

Contents lists available at [SciVerse ScienceDirect](#)

Journal of Business Research



Who benefits most? The effects of managerial assistance on high- versus low-performing small businesses

Joo Hwan Seo ^{a,*}, Vanessa G. Perry ^a, David Tomczyk ^b, George T. Solomon ^c

^a The George Washington University School of Business, Department of Marketing, Funger Hall, Suite 301, Washington, DC 20052, United States

^b Quinnipiac University School of Business, 275 Mount Carmel Avenue, Hamden, CT 06518, United States

^c The George Washington University School of Business, Department of Management, Duquès Hall, Office 315D, Washington, DC 20052, United States

ARTICLE INFO

Article history:

Received 20 October 2011

Accepted 26 January 2012

Available online xxxx

Keywords:

Technical assistance

Small business performance

Primary and secondary business functions

Quantile regression

ABSTRACT

This study investigates the relationship between outside managerial assistance and small business performance using a conditional quantile regression approach. The model was tested using a sample of 902 ventures that received managerial or technical assistance from the U.S. Small Business Administration's Entrepreneurial Development Resource Partners. Results show that outside assistance for primary business functions, such as marketing strategy, promotional strategy, financial management and general management, is more effective for firms with lower levels of financial performance. Outside assistance for secondary business functions, such as human resources and obtaining capital, is likely to have a greater impact on firms in the middle- to upper-quantile levels. Based on the results, we propose that managerial outside assistance providers should employ different approaches for firms with lower versus higher levels of financial performance.

© 2012 Elsevier Inc. All rights reserved.

1. Introduction

According to prior studies in entrepreneurship, public-sector entrepreneurial assistance programs have had positive influence on new venture creation by improving the capabilities of their founders (Gatewood, 1993). In addition, these programs may positively affect a venture's success by leading to revenue and employment growth that exceeds national averages. However, because these public-sector management and technical assistance programs are expensive and rely upon public funds, evaluation of these programs remains a consistent focus of scholars and policymakers. U.S. government oversight agencies such as the Office of Management and Budget are required to provide analysis and policy recommendations pertaining to programmatic funding. Both advocates and critics of entrepreneurship programs, including researchers, policymakers, and the U.S. Small Business Administration (SBA), are interested in determining whether outside assistance has a significant economic impact. Although the outcomes of these programs have been a subject of debate (e.g. Wood, 1994), researchers have argued that outside assistance programs for less-experienced entrepreneurs lead to the creation and development of sustainable competitive advantage (Chrisman & McMullan, 2004; Chrisman, McMullan, & Hall, 2005).

Thus, previous studies have acknowledged the value of and need for managerial outside assistance. In general, these studies have found that

entrepreneurial assistance programs improve the abilities and problem-solving skills of individuals pursuing the venture-creation process (Lang & Golden, 1989). Outside assistance programs are shown to not only help entrepreneurs develop knowledge for their nascent ventures, but also assist them once they begin and are fully functioning (Chrisman, Hoy, & Robinson, 1987). Effective management and technical assistance (face-to-face counseling) have been shown to help small businesses overcome their weaknesses and to implement appropriate managerial functions (Chrisman et al., 2005; West & Noel, 2009). Although a number of articles have attempted to account for the helpfulness of assistance programs as a knowledge resource, such studies tend to focus on generalities rather than the specific needs of individual firms.

Recognizing the specific needs of individual firms is important for a simple reason—they are fundamentally different from one another in a number of areas such as entrepreneurial skills, experiences, history, values, strategies, and industry structures (Chrisman, Bauerschmidt, & Hofer, 1998). In other words, all ventures are heterogeneous and the resource needs of each venture are idiosyncratic (Alvarez & Busenitz, 2001; Lichtenstein & Brush, 2001; West & Noel, 2009), and all ventures have individual specific resources to lead to the heterogeneous outputs (Alvarez & Busenitz, 2001). Thus, this study focuses on specific outside assistance programs seen as a knowledge resource.

The current study builds on existing research by examining the effects of outsider assistance on small businesses at different levels of performance. We propose that the different levels of firm performance are a function of managerial assistance, along with key firm and owner characteristics. This paper begins with a brief review of the managerial

* Corresponding author. Tel.: +1 217 766 1693; fax: +1 202 994 8999.

E-mail addresses: joochwans@gwu.edu (J.H. Seo), vperry@gwu.edu (V.G. Perry), David.Tomczyk@quinnipiac.edu (D. Tomczyk), gsolomon@gwu.edu (G.T. Solomon).

assistance literature to summarize the existing theory of knowledge resources for small businesses as well as the limitations of these resources.

2. Theoretical framework

Unlike large companies, most entrepreneurs have less experience, knowledge and history in business (Chrisman et al., 2005; West & Noel, 2009). As a result, they devise simple strategies in complex circumstances (Alvarez & Busenitz, 2001). Even when entrepreneurs have considerable business experience, knowledge gaps can persist. These knowledge gaps may appear in a range of areas, including finance, marketing, accounting, employee management, staff recruitment, and the gathering of information about competitors and customers (Chrisman & McMullan, 2004; Chrisman et al., 2005; Zahra, Neubaum, & Larrañeta, 2007).

Although entrepreneurs are ready to learn, external knowledge from consultants is not free, and entrepreneurs are often unable to afford private consultants for valuable information or advice to improve performance. However, the accumulation of knowledge can potentially increase a venture's sustainability and competitiveness as entrepreneurs become better equipped to handle a range of managerial problems (Olavarrieta & Friedmann, 2008; Sullivan & Marvel, 2011). Outside assistance programs, whether in the nascent, start-up, or operating phase, can also help entrepreneurs reduce their knowledge gaps in specific areas (Chrisman & McMullan, 2004; Chrisman et al., 2005). Furthermore, learning and knowledge can help them avoid uncertainty and promote advantageous venture outcomes (Alvarez & Busenitz, 2001; Chrisman et al., 2005; Wu and Shanley, 2011).

Prior studies have investigated the relationship between venture performance and specific knowledge resources such as financial management (Ladzani & Van Vuuren, 2002), and human resource management (Haber & Reichel, 2007). Other outside assistance programs broadly cover how to set up a business, how to manage aspects of human resources, development, competition, and the use and adaptation of technology (West & Noel, 2009; Wiklund & Shepherd, 2003).

