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DISSERTATION

Self-Employment among Older Workers

Assistance Programs, Liquidity Constraints and Employment Patterns

Qian Gu

This document was submitted as a dissertation in September 2009 in partial fulfillment of the requirements of the doctoral degree in public policy analysis at the Pardee RAND Graduate School. The faculty committee that supervised and approved the dissertation consisted of Julie Zissimopoulos (Chair), Lynn Karoly, and Susan Gates.

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Published 2009 by the RAND Corporation
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Abstract

The aging population has substantially changed the workforce in the United States. The labor participation rate among older workers has been rising in the past few decades. Self-employment is an increasingly popular form of employment among older workers. Self-employment at older ages could potentially contribute positively to the economy of the United Sates. However, starting a new business at an older age could expose older workers to substantial financial risk. Surprisingly, however, self-employment at older ages has not received much attention from academic researchers and policy makers.

This dissertation intends to expand our knowledge base of the self-employment experience at older ages and provide empirical evidence that can facilitate policy making in the relevant area. The first paper documents the largest public and private small business assistance programs in the United States, critically reviews the evaluation studies conducted on those programs and provides suggestions to improve future evaluation studies of those programs. This analysis reveals an urgent need for substantial investment in performance data collection and more evaluations studies with rigorous methodology.

The second paper highlights the existence and importance of liquidity constraints in older workers' decisions to start a new business, even if older workers have, on average, more wealth than younger workers. Liquidity constraint is defined as a lack of sufficient starting capital to start a new business. First, I find a positive relationship between household wealth and movements into self-employment throughout the wealth

distribution. Second, I estimate that wealth matters more for becoming self-employed in industries requiring high starting capital. Finally, I show that workers with a lump-sum distribution option (LSO) in an employer-provided pension plan—a proxy for liquidity—are more likely than workers with a pension and without an LSO to transition into self-employment. Compared with workers with no LSO in their pension plan, workers with an LSO are 27 percent more likely to transitions from wage and salary work to self-employment over a two-year period.

The third paper analyzes the employment trajectories of individuals who enter self-employment at older ages, develops approaches for identifying workers' expectations at the time of self-employment entrance, compares the trajectory patterns of those who are likely using self-employment as a retirement transition with those who are not and identifies the factors that contribute to older workers' survival in self-employment. This analysis indicates that around one third of self-employed older workers survive six or more years in self-employment. The survival rate in self-employment among older workers is 20 percentage points lower than that of the younger self-employed workers. The lower survival rate for older workers may reflect the fact that many self-employed older workers are nearing their desired retirement age when they enter self-employment. This analysis further indicates that most self-employed older workers do not expect to work for a period of time much longer than six years when they enter self-employment. The regression analysis highlights the importance of the self-reported probability of working and the initial business conditions in determining self-employment survival among older workers.

Acknowledgements

I would like to acknowledge the many people who provided guidance and support during this study. I am extremely grateful to my dissertation committee members, Julie Zissimopoulos, Lynn Karoly, and Susan Gates for their invaluable guidance to my dissertation research and academic training. I am extremely lucky to work with Julie since the early time in the graduate school. The research experience I accumulated while working with her built a solid foundation for this dissertation and my future research. She has inspired me of this research from a very early stage and mentored me with great patience and enthusiasm in the development since. I would also like to thank her for providing substantial funding for this dissertation. Lynn and Susan have offered generous help and invaluable comments on my analysis throughout this study. Their comments and suggestions greatly improved the quality of this analysis. This dissertation is not possible without their unreserved support.

Among many other RAND researchers, I am particularly indebted to Darius Lakdawalla and Seth Seabury. Darius always had great confidence in me and my work and provided generous help, support and research funding throughout my time at RAND. I have learnt tremendously from Seth on conducting empirical econometric analysis. He is extremely patient to answer my questions and very generous to offer help whenever I needed. I would like to extend a special thank to my external reviewer, Prof. Robert W. Fairlie at the University of California at Santa Cruz, for his timely response and very helpful comments.

Rachel Swanger has provided generous support for my graduate study and my dissertation since my first day at PRGS. She had done more than she needed to find funding for my research. I would like to acknowledge that this dissertation is partially supported by the Rothenberg Dissertation Fellowship.

Lastly, I would like to thank my wife Jingjing Ye and my parents for their unconditional love and support. My gratitude to them is beyond expression by words. It is because of them I regained my confidence during the most difficult time in personal life and research.

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Chapter 1

Introduction

1.1 Background

Small businesses play a significant role in economic development and expansion in the United States. Self-employed workers are an important part of the American workforce. In 2006, 11.9 percent of the economically active workforce was self-employed in either incorporated or unincorporated businesses (Zissimopoulos & Karoly, 2008). Older workers, however, a have higher rate of self-employment than younger workers: rates of self-employment among workers over age 50 are 20 percent while the rates for all workers over age 16 peaked in 1994 at 12 percent (Zissimopoulos and Karoly, 2008). While some of the self-employed older workers have been self-employed much of their working life, many older workers make a transition to self-employment after age 50, typically from a wage and salary job. Self-employed older workers can be found in a wide array of industries and occupations. Some of them work alone or with one's spouse. Others hire employees other than family members or friends (Zissimopoulos & Karoly, 2006).

The labor market participation rate of older workers has fallen dramatically in America, as it has in most other developed countries[1]. Because of the aging population and earlier retirement ages, the ratio of workers to retirees has dropped steadily (from 5:1

[1] This trend started to stop and reverse in recent years; see Maestas and Zissimopoulos (forthcoming) for details.

in 1960 to 3.3:1 in 1996; it is projected to be 2:1 in 2030) (Quinn, 1996). As a result, the Social Security system is projected to be insolvent in the near future (Quinn & Mitchell, 1996). Public policies that provide incentives to encourage workers to work additional years, especially at the later stage of working life, are extremely important for securing retirement resources for older Americans.

Self-employment transition at older ages has important economic implications. Compared with wage and salary workers, self-employed workers are more likely to work longer and retire later (Zissimopoulos and Karoly, 2006). Considering the financial imbalance of the Social Security system and the financial uncertainty of define-contribution pension plans, self-employment at an older age could potentially increase the financial security of workers nearing retirement age. The product, service and job opportunities created by the self-employed older workers could contribute to economic growth. The flexibility offered by self-employment also fits in the lifestyle of older workers. All these potential benefits associated with self-employment at older ages, however, depend on the outcomes of their self-employment and the performance of their small businesses.

Older workers are different from younger workers in important ways, ways that affect older workers' likelihood of becoming business owners. For example, older workers have more wealth, different types of wealth and more work experience than younger workers. Thus they have less need for credit and, for those who need to borrow, may have more access to credit. On the other hand, older workers may be less willing to take on the risk of business ownership, given that they have fewer healthy work years

remaining compared to younger workers to recoup the losses of an unsuccessful business. Older workers may prefer the job flexibility and work conditions of being a business owner more than young workers. Compared with wage and salary workers, self-employed older workers are more likely to appreciate the autonomy of being their own boss and have a more favorable rating in terms of enjoying their job (Zissimopoulos & Karoly, 2006). On the other hand, they may be less willing to leave a wage and salary job that offers health insurance for self-employment than younger workers because of the increased likelihood of being in poor health or experiencing a health shock.

Despite the complexity and significance of self-employed older workers, few studies have been devoted specifically to the study of self-employment among older workers. We have a lot to learn about the personal characteristics of those older workers who choose self-employment, the patterns of self-employment among older workers, the advantages and disadvantages older workers possess to start self-employment, the channels the older workers use to fund their new business, the performance of their business and their feelings and opinions toward self-employment. The paucity of relevant research prevents policymakers from utilizing self-employment as a tool to encourage a higher labor market participation rate among older workers.

1.2 Literature

The significance of self-employment has attracted extensive attention from researchers in public policy and labor economics. The existing research on self-employment focuses on describing the factors that determine the choice of self-employment over wage and

salary jobs. For example, studies have demonstrated that, among the general workforce, men are more likely to be self-employed than women, and that married persons and persons with better education have a higher rate of self-employment (Devine, 1994; Bregger, 1996). African Americans and Hispanics are less likely to seek self-employment than white people (Fairlie & Meyer, 1996). Studies of the determinants of self-employment also suggest that liquidity constraints may bind when people start self-employment but the results are mixed (Evans and Jovanovic 1989; Evans and Leighton 1989; Holtz-Eakin, Joulfaian and Rosen 1994; Dunn and Holtz-Eakin 1995, 2000; Fairlie 1999; Bruce, Holtz-Eakin and Quinn 2000; Hurst & Lusardi, 2004; Fairlie and Kranshinsky, 2006). The level of risk-aversion and the availability of health insurance have also been reported as strong determinants of self-employment choice (van Praag and Cramer, 2001; Wellington, 2001; Lombard, 2001). Several attractive features of self-employment that have the effect of pulling people into self-employment have been reported, including high reward, non-pecuniary benefit and job autonomy (Evans & Leighton, 1989; Blanchflower & Oswald, 1998; Lombard, 2001).

Despite its importance, self-employment transition at older ages remains an understudied area. Earlier studies have reported the importance of flexibility of work and prior self-employment and managerial experience in the self-employment choices of older workers (Quinn, 1980; Fuchs, 1982). Some recent research has studied the effects of the portability of health insurance on self-employment transition at older ages, with mixed results (Bruce et al, 2000). Karoly and Zissimopoulos (2004) presented an overview of the current situation and important characteristics of self-employed older

workers. They reported that the characteristics of self-employed older workers are similar to the general self-employed population in terms of gender, education, race, marital status, wealth and health condition. Zissimopoulos and Karoly (2007) provided a comprehensive assessment of the factors that determine the transition from wage and salary jobs to self-employment at older ages. Their multivariate regression models highlight the importance of health condition, wealth, pension and health insurance coverage in the self-employment transition.

Little research has studied the employment experience of self-employed older workers and the performance of their new business. However, there is a significant amount of literature that studies the survival of new businesses in general. Most of these studies reported consistently poor survival rates for new businesses. For example, Shane (2008) indicates that about 45 percent of the new firms established in 1992 last five years and only 30 percent last ten years. Taylor (1999) reported that only 60 percent of the self-employment businesses started in Britain have survived the first year. Some studies have attempted to differentiate voluntary exit from involuntary exit (e.g. bankruptcy) (Taylor, 1999; Headd, 2003; van Praag, 2003). Taylor (1999) observed that a substantial part of business dissolution can be attributed to alternative employment opportunities. Headd (2003) reported that a third of the closed businesses were successful at the time of their closure, thus suggesting that many business owners have executed a planned exit strategy. Factors that determine the survival and performance of small business include firm age, business size, industry, education, motivation, the financial resources of business owners and the financial investment of the business (Bates, 1990; Audretsch,

2004; Holtz-Eakin, Joulfaian and Rosen, 1994; Nucci, 1999; Headd, 2003). Fairlie and Robb (2008) has emphasized the importance of racial disparity in business survival: businesses owned by African Americans are more likely to close and have a poor business performance (in terms of sales, profits and number of employees) than white-owned businesses; and businesses owned by Asian Americans tend to be more successful.

1.3 Research Questions and Analytical Plan

The objective of this dissertation is to understand the nature of self-employment among older workers, the factors that affect their self-employment decision, the outcomes of their self-employment experience and in general, the barriers to successful self-employment and business ownership among older workers. The objective of this dissertation is achieved by answering the following research questions:

1. What is the self-employment promotion environment in the U.S.? What are the self-employment assistance programs in the U.S.? Is there empirical evidence that suggests these programs are effective?
2. Do liquidity constraints bind for older people when they start self-employment? Is a lack of access to credit a barrier to self-employment for older workers?
3. What are the employment patterns over time of older workers who enter self-employment? What is the self-employment survival rate of older workers? What are the personal and business characteristics that affect older workers' survival in self-employment?

