X_A)^T (\beta_A - \beta_B) - \{E(X_A) - E(X_B)\}^T (\beta_A - \beta_B) \quad \text{---- (3)}$$

Another approach to combining the second and third parts of the equations above that is prevalent in the literature is as follows:

$$G = \underbrace{\{E(X_A) - E(X_B)\}^T \beta^*}_E + \underbrace{\{E(X_A)^T(\beta_A - \beta^*) + E(X_B)^T(\beta^* - \beta_B)\}}_U \text{ ----- (4)}$$

where  $\beta^*$  represents a non-discriminatory coefficient vector. The first expression, E, represents the “explained part” (also known as the quantity effect) and the next expression represents the unexplained part (which comprises discrimination and potential effects of unobserved variables). The previous literature proposes multiple approaches for calculating  $\beta^*$  such as Reimers (1983) who proposed a 50:50 weight for  $\beta_A$  and  $\beta_B$  and Cotton (1988) who proposed weighting based on the sample size of groups A and B. Oaxaca and Ransom (1994) developed a generalized formula for  $\beta^*$  which subsumed the above approaches.

$$G = \{E(X_A) - E(X_B)\}^T \{W\beta_A + (I - W)\beta_B\} + \{(I - W)^T E(X_A) + W^T E(X_B)\}^T (\beta_A - \beta_B)$$

where W is the vector of weights, and I is an identity vector. Depending on the value of W, we could derive equations 2, 3, 4 above or other such related equations. Oaxaca and Ransom (1994) showed that W is given by the following equation when a pooled model over the two groups is used:

$$W_{est} = \Omega = (X_A^T X_A + X_B^T X_B)^{-1} X_A^T X_A$$

According to Elder, Goddeeris, and Haider (2010), the total unexplained decomposition gap corresponds to the coefficient of the dummy indicator of the group in an OLS regression. However, an issue with the above approaches, including Oaxaca and Ransom



(1994), is that it may overstate the explained part at the cost of the unexplained part (Elder et al., 2010; Jann, 2008). Thus, the summation of the Unexplained Pooled decomposition may be smaller in magnitude than the OLS coefficient of the dummy of the group indicator variable. Jann (2008) proposes that including a group indicator variable in the pooled model should address the bias issue. Furthermore, usually the pooled decomposition results of the unexplained part should lie between the values of unexplained decompositions for  $W = 0$  or  $1$  (these could be used as references for upper and lower bounds). Finally, it may be informative to analyze the difference between the Total Unexplained Pooled Gap from the decomposition and the OLS Dummy coefficient, if the gap is small then probably the bias is also not significant. I employ all of the above methods in the data analyses to allay fears of bias.

### *4.3.3 Variables*

#### *4.3.3.1 Dependent Variables*

I use multiple measures of performance of new ventures:

Survival – a venture was recorded as surviving each year it was in business as an independent entity. If the venture survived till the end of the survey period (year 2011) it was censored. In the data, failure is coded as 1 (to signify an event) and survival (status quo as 0).

Log Total Revenues – are the logarithm of leading total revenues of a venture. For computational purposes \$1 was added to the raw revenue numbers and then a log taken.

Log Net Profits – are the logarithm of leading net profits of a venture. Net profits can be zero, hence \$1 was added to the absolute value of the net profits and then logarithms were taken. Finally, if the profits were negative, the above values were multiplied by -1.

#### 4.3.3.2 Independent Variables and Controls

The KFS contains a wealth of information about the owners and the ventures themselves. This makes the use of multiple control variables possible. to manage unobserved heterogeneity.

Gender Dummy – is an indicator variable representing the majority of owner operators of a venture. Ventures with a female majority of owner operators were coded as 0 and those with male majority were coded as 1.

Average Same Industry Work Experience – The average work experience of the owner operator team in an industry similar to the current venture.

Education level - Proportion of owners of the active founder team with various levels of education: 1. High school graduate or less 2. Technical trade or vocational degree 3. Some college, but no degree 4. Associate's degree 5. Bachelor's degree 6. Some graduate school but no degree 7. Master's degree 8. Professional School or Doctorate

Product vs service - Multiple past studies suggest that industry may be playing a part in the gender performance gap of ventures (Anna, Chandler, Jansen, & Mero, 2000; Rosa et al., 1996). The underlying logic of most of these studies is that women enter service industries relatively at a higher rate compared to men. Service industries require lesser startup capital but are also prone to closing faster (Hutchinson, Hutchinson, & Newcomer, 1938). Fairlie

and Robb (2009) find that industry is not a significant explanatory variable in the gender performance gap. Thus, I control for type of output of the business – service or product, provided by the business in the models.

