INDIVIDUAL AND OPPORTUNITY FACTORS INFLUENCING JOB CREATION IN NEW FIRMS

JOHN C. DENCKER
University of Illinois at Urbana-Champaign

MARC GRUBER
Ecole Polytechnique Fédérale de Lausanne (EPFL)

SONALI K. SHAH
University of Washington

We build on multiple theoretical perspectives to investigate the unique and joint effects of individual- and opportunity-level factors affecting job creation in new firms. We tested hypotheses using survey data from individuals who transitioned from unemployment to self-employment under the auspices of a German public policy program. Our findings reveal that an entrepreneur's breadth of knowledge has a negative influence on the firm's job creation, whereas the entrepreur's leadership experience has a positive influence. However, as the sector-specific labor requirements of a business opportunity increase, both breadth of knowledge and leadership experience allow founders to operate their firms with fewer employees.

The creation of new jobs is the lynchpin of economic growth and development. Over the past three decades, scholarly work on job creation has focused on understanding the contributions of different populations of firms—new and existing, large and small—to the overall creation of new employment (cf. Birch, 1979; Neumark, Zhang, & Wall, 2006). This research has shown that newly founded firms generate significant numbers of new jobs. In fact, the average U.S. net employment growth rate from 1980 to 2005 would have been negative, if not for the jobs created by newly founded firms (Haltiwanger, Jarmin, & Miranda, 2009).

Despite the critical role of new firms in contributing to macrolevel employment outcomes, there exists little theoretical and empirical research at the individual and organizational levels that can help explain the specific factors that either enhance or constrain a new firm's ability to create jobs (Shane, 2003). This lack of knowledge is fairly surprising, because improved knowledge of the factors influencing job creation in new firms would not only be of key relevance for the organizational, labor market, and entrepreneurship literatures (Davidson, 2004; Ireland, Reutzel, & Webb, 2005), but would also be of vital interest to policy makers as governments seek to implement policies and programs to ensure that their citizens can find work (Osterman, Kochan, Locke, & Piore, 2002).

In this study, we drew on human capital theory and entrepreneurship theory to develop a framework for investigating the unique and joint effects of firm founders' *human capital* and *business opportunity characteristics* on job creation. According to human capital theory, individuals possessing greater knowledge and experience will be more successful than individuals possessing lower levels of such human capital (Becker, 1964; Mincer, 1974). For instance, because the hiring of employees adds complexity, responsibility, and a host of challenges to the role of firm founder (Blanchflower, 2000), founders with higher human capital should be able to address these challenges more

easily—and thus create more jobs—than founders with less human capital (Burke, FitzRoy, & Nolan, 2000; Hinz & Jungbauer-Gans, 1999). Yet, given the dearth of research in this area, little is known about the types of human capital relevant for job creation in new firms, let alone whether higher human capital endowments of firm founders actually lead to more job creation.

We examined two human capital endowments likely to be of key relevance for job creation: a firm founder's breadth of knowledge and her or his prior leadership experience. We examined breadth of knowledge because recent economic thinking on entrepreneurship has highlighted its importance (Lazear, 2005) and because findings would have ramifications for contemporary labor market and employment policies, particularly since individual employment histories are more varied nowadays than they were in the past (Osterman et al., 2002). We examined leadership experience because it should have a direct and substantial effect on job creation outcomes and because findings would help to increase the currently limited understanding of this human capital characteristic in research on entrepreneurship (Aldrich & Ruef, 2006; Antonakis & Autio, 2006).

Beyond founders' human capital, however, a framework seeking to explain job creation in new firms should account for interaction between founder characteristics and the characteristics of a particular business opportunity—a concept termed the "individual-opportunity nexus" in entrepreneurship theory. This concept highlights that "entrepreneurship cannot be only a fixed attribute of certain people, but rather must involve their reaction to the existence of opportunities for profit" (Shane, 2003: 6–7). Hence, when two different individuals exploit the same opportunity, the outcome may differ.

Although the individual-opportunity nexus concept has been well received in the entrepreneurship literature, little empirical research examining it exists. In developing our framework, we therefore considered interactions between a founder's human capital characteristics and one key opportunity characteristic that seemed to be the most relevant in the context of our research: the sector-specific labor requirements of a newly founded firm. By investigating this opportunity characteristic, our framework incorporates the idea that firms created in different sectors require different numbers of employees to staff and run (Shane, 2003).

We analyzed our predictions in 451 new firms founded by unemployed individuals under the auspices of a program administered by the German Federal Employment Agency (FEA). Our sample provided a particularly useful context for examining the unique and joint effects of human capital and opportunity characteristics on job creation, as it was diverse in terms of founder characteristics and the types of businesses created. Moreover, formerly unemployed founders such as the ones in our sample are responsible for generating a high fraction of start-up activity, accounting for 62 percent of new firm foundings in Germany, 30 percent in Sweden, and 15 percent in Austria (Institut für Mittelstandsforschung, 2005; SCB, 1994).

Our analysis uncovers several key results. In particular, our study supports the idea that founders' human capital characteristics affect job creation. However, we also found that more human capital is not always better: founders possessing a greater breadth of knowledge created *fewer* jobs, and those possessing prior leadership experience created *more* jobs. Moreover, as the sector-specific labor requirements of a business opportunity increase, both breadth of knowledge and leadership experience allow founders to run their firms with fewer employees over time.

The findings of this study provide important benefits to theory and policy. From a theoretical perspective, we expand understanding of the factors that promote job creation in new firms, explicate the effects of different types of founder human capital on job creation, and offer empirical support for the individual-opportunity nexus. From a policy perspective, our findings on the factors influencing job creation will enable government officials to better design, implement, and find public support for job creation programs (Osterman et al., 2002).

HYPOTHESIS DEVELOPMENT

In this section, we examine the unique and joint effects of founder characteristics and business opportunity characteristics on the job creation process. We begin with a discussion of a firm founder's human capital characteristics.

Founder Characteristics

Breadth of knowledge. A key individual human capital characteristic is breadth of knowledge. By breadth of knowledge, we mean the extent to which an individual possesses knowledge of a variety of different business areas important for starting and running a firm. Depending on their education, career, and personal histories, some individuals acquire knowledge in multiple areas. For example, a general manager is likely to develop knowledge of a specific industry, as well as knowledge of business areas such as marketing and sales, finance, opera-

tions, and information technology. Other individuals, such as specialists and entry-level employees assigned to a single role or task, are instead likely to acquire knowledge in only one or a small number of areas.

Prior research indicates that a founder with a broad base of knowledge (i.e., a generalist or a jack-of-all-trades [cf. Lazear, 2005]) enjoys benefits relative to a founder with a narrow base of knowledge because establishing a business requires founders to perform many different tasks well (Lichtenstein, Dooley, & Lumpkin, 2006; Shane, 2003). For example, to establish a retail shop for office furniture (as did one of the founders in our study), an individual needs to accomplish tasks such as choosing a location and décor, finding suppliers, setting up an inventory management system, keeping books, developing marketing campaigns, selling the furniture in the store, arranging for delivery of the furniture to customers, and handling service and support.

Given the need to perform many different tasks when setting up a new venture, we argue that a founder's breadth of knowledge systematically affects job creation. If a founder possesses a particular type of knowledge, he or she will have little need to hire an employee possessing the same knowledge, because employees are hired to fulfill ongoing needs for certain skills and capabilities that a firm requires (Davis-Blake & Uzzi, 1993). Thus, founders with broad sets of skills, experience, and knowledge can and will do more types of work themselves and will therefore hire fewer people as they form and operate their businesses.

Hypothesis 1a. Founders' breadth of knowledge has a negative effect on job creation in new firms.

Prior leadership experience. Scholars have defined leadership in many ways, but at its core, it involves the use of noncoercive influence to direct and coordinate the activities of the members of an organized group toward the accomplishment of group objectives (Jago, 1982). In other words, the goal of a leader is the satisfactory execution of an employee's assignments, and through that, the attainment of organizational goals for which the employee is responsible (Mintzberg, 1973). Developing the ability to influence others is a critical skill, perhaps best learned through practice and experience in leading others (Day, Harrison, & Halprin, 2008). Leadership experience is important in our context because several arguments suggest that founders with leadership experience may create more jobs than founders without leadership experience.

First, founders with leadership experience may have more success in recruiting new employees. Joining a small, new firm may seem risky to employees. Thus, a founder with leadership ability may be better able to assuage concerns of future employees and/or be able to create an atmosphere in which the potential employees feel comfortable. Although no direct evidence supports this assertion in the context of small firms, research does indicate that employees value leadership. For instance, studies of CEOs suggest that leadership experience may even help founders to attract employees, as leaders may exhibit greater confidence and charisma (House, 1977; Waldman, Ramirez, House, & Puranam, 2001).

Second, having to perform in a leadership role creates a number of responsibilities for firm founders. For example, once founders hire others, their role changes in important ways, because they will bear responsibility for their staff and will have to engage in organizational tasks such as employee supervision, coordination, and delegation (Scase & Goffee, 1982). Faced with these additional responsibilities, founders with prior leadership experience may feel more comfortable hiring employees, as they can draw on high levels of task-specific knowledge (Walsh, 1995) and thus have confidence in their ability to lead, coordinate, motivate, and manage.

Third, as a result of their prior leadership roles, founders may have developed a work style that relies on the contributions of subordinates, leading them to hire more employees than founders who lack such experience (Brüderl, Preisendörfer, & Ziegler, 1992). For example, founders with prior leadership experience may not be willing to perform secretarial activities and thus may be more inclined to hire other people for such tasks.

Hypothesis 1b. Founders' prior leadership experience has a positive effect on job creation in new firms.

Opportunity Characteristics: Sector-Specific Labor Requirements

Firms can be characterized along a number of dimensions, with extant research on entrepreneurship suggesting that organizational characteristics such as the size of the initial financial investment, legal form, geographic market scope, and strategic focus affect new firm performance outcomes (e.g., Audretsch & Mahmood, 1995; Brüderl et al., 1992; Durand & Coeurderoy, 2001; Feeser & Willard, 1990). We focus here on one key influence on job creation, sector-specific labor requirements, and

control for the effects of other organization-level characteristics.