However, according to Alvarez and Busenitz (2001), entrepreneurs need specialized disparate knowledge; not only are firms heterogeneous, but distinct knowledge allows them to better select appropriate markets and engage in production. Through direct observation or hands-on experience leading to both explicit and tacit knowledge, they will be able to exploit existing opportunities and succeed (Minniti & Bygrave, 2001; West & Noel, 2009). Specifically, when outside assistance programs help entrepreneurs learn by doing by providing guidance and specific feedback, entrepreneurs will be more likely to gain the specific knowledge necessary for the implementation of appropriate strategies (Chrisman & McMullan, 2000).

We assume that these outside programs would have a positive impact on not only new ventures, but also established businesses. We believe that the numerous types of outside assistance programs have an impact on performance based on the specialized disparate knowledge resources they provide, as well as assistance related to marketing strategy, promotional strategy, financial management, and general management, which is beneficial for all firms. Since lower-performing firms are more likely to have more limitations regarding core knowledge, the ability to receive new knowledge, and the ability to hire outside counselors, the core knowledge areas should lead to an improvement in performance for them. In contrast, higher-performing firms are more likely to have that core knowledge, which has probably contributed to their current success. However, they may still face knowledge gaps related to other internal and supportive information. Thus, we posit that there is a significant relationship between the types of outside assistance as a knowledge resource and the different levels of performance.

Outside assistance programs for entrepreneurs are designed to help business owners identify problems and gain entrepreneurial

knowledge in areas such as purchasing equipment, creating alliances, selling their products, and hiring staff—consequently saving time and money (Ladzani & Van Vuuren, 2002). Managerial outside assistance has been shown to be the key to the growth of small firms embarking on growth strategies (Florin, 2005). Most studies examining outside assistance over the past three decades have looked primarily at the aggregate performance effects of such assistance. For example, Chrisman (1999), Chrisman and McMullan (2000, 2004), and West and Noel (2009) evaluate the effectiveness of assistance programs—most commonly SBDCs, although others have been included as well—in this light and determined that the programs are effective. As a result, outside assistance programs should help entrepreneurs acquire more comprehensive managerial knowledge. Therefore, outside assistance programs should have a positive impact on the venture development process (Chrisman & McMullan, 2004; Chrisman et al., 2005). We thus expected to see a positive relationship between more knowledge resources and higher performance.

Hypothesis 1. Managerial outside assistance programs as knowledge resources have positive effects on firm performance.

Several studies have also examined how the specific types of training—such as accounting (Ho & Mula, 2004), finance (Deeds, Decarolis, & Coombs, 1997; Ladzani & Van Vuuren, 2002), marketing (Pearce & Michael, 1997), obtaining capital (Florin, 2005), and start-up, operating, and expansion issues—have affected small business performance. These studies have generally evaluated the impact of the assistance in very specific ways. For example, Ho and Mula (2004) defined business performance as net profit and owner's remuneration.

Rummler and Brache (1995) discuss assistance relating to two categories: primary business functions and secondary business functions, with primary functions related to the core business and resulting in a product or service received by the firm's external customers, and secondary functions related to supporting and operating issues such as capital development, human resources, and international trade. Primary business functions encompass management, strategic, and administrative processes, from marketing and promotional strategy to financial and general management. In addition, previous literature has recognized the importance of marketing strategy, promotional strategy, and financial and general management in the development of entrepreneurial ventures (Brinckmann, Salomo, & Gemuenden, 2011; Coviello, Brodie, & Munro, 2000; Rasmussen & Sørheim, 2006).

Fig. 1 represents our framework for understanding outside assistance programs. In previous research, managerial outside assistance programs were shown to uniformly impact firm performance. In contrast, we propose that the effects of managerial outside assistance will vary based on the type of assistance (i.e., assistance with primary versus secondary business functions) and the firm's level of performance.

Hypothesis 2. The effects of managerial outside assistance will vary depending on the level of firm performance. In other words, the effects of managerial assistance will differ between low-, middle- and high-quantile levels.

Marketing support effectively increases sales, breadth of production and geographic coverage to improve performance (Pearce & Michael, 1997; Soriano, 2010). A marketing strategy is necessary for the development of a small business in order to emphasize the product and service offering, to engage with primary customers, and to strongly invest in personal relationships (Coviello et al., 2000). In addition, promotional strategy positively relates to firm performance and positively influences societal attitudes about entrepreneurship. The relationship between promotional strategy and firm performance is stronger in more dynamic environments (Wallace, Little, Hill, & Ridge, 2010). Also, there is evidence that

		Business Function	
		Primary	Secondary
Quintile	Low	High Impact	Low Impact
	High	Uniform and Low Impact	High Impact

Fig. 1. Framework: effects of training for primary business functions vs. secondary business functions based on firm performance level.

the promotion of resource-based value and family-based brand identity affects firm performance (Craig, Dibrell, & Davis, 2008).

Financial management activities such as financial operations, awareness of financial risks, strategic financial planning and financial control of contributions positively relate to small business growth (Brinckmann et al., 2011). Financial management training provides finance transformation, control optimization, regulatory compliance and process standardization. Finances also have the strongest relation to growth willingness in entrepreneurship (Hood & Young, 1993). Thus, we believe that technical assistance in the financial management area should be strongly associated with firm performance.

Typically, general management involves four basic functions (i.e., planning, organizing, activating and controlling) and six additional functions (i.e., decision making, communication, motivation, coordination, delegation and discipline) (Kroon, 1995). In general, managerial outside assistance for primary business functions is likely to have a more significant and positive impact on firms with lower levels of performance, as they generally have less access to the core knowledge. The primary business functions are likely to lead to improvement of core knowledge in venture performance.

Hypothesis 2a. Outside assistance with primary business functions (i.e., marketing strategy, promotional strategy, financial management and general management) has greater impact on firm performance than outside assistance with secondary business functions (i.e., capital acquisition, human resources and international trade) at the lower quantile levels of performance.

Hypothesis 2b. Outside assistance with primary business functions has a greater positive impact on firm performance at lower- to middle quantile levels than at middle to upper quantile levels of performance.