Sole Proprietor – is a dummy variable, coded as 1 if the venture is sole proprietorship and 0 otherwise (includes limited liability corporation or partnerships etc.).

Average Hours Worked by Owner/s – Number of hours worked on average by the owner operator team in a week.

Owner age – Owner team age may impact industry experience (Delmar & Shane, 2006). Also, higher age may be associated with more maturity and experience in solving problems but may also be correlated with slower reaction times to problems by owners. Thus, I control for average owner team age.

Hi, Medium and Low Technology – are indicator variables representing the technology level (type of employees, product) of a venture. The categorization was done by KFS based on SIC classification developed by Bureau of Labor Statistics (Hadlock, Hecker, & Gannon, 1991).

US Citizenship – Oyelere and Belton (2013) show that citizenship matters in the context of self-employment in the US. Self-employed individuals who have a foreign root (parents are non US citizens, individuals themselves are non US born, were naturalized) seem on average to have higher self-employment rates. Hence, I control for citizenship in the study.

Race – Multiple studies find that Black owned ventures perform worse than White owned ventures on multiple measures of performance (Cooper, Gimeno-Gascon, & Woo, 1994;

Robb, 2002; Sexton & Robinson, 1989). Hence, it is important to control for the racial composition of the owner operator team.

Home Based – is an indicator variable coded as 0 if a venture is operating from a home/garage and 1 otherwise.

Website and Email – are indicator variables, coded as 1 if the venture has its own website/email and 0 otherwise.

Total active founders – is a count variable for the number of owners who are actively involved in the operations of the business.

Log Total Employees – Log of sum of active owners and employees (full time and part time) of a venture.

#### **4.4 Results**

Table 4-1 presents summary statistics of Male vs Female-owned ventures. The two categories are statistically different in average years of work experience in the same industry, levels of incorporation, average hours worked, proportion of ventures providing services, log total size, number of owner operators, and technology levels. Given earlier arguments about women being considered primary care givers in the household, it is intuitive that they work less hours and have less same industry experience than men. As pointed out by past research, (Cotton, 1988; Robb, 2002) I also find that women ventures are smaller in size. Women engage in less technology intensive ventures as well.

**Table 4-1: Descriptive Statistics**

	<b>Female-owned</b>	<b>Male-owned</b>		<b>Difference</b>	<b>Standard Error</b>	<b>T-stat</b>	<b>N</b>
Log Total Revenues	7.563	8.227		-0.665	0.287	-2.318	2393
Log Net Profit	1.265	1.796		-0.531	0.516	-1.030	2269
Average Age	45.363	44.499		0.864	0.521	1.660	2752
Average Work Exp (Same Ind)	9.437	12.850		-3.413	0.491	-6.955	2754
Avg Education	6.215	6.045		0.170	0.102	1.670	2747
Provides Product	0.536	0.493		0.043	0.026	1.677	2756
Provides Service	0.808	0.879		-0.071	0.020	-3.618	2756
Sole Proprietorship	0.537	0.362		0.176	0.025	6.896	2756
Avg Hrs worked	39.903	42.124		-2.221	1.156	-1.920	2749
Log Total Size	0.463	0.705		-0.242	0.037	-6.512	2676
Number Owner Operators	1.161	1.317		-0.155	0.030	-5.198	2756
Home Based	0.464	0.507		-0.043	0.026	-1.677	2756
Website	0.402	0.413		-0.011	0.025	-0.429	2756
Email	0.876	0.870		0.006	0.017	0.349	2756
Hi Tech Business	0.009	0.022		-0.014	0.001	-10.342	2756
Medium Tech Business	0.107	0.148		-0.041	0.007	-5.566	2756
Low Tech Business	0.884	0.830		0.054	0.008	7.140	2756

Tables 4-2 and 4-3 report regressions for Survival (Linear Probability Model and Logit), Total Revenues and Net Profits. The Gender dummy coefficient is insignificant, in all three regressions echoing findings similar to Robb and Watson (2012). As conjectured by Robb and Watson (2012) controlling for the age of the venture (implicit since all ventures are from the same cohort) seems to be crucial in making the coefficient insignificant, as compared to studies such as Fairlie and Robb (2009) which find that women owned ventures perform worse than men.

