

QUANTIFYING THE IMPACT OF CREDIT CARDS ON SMALL BUSINESS GROWTH & U.S. JOB CREATION

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EXECUTIVE SUMMARY

This study presents compelling empirical evidence that business credit cards are an important contributor to small business success and U.S. economic performance. Small businesses that use business credit cards more tend to experience faster employment growth and faster revenue growth. Furthermore, the expanded use of credit card credit by small businesses has significantly increased national employment and income levels — both through direct effects on small businesses themselves and also through indirect and induced effects on the U.S. economy as a whole. These results suggest that policymakers considering proposals that might limit small firm access to business credit cards should carefully weigh the benefits against the financial and economic costs that they might place on small businesses, the communities that depend on them, and the national economy.

Small businesses are a critical source of growth and job creation in the U.S. economy. According to the latest data available, the small business sector represents 50% of all U.S. employment and 44% of annual pay. The small business sector is also the most dynamic portion of the U.S. economy, responsible for 65% of new jobs created in the past 15 years.

Access to financial capital plays a critical role in small firms' ability to contribute to a thriving U.S. economy. However, as a result of capital market imperfections (e.g., information asymmetries and diseconomies of scale in providing small amounts of credit to small businesses) small firms often find it difficult to obtain traditional bank loans on affordable terms. The credit card industry has emerged to fill the financing gap and provide access to financial capital to this key market segment.

- According to a 2010 National Federation of Independent Businesses survey, for example, only one third of small business credit line applicants receive an offer with what they consider to be satisfactory terms and conditions, and only 39% of bank loan requests from small firms are granted. On the other hand, three quarters of all small businesses are successful in obtaining business credit card credit.
- Also, a 2009 National Small Business Association survey revealed that 59% of small businesses use credit cards to meet their capital needs, and more than one-third of small businesses obtain 25% or more of their overall debt financing from credit cards.

Several external factors, including market structure, macroeconomic conditions, and regulatory policies, influence small business access to credit cards. As a result of the financial crisis of 2007-09, for example, the federal government has taken a more active role in regulating the credit card industry, including through the passage of the CARD Act of 2009. Within this context, it has become ever more important to understand trends in small business use of credit cards, the relationship between credit cards and small business performance, and the potential impact of shifts in credit card access on the U.S. economy. This study examines these issues with three primary objectives:

- (1) Quantify the impact of small business credit card lending on revenue and employment growth in the small business sector.

(2) Quantify the impact of historical changes in small business credit card lending on U.S. employment and GDP growth.

(3) Quantify the role of small business credit card lending on revenue and employment growth of “start-up” small firms.

The analysis relies upon widely used datasets, including the Federal Reserve’s Survey of Small Business Finances, and widely accepted statistical and econometric modeling techniques. The study finds:

- There is strong statistical evidence that small business credit card lending facilitates growth in employment and revenue at small firms. Each one percent (or \$31 per month, in 2003 dollars) increase in business credit card credit used by small firms is associated with a 0.051% increase in firm employment and a 0.144% (\$2,020 on average) increase in firm revenue. These findings suggest that the average small firm creates one net new job for each \$5,613 increase in credit card use per month.
- Based on these findings, it is estimated that the expansion of credit card lending to small businesses from 2003 to 2008 contributed to the creation of 1.6 million U.S. jobs, including a direct contribution to the creation of 592,000 small business jobs, and an indirect or induced contribution to the creation of an additional 1.0 million jobs throughout the U.S. economy.
- It is also estimated that the increase in credit card lending to small businesses from 2003 to 2008 resulted in a cumulative increase in the value added of the U.S. economy of \$142 billion. On an annual basis small business use of business credit cards therefore contributed roughly one quarter percentage point of total U.S. value added or GDP.
- There is also a positive and statistically significant relationship between “start-up” small businesses use of business credit cards and firm revenue growth. Each one percent increase in credit card credit use by start-up businesses is associated with a 0.116% increase in firm revenue. This means that, on average, an extra \$1,000 of credit card use would be associated with about a \$5,500 increase in firm revenue.

I. Introduction

Small businesses¹ are a critical source of growth and job creation in the U.S. economy, representing 50% of employment and 44% of household pay (U.S. Census). The small business sector is also the most dynamic portion of the U.S. economy, responsible for 65% of new jobs created in the past 15 years (Headd, 2010).

Access to financial capital plays a critical role in small firms' ability to contribute to a thriving U.S. economy. However, as a result of capital market imperfections (e.g., information asymmetries and diseconomies of scale in lending small amounts of credit to small businesses) small firms often find it difficult to obtain traditional bank loans on affordable terms. The credit card industry has emerged to fill the financing gap and provide access to financial capital to this key market segment.

The percentage of small businesses using business credit cards has steadily increased over the past decade, and the majority of small businesses now use business cards for short-term borrowing. For example, according to the Federal Reserve's Survey of Small Business Finances ("SSBF"), 48% of small firms used business cards in 2003, up from 34% in 1998. According to a NFIB survey, 74% of small employers had a business credit card in 2008 (NFIB, 2010). Although this figure dropped to 64% in 2009, evidence suggests that it is still much easier for small businesses to obtain credit card credit than institutional loans.² Also, a 2009 National Small Business Association ("NSBA") survey revealed that more than one-third of small businesses obtain 25% or more of their overall debt financing from credit cards.

In addition to partially offsetting the traditional lack of large bank financing for small businesses, credit cards provide distinct benefits to small business owners that are difficult to replace with other forms of credit. According to the Small Business & Entrepreneurship Council ("SBEC"), credit cards facilitate market expansion, guarantee payments, and are a tool for entrepreneurs to weather economic recessions. Credit cards also enhance efficiency and eliminate the considerable costs of establishing in-house credit and billing systems. Moreover, using credit cards to manage business expenses reduces or eliminates employee theft.

Despite these benefits, empirical evidence regarding the net impact of credit cards on the overall health and success of small businesses is mixed. A study by Blanchflower & Evans (2004) based on a nationally representative sample of small businesses, for example, finds that revenue and employment growth rates are higher for firms that use credit cards. Scott (2009), however, suggests that due to the high carrying cost of credit card debt, increased use of credit cards raises the risk of start-up small business failure.³ Given these mixed results, and the potential negative impact on the price and availability of credit due to recent efforts to more stringently

¹ The Small Business Administration ("SBA") has multiple size standards for defining "small businesses." For research purposes, the SBA Office of Advocacy defines small businesses as having fewer than 500 employees.

² According to the latest National Federation of Independent Businesses ("NFIB") survey (2010), only one third of small business credit line applicants received an offer with satisfactory terms and conditions, and only 39% of bank loan requests from small firms were granted. On the other hand, three quarters of all small firms were successful in obtaining credit card credit.

³ This study could, however, indicate that riskier businesses rely more on credit cards.

regulate the credit card industry, there is a clear need to evaluate, quantify, and better understand the impact that credit cards have on the small business community and, by extension, the U.S. economy. This evaluation will allow for a fuller understanding of the broader impact that policy decisions affecting price and access to credit card credit may have on small businesses and the national economy.

The objectives of this study are to analyze the impact of business credit cards on the small business sector in particular and the U.S. economy in general. The study focuses on three research questions:

- (1) What is the impact of small business credit card lending on revenue and employment in the small business sector?
- (2) What did this impact mean for jobs growth throughout the U.S. economy when credit card lending expanded from 2003 to 2008, and when it contracted in 2009?
- (3) What is the role of business credit card lending in the growth of start-up firms?

The core of the study was carried out with a nationally representative sample of small businesses and a widely-utilized macroeconomic model of the U.S. economy. Additionally, a unique data set focusing on start-up small businesses was used to examine specific questions about the impact of credit cards on the growth of start-up firms.

In short, the study finds that small business credit card use has a positive and significant impact on the small business sector and on the U.S. economy. Among a nationally representative sample of small businesses, there is a statistically significant and robust relationship between the use of small business credit cards and firm growth. Based on the statistical findings, the expansion of small business credit card lending from 2003 to 2008 contributed directly to the creation of 592,000 small business jobs and an additional 1.0 million indirect or induced jobs throughout the U.S. economy. Additionally, analysis of a unique data set of start-up small businesses found a statistically significant relationship between the use of small business credit cards and start-up revenue growth during the early years of operation. Given these findings, policy makers need to be mindful of the full range direct and indirect consequences that may result from changes in the regulation of the small business credit card industry.

The study is organized as follows. Section II provides an overview of recent regulatory measures that are likely to impact credit card markets. Section III reviews the literature on small business financing. Sections IV through VI describe the data, methodology, and results for each of the three research questions. Section VII provides conclusions for policymakers.

II. Policy Context

In response to the financial market crisis of 2007-09, policymakers have enacted or proposed a range of measures intended to tighten regulatory oversight of credit markets and strengthen consumer financial protections. During the past two years, the Federal Reserve Board (FRB), the Obama Administration, and the U.S. Congress have either enacted or proposed at least four major regulations that affect the credit card market:

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- (1) Amendments to the Truth in Lending Act (TILA): In December of 2008, the FRB proposed amendments to TILA that impose new regulations on the disclosures provided by lenders and also tighten standards on conducting due diligence for prospective accounts.
 - (2) The Card Accountability, Responsibility, and Disclosure (CARD) Act: In May of 2009, President Obama signed into law stringent financial rules under the CARD Act. Also known as the "Credit Cardholders' Bill of Rights," this law aims to halt certain lending practices (e.g., two-cycle billing and retroactive interest rate hikes) and force credit issuers to disclose terms in a concise, timely manner.
 - (3) The Consumer Financial Protection Bureau (CFPB): Regulatory reform included in the conference report of the Restoring American Financial Stability Act of 2010 ("RAFSA") provided for the creation of a new CFPB to regulate consumer financial products. This new agency would regulate consumer financial services, as well as participate directly in credit markets by creating and overseeing the distribution of new credit products.
 - (4) Interchange Regulation: During the summer of 2009, the House and Senate introduced versions of legislation designed to regulate interchange fees on debit and credit cards as well as to affect network rules governing card acceptance. As of early July 2010, House and Senate conferees agreed to include a provision in RAFSA that would affect interchange fees (i.e., a fee paid by a merchant's bank to the customer's bank for processing a credit or debit card transaction) associated with debit card use, as well as certain card network rules on discounts and minimum transaction thresholds.

Supporters of measures like those above contend that the terms and pricing policies of credit offerings historically have been misleading or unfair. They argue that the four initiatives above are designed to protect consumers by fixing information asymmetries, mandating "fair" practices, and stimulating competition. For example, the intended benefits of these regulations would ensure "reasonable" penalty fees, steadier interest rates, and more understandable billing statements in an attempt to limit the downside risk of consumer credit while maintaining the broader economic benefits of a ubiquitous electronic payments system.