Because different businesses have different technical and market characteristics, they require different numbers of employees to staff and run them (Shane, 2003). Some business opportunities can be effectively exploited by a founder working alone, but others require founders to hire additional employees to become operational. For instance, a single individual can run a start-up firm offering a service such as consulting or tax preparation. By contrast, running a restaurant is labor-intensive and requires a founder to hire multiple employees—chefs, wait staff, busboys, and dishwashers—to take on different tasks.

As the labor requirements of a given business opportunity increase, we expect that founders, no matter how knowledgeable and skilled, will hire others owing to some combination of the overall volume of labor required and the variety of knowledge needed to complete tasks. That is, founders will hire the necessary number of employees to ensure that their business opportunities are exploited effectively. Although the test of this prediction is unlikely to produce surprising results, the effects of the interaction between labor requirements and opportunity characteristics on job creation have been important in recent research on entrepreneurship. Hence, we treated sector-specific labor requirements as a focal study variable.

Hypothesis 2. The labor requirements of the sector in which a founder pursues a business opportunity has a positive effect on job creation in new firms.

Examining the Individual-Opportunity Nexus

Shane (2003) introduced the concept of the individual-opportunity nexus as a lens for viewing entrepreneurial activity. In this account, the expression of entrepreneurial activity depends on the *interaction* between the characteristics of a particular opportunity and the characteristics of the entrepreneur who exploits the opportunity. Drawing on this line of reasoning, we argue that the human capital of a founder and sector-specific labor requirements jointly affect rate of job creation in ways that differ from the unique effects of human capital or labor requirements alone.

Breadth of knowledge and sector-specific labor requirements. As stated in Hypothesis 1a, we expect that founders possessing broad knowledge—knowledge in a variety of different business areas—will undertake many tasks themselves and therefore hire fewer people than will founders with more limited knowledge. However, as the labor requirements of the sector in which a founder pursues a business opportunity increase, even the most knowledgeable and skilled individuals will have to hire and manage others to undertake tasks. A number of arguments suggest that founders possessing broad knowledge are more effective as they hire and manage employees than founders with narrow knowledge.

First, a founder who understands a business area is better able to assess a potential employee's qualifications and therefore better able to hire qualified (e.g., effective and efficient) employees than a founder with limited understanding in this area. For example, the founder of a restaurant with significant experience working in and managing restaurants may be better able to identify and hire a waiter who can work quickly and effectively and do the work of one-and-a-half average waiters. The benefits of founder knowledge on hiring decisions are likely to increase as the labor requirements of a business opportunity increase.

Second, founders with broad knowledge can cross-train employees to take on multiple tasks and thereby make efficient use of employee skills and time (Campbell, 1999; McCune, 1994; Pfeffer, 1995). Moreover, the benefits of cross-training employees are likely to increase as the labor requirements of the opportunity being exploited increase.

Third, founders starting off with a greater breadth of knowledge than others can generate second-order benefits that reduce hiring needs. For example, because founders with broad knowledge hire few if any employees and take on many tasks initially, they will increase their knowledge and expertise—which in turn may improve their ability to select and cross-train more effective employees. Moreover, because of the knowledge, selection, and training factors associated with founders with broad knowledge bases, they will also be able to spend less time monitoring, motivating, and coordinating the work of employees than will founders with narrow knowledge bases.

Hypothesis 3a. The negative effect of founders' knowledge breadth on job creation increases as the sector-specific labor requirements of a business opportunity increase.

Prior leadership experience and sector-specific labor requirements. As the labor requirements of the sector in which a founder pursues a business opportunity increase, he or she needs to hire and thus lead more employees. We expected founders with prior leadership experience to accomplish the same activities with *fewer* employees than those without leadership experience. At least two argu-

ments support this line of reasoning, and these arguments should gain in relevance the larger the labor requirements of the opportunity being exploited.

First, compared to founders with no leadership experience, founders with leadership experience should have a better understanding of how to structure the work of multiple employees. Specifically, they are likely to have superior knowledge regarding how tasks can be efficiently divided among employees and how relations among them can be managed efficiently (Aldrich & Ruef, 2006; Antonakis & Autio, 2006).

Second, compared to founders with no leadership experience, founders with leadership experience should be better able to motivate multiple employees by engaging in activities such as articulating vision, communicating values and goals, and influencing employee behavior to accomplish those goals in a concerted manner. For example, they should have a better understanding of how to engineer reward systems to improve employee performance (Stinchcombe, 1965).

Both of these arguments suggest that as the challenges associated with managing employees increase with labor requirements, founders with leadership experience can, compared to those without leadership experience, make better use of employees and thus make do with fewer employees.

Hypothesis 3b. The positive effect of founders' prior leadership experience on job creation declines as the sector-specific labor requirements of a business opportunity increase.

DATA AND METHODS

We examined job creation in start-up firms using data from a population of firms founded in 2001 by unemployed individuals receiving government assistance to support their transition to self-employment. We collected data through a survey distributed in early 2005 to the entire 2001 cohort of such firm founders (that is, the survey was distributed to founders still operating their businesses *and* to those whose businesses had failed). Questions asked in this survey allowed us to trace their entrepreneurial experiences for three full business years. Data from 451 completed surveys were analyzed.

We also acquired data from two external sources to supplement our analysis. First, we obtained statistical data from the Centre for European Economic Research (ZEW) on the average employment size of newly founded firms in Germany for each five-digit industry code and each of the three business years covered in our analysis. As explained in

further detail below, these data allowed us to examine how the labor requirements of an opportunity affected job creation (Hypothesis 2), and the individual-opportunity nexus concept (Hypotheses 3a and 3b). Second, we obtained data on German wage levels from the German Statistical Office for each two-digit industry code in our sample. As explained in further detail below, this allowed us to control for the average wage level in the industry in which each firm operated.

Study Setting

We studied a cohort of firms founded with limited financial assistance from a branch of the German FEA serving the Munich region. This program is similar to programs administered at the state and local level in many European countries and in the United States (Blanchflower, 2004). All firms were founded at some point in 2001 by unemployed individuals living in Munich or its suburbs, a metropolitan area characterized by a diverse and stable mix of industries, with a total of 60,000 firms and about 1.1 million employees. In 2001, the unemployment rate was 9.4 percent in Germany as a whole and 5.0 percent in the Munich metropolitan region (Agentur für Arbeit München, 2003; Bundesministerium für Arbeit und Soziales, 2002).

Founders participating in the program received a monthly stipend equivalent to the unemployment check they would have received had they not founded firms to help offset their social security and living expenses (Wiessner, 2000). These "bridging allowances" averaged 1,000 euro per month and were granted for six months. The funds did not require repayment.

Individuals who had received unemployment pay for at least four weeks were eligible to apply for funding. The program was widely communicated to unemployed individuals by the local employment agencies to which all these individuals had to report at least quarterly. In addition, the program received considerable press coverage. The application process was straightforward and administered by Munich's FEA. Each prospective founder was asked to submit a business plan outlining an idea and a statement from an expert (such as a member of a chamber of commerce, a banker, or a tax consultant) attesting that the proposed firm was economically viable and sustainable. The threshold for economic viability was low; it was defined as providing firm founders with an adequate income with which to support themselves (Wiessner, 2000).

Survey Data

Survey design and response rate. We conducted 15 in-depth qualitative interviews with firm founders and staff members of Munich's FEA to develop a deeper understanding of the challenges faced by founders coming from unemployment, the resources to which they had access, and the process by which they investigated and pursued their business opportunities. We based an eight-page survey instrument on insights gleaned from these interviews and an extensive review of the literature. The survey instrument was pretested on 17 founders and four FEA staff members. Minor modifications were made to improve the clarity of some survey items.

The FEA provided us with access to the complete 2001 cohort of funding recipients (1,892 individuals). Surveys were addressed and mailed to each of these individuals by the FEA to protect the anonymity of individuals in the cohort. A cover letter and a stamped return envelope accompanied each survey. Surveys sent to 456 individuals were returned by the postal service; these individuals could no longer be reached in 2005 using the 2001 home address data supplied to the agency. Given that individuals in the Munich metropolitan area move frequently, systematic bias in these returned surveys is unlikely with respect to survivorship (see below for an extended discussion). Individually addressed reminder postcards were sent to all members of the cohort seven weeks after the initial mailing. The total of 456 responses received constituted a response rate of 24.1 percent, based on the size of the full cohort, or 31.4 percent, based on the number of individuals who received the survey. Of these, only 5 responses were excluded from our analyses owing to missing values, resulting in a sample size of 451. The response rate of 24.1 percent is generally in line with or even higher than the rates reported in other empirical studies addressing business owners and top managers (Sarkar, Echambadi, & Harrison, 2001; Simonin, 1997).

Response bias. A concern among survey researchers is to limit response bias (e.g., survey nonresponse) in order to ensure consistency between samples and populations of interest. In our study, the population of interest was the group of unemployed individuals who received funding from the Munich FEA. Two key issues related to response bias might have arisen in our study. First, the descriptive data from our sample might not match the data for the population of interest. Second, and more importantly for our purposes, statistical inferences made from multivariate analyses drawn from a biased sample might not generalize to the population of interest. Several analyses indicated that the founders who responded to our survey were largely representative of the population of interest, thus suggesting that response bias was not a key concern in our study.

First, in terms of demographic characteristics, an analysis of the address data used to contact the entire 2001 cohort showed that 37.2 percent of members of the population receiving funding were female, and 39.9 percent of our sample members were female. We do not have additional demographic information on the entire cohort of founders, yet note that demographic data obtained by the Founder's Support Office at the FEA via a random phone survey ($n = 480$) matched our data on all dimensions we could assess (i.e., sex, age, initial monetary investment in a firm, and the form of the business activity).