**Table 4-2: Pooled Regressions for Survival**

	Model 1: LPM coef/std err	Model 2: Logit coef/std err
Gender Dummy	-0.005 (0.01)	-0.130 (0.09)
Average Work Exp (Same Ind)	-0.001*** (0.00)	-0.019*** (0.01)
Edu., Technical	-0.014 (0.01)	-0.272 (0.21)
Edu., Some Clg	-0.012 (0.01)	-0.239 (0.15)
Edu., Associate	-0.002 (0.01)	-0.093 (0.18)
Edu., Bachelors	-0.013 (0.01)	-0.264 (0.14)
Edu., Some Grad	-0.027* (0.01)	-0.491* (0.23)
Edu., Masters	-0.022 (0.01)	-0.412* (0.17)
Edu., PhDs/Prof.	-0.029* (0.01)	-0.551* (0.23)
Avg. Age	0.000 (0.00)	-0.001 (0.00)
Provides Product	-0.004 (0.01)	-0.106 (0.09)
Provides Service	-0.015 (0.01)	-0.308* (0.12)
Sole Proprietor	-0.018** (0.01)	-0.324*** (0.09)
Avg Hrs worked	-0.000*** (0.00)	-0.009*** (0.00)
Hi Tech	-0.011 (0.01)	-0.233 (0.13)
Medium Tech	-0.011* (0.01)	-0.194* (0.10)
Prop. US Cit.	-0.015 (0.02)	-0.624** (0.19)
Home Based	0.004 (0.01)	0.067 (0.10)
Website	-0.016** (0.01)	-0.261** (0.09)
Email	-0.036** (0.01)	-0.525*** (0.13)
Tot. Active Fndrs	-0.002 (0.00)	-0.091 (0.07)
Log Total Employees	-0.004 (0.00)	-0.043 (0.06)
Race Controls?	Yes	Yes
Year Dummies?	Yes	Yes
Number of observations	15013	15013
R-sq	0.0159	

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Table 4-3: Pooled Regressions for Revenues and Profits**

	Model 1: Log Total Revenues coef/std err	Model 2: Log Net Profits coef/std err
Gender Dummy	0.228 (0.20)	0.603 (0.39)
Average Work Exp (Same Ind)	0.029*** (0.01)	0.063*** (0.02)
Edu., Technical	-0.735 (0.41)	-1.677* (0.70)
Edu., Some Clg	-0.297 (0.32)	-0.905 (0.62)
Edu., Associate	-0.278 (0.36)	-1.604* (0.73)
Edu., Bachelors	0.340 (0.30)	0.029 (0.58)
Edu., Some Grad	0.119 (0.37)	-1.191 (0.79)
Edu., Masters	0.259 (0.34)	-0.352 (0.68)
Edu., PhDs/Prof.	-0.321 (0.46)	0.194 (0.87)
Avg. Age	-0.011 (0.01)	-0.059*** (0.02)
Provides Product	0.422** (0.15)	-1.457*** (0.32)
Provides Service	0.233 (0.23)	1.329** (0.48)
Sole Proprietor	-0.895*** (0.19)	1.136** (0.35)
Avg Hrs worked	0.038*** (0.00)	0.031*** (0.01)
Hi Tech	0.575** (0.21)	0.479 (0.52)
Medium Tech	0.254 (0.17)	0.972** (0.36)
Prop. US Cit.	0.703 (0.65)	0.197 (1.19)
Home Based	0.879*** (0.19)	0.434 (0.36)
Website	0.622*** (0.16)	-0.469 (0.34)
Email	0.587* (0.29)	-0.030 (0.53)
Tot. Active Fndrs	0.086 (0.12)	-0.043 (0.23)
Log Total Employees	0.833*** (0.10)	-0.065 (0.24)
Race Controls?	Yes	Yes
Year Dummies?	Yes	Yes
Number of observations	12041	11753
R-sq	0.2260	0.0533

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$



Tables 4-4 and 4-5 represent the decomposition analysis of survival, total revenues and net profits. It is worth noting that as mentioned by Elder et al. (2010) the coefficients of the Gender Dummy in the linear regressions, are very close to the unexplained gap in the Oaxaca decomposition models of survival, total revenues and net profits.