On the other hand, opponents argue that stricter credit card regulations could have significant unintended consequences. The new rules regarding constraints on the ability to raise rates could alter lenders' business models and cause lenders to tighten credit conditions. For example, opponents suggest that the CARD Act could restrict lenders' ability to price credit for risk, and inadvertently lead issuers to stop lending to higher-risk customers. Possible unintended consequences of the CARD Act include: (1) higher customer fees, (2) fewer rewards, and (3) rising rates, particularly on delinquent accounts.⁴

The extent to which consumer credit might be tightened remains to be seen, but experts suggest that cutbacks could be substantial. For example, in a recent Wall Street Journal opinion piece, banking analyst Meredith Whitney estimated that new lending regulations could result in a \$2.7 trillion reduction in credit offered through credit card lines, a 57% decrease from current levels (Whitney, 2009). Evans and Wright (2009) estimate that CARD could cause effective interest

⁴ See for example: http://money.cnn.com/2010/02/17/news/companies/credit_card_rules/index.htm

rates on credit card debt to increase by 160 basis points. Some experts in the credit card industry argue that such an impact would unfairly burden households with good credit by raising interest rates for everyone. Additionally, borrowers considered “low-risk” could be negatively affected by new CARD rules that permit issuers to impose annual fees and eliminate rewards programs to mitigate the effects of declining revenues. The ultimate concern is that tighter regulation on credit card products would save some consumers from risky behavior but only at the cost of less access to credit, which would create economic harm for others.

Small businesses could be especially impacted by regulations that affect credit card use. The current version of the CARD Act does not extend to business credit cards held by small firms, which it defines as businesses with fifty or fewer employees, but this could change in the near future. The Federal Reserve convened to review the usage and terms of small business credit cards, and reported to Congress in May 2010 a list of recommendations on whether CARD rules or other legislative initiatives should be extended to small business credit cards (Federal Reserve, 2010). The key policy conclusions from this study indicate that there are significant differences between consumer and small business credit card markets that would make the net benefits of extending TILA to small business cards ambiguous. For example, small businesses may not benefit from TILA's disclosure requirements to the same extent as consumers while imposing costs to credit card issuers. Also, the Federal Reserve concluded that TILA's substantive credit card protections to small business credit cards could potentially have adverse effects on the cost and availability of small business credit cards.

III. Literature Review

Academic research on small business growth and credit card financing focuses on three lines of inquiry: (1) the availability of credit for small businesses; (2) the capital structure decisions of small firms; and (3) the drivers of firm survival. These three areas of study are all influenced by the fact that capital constraints are felt acutely by small businesses. Jaffee and Russell (1976) explain that asymmetric information and agency problems are at the source of these inefficiencies. Lenders find it difficult to assess the creditworthiness of small firms, especially start-ups, because of the lack of public information. Additionally, the high level of heterogeneity among firms in the small business sector inhibits lenders from codifying a standard set of metrics to evaluate loan applications, thereby increasing the cost of due diligence. Stiglitz (1985) demonstrates that the low, uncertain, and volatile returns on small business loans often result in unfavorable risk-return trade-offs for lenders. In response to these conditions, lenders either ration credit or demand small firms to pay higher premiums.

Supply-side factors are not the only reasons small businesses face credit constraints; other factors that influence the price and accessibility of credit include: firm-level factors (i.e. industry and location), owner characteristics, management practices, and firm-lender relationships. For instance, Petersen and Rajan (1994) and Berger and Udell (1995) used the 1987 Survey of Small Business Finances (SSBF) to study the influence of firm-lender relationships on the allocation of credit. They found that firms with longer preexisting relationships with lenders tend to receive lower loan rates on credit lines.

Taken together, these supply- and demand-side dynamics explain why gaps exist in traditional debt markets facing small businesses, and why credit card financing has emerged to fill some of

these gaps. From 1993 to 2009, the percentage of small business owners using credit cards for funding increased from 16% to 59% (NSBA 1993 and 2009). Similarly, 58% of start-up firms used credit card financing in 2004 (Scott 2009). The frequent use of credit cards suggests that the benefits, at least to some extent, outweigh the costs. For example, small business bank loans often require a formal business plan, shopping around to different lenders, tangible collateral, and regular principle and interest payments. Credit cards, on the other hand, can be used on-demand and allow business owners to adjust payments to fit their cash flow profile, so long as they meet the minimum monthly payments.

A number of studies focus specifically on how capital structure decisions—and credit card usage in particular—help or hinder small firm growth. Robb and Robinson (2008) demonstrate that credit cards are a critical tool for expanding credit to small businesses. They looked at the impact of credit market access on firm success and found that more successful firms tend to have capital structures with greater exposure to formal credit channels. Often times, small firms' only access to these formal channels is through credit card financing. Additionally, Blanchflower and Evans (2004) found that personal and business credit card use by small businesses had a positive effect on firms' ability to manage liquidity constraints and to expand business employment. Over a one-year period, firms that used business credit cards (for financing) expanded 10.5%, while firms that used no credit cards grew only at a rate of 5.8%. The authors explain that the option to borrow through credit card financing contributes to conditions that allow firms to grow.

Some research focuses on the potential downsides of credit card usage. Scott (2009) hypothesizes that credit card debt is a primary driver of start-up small business failure, arguing that the high cost of credit cards leads to insurmountable levels of revolving debt that affects new firms' ability to grow and increases the likelihood of closure. However, Scott's statistical analysis does not account for the possibility that higher credit card debt among failing start-up small businesses could be a symptom of other financial problems. For example, firms that use credit cards to cover expenses, but may never generate enough income to maintain ongoing operations, would likely fail regardless of debt levels.

Research studies offer a number of explanations on why firms succeed, including theories related to financial and human capital. In addition to the research that identifies a causal relationship between capital constraints and firm survival⁵, a number of studies indicate that a small firm's probability of survival is a function of the small business owner's assets.⁶ Contrary to the financial capital theorists, Cressy (1996, 2006) argues that when human capital—a key determinant of a start-up's likelihood of success—was included in regression models, the relationship between financial capital and the probability of survival becomes spurious. This suggests that owners' personal characteristics could be an important factor to consider while examining the impacts of small businesses' credit card use.

⁵ Berger and Udell (1999); Levenson and Willard (2000); Estevez-Perez and Manez-Castillejo (2008); Everett and Watson (1998); Headd (2003); Holtz-Eakin et al. (1994); Knaup and Piazza (2007); Phillips and Kirchhoff (1989); Strotmann (2007); Henrekson and Johansson (2009).

⁶ Evans and Jovanovic (1989); Black et al. (1990); Blanchflower and Oswald (1990); Holtz-Eakin, Joulfaian, and Rosen (1994); Haynes and Brown (2009)

IV. The Impact of Credit Card Lending on Small Business Revenue & Employment Growth

4.1 Data

The best data available to quantify the link between credit card credit and employment and revenue growth are in the Federal Reserve's *Survey of Small Business Finances* ("SSBF"), a nationally representative survey of small U.S. firms. The Federal Reserve administered this cross sectional survey in 1987, 1993, 1998, and 2003. Drawn from Dunn & Bradstreet's Market Identifiers list, the stratified random sample of 4,240 firms was selected to broadly represent 6.3 million U.S. small businesses, defined as non-financial, non-governmental, non-farm enterprises that employ fewer than 500 full-time equivalent employees.⁷

The 2003 SSBF is the latest data released by the Federal Reserve. The cross-sectional survey is weighted to represent all small businesses in operation as of year-end 2003, and includes detailed owner and financial information.⁸ In particular, the survey covers firms' performance and capital structure (i.e., income and balance sheet information); credit history; use of financial services and institutions; and demographic characteristics of the firm and owners. This data set can be used to investigate firm-level credit card usage, specifically how usage varies by employees, sales, assets, years under current ownership, and location, and the impact of credit card usage on the size and financial condition of small firms.⁹

Additional supporting data was drawn from the Small Business Administration micro and small business lending reports, and surveys conducted by the National Federation of Independent Businesses (NFIB) and the National Small Business Association (NSBA).

As shown in Table 1, in 2003, small firms with business credit cards had, on average, greater assets, loans, revenue, and employees. This is consistent with Table 3 (below), which demonstrates that the largest small firms are more credit-card intensive.

⁷ About 64% of the 2003 sample had 19 or fewer employees, and the average size of the firms was nearly \$3 million in total assets. The reference date for most questions corresponded with the date of the interview, between June 2004 and January 2005; however, the date for balance sheet and income data aligned with the firm's most recent fiscal year-end. The overall weighted response rate for both the screening and interview phases was 32.4%.

⁸ The SSBF is a stratified random sample with oversampling of larger employment companies (firms with 20 or more employees). Therefore, the statistical analysis incorporated cross-sectional regression models including sampling weights to account for disproportionate sampling and unit non-response.

⁹ Like most surveys, the 2003 SSBF contained missing values: on average, the median firm in the data set has about 0.5% missing items. To fill in these gaps, the SSBF imputed data for only those missing values that could be estimated. The most frequently used methodology consisted of converting categorical response questions to binary responses and then estimating a value using a randomized linear probability regression model. One of the major critiques of previous survey rounds was that imputing new data could introduce additional variation. In response to this critique, the 2003 SSBF includes five imputates for each of the 4,240 firms, resulting in an overall data set of 21,200 observations. Researchers can use these multiple imputates to adjust the estimated standard errors and confidence intervals as needed.

Table 1. Survey of Small Business Finances: Average Values for Firms with and without Business Credit Cards

(\$ 2003)	All Small Businesses	Business Credit Cards Users	No Business Credit Cards	Business Credit Cards Users & <=50 Employees	No Business Credit Cards & <=50 Employees
Number of Firms	4,240	2,275	1,965	1,713	1,700
Business Credit Card Balance	\$1,493	\$3,101	n/a	\$2684	n/a
Assets	\$552,918	\$687,398	\$428,116	\$434,548	\$333,084
Loans	\$215,531	\$275,208	\$160,148	\$176,313	\$131,489
Revenue	\$1,072,192	\$1,412,528	\$756,347	\$887,584	\$523,186
Employees	8.6	10.8	6.5	7.1	4.9
Asset Turnover	19.2x	25.2x	13.4x	26.0x	13.6
Net Income	\$176,804	\$200,627	\$154,709	\$152,611	\$125,034
Net Margin	-3.5%	-17.9%	10.1%	-18.9%	10.1%
Owner's Age	51.6	50.5	52.6	50.4	52.5
Owner's Prior Experience	19.7	19.4	20.0	19.2	19.9
Owner's Education	(At least some post secondary training, including trade school)				
Number of Owners	8.6	10.8	6.5	7.1	4.9

Source: Survey of Small Business Finances 2003

4.1.1 Dependent Variables

Regression analysis was used to examine the factors that affect small business growth. The dependent variables for these equations were:

- *Number of Employees*: Includes full-time and part-time employees, and owners that were identified as working for the firm.
- *Total Revenue*: Company revenues generated per year.