Second, in terms of firm survival, the failure rate in our sample ranged from 4 to 6 percent in a given year (or a total of 14.5 percent after three years) and thus corresponded to the official 2001 statistics kept by the Founder's Support Office in Munich (Büro für Existenzgründungen, 2004). In addition, the failure rates in our sample are generally in line with those reported in other studies: the three-year rate is a bit higher than the three-year failure rate of 12 percent reported by Hinz and Jungbauer-Gans (1999) in their study of firms started by the unemployed in the Munich region, and slightly lower than those reported in other studies of new firms formed by unemployed individuals in Germany (Institut für Mittelstandsforschung, 2005; Wiessner, 1998). Firms created by the unemployed thus seem to have slightly higher survival chances than other populations of newly created firms. For example, in their broader sample of firms in the Munich area, Brüderl et al. (1992) indicated a 37 percent failure rate after five years. Watson and Everett (1996) provided a review of studies across countries to show that failure rates typically range between 30 and 60 percent after 5 years.

Third, we conducted a questionnaire nonresponse test by comparing early and late respondents—that is, respondents who filled in the questionnaire before receiving the reminder postcard, and those who did so afterwards. The latter served as a proxy group for nonresponding firms (Hendricks, 1949). The analysis did not show any significant difference between the groups. Taken together, these tests suggested that individuals responding to our survey should be representative of our population of interest.

ZEW and German Statistical Office Data

We supplemented our survey data with information on the average employment sizes of newly founded firms in Germany for each of the five-digit industries and business years covered in our study (i.e., the first, second and third business years of firms founded in 2001). These data were obtained from the ZEW, which has established a panel study on new firm creation based on information supplied by CREDITREFORM, the largest German credit rating agency. The ZEW panel study data are considered a highly accurate source of statistical information on newly founded firms (all legally independent new firms founded in the private sector) in Germany over time (cf. Engel & Fryges, 2002). The ZEW collected data on roughly 240,000 new firms founded in Germany in 2001, the year in which our study began (ZEW, 2002). Each year, the ZEW updates its database with new information that becomes available on the newly founded firms of a particular vintage (cohort). This means that for the purposes of our study, we not only had data on the mean, median, and variance of employment size of new firms founded in a particular five-digit industry in the year 2001 (the first business year), but also for this particular cohort of firms in 2002 (the second business year) and in 2003 (the third business year); that is, the data from the ZEW matched our time frame.

Furthermore, it is important to note that the employment size data from the ZEW are extremely fine-grained, because they are based on five-digit industry codes that represent the most detailed level of the German industry classification code (WZ93). For example, the five-digit industry codes include industry groupings as refined as "retail sales in photography" and "offices for editorial services."

Finally, we supplemented the data set with wage data obtained from the German Statistical Office for 25 different two-digit industry codes represented in our sample (Bundesministerium für Arbeit und Soziales, 2002; Statistisches Bundesamt, 2002). Because higher wage levels in some industries may make it harder for founders to hire people, we used the wage data as a control variable.

Measures

Dependent variable. Our dependent measure captures the total employment count of a newly founded firm in a given year. Respondents were asked to state the number of full-time employees, part-time employees, mini-job employees (i.e., employees with salaries lower than 400 euros per month), and freelancers working for their firms in each of the three years covered by our study. The characteristics of these different job types were common knowledge for founders in our sample, as important legal and financial consequences (e.g., social charges) are associated with hiring in the different categories. Our pilot study and discussions with individuals in the FEA confirmed that the founders were aware of the differences among these job types. Using a procedure analogous to the construction of the labor requirements measure (see below), for each business year, we summed up the different types of jobs (i.e., full-time, part-time, mini, freelancer) to arrive at our total employment count. For example, if a firm employed one full-time employee and three freelancers in the first year—and two full-time employees and one freelancer in the second year—the employment count for that firm was four in the first year and three in the second year.

Independent variables. Our independent variables include measures of individual characteristics (a founder's *breadth of knowledge* and *leadership experience*) and opportunity characteristics (the sector-specific *labor requirements* of a business opportunity) related to each newly founded entity.

To measure breadth of knowledge, we assessed founders' knowledge of three different areas that are relevant in new firms in different sectors: market and industry, marketing and sales, and computer/hardware/software. Respondents rated their knowledge in each area on a scale ranging from 1, "very little knowledge," to 5, "very high knowledge."[1] From these measures, we generated a dummy variable for each of the three knowledge areas denoting whether a founder possessed at least a medium level of knowledge in that area (coded 1) and created the linear sum of all three dummies to obtain our measure for founder knowledge breadth. For example, if a founder possessed at least medium levels of knowledge in all three areas, he or she would score 3; another founder who had at least medium levels of knowledge in just two of the three areas would score 2. Robustness checks showed that this measure was robust to choosing different cutoffs in the five-point scale.

We measured leadership experience as the highest position a respondent had attained. Response categories were "technical employee, nonleader-

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[1] Although there could be a number of additional knowledge areas in new firms in different sectors, the length of our survey instrument precluded our conducting an exhaustive investigation of such areas.

ship position," "technical employee, leadership position," "management employee, nonleadership position," "management employee, leadership position," and "other." A respondent selecting the "other" category was asked to describe the highest previous position, and the authors and three organizational scholars coded these responses into leadership and nonleadership groups. Agreement among these assessments was high (.91, .88, .93). From these data, we created a dummy measure coded 1 if a founder had obtained leadership experience in a previous work activity and 0 otherwise.

In terms of opportunity characteristics, our focal variable was the sector-specific labor requirements of a business opportunity. We created this measure drawing on detailed panel data obtained from the ZEW on the average employment size of *new* firms founded in Germany in 2001 by 197 five-digit industry codes (see the description of the ZEW data set above). It is important to note that the ZEW tracked each firm founded in 2001 over the next few years. Hence, we had data not only on the average size of the firms founded in 2001 in 197 five-digit industry sectors, but also on their average size in their second (2002) and third business year (2003). For example, the ZEW data showed that new firms created in the sector "retail sales in photography" (industry code 74.81.1) had an average employment size of 1.8 people in their first business year (2001). It also showed that these firms that had been created in 2001 had an average employment size of 3.2 in their third business year (2003).

As the ZEW data were based on the headcount in a business regardless of type of employment, we subtracted one person (i.e., the founder) from the average employment size data to match the ZEW data to our dependent measure (which only captured jobs created for individuals besides founders). Furthermore, we note that because of the yearly updates, the ZEW data took into account that some of the firms in this 2001 cohort failed over time.

Control variables. We controlled for a number of factors that might influence yearly employment counts in newly founded firms. At the individual level, we considered several human capital measures: founders' *formal education*, *years of prior work experience*, *duration unemployed*, average number of *hours worked per week* while self-employed, and *prior self-employment experience.* We measured education as reported formal educational attainment (in terms of degrees received in the German school system) and vocational and occupational training received from first grade onward. Dummy variables captured the highest educational

degree received. To measure prior work experience, we asked respondents to report the number of years that they had worked prior to founding their firms (i.e., prior to 2001). Following convention, we counted an apprenticeship, which typically takes three years, half as work experience and half as education (Brüderl et al., 1992).

Because a founder's human capital may depreciate with increasing unemployment (Mincer & Ofek, 1982), we controlled for the duration of unemployment. Respondents selected one of nine categories: "less than 1 month," "1 to 2 months," "3 to 4 months," "5 to 6 months," "7 to 9 months," "10 to 12 months," "13 to 24 months," "25 to 36 months," and "more than 36 months." For the measure of hours worked per week, response categories (in hours) were "less than 40," "40 to 50," "51 to 60," "61 to 70," "71 to 80," and "more than 80." Prior self-employment experience was a dummy variable coded 1 if a founder reported that she or he had been self-employed previously and 0 otherwise (Brüderl et al., 1992).

An individual's *age* and *gender* may also influence entrepreneurial behavior (Aldrich & Ruef, 2006; Lévesque & Minniti, 2006) and, in particular, hiring decisions. Age was coded into one of six categories: "below 25," "25 to 29," "30 to 34," "35 to 39," "40 to 44," "45 to 49," "50 to 54," "55 to 59," and "over 60." Gender was coded 1 for male and 0 for female.

Because entrepreneurship research suggests that a founder's personality traits influence new firm creation processes and outcomes (e.g., Ciavarella, Buchholtz, Riordan, Gatewood, & Stokes, 2004)—and because extant studies suggest that hiring employees adds complexity, responsibility, and a host of other (perhaps stressful) challenges to the founder role (Blanchflower, 2000)—the personality traits of firm founders may influence job creation. We thus controlled for psychological characteristics using the "Big 5" personality traits: *conscientiousness, agreeableness, emotional stability, openness to experience,* and *extraversion.* Following prior research, we used a validated 20-item scale to derive the five factors (mean-centered) with values of coefficient alpha ranging between .73 and .86 (Barrick & Mount, 1991; McCrae & Costa, 1987).

Research has also shown that the hands-on and emotional support that founders receive from their families influence the founding process (Brüderl & Preisendörfer, 1998; Sanders & Nee, 1996). Hands-on support from relatives may reduce the hiring needs of a new business (Brüderl & Preisendörfer, 1998). Emotional support from family members can be helpful in sustaining emotional stability (Sanders & Nee, 1996) and thus in coping with

the additional responsibilities that hiring and managing other people entail. In our analysis, we thus controlled for family factors by including measures of *hands-on support from relatives* and *emotional support from relatives* (Brüderl & Preisendörfer, 1998). Founders were asked to indicate the level of each type of support on a scale ranging from 1, "very weak support," to 5, "extremely strong support."

We controlled for organization-level factors by including measures of the *number of founding partners* and whether a founder was engaged in a *follower business* (coded 1 if a respondent stated that he or she had purchased an existing firm). Approximately 15 percent of firms were founded by more than one individual, and approximately 4 percent of founders took over existing entities. Our main findings held when we removed founders who had partners or who took over firms.