While assistance with primary business functions should have more impact on firms at lower performance levels, managerial outside assistance with secondary functions is more likely to have an impact on higher-performing firms. Although firms with high levels of performance usually enjoy a better understanding of primary business knowledge, they may still face knowledge gaps regarding their internal and supportive information. In terms of secondary business functions, human resources are one important function for small businesses. A higher skill level, particularly a higher degree of founders' precise business knowledge, has been associated with increased firm size, performance appraisal, and firm growth (Heneman, Tansky, & Camp, 2000; Kaman, McCarthy, Gulbro, & Tucker, 2001). Human resources are critical for success in new ventures (Unger, Rauch, Frese, & Rosenbusch,

2011; Zolin, Kuckertz, & Kautonen, 2011). In addition, owners' human resource education impacts the performance of small firms with fewer employees (Honig, 2001).

With respect to managerial outside assistance with financial capital, obtaining a loan enhances the profitability of small microenterprise firms, as the financial experience and amount of start-up capital are positively related to new small firm growth and increased firm performance (Brinckmann et al., 2011). Finally, in terms of assistance with international trade, the successful integration of new knowledge about foreign markets should be positively associated with firm performance (Zahra & Hayton, 2008).

Hypothesis 2c. Outside assistance with secondary business functions has a greater positive impact on firm performance at middle- to upper-quantile levels than at lower- quantile levels.

3. Methods

3.1. Data collection

The SBA's Office of Entrepreneurial Development designed a multi-year study to assess the effectiveness of the face-to-face entrepreneurial development (ED) programs it offered to small business clients in the previous fiscal year. SBA ED resource personnel randomly selected clients serve within a 90-day period. Surveys are sent via mail proportionate to the designated strata (nascent, start-up, and in-business). The SBA defines a *nascent* business as an individual or group that has taken one or more positive steps to start a business; *start-ups* are ventures that have been in business for 6 months or less; and *in-business firms* are those who have been in business more than 6 months and are classified as small by the SBA. The ED resource providers of technical and managerial counseling include Small Business Development Centers, SCORE and Women's Business Centers. All surveys were coded to ensure that addresses and contact information remain confidential and to assess potential bias due to nonresponse. Follow-up surveys are distributed to non-respondents 10 days after the initial survey. In addition, telephone surveys, distributed proportionately by ED resources, are conducted with non-respondents. An analysis of the telephone survey data reveals no significant bias due to non-response. Overall, the response rate was 22.5%, which is consistent with response rates found in other surveys of entrepreneurs (Aldrich and Baker, 1997; Dennis, 2003). Excluding missing data, the final useable sample was 25.17%, or 902 out of 3583 firms surveyed.

One of the concerns in previous studies has been how best to measure business performance. In this study, performance is measured based on attitudinal assessments, which were self-reported improvements in management/marketing skills, as well as growth in revenues, profits and employment. Evaluations of entrepreneurial assistance programs have relied primarily on surveys of clients (Nahavandi & Chesteen, 1988), which means reliance upon self-reported data. Brush and Vanderwerf's (1992) findings that owners' self-reported assessments of performance correlated with measures of actual performance provide some evidence of the validity of self-reported business outcome data, indicating that the self-reported performance measures used in most evaluations of government programs are not just the optimistic views of the business owners.

3.2. Dependent variable measures

The dependent variable of interest in this study is firm performance, which we define as self-reported financial growth. We measure performance using a six-item summated scale. Survey participants are asked to indicate the extent to which managerial and technical assistance impacted their firm using a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), in the areas of increased market share, increased sales, improved cash flow, increased profit margin, the hiring

of new staff, and current staff retention. The scale has a Cronbach's alpha coefficient of reliability of 0.948, indicating strong internal reliability (Cortina, 1993).

3.3. Independent variable measures

The key independent variables include the characteristics of the technical assistance received, along with characteristics of the firm and owner. In particular, respondents were asked to indicate the type of technical or managerial assistance received, such as assistance with financial management, promotional strategy, human resources, obtaining capital, marketing strategy, general management and international trade.

3.4. Control variables

We included two categories of background variables: characteristics of respondents' firms and demographic characteristics of the owner. In preliminary analyses, we included dummy variables for each of the 16 industry categories, but since these variables were not statistically-significant we omitted from subsequent estimations. We include firm age and size since they have implications for competitive practices. Firm age has been considered an indication of external legitimacy and a firm's survival power (BarNir, Gallaughner, & Auger, 2003; Murphy, Trailer, & Hill, 1996; Raju, Lonial, & Crum, 2011). Firm size is often identified with resource endowment, market presence, or competitive strength, although previous literature has not clearly defined small firm size. In this paper, small firms with less than 500 employees are examined based on the SBA's small business size standards. The SBA defines the small business in general as having fewer than 500 employees for the manufacturing industry and less than \$7 million in annual income for nonmanufacturing businesses. We also consider microfirms, defined as those employing up to nine workers (Kotey & Folker, 2007). Owners at the lower size scale can directly control work performance, which may directly relate to firm performance (Jennings & Beaver, 1997; Kotey & Folker, 2007).

In regards to demographics, we draw upon the upper echelon theory of organizations. This theory indicates that demographic characteristics, such as age, gender, and race, are associated with cognitive base, values, and perceptions (Hambrick & Mason, 1984). In addition to the respondents' demographic characteristics, we also control for firm characteristics. In particular, we look at the firm size and firm survival period. We control for firm size since respondents from larger organizations have different perceptions of performance (Gomez-Mejia, Larraza-Kintana, & Makri, 2003). A firm's size is measured according to revenue and number of employees. For revenue, we take the log transformation of self-reported annual revenue. Firms also report on the number of part-time and full-time employees using a continuous scale. Finally, for firm survival, we calculate the time from firm launch to 2007. For example, if the business started in 2000, the firm had a 7-year history.

3.5. Quantile regression research design

Many analyses of entrepreneurial outcomes have employed ordinary least squares (OLS) regression methods that generate the conditional mean of a dependent variable. OLS estimates only a single value across the distribution and can fail to capture the variation in the different quintiles. For example, OLS would be inappropriate to analyze the relationship between Major League Baseball (MLB) player wages and consumption behavior because of the wide variation of wages among the players. In this case, quantile regression that divides the players according to the wages into the conditional quantile levels would provide a more complete picture on the consumption pattern of the players.