4.1.2 Explanatory Variables

The main variable of interest was the *Use of Business Credit Cards*. The SSBF defines this as the average monthly business expenses placed on business credit cards. Additional financial variables were used to control for a variety of factors:

- *Revenue* was included as a key determinant of employment levels. In general, larger firms should have more employees, and many small firms base hiring decisions on the ratio of revenue per employee. Inclusion of this variable thus avoids that the statistical results simply reflect the more prevalent use of credit cards by bigger or smaller firms.
- *Employment* was used as an explanatory variable in the revenue models along with capital to describe firms' major factors of production.
- *Total Assets* was included to control for the size of the company, including the level of output generating capital, and short-term credit extended to customers.

- *Net Income* was included to account for the level of profit—a proxy for operating cash flow that can be used to pay down debt and/or reinvest in the company.¹⁰
- *Net Margin* was added as a reflection of firms' pricing strategy and ability to control costs.

In addition, several independent variables (*Age, Experience, Education, and Number of Owners*) were used to control for a variety of owners' human capital characteristics that are likely to impact firm performance, including: business acumen, customer networks, financial management skills, and other intangible benefits. Finally, given that a firm's industry can affect growth rates, a dummy variable was used to account for firm industry using two-digit SIC codes. Because the SSBF is a cross-sectional survey, all firms were subject to similar macroeconomic conditions, precluding the need to control for national-level economic factors.

4.2 Methodology

This study utilized regression analysis to estimate the impact of credit card lending on small business employment and revenue. As described below, equations 1 and 2 were used to explain the differences in small firms' employment and revenue as a function of the level of credit card lending, other financial factors, the owner's human capital characteristics, geographic factors, and macroeconomic factors. The regression models included a mix of original data and log-transformed variables to account for both linear and non-linear relationships. Because the variables of interest (i.e., dependent variables and credit card lending) are log-transformed, the coefficient on business card lending can be interpreted as the "elasticity," or proportional response to changes in small business credit card use. That is, the models estimate the percent change in employment or revenue associated with a 1% change in credit card use, holding all other factors constant.

$$\begin{aligned} \text{Number of Employees} = & \text{Credit Card Credit} + \text{Revenue} + \text{Positive Net} \\ & \text{Income} + \text{Negative Net Income} + \text{Net Margin} + \text{Assets} + \text{Asset Turnover} \\ & + \text{Loans} + \text{Owner's Age} + \text{Owner's Education} + \text{Owner's Experience} + \\ & \text{Industry} + \text{Number of Owners} \end{aligned} \quad [1]$$

$$\begin{aligned} \text{Revenue} = & \text{Credit Card Credit} + \text{Positive Net Income} + \text{Negative Net} \\ & \text{Income} + \text{Net Margin} + \text{Assets} + \text{Asset Turnover} + \text{Number of} \\ & \text{Employees} + \text{Loans} + \text{Owner's Age} + \text{Owner's Education} + \text{Owner's} \\ & \text{Experience} + \text{Industry} + \text{Number of Owners} \end{aligned} \quad [2]$$

Table 2 describes the variables used in the regression analysis along with a list of any transformations made to the data series.

¹⁰ The linear relationship between employment (and revenue) and net income is best described when both variables are log-transformed, a common transformation for financial variables. However, in doing so, this eliminates all firms with negative or zero income for the year. In this case, an approximating transformation using cubed roots is sometimes used. Scatter plots of the log of revenue and the cubed root of income showed two distinct slopes; a positive slope for incomes greater than zero and a negative slope for incomes less than zero. Thus the effect of income is described in the following equations using two interaction terms consisting of a binary term defining whether or not an observation had positive or negative income, and the cubed root of income.

Table 2. Description of Model Variables

Variable Name	Description	Transformations
Number of Employees	Total employees including owners	Natural log
Business Credit Card Credit	Average monthly expenses on business credit card	Natural log
Revenue	Total annual revenue	Natural log
Positive Net Income	Interaction term, 1 if net income was positive, 0 if negative	Interaction
Negative Net Income	Interaction term, 1 if net income was negative, 0 if positive	Interaction
Net Margin	Net income divided by revenue	None
Assets	Total assets at year end	Natural log
Loans	Total loans at year end	Natural log
Owner's Age	Primary owner's age in years	None
Owner's Education	Primary owner's level of education	None
Owner's Experience	Primary owner's years of experience	None
Industry	Dummy variable: 1 for services firms and 0 for manufacturers	Binary variable
Number of Owners	Number of owners per firm	None

The regression analyses incorporated a multiple imputation estimation technique that combined analyses of the SSBF's five imputations (see Footnote 8) into a single inference. Tables 4 and 5 and Appendix A display the output from the multiple imputation models.

As discussed above, the statistical models in both stages were constructed to control for a wide spectrum of factors that could influence small business growth. The analysis incorporated three general categories of factors that impact business outcomes: financial variables including credit card credit, human capital characteristics, and macroeconomic factors.

A variety of financial variables were included in the statistical models to explain small business employment and revenue levels. While it was hypothesized that business credit card credit would be a significant contributor to firm growth, other financial variables were expected to have a greater impact on firm outcomes. Also, the financial explanatory variables helped to control for "reverse causality," one of the key statistical issues in this study. In other words, struggling firms may have relied more heavily on credit cards to finance operations while trying to work out of trouble. Without adequate attention given to this potential problem, the apparent marginal impact of credit card credit could be muted or even reversed.

As with similar previous studies, the statistical models also accounted for the importance of human capital characteristics. The SSBF survey included numerous variables, such as the owners' age, education, years of experience, and the number of prior businesses started. A priori, this study hypothesized that, in particular, more education and experience would have a positive impact on business outcomes.

4.3 Results

Small businesses' use of credit cards has expanded dramatically since the 1990s. The most consistent measure of business credit card use is the historical record provided by the SSBF. As shown in Table 3, small business credit card use across all categories has expanded. Credit card use increased particularly rapidly among larger small businesses, though small firms of all sizes increased credit card borrowing. For example, the percentage of all small firms using business credit cards increased from 28% in 1993 to 48% in 2003. Although the SSBF was discontinued in 2003, other surveys indicate that this overall trend continued through 2009 — according to the NSBA, 54% used their business credit cards as a source of financing in 2009.

Table 3. Proportion of Small Businesses Using Credit Cards

Small Business Classification	Business Credit Card		
	1993	1998	2003
All Firms	27.6%	34.1%	48.1%
Number of Employees			
0	20.6%	17.4%	32.0%
1-4	24.7%	29.3%	45.7%
5-9	39.4%	44.1%	56.8%
10-19	34.5%	51.8%	59.7%
20 - 99	43.5%	57.9%	62.7%
100 - 499	37.1%	62.5%	71.5%
Total Sales			
Less than 25,000	10.3%	11.6%	25.7%
25,000 - 49,999	21.3%	21.3%	34.1%
50,000 - 99,999	23.6%	26.6%	41.0%
100,000 - 249,999	26.4%	32.6%	48.2%
250,000 - 499,999	34.2%	44.0%	54.9%
500,000 - 999,999	35.2%	45.0%	62.5%
1,000,000 - 2,499,999	42.3%	55.0%	63.6%
2,500,000 - 4,999,999	44.3%	63.9%	61.9%
5,000,000 - 9,999,999	41.9%	71.4%	63.3%
10,000,000 or more	37.5%	67.5%	68.9%
Standard Industrial Classification			
Mining and construction	31.9%	33.4%	52.1%
Manufacturing	31.0%	39.3%	54.8%
Transportation	26.0%	45.5%	51.8%
Wholesale Trade	33.7%	46.3%	54.4%
Retail Trade	22.4%	30.0%	45.0%
Finance, insurance & Real Estate	22.8%	36.3%	43.0%
Services	29.2%	31.7%	47.1%

Source: Survey of Small Business Finances 1993, 1998, 2003

The statistical techniques described above were used to examine the relationship between various characteristics, including credit card lending, and small businesses' employment and revenue. Tables 4 and 5 present the regression results for the employment and revenue models tested using the Fed's 2003 SSBF.

Table 4 presents the results from the SSBF employment model. The coefficient on the natural log of business credit card credit was both positive and statistically significant. This finding indicates a positive relationship between credit card borrowing and employment, holding other factors

constant. The elasticity of employment to credit card lending was 0.051. This means that for every 1% increase in credit card lending, employment increased by 0.051%. On a national scale, every 1% increase in small business credit card use (\$1.128 billion) is associated with approximately 17,000 small business jobs. This finding is consistent with the original hypothesis that increased credit card borrowing has facilitated small business employment by improving capital liquidity.

Table 4. SSBF Multiple Imputation Regression Model on Small Firm Employment

Number of Employees	β	Std. Error	T	P> t 	[95% Conf. Interval]	
Business Credit Card Credit	0.051	0.017	2.95	0.00	0.017	0.085
Revenue	0.360	0.028	12.77	0.00	0.304	0.415
Positive Net Income	-0.003	0.001	-4.19	0.00	-0.005	-0.002
Negative Net Income	0.000	0.001	0.11	0.92	-0.003	0.003
Net Margin	-0.005	0.000	-12.37	0.00	-0.006	-0.005
Assets	0.062	0.021	2.92	0.00	0.020	0.104
Loans	0.005	0.017	0.32	0.75	-0.027	0.038
Owner's Age	0.001	0.003	0.30	0.76	-0.004	0.006
Owner's Education	-0.008	0.011	-0.74	0.46	-0.030	0.013
Owner's Experience	0.000	0.003	-0.13	0.90	-0.006	0.005
Industry	0.011	0.046	0.23	0.82	-0.080	0.102
Number of Owners	0.015	0.001	14.59	0.00	0.013	0.017
Constant	-4.141	0.257	-16.10	0.00	-4.645	-3.636
N = 1,578						
R-squared not reported in multiple imputation estimations. The R-Squared on estimations performed on individual imputations ranged from .59514 to .59541						

The model controlled for a variety of financial, human capital, and geographic factors. In addition to business credit card credit, most other financial variables were statistically significant. For example, employment was positively affected by revenue and firm size (measured by total assets) — for every 1 percent increase in revenue (\$14,125), small firm employment is greater by 0.36%. This means that there was 1 additional small business job for every \$360,000 of revenue. The financial variable coefficients had the expected sign, except for the positive and negative net income variables and net margin. It was originally hypothesized that higher profits would be associated with higher employment. Unexpectedly, more profitable firms tended to have fewer employees, and vice versa. This could be for several reasons — for example, firms that earn higher profits, all else equal, may have more efficient employees compared to their peers.