We also controlled for the *amount of capital invested* and the breadth of customer segments addressed (denoted as *specialist business* in the tables). We asked respondents to state the capital they invested in their new businesses by checking one of the following eight categories (measured in euros; the exchange rate was at 0.90 euro/US$ during 2001): "no investment," "1 to 2,500," "2,501 to 5,000," "5,001 to 15,000," "15,001 to 25,000," "25,001 to 37,500," "37,501 to 50,000," and "greater than 50,000." As did Brüderl et al. (1992), we distinguished specialist firms, which focus on one type of customer group, from generalist firms, which offer products or services to different customer groups. Accordingly, we used a dummy variable (coded 1) to denote firms that focused on just one of the following types of customer groups as specialists: "small- and medium-sized firms (< 250 employees)," "large firms (≥ 250 employees)," "public administration," "private consumers/households," and "other." Firms that catered to more than one of these customer groups or that indicated that their customer group was not defined were coded as generalist businesses. Results were robust when coding those firms that only checked the "other" category as generalist rather than specialist businesses.

We also controlled for *average industry wage*, obtaining official data from the German Statistical Office for 25 different two-digit industry codes represented in our sample (Bundesministerium für Arbeit und Soziales, 2002; Statistisches Bundesamt, 2002). The wage levels (in thousands of euros) in the founding year 2001 were used for the analysis. We also controlled for time period effects using dummies pertaining to the different years in which firms could create jobs (the *second* and *third year of self-employ-*

ment were included in the analyses and the first year as the omitted reference category). Thus, for instance, the first-, second-, and third-year variables are coded 1 for firms that survived until 2003.

Analyses

We relied on a number of analytic methods. The employment count data structure was a (yearly) pooled cross-sectional time series. Because the number of observations varied by firm (some left the sample earlier than others) our data were unbalanced. Firms in existence for only one year contributed only one observation to the data set and firms surviving three years contributed three observations, as did those surviving beyond three years (i.e., firms still alive at the time of the survey), which are recorded as right-censored observations. Thus, for example, firms that failed in the second year contributed two observations (hence, the employment count in the second year includes information on the number of employees both for those firms surviving into the third year and those that failed during the second year).

Data such as those we study are often modeled using fixed-effects estimators, which analyze within-firm and over-time variation. This method was ill suited to our context since most of our independent measures were constant over time, as were the values of the dependent measure for some firms (e.g., not all firms created jobs for individuals other than their founders). Given that the dependent measures were nonnegative event counts that exhibited overdispersion (i.e., the variance of each variable was greater than its mean), we chose to use the negative binomial model, rather than the more commonly used Poisson method (Hausman, Hall, & Griliches, 1984). Although there were a nontrivial number of zero counts in our data set, the results of zero-inflated negative binomial models were very similar to those of standard negative binomial models.

We used Huber-White standard errors to correct for potential nonindependence of observations (Yamaguchi, 1991). That is, using the "cluster" subcommand in STATA, we adjusted the standard errors for intragroup correlation (Wooldridge, 2002). In addition, to adjust for possible interdependence of levels of analysis, we reran our models and clustered by the five-digit and the two-digit industry of each firm. Main results presented in this article were robust to the different clustering procedures.

It is also important to consider that the likelihood of firm failure may lead to differential rates of job creation over time. For example, it could well be that firms close to failure hire more employees in an effort to prevent failure. To address potential biases arising

TABLE 1
Examples of Businesses in the Sample

Advertising agency	Flea market organizer	Public relations consulting
African drums and dance instruction	Florist	Publishing agency
Auto body shop	Gardening services	Restaurant
Automobile repair shop	Glazier's shop	Sales of baby supplies
Bookkeeping and typing service	Graphic design	Sales of lamps
Building construction	Heating and sanitary services	Sales of horseback riding equipment
Car dealership	Housekeeping service	Sales of office furniture
Carpentry	Internet services	Sound studio
Carpet installation	Jewelry making (gold)	Storage and shipping service
Catering services (sushi)	Light design	Stonecutting
Commercial cleaning service	Management consulting	Textile sales and tailor
Construction engineering	Manufacture of custom glass components	Translation services
Courier service	Medical technology sales and distribution	Travel agency
Editorial services	Painter (homes and buildings)	Travel photojournalism
Energy consulting	Personal trainer	Ventilation services
Event management	Personnel consulting and services	Video graphic design
Export services	Physiotherapy	Watchmen service
Farmer's market stand	Piano and harpsichord building	Webdesign
Financial and investment consulting	Plumbing	Wholesale company (plastic products)

from differential survival chances, our models took the risk of failure into account (Castilla, 2008; Delmar & Shane, 2006). We controlled for firm failure over time by including the estimated hazard of failure in our event count models, following Castilla (2007), Lee (1979, 1983), and Lee and Maddala (1985). Specifically, we used a two-stage estimation procedure in which our dependent employment counts model included an estimated failure hazard from our estimation of the following:

$$\pi(t, Z_{i,t}) = \exp|\Gamma' Z_{i,t}|q(t).$$

In the equation, π is the instantaneous failure rate of firms in our sample. This rate is typically specified as an exponential function of covariates that is multiplied by $q(t)$, which is a time function. Z, the vector of covariates that influences the hazard of firm failure for a given founder, is indexed by both i—to indicate individual heterogeneity—and by t—to highlight that the values of the explanatory variables may change over time. Like Castilla (2008), we estimated Equation 1 using the Cox model (Cox, 1972, 1975). A benefit of the Cox model is that it does not require a particular assumption about the functional form of $q(t)$.

In estimating the likelihood of failure, we included several exogenous measures, one of which significantly influences firm failure but does not influence employment counts (cf. Greene, 2000): namely, the variance of credit risk obtained from the ZEW. This measure, updated for each year covered in the analysis, provided a control for whether random external shocks influenced the rate of failure. Additional exogenous measures were the labor requirements measure, provided by the ZEW, and the wage level measure for each of the 25 two-digit industries represented in our sample, obtained from the German Statistical Office. Thus, our first-stage estimation was identical to our second-stage regression, with the important difference that we included the measure of credit rating in the first stage but not in the second stage of our estimation procedure.

Because of potential issues in incorporating predicted values of nonlinear models into the second-stage model (Hausman, 2001), we also conducted a number of robustness tests for firm failure (e.g., piecewise constant exponential models, probit models). These different specification and functional form tests all yielded results similar to those reported in this article. Results from two-stage analyses, wherein we included a sample selection variable (lambda) generated from a piecewise constant event history model of firm failure, left our main findings unchanged (Delmar & Shane, 2003, 2006). In addition, as we describe below, our results were robust when we excluded the estimated failure hazard from the analysis. Finally, results were robust to the inclusion of a variable capturing the lagged values of our dependent employment count measure (all results are available from the authors upon request).

RESULTS

Descriptive Statistics

Our empirical analysis was based on data from 451 newly founded firms. As Table 1 shows, these businesses were founded in a wide variety of fields.

Table 2 presents the descriptive statistics and correlations for our variables. These statistics

TABLE 2
Descriptive Statistics and Correlations[a]

Variable	Min.	Max.	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1. Yearly total employment count	0	14	.57	1.71																													
2. Yearly failure rate	0	1	.04	.19	-.07																													
3. Breadth of knowledge	0	3	1.24	.60	-.01	-.02																												
4. Leadership experience	0	1	.51	.50	.10	-.05	.19																										
5. Labor requirements of average industry firm	.19	3.35	.92	.49	.20	-.10	-.08	.04																									
6. Secondary school degree (Hauptschule)	0	1	.19	.40	.03	.07	-.06	.03	.11																								
7. Secondary school degree (Realschule)	0	1	.29	.45	-.03	.10	.07	-.03	-.05	-.04																							
8. Vocational degree	0	1	.46	.50	-.02	-.02	-.00	.01	-.00	.28	.35																						
9. Master craftsman certificate	0	1	.09	.29	-.01	-.06	-.09	.01	.25	.18	-.01	.13																					
10. University degree	0	1	.48	.50	-.04	-.08	-.02	-.02	-.02	-.35	-.40	-.53	-.23																				
11. Ph.D.	0	1	.08	.27	.08	-.06	-.05	.02	.10	-.12	-.16	-.20	-.09	.05																			
12. Years of prior work experience	0	43	15.8	10.0	-.00	.11	.14	.13	.03	.27	.13	.22	.02	-.18	-.08																		
13. Duration unemployed	1	9	4.1	1.9	-.11	.13	.01	-.09	-.17	-.04	-.01	-.03	-.11	.06	.01	.26																	
14. Hours worked per week	1	6	2.6	1.2	.22	-.01	.08	.06	.18	.17	.03	.06	.12	-.10	-.06	.08	-.19																
15. Prior self-employment experience	0	1	.20	.40	-.03	.04	.05	-.01	-.04	-.00	.08	-.01	-.04	-.04	.07	.08	.12	-.04														
16. Age	2	9	5.49	1.7	-.04	.06	.07	.04	-.01	.11	.03	.01	-.09	.00	.02	.77	.37	-.07	.19													
17. Gender	0	1	.60	.49	.07	.03	.05	.20	.23	.20	-.05	.01	.20	-.04	.03	.13	-.08	.20	-.02	.06												
18. Conscientiousness	-3.58	0.81	.00	.81	-.01	.02	.06	.02	.07	.02	.12	.17	.06	-.07	.02	.14	.05	.02	-.09	.07	-.14											
19. Agreeableness	-1.50	3.47	-.00	.77	.05	-.06	-.00	.05	.08	-.03	-.07	-.02	.03	.11	.03	-.06	-.03	-.05	.01	-.05	.13	-.14									
20. Emotional stability	-2.20	1.44	.01	.73	.04	.05	.07	.05	.01	.04	.04	-.02	.06	-.08	.01	.04	-.08	-.01	-.01	-.01	.15	.03	-.18								
21. Openness to experience	-3.36	0.98	-.00	.88	-.03	-.00	.12	.03	-.05	-.01	-.09	.04	-.02	-.05	-.02	.05	.10	.05	.10	.04	-.19	.28	-.21	.09							
22. Extraversion	-1.12	2.82	-.00	.81	-.01	-.01	-.09	-.06	.07	-.04	-.09	-.08	-.05	.12	.07	-.03	.07	-.07	.04	.05	.13	-.14	.16	-.14	-.37						
23. Hands-on support from relatives	1	5	2.4	1.3	.05	-.06	-.05	-.04	.07	.09	-.01	.10	.04	-.14	-.00	.06	-.08	.09	-.05	-.01	.02	.05	-.08	-.01	.02	-.00					
24. Emotional support from relatives	1	5	3.6	1.2	.06	-.17	.01	.13	.03	-.07	-.05	-.01	-.01	.03	.05	-.02	-.10	.06	-.17	-.07	-.03	.10	.03	.03	.04	-.02	.44				
25. Number of founding partners	0	6	.29	.82	.15	.07	.04	.03	.07	-.05	-.07	-.07	-.06	.05	.06	-.07	-.05	.06	-.05	-.05	.11	.00	.09	.06	-.04	-.04	.05	.08			
26. Follower business	0	1	.04	.19	.25	.08	-.02	-.03	.07	.05	-.02	-.04	.02	-.03	-.01	-.06	-.04	.08	-.04	-.02	-.03	-.08	.00	.02	-.05	-.02	-.03	-.01	-.01		
27. Specialist Business	0	1	.85	.36	-.06	.02	-.06	-.05	-.00	-.07	.06	-.02	-.02	.04	.03	-.05	.01	-.01	-.01	.00	-.05	-.00	.01	-.03	-.01	-.00	-.04	.02	-.03	-.01	
28. Amount of capital invested	1	8	3.9	1.9	.36	-.03	.07	.12	.23	.12	.01	.04	.12	-.07	.01	.12	-.08	.33	-.08	.04	.12	-.05	-.01	-.01	.04	-.03	.22	.14	.09	.18	-.10
29. Average industry wage (1,000 euros)	1.97	3.51	3.0	.33	-.14	.04	.05	.05	-.22	-.12	-.00	-.10	-.33	.20	.04	.00	.09	-.17	.03	.12	.01	-.05	-.01	.11	-.01	-.04	-.09	-.06	.06	-.07	.01	-.16
30. Average industry credit rating	16.7	99.9	67.6	13.2	-.02	.07	.06	.05	-.32	.09	.07	.05	-.02	-.09	-.17	.13	.01	.04	.08	.06	.00	.00	-.02	.06	.06	-.12	-.03	-.04	-.08	.06	-.03	-.04	.01