This dissertation is organized into three empirical papers that attempt to answer the research questions above. Chapter 2 documents the most important public and private programs designed to promote self-employment and small business creation, critically examines the existing research on the effects of those programs, and identifies new directions for future research on this topic. Chapter 3 adds to the current literature on the importance of liquidity constraints for business formation by analyzing rich, longitudinal data, employing new empirical methods, and by studying a middle age and older population. Chapter 4 analyzes the employment trajectories of individuals who enter self-employment at older ages, develops approaches for identifying workers' expectation at the time of self-employment entrance, compares the trajectory patterns of those who are likely using self-employment as a retirement transition with those who are not and identifies the factors that contribute to older workers' survival in self-employment. Chapter 5 discusses the policy implications of the empirical evidences.

Chapter 2

Small Business Assistance Programs in the United States: An Analysis of What They Are, How Well They Perform, and How We Can Learn More about Them

INTRODUCTION

Small businesses play a significant role in economic development and expansion in the United States. According to the U.S. Small Business Administration (SBA), in 2006, 99.9 percent of the nearly 26 million firms in the United States were small businesses with fewer than 500 employees, most of which (97.5 percent of all firms) were very small businesses with fewer than 20 employees (SBA Office of Advocacy, 2006). Very small businesses, however, accounted for 50 percent of the non-farm real gross domestic product and 60-80 percent of net new job creation over the past decade (SBA Office of Advocacy, 2006).

Small business activity rests on a relatively small cadre of entrepreneurs who start and manage new enterprises. As of 2006, 11.9 percent of the economically active workforce in the United Stated was self-employed in incorporated or unincorporated businesses (Zissimopoulos and Karoly, 2008). The Kauffman Index of Entrepreneurial Activity indicates that the average percentage of the American adult population starting a new business each month in the years 1996 to 2005 fluctuated around 0.30 percent, with a decline to 0.27 percent during the high-tech bubble and a rise thereafter reaching a peak of 0.32 percent in 2003. The index, however, shows significant differences in business formation among demographic groups (Fairlie, 2006a), a finding that is consistent with

the literature on self-employment. Research finds, for example, that men are more likely to seek self-employment than women and that married persons and persons with better education have higher rates of self-employment than unmarried and low educated individuals (Devine, 1994; Bregger, 1996; Manser and Picot, 1999; Georgellis and Wall, 2000). In terms of race and ethnicity, African Americans and Hispanics are less likely to be self-employed than whites, however business ownership is often cited as a path to economic success for immigrant groups of various ethnicities (Fairlie and Meyer, 1996; Hout and Rosen, 2000).

The propensity of business formation is geographically heterogeneous. Mountain and Pacific states enjoy the highest rates of business formation and Middle Southern and Midwestern the lowest rates. The geographic difference is substantial considering that the highest state-level business creation rate (Vermont) is more than 3 times of the lowest rate (Delaware) (Fairlie, 2006b). The differences in entrepreneurial activities across groups and geographic locations may in part reflect an uneven distribution of entrepreneurial resources, including individual level resources such as human capital and wealth as well as community and state level resources such as entrepreneurial assistance programs, public and private financial resources and more generally, an entrepreneurial environment.

The vital importance of small businesses in the American economy has prompted federal and state governments and private organizations to implement various programs to facilitate small business creation and expansion. For example, Small Business Development Centers (SBDCs) offered by the SBA have provided business training and

technical assistance to current and prospective small business owners in past decades. The 1998 Workforce Investment Act (WIA) authorized states to adopt Self-Employment Assistance (SEA) programs as part of their Unemployment Insurance (UI) program, although only seven states currently have programs in place. SEA participants are entitled to receive unemployment insurance benefits while starting a new business, instead of searching for a wage and salary job. While some small business assistance programs are universally available, others target specific groups. For example, SBA funded Women's Business Centers (WBCs) offer business assistance to new and nascent women business owners, especially those from disadvantaged groups. Moreover, there are hundreds of microenterprise programs across the United States that provide business training, financing, and other assistance to entrepreneurs from different socio-economic groups with various resource needs.

Together, the small business assistance programs may exert significant impact on the entrepreneurial activities and profiles of small business owners in the United States. Yet how much do we know about the effects of these small business assistance programs, the features that make programs effective, and who benefits from the programs? Our aim in this study is to address this question by: (1) documenting the most important public and private programs designed to promote self-employment and small business creation; and (2) critically examining the existing research on the effect of those programs designed to promote entrepreneurship on various business outcomes. In addition, we seek to identify new directions for future research on this topic. In particular, we identify ways in which existing data sources may be used to expand the knowledge base of the

effects of small business assistance programs on rates of entrepreneurship and the economic performance of small firms.

To preview our findings, we document that the class of small business (or self-employment) assistance programs is heterogeneous in the sense that a multiplicity of programs serve a diverse clientele, are designed to meet varied needs, and are dispersed across geographic locations. Our synthesis of the literature reveals that our understanding of the effects of business assistance programs is far from complete. Notably, many evaluation designs do not distinguish the effect of the program on business outcomes from the effect of the economy or other programs, or more generally do not measure the counterfactual of what business outcomes would have been in the absence of the program. The methodological challenges in identifying the effect of business assistance programs on business outcomes are substantial and are, in part, a result of data limitations and the lack of experimental design in program evaluations. Thus few studies are able to identify a causal relationship between small business assistance programs and business creation and subsequent economic performance of assisted small firms. Moreover, the body of research has yet to identify the essential characteristics of effective small business assistance programs such as the optimal services to provide, what works best for whom or in what geographic locale, and how program effects relate to program costs. Despite these limitations of the research to date, we identify several potential strategies that may be used with existing data to advance our understanding of program impacts. Combined with greater use of experimental methods,

the evidence base can be extended to support sound policy decisions regarding the future of such programs.

We organize the study in three main sections, supported by results arrayed in two-dimensional tables. The first section highlights the diversity of small business assistance programs in the United States today, including such features as program objective, services provided, targeted participants, funding source, and geographical coverage. The second section synthesizes the published literature that measures the outcomes for small business assistance programs. Research studies are characterized in terms of the program studied, data used, methodology employed, and findings. Using this framework, we assess what is known about the causal effects of small business assistance programs on business outcomes. The third section illustrates the features of several available data sources that may be exploited for the study of small business assistance programs, covering aspects such as the data design (e.g., cross-sectional or longitudinal), years available, sample size, response rates, business outcomes and other variables of interest, and sources of variation. From this information, we evaluate the usefulness of the available data to extend the existing literature on the effects of small business assistance programs. The final section summarizes our findings and offers directions for future research.

The Landscape of Small Business Assistance Programs[2]

In the United States, myriad services and information sources exist for new and aspiring entrepreneurs supported by both public and private funds. This study focuses on relatively larger-scale programs that provide assistance to new small business start-ups and support for established small firms to expand, where we limit our focus to those programs that provide direct services. Outreach programs, for example, whose sole purpose is to raise the awareness of available programs, are not included. We do not analyze internet-based information portals for small business owners, nor do we include for-profit service providers (e.g. commercial service and loan providers, venture capital firms, and so on).

Table 1 characterizes the 16 small business assistance programs in the United States that meet our criteria, where programs are grouped into six categories based on the types of services offered (shown in panels (a) to (f), respectively). For each program, the rows contain the full program name and initiation year, along with the program objective, eligible participants and numbers served, funding sources and level, and geographic coverage. It is evident from Table 1 that the 16 programs share a common objective of promoting the formation and continuation of small business, either on a universal basis or for targeted communities or populations of entrepreneurs. Despite this common goal, the programs vary in terms of the means they use to reach their objectives, with a range of

[2] This section draws on information about the programs we discuss from various sources including program websites (e.g. official websites of SBA, SCORE, DOL, SBI, UEP and other related websites) and program documents and reports (e.g. Bellotti et al., 2006; Godwyn et al., 2005; Kosanovich et al., 2001; U.S. SBA, 2007; and SBA Office of Advocacy, 2006).

services designed to support business development and success and through both universal and targeted mechanisms. They also rely on varied funding sources and operate on different scales and with differences in geographic coverage. We now review each of these dimensions in turn and conclude by discussing how the heterogeneity across programs can potentially be exploited to evaluate program effects. The host of smaller-scale microenterprise programs are not included in the table but will be discussed at the end of the section.

Diversity of Services

The services provided by small business assistance programs are diverse. For purposes of this discussion, we group the services into four broad categories: business assistance, loans, grants, and specialty services (e.g. assistance with procurement of federal contracts). We organize the programs in Table 1 according to their services or combination of services in panels (a) to (f), respectively: business assistance only, loan supply only, grant only, contracting service only, business assistance and contracting service, and business assistance and loan supply.

Seven of the 16 programs primarily provide business assistance to small businesses (see panel (a)), while another four programs provide a combination of business assistance and other services (see panels (e) and (f)). Although detailed services are program dependent, business assistance usually includes a combination of business consulting, counseling, training, and technical assistance. These services are designed to give potential entrepreneurs the skills in planning for a new business (e.g., creating a

business plan), as well as the know-how to execute the plan. For current business owners, the services can be directed toward business expansion or refining the business model for greater success. Presumably, based on the technical assistance, some individuals may be deterred from starting a new business as a result of a more rigorous planning process, and current owners may scale back plans for expansion. In this way, better planning may ensure that only the enterprises that are likely to be most successful are pursued.

For instance, the SBDC and Service Corps of Retired Executives (SCORE) are two major programs offering counseling and training in all aspects of small business management. The SBDC, for example, assists small business with "financial, marketing, production, organization, engineering and technical problems and feasibility studies." SCORE offers similar services (both face-to-face and online), with a focus on pre-startup activities. Because the services provided by SBDC and SCORE are available almost everywhere across the country (and free, in most cases), some programs—for example, the Self-Employment Assistance (SEA) program and Project GATES (Growing America Through Entrepreneurship)—leverage the counseling services from SBDC or SCORE instead of offering the same services themselves. Through the SBA 7(j) Program, SBA funds vendors to deliver business assistance services in disadvantaged communities where SBA services are otherwise not available. The Women's Business Center (WBC) Program is likewise targeted to serve women business owners, especially those from socially and economically disadvantaged backgrounds, while the Urban Entrepreneurship Partnership (UEP) targets minority business owners. Most counselors and advisors who

deliver business assistance are professionals with substantial experience in business management. The only program that primarily uses students as the counselors is the Small Business Institute (SBI) in which teams of business students, supervised by faculty, serve as counselors.

Liquidity constraints or inadequate access to credit are often cited as a barrier to entrepreneurship (Evans and Jovanovic, 1989; Holtz-Eakin et al., 1994; Blanchflower and Oswald, 1998). Aside from the small loans provided through small-scale microenterprise programs (discussed below), SBA provides most small business loans (see panels (b) and (f)). With a loan portfolio of tens of billion of dollars, SBA is the single largest creditor for U.S. small businesses (Craig et al., 2007). Major SBA loan programs include the 7(a) Loan Program and the smaller 504 Loan Program (see panel (b)). Both target small businesses that are unable to obtain commercial loans through normal lending channels. The 7(a) Loan Program partially guarantees the repayment of small business loans made by commercial lenders, with the guarantee covering a portion (up to $2 million) of the unpaid balance on a defaulted loan. The SBA 504 Loan Program provides long-term, fixed-rate financing to small businesses only for the purchase or improvement of fixed assets. Two other SBA loan programs also provide business assistance services (see panel (f)). The SBA Microloan Program provides very small loans (up to $35,000) through non-profit lending intermediaries primarily for small start-up businesses. Other SBA-backed loans are provided through the Small Business Investment Company (SBIC) Program, where privately owned companies, regulated by

SBA, provide funds from private investors and SBA debentures, as well as relevant technical assistance, to eligible small firms (U.S. SBA, 2007).

The Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTP) are the largest small business grant programs (coordinated by SBA) in the United States, designed to provide R&D funding to small technology-oriented firms (see panel (c)). SBIR awards grants to small firms with promising innovation concepts while STTP, an extension of SBIR, awards grants to finance research cooperation between small technology firms and academic research institutes.

SBA also provides specialty services such as assistance in obtaining government contracts, specifically for small disadvantaged businesses (SDBs) (see panels (d) and (e)). The SBA HUBZone Empowerment Contracting program is essentially a federal contracting assistance program specially designed for small firms in historically underutilized business (HUB) zones. Participants in the SBA 8(a) Program—available to eligible small businesses owned by individuals in socially or economically disadvantaged groups—receive SDB certification, as well as business assistance for nine years. During that period, 8(a) firms are eligible for special benefits in federal contracting, such as receipt of sole-source contracts and eligibility to bid on federal contracting set asides for 8(a) firms.

Universal and Targeted Programs

As is evident from the discussion of program services, the small business assistance programs listed in Table 1 include those that are designed to serve the general

population, as well as others that are targeted to serve the needs of specific groups such as women or socially and economically disadvantaged persons. Anyone who wants to start or improve a small business is eligible to receive services from the SBDC, SCORE, SBI, and Project GATE, although special attention is given to disadvantaged groups in each of these programs.[3] The SBDC, for example, places a priority on reaching individuals in socially and economically disadvantaged groups, as well as veterans, women, and the disabled. SBA loan programs are available to all small business owners, while the grant programs are open to all technology-oriented small firms. SEA, by targeting UI claimants, aims to use the situation of job loss and the flow of UI benefits as an opportunity to transition individuals into self-employment rather than another wage and salary job.

Targeted programs are often motivated by the understanding that certain groups may have historically faced discrimination or other barriers to small business ownership such as more limited access to capital or federal contracting. Program services are designed to give those groups an advantage in the marketplace until they are able to compete more fully on their own without assistance. Targeted populations include those groups that are historically underrepresented as small business owners such as women, racial and ethnic minorities, individuals with low income, and those in distressed communities. For example, WBC is the largest federal small business assistance program specifically designed for women business owners. Minorities are targeted by UEP, while

[3] Participants in Project GATE in the demonstration period are subject to random assignment. Therefore, not everyone applied actually received the service. However, the application is open to everyone.

the SBA 7(j) program serves disadvantaged business owners in geographic areas without access to other SBA services. The SBA 8(a) program provides management and contracting assistance exclusively to business owners certified by SBA as SDBs. The time limit on that program (nine years) reflects the expectation that the need for specialized services should diminish as firms gain standing in the marketplace (in this case the world of federal contracting).

Funding from Public and Private Sources

Most of the programs listed in Table 1 are public assistance programs funded by federal and state governments. Several large and influential programs are administered and funded entirely by the SBA, while others are funded by SBA and matching funds (e.g., SBDCs, and WBCs). The SBDC, one of the largest small business assistance programs in the United States, receives less than half of its funds from the SBA, with the rest coming from state and local governments and other sponsors. The U.S. Department of Labor (DOL) is another smaller source of federal funding source for small business assistance programs, through Project GATE (funded for a five-year demonstration since 2003) and the SEA program (as part of the UI program administration). Other federal agencies support the SBIR and STTR grant programs through funds reserved for small business R&D.

Private foundations and other private organizations are also important funding sources for small business assistance programs. Although unusual to be a sole funding source of programs, private sponsors either provide matching funds or play an active role

in public-private initiatives for small business assistance. The UEP, in which private organizations both fund and manage the initiative, provides an example of the latter case. Although most programs are funded at least in part by federal and state governments, the majority of the programs rely on a close partnership among different public agencies, private organizations, and in some cases, academia. In the case of the SBDC, for example, stakeholders include the SBA, state and local governments, institutions of higher learning, private enterprise, and local nonprofit economic development organizations. As another example, SBA loan programs depend on the partnership between SBA offices and commercial banks and nonprofit community-based intermediary lenders.

Range of Program Size and Geographic Coverage

We evaluate the size of the programs in Table 1 based on their annual budget and the number of clients served per year, using data for the most recent year available.[4] In making comparisons, we exclude the budgets for SBIR and STTP as they reflect the dollar amount of grants awarded each year, whereas the budgets for the other programs in Table 1 represent administrative costs only. In terms of both budget and service measures, the SBDC is the largest program. With an annual federal budget of more than $100 million (not including local matching funds), the SBDC serves more than 1 million clients per year. With annual budgets of tens of million dollars and hundreds of thousands of clients, the WBC and SCORE are also large programs offering general business

[4] In some cases, funding levels and data on numbers served are not available.

assistance. The SBA 7(a) Loan Program is the largest among the loan programs, operating with nearly twice the budget and eight times the number of clients served as the two other SBA loan programs combined (504 and Microloan programs). Budgets for the SEA programs vary across sites and are generally small. Project GATE has a relatively small budget because it is in the pilot project stage.

In general, SBA programs have a larger size than other public and public-private programs. Programs that serve the general population of small business owners are larger than those serving a more targeted population, like individuals from disadvantaged backgrounds or communities. And naturally, national programs are larger than programs implemented in selected locations. Most of the programs list in Table 1 are national in scope, available in all states, Washington D.C., and some U.S. territories. The exceptions are SEA, UEP, and Project GATE. These programs are implemented in selected state or sites only. All states are authorized by Congress to adopt SEA programs but only a few have done so. Project GATE and UEP are demonstration projects and may expand to new locations if there is evidence of success. Even for those programs with national coverage, however, the level of geographic penetration can vary. For example, WBC has 99 centers across the country while SBDC has nearly 1,000 centers. Usually, a program follows a similar design in all its service locations with adjustments based on local conditions. This is not always true. Programs composed of loosely connected local service providers, like participating non-profit organizations in WBC and participating local colleges in SBI, may use very different program designs according to their own expertise and conditions.

Multiple Dimensions of Program Variation for Analysis

Program heterogeneity, in terms of geographic location, initiation date, how it has changed over time, and populations served provides useful variation for understanding the casual effect of programs on the intended beneficiary. Table 1 summarizes the relevant variation for the 16 programs we consider, the most common being variation in program availability over time and across geographic locations. For example, most SBA programs have a long history and have established centers in different locations in different years. Other programs like Project GATE and UEP have been in service for only a couple of years and operate in select locales. The various grant and loan programs have generally varied in level of funding or awards by location and across years. Business assistance and contracting service programs that are not center-based—SBA 7(j) and 8(a) programs in particular—have variation across time and place in the number of clients served.

Multitude of Microenterprise Assistance Programs (MAPs)

In addition to the larger-scale programs listed in Table 1, there is a host of business assistance programs across the country that provide services to "micro" enterprises—very small businesses with five or fewer employees and a start-up capital requirement of less than $35,000 (Edgcomb and Klein, 2005). Although the exact number of microenterprise assistance programs (MAPs) is not readily available, the microenterprise program directory compiled by the Aspen Institute lists more than 500 such programs, unevenly distributed across the country (Walker and Blair, 2002). As a group, MAPs focus on an even broader set of underserved populations than the programs

listed in Table 1, ranging individuals with low income, to racial and ethnic minorities, to welfare recipients and refugees, to persons with disabilities (Edgcomb and Klein, 2005). MAPs may provide business assistance (business training and technical assistance) only, loan service (direct microloan or peer-lending or both) only, or both assistance and loans. With an average annual budget of around $420,000 and average staff size of 5 or fewer persons, MAPs are typically very small organizations. MAPs obtain funding from various sources, with federal and private funding accounting for the largest share. In fiscal year (FY) 2002, MAPs provided assistance to 26,441 small businesses and 6,817 loans were made.[5]

MAPs are very diverse in terms of services, participants, size, mission and so on. In order to facilitate the evaluation of MAPs in the United States, Johnson (1998) created a useful typology according to their mission, participants, and lending practice.[6] The author identified three major forms of MAPs: empowerment oriented (programs offering group lending to specific groups), economic development oriented (programs offering individual loans with no eligibility requirements), and multipurpose (programs offering a combination of lending practice, with target groups but open application to everyone) (Johnson, 1998).

[5] MAPs statistics cited in this paragraph were obtained from Aspen Institute (2005).

[6] Business assistance was not included because the majority of all MAPs offer business training or technical assistance (Johnson, 1998).

Efforts to evaluate small business assistance programs

The prior section serves to highlight the significant investment in the United States in various types of small business assistance programs. In this section, we seek to understand how much we know about the impact of these programs. In doing so, our interest is in going beyond descriptive analyses of programs in terms of clients served or services delivered. Instead, we want to know whether these programs change the outcomes of those who receive services from what they would have been in the absence of the program. In other words, we want to understand the causal impact of these programs. However, to illustrate the state of current knowledge, we cast our net somewhat wider and do include more descriptive studies. Our focus is on evaluations of programs in the United States.[7]

In all cases, we rely on studies in the peer-reviewed literature, primarily conducted by independent academic researchers. This means that we exclude process evaluations conducted by program administrators or the contractors they hire, as these studies are typically not published in peer-reviewed journals (although they are usually available online). The SBDC, for example, produces an annual economic impact report of SBDC counseling services, conducted by an independent consultant.[8] Project GATE also produces interim reports about program implementation, conducted by IMPAQ International. Generally, these reports find a positive relationship between program

[7] We do cite relevant literature from evaluations of programs in other counties, primarily from the United Kingdom, to illustrate points regarding methodology.

[8] Dr. James Chrisman, who has published many peer-reviewed evaluation studies on SBDC, is also hired by SBDC to conduct its annual economic impact report.

activities and client outcomes. Although evaluations conducted by or for program administrators are an excellent information source on program operations, they do not employ methods that support a causal link between the programs and outcomes.

In order to identify causal effects of small business assistance programs, the methodology employed is critical. The ideal methodology, often called the gold standard of program evaluation, is a randomized control trial (RCT). In this approach, business owners (or potential business owners) are randomly assigned to the treatment group, which receives the program services (participants) or the control group that does not receive the services (nonparticipants). When properly implemented, an RCT ensures that differences in outcomes between the treatment and control groups can be attributed to the factor that systematically differs between the two groups: participation in the program of interest.

Since RCTs can be expensive or impractical to implement, researchers have developed other quasi-experimental methods that provide a high degree of confidence that causal impacts are measured. For example, a comparison group of nonparticipants that is closely matched to the group of participants may be defined and appropriate statistical techniques used to isolate the program impact. Other statistical techniques may be used to control for any bias introduced when participants self-select into a program. When less rigorous evaluation designs are used, the resulting analysis may provide interesting descriptions of the individuals or businesses that chose to participate in a program and their associated outcomes, but the results generally cannot be used as an indication of the casual effect of the program on those outcomes.

Table 2 includes 22 studies in the published literature that evaluate U.S. small business assistance programs. The studies are grouped into four methodological categories arrayed from most rigorous to least rigorous (see panels (a) to (d), respectively): random assignment, econometric analysis, mean comparison, and descriptive analysis. For each study, we identify the program(s) studied, data used, features of the methodology (i.e., use of a control/comparison group, measure of program participation, outcomes studied, and covariates employed), and the findings. In the discussion that follows, we draw on the information in the table to assess what is known about the causal effects of small business assistance programs on business outcomes. Since the methodology employed is critical for the ability to measure causal effects with confidence, we start by reviewing programs in terms of their methodological approach. We then discuss other key features such as data employed and outcomes analyzed before summarizing the findings that emerge from this body of research.