Furthermore, OLS model assumptions are not constantly met in our study since focusing only on central tendencies of the conditional distribution can fail to capture useful firm information in the response distribution (Hao & Naiman, 2007). This is because the OLS model results are not necessarily indicative of the size and nature of these effects on all levels of the impact distribution. The performance of a small business could be significantly different from a large one due to a variety of reasons such as firm size, industry category, the year the business was founded, as well as management style. This necessitates the analysis that recognizes the fundamental heterogeneity in firms. More specifically, the transformation of inputs by outside assistance programs must produce different results according to the conditional quantile. For these reasons, we strongly believe that the OLS model based on a knowledge resource is not suitable for analyzing the effects of managerial outside assistance programs on the firm performance.

Based on the limitations of OLS and the goals of our study, we employ conditional quantile regression, which is an alternative covariate approach that solves the heterogeneity problem (Koenker & Bassett, 1978). More specifically, quantiles such as quartile, quintile and percentile describe alternative non-central positions of a distribution. Thus, quantiles can refer specifically any position of a distribution. For example, the quantile regression can demonstrate that consumption behavior of the bottom 10% of the MLB players is different from the top 10% by generating a covariate coefficient. Using conditional quantile regression, we investigate how particular quantiles of Y , that is, firm performance, are affected by explanatory variables X , which include the different types of outside assistance in the conditional quantile. Also, unlike OLS, the quantile regression requires no strong distribution assumptions and is robust in addressing large outliers in the sample (Kim & Hwang, 2011; Koenker & Hallock, 2001; Yu, 2011).

The quantile regression method as introduced by Koenker and Bassett (1978) for asymptotic normality can be written as

$$y_i = x_i' \beta_\tau + e_i, \quad (1)$$

where e_i is independent identical distribution (iid) variables with τ th at 0. We substitute the scalar u by parametric function $u(x'/\beta)$ and solved for

$$\min_{u \in \mathbb{R}^p} \sum_{i=1}^n (y_i - x_i' \beta)^2, \quad (2)$$

We assume that the τ th conditional quantile function was

$$Q_Y(\tau|x) = x' \beta_\tau, \quad (3)$$

for some parameter vector $\beta_\tau \in \mathbb{R}^p$ value. The estimate tests $\hat{\beta}_\tau$ of β_τ based on a sample of $(x_i, y_i) i = 1, \dots, n$ are presented by solving

$$\min_{\xi \in \mathbb{R}^p} \sum_{i=1}^n \rho_\tau(y_i - x_i' \beta_\tau), \quad (4)$$

where the function $\rho_\tau(u) = u(\tau - I(u < 0))$, $0 < \tau < 1$, and $I(\cdot)$ denotes the indicator function. The empirical analysis in the study considers the explanatory model for firm performance. The final model can be written as

$$Q_{y_i}(\tau_j|x_i) = \beta_0(\tau_j) + \beta_1(\tau_j)x_{i1} + \beta_2(\tau_j)x_{i2} + \dots + \beta_n(\tau_j)x_{in} \quad (5)$$

where equation y_i denotes the self-reported firm performance using items summated scale and x_i includes all independent and control variables and $I = 1, \dots, 16$. Also, τ_j is a different quantile level and $0 < \tau < 1$.

To test our propositions, we examine both the significance and size of coefficient estimates from the OLS and quantile regression models. Plots are developed to depict the impact of an independent or control variable on the dependent variable. Thirty-eight point estimates of each coefficient are analyzed at quantiles ranging from 0.05 to 0.95 in 0.05 increments.

4. Results

4.1. Respondent and firm characteristics

Table 1 presents descriptive statistics on demographics. Although the number of male (51.6%) and female (48.4%) owners is almost equal, their age distributions are quite different. For example, relative to males, the age of female owners is more concentrated between 35 and 54. Of the 437 female owners, 300 (68.5%) are in this range.

As shown in Table 2, in our sample, the average firm age is 6.6 years, with a median of 3, a minimum of <1, and a maximum of 89 years. The firms have an average of 3.8 full-time employees (median, 1; range, 0–170) and an average of 2.0 part-time employees (median, 0; range, 0–111). Many of the firms in the sample have no employees; thus, many respondents are sole proprietors. These small firms span 16 industry categories (see Table 3).

4.2. Quantile regression analysis: primary business functions

As noted above, the impact of managerial outside assistance is not uniformly distributed. In other words, there is no simple relationship between technical or managerial outside assistance and firm performance. Since the impact of managerial outside assistance is unequally distributed, we consider a quantile regression model most suitable for this study. The quantile regression model estimates firm performance as a function of the types of managerial outside assistance, including marketing strategy, promotional strategy, financial management, general management, human resources, obtaining capital, and international trade. The model also includes firm characteristics, such as the age of the firm, the number of part-time and full-time employees, and annual revenue, as well as owner characteristics, such as age and gender. Fig. 2 to Fig. 3 present the relationship between managerial outside assistance and firm performance across all quantile levels. In this graph and the ones that follow, the black dotted line represents each point quantile estimate of the coefficient. The shaded gray area represents the 90% confidence level bands for the estimated coefficients. The solid line depicts the OLS regression estimate of the mean effect, while the two dashed lines represent the 90% confidence interval for the OLS estimated coefficients.

Table 1
Respondent demographics.

Category	Variable	Male	Female	Total
Age	18–24	4	4	8
	25–34	64	52	116
	35–44	127	135	262
	45–54	148	165	313
	55–64	97	71	168
	65–74	21	10	31
	75+	3	1	4
	Total	464	438	902
	Ethnicity ^a	Hispanic/Latino	36	30
American Indian		11	10	21
Asian		20	19	39
African American		34	47	81
Native Hawaiian		3	6	9
White		375	346	721
Total		479	458	937

^a The totals for each row add to values larger than the actual number of respondents, as some respondents indicated belonging to multiple races, leading to a total of 937.

Table 2
Characteristics of responding firms.