The number of owners was also a significant determinant of employee levels. The results indicate that for every additional owner, employee levels increase by 1.5%. This could be explained if firms with more owners were more likely to have a greater breadth of skill sets and larger potential customer networks to generate business.

None of the other human capital characteristics had a statistically significant impact on small firm revenue. Data from the SSBF reveals characteristic differences in average employment, income and asset levels between firms in the services and industrial sectors. In order to minimize the potential for endogeneity in these explanatory variables, the industry dummy was used explicitly in the regression analysis. Other variables (not shown in Table 4) used to account for

differences across geographic regions and industry, such as dummy variables for urban/rural firms and services/industrial firms, were statistically insignificant.

As shown in Appendix A, regression analysis was also performed on a sub-sample of firms with 50 or fewer employees to determine the potential impact of restricted credit card lending on very small businesses. The results are similar to Table 4, with a marginally smaller coefficient on business credit card credit. The slight decrease in the coefficients might be expected, as business credit card intensity was greater for the largest of small businesses. *Nevertheless, the results indicate that policies that impact credit card lending for businesses with 50 or fewer employees would have a statistically significant effect on their employment.*

Table 5 displays the results of a regression model analyzing small firm revenue as a function of financial, human capital, and other factors using a similar structure and multiple imputation estimation technique as described above.

Table 5. SSBF Multiple Imputation Regression Model on Small Firm Revenue

Revenue	β	Std. Error	T	P> t	[95% Conf. Interval]	
Business Credit Card Credit	0.144	0.022	6.55	0.00	0.101	0.188
Positive Net Income	0.011	0.001	9.07	0.00	0.009	0.013
Negative Net Income	-0.004	0.002	-1.99	0.05	-0.008	0.000
Net Margin	0.015	0.000	55.26	0.00	0.014	0.015
Assets	0.208	0.032	6.52	0.00	0.145	0.271
Number of Employees	0.658	0.042	15.83	0.00	0.576	0.739
Loans	0.054	0.023	2.34	0.02	0.009	0.100
Owner's Age	0.002	0.004	0.41	0.68	-0.006	0.009
Owner's Education	0.014	0.016	0.92	0.36	-0.016	0.045
Owner's Experience	0.005	0.004	1.22	0.22	-0.003	0.012
Industry	0.061	0.069	0.89	0.38	-0.074	0.196
Number of Owners	-0.002	0.001	-2.94	0.00	-0.004	-0.001
Constant	6.985	0.316	22.14	0.00	6.366	7.604
N = 1,578						
R-squared not reported in multiple imputation estimations. The R-Squared on estimations performed on individual imputations ranged from .80419 to .80605						

The coefficient on the natural log of business credit card credit was positive and statistically significant, representing a positive linear relationship between credit card borrowing and revenue. *The analysis indicated a 0.144% (\$2,034 on average) increase in revenue for every 1% increase in business credit card credit (\$31 on average), holding other factors constant. This finding was consistent with the hypothesis that increased credit card borrowing leads to increased small business output.*

In addition to business credit card credit, the coefficients for several other control variables were both statistically significant and positively signed. For example, revenue was positively related to profit margin, firm size (measured by total assets), number of employees, and the number of owners. As expected, the number of employees and total assets appear to be the dominant factors in explaining small firm revenue, because they are the main inputs to production.

The number of owners was also a significant determinant of revenues, though the coefficient was relatively small in magnitude and unexpectedly negative. This may indicate that, all else equal, there is some benefit to sole proprietorships. Similar to the employment model, various combinations of human capital characteristics did not have a significant impact on small firm revenue. Owner's age, educational level, and experience as proxies for business acumen and other intangible characteristics were not found to be statistically significant.

Appendix A also displays the results of the regression analysis for a sub-sample of firms to determine the potential impact on businesses with 50 or fewer employees. The results were similar to Table 5, with relatively negligible differences between the coefficients on business credit card credit and other variables.

4.4 Discussion

The results from the employment and revenue models above were consistent with previous research using the 1998 release of the SSBF. Blanchflower and Evans (2004) found that small firms that used credit cards grew at a significantly higher rate. Regarding employment, firms whose owners did not have credit cards had the lowest three-year employment growth rates. Furthermore, firms with business credit cards grew significantly faster than either businesses with only personal credit cards, or businesses with no credit cards at all.

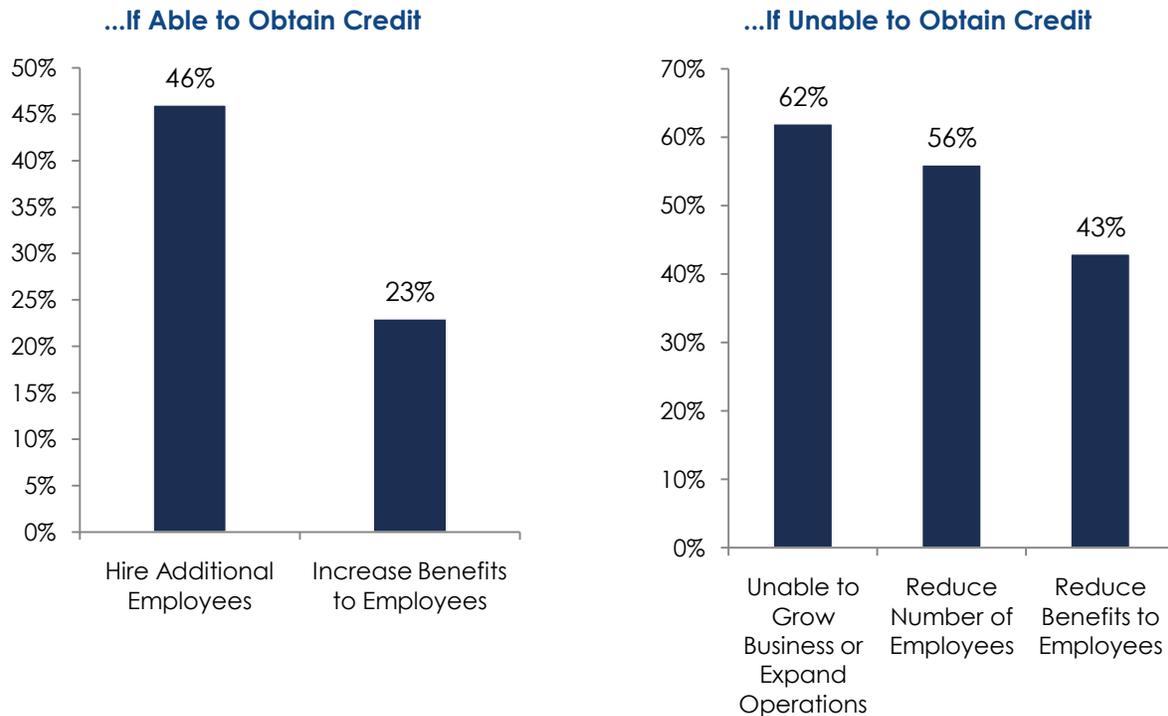
Although only 20% of small firms use business credit cards for mid- to long-term borrowing (NFIB, 2010), the widespread use of business cards as a working capital tool should not be overlooked. The 80% of firms that do pay off their business card balance in full each month benefit from the ability to manage their monthly expenses and stretch out payments for 30 to 45 days. For example, expensive equipment (e.g., printers, computers) or business travel can be purchased on the first day of a billing cycle and carried interest free until the next payment cycle is due. These are often large purchases for small firms that would be more difficult to efficiently manage if it were not for credit cards.

There are several likely explanations for the positive relationship between business credit cards and higher small business employment and output. First, business credit cards allow small firms to tap into a liquid and expanding segment of the capital market. Firms that are able to obtain business credit cards may face fewer credit restraints than the typical firm without access to credit card credit. Though the explicit cost of credit card debt is higher than institutional loans, the flexibility of credit cards may allow businesses to use smaller amounts of credit on-demand for financing various expenses and investments.

Second, it is important to consider the direction of causality in the relationship between credit card credit and employment or revenue growth. Specifically, it can be difficult to eliminate the possibility of reverse causality — namely, that more successful firms are able to obtain more credit card credit. The typical approach to overcome this problem is to use a two stage least squares model with an instrumental variable for the variable in question – in this case, business credit card use. The ideal instrument for the first stage of the model would be one that is correlated with business credit card borrowing but not correlated with employment. More than 100 SSBF variables were tested, but none were found to meet this test. Therefore, the OLS approach described above was taken. A key reason for believing the line of causality posited in

this study is that this view is heavily supported by survey data. Surveys show that small business owners report that they would indeed hire more employees if they could obtain credit, and would reduce staff if they were unable to obtain credit (see NSBA 2009 and Figure 1).

Figure 1. Small Business Owners Reactions to Changes in Credit Availability



V. The Impact of Credit Card Lending on Job Creation in the U.S. Economy

The second phase of the study aggregated the above results to the national level and simulated them in IMPLAN, a macroeconomic model of the U.S. economy, to determine the direct and indirect effects on national level employment and output.

5.1 Data & Economic Model

IMPLAN is a static input-output (“I/O”) model widely used to estimate impacts on the U.S. economy. The model tracks the flow of dollars between suppliers, businesses, and final consumers. The underlying Social Accounting Matrix includes details on firms, households, and government sectors, and therefore captures “non-market” transactions such as taxes and unemployment benefits. Furthermore, it has significant geographical and industry breakdown, providing state level detail and coverage of 440 industrial sectors.¹¹ IMPLAN extends a basic I/O table into a highly detailed Social Accounting Matrix (“SAM”) of the U.S. economy.¹²

¹¹ I/O modeling quantifies the interactions between industries within an economy. I/O models are built on the concept of an I/O table, which depicts the inter-industry relationships of an economy. The I/O table tracks, for each industry, the value of goods and services purchased from all other industries, as well as final demand and value added – i.e., all the transactions within an economy. The sum of each row in the matrix equals the total output for each industry, and the sum of each column in the matrix represents the total intermediate demand by each industry.

Layered on top of the SAM are a set of multipliers that simulate the sensitivity of a local economy to specific changes in that region (e.g., government spending on road construction). IMPLAN's multipliers are built directly from region-specific data, describing the unique economic structure of each local economy. The multipliers estimate the "spillover" effects of a given activity and disaggregate economic impacts into three effects:

- (1) *Direct Effects* are the initial changes, corresponding in this study to the marginal impact of business credit cards on small firm employment and revenue;
- (2) *Indirect Effects* are changes in the inter-industry transactions as the directly impacted industries purchase more inputs from suppliers; and
- (3) *Induced Effects* are the changes in local spending that result in changes in income in the directly and indirectly affected industry sectors.