Methodology

It is evident from Table 2 that the gold standard of random assignment is the exception rather than the rule in this literature (see panel (a)). Notably, Benus (1994) is the only study to date that uses an experimental methodology, in this case to evaluate two state demonstration programs implemented in the early 1990s. The two projects are the Washington State Self-Employment and Enterprise Development Demonstration and the Massachusetts Enterprise Project—the first two federally funded UI self-employment demonstration projects (Benus, 1994). Project GATE is also being evaluated using an

experimental design, however, no published results from that component of the evaluation are available to date.[9]

The vast majority of the studies listed in Table 2 use econometric analysis or means comparison methods (see panels (b) and (c)). Seven studies use multivariate regression methods (i.e., econometric analysis) to study the effectiveness of various small business assistance programs. The studies differ in many ways including outcomes studied: client evaluation (Weinsten et al., 1992); business survival (Bates, 1995; Chrisman and McMullen, 2004); economic performance of assisted businesses (Lerner, 1996); local labor market employment rate (Craig, Jackson, and Thomson, 2007); and household income and poverty (Sanders, 2002). Although these studies differ in many ways, they share other similarities. All the studies include covariates to reduce bias from omitted variables on the program coefficients of interest. The studies vary in the control variables they use which will affect the quality of their results. Studies that investigate the effect on economic performance of small firms, like Bates (1995), Chrisman and McMullan (2004), Chrisman, McMullen, and Hall (2005) and Lerner (1996), include controls for characteristics of both business owners and the businesses (e.g. firm size and industry) in the regressions. Papers that study the effect on employment outcomes of assisted individuals, like Sanders (2002), control for demographics and the human capital of assisted individuals. Craig, Jackson, and Thomson (2007) control for characteristics of

[9] The Project GATE interim report indicates that an impact analysis and a cost-benefit analysis will be conducted and reported in a final report (Bellotti et al, 2006).

local markets (e.g. market liquidity, per capita income of local market, per capita bank deposit and deposit market Herfindahl index).

More important, most of the econometric studies do not use a quasi-experimental design because of the difficulty of identifying a valid non-client comparison group. The lack of a valid comparison group makes it difficult to infer the counter-factual: what would have been the outcome without program assistance. Of the seven studies utilizing multivariate regression methods, only two used a matched comparison group. Lerner (1996) created a group of 594 firms that do not receive SBIR awards to compare with 541 awardees. The comparison group is matched by industry and employment. Sander (2002) created two non-MAP client comparison groups using Panel Study of Income Dynamics (PSID) data: non-participating self-employed workers and wage and salary workers. The two comparison groups are matched along key demographic characteristics including education, age, household size, race, gender, marital status, and presence of children age five and under. These studies, however, may still suffer selection bias if they were not able to control for all characteristics that affect the propensity of program participation and are correlated with business success (e.g., underlying business acumen or motivation). As an alternative to using matched comparison groups, several studies in the United Kingdom model both the decision to participate in the small business assistance program and the business outcomes (Roper and Hewitt-Dundas, 2001; Wren and Storey, 2002). The methodological challenge with directly modeling program participation is to identify variables that affect program participation but do not otherwise explain variation in the program outcomes (also known as exclusion restrictions).

Another twelve evaluation studies listed in Table 2 (see panel (c))—almost exclusively focused on SBDC— base their results on mean comparisons, comparing outcomes for program participants with some reference or comparison group or comparing outcomes across different subgroups of participants (e.g. urban/rural, male/female, nonminority/minority). Unlike regression analysis, this method examines key client outcomes without controlling for confounding variables, which makes these studies more susceptible to selection bias. Because the data on economic performance before program utilization is not applicable for new firms and is usually not collected for existing firms, studies that use mean comparison as the main analysis technique often compare the post-service performance of assisted firms to that of non-assisted firms. The vast majority of studies choose aggregate level (state-level or nation-level) performance statistics or results from previous studies as the comparison benchmark. For example, Chrisman et al. (1985) use average performance of all firms in Georgia and South Carolina as the benchmark, while Chrisman and Katrishen (1994) use the average performance level of all U.S. firms as a benchmark. Chrisman, Hoy, and Robinson (1987) and Chrisman and McMullen (2000) use results from other studies and state/national averages as benchmarks for different performance indicators.

Several of the mean comparison studies investigate the differential effect of performance of clients across different subgroups, including urban versus rural or regional differences (Chrisman, Gatewood, and Donlevy, 2002; Chrisman, 1999), male versus female differences (Chrisman et al., 1990), and differences by race-ethnicity (Chrisman and Carsrud, 1991) Chrisman and Leslie (1989) compared the effect of

different types of assistances received (e.g. administrative, operating, or strategic assistance). In this group of studies, Robinson (1982) is the only study that uses two control groups matched by type of business, annual sales and number of employees.

Finally, Rocha and Khan (1984) and Nahavandi and Chesteen (1988) use descriptive analysis as their methodology (see panel (d)). Both studies use only simple statistical tabulations to present their evaluation outcomes with no control or comparison groups.

Data Utilized

Most of the evaluation studies listed in Table 2 rely on program administrative data or surveys of clients in a specific program. One exception is Bates (1995) which relies on the Characteristics of Business Owners (CBO), a large-scale national dataset.[10] However, since the CBO was not designed to evaluate any given program, it does not collect information about participation in specific programs but only on general types of assistance received. The alternative is to use specialized data for specific programs. However, the cost is often smaller sample sizes and less geographic coverage. For example, a number of the studies in Table 2 use data from state or local surveys of small business assistance programs (e.g., Robinson, 1982; Rocha and Khan, 1984; Chrisman et al., 1985; Pelham, 1985; Nahavandi and Chesteen, 1988; Chrisman and Leslie, 1989; Chrisman et al, 1990; Chrisman and Carsrud, 1991; Weinsten, Nicholls, and Seaton,

[10] As we discuss in the next section, the CBO is a national sample of small firms with information about their utilization of general types of small business assistance rather than participation in specific programs like those listed in Table 1.

1992; Benus, 1994; Chrisman and McMullan, 2000). Such data usually have relatively small sample sizes.[11] In addition, the data collection efforts often suffer from low responses rates, leading to potential response bias although some studies report no response bias detected in terms of critical parameters (e.g. Robinson, 1982; Chrisman and Leslie, 1989; Chrisman et al, 1990; Chrisman and Carsrud, 1991; Chrisman and McMullan, 2004; Chrisman, McMullan and Hall, 2005).[12]

There are a few exceptions where national survey data with larger samples are used to evaluate program performance (Chrisman and Katrishen, 1994; Chrisman, 1999; Chrisman, Gatewood, and Donlevy, 2002). However, as with the local data, even the national data sources are cross-sectional.[13] Lack of longitudinal performance data prevents using panel data evaluation methods and precludes comparisons of economic performance of small businesses across years, as well as any evaluation of long-term effects.[14]

[11] For example, Robinson (1982) has 101 firms in the sample; Chrisman, Nelson, and Robinson (1985) have 84 small businesses in the Georgia sample and 19 in the South Carolina sample; and Chrisman, McMullan and Hall (2005) have a sample of 159 new ventures.

[12] A typical response rate for such surveys is between 20 percent and 30 percent. For example, Chrisman, McMullan, and Hall (2005) reported that the overall response rate is 28 percent. And the response rates by year (it is a multiple year sample of a Pennsylvania SBDC) are 24 percent in 1992, 24 percent in 1994, and 36 percent in 1996.

[13] One exception is Chrisman and McMullan (2004), which has a follow-up study of the same cohorts. However, even for this study, only two time points are available.

[14] With few exceptions (e.g., Chrisman, McMullan, and Hall, 2005), most survey data measure only short-term effect of assistance program (e.g., one year after assistance).

Outcomes Studied

Evaluation studies on small business assistance programs use different measures of effectiveness and efficiency, depending upon the data used (individual or business level) and the research questions answered. McMullan, Chrisman, and Vesper (2001) classify measures of effectiveness used in the literature into three types: (1) subjective measures of client satisfaction, (2) perceptions of performance improvement attributable to the programs, and (3) objective measures of post-assistance business performance.

Subjective client satisfaction is generally measured on a scale and this outcome is often utilized along with more objective measures because of concern that these two types of measure are not necessarily correlated (McMullan, Chrisman, and Vesper, 2001). For example, Pelham (1985) uses subjective measures (6-point scale of service quality) in concert with objective economic measures (job generation rate, sale increases rate, failure rate, incremental taxes from job and sales). Chrisman and McMullan (2000) evaluate both client satisfaction and economic performance measures (survival rate, sales revenue and growth rate, innovation rate). Of the objective measures, many studies use business survival, sales revenue or growth and employment level or growth (Robinson, 1982; Solomon and Weaver, 1983; Chrisman, Nelson, Hoy, and Robinson, 1985; Chrisman, Roy, and Robinson, 1987; Chrisman and Leslie, 1989; Chrisman and Katrishen, 1994; Lerner, 1996; Chrisman, 1999; Chrisman, Gatewood, and Donlevy, 2002; Chrisman, McMullan, and Hall, 2005). A few studies use all three types of measures (Chrisman, Roy, and Robinson, 1987; Chrisman, Gatewood, and Donlevy, 2002).

Studies that evaluate the effect of programs on individual outcomes often use different measures. Benus (1994), for example, studies the likelihood of entry into self-employment, the timing of this entry, the likelihood of remaining self-employed, and the impact on total employment. Sander (2002) measures the effect of MAP on household income and poverty status of clients. The focus on individual outcomes allows for the possibility that small business assistance programs may help individuals select the labor market path—self-employment versus wage and salary work—where they will be most successful. Thus, self-employment rates may decline but overall family income may rise or periods of unemployment may decline.

Programs Evaluated and Findings

As the largest small business assistance program in the United States, the SBDC has attracted the most attentions from researchers. Among the 22 studies list in Table 2, 14 investigate the effect of SBDC counseling services and most are by the same author (with various co-authors). However, it is important to keep in mind that none of these studies use a very rigorous methodology to ensure that causal program impacts are measured. Twelve of the 14 studies use a weaker mean comparison or simple descriptive methodology. Only two use multivariate regression to control for potential confounders, and in those cases no comparison group is included. Keeping this limitation in mind, we note that all studies of the SBDC report a positive relationship between SBDC services and business outcomes and several studies claim the services are a cost-efficient way to promote entrepreneurship (Chrisman et al., 1985; Pelham, 1985; Chrisman, Hoy, and

Robinson, 1987; and Chrisman and Katrishen, 1994). Based on the results of the first national study of SBDC economic impact, for example, Chrisman and Katrishen (1994) reported that $3.7 billion in new sales and 65,000 new jobs were generated in 1991 by small business that were SBDC clients in 1990. The authors also estimated that the program outcomes generated approximately $2.61 in incremental tax revenue for every dollar spent.[15]

The research also suggests an inverted U-shaped relationship between the number of hours of SBDC counseling and business survival (Chrisman and McMullen, 2004) and between program services and long-term growth (Chrisman, McMullan, and Hall, 2005). Although Chrisman, McMullan, and Hall (2005) interpret this non-linear relationship to mean excessive counseling has a detrimental effect on outcomes, it is likely that those firms that seek the most counseling may be the worst off—in other words, the selectivity of program intensity means the results can not be interpreted as causal. Chrisman and Leslie (1989) compared the effect of program on sales growth and profit added by different types of assistance received by clients. They reported that not all types of assistance have the same effect on client performance: clients benefit more from administrative and operating assistance than from strategic assistance and assistance with a comprehensive approach serves clients the best.