	Age of the Firm (years)	Annual revenue (\$)	Full-time employees (n)	Part-time employees (n)
Mean	6.6	822,753	3.8	2.0
Median	3	75,000	1	0 ^a
Maximum	89	325,000,000	170	111
Minimum	0 ^b	5	0 ^a	0 ^a
Std. Dev.	8.8	10,962,883	10.2	7.3

^a Owners were not considered employees; firms with 0 employees were sole proprietorships.

^b A value of 0 indicates a launch in 2007.

As shown in Fig. 2, outside assistance with marketing strategy has a significant positive effect on firm performance, with an OLS estimate of 3.25. However, the disparity between the OLS and quantile estimates is much larger in the lower quantiles of firm performance. For example, the coefficient is 6.14 at the 12.5th conditional quantile, compared to 1.79 at the 90th conditional quantile. The relationship between outside assistance with marketing strategy and firm performance is a convex curve in the lower to middle quantile levels. This pattern of results is generally consistent with Hypothesis 2b. Thus, although marketing management support is helpful for high performers, it is much more helpful for firms with low performance than for firms with high performance.

Managerial outside assistance with promotional strategy also has a significant positive effect on firm performance. The OLS estimate of the mean effect is 1.37, but based on the quantile regression estimates, the effect on firm performance is asymmetric. That is, promotion assistance had a 2.49 coefficient value for firms performing at the 10th conditional quantile level, but a value of only 1.5 for those at the 90th conditional quantile level. Thus, the relationship for promotional strategy and firm performance is significant and positive and supported Hypothesis 2b.

Financial management assistance has a standardized OLS coefficient of 2.88, which can be interpreted as the mean effect of financial management assistance on firm performance. However, the quantile regression results showed a much more interesting picture. In the lowest quantile of the distribution of firm performance, the size of the coefficient is 7.58, compared to 1.60 in the uppermost quantile. Thus, firms reporting low performance perceive more benefits from financial management assistance than high-performance firms. Relying on the OLS estimate obscures this effect; only by examining each quantile did this pattern emerge. Also, the pattern is similar to that of marketing strategy, with a plot that is a convex curve in the lower to middle quantile levels

Table 3
Firm industries of respondents.

Industry	Number	Percentage
Construction	70	8.5
Manufacturing	63	7.7
Consulting	86	10.5
Wholesale	42	5.1
Finance, insurance, real estate	27	3.3
Entertainment	18	2.2
Retail	153	18.6
Restaurant	29	3.5
Engineering	13	1.6
Publishing	14	1.7
Education	23	2.8
Service	164	20.0
Health care	43	5.2
Day care	36	4.4
Transportation	13	1.6
Computer systems	27	3.3
Total	821 ^a	100%

^a The final sample is 902, but the industry sample is 821, as a portion of the respondents did not indicate their industry.

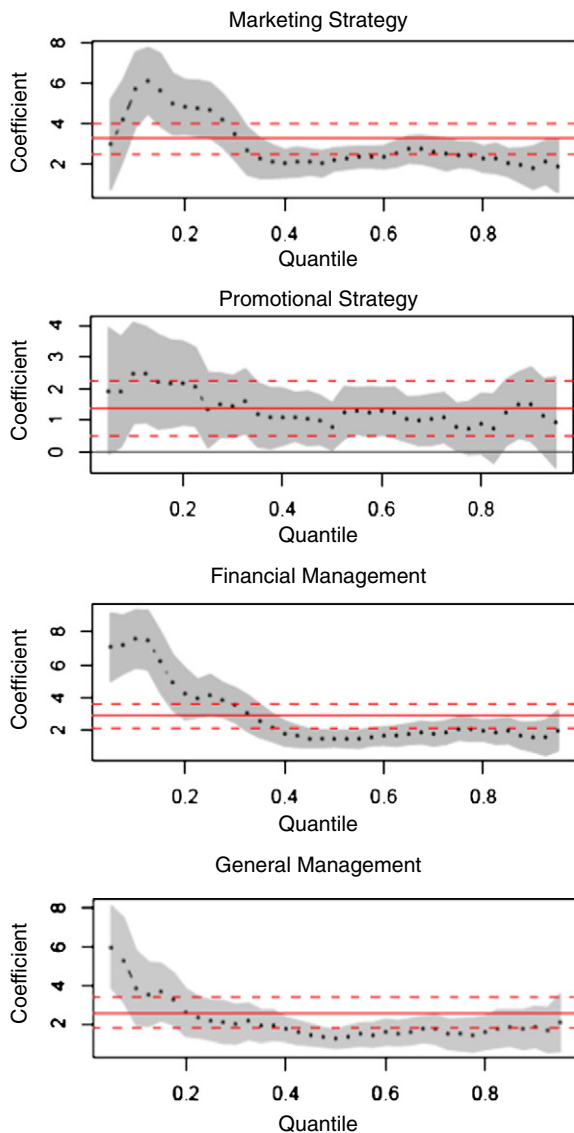


Fig. 2. Outside assistance for primary business function and firm performance.

but largely uniform in the middle- to upper-quantile levels. Results are consistent overall with [Hypothesis 2b](#).

Finally, general management assistance has a pattern similar to that of financial management. Although the OLS estimates show the average impact of the training as 2.58, the quantile regression result starts significantly higher than this level for the firms at the lower-quantile levels of firm performance (3.875) and decreases to 1.852 for firms at the medium and higher levels, $\tau = [0.75, 0.95]$. General management assistance has a positive and significant relationship with firm performance at all quantile levels, but the relationship is a concave curve in the lower to middle quantile levels. This pattern is consistent with [Hypotheses 2a and 2b](#). Thus, all the patterns relate to the primary business functions are consistent with [Hypotheses 1, 2, 2a and 2b](#).