[a] $n = 451$ firms/persons. Descriptive statistics and correlations apply to the first year of founding, 2001.

pertain to the first year of the sample frame (that is, we provide information on the 451 founders for the year 2001). As can be seen in Table 2, the maximum total employment count was 14 in the first year of the sample, a figure reaching a high of 23 in any one year over all three years of our study. Prior studies of entrepreneurship might have led one to expect that after three years some firms in the sample would have more than 23 employees, but here it is useful to remember that the firms in this study were located in a variety of non-high-tech and non-high-growth industries and were not backed by venture capitalists. Moreover, this maximum number is nonetheless impressive with respect to the primary goal of the policy program of increasing employment—particularly given that German labor laws are more restrictive with respect to hiring than are those in a number of other countries.

Our employment count numbers also reflect the size of most firms in the economy. In many countries, employment is distributed over a very large number of small firms and a small number of large firms. For example, in 2007, 32 percent of the approximately 336,000 firms (of any age) in Bavaria (the state in which Munich is located) had no employee besides the owner, and about 50 percent employed between 1 and 8 workers. Overall, 96 percent of all establishments in Bavaria employed fewer than 50 people, accounting for 41 percent of the workforce (Bundesagentur für Arbeit, 2007). These statistics are similar to those found in the United States. For instance, Osterman et al. noted that "of the approximately 6 million establishments in the U.S., nearly 92 percent employ fewer than 50 workers. These small firms employ 43 percent of the work force and are a significant factor in any discussion of employment policy" (2002: 17) Thus, an important feature of our study is that our sample may be more representative of the majority of firms in the economy than are the samples in some other entrepreneurship research, increasing the usefulness of this study for policy and application.

Coming back to our sample, we found that 20.2 percent of founders created jobs for others in their first business year, a figure that corresponds well to secondary data indicating that 20 percent of all new firms created in 2005 in Germany generated employment for others in their first year of business (Piorkowsky, 2006). With these numbers in mind, it is not surprising that Blanchflower emphasized the difference between "the most successful self-employed who have *one or more employees*—the *job makers*—and the self-employed without any employed who have created a job only for themselves" (2004: 3). Taking later years into consideration, we saw a growing share of founders become job mak-

ers, as about 30 percent of all founders employed other workers in their third business year. In effect, the largest 10 percent of founders in our sample employed an average of 7.9 individuals by their third year of operation, which compares to an average of 4.8 individuals in the first business year. Across all firms in our sample (including the self-employed without any employees), the average employment count for all founders rose from 0.60 employees in the first business year to 1.15 in the third (an annual increase of 24 percent).

Analyses of Firm Failure

Table 3 provides results from Cox analyses of new firm failure and represents the model used to estimate the control for hazard of firm failure for our analyses of employment counts. Findings in Table 3 are largely consistent with those of prior studies of new firm failure (cf. Brüderl et al., 1992). Our findings also reveal that previously unexplored factors have an important effect on the survival rates of newly founded firms; for example, founders receiving greater emotional support from relatives are shown to be less likely to go out of business. As one would expect, the exogenous measure of average credit rating indicates that the riskier the five-digit industry in which a firm is located, the higher are its chances of failure.

Negative Binomial Analyses of Employment Counts

Table 4 provides results from negative binomial models predicting yearly employment counts in the start-up firms over a three-year period beginning at the time of founding. Model 1 provides baseline results for the control variables. Model 2 introduces the main hypothesized variables of interest. In keeping with Hypothesis 1a, we found that founders with greater breadth of knowledge were significantly less likely to generate employment than founders with less extensive knowledge. In addition, supporting Hypothesis 1b, we find that founders with leadership experience have higher rates of job creation than founders who lacked such experience. Model 2 also shows that opportunity factors play a key role in job creation in new firms. In particular, in keeping with Hypothesis 2, results reveal that job creation increases significantly with increasing sector-specific labor requirements of the business opportunity that is being pursued.

In addition, it is important to note that, as the coefficient for the labor requirement variable in model 2 indicates, founders in our sample created jobs at a 26 percent rate relative to the labor require-

TABLE 3
Results of Cox Model Predicting the Likelihood of New Firm Failure[a]

Variable	Model 1	
General human capital		
Secondary school degree (Hauptschule)	−.01	(.02)
Secondary school degree (Realschule)	−.01	(.01)
Vocational degree	.03[†]	(.02)
Master-craftsman certificate	.02	(.02)
University degree	.01	(.02)
Ph.D.	−.00	(.02)
Years of prior work experience	−.00	(.00)
Duration unemployed	−.01	(.00)
Hours worked per week	.01	(.01)
Prior self-employment experience	.00	(.02)
Individual demographic characteristics		
Age	.01	(.01)
Gender	−.02	(.01)
Individual personality characteristics		
Conscientiousness	−.01[†]	(.01)
Agreeableness	.00	(.01)
Emotional stability	−.00	(.01)
Openness to experience	.00	(.01)
Extraversion	.00	(.01)
Support from family and relatives		
Hands-on	.00	(.00)
Emotional	.02**	(.01)
Organizational characteristics		
Number of founding partners	−.02[†]	(.01)
Follower business	−.04	(.03)
Specialist business	−.03*	(.01)
Amount of capital invested	.00	(.00)
Period effects		
Second year of self-employment	−.03[†]	(.01)
Third year of self-employment	−.05**	(.02)
Specific human capital		
Breadth of knowledge	−.00	(.01)
Leadership experience	.02	(.01)
Organization- and industry-level characteristics		
Average industry wage	−.01	(.02)
Labor requirements of average industry firm	.02[†]	(.01)
Average industry credit rating	−.001*	(.000)
χ^2	42.31	
Probability > χ^2	.07	
df	30	
Log-likelihood	−9,149.8	

[a] Robust standard errors are in parentheses. *n* = 1,301 person years (451 founders). Number of failures in year 1 (2001), 16; number of failures in year 2 (2002), 20; number of failures in year 3 (2003), 21.

[†] *p* < .10
* *p* < .05
** *p* < .01
Two-tailed tests.

ments (exp [.23] = 1.26).[2] The divergence between predicted employment counts and labor requirements likely stems in no small part from the lower investment levels of founders in our sample relative to other founders. For instance, increasing the level of investment in our sample from the mean to the maximum (a roughly 2 standard deviation increase) increases the expected employment count in model 2 from 0.39 to 1.61—a figure roughly equivalent to the average labor requirements measure.

Model 3 of Table 4 examines the interaction between breadth of knowledge and business opportunity characteristics. In keeping with Hypothesis 3a, we found that founders with greater breadth of knowledge had significantly lower employment counts as the labor requirements of the business opportunities increased, relative to founders without such knowledge—a result that holds in the full model (model 5). Note that the change in significance of the breadth of knowledge variable between models with and without the interaction term reflects the fact that the coefficient has different meanings when the interaction is added to the model (cf. Aiken & West, 1991).

Model 4 provides support for Hypothesis 3b. Compared to founders with no leadership experience, founders with leadership experience created fewer jobs as the labor requirements of business opportunities increased—a result that holds in the full model (model 5). Finally, as we show in model 6, our results were robust when we examined only firms founded by a single person (i.e., when we excluded the 15 percent of firms founded by two or more individuals from the analysis).

Figure 1 graphically depicts the effect of the individual opportunity nexus on job creation. Using the SPost program ("prvalue" command) for Stata (Long & Freese, 2001), we obtained predicted employment counts from the analyses in model 5. We obtained the values separately for each of the two interactions (*breadth of knowledge* × *labor requirements*, and *leadership* × *labor requirements*), holding the other measures at their means.