The explained portion of the results can be evaluated in terms of how the variables impact the outcomes if the male-owned ventures' characteristics were allocated to the female-owned ventures. Three groups of results can be identified – factors that help explain the explained gap between female and male-owned ventures, factors that have mixed effects explaining the gap for some outcome variables (for example survival) and not for others (say revenues and profits) and finally, the third group comprises factors that have close to zero point estimates and hence materially do not impact the gap.

If the male-owned venture endowments were assigned to female-owned ventures, the variables in the first group would increase the survival chances, revenues and profits of the female-owned ventures (since as evident from the decomposition results male-owned ventures outperform female-owned ventures in the explained gap). A few variables in this group are significant and have high enough point estimates to explain significant portions of the explained gap. Work experience in the same industry accounts for 80% of the gap in survival, 12% in revenues and 47% in net profits. This makes intuitive sense since male owners on average possess more same industry work experience which in turn leads to better ability in managing and running a startup and hence, better performance. A similar explanation is valid for average hours worked by the owner team, which accounts for 20% to 40% of the gap. The analyses indicate that higher technology levels of ventures lead to better survival and performance for male ventures (technology explains 2% to 12% of the

explained gap). I conjecture one of the explanations could be that operating a low technology business might be leading to more competition and hence, worse performance. The remaining set of variables in the group, such as providing service, average age of the owners, number of active founders, and number of employees possess point estimates which explain 1% to 23% of the explained gap, but are statistically not significant in all the specifications. It is possible that there is in fact no 'true' effect of these variables or it could be a limitation of the sample size of the data, hence this is an area of further investigation in future studies.

The second group of variables provides mixed indications, some point estimates help explain the gap whereas others increase it. The interpretation of the sole proprietorship results is nuanced, for survival it accounts for 70% to 75% and for net profits 55% of the explained gap. However, the sign of the point estimate indicates that if women-owned ventures were to incorporate at similar levels as male-owned ventures, their survival and profits would worsen. However, for the revenues (20% of the explained gap), it aids in accounting for the gap. A possible explanation could be that sole proprietors are more heavily invested in their ventures, hence they put in extra effort in their ventures and this leads to the ventures surviving when an incorporated venture would have folded. Similarly, a proprietor may have a sharper focus on profits compared to an incorporated business since sole proprietors are personally liable for dues of a venture. However, incorporated ventures may be bigger in size (owners or employees) leading to more resources devoted to crucial activities such as sales, but as discussed above these extra revenues do not seem to necessarily imply higher profits. Other variables in this group such as home based ventures, education and venture providing a product, account for 1% to 13% of the

explained gap but are not always statistically significant, as explained earlier this is an open avenue for future research.

Finally, the third group of variables comprises website and email. Similar percentages of male and female-owned ventures owned a website and used email, and the point estimates of these variables are close to zero.

**Table 4-4: Survival Decomposition**

**Fairlie Decomposition - Survival**

Total N	15013
Number Female-owned	3571
Number Male-owned	11442
	<b>Coeff</b>
Female-owned	0.0749
Male-owned	0.0648
Difference	0.0101
Explained	0.0055

**Oaxaca Decomposition Analysis - LPM**

Total N	15013	
Number Female-owned	3571	
Number Male-owned	11442	
	<b>Coeff</b>	<b>T-stat</b>
Female-owned	0.0749	13.2688
Male-owned	0.0648	21.1381
Difference	0.0101	1.5709
Explained	0.0052	2.3341
Unexplained	0.0049	0.7595

	<b>Coeff</b>	<b>T-stat</b>	<b>% of Explained Gap</b>
Average Work Exp (Same Ind)	0.0044	3.7959	81%
Education	-0.0007	-0.9205	-13%
Avg. Age	0.0004	0.9781	7%
Provides Product	-0.0003	-0.8161	-5%
Provides Service	0.0012	1.5775	23%
Sole Proprietor	-0.0041	-2.8416	-75%
Avg Hrs worked	0.0025	3.3079	46%
Race	0.0004	0.8514	7%
Technology	0.0007	2.2920	12%
Prop. US Cit	-0.0004	-0.8053	-8%
Tot. Active Fndrs	0.0007	1.2490	13%
Log Total Employees	0.0005	0.4164	10%
Website	0.0001	0.2015	1%
Email	-0.0001	-0.6393	-2%
Home Based	-0.0003	-0.7580	-6%
Time	0.0005	1.0490	9%
<b>TOTAL EXPLAINED</b>	<b>0.0055</b>		<b>100%</b>