4.3. Quantile regression analysis: secondary business functions

Fig. 3 depicts the relationship between managerial outside assistance with secondary business functions and firm performance across all quantile levels. The effect of human resource assistance on firm performance highlights the advantage of using quantile regression over OLS

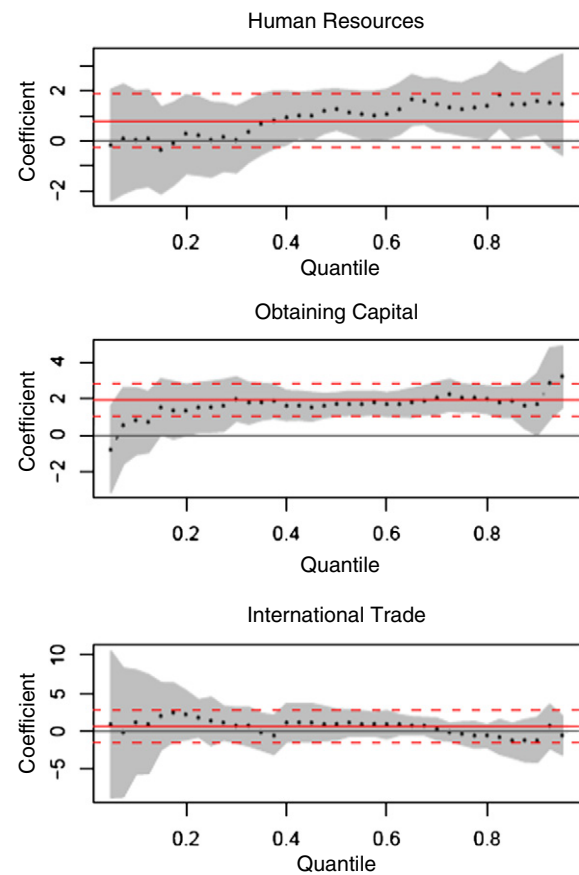


Fig. 3. Outside assistance for secondary business function and firm performance.

regression. The OLS estimate is not statistically significant at all, which indicates that human resource assistance has little impact on firm performance. In contrast, the quantile regression analysis shows a significant effect in the middle to upper quantiles, as a coefficient ranges from 0.99 at the 45th conditional quantile to 1.61 at the 90th conditional quantile. Thus, the overall relationship between these variables is upward sloping and was largely consistent with [Hypothesis 2c](#). We can conclude that human resource management assistance is beneficial for firms reporting higher levels of performance.

The effect of assistance with obtaining capital is significant and positive in the OLS case, as well as in every quantile except the lower quantile levels, $\tau = [0.05, 0.25]$. Using the OLS method of the mean effect, the coefficient was 1.94, but in the quantile regression, the coefficient estimates ranged from 1.54 to 2.01. The pattern appears to be similar to that of human resource assistance. Although outside assistance with obtaining capital do not significantly affect performance at the lower quantile levels, the pattern of results basically supports [Hypothesis 2c](#).

Outside assistance with international trade has no statistically significant effect on firm performance either in the OLS or in the quantile regression models. Thus, [Hypothesis 2c](#) does not hold true in the case of assistance with international trade assistance. This result suggests either that technical support in this area is not useful to the small firms or that many firms in our sample were not international but domestic businesses.

5. Conclusion and implications

Five levels (0.1, 0.2, 0.5, 0.7, 0.9) of β coefficients for the quantile regression and OLS coefficients are reported in [Table 4](#). In addition, the p value for each estimated coefficient is reported.

Table 4
Results of quantile regression for firm performance.

Variables	Quantiles					Mean (OLS)
	0.1	0.2	0.5	0.7	0.9	
Intercept	6.009*** (0.007)	8.975*** (0.000)	21.771*** (0.000)	23.10*** (0.000)	27.638*** (0.000)	17.768*** (0.000)
Marketing Strategy	5.681*** (0.000)	4.812*** (0.000)	2.202*** (0.000)	2.58*** (0.000)	1.786*** (0.003)	3.245*** (0.000)
Promotional Strategy	2.485** (0.011)	2.168*** (0.008)	0.787* (0.096)	1.004** (0.029)	1.500** (0.023)	1.368** (0.011)
Financial Management	7.576*** (0.000)	4.225*** (0.000)	1.500*** (0.00)	1.76*** (0.000)	1.596*** (0.005)	2.884*** (0.000)
General Management	3.875*** (0.001)	2.589*** (0.000)	1.229*** (0.000)	1.718*** (0.000)	1.852*** (0.001)	2.578*** (0.000)
Human resources	0.041 (0.970)	0.0258 (0.809)	1.245** (0.034)	1.439** (0.013)	1.606* (0.058)	0.797 (0.226)
Obtaining capital	0.754 (0.429)	1.365 (0.110)	1.667*** (0.000)	2.005*** (0.000)	1.676* (0.063)	1.935*** (0.000)
International Trade	1.199 (0.782)	2.136 (0.306)	0.881 (0.366)	0.304 (0.614)	−1.122 (0.548)	0.671 (0.618)
Age of the firm	−0.031 (0.210)	−0.071*** (0.009)	−0.012 (−0.579)	−0.006 (0.781)	0.007 (0.882)	−0.020 (0.433)
Revenue of the firm	0.249 (0.311)	0.772*** (0.001)	0.212** (0.019)	0.196 (0.065)	0.128 (0.259)	0.396*** (0.001)
Number of full-time employees	0.089*** (0.007)	0.049 (0.237)	−0.010 (0.559)	−0.016 (0.499)	0.007 (0.780)	0.012 (0.594)
Number of part-time employees	−0.056 (0.472)	0.002 (0.970)	0.018 (0.481)	0.022 (0.687)	0.135 (0.114)	0.009 (0.748)
Female owner	0.047 (0.911)	1.17 (0.189)	0.240 (0.426)	0.036 (0.927)	0.288 (0.650)	0.595 (0.146)
Age of owner	−0.121 (0.647)	−0.874** (0.03)	−0.129 (0.310)	−0.135 (0.438)	−0.370 (0.219)	−0.452** (0.021)

* $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$.

Entrepreneurs need outside assistance to start their businesses approximately 60% to 78% of the time (Chrisman, 1999), and different types of specific knowledge contribute to firms' heterogeneous output and make them competitive in the marketplace. Thus, outside programs are an important knowledge resource.