For example, if a small automobile repair business gets an influx of new business, there is an immediate *direct* gain of output, jobs, and wages. In turn, there is an *indirect* increase in demand for inputs, such as tires, parts, and tools—this leads to a marginal increase in output, jobs, and wages for auto repair suppliers. Also, there is an *induced* effect as the directly and indirectly affected households have more discretionary money to spend on groceries, entertainment, and other goods and services, generating income for other businesses in the region.

5.2 Methodology

The statistical results from the employment model presented in Section IV were used to estimate a national level employment change generated by the use of credit card financing over a given period of time. The methodology consisted of four steps:

- (1) Estimate the annual percent change in small business credit card lending from 2003 to 2009. These are not readily available figures, and therefore several assumptions were made. Existing data from the SBA's Small Business and Micro Business Lending reports, along with the Federal Reserve's report on revolving consumer credit were used as proxies.
- (2) Apply the elasticity of employment to the estimated percent change in small business credit card lending. The statistical results (coefficients) from Section IV represent the elasticity, or proportional response of employment to changes in business credit card credit. The coefficient on business credit card credit times the change in business credit card credit used (calculated in Step 1) equals the percent change in employment over a given time period. That percent change is then multiplied by the base level of employment to determine the change in the level of employment.
- (3) Disaggregate the total direct impact by sector. The SSBF's sector weighting was mapped to IMPLAN's industry coding (using the NAICS as a bridge between the two). The total direct

¹² Data used in the underlying SAM framework is compiled from publicly available sources including the US Bureau of Economic Analysis, US Bureau of Labor Statistics, US Census Bureau, US Department of Agriculture, and the US Geological Survey.

employment impact calculated in Step 2 was apportioned to individual sectors based on the percent of small firms that used credit cards in each sector.

- (4) IMPLAN was then used to estimate the direct, indirect, and induced economic effects of the calculated change in employment. The sector-level employment impacts were inputs to the model for calculating the total impacts on employment, output, and value added. The model works by applying economic multipliers for each economic activity affected directly or indirectly by the inputted shock.

5.3 Results

The results of the macroeconomic analysis depend on two major assumptions. First is the statistical relationship between credit card use and employment, estimated above. The second is the change in overall small business credit card use over time.

Data on the size of the overall business credit card market is sparse and inconsistent. The Federal Reserve cites *Nilson Reports* data suggesting that spending on small business Visa and MasterCard credit cards more than tripled between 2002 and 2007, to about \$150 billion in 2007 (Federal Reserve, 2010). Meanwhile, CreditCards.com estimated that small business credit card charges increased from \$120 billion in 2002 to more than \$300 billion in 2008 (a 114% increase), citing data from TowerGroup, a financial services industry research firm (Keating, 2009). However, the SSBF indicates that spending on small business credit cards was \$112.8 billion in 2003, 6% below the TowerGroup 2002 figure.

Because there was no standard measure for small business credit card loans, this study used two publicly available measures to estimate the change in small business credit card lending:

- “Micro” business loans (loans less than \$100,000) increased 36% from \$125.7 billion in 2003 to \$170.5 in 2008.¹³ The SBA has not yet released figures for 2009.
- Total revolving consumer credit outstanding, which includes small business and household debt, increased 28% from \$755 billion in January 2003 to \$958 billion in December 2008, and then decreased by -9.6% by December 2009.

Together, the following data forms an estimate of changes in small business credit card lending from 2003 to 2009. Table 6 shows the estimated year-by-year changes in small business credit card lending.

The 2003-08 and 2009 time frames were chosen for several reasons. The SSBF data is from 2003, which presents a natural starting point. From 2003 through 2008, credit generally expanded, which provides an example of the effects of growing small business credit card use on employment and output. Then, during 2009, credit use and availability contracted, which provides a basis for examining the impacts of credit tightening.

¹³ In the absence of national statistics on the use of small business credit cards, the Small Business Administration validated the use of the growth rate of micro business loans as a proxy for the growth rate of small business credit card lending.

Table 6. Estimate of Small Business Credit Card Growth Rate

Year	Revolving Consumer Credit¹	Micro Business Loans (<\$100k)²	Estimated Small Business Credit Card Growth Rate³
2004	4.1%	0.0%	0.0%
2005	3.8%	10.1%	10.1%
2006	5.0%	5.5%	5.5%
2007	8.1%	9.4%	9.4%
2008	1.6%	6.8%	6.8%
2009	-9.6%	---	-9.6%

Sources:

¹Federal Reserve G.19 Release

²Small Business Administration, Office of Advocacy

³Keybridge Research estimates

According to the SSBF, the total amount of small business credit card credit use in 2003 was approximately \$112.8 billion. Using the trend in micro-business lending as a proxy, small business credit card use increased to more than \$152 billion by 2008. Assuming that small business credit card lending decreased in 2009 at the same rate as overall revolving credit implies that small business credit card use fell 9.6% to approximately \$137 billion.

These trends are consistent with surveys that illustrate the importance of credit to small firms and the potential impact of a decline in credit availability:

- In 2003, approximately 48% of small firms used business credit cards for financing and managing expenses, up significantly from 34% in 1998 (SSBF 1998, 2003).
- In 2008, the National Federation of Independent Businesses ("NFIB") reported that 74% of small businesses had business credit cards, and as of 2009, 59% of small businesses surveyed by the National Small Business Association ("NSBA") used credit cards to meet their capital needs.
- A 2009 NSBA survey indicated that 46% of small firms would hire additional employees if they were able to obtain additional capital, but 56% of firms would reduce the number of employees if they were unable to obtain financing.

The increase in small business sector employment associated with rising credit card lending was calculated by multiplying the elasticity of employment to credit card use by the percent change in overall business credit card use. This results in a direct employment effect of approximately 1.8% (.36 times .051 times 100) from 2003 through 2008. This relationship applies to the 48% of small firms identified in the SSBF as using business credit cards. These firms represented about 32.8 million, or 57%, of all small business employees. Therefore, the overall employment impact from 2003 to 2008 was approximately 592,000 jobs (see Table 7). Subsequently, the 9.6% credit tightening in 2009 led to a loss of more than 216,000 jobs.

Table 7. Direct Impact of Business Credit Cards on Small Business Employment

Year	Business Credit Card Lending Growth (Percent)	% Impact on Employment Attributed to Business Credit Cards	Number of Jobs Created
2003	---	---	---
2004	0.0	0.0	0
2005	10.2	0.5	168,386
2006	5.5	0.3	100,048
2007	9.4	0.5	180,368
2008	6.8	0.3	142,752
2009	-9.6	-0.5	-216,049
2003-08	35.7*	6.1*	591,554
2003-09	22.7*	5.6*	375,505

*Compounded growth rate

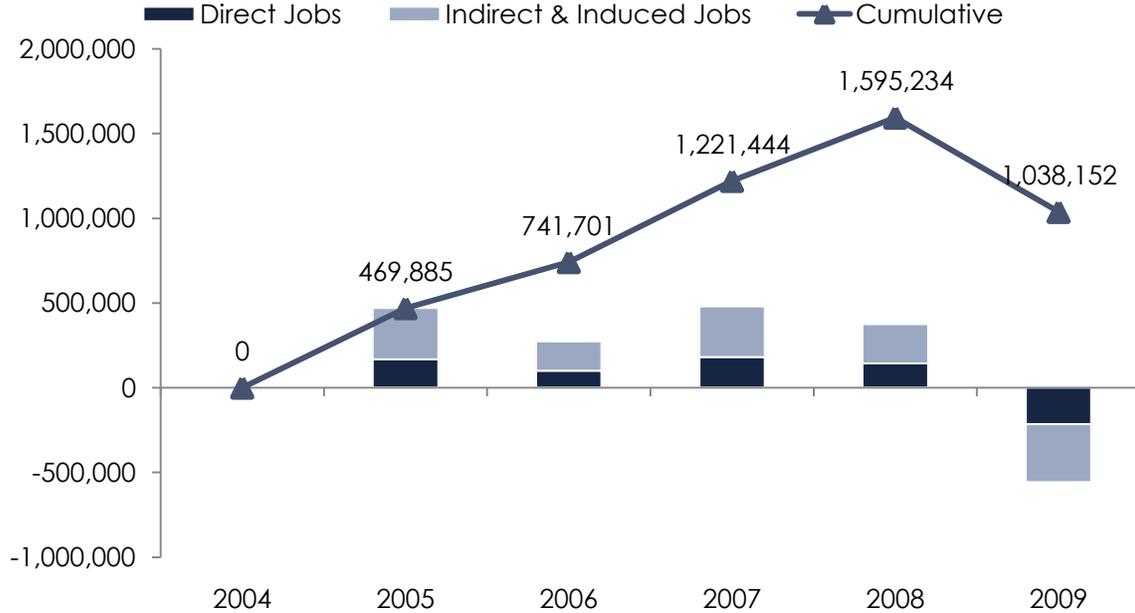
Using the SSBF two-digit SIC codes, this direct job impact was apportioned across the 59 sectors covered in the survey, and then synchronized with IMPLAN's sector coding. The sector-level direct job impacts were entered into IMPLAN, and the model was used to calculate the total direct, indirect, and induced economic impact of small business credit card lending.

The IMPLAN model first converts the direct impact (change in employment by industry) into final demand using empirical data to calculate the average revenue per employee for the industries in question. Stage two of the model applies the indirect multipliers which account for multiple iterations of supplier effects. In other words, industries that are directly impacted must procure goods and services from suppliers, which in turn purchase inputs from other suppliers, and so on. In this way, the indirect multipliers account for the unique supply chain of each industry. In stage three of the model, IMPLAN applies the induced effects multipliers which account for money that is re-circulated in the region due to changes in household income as the result of the indirect effects.

The results of the macroeconomic analysis are shown in Figure 2. In general, the sector-weighted jobs multiplier averaged 2.7, meaning that for every 1 direct job created as a result of increased small business credit card use, an additional 1.7 jobs was generated elsewhere in the economy. From 2003 to 2008, increased small business credit card lending was associated with the creation of 592,000 small business jobs, and 1.6 million total jobs throughout the U.S. economy. Over this same period, the U.S. Bureau of Labor Statistics' Business Employment Dynamics estimates that nearly 2 million small business jobs were generated. This indicates that roughly one-quarter of small business job creation could be considered to be associated with business credit card lending. This level of impact was not surprising given that credit cards may make up to 40% to 50% of all small business lending.¹⁴

¹⁴ Rough estimate based on SBA Small and Micro Business Lending reports.