	<b>Coeff</b>	<b>T-stat</b>	<b>% of Explained Gap</b>
Average Work Exp (Same Ind)	0.0041	3.5254	80%
Education	-0.0006	-0.7714	-11%
Avg. Age	0.0002	0.7687	4%
Provides Product	-0.0001	-0.4763	-1%
Provides Service	0.0009	1.4933	17%
Sole Proprietor	-0.0037	-2.7975	-71%
Avg Hrs worked	0.0021	2.7992	41%
Race	0.0003	0.5793	6%
Technology	0.0006	2.1739	12%
Prop. US Cit	-0.0003	-0.7876	-6%
Tot. Active Fndrs	0.0004	0.8542	8%
Log Total Employees	0.0012	1.0222	22%
Website	0.0001	0.2843	2%
Email	0.0000	0.0315	0%
Home Based	-0.0003	-0.6590	-5%
Time	0.0001	0.4204	2%
<b>TOTAL EXPLAINED</b>	<b>0.0052</b>		<b>100%</b>

**Table 4-5: Oaxaca Decomposition Analysis**

Total Revenues				Net Profits			
Total N	12041				11753		
Number Female-owned	2809				2722		
Number Male-owned	9232				9031		
	Coeff	T-stat			Coeff	T-stat	
Female-owned	8.3082	44.7269			1.8899	5.7694	
Male-owned	9.3984	85.1416			2.8912	14.6425	
Difference	-1.0902	-5.0638			-1.0013	-2.6198	
Explained	-0.8717	-6.6131			-0.3992	-2.5444	
Unexplained	-0.2185	-1.1013			-0.6022	-1.5832	
Total Revenues - Explained Gap				Net Profits - Explained Gap			
	Coeff	T-stat	% Explained		Coeff	T-stat	% Explained
Average Work Exp (Same Ind)	-0.1037	-3.1403	12%		-0.1879	-2.8897	47%
Education	-0.0252	-0.9858	3%		-0.0805	-1.6495	20%
Avg. Age	-0.0086	-0.8927	1%		-0.0391	-1.0982	10%
Provides Product	0.0045	0.3930	-1%		-0.0143	-0.3619	4%
Provides Service	-0.0129	-0.9668	1%		-0.0758	-2.0838	19%
Sole Proprietor	-0.1783	-3.9689	20%		0.2182	2.8987	-55%
Avg Hrs worked	-0.1660	-3.6816	19%		-0.1402	-2.9341	35%
Race	-0.0329	-0.6973	4%		-0.0264	-0.4308	7%
Technology	-0.0195	-2.1236	2%		-0.0492	-2.2579	12%
Prop. US Cit	0.0147	1.0243	-2%		0.0047	0.1742	-1%
Tot. Active Fndrs	-0.0140	-0.8318	2%		0.0030	0.0915	-1%
Log Total Employees	-0.2699	-5.4770	31%		0.0199	0.2691	-5%
Website	-0.0023	-0.1366	0%		0.0001	0.0110	0%
Email	-0.0032	-0.4233	0%		0.0003	0.0732	0%
Home Based	-0.0526	-1.9041	6%		-0.0254	-1.0278	6%
Time	-0.0019	-0.1196	0%		-0.0065	-0.6682	2%
TOTAL EXPLAINED	-0.8717		100%		-0.3992		100%

#### 4.5 Robustness and Endogeneity

Fairlie and Robb (2009) found that industry does not explain a significant portion of the explained gap. Thus I used technology levels, product and service provided as

variables. However, I also conducted robustness checks including 2 digit NAICS code in regressions, since these industry effects may be correlated with technology levels these regressions had lower levels of significance of the technology variables. The story for all other variables was generally as described in the results. I also tested the boundary conditions of decomposition as per Elder et al. (2010) and found that the unexplained gap is between the two extremes of the male or female only reference models.

The results for total revenues and net profits might be impacted by selection bias since I can only observe the total profits and revenues for firms that are in business in a given year. I was unable to find instruments that are correlated with gender and uncorrelated with performance, so this remains a challenge for future research. It would entail collecting appropriate data so that selection bias concern could be mitigated.