Several studies investigate the effect of SBDC assistance across subgroups of clients. Generally, these studies reported no significant difference in the effect of

[15] The 2003-2004 economic impact study of SBDC reported approximately $6.1 billion in new sales and 74,253 in new job creation as a result of the service (Chrisman, 2005). The study estimated that the SBDC service generated $2.78 in tax revenue for every dollar spent on the program.

assistance across subgroups, although differential selectivity in who participates across the subgroups examined may bias the estimated differential. Chrisman, Gatewood, and Donlevy (2002) argue that the program is equally effective in urban and rural setting and therefore it is not necessary to arrange special SBDC services or other programs for rural entrepreneurs. Chrisman et al (1990) reported similar effect of SBDC assistance on male and female clients, while Chrisman and Carsrud (1991) argue that SBDC assistance is equally effective across different racial/ethnical groups.

Studies on other small business assistance programs are relatively rare but three of the studies with the strongest methodology fall in this group. Benus (1994), using an experimental design, reported that the state UI self-employment demonstration projects assessed in Massachusetts and Washington raised the rate of entry into self-employment, shortened the time elapsed before entry, raised the duration of self-employment, and increased the total employment rate (self-employment or wage-salary work) of clients, compared with the control group. Some of these effects were substantial while others were more modest. For example, in Massachusetts, 47 percent of participants entered self-employment compared with 29 percent of the control group, and the time to entry was shorter for the treatment group by 2.4 months. A similar differential was measured in Washington (52 versus 27 percent, and earlier entry by 5.9 months). However, the projects had no effect on the probability of staying in self-employment once people entered and there was only a modest increase in duration of self-employment (3.9 months for the treatment group compared with 2.3 months for the control group in Massachusetts, and 5.8 versus 1.9 months in Washington).

The two studies that used econometric methods with a matched comparison group find different results for the two programs examined. Lerner (1996) reported the significant improvement of SBIR awardees in sales and employment, although this effect is not uniform in all locations. Sanders (2002) found the MAPs studied have no significant effect in helping clients to increase household income and move out poverty.

The remaining evaluations use weaker designs but generally find favorable program effects. Weinstein et al. (1992) report positive client evaluations of SBI assistance services. Solomon and Weaver (1983) and Rocha and Khan (1984) both reported positive effect of SBI service on business performance of clients. Craig, Jackson, and Thomson (2007) report an increased local labor market employment rate associated with the SBA 7(a) guaranteed loan program. Bates (1995) is the only study that investigates the effect of assistance programs in general using a national database (the CBO). The author reports differential effects of assistance programs on survival between minority-owned firms and non minority-owned firms: no effect for the former but improved survival for the latter. The study also argues that the evaluation of assistance programs is intrinsically hard because many firms use multiple assistance programs.

Several studies discuss the reason why some program clients do not implement the recommendations offered by the consultants. Nahavandi and Chesteen (1988) reported that lack of necessity and consultant expertise is among the top reasons that SBDC clients do not implement recommendations offered. Solomon and Weaver (1983) reported that the primary reasons why SBI client did not implement are either

recommendation is too costly or the recommendation does not address clients' needs. Rocha and Khan (1984) reported that the top reasons that SBI clients did not implement recommendations are the cost and riskiness of the recommendations.

Need for More Rigorous Research

In a recent study of small business policy in the United Kingdom, Curran (2000) concludes that the research lags far behind the growth of the programs. The same could be said for the state of knowledge of the impact of small business assistance programs in the United States. Despite their policy importance, such programs have not been evaluated using the most rigorous methods to ensure that causal program effects are being measured. Just one of the studies we captured in our scan of the literature was based on results from an RCT—the gold standard of program evaluation. Only a few other studies might qualify as using an appropriate quasi-experimental design with an adequate comparison group and controls for other confounding factors. The remaining studies use much weaker designs, designs that are also often compromised by small sample sizes, limited to specific geographic locales, and potentially biased by low response rates.

With so few reliable studies, it is hard to be definitive about the effects of small business assistance programs on relevant outcomes. The one experimental study suggests favorable effects of self-employment assistance to unemployed workers, although the benefits were largely related to entry into self-employment rather than sustained success of the new businesses. Moreover, these were two demonstration projects in the 1990s in

separate states that may not be generalizable to current programs or other states. Other more rigorous designs show mixed results for technology-oriented small business grants and for services provided to microenterprises. The SBDC program has received the most study but with consistently weaker evaluation designs. Thus, while the cumulative evidence from that body of work suggests the program has favorable impacts and is even cost-beneficial, the methodological limitations cast doubt on whether the same effects would be evident using more rigorous designs. Moreover, the existing literature does little to shed light on other issues of critical important for policy such as which features make programs effective and whether there are differential benefits for population subgroups.

Potential data to extend existing research

Given the limitations of the research to date, it is reasonable to ask whether existing data sources could be exploited to strengthen the knowledge base about the causal effects of small business assistance programs. To address that question, Table 3 summarizes the data sources that could potentially be used to extend the existing literature. Although we do not intend to fully capture all potential data sources, the eight sources listed in Table 3 contain the main larger-scale sources and are illustrative of the types of data that could be used for program evaluation. Notably, only two of the data sources have been used in the literature reviewed in the prior section (the CBO by Bates, 1995; and the PSID by Sanders, 2002).

For each data source, Table 3 provides various details including whether it is longitudinal (or alternatively cross-sectional), the years available, sample sizes, response rates, outcome measures and other variables of interest, and sources of variation. Using this information, we first briefly review the features of the data sources and then assess their usefulness for further evaluation of small business assistance programs.

Data Sources and Their Features

The eight data sources listed in Table 3 are stratified into two main groups. The five data sources in panel (a) are large-scale databases of U.S. small business owners or small businesses that would support analysis of business outcomes such as sales (revenue) and employment. The four sources that provide panel data also include information on the opening, closure, and survival of the firms. The other three data sources listed in panel (b) are population-based surveys with measures of employment outcomes for the sampled individuals such as the class of worker (self-employment vs. wage and salary worker), sources of income, and unemployment status (receipt of unemployment insurance and duration).

All data sets in Table 3 have a longitudinal design except the 1992 CBO, which is a single cross-section. Comprehensive business databases such as the Longitudinal Business Database (annual since 1976) and the National Establishment Time-Series Database are business directories that track millions of businesses over time, capturing when they start and fold. The smaller Kauffman Firm Survey is following a panel of nearly 5,000 firms, with baseline data and two follow-ups available. Smaller still is the

Panel Study of Entrepreneurial Dynamics (PSED) that has two panels of entrepreneurs, with 4 waves for the first cohort (a sample of 830) and 3 waves for the second cohort (a sample of nearly 1,200). Among the population-based surveys, the PSID has the longest panel, dating back to 1968. The National Longitudinal Survey of Youth (NLSY) has followed two age cohorts. NLSY 1979 cohort was surveyed annually from 1979-1994 and has been surveyed biannually thereafter; and the NLSY 1997 cohort has been surveyed annually since 1997. The Current Population Survey (CPS) is typically used as a repeated cross-section survey, but it too has a longitudinal dimension.[16]

Most of the data sets listed in Table 3 generally have large samples of respondents of several thousand or tens of thousands. The large sample size improves the power of econometric techniques to detect real difference of performance measures between clients and non-clients. In addition, most of the data sources have a very high response rate. The response rates for the CPS, NLSY, and PSID, for example, are well above 90 percent, in contrast to the average response rate of 20 to 30 percent for the survey data used in much of the literature we reviewed in the prior section. Other features of the data sources will be discussed below in the context of the usefulness of these sources for further research.

[16] The monthly CPS includes rotation groups of households that are in the survey for 4 consecutive months, out for 8 months, and then return for another 4 months before leaving the sample permanently. The March survey includes additional information on income and sources of income for the prior calendar year. In any given March CPS, half the sample rotation groups were in the survey the prior March, while the other half would be in the survey rotation groups in the following March.

Potential Value for Evaluating the Effects of Small Business Assistance Programs

Generally, there are three types of data researchers may use to evaluate small business assistance programs. The gold standard of program evaluation would require data collected from a randomized experiment, with information on the outcomes and characteristics of program participants and nonparticipants where those two groups were determined by random assignment. To our knowledge, there is no such data currently available except for the data collected from the two UI self-employment demonstration projects used by Benus (1994). Project GATE is the only active program that randomly assigns applicants to receive services or not. However, the Project GATE data are not publicly available.

In the absence of experimental data, researchers must rely on observational data and use appropriate statistical techniques to measure program impacts. One type of observational data that would support program evaluation would contain information on program participants and nonparticipants, their characteristics, and their outcomes. The strength of this type of data is that they can be used to directly evaluate the effect on client outcomes of one specific program or a set of programs more generally (depending on the structure of the data). However, with such observational data, program participation is not randomly assigned, so researchers must be able to account for possible selectivity in who chooses to participate in the program so as to eliminate any bias in measures of program impact. Researchers therefore need data that support

appropriate statistical techniques to correct for potential selection bias, approaches that may include directly modeling the program participation decision.

A second type of observational data does not include measures of program participation but only measures of outcomes for firms or individuals, with coverage of outcomes across geographic areas or through time or both. Although program participation is not directly observed, variation through time and/or space in program availability or program activity can be correlated with the outcomes of interest, either at the micro-level (e.g., individual or firm) or at a more aggregate level (e.g., local market, county, or state). Such data could be used to examine, for example, if areas with wider availability of a given program had better outcomes (e.g., higher rates of self-employment, more small business, or more successful small businesses). Again, appropriate statistical techniques must be used to control for potential confounders that may explain variation in the observed outcomes other than the program or programs of interest.

Of the data sources listed in Table 3, only two fit the requirements for the first type of observational data, with measures of program participation, relevant outcomes, and the characteristics of participants and nonparticipants. The 1992 CBO survey contains information about utilization of major forms of business assistance and the sponsor for that assistance (federal government, state government, or private). The CBO also provides performance information on the associated small business, including sales, profits, employment, payroll, and survival. Various characteristics of the firms and their owners (including the reason they start a new business) are also included. The sample

coverage is nationwide and includes state identifiers. The main drawback of these data is that they do not measure participation in specific small business assistance programs such as those listed in Table 1. This may be less of a concern to the extent that there is multiple program participation and it is more realistic to evaluate the collective effects of small business assistance programs rather than their separate impacts. The absence of panel data or repeated cross-sections also limits the ability to control for confounding factors. With only state geographic identifiers, an analysis of program impacts at a more local level would not be possible.[17]

More promising is the Panel Study of Entrepreneurial Dynamics (PSED), which asked respondents detailed questions about participation in start-up business assistance programs, including contact, type of program, program sponsor, location, services, hours spent, and satisfaction. The data also include business performance measures (e.g. sales and employment), along with characteristics of the firms and the business owners. As a panel data set with geographical identifiers down to the state and county level, the PSED offers the opportunity for analysis utilizing variation over time and space. With more specificity about the types of programs the business owner participated in, it may be possible to focus on specific programs or program types. Methods to correct for selection bias could include the use of instrumental variables, as well as panel data techniques (e.g., fixed or random effects).

[17] For example, one strategy would be to construct measures at the local level based on program availability to serve as instruments for program participation. However, such measures could only be constructed at the state level using the CBO which would not provide much variation in a single cross-section.