Figure 2. Total Employment Impacts on the U.S. Economy



Assuming that small business credit card lending declined by 9.6% in 2009, the results of this study suggest that such a reduction in credit to small firms led directly or indirectly to the loss of more than 550,000 jobs. These results are consistent with surveys that show that a majority of small businesses would cut jobs if they were unable to obtain adequate capital. For example, in 2009 a NSBA survey indicated that 62% of small firms would be unable to expand operations, 56% would have to reduce the number of employees, 43% would have to reduce employee benefits, and 34% would be unable to finance increased sales, if they were unable to obtain credit (NSBA, 2009).

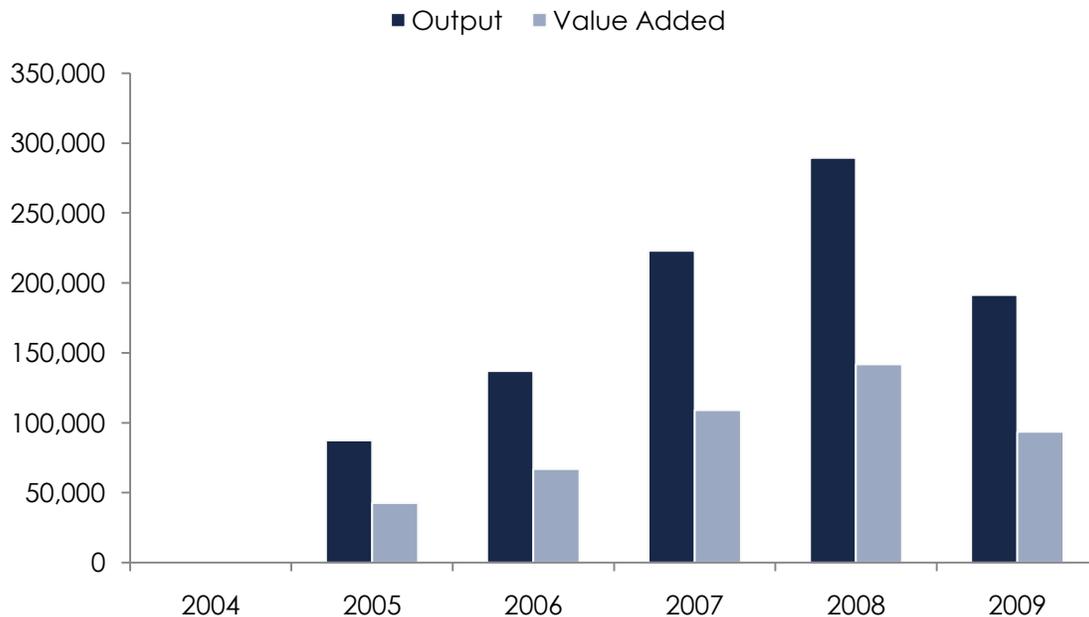
At the sector level, the services sector generated 914,000 jobs, or about 57% of the total small business jobs impact through 2008 (see Table 8). Trade (wholesale and retail) and Manufacturing sectors generated more than 278,000 jobs and 152,000 jobs, respectively. Transportation, Information, and Public Utilities industries created 112,000 jobs. Mining, Government and Agriculture were the least impacted sectors.

Table 8. Total Sector Employment Impacts for U.S. Economy

Sector	Total 2003-08	Total 2003-09
Total	1,595,234	1,038,152
Agriculture	33,161	21,748
Mining	8,242	5,428
Construction	79,594	50,860
Manufacturing	152,701	98,971
Transportation, Information, and Public Utilities	111,621	72,875
Trade	278,774	180,895
Service	914,270	596,238
Government	16,872	11,137

Two measures of overall economic activity generated by small business credit card use are output and value added. Output is equal to total revenue generated directly or indirectly by small business credit card use. Value added is equal to profits, indirect business taxes, and payments to households (wages). As shown in Figure 3, from 2004 to 2008, the resulting cumulative output and value added for the U.S. economy were \$289 billion and \$142 billion, respectively. On an annual basis, small businesses' use of business credit cards contributed approximately one quarter percentage point to total U.S. output and GDP (value added).

Figure 3. Cumulative Impact of Small Business Credit Card Use on U.S. Output & Value-Added (\$2010 Millions)



VI. The Role of Credit Card Lending in the Growth of “Start-Up” Small Businesses

While prior research has shown that the availability of credit is a particularly important factor for “start-up” firms (See Robb and Robinson, 2008), few studies have focused on the relationship between business credit cards and the growth of start-up firms. The analysis in this section is

intended to: (1) validate the results using the SSBF with a more contemporary data set that includes a time series component, and (2) identify whether start-up small firms are uniquely impacted by the use of business credit cards. While the SSBF is well suited for analyzing a nationally representative sample of small firms, it has not been updated for a few years and it does not focus on start up firms. For these reasons, the analysis in this section relies upon the Kauffman Firm Survey ("KFS") data, a unique up-to-date data set for analyzing the role of business credit cards in facilitating start-up growth. This data set tracks detailed financial, owner, and other operating data for start-up small firms in the U.S., and follows individual firms over time. The results from this analysis suggest that there is a significant positive relationship between credit card use and the revenue growth of small start-up businesses that is comparable to the relationship found between these two variables for all small businesses analyzed using the SSBF.

6.1 Data

Analysis of the KFS was intended primarily to determine if start-up small firms' growth rates are affected by the use of credit card financing. The KFS is a unique panel survey of 4,928 randomly selected small businesses, providing a nationally representative sample of start-up firms founded in 2004. It tracks these firms through 2008, and covers detailed financial and owner characteristics similar to those found in the SSBF. The KFS allows for the evaluation of factors that influence the growth of newly launched small businesses. The survey is focused on the nature of new business formation activity; characteristics of the strategy, offerings, and employment patterns of new businesses; the nature of the financial and organizational arrangements of these businesses; and the characteristics of their founders. For example, the data set included micro-level data on the sources and amounts of financial capital, financial performance, as well as other firm and owner characteristics.

The most recent data, released in Spring 2010, included the 2004 baseline and four annual follow up surveys. All financial data was reported on a year-end basis. The latest follow-up was conducted during 2009 and covers information for the 2008 calendar year. Additionally the KFS data set included various geographical identifiers, which provide the opportunity to match firms with the regional context in which they were operating during the survey period.

As with any data analysis, certain assumptions were necessary to standardize key variables in the KFS survey. The following assumptions were made for analytical purposes:

- *Number of Employees:* The Kaufman Firm Survey asked small business owners to identify the number of employees, excluding themselves. In a separate question, the owners were asked if they were a paid employee of the business. The number of employees was taken as the sum of these responses. For the purposes of this study, "zero" employee firms are taken to be firms with one employee.
- *Human Capital and Missing Data:* No assumptions were made regarding human capital characteristics of owners, such as age, gender, experience, etc. If values were missing for these characteristics, associated observations were dropped from the regression analysis.
- *Financial Variables and Missing Data:* The KFS data set covered a wide array of financial variables. These included questions regarding the personal credit card debt of first, second, or third owners, loans received from friends or angel investor, level of assets, including

vehicles and property, etc. In many cases these situations do not apply broadly to small businesses. Thus, the dataset included a large number of missing values, and several imputations were made for the following variables: loans, credit card balances, equity, assets, and liabilities.¹⁵

- *Transforming Profit/Loss*: Analysis of income data showed a negative relationship between income and revenue for firms with negative net losses, and a positive relationship between income and revenue for firms with net profits (i.e. greater revenue levels were associated with greater profits or losses). This is consistent with the view that larger companies stand to gain or lose more, on an absolute basis, than their smaller counterparts. In order to account for these two different slopes in the lines representing the revenue-income relationship, income was defined in the regression models using two interaction terms composed of a raw income number (either positive or negative) and a dummy variable signaling whether or not the income value represented a profit or a loss.

Regression analysis was used to assess the marginal impact of small business credit card lending on start-up small firms' employment and revenue growth. The dependent and explanatory variables used to answer Question 3 are, with few exceptions, similar to those used in the SSBF analysis. The two most important differences are:

- In the KFS, business credit card use was defined as the year-end outstanding balance on owners' business credit cards.
- While KFS did not include macroeconomic data, it did allow for merging external data, such as state-level unemployment rates, and other regional factors.

6.2 Methodology

Using a representative sample of start-up small businesses, this analysis used statistical methods to determine the marginal impact of small business credit card lending on start-up firms' revenue and employment levels. Several panel data models were considered for estimating the effects of credit card usage on employment and revenue growth. The length of the panel (i.e., the number of years over which individual firms were observed) averaged 2.3 years. This precluded the use of fixed effects estimation, because of the consequent lack of variation within firms across the surveyed years. Given this fact, and the exogeneity of the explanatory variables, both a pooled average model and random effects model were tested.

The KFS has an inherent survivorship bias, as firms that close are dropped from the survey. To avoid sample selection issues that may have lead to inconsistent estimates, this study looked

¹⁵ Missing values cause observations to drop out of the regression analysis. Therefore, in order to compute these aggregates and not lose a significant portion of the sample, this study assumed that if one value in a group of financial statistics (e.g. loans, assets, etc.) for any given observation were a real value, then any other missing value in that group should be considered a zero. For example, if the owner reported \$1,000 in business credit card debt (i.e., a credit card in their name, but used solely for business purposes), but no response was provided for the balance on a corporate credit card (a credit card bearing the name of the business itself), then it was assumed that the balance on the corporate card was equivalent to zero.

only at firms which survived for the entire four-year period of the panel. Further imbalances in this subsample were assumed to be random.¹⁶

The effect of credit card usage on employment and revenue growth was estimated using equations 3 and 4. As with the analysis of the SSBF data above, these equations explain the growth in current revenue and employment as a function of business credit card borrowing, other financial factors, human capital factors and regional macroeconomic conditions. The explanatory variables used in the small business start-up models are generally analogous to those used in the analysis of the SSBF data. For the reasons mentioned above, the following models were evaluated on firms who succeeded during all four years of the survey. As such, the results can be interpreted as describing the relationship between factors of small business growth for firms who survived in their infancy.

$$\begin{aligned} \text{Number of Employees} = & \text{Credit Card Credit} + \text{Revenue} + \text{Positive Net} \\ & \text{Income} + \text{Negative Net Income} + \text{Long-term Assets} + \text{Short-term Assets} \\ & + \text{Industry} + \text{Owner's Age} + \text{Owner's Education} + \text{Owner's Experience} + \\ & \text{Number of Owners} + \text{State Unemployment Rate} \end{aligned} \quad [3]$$

$$\begin{aligned} \text{Revenue} = & \text{Credit Card Credit} + \text{Number of Employees} + \text{Positive Net} \\ & \text{Income} + \text{Negative Net Income} + \text{Long-term Assets} + \text{Short-term} \\ & \text{Assets} + \text{Industry} + \text{Owner's Age} + \text{Owner's Education} + \text{Owner's} \\ & \text{Experience} + \text{Number of Owners} + \text{Hours Worked (Primary Owner)} + \\ & \text{State Unemployment Rate} \end{aligned} \quad [4]$$

Table 9 describes the variables used in the regression analysis along with a list of any transformations made to the data series.