In examining the relationship between firm performance and managerial outside assistance, this study showed that outside assistance programs must consider current entrepreneurial performance when they help entrepreneurs. In previous literature, managerial assistance is shown to uniformly impact firm performance using an OLS model. However, our results from conditional quantile regression show that there is no single relationship between outside assistance programs and firm performance. The relationships between different types of outside assistance and firm performance are not linear; different assistance programs have different impacts on firm performance. In particular, we find that human resource assistance is only significant on firm performance in the middle- to upper-conditional quantile level.

This study demonstrates that outside assistance with primary business functions, such as marketing strategy, promotional strategy, financial management, and general management, appears to have a concave-shaped relationship with firm performance. Outside assistance programs in these areas are more effective for lower-performing firms. Firms who may be in danger of going out of business benefit most from financial management and marketing strategies related to aspects such as distribution and pricing, promotional strategy to customers, and general management to increase productivity.

In contrast, managerial outside assistance with secondary business functions, such as human resources and obtaining capital, is more likely to impact higher-performing firms. More specifically, outside assistance with obtaining capital has an almost uniformly positive effect on performance. While outside assistance with human resources is not significant using the OLS regression, it is marginally positive at the middle- to upper-level of firm performance. Higher-performing firms

are better able to utilize these types of outside assistance and integrate them into their business practices.

One of the most important implications to be drawn from the analysis is that firms at different levels of performance require different approaches for outside assistance. For firms with low performance, outside assistance programs are the most effective as knowledge resources for providing managerial outside assistance for marketing strategy, promotional strategy, financial management, and general management. In contrast, for higher-performing firms, the outside assistance programs may focus on helping entrepreneurs gain more internal knowledge in areas such as human resources and obtaining capital. Furthermore, there is little evidence that outside assistance for international trade management has a significant impact at any level of firm performance. This knowledge resource might be more effectively deployed towards other types of assistance.

In conclusion, these results make a case for a more flexible offering of managerial outside assistance to improve firm performance. These results also demonstrate the value of the quantile regression method in observing heterogeneous factors that would otherwise be masked. Future research should examine in more detail how to efficiently allocate outside assistance resources, particularly publicly funded programs, in the case of low- versus high-performing firms.

Acknowledgments

The opinions expressed in this paper are those of the authors and do not necessarily reflect those of the U.S. Small Business Administration or its resource partners. The authors gratefully acknowledge Professor James Chrisman's valuable comments and thank Cindy Orticio, Jaehyung Kang, Inwook Kim, Jane Park, Junghyun Lee, Woonkyung Claire Song and Yoona Youm for their comments and suggestions on earlier versions of this manuscript.