The top graph in Figure 1a shows important differences in job creation rates for founders of different knowledge breadth. In keeping with our theoretical development, we see that founders with a low breadth of knowledge create a higher number of jobs than founders with a high breadth of knowledge, all else being equal. This effect becomes more

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[2] Note that in the case of count models such as negative binomial models, exponentiated coefficients are incidence rate ratios (cf. Hardin & Hilbe, 2002).
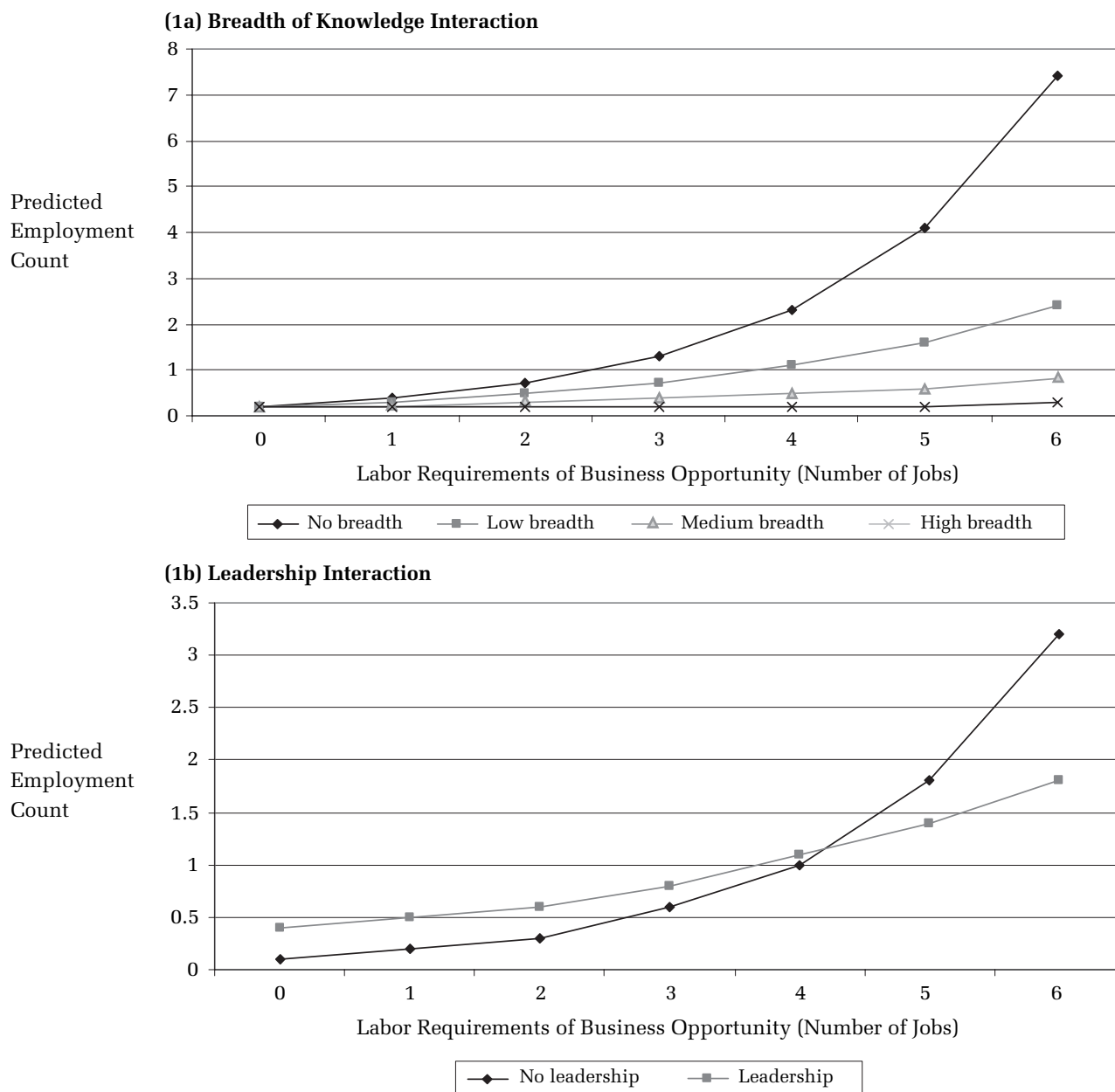
TABLE 4
Negative Binomial Estimates of Yearly Employment Counts[a]

Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
Human capital												
Secondary school degree (Hauptschule)	0.34	(0.29)	−0.00	(0.29)	0.05	(0.29)	0.01	(0.29)	0.05	(0.29)	0.09	(0.32)
Secondary school degree (Realschule)	0.02	(0.25)	−0.06	(0.24)	−0.05	(0.24)	−0.06	(0.24)	−0.05	(0.24)	−0.16	(0.27)
Vocational degree	−0.46	(0.30)	0.03	(0.33)	0.03	(0.33)	0.06	(0.33)	0.05	(0.33)	0.03	(0.40)
Master-craftsman certificate	−1.21*	(0.48)	−0.74	(0.46)	−0.80†	(0.45)	−0.79†	(0.46)	−0.82†	(0.46)	−0.75	(0.49)
University degree	−0.64*	(0.25)	−0.56*	(0.25)	−0.49*	(0.25)	−0.55*	(0.24)	−0.51*	(0.25)	−0.62*	(0.29)
Ph.D.	0.12	(0.39)	0.31	(0.38)	0.35	(0.37)	0.22	(0.36)	0.26	(0.36)	0.50	(0.44)
Years of prior work experience	−0.01	(0.02)	−0.03	(0.02)	−0.03	(0.02)	−0.04	(0.02)	−0.04†	(0.02)	−0.04	(0.02)
Duration unemployed	−0.14†	(0.08)	−0.20**	(0.08)	−0.18*	(0.07)	−0.20*	(0.07)	−0.19**	(0.07)	−0.21*	(0.08)
Hours worked per week	0.12	(0.09)	0.26**	(0.09)	0.26**	(0.09)	0.29**	(0.10)	0.29**	(0.10)	0.31**	(0.11)
Prior self-employment experience	−0.22	(0.26)	−0.14	(0.25)	−0.16	(0.25)	−0.21	(0.25)	−0.22	(0.25)	−0.25	(0.31)
Individual demographic characteristics												
Age	0.12	(0.12)	0.18	(0.12)	0.16	(0.12)	0.18	(0.11)	0.17	(0.11)	0.21	(0.13)
Gender	0.57*	(0.26)	0.19	(0.27)	0.21	(0.26)	0.10	(0.27)	0.13	(0.27)	0.13	(0.32)
Individual personality characteristics												
Conscientiousness	0.23	(0.14)	0.01	(0.14)	−0.01	(0.14)	−0.00	(0.14)	−0.02	(0.14)	−0.16	(0.17)
Agreeableness	−0.01	(0.15)	0.01	(0.14)	−0.02	(0.14)	−0.01	(0.14)	−0.03	(0.14)	−0.21	(0.16)
Emotional stability	−0.06	(0.13)	−0.07	(0.13)	−0.09	(0.13)	−0.09	(0.13)	−0.10	(0.13)	−0.02	(0.16)
Openness to experience	−0.04	(0.13)	0.04	(0.12)	0.05	(0.12)	0.02	(0.12)	0.04	(0.12)	−0.04	(0.13)
Extraversion	−0.20	(0.14)	−0.12	(0.14)	−0.14	(0.13)	−0.10	(0.14)	−0.11	(0.13)	−0.19	(0.15)
Support from family and relatives												
Hands-on	−0.12	(0.08)	−0.07	(0.08)	−0.08	(0.08)	−0.07	(0.08)	−0.07	(0.07)	−0.07	(0.09)
Emotional	−0.05	(0.14)	0.21	(0.14)	0.22	(0.14)	0.23	(0.14)	0.24†	(0.14)	0.21	(0.18)
Organization- and industry-level characteristics												
Number of founding partners	0.53***	(0.14)	0.32*	(0.15)	0.31*	(0.15)	0.27†	(0.15)	0.27†	(0.15)		
Follower business	1.39**	(0.42)	0.73†	(0.44)	0.77†	(0.44)	0.60	(0.45)	0.64	(0.45)	0.84	(0.58)
Specialist business	0.09	(0.30)	−0.39	(0.29)	−0.38	(0.29)	−0.46	(0.29)	−0.44	(0.29)	−0.24	(0.36)
Amount of capital invested	0.27***	(0.05)	0.35***	(0.05)	0.36***	(0.05)	0.38***	(0.05)	0.38***	(0.05)	0.33***	(0.07)
Average industry wage	−0.22	(0.33)	−0.30	(0.30)	−0.33	(0.30)	−0.35	(0.30)	−0.37	(0.30)	−0.51	(0.34)
Period effects												
Second year of self-employment	0.56***	(0.10)	0.24	(0.15)	0.26	(0.16)	0.24	(0.16)	0.26	(0.16)	0.20	(0.19)
Third year of self-employment	1.12***	(0.18)	0.35	(0.31)	0.41	(0.31)	0.35	(0.32)	0.39	(0.31)	0.39	(0.37)
Failure hazard rate	−14.41*	(5.88)	−2.17	(6.86)	−1.56	(6.91)	−4.36	(6.93)	−3.69	(6.97)	−2.80	(8.51)
Hypothesized measures												
Breadth of knowledge (H1a)			−0.37*	(0.16)	0.05	(0.21)	−0.35*	(0.16)	−0.05	(0.22)	−0.27	(0.26)
Leadership experience (H1b)			0.73**	(0.22)	0.76***	(0.22)	1.46***	(0.34)	1.38***	(0.34)	1.13**	(0.42)
Labor requirements (H2)			0.23*	(0.10)	0.50***	(0.14)	0.43***	(0.11)	0.59***	(0.14)	0.53***	(0.16)
Breadth × labor requirements (H3a)					−0.26**	(0.09)			−0.18†	(0.10)	−0.17†	(0.10)
Leadership × labor requirements (H3b)							−0.38**	(0.14)	−0.33*	(0.14)	−0.27†	(0.16)
Constant	−15.37**	(5.64)	−0.33	(6.45)	−1.39	(6.47)	1.38	(6.52)	0.45	(6.53)	0.22	(7.92)
	315.03		288.15		295.92		292.58		296.43		227.49	
Probability > χ²	0.00		0.00		0.00		0.00		0.00		0.00	
df	27		30		31		31		32		31	
Log-likelihood	−1,261.4		−1,242.3		−1,239.0		−1,236.4		−1,234.9		−886.1	

[a] Robust standard errors are in parentheses. $n = 1,301$ person years (451 founders) for models. Model 6 provides results for firms founded by one individual only ($n = 1,089$ person years/376 founders).