¹⁶ Among the challenges presented in using the KFS dataset was the large number of missing values for key variables in the regressions. After accounting for the selection of a subsample of firms, and the large number of observations dropped due to missing data, the regression analysis was based on approximately 10% of the original sample. This leads to concerns regarding proper weighting and the consistency of the regression estimates. When using complex survey data such as the KFS it is generally appropriate to use weights when doing regression analysis. Because there is little consensus on an optimal approach to the challenge caused by uneven weighting due to sample selection, this study follows the recommended procedure of running the regressions using the longitudinal weights provided in the dataset.

Table 9. Description of Model Variables

Variable Name	Description	Transformations
Number of Employees	Total employees including owners	Natural log
Business Credit Card Credit	Total credit card balance (corporate and business) at time of survey	Natural log
Revenue	Total annual revenue	Natural log
Positive Net Income	Interaction term, 1 if net income was positive, 0 if negative	Interaction
Negative Net Income	Interaction term, 1 if net income was negative, 0 if positive	Interaction
Long-term Assets	Total long-term assets	Natural Log
Short-term Assets	Total short-assets	Natural log
Industry	Dummy variable: 1 for services firms and 0 for manufacturers	Binary variable
Owner's Age	Primary owner's age in years	None
Owner's Education	Primary owner's level of education	None
Owner's Experience	Primary owner's years of experience	None
Hours Worked	Hours worked by primary owner per week	None
Number of Owners	Number of owners per firm	None
State Unemployment Rate	State unemployment rate	None

Financial factors controlled for the size and financial stability of firms, while human capital characteristics and the number of owners control for age, education, experience, and potential client network size. Finally, geographic and macroeconomic factors helped to control for the business environment affecting each firm.¹⁷ By controlling for these various factors, the model isolated the potential change in revenue and employment associated with a corresponding change in credit card use.¹⁸

6.3 Results

The estimates for the impact of business credit card use on revenue growth were statistically significant in regressions run on the KFS data. As shown in Table 10, the elasticity of start-up revenue with respect to a change in credit card credit was 0.116 and was significant at the .001 level (i.e., for every 1% change in credit card usage there was, on average, a 0.116% increase in revenues, holding all else constant). These results were relatively robust and lend support to the estimates derived above using the Federal Reserve's Survey of Small Business Finance.¹⁹

¹⁷ State dummy variables and state level unemployment were included in the models. Most state dummy variables were significant, but are not reported in the regression tables.

¹⁸ A detailed discussion of the explanatory variables used for these models was presented in section 4.1 above.

¹⁹ The regression analysis using the KFS data yielded results which were relatively robust to variations in weighting and assumptions about autocorrelation structures. The estimates presented above are the results of a pooled average model which assumed equicorrelated errors. This model was chosen because it allowed the use of weights, and utilized

Table 10. Kauffman Start-Up Firm Revenue Panel Regression Results

Revenue	β	Std. Err.	z	P> z	[95% Conf. Interval]	
Business Credit Card Credit	0.116	0.028	4.190	0.000	0.062	0.170
Number of employees	0.584	0.051	11.380	0.000	0.484	0.685
Positive Net Income	-0.002	0.005	-0.400	0.692	-0.012	0.008
Negative Net Income	0.031	0.004	7.190	0.000	0.022	0.039
Long-term Assets	0.041	0.012	3.450	0.001	0.018	0.065
Short-term Assets	0.170	0.027	6.300	0.000	0.117	0.223
Industry	-0.322	0.100	-3.230	0.001	-0.518	-0.127
Owner's Age	0.007	0.005	1.370	0.169	-0.003	0.016
Owner's Education	0.304	0.091	3.340	0.001	0.125	0.483
Owner's Experience	0.005	0.005	1.050	0.293	-0.004	0.014
Number of Owners	0.016	0.006	2.630	0.009	0.004	0.028
Hours Worked (Primary Owner)	0.014	0.003	5.210	0.000	0.009	0.019
State Unemployment Rate	-0.055	0.046	-1.210	0.227	-0.145	0.034
Constant	7.184	0.475	15.130	0.000	6.253	8.114

N = 2,734

R-Squared not reported for pooled regression; Wald chi(2) p-value = 0.000

All of the explanatory variables – excluding negative income, age, experience, and unemployment rate – were significant. The direction of the significant coefficients was as expected. Firms with a greater number of employees, higher profits, more assets, higher efficiency of asset use, more owners, more educated owners, or owners who work longer hours will, on average, have higher revenues.

Table 11 presents the results of a panel regression model with total employment as a function of financial, human capital, and macroeconomic factors. The coefficient on business credit card balance was positive, but significant only at a 6% level.²⁰

The directions of the coefficients on other independent variables were as expected. Firms with greater profits and revenues were more likely to have a greater number of employees. Likewise, higher long-term assets are associated with higher employment levels. One would expect firms that invest in fixed capital to hire more employees to utilize those assets. However, the magnitude of the coefficients was questionable.²¹

Other factors that significantly impacted start-up firms' employment were:

a more parsimonious error correlation structure. Additional regression results, including those from a random effects model are presented in Appendix B.

²⁰ The results for the employment model were not particularly robust, as they varied across alternative model specifications.

²¹ In particular, the coefficient on revenue suggests a much higher revenue/employee threshold for hiring additional workers relative to the average revenue/employee for start-up firms in the survey.

- *Short-term Assets*: This variable was a dominant factor in the employment model. Firms' most liquid assets (cash, accounts receivable, and inventory) are directly associated with current business activity, and the need to employ a larger work force.
- *Net Income*: The original hypothesis was that more profitable firms would hire more employees. The results suggest this was true for firms showing a profit, but firms with larger losses also appeared to be employing more labor. This may make sense when viewed from the perspective that larger firms on average have a higher level of net income, whether it be a profit or loss.
- *State Unemployment Rate*: As expected, firms in states with higher unemployment rates had fewer employees. For every 1% increase in the state unemployment rate, start-up firms, on average, employed 0.049% fewer workers. Again, the direction of the change was as expected, but the magnitude of the effect was too small (i.e. it would be expected that for every 1% increase in the unemployment rate there would be a greater than 1% decrease in a small business' employment level).

Table 11. Kauffman Start-Up Firm Employment Panel Regression Results

Number of Employees	β	Std. Err.	z	P> z	[95% Conf. Interval]	
Business Credit Card Credit	0.025	0.013	1.900	0.058	-0.001	0.051
Revenue	0.101	0.013	7.860	0.000	0.076	0.126
Positive Net Income	-0.007	0.001	-4.470	0.000	-0.009	-0.004
Negative Net Income	0.004	0.001	2.740	0.006	0.001	0.006
Long-term Assets	0.009	0.005	2.050	0.041	0.000	0.019
Short-term Assets	0.036	0.008	4.350	0.000	0.020	0.052
Industry	-0.001	0.057	-0.020	0.984	-0.113	0.111
Owner's Age	-0.003	0.003	-1.260	0.208	-0.008	0.002
Owner's Education	0.047	0.070	0.680	0.499	-0.090	0.184
Owner's Experience	0.002	0.003	0.670	0.504	-0.003	0.007
State Unemployment Rate	-0.048	0.017	-2.850	0.004	-0.082	-0.015
Constant	-1.014	0.236	-4.300	0.000	-1.476	-0.552

N = 2,740

R-Squared not reported for pooled regression; Wald chi(2) p-value = 0.000

VII. Conclusions for Policymakers

Small businesses employ 50% of the private sector economy, and have been responsible for 65% of new jobs created in the past 15 years. One of the primary growth challenges faced by small firms is access to credit. Even during periods of economic stability, small businesses face credit constraints due to market imperfections (e.g., information asymmetries, agency problems) that result in unfavorable risk-return trade-offs for lenders — requiring them to demand small firms to pay high premiums.

The percentage of small businesses using business credit cards has steadily increased over the past decade, and the majority of small businesses now use business cards for short-term financing. For example, according to the Federal Reserve's Survey of Small Business Finances, 48% of small firms used business cards in 2003, up from 34% in 1998. According to a National Federation of Independent Businesses survey, 74% of small employers had a business credit card

in 2008. During the credit crisis, this figure dropped to 64% (NFIB, 2010) in 2009, although small firms were far more likely to meet their capital needs through credit cards as compared with more traditional loans.

This study shows a positive link between small firms' use of business cards and employment and output. Furthermore, small business sector growth associated with expanded use of business credit cards has had a significant positive impact on the entire U.S. economy. Specifically, based on the empirical analysis discussed above:

- (1) At the firm level, there is a positive and statistically significant relationship between small businesses' use of business credit cards and their level of employment and revenue.*
- (2) At the national level, the 36% expansion of business credit card use in the five-year period from 2003 to 2008 is associated with the creation of approximately 1.6 million jobs, and the creation of \$289 billion in U.S. output and \$142 billion in national value-added.*
- (3) There is also evidence of a positive statistical relationship between the use of business credit card financing and the revenue growth of start-up small businesses.*

Given strong evidence of a link between business credit cards and job creation, policymakers should exercise care when considering regulations which may restrict small firms' access to credit. Policies that would potentially limit access to business credit cards would likely limit growth opportunities for all small businesses. The evaluation of any policy proposal should carefully quantify the benefits of credit card legislation and weigh them against the real financial and economic costs placed on small businesses and the communities that depend on them.

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APPENDIX A:
SSBF REGRESSION RESULTS FOR FIRMS WITH 50 EMPLOYEES OR LESS

Appendix A presents regression results using the SSBF data for firms with 50 or fewer employees. The results are comparable to the models applied broadly to all small firms. The multiple imputation technique (described above) was used to combine results across the SSBF's five imputed data sets into one inference.