The remaining data sources described in Table 3 meet the requirements for the second type of observational data: they do not have program participation information but they do offer variation in business or labor market outcomes over time (panel data) and location. All eight sources have geographic identifiers below the state level, in some cases at the county level and in others for a finer level of geography (e.g., metropolitan statistical areas (MSAs)). By matching measures of program availability and services (e.g., existence in a location, staffing level, or services offered) at the local level for programs in Table 1 to the data sources in Table 3, it would be possible to examine the relationship between small business performance outcomes or employment outcomes and these program measures, controlling for either the characteristics of business owners or workers. Panel data techniques could be used to control for confounding factors (e.g., fixed or random effects). Among the data sources listed in Table 3, this approach is likely to be most fruitful with data sources that have larger sample sizes and finer levels of geographic identifiers, such as the National Establishment Time-Series Database and the Longitudinal Establishment and Enterprise Microdata.

CONCLUSION

Small business assistance programs are potentially a significant force in the promotion of entrepreneurship in the United States. The programs have attracted hundreds of millions of dollars of federal and private funding. They provide various services to small business owners, including business training, technical assistance, financing services, grants, and special services, where these services are available on a

universal basis or targeted to particular population groups or types of businesses. The investment in these programs suggests it would be worthwhile to know whether they meet their intended objectives. Policymakers and program implementers would also benefit from knowing what program features are most effective and who benefits from program participation. At the same time, the diversity of programs, the range of program participants served, and the likely importance of the local context, present a challenge for fully understanding what works, for whom, and in what setting.

Our literature review shows that research on small business assistance programs lags far behind the proliferation of the programs themselves. In particular, the quality of existing evaluations in terms of their ability to measure the casual effects of programs on business outcomes is, in many cases, unsatisfactory. There is a paucity of studies using the most rigorous designs such as experimental or well-designed quasi-experimental methods. While those studies using weaker designs will not necessarily produce biased results, it is a very real possibility that the inability to control for the selectivity of program participants generates more favorable results than what would be found with more rigorous methods. Moreover, much of the evaluation literature has focused on one particular program out of the array of major programs we identified, not to mention the hundreds of smaller programs that serve microenterprises.

Researchers who seek to advance our understanding of the effects of small business assistance programs must contend with the limitations of existing data. While further investment in randomized control trials would have a payoff in terms of expanding the number of scientifically sound evaluations, that approach will not be

appropriate in all cases such as large scale programs that are already widely available. Instead, our assessment is that there are other data sources that could be exploited using rigorous non-experimental methods to advance our understanding of specific programs or types of programs. Such an investment will serve to either confirm the evidence from existing studies or illustrate the importance of accounting for potential biases associated with weaker designs. Either way, policymakers and program implementers will benefit from having a deeper knowledge base to draw on.

Table 2.1—Small Business Assistance Programs in the United States

Name [Starting Year]	Objective	Eligible Participants	Numbers Served[1]	Funding Sources [Funding Level[2]]	Geographic Coverage[3]	Program Variation
a. Business Assistance Only						
Self-Employment Assistance Program (SEA) [between 1995 and 1999, varying by state]	To enable unemployed workers to start their own small businesses through business assistance, usually provided through an SBDC	Unemployment Insurance claimants	Participation varies by state[4]	UI administrative expenses, WIA grants, and other state funding [Varies by program[5]]	DE, ME, MD, NJ, NY, OR, PA, and CA (terminated)	Location and time
Service Corps of Retired Executives (SCORE) [1964]	To educate business owners and assist the formation, growth and success of small businesses through onsite and online assistance	Anyone who wants to start or improve a small business	308,710 clients	SBA [$16.9 M]	U.S. (390 chapters & 800 locations)	Location and time
SBA 7(j) Program [authorized by Small Business Act 1953]	To provide business development assistance to socially and economically disadvantaged businesses	Disadvantaged small businesses	2,317 small businesses	SBA [$2.3 M]	U.S.	Number of clients by location and time
Small Business Development Center (SBDC) [1977]	To stimulate economic growth by assisting small businesses with startup and ongoing development	Anyone who wants to start/improve a small business	1.25 million clients (FY05)	SBA and state/local match [$103 M (federal)]	U.S.	Location and time
Small Business Institute (SBI) [1972]	To strengthen the small business sector, provide entrepreneurship education, and support economic development	Small business owners willing to receive student consulting	n.a.	Partial funding from SBA during 1972-1995; since 1996, independent of SBA with various self-supports [n.a.]	U.S. (nearly 134 participating universities and colleges)	Location and time
Urban Entrepreneurship Partnership (UEP) [2004]	To foster business development in historically neglected and economically underserved urban areas through business assistance	Minority business owners	n.a.	Participating public and private organizations [n.a.]	Pilots in Kansas City, Atlanta, Cincinnati, Cleveland, Jacksonville, Milwaukee, Baltimore, and New Orleans	Location and time
Women's Business Center (WBC) Program [1989]	To provide business assistance to promote the growth of women-owned businesses	New and nascent women business owners, especially from socially and economically disadvantaged groups	129,373 clients	SBA and private match [$22 M (federal]	U.S. (99 centers in 2006)	Location and time

Table 2.1—Small Business Assistance Programs in the United States, *Continued*

Name [Starting Year]	Objective	Eligible Participants	Numbers Served[1]	Funding Sources [Funding Level[2]]	Geographic Coverage[3]	Program Variation
b. Loan Supply Only						
SBA 7(a) Loan Program, authorized by Small Business Act [1953]	To provide small businesses with access to credit (up to $2M) to enable their formation and viability	Small businesses that are not be eligible for business loans through normal lending channels	80,303 small businesses, 90,483 new loans	SBA[6] [$72.5 M[6]]	U.S.	Number of loans by location and time
SBA 504 Loan Program [1980]	To promote economic growth within a community by providing a financing mechanism for growing businesses	Growing small businesses who need long-term, fixed-rate financing for major fixed assets	7,569 small businesses, 8,162 new loans	SBA[6] [$21.4 M[6]]	U.S.	Number of loans by location and time
c. Grant Only						
Small Business Innovation Research (SBIR) Program [1982]	To provide grants to strengthen and expand the competitiveness of small high technology businesses	Small technology-oriented businesses	4,638 Phase I awards and 2,013 Phase II awards (FY 04)	External R&D set-asides from 11 federal agencies [$ 2 B (FY04)]	U.S.	Number of awards by location and time
Small Business Technology Transfer Program (STTR) [1994]	To strengthen the competitiveness of small high technology businesses through grants for partnerships with non-profit research institutions	Small technology-oriented businesses	614 Phase I awards and 195 Phase II awards (FY 04)	External R&D set-asides from 5 federal agencies [$198 M (FY04)]	U.S.	Number of awards by location and time
d. Contracting Service Only						
SBA HUBZone Empowerment Contracting Program [1997]	To encourage economic development in historically underutilized business zones through contracting set asides	Small business in historically underutilized business zone	FY05: 4,900 small businesses (value of federal contract: $6.1 billion)	SBA [$7.5 M]	U.S. (designated areas only)	Location and time
e. Business Assistance and Contracting Service						
SBA 8(a) Program [authorized by Small Business Act 1953]	To improve the performance and viability of disadvantaged small businesses through business assistance and contracting set asides	Small businesses owned by socially and economically disadvantaged groups	9,600 small businesses	SBA [$29.6 M]	U.S.	Number of clients by location and time

Table 2.1—Small Business Assistance Programs in the United States, *Continued*

Name [Starting Year]	Objective	Eligible Participants	Numbers Served[1]	Funding Sources [Funding Level[2]]	Geographic Coverage[3]	Program Variation
f. Business Assistance and Loan Supply						
Project GATE (Growing America Through Entrepreneurship) [2003]	To provide small businesses with access to credit (through SBA microloans) and assistance to enable their formation and viability	Anyone who wants start/improve a small business (subject to random assignment)	2097 (out of 4201) applicants were assigned to treatment (2003-05); varies by sites[7]	US Department of Labor [$9 M over the 5 years]	PA, MN, and ME[8]	Location and time
SBA Microloan Program [1994]	To serve the growth/capital needs of America's small businesses through business assistance and loans (up to $35K)	Small businesses (especially from disadvantaged groups) that are not eligible for an SBA guaranteed loan	2,395 small businesses, 2,395 new loan	SBA[6] [$15.9 M[6]]	U.S.	Number of loans by location and time
Small Business Investment Company (SBIC) Program [1958]	To energize local small business creation and help create, support, and expand small businesses through assistance and loans financed by private investors and SBA guarantees	Existing small businesses that need funds	1,488 small businesses	SBA[6] [$15.2 M[6]]	U.S.	Amount of investment by location and time

SOURCES: Authors' tabulations based on information collected from various sources, including but not limited to the official websites of SBA, SCORE, DOL, SBI, UEP and other related websites; and program documents and reports including U.S. SBA (2007), SBA Office of Advocacy (2006), Bellotti et al. (2006), Godwyn et al. (2005), and Kosanovich et al.
(2001). Information about SBA program funding levels and participants served are from U.S. SBA (2007).

NOTE: n.a. = not available.

[1] As of FY06, unless specified otherwise.

[2] As of FY06, unless specified otherwise. M stands for million; B stands for billion.

[3] "U.S." indicates all U.S. states, District of Columbia and some of the U.S. territories, unless specified otherwise.

[4] NY SEA (the largest one) has over 5000 participants in period 1996-99; while DE SEA has only 24.

[5] PA program has a funding of $1.46 million in 1999; while DE program only cost $1,054 through the end of 1999.

[6] Funding for program operations only.

[7] Minneapolis (837) and Philadelphia (602) site has the most applicants.

[8] Five sites in three states: Philadelphia, Pennsylvania; Pittsburgh, Pennsylvania; Minneapolis/St. Paul, Minnesota; Northeast Minnesota; and Maine.

Table 2.2—Studies Evaluating Small Business Assistance Programs in the United States

Study	Program	Data[1]	Matched Group	Program Variable[2]	Outcomes	Covariates	Findings
a. Random Assignment							
Benus (1994)	WA & MA UI SED[3]	Participant Tracking System & follow-up survey (N=1,653)	Y (Control group)	Random assignment	Employment outcomes[4]	Demographics, prior employment, unemployment rate, site dummies, etc.	Positive effect on employment outcomes
b. Econometric Analysis							
Bates (1995)	General	CBO Database[5] (N=78,147)	N (Respondents include both clients and non-clients)	Whether assisted by local aids/multiple aids	Survival	Demographics, labor input, capital, time start business, industry	Effect of government assistance is different on performance of non-minority-owned and minority-owned businesses
Craig, Jackson, and Thomson (2007)	SBA 7(a)	7(a) loan data; economic conditions data; deposit data from FDIC (N=2,359 local markets)	N	Annual dollar amount of SBA 7(a) loans of local market[6]	Local labor market employment rate	Characteristics of local market[7]	Positive effect on local market employment
Chrisman and McMullen (2004)	SBDC	1994/1996/1998 survey of clients of PA SBDC and 2001 follow-up (N=159)	N	Number of hours spent on SBDC counseling	Survival rate	Demographics, firm size, industry	Positive and curvilinear effect on business performance
Chrisman, McMullen and Hall (2005)	SBDC	1994/1996/1998 survey of clients of PA SBDC and 2001 follow-up (N=159)	N	Number of hours spent on SBDC counseling	Sales and employment	Demographics, industry, geographic scope	Positive and curvilinear effect on business performance
Lerner (1996)	SBIR	Survey of awardees by GAO[8] in 1986 and a 1988 follow-up (N=541 awardees and 594 from control sample)	Y (by industry and employment)	Whether awarded	Employment and sales	Major business characteristics[9]	Positive effect on business performance (with strong location effect)