#### **4.6 Conclusion**

In this paper, I study whether there is a difference in performance between male and female-owned ventures. I find that no significant difference in performance exists between the two categories. However, summary statistics revealed that there are multiple variables on which male-owned ventures differ from female-owned ventures, four of which seem to be having a statistically significant and material impact in explaining the gap. These include same industry work experience of the owner team, number of hours worked by owner team, incorporation status and level of technology of the venture.

This study adds to a prior body of research on gender differences in new venture performance. Past studies usually found female ventures performing worse than male-owned ventures, however more recent studies such as Robb and Watson (2012) find no

difference, arguing that using adequate controls leads to the disappearance of the performance gap between the categories. This study finds results similar to the more recent studies (it is worth noting that Robb, Watson, 2012 also used the same dataset but a smaller time frame of analysis). Thus, reinforcing the view that relevant controls play an important role in empirical studies of gender, and future research work should carefully collect and incorporate relevant controls in the analysis.

Most past studies in decomposition analysis usually do not reconcile the gap between regression analysis and decomposition results. It has been shown that the unexplained part of the total gap is equal to the regression coefficient in OLS (Elder et al., 2010). In this study, I find support for the assertion. Another aspect of decomposition research has been the rare reporting of significance levels (Jann, 2008), I report these and draw conclusions based on both point estimates and significance.

The study has practical implications for policy makers and female entrepreneurs. The results indicate that women possess less prior industry work experience and work fewer hours per week. This leads to a performance deficit for their ventures. Thus it is important to understand how parity can be developed between male and female owners on these variables. Further research is required to understand what the reasons for the gap are. Is it an issue of mindset where women are ‘expected’ to work less and they ‘confirm’ to the bias, in such a scenario more focus is needed on changing the attitudes of society. Another issue could be that enough opportunities do not exist for women to gain prior industry work experience this may again be due to inherent biases in hiring or may be women do not possess appropriate skills to cater to the job requirements. Each of these situations will have different policy solutions. Similarly, women owners tend to work fewer

hours and it is important to conduct research on why this is the case? If it is due to expectations of performing household work then again attitudes in society need to be changed. However, if this is an infrastructural issue such as non-availability of enough day care facilities or they being expensive, then women might spend more time at home. The results about incorporation are another area where policy makers need to think carefully, women have a higher proportion of unincorporated ventures but this is better for survival and net profits however incorporation is better for sales (hence male-owned ventures are better off in sales). Thus, if the end goal is to grow the sales of ventures (for example when the country wants to expand, provide more jobs etc.) this might be better but, if the focus is on resource utilization it might be better to have unincorporated ventures. Finally, women owned ventures are lower tech than male-owned and this is correlated with worse performance of the former ventures. From a policy perspective it is important to understand whether women choose participation in low tech ventures or they are ‘forced’ to make such choices due to a deficit in skills and education. Finally, a potential area of further research could be boundary conditions for example this study was based on US data, are similar results observable in say Europe, Asia and the Middle East.

The study has certain limitations which also open up avenues for future research. The ventures are all from the 2004 cohort and from the US, a broader data collection effort across countries and containing ventures of various cohorts may lead to wider external validity. The regressions for total revenues and net profits may suffer from survival bias since it is not possible to observe the revenues and profits of ventures that ceased to exist. Future data collection efforts which collect data on instrumental variables or keep in mind causal methods such as coarsened matching techniques would be helpful in our



understanding of causality. Finally, the responses to surveys may vary depending on the gender of the person filling out the survey, this is a limitation of the current study and future studies could incorporate a proportional mix of men vs women respondents to address this limitation.

In spite of the limitations of the current study, it has far reaching implications for researchers and policy makers. It furthers our understanding of gender based venture performance differences and points to future fruitful avenues or research. It will also aid the policy makers in deciding the factors they need to focus on to enhance the performance of female-owned ventures.

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Mayank Jaiswal graduated with an MBA from the University of Chicago, prior to that he attended the University of Delhi and completed a Civil Engineering degree. Mayank worked as a civil engineer and was involved in laying crude oil pipelines for the biggest oil major in India. Following his MBA and before joining the Strategic Management PhD program, Mayank worked in agri-business, utility and social venture capital firms, in various functions such as Strategy, Operations and Talent recruitment.

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