**Table A1. SSBF Multiple Imputation Regression Model on Small Firm Employment
(Firms with 50 or fewer employees)**

Number of Employees	β	Std. Error	t	P> t 	[95% Conf. Interval]	
Business Credit Card Credit	0.037	0.012	3.02	0.00	0.013	0.060
Revenue	0.167	0.020	8.32	0.00	0.128	0.207
Positive Net Income	-0.002	0.001	-2.31	0.02	-0.003	0.000
Negative Net Income	0.000	0.001	-0.26	0.80	-0.003	0.002
Net Margin	-0.002	0.000	-6.55	0.00	-0.003	-0.002
Assets	0.034	0.016	2.13	0.03	0.003	0.065
Loans	-0.010	0.012	-0.79	0.43	-0.034	0.015
Owner's Age	-0.001	0.002	-0.29	0.77	-0.005	0.003
Owner's Education	-0.009	0.008	-1.04	0.30	-0.025	0.008
Owner's Experience	0.000	0.002	-0.10	0.92	-0.004	0.004
Industry	-0.004	0.035	-0.11	0.92	-0.073	0.065
Number of Owners	0.073	0.003	26.72	0.00	0.068	0.078
Constant	-1.518	0.221	-6.86	0.00	-1.952	-1.084

N = 1,121

R-squared not reported in multiple imputation estimations. The R-Squared on estimations performed on individual imputations ranged from 0.4206 to 0.42081

**Table A2. SSBF Multiple Imputation Regression Model on Small Firm Revenue
(Firms with 50 or fewer employees)**

Revenue	β	Std. Error	t	P> t 	[95% Conf. Interval]	
Business Credit Card Credit	0.146	0.023	6.23	0.00	0.100	0.192
Positive Net Income	0.012	0.001	8.48	0.00	0.009	0.015
Negative Net Income	-0.005	0.003	-1.86	0.06	-0.010	0.000
Net Margin	0.015	0.000	52.64	0.00	0.014	0.015
Assets	0.197	0.032	6.08	0.00	0.133	0.260
Number of Employees	0.616	0.063	9.74	0.00	0.492	0.740
Loans	0.053	0.024	2.21	0.03	0.006	0.100
Owner's Age	0.002	0.004	0.40	0.69	-0.006	0.009
Owner's Education	0.014	0.016	0.86	0.39	-0.018	0.046
Owner's Experience	0.005	0.004	1.25	0.21	-0.003	0.013
Industry	0.062	0.073	0.84	0.40	-0.081	0.204
Number of Owners	0.004	0.006	0.64	0.53	-0.008	0.015
Constant	7.093	0.338	21.01	0.00	6.431	7.756

N = 1,121

R-squared not reported in multiple imputation estimations. The R-Squared on estimations performed on individual imputations ranged from 0.80643 to 0.80814

APPENDIX B:
ALTERNATIVE SPECIFICATIONS OF REGRESSIONS USING KFS DATA

Appendix B presents regression results for revenue models using the Kauffman Firm Survey. Due to concerns that results may not have been robust with respect to the application of sample weights, and assumptions about the form of error correlation structures, the following models were tested. The coefficient on business credit card credit is consistently positive and highly significant.

Table B1. Pooled Average Regression on Small Firm Revenue

Error Structure: Equicorrelated
Weighting Scheme : None

Revenue	β	Std. Err.	Z	P> z	[95% Conf. Interval]	
Business Credit Card Credit	0.085	0.024	3.570	0.000	0.039	0.132
Number of employees	0.622	0.042	14.750	0.000	0.539	0.704
Positive Net Income	0.000	0.004	0.020	0.984	-0.008	0.008
Negative Net Income	0.030	0.003	9.750	0.000	0.024	0.036
Long-term Assets	0.042	0.010	4.340	0.000	0.023	0.061
Short-term Assets	0.178	0.021	8.640	0.000	0.137	0.218
Industry	-0.293	0.081	-3.600	0.000	-0.452	-0.134
Owner's Age	0.008	0.004	2.050	0.040	0.000	0.016
Owner's Education	0.229	0.080	2.860	0.004	0.072	0.386
Owner's Experience	0.001	0.004	0.170	0.863	-0.007	0.009
Number of Owners	-0.015	0.020	-0.750	0.451	-0.053	0.024
Hours Worked (Primary Owner)	0.019	0.002	7.800	0.000	0.014	0.024
State Unemployment Rate	-0.090	0.040	-2.230	0.026	-0.169	-0.011
Constant	7.666	0.459	16.700	0.000	6.766	8.565

N = 3,352

R-Squared not reported for pooled regression; Wald chi(2) p-value = 0.000

Table B2. Pooled Average Regression on Small Firm Revenue

Error Structure: Unstructured
Weighting Scheme : KFS weights

Revenue	β	Std. Err.	Z	P> z	[95% Conf. Interval]	
Business Credit Card Credit	0.104	0.027	3.900	0.000	0.052	0.156
Number of employees	0.594	0.051	11.580	0.000	0.494	0.695
Positive Net Income	-0.002	0.005	-0.360	0.717	-0.011	0.008
Negative Net Income	0.029	0.004	6.840	0.000	0.021	0.038
Long-term Assets	0.043	0.012	3.760	0.000	0.021	0.066
Short-term Assets	0.164	0.026	6.300	0.000	0.113	0.215
Industry	-0.338	0.101	-3.360	0.001	-0.536	-0.141
Owner's Age	0.006	0.005	1.160	0.246	-0.004	0.015
Owner's Education	0.308	0.090	3.430	0.001	0.132	0.483
Owner's Experience	0.006	0.005	1.260	0.207	-0.003	0.015
Number of Owners	0.012	0.007	1.760	0.078	-0.001	0.026
Hours Worked (Primary Owner)	0.014	0.003	5.280	0.000	0.009	0.019
State Unemployment Rate	-0.033	0.043	-0.780	0.436	-0.118	0.051
Constant	7.214	0.452	15.980	0.000	6.329	8.100

N = 2,734

R-Squared not reported for pooled regression; Wald chi(2) p-value = 0.000

APPENDIX B:
ALTERNATIVE SPECIFICATIONS OF REGRESSIONS USING KFS DATA

Table B3. Pooled Average Regression on Small Firm Revenue

Error Structure: Unstructured
Weighting Scheme : None

Revenue	β	Std. Err.	z	P> z	[95% Conf. Interval]	
Business Credit Card Credit	0.078	0.024	3.310	0.001	0.032	0.124
Number of employees	0.622	0.042	14.780	0.000	0.540	0.705
Positive Net Income	0.000	0.004	-0.040	0.968	-0.008	0.007
Negative Net Income	0.030	0.003	9.750	0.000	0.024	0.036
Long-term Assets	0.042	0.010	4.420	0.000	0.023	0.061
Short-term Assets	0.175	0.020	8.750	0.000	0.136	0.214
Industry	-0.305	0.082	-3.730	0.000	-0.466	-0.145
Owner's Age	0.007	0.004	1.830	0.068	-0.001	0.015
Owner's Education	0.224	0.080	2.810	0.005	0.068	0.380
Owner's Experience	0.001	0.004	0.340	0.736	-0.007	0.009
Number of Owners	-0.016	0.020	-0.830	0.406	-0.055	0.022
Hours Worked (Primary Owner)	0.019	0.002	8.020	0.000	0.015	0.024
State Unemployment Rate	-0.072	0.039	-1.830	0.067	-0.148	0.005
Constant	7.710	0.462	16.680	0.000	6.804	8.616

N = 3,352

R-Squared not reported for pooled regression; Wald chi(2) p-value = 0.000

Table B4. Random Effects Regression on Small Firm Revenue

Error Structure: Equicorrelated
Weighting Scheme : None

Revenue	β	Std. Err.	z	P> z	[95% Conf. Interval]	
Business Credit Card Credit	0.085	0.023	3.770	0.000	0.041	0.130
Number of employees	0.598	0.043	14.060	0.000	0.515	0.681
Positive Net Income	0.002	0.004	0.490	0.622	-0.005	0.009
Negative Net Income	0.029	0.003	8.430	0.000	0.022	0.035
Long-term Assets	0.034	0.010	3.550	0.000	0.015	0.053
Short-term Assets	0.143	0.018	7.800	0.000	0.107	0.179
Industry	-0.350	0.103	-3.400	0.001	-0.552	-0.148
Owner's Age	0.017	0.005	3.170	0.002	0.006	0.027
Owner's Education	0.255	0.097	2.620	0.009	0.065	0.445
Owner's Experience	-0.002	0.005	-0.320	0.748	-0.012	0.008
Number of Owners	-0.002	0.019	-0.130	0.900	-0.040	0.035
Hours Worked (Primary Owner)	0.019	0.003	7.090	0.000	0.013	0.024
State Unemployment Rate	-0.098	0.035	-2.800	0.005	-0.167	-0.030
Constant	7.859	0.854	9.200	0.000	6.185	9.534

N = 3352

R-Squared not reported for pooled regression; Wald chi(2) p-value = 0.000

APPENDIX C:
KEYBRIDGE RESEARCH PROJECT TEAM

Robert F. Wescott is President of Keybridge Research LLC. Dr. Wescott has nearly 30 years of professional experience working on macroeconomic, financial, and public policy issues. He served for four years as Special Assistant to the President for Economic Policy at the National Economic Council at the White House and as Chief Economist at the President's Council of Economic Advisers. From 1994-98 Dr. Wescott was Deputy Division Chief in the Research Department of the International Monetary Fund, where he did research on global economic risks and policy challenges. He also was an official in the Fund's European Department. From 1982-93, he was Senior Vice President and Chief U.S. Economist at WEFA Group (today IHS Global Insight), a private economic modeling and analysis firm, where he was responsible for all economic modeling, forecasting, and consulting operations. In 1989-90, he helped the University of Pennsylvania establish the International Centre for the Study of East Asian Development in Kitakyushu, Japan. Dr. Wescott holds a Ph.D. in Economics from the University of Pennsylvania.

Adam Karson is Senior Economist at Keybridge Research LLC. Mr. Karson specializes in international economics, finance, and investment analysis. Before joining Keybridge, Mr. Karson spent three years at Booz Allen Hamilton as a consultant to U.S. Federal government and private sector clients, where he focused on economic and regulatory impact studies and worked extensively in the Middle East. From 2001 to 2004, he worked with The Capital Group Companies, a major global investment firm, and performed research and valuations for equity and fixed income securities, gaining international experience in London and Geneva. Mr. Karson holds a Bachelor's degree, with Honors, in Economics from Johns Hopkins University and a Master's degree in Public Policy from Duke University.

Ryan McCann is Senior Analyst at Keybridge Research LLC. Prior to joining Keybridge, Mr. McCann worked at the Massachusetts Institute of Technology Center for Real Estate, where he helped develop the Center's Housing Affordability Index. Mr. McCann has lived and worked in the Middle East, Spain and Ecuador. He holds a Bachelor's degree in Mathematics from Saint Anselm College in Manchester, NH, and a Master's Degree in Economics from Tufts University.

Elizabeth Phillips is Research Assistant at Keybridge Research LLC. Before joining Keybridge, Elizabeth worked with an Indian microfinance organization in Bangalore. She has conducted independent research in the Philippines with a Fulbright Grant and has taught an economic development course on microfinance methodologies at the Ateneo de Manila University. Elizabeth holds a Bachelor's degree in Economics and International Studies from Rhodes College.