References

- Aldrich, H. E., & Baker, T. (1997). Blinded by the cites: Has there been any progress in entrepreneurship research? In D. L. Sexton, & R. L. Smilor (Eds.), *Entrepreneurship 2000 Chicago*. IL: Upstart Publishing.
- Alvarez, S., & Busenitz, L. (2001). The entrepreneurship of resource-based theory. *Journal of Management*, 27, 755–775.
- BarNir, A., Gallaughier, J. M., & Auger, P. (2003). Business process digitization, strategy, and the impact of firm age and size: The case of the magazine publishing industry. *Journal of Business Venturing*, 18, 789–814.
- Brinckmann, J., Salomo, S., & Gemuenden, H. G. (2011). Financial management competence of founding teams and growth of new technology-based firms. *Entrepreneurship Theory and Practice*, 35(2), 217–243.
- Brush, C. G., & Vanderwerf, P. A. (1992). A comparison of methods and sources for obtaining estimates of new venture performance. *Journal of Business Venturing*, 7, 157–170.
- Chrisman, J. J. (1999). The influence of outsider-generated knowledge resources on venture creation. *Journal of Small Business Management*, 37(4), 42–58.
- Chrisman, J. J., Bauerschmidt, A., & Hofer, C. W. (1998). The determinants of new venture performance: An extended model. *Entrepreneurship Theory and Practice*, 23(1), 5–29.
- Chrisman, J. J., Hoy, F., & Robinson, R. B., Jr. (1987). New venture development: The costs and benefits of public sector assistance. *Journal of Business Venturing*, 2, 315–328.
- Chrisman, J. J., & McMullan, W. E. (2000). A preliminary assessment of outsider assistance as a knowledge resource: The longer term impact of new venture counseling. *Entrepreneurship Theory and Practice*, 24(3), 37–53.
- Chrisman, J. J., & McMullan, W. E. (2004). Outsider assistance as a knowledge resource for new venture survival. *Journal of Small Business Management*, 42, 229–244.
- Chrisman, J. J., McMullan, W. E., & Hall, J. (2005). The influence of guided preparation on the long-term performance of new ventures. *Journal of Business Venturing*, 20, 769–791.
- Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *The Journal of Applied Psychology*, 78, 98–104.
- Coviello, N. E., Brodie, R. J., & Munro, H. J. (2000). An investigation of marketing practice by firm size. *Journal of Business Venturing*, 15, 523–545.
- Craig, J. B., Dibrell, C., & Davis, P. S. (2008). Leveraging family-based brand identity to enhance firm competitiveness and performance in family businesses. *Journal of Small Business Management*, 46, 351–371.
- Deeds, D. L., Decarolis, D., & Coombs, J. E. (1997). The impact of firm-specific capabilities on the amount of capital raised in an initial public offering: Evidence from the biotechnology industry. *Journal of Business Venturing*, 12(1), 31–46.
- Dennis, W. J., Jr. (2003). Raising response rates in mail surveys of small business owners: Results of an experiment. *Journal of Small Business Management*, 41(3), 278–295.
- Florin, J. (2005). Is venture capital worth it? Effects on firm performance and founder returns. *Journal of Business Venturing*, 20, 113–135.
- Gatewood, E. (1993). The expectancies of public sector venture assistance. *Entrepreneurship Theory and Practice*, 16(4), 91–95.
- Gomez-Mejia, L. R., Larraza-Kintana, M., & Makri, M. (2003). The determinants of executive compensation in family-controlled public corporations. *Academy of Management Journal*, 46, 226–237.
- Haber, S., & Reichel, A. (2007). The cumulative nature of the entrepreneurial process: The contribution of human capital, planning and environmental resources to small business. *Journal of Business Venturing*, 22(1), 119–145.
- Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, 9(2), 193–206.
- Hao, L., & Naiman, D. Q. (2007). *Quantile regression*. Sage.
- Heneman, R. L., Tansky, J. W., & Camp, S. M. (2000). Human resource management practices in small and medium-sized enterprises: Unanswered questions and future research perspectives. *Entrepreneurship Theory and Practice*, 25(1), 11–27.
- Ho, N. K., & Mula, J. M. (2004). Impact of advisers on small and medium enterprises' business performance—A study of CPA interventions on Singaporean Chinese SMEs. *Paper presented at the 49th ICSB World Conference 2004; Johannesburg, South Africa*.
- Honig, B. (2001). Human capital and structural upheaval: A study of manufacturing firms in the West Bank. *Journal of Business Venturing*, 16, 575–594.
- Hood, J. N., & Young, J. E. (1993). Entrepreneurship's requisite areas of development: A survey of top executives in successful entrepreneurial firms. *Journal of Business Venturing*, 8, 115–135.
- Jennings, P. L., & Beaver, G. (1997). The performance and competitive advantage of small firms: A management perspective. *International Small Business Journal*, 15(2), 63–75.
- Kaman, V., McCarthy, A. M., Gulbro, R. D., & Tucker, L. T. (2001). Bureaucratic and high commitment human resource practices in small service firms. *Human Resource Planning*, 24(1), 33–44.
- Kim, S. H., & Huang, K. H. (2011). Winning strategies for innovation and high-technology products management. *Journal of Business Research*, 64(11), 1147–1150.
- Koenker, R., & Bassett, G. W. (1978). Regression quantiles. *Econometrica*, 46, 33–50.
- Koenker, R., & Hallock, K. F. (2001). Quantile regression. *The Journal of Economic Perspectives*, 15(4), 143–156.
- Kotey, B., & Folker, C. (2007). Employee training in SMEs: Effect of size and firm type—Family and nonfamily. *Journal of Small Business Management*, 45(2), 214–238.
- Kroon, J. (1995). *General management Cape Town*. South Africa: Pearson South Africa.
- Ladzani, M. W., & Van Vuuren, J. J. (2002). Entrepreneurship training for emerging SMEs in South Africa. *Journal of Small Business Management*, 40(2), 154–161.
- Lang, J. R., & Golden, P. A. (1989). Evaluating the efficiency of SBDCs with data development analysis: A longitudinal approach. *Journal of Small Business Management*, 27(2), 42–49.
- Lichtenstein, B. M. B., & Brush, C. G. (2001). How do 'resource bundles' develop and change in new ventures? A dynamic model and longitudinal exploration. *Entrepreneurship Theory and Practice*, 25(3), 37–58.
- Minniti, M., & Bygrave, W. (2001). A dynamic model of entrepreneurial learning. *Entrepreneurship Theory and Practice*, 25(3), 5–16.
- Murphy, G. B., Traylor, J. W., & Hill, R. C. (1996). Measuring performance in entrepreneurship research. *Journal of Business Research*, 36(1), 15–23.
- Nahavandi, A., & Chesteen, S. (1988). The impact of consulting on small business: A further examination. *Entrepreneurship Theory and Practice*, 13(1), 29–40.
- Olavarrieta, S., & Friedmann, R. (2008). Market orientation, knowledge-related resources and firm performance. *Journal of Business Research*, 61(6), 1623–1630.
- Pearce, J. A., II, & Michael, S. C. (1997). Marketing strategies that make entrepreneurial firms recession-resistant. *Journal of Business Venturing*, 12, 301–314.
- Raju, P. S., Lonial, S. C., & Crum, M. D. (2011). Market orientation in the context of SMEs: A conceptual framework. *Journal of Business Research*, 64(12), 1320–1326.
- Rasmussen, E., & Sørheim, R. (2006). Action-based entrepreneurship education. *Technovation*, 26, 185–194.
- Rummler, G. A., & Brache, A. P. (1995). *Improving performance: How to manage the white space on the organization chart* (2nd ed.). San Francisco, CA: Jossey-Bass.
- Soriano, D. R. (2010). Management factors affecting the performance of technology firms. *Journal of Business Research*, 63(5), 463–470.
- Sullivan, D., & Marvel, M. (2011). How entrepreneurs' knowledge and network ties relate to the number of employees in new SMEs. *Journal of Small Business Management*, 49(2), 185–206.
- Unger, J. M., Rauch, A., Frese, M., & Rosenbusch, N. (2011). Human capital and entrepreneurial success: A meta-analytical review. *Journal of Business Venturing*, 26(3), 341–358.
- Wallace, J. C., Little, L. M., Hill, A. D., & Ridge, J. W. (2010). CEO regulatory foci, environmental dynamism, and small firm performance. *Journal of Business Venturing*, 48(4), 580–604.
- West, G. P., III, & Noel, T. W. (2009). The impact of knowledge resources on new venture performance. *Journal of Small Business Management*, 47(1), 1–22.
- Wiklund, J., & Shepherd, D. A. (2003). Knowledge-based resources, entrepreneurial orientation, and the performance of small and medium-sized businesses. *Strategic Management Journal*, 24(13), 1307–1314.
- Wood, W. C. (1994). Primary benefits, secondary benefits, and the evaluation of small business assistance programs. *Journal of Small Business Management*, 32(3), 65–75.
- Wu, J., & Shanley, M. T. (2011). Knowledge stock, exploration, and innovation: Research on the United States electromedical device industry. *Journal of Business Research*, 62(4), 474–483.
- Yu, T. H. (2011). Heterogeneous effects of different factors on global ICT adoption. *Journal of Business Research*, 64(11), 1169–1173.
- Zahra, S. A., & Hayton, J. C. (2008). The effect of international venturing on firm performance: The moderating influence of absorptive capacity. *Journal of Business Venturing*, 23, 195–220.
- Zahra, S. A., Neubaum, D. O., & Larrañeta, B. (2007). Knowledge sharing and technological capabilities: The moderating role of family involvement. *Journal of Business Research*, 60(10), 1070–1079.
- Zolin, R., Kuckertz, A., & Kautonen, T. (2011). Human resource flexibility and strong ties in entrepreneurial teams. *Journal of Business Research*, 64(10), 1097–1103.