Table 2.2—Studies Evaluating Small Business Assistance Programs in the United States, *Continued*

Study	Program	Data[1]	Matched Group	Program Variable[2]	Outcomes	Covariates	Findings
b. Econometric Analysis, *Continued*							
Sanders (2002)	MAP	SELP[10] (participant group); PSID (matching group) (totally N=431)	Y[11] (by key demographic factors)	Program Participation	Household income and poverty status	Demographics and family composition	No effect on household income and poverty status
Weinsten, Nicholls, and Seaton (1992)	SBI	Census of local SBI clients during 1985-1989 (N=57)	N	Program Participation	Client evaluation	Business knowledge, practicality of recommendations and etc.	Positive client evaluation
c. Mean Comparison							
Chrisman (1999)	SBDC	1994 national survey of clients (N=2,025)	N	Program Participation	Starting rate, employment, sales	n.a.	Positive effect of business performance (with location effect)
Chrisman et al. (1985)	SBDC	1982 survey of clients (N=103)	N	Program Participation	Sales, employment, profit and , tax revenue generated	n.a.	Positive effect of business performance
Chrisman et al. (1990)	SBDC	Survey of clients of a state SBDC (N=188)	N	Program Participation	Type and amount of assistance, perceived service value and start-up propensity	n.a.	No gender difference in value and effect of program
Chrisman and Carsrud (1991)	SBDC	Survey of clients of a state SDBC (N=139)	N	Program Participation	Type and amount of assistance, perceived service value and start-up propensity	n.a.	No racial/ethnic difference in value and effect of program
Chrisman, Gatewood, and Donlevy (2002)	SBDC	1994 national survey of SBDC clients (N=8,703)	N	Program Participation	Starting rate, employment, sales, perceived monetary value of service, client evaluation	n.a.	No urban/rural difference in terms of the effect of program on business performance

Table 2.2—Studies Evaluating Small Business Assistance Programs in the United States, *Continued*

Study	Program	Data[1]	Matched Group	Program Variable[2]	Outcomes	Covariates	Findings
c. Mean Comparison, *Continued*							
Chrisman, Hoy, and Robinson (1987)	SBDC	1984 survey of pre-venture clients (N=135)	N	Program Participation	Client evaluation, starting/survival rate, sales, employment, tax revenue generated	n.a.	Positive effect of pre-venture business performance
Chrisman and Katrishen (1994)	SBDC	1991 national survey of clients (N=1,820)	N	Program Participation	Sales, employment, tax revenue generated	n.a.	Positive effect of business performance
Chrisman and Leslie (1989)	SBDC	Survey of clients from a state SBDC (N=76)	N	Program Participation	Sales growth, profit added	n.a.	Clients benefit more from administrative and operating assistance than from strategic assistance; a comprehensive approach is the most useful
Chrisman and McMullen (2000)	SBDC	1992 & 1994 survey of clients of a state SBDC (N=169)	N	Program Participation	Client evaluation, survival rate, time to break even, starting subsequent business, business size (employees, sales) and incidents of innovations	n.a.	Positive effect of business performance
Pelham (1985)	SBDC	Three surveys of clients of Iowa SBDC (N=766)	N	Program Participation	Client evaluation, employment, sales, tax revenue generated	n.a.	Positive effect of business performance
Robinson (1982)	SBDC	A sample of assisted firms (N=101)	Y (by business type, sales and employees)	Program Participation	Profitability, sales, productivity, employment	n.a.	Positive effect of business performance

Table 2.2—Studies Evaluating Small Business Assistance Programs in the United States, *Continued*

Study	Program	Data[1]	Matched Group	Program Variable[2]	Outcomes	Covariates	Findings
c. Mean Comparison, *Continued*							
Solomon and Weaver (1983)	SBI	National pilot survey of economic impact of SBI program (N=189)	N	Program Participation	Employment, perceived financial changes, sales, profit, net worth, owner compensation	n.a.	Positive effect on business performance; cost and appropriateness were top reasons for not implementing recommendations; consulting expertise is also important
d. Descriptive Analysis							
Nahavandi and Chesteen (1988)	SBDC	1986 survey of clients from a local SBDC (N=106)	N	Program Participation	Client satisfaction, impact on sales, profit, net worth and employees	n.a.	Clients highly satisfied with assistance received; lack of necessity and consultant expertise are the primary reason for not implementing recommendations
Rocha and Khan (1984)	SBI	Survey of a local SBI (N=17)	N	Program Participation	Implementation, type and degree of impact	n.a.	Positive effect on business operations; cost and riskiness are the top reasons for not implementing recommendations

SOURCES: Authors' tabulations based on sources cited in first column.
NOTE: n.a. = not applicable.
[1] Sample size shown in parenthesis.
[2] Indicates the dimension of program that is analyzed.
[3] The Washington State And Massachusetts UI Self-Employment Demonstrations.
[4] The likelihood of entry into self-employment, the timing of this entry, the likelihood of remaining self-employed, and the impact on total employment.
[5] U.S. Bureau of Census Characteristics of Business Owners Database.
[6] Inflation-adjusted and scaled by average population in local market.
[7] Including market liquidity, per capita income of local market, per capita bank deposit, and deposit market Herfindahl index.
[8] U.S. Government Accountability Office.
[9] Including measure of venture activity, average industry market-to-book ratio, ratio of tangible to total assets, ratio of R&D to sales, age of firm, and whether venture financing.
[10] Self-Employment Learning Project (SELP) from Aspen Institute.
[11] Two matched groups: non-participating self-employed and non-self-employed.

Table 2.3—Data Sources for Evaluating Small Business Assistance Programs in the United States

Data	Subject	Panel	Years Available	Sample Size	Response Rate	Outcomes	Covariates	Source of Variation
a. For Analysis of Business Outcomes								
1992 Characteristics of Business Owners (CBO)[1]	U.S. business owners and their businesses	N	1992	62% of the 78,134 firm questionnaires returned, 59% of the 116,557 owner questionnaires returned	Around 60%	Sales, profit, employment, payroll	Characteristics of businesses and owners	Program participation,[2] location (national with state codes)
2002 Survey of Business Owners (SBO)[1]	U.S. business owners	N	2002	2.3 million businesses	81%	Sales, receipt, payroll, employment	Characteristics of businesses and owners	Location (national with state, MSA, county, and place code)
Kauffman Firm Survey	New U.S. businesses	Y	Baseline (05-06), first-follow-up (06-07), second follow-up (ongoing)	Baseline: 4,928 businesses; first follow-up: 3,998 (369 out of business)	Baseline: 43%; first follow-up: 88%	Sales, profit, employment, survival	Characteristics of businesses and owners	Location (national with state and MSA code), time
Longitudinal Business Database	U.S. businesses with paid employees	Y	Every year from 1976 (ongoing)	24 million unique businesses covered (annual size varies)	n.a.	Payroll, employment, survival	Characteristics of businesses	Location (national with county code), time
National Establishment Time-Series Database[3]	U.S. businesses	Y	Every year from 1990 (ongoing)	30 million unique businesses covered (annual size varies)	n.a.	Employment, sales, growth relative to peers, survival	Characteristics of businesses	Location (national with state, county, MSA,, city, and zip code), time
Longitudinal Establishment and Enterprise Microdata[4]	U.S. businesses	Y	Every year from 1988 (ongoing)	n.a.	n.a.	Payroll, Employment	Standard Industrial Classification, length in business	Location (national with state, MSA, county, and place code), time
Panel Study of Entrepreneurial Dynamics (PSED)	U.S. nascent entrepreneurs and their businesses	Y	PSED I has 4 waves; PSED II has 3 waves (both ongoing)[5]	PSED I: 830 entrepreneurs; PSED II: 1,214 entrepreneurs	PSED I: 77%; PSED II: 80%	Employment, sales, net worth of business, survival	Characteristics of businesses and owners	Program participation,[6] location (national with state and county code), time

Table 2.3—Data Sources for Evaluating Small Business Assistance Programs in the United States, *Continued*

Data	Subject	Panel	Years Available	Sample size	Response Rate	Outcomes	Covariates	Source of Variation
b. For Analysis of Employment Outcomes								
Monthly Current Population Survey (CPS)	U.S. population	Y[7]	Monthly microdata from 1968 (ongoing)	About 50,000 households	Around 94% (Dec. 1996)	Employment outcomes[4]	Demographics, employment characteristics, income (March only), etc.	Location (national with state and county code), time
National Longitudinal Survey of Youth (NLSY) 1979 and 1997	U.S. youth population	Y	NLSY 79: annually 1979-1994, biennially thereafter NLSY 97: annually from 1997 (both ongoing)	NLSY 79: 12,686 individuals; NLSY 97: 8,984 individuals	NLSY 79: between 80% to above 90%; NLSY 97: above 90%	Employment outcomes[8]	Demographics, family composition, income and assets, etc.	Location (national with geocode-restricted access), time
Panel Study of Income Dynamics (PSID)	U.S. families and individuals	Y	Annually 1968-1996, biennially thereafter (ongoing)	7,790 families (2003)	Ranged between 97% and 99%, for most years	Employment outcomes[8]	Demographics, family composition, income and assets, etc.	Location (national with geocode-restricted access), time

SOURCES: Authors' tabulations based on documentation for data sources listed in the first column.
NOTE: n.a. = not available.

[1] 1992 CBO and 2002 SBO are both part of the Economic Census of their respective survey years. The publicly available SBO documentation is not complete. The information about SBO is based on those publicly available.

[2] Including information about utilization of major forms of government assistance and the sources/sponsor type of assistance used.

[3] Commercial data by Walls & Associates.

[4] Confidential data located at Center for Economic Studies of U.S. Census Bureau.

[5] Two cohorts available. PSED I began screening in 1998-2000; PSED II began screening in 2005-2006.

[6] PSED has detailed questions about participation of start-up assistance program (contact, type of program, program sponsor, location/state, services, hours spent, satisfaction).

[7] Households are in the survey for 4 consecutive months, out for 8, and then return for another 4 months before leaving the sample permanently.

[8] Including class of worker (self-employment status), sources of income (including self-employment income), receipt of UI benefits, and duration of unemployment.

Chapter 3

Liquidity Constraints, Household Wealth, and Self-Employment: The Case of Older Workers

INTRODUCTION

An efficient credit market is essential for entrepreneurial activities. For nascent and aspiring entrepreneurs, insufficient starting capital can be a substantial obstacle to starting a new business. The existence and importance of liquidity constraints are cited as justification for public intervention in the credit market for new businesses. Federal and state governments in the United States, for example, have implemented various programs to facilitate new business creation with loan provision being one of the primary services provided (Gu, Zissimopoulos, and Karoly 2008). The federally funded Small Business Administration is the largest single financial backer of small businesses in the United States with a business loan portfolio of tens of billions of dollars (Craig et al. 2007). Whether liquidity constraints bind and for whom, how important they are, and whether they justify public intervention are important policy questions.

Evidence that liquidity constraints affect entrepreneurship includes empirical findings that rates of business formation increase with household wealth up to a point but that there is no relationship between the likelihood of business formation and wealth at very high wealth levels. A substantial body of empirical literature has documented the positive relationship between household wealth and new business ownership or entry into self-employment, consistent with the hypothesis that liquidity constraints deter entrepreneurship (Evans and Jovanovic 1989; Evans and Leighton 1989; Holtz-Eakin,

Joulfaian and Rosen 1994; Dunn and Holtz-Eakin 1995, 2000; Fairlie 1999; Bruce, Holtz-Eakin and Quinn 2000; Zissimopoulos and Karoly 2007, forthcoming).[18]

However, a study by Hurst and Lusardi (2004) has challenged the long-standing belief about the existence and importance of liquidity constraints in entrepreneurial activities. Analyzing data from the Panel Study of Income Dynamics (PSID), they found a positive relationship between household wealth and becoming a business owner for households in the highest 5th percentile of the wealth distribution. They concluded that the lack of a positive relationship between wealth and entrepreneurship for the majority of the wealth distribution indicated that being liquidity constrained is not an empirically important deterrent for the majority of new business owners. Moreover, using census-region-level housing capital gains as a new instrument for household wealth, they found no effect of wealth on business entry.