† $p < .10$
* $p < .05$
** $p < .01$
*** $p < .001$

FIGURE 1
Predicted Employment Counts[a]

(1a) Breadth of Knowledge Interaction

(1b) Leadership Interaction

[a] Predicted employment counts were generated from model 5 of Table 4 using the SPost program ("prvalue" command) for Stata (Long & Freese, 2001). These counts reflect the expected level of employment of the average firm in a given year (i.e., averaged over all three years of our sample), with all other variables held at mean levels. Predicted employment counts for interactions between breadth of knowledge and labor requirements—and between leadership and labor requirements—were estimated separately (with the other interaction held at its mean).

pronounced with increasing labor requirements of the business opportunity that is pursued. The bottom graph in Figure 1b indicates key differences in job creation rates for founders with and without leadership experience. Again, as our theoretical development suggests, the positive effect of founders' prior leadership experience on job creation declines with increasing labor requirements of the business opportunity.

In keeping with the results already discussed above (cf. model 2 of Table 4), these graphs also indicate that the formerly unemployed are relatively weaker job creators than the general population of firm founders (as captured in the ZEW measure for sector-specific labor requirements). In this vein, recall that the level of financial resources invested in new firm creation has a strong impact on job creation outcomes and that founders in our

TABLE 5
Negative Binomial Estimates of Yearly Employment Counts in Different Years[a]

Variables	Model 1, Year 2001		Model 2, Year 2002		Model 3, Year 2003		Model 4, Entire Sample	
Human capital								
Secondary school degree	0.17	(0.37)	−0.08	(0.34)	−0.24	(0.33)	−0.19	(0.30)
Secondary school degree	0.03	(0.31)	−0.05	(0.27)	−0.06	(0.26)	−0.15	(0.26)
Vocational degree	−0.07	(0.42)	0.23	(0.42)	0.28	(0.44)	0.10	(0.32)
Master-craftsman certificate	−0.76	(0.53)	−0.60	(0.54)	−0.62	(0.52)	−0.77*	(0.37)
University degree	−0.44	(0.30)	−0.53	(0.32)	−0.55	(0.34)	−0.49[†]	(0.27)
Ph.D.	0.60	(0.49)	0.30	(0.42)	0.51	(0.43)	0.13	(0.39)
Years of prior work experience	−0.03	(0.03)	−0.05[†]	(0.03)	−0.04	(0.03)	−0.04[†]	(0.02)
Duration unemployed	−0.16*	(0.08)	−0.18*	(0.08)	−0.22*	(0.09)	−0.17*	(0.07)
Hours worked per week	0.29*	(0.13)	0.35**	(0.11)	0.33**	(0.11)	0.25**	(0.10)
Prior self-employment experience	−0.02	(0.32)	−0.36	(0.27)	−0.36	(0.27)	−0.19	(0.29)
Individual demographic characteristics								
Age	0.22	(0.16)	0.22	(0.14)	0.19	(0.14)	0.11	(0.11)
Gender	0.20	(0.36)	0.14	(0.32)	0.18	(0.33)	0.18	(0.25)
Individual personality characteristics								
Conscientiousness	−0.11	(0.19)	−0.07	(0.17)	−0.06	(0.18)	0.05	(0.14)
Agreeableness	0.17	(0.16)	−0.09	(0.15)	−0.06	(0.15)	−0.00	(0.15)
Emotional stability	0.05	(0.16)	−0.03	(0.16)	−0.01	(0.16)	−0.23	(0.13)
Openness to experience	0.21	(0.15)	−0.09	(0.14)	−0.04	(0.14)	−0.03	(0.12)
Extraversion	−0.08	(0.16)	−0.13	(0.14)	−0.12	(0.14)	−0.27*	(0.13)
Support from family and relatives								
Hands-on	−0.12	(0.10)	−0.08	(0.09)	−0.12	(0.09)	−0.04	(0.08)
Emotional	0.07	(0.18)	0.30	(0.19)	0.34[†]	(0.19)	0.26[†]	(0.15)
Organization- and industry-level characteristics								
Number of founding partners	0.38*	(0.19)	0.44*	(0.19)	0.29	(0.21)	0.32*	(0.15)
Follower business	0.98[†]	(0.55)	0.21	(0.51)	0.18	(0.53)	−0.19	(0.51)
Specialist business	−0.45	(0.37)	−0.54	(0.35)	−0.65[†]	(0.37)	−0.48	(0.29)
Amount of capital invested	0.39***	(0.07)	0.41***	(0.07)	0.43***	(0.06)	0.37***	(0.06)
Average industry wage	−0.11	(0.38)	−0.35	(0.35)	−0.48	(0.35)	−0.38	(0.29)
Failure hazard rate	−0.08	(9.25)	−7.33	(9.48)	−10.43	(10.1)	−2.97	(6.39)
Hypothesized measures								
Breadth of knowledge	−0.48*	(0.22)	−0.42*	(0.17)	−0.44*	(0.17)	−0.28[†]	(0.17)
Leadership experience	0.84**	(0.28)	1.02***	(0.27)	1.00***	(0.25)	0.88***	(0.24)
Labor requirements	0.71[†]	(0.41)	0.47**	(0.15)	0.27**	(0.09)	0.34	(0.29)
Constant	−3.55	(8.11)	4.89	(8.55)	8.42	(9.23)	0.62	(5.77)
χ^2	196.50		216.07		218.96		219.94	
Probability $> \chi^2$	0.00		0.00		0.00		0.00	
df	28		28		28		28	
Log-likelihood	−334.3		−660.9		−642.8		−374.8	
n (observations/firms)	451/451		435/435		415/415		451/451	

[a] Robust standard errors are in parentheses. Model 4: The job creation dependent variable pertains to the year of failure, or censoring if the firm survived is still in business at the end of the year 2003.

sample made lower financial investments than other founders. The implications of this finding for public policy thus merit discussion in more detail below.

Extensions and Robustness Tests

We conducted a number of robustness tests and extensions to our analyses (results are available upon request). We found that the factors influencing job creation were largely similar regardless of the types of jobs that founders created. We also assessed whether our main results were robust when we examined patterns of employment counts for each year of the data set (i.e., 2001, 2002, and 2003) in Table 5. These analyses (see models 1, 2, and 3) indicate that effects of all hypotheses were strong. In addition, patterns were strong when we analyzed the entire sample—using only the last observed record for each founder (e.g., employment counts for firms failing in year one were for 2001, whereas employment counts for censored firms

were for 2003) (see model 4). Taken together, these results suggest that sampling and selection issues did not have a significant influence on our main findings. For instance, the factors investigated in this research are robust even as average firm size increases and as firms fail.

We also examined the robustness of our findings to different specifications of our labor requirements measure. For example, we asked six experts (including employees of the funding agency) to estimate the minimum number of employees needed to run each of the businesses in our sample. Correlations between the expert estimates were very high (> .90). We therefore created a measure that reflects the average of these rankings as well as several others to assess consistency. Results for all expert ranking measures were similar to those presented for the measure obtained from the ZEW. Moreover, the average expert ranking had a stronger effect on employment counts than the measure from the ZEW. Our main results were also robust to the use of the median employment size of the firms.

In unreported tests, we also assessed whether our results changed when we excluded the estimated failure hazard from our full model (model 5). Results indicated that our focal study variables were robust to the exclusion of the estimated failure hazard rate. For example, the coefficients for the breadth of knowledge measure increased by 0.01 when the failure hazard measure was excluded (from −0.05 to −0.04), and the coefficient for the leadership experience measure decreased by 0.06 (from 1.38 to 1.32). Results also indicated that the coefficients for the control variables changed only slightly when the failure hazard was excluded from model 5, with the main changes pertaining to the follower business measure—which increased from 0.64 to 0.79 (becoming significant at the .05 level)— and to the year dummies (with the coefficient for year 2002 increasing from 0.26 to 0.31 (significant at the .01 level), and the coefficient for year 2003 increasing from 0.39 to 0.52 (significant at the .01 level).

DISCUSSION

In this article, we investigated the individual- and opportunity-level factors influencing job creation in new firms—a critical but little explored topic in the extant literature—by refining, extending, and testing theories of human capital and entrepreneurship. Several key results emerge from our analyses. Our findings support the idea that founders' human capital characteristics affect job creation in new firms. However, our findings also show that more human capital is not always better:

founders possessing a greater breadth of knowledge create *fewer* jobs, and founders possessing prior leadership experience create *more* jobs. Moreover, as the sector-specific labor requirements of a business opportunity increase, both breadth of knowledge and leadership experience allow founders to run their firms with fewer employees. As we discuss below, our findings have a number of key implications for theory and public policy.

Theoretical Implications

The factors influencing job creation operate at a number of different and often linked analytic levels, doing so in ways that are not fully understood conceptually or empirically. The systematic linkages that our analysis revealed indicate ways in which we can better explain and predict job creation, providing future studies with critical information on the trail to a more general theory of job creation.

We contribute insights for human capital theory, particularly with respect to the effects of two types of human capital on a little explored outcome, namely job creation in newly founded firms. Our findings also reveal an intriguing pattern: although one would expect that more human capital should generally lead to "better" outcomes, and thus that founders endowed with greater amounts of knowledge and experience should create more jobs, our results indicate that this general assertion is only partly true. Our study therefore suggests a more nuanced view of the effects of human capital on job creation.

Our findings also provide several interesting contributions to the entrepreneurship literature. We offer one of the first studies using job creation as a dependent variable, thereby improving understanding of how entrepreneurship influences wealth creation at a societal level (MacMillan, 2005). We thus extend prior work that has mainly focused on understanding the relationship between (some of) the factors studied here and processes and outcomes such as opportunity identification (cf. Shane & Venkataraman, 2000), survival (cf. Brüderl et al., 1992), and sales (cf. Delmar & Shane, 2006).