More recently, Fairlie and Krashinsky (2006) questioned the conclusions of Hurst and Lusardi. They argued that separate analysis is needed for those who start new businesses after job loss and those who do so but are not job losers because of differences in the incentives faced by the two groups in a model of entrepreneurial choice (Evans and Jovanovic, 1989). Using the same PSID data (but different waves), Fairlie and Krashinsky first reproduced the empirical evidence presented by Hurst and Lusardi when job losers and non-job losers are pooled, but found that the relationship between wealth and business creation increases throughout the wealth distribution when the model is estimated separately for each group. To address the issue of potential endogeneity, they used matched data from the Current Population Survey from 1994 to 2004 and find a

[18] Some of these studies define entrepreneurship by business ownerships while others define it in terms of self-employment.

positive relationship between unanticipated housing appreciation at the MSA level and transitions to self-employment.

These recent studies, as well as most of the literature on liquidity constraints and entrepreneurship, are based on samples that include persons of all working ages with the exceptions of Bruce, Holtz-Eakin and Quinn (2000) and Zissimopoulos and Karoly (2007, forthcoming). Older workers have higher rates of self-employment than younger workers: rates of self-employment among workers over age 50 are 20 percent while the rates for all workers over age 16 peaked in 1994 at 12 percent (Zissimopoulos and Karoly, 2008). Older workers are also different than younger workers in ways that affect both their likelihood of becoming business owners and their likelihood of facing liquidity constraints. For example, older workers have more wealth than younger workers, different types of wealth and more work experience. Thus they have less need for credit and, for those who need to borrow, may have more access to credit. On the other hand, older workers may be less willing to take on the risk of business ownership given that, compared to younger workers, they have fewer healthy work years remaining over which to recoup the losses of an unsuccessful business. Older workers may prefer the job flexibility and work conditions of being a business owner more than younger workers. On the other hand, compared with younger workers, they may be less willing to transition from a wage and salary job that offers health insurance to self-employment because of the increased likelihood of being in poor health or experiencing a health shock. Finally, compared with younger workers, older workers may be more likely to be pushed into self-employment following job loss because they have fewer options in the wage and salary sector (Fairlie and Krashinsky, 2006).

In this paper we add to the current debate on the importance of liquidity constraints for business formation by analyzing rich, longitudinal data, employing new empirical methods, and studying a middle age and older population characterized by rates of self-employment and wealth that are substantially higher than a population of all workers. As we indicate in the next section, we use seven waves of panel data spanning 14 years from the Health and Retirement Study (HRS), a nationally representative sample of individuals over age 50 and their spouses, to study the relationship between wealth and self-employment. In the third section, we document our empirical approach and describe our findings. In brief, we estimate probit multivariate regression models of movements into self-employment from wage and salary work that include a non-linear specification of household wealth and liquid wealth and find a positive relationship between wealth and business formation over the entire wealth distribution, a pattern that is consistent with the existence of liquidity constraints. In addition, we find that wealth matters more for the formation of businesses requiring high starting capital, thereby providing further evidence of the importance of liquidity constraints.

Household wealth and business formation, however, may be correlated with third factors that cause households to accumulate wealth and be more likely to start a new business. Thus, in the fourth section, we propose an alternative method for studying the relationship between wealth and business formation, particularly relevant for older workers: the availability of a lump-sum distribution option (LSO) of an employer-provided pension plan as a proxy for liquidity. That is, in order to fund the start-up of a new business, people with an LSO can cash out their pension benefit when eligible, rather than receive an annuity. Compared with workers with no LSO in their pension plan, we

find that workers with an LSO are 27 percent more likely to transitions from wage and salary work to self-employment over a two-year period. A final section concludes the paper.

HRS DATA AND DESCRIPTIVE RESULTS

We analyze the relationship between household wealth and transitions into self-employment using data from the HRS, a nationally representative, longitudinal survey of the labor force behavior, health, income and wealth of middle-aged and older Americans. Since 1992, the HRS surveyed more than 22,000 Americans over age 50 and their spouses every two years. Besides the original HRS cohort (born 1931-1941), several additional birth cohorts were added in the subsequent survey years. This paper uses the first seven waves (1992 to 2004) of the HRS with data from the original HRS cohort, as well as the Children of the Depression Era (CODA) and War Babies cohorts added in 1998 (born 1924 to 1930 and 1942 to 1947, respectively).[19]

The HRS is well suited for this study. In each wave of the HRS, respondents who report that they are currently working are asked if they are self-employed or not in their main job. In this study, we begin with a sample of individuals working at a wage and salary job at time *T* and who continue to work at time *T+2*. A transition to self-employment is defined as those who move from being a wage-and-salary worker in one wave (time *T*) and to being self-employed at the next wave (time *T+2*).[20] This definition captures entrepreneurship through the class of worker on the main job and does not include other business ownership on the part of individuals who are wage and salary

[19] Data from the 2006 HRS wave is available only as a preliminary release.

[20] This definition excludes transitions to self-employment for those who are unemployed at time *T*. However, including unemployed people at time *T* does not change our analytical results.

workers in their main job. This definition is consistent with other studies of liquidity constraints in entrepreneurship such as Evans and Jovanovic (1989), Evans and Leighton (1989), and Fairlie and Krashinsky (2006), among others. While Hurst and Lusardi (2004) define entrepreneurship based on entry into business ownership, regardless of current class of worker, they report that their results are similar when they define entrepreneurship by entry into self-employment. Our total sample of wage and salary workers age 50 and above at time *T* who are working at time *T+2* has 22,363 observations (person waves), with 705 transitions to self-employment.

In addition, the HRS is known to provide high-quality information on wealth and its components (Juster and Smith 1997; Hurd, Juster, and Smith 2003), as well as information on pension characteristics including the availability of an LSO. The HRS is also extremely rich in terms of individual and household characteristics associated with self-employment transitions such as demographic characteristics, risk aversion, health status and health insurance availability, and characteristics of the wage and salary job at time *T* (e.g., occupation and industry) or the self-employment job at time *T+2*.

Before presenting the regression results for the relationship between self-employment entry and wealth in the next section, we first examine the characteristics at time *T* of wage and salary workers who become self-employed between survey waves (approximately a two-year period), a group we call self-employment entrants, compared to those who do not transition to self-employment, the non-entrants (i.e., those who remain wage and salary workers). In Table 1, we report summary statistics for the sub-samples of self-employment entrants and non-entrants. On average, compared to non-entrants, self-employment entrants are more likely to be older, white, male, married,

college educated, and more likely to have a work-limiting health condition. A slightly higher proportion of entrants score on the lower range of the scale of risk aversion, meaning that they are less risk averse, although the difference is not statistically significant at conventional levels (p=0.11).[21] Entrants also have higher family labor income and, on their wage and salary job, they are less likely to have a pension plan and be covered by employer-provided health insurance or any health insurance.[22]

The two sub-samples differ most strikingly in the level of mean and median net total wealth (or net worth), net housing wealth (based as the primary residence) and liquid wealth, all measured in 1996 dollars.[23] Total net wealth is defined as the sum of the value of the primary residence, other real estate, vehicles, businesses, individual retirement accounts, Keogh accounts, stocks, mutual funds, investment trusts, checking and saving accounts, certificates of deposit, bonds and other savings, less home mortgages and household debt.[24] Liquid wealth excludes the non-financial net assets (i.e., the net value of the primary residence, other real estate, vehicles, and businesses). For married couples, the wealth components are summed across the two spouses.

As seen in Table 1, mean and median net worth for entrants into self-employment are $384,783 and $169,440 respectively and are much higher than for non-entrants at the mean and median ($220,003 and $111,968 respectively). Notably, the median net worth

[21] Risk aversion in the HRS is measured on a 4-point scale, from 1 (least risk averse) to 4 (most risk averse). We classify individuals who score a 1 or 2 in the "less risk averse" group.

[22] The measure of any health insurance shown in Table 1 includes insurance from any source: government, employer, or other. Coverage rates by source are also shown in non-mutually exclusive categories. Because of dual coverage, the percentage of entrants or non-entrants covered by each source will sum to a total that exceeds the percentage covered by any health insurance.

[23] Dollar amounts are converted using the Consumer Price Index.

[24] This definition of wealth is the same as that used by Hurst and Lusardi (2004) and they also report amounts in 1996 dollars.

of self-employment entrants in the HRS, where the sample age range is 51 to 78 is approximately three times the value reported by Hurst and Lusardi (2004) for the PSID sample of self-employment entrants aged 22 to 60. Likewise, HRS non-entrants have four times the median net worth of the PSID non-entrants. This large difference in the wealth distribution between the HRS and PSID is expected given the age difference in the two samples and would suggest that liquidity constraints may be less binding in a sample of older workers assuming a non-trivial level of starting capital for a transition to self-employment.

HOUSEHOLD WEALTH AND THE TRANSITION TO SELF-EMPLOYMENT

In this section, we analyze the relationship between household wealth and transitions into self-employment from wage and salary work. As in previous studies, we use total net worth as the primary measure of household wealth.[25] We first estimate multivariate probit regression models of becoming self-employed in the main job at time *T+2*, conditional upon being a wage and salary worker at time *T*, as a function of household net wealth and several relevant controls (see Table 1). The covariates include a quadratic in age, the logarithm of family labor income, and categories for highest education degree received. Indicator variables are also included for being non-white, female, and married and for having low risk-aversion, a work-limiting health condition, and a pension in the wage and salary job at time *T*. Other categorical variables measure types of health insurance coverage and the industry and occupation on the wage and

[25] We exclude the net value of secondary residence because it is not available for all waves of the HRS.

salary job.[26] Like Hurst and Lusardi (2004), we use two non-linear specifications for total net wealth to account for the fact that a few households have very large wealth values and a few have very low values. In the first specification, total net wealth enters as a series of wealth quintile dummies, with a separate category for the highest 5 percent, for a total of six categories. In the second specification, we use a fifth-order polynomial in wealth. The wealth amount used in the fifth-order polynomial model is divided by $100,000.

BASELINE RESULTS

The first two columns in Table 2 report the regression coefficients and marginal effects for the wealth variables in the two specifications of the probit model of the probability of transitioning to self-employment.[27] Both models reveal an increasing likelihood of transitioning to self-employment as wealth increases, consistent with the existence of liquidity constraints. Estimates from the wealth quintile specification are given in column 1 (model 1) and indicate that, compared to the lowest 20th percentile wealth group, each successively higher wealth group is more likely to transition into self-employment between waves. The magnitude of the estimate for the 20th-40th is relatively small and not statistically different than the reference group. Relative to the workers in the lowest wealth quintile, wage and salary workers in the 40th-60th percentile of wealth are 25 percent more likely to become self-employed (a 0.8 percentage-point increase over the baseline transition rate of 3.2 percent). Worker in the 60th-80th percentile of wealth are 47 percent more likely than the reference group to become self-employed (a 1.5 percentage-point increase). Workers in the 80th-95th percentile of wealth are 84 percent

[26] Because of the rich background information in HRS, we can control for a more extensive set of individual characteristics compared with previous studies.

[