Furthermore, our findings provide direct empirical support for the individual-opportunity nexus concept (Shane, 2000, 2003). Specifically, our results indicate that the manner in which an opportunity is exploited is a function of the interaction of characteristics at different levels of analysis: a founder's individual characteristics (breadth of knowledge, leadership experience) and the characteristics of the opportunity (labor requirements).

Finally, we offer novel insights on the role of pre-entry knowledge endowments in new firm creation. Although the importance of these pre-entry endowments has been recognized and has been subject to much theoretical and empirical research (e.g., Baron, Hannan, & Burton, 1999; Dencker, Gruber, & Shah, 2009; Helfat & Lieberman, 2002), we are unaware of any study that highlights the key effects of prior leadership experience and breadth of knowledge in shaping firm creation outcomes. Along these lines, Lazear's (2005) study suggests that entrepreneurs tend to have more varied backgrounds (i.e., they are "jacks-of-all-trades") than individuals who work for others. Our findings enrich this picture by suggesting that the jacks-of-all-trades create fewer jobs when setting up their firms.

Public Policy Implications

Bridging programs. Many postwar policies and institutions were created with an underlying assumption of lifetime employment, but employment relationships have become more tenuous and less certain in duration, with transient unemployment and permanent job loss increasing considerably (Osterman et al., 2002). Because labor market institutions are often no longer consistent with the realities of contemporary economic and social life, they may no longer be able to generate the results that they were designed to achieve (Kochan, 2000). Faced with these changing realities, local, state, and national governments are struggling to create programs to help unemployed individuals regain a place in the workforce.

The policy program we examined is quite different from many others in that it is rooted in entrepreneurship, an area that has traditionally been left in the hands of individuals. In taking this direction, governments are promoting self-reliance and creativity among their citizens and decreasing their reliance on large employers at a time when the employment contract is disintegrating.

Our findings regarding the effect of individual and opportunity characteristics on job creation outcomes have implications for improving the administration and structure of programs designed to support the transition of the unemployed to self-employment. Moreover, our results provide important insights into how governments can attempt to meet challenges in contemporary labor markets. In the following subsections, we discuss in more detail a number of specific policy implications of our study.

Job creation. Like other policy programs aimed at unemployed people, the program we investigated has the primary goal of putting people back to work. Yet our results show that these programs have a secondary effect: not only do they help individuals transition from unemployment to self-employment, but also, under the right circumstances, they create jobs for others. In total, the 451 founders in our sample created jobs for 498 other individuals, namely, 150 full-time positions, 44 part-time positions, 98 mini-jobs, and 206 freelance jobs. Although our study design did not allow us to perform an overall cost-benefit analysis, prior work investigating first-order employment effects (that is, employment created for a founder) has concluded that the program studied here is cost-effective from the perspective of the program administrator (Caliendo, 2008; Caliendo, Steiner, & Baumgartner, 2007). To the extent that government officials designing and implementing such a program want to broaden their goals, our empirical findings point to a number of factors on the individual and organizational levels that policy designers and program administrators should consider.

Sector-specific labor requirements. The labor requirements construct highlights the fact that businesses in different sectors require different numbers of employees. Program administrators can use this insight to better understand the challenges associated with the creation of particular types of firms and better assist firm founders. In particular, this insight is of high importance when the financial resources available for new firm creation are taken into account. As our analysis has revealed, founders coming from unemployment create fewer jobs than the general population of founders—in no small part because of low levels of financial investment into their businesses. Thus, if access to financial capital is indeed a key factor limiting job creation in this population, program offices might want to consider offering a variable component in the financial support scheme according to the sector-specific labor requirements being exploited.

From a nonfinancial perspective, program offices could help new businesses fill required positions. For example, agencies could create a searchable database of unemployed individuals that allows founders to identify employees with required skill sets. Given a more efficient and effective search for employees, founders could devote more time to other tasks required in the new firm creation process. Agencies could also train founders starting larger firms on hiring processes, payroll and benefits administration, and government requirements related to hiring. Such assistance would be valuable since the management of these activities is likely to be new to most founders and could significantly distract them from revenue-creating activities (Cook, 1999; Klaas, McClendon, & Gainey, 2000; Terpstra & Olson, 1993). Administrators

could also provide motivational support to founders. For instance, because hiring other people leads to additional responsibilities, the agency might provide encouragement by pointing founders to research such as ours highlighting that people like them were able to cope with the pressures of firm creation and successfully generate employment for others.

Breadth of knowledge and leadership experience. Government agencies can use our insights on the individual-level factors influencing job creation (and their interaction with a business opportunity's labor requirements) to go one step further in tailoring their assistance to the human capital of the unemployed. Such tailoring is particularly critical given the varied employment and educational histories possessed by individuals in the 21st century. For example, assessing the breadth of a founder's knowledge might be a critical first step in providing guidance for the firm creation and employment process (e.g., in defining which types of work the founder can do on his or her own). Program offices might provide additional guidance to founders who lack leadership experience so that they become more comfortable with managing employees. For instance, the program's administrators could organize evening classes or encourage founders to seek out existing educational programs that address leadership issues.

Limitations and Directions for Future Research

There are limitations to be considered when interpreting and using the results of our study. As with all survey-based studies, the quality of our data depended on survey responses. We addressed the issue of response bias with respect to our population of interest in the methods section. On the basis of a number of comparisons and tests, we maintain that the results of our study should not be strongly affected by response bias.

Yet our data source also raises questions regarding generalizability. One particularly important concern is whether the relationships identified in this study generalize beyond our population of formerly unemployed people who received funding from the FEA to (1) the overall group of people who had been unemployed and became founders and (2) all firm founders.

To address the first issue, we investigated whether formerly unemployed founders who received funding differed systematically from unemployed individuals who started new firms without such funding. Unfortunately, secondary statistical material is too coarsely grained to provide a basis for a detailed comparison of founders' breadth of

knowledge, leadership experience, and labor requirements in the two groups of formerly unemployed founders. However, the available data provided a basis for a preliminary assessment, as they include information on founder characteristics that likely link to our key predictors. In particular, extant secondary data covering 1,443 firms founded between 2003 and 2006 (Sandner, Block, & Lutz, 2008) indicate that the two groups of formerly unemployed founders are similar along many dimensions (e.g., age, education, proportion of founding partners, and one-digit industry sector of firm) yet significantly different in gender (19 percent female representation among formerly unemployed founders without funding versus 40 percent in our sample).[3]

The age and education similarities between the two groups of unemployed founders suggest that mean levels of breadth of knowledge and leadership experience should be similar in the groups. The similarities in terms of general industry sectors also provide initial evidence of fairly similar labor requirements of the firms in both samples. Nevertheless, given a lack of specific, detailed information on the different predictors, a full assessment of the generalizability of our results to the overall group of people who had been unemployed and became founders requires further research.

In terms of whether our results generalize to all firm founders, we again face the challenge of a lack of secondary data upon which we can draw. Perhaps the most relevant study is Niefert and Tchouvakhina (2006), which provides data on a more general population of founders obtained from a sample of 877 firms founded in Germany in 2003–04. We found that our formerly unemployed founders were highly similar to their founders along dimensions such as age, education, and gender. We also found strong similarities in the industry sectors in which formerly unemployed founders created businesses, except for the manufacturing sector, where the founders in our sample are slightly underrepresented.

Demographic similarities between our sample and the population of founders might suggest fairly similar levels of breadth of knowledge and leadership experience for the two groups, whereas the broad similarity in general business sectors could indicate fairly similar labor requirements for the two groups. The available secondary data appear to indicate that the effects of our key predictors on job

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[3] We thank Joern Block for running the additional analysis based on German data described in Sandner et al. (2008).

creation should be strong in the more general population of founders.

As our focal study variables seem to be important predictors of job creation in new firms, we encourage researchers to assess the generalizability of our findings to the general population in more detail. In turn, such research could be informative for policy makers designing programs such as the ones offered by the Small Business Administration (SBA) in the United States. For instance, policy makers might seek to ensure that job creation is part of the SBA mandate when founders create firms. Furthermore, the SBA might wish to search for the characteristics among founders that we identify as leading to higher rates of job creation.

Looking beyond key predictor variables to our dependent variable, the available secondary evidence suggests that founders coming out of unemployment are weaker job creators than founders in the more general population. In this regard, the comparison provided by Niefert and Tchouvakhina (2006) indicates more specific differences in job creation activity: (1) about 27 percent of formerly unemployed founders have created jobs for others within the first business year, while 53 percent of all other founders have done so, and (2) on average, formerly unemployed founders create one additional job for others within their first business year, while other founders create 2.9 additional jobs in their first year. To a large extent, these differences can be attributed to the different levels of financial investment available for new firm creation: formerly unemployed founders have significantly lower financial resource endowments and find it significantly more challenging to finance their start-ups (Niefert & Tchouvakhina, 2006).

Conclusion

Stimulating and supporting job creation is a high priority for almost any government around the world. In this article, we shed light on the job creation challenge by showing how founder and opportunity characteristics influence job creation in newly founded firms. The policy program studied here should be attractive to governments in many countries, and specifically to policy makers in the United States, because it is coherent with a set of values that emphasize freedom of personal expression and equality of opportunity to achieve individual goals.

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John C. Dencker (dencker@illinois.edu) is an associate professor in the School of Labor and Employment Relations at the University of Illinois at Urbana-Champaign. He received his Ph.D. in sociology from Harvard University. His research examines the effects of corporate restructuring, public policy initiatives, generational dynamics, and mergers and acquisitions on the employment relationship.

Marc Gruber (marc.gruber@epfl.ch) is an associate professor at the College of Management of Technology at the Ecole Polytechnique Fédérale de Lausanne (EPFL). He received his Ph.D. from the University of St. Gallen, Switzerland, and his habilitation from the Ludwig-Maximilian-University Munich. His research examines the processes underlying new firm creation, entrepreneurial opportunity identification, and technology commercialization.

Sonali K. Shah (sonali@alum.mit.edu) is an assistant professor of management in the Foster School of Business at the University of Washington. She received her Ph.D. in management at the Massachusetts Institute of Technology. Her research interests include community-based innovation, the role of founders' prior knowledge and experience in new firm creation, and industry emergence and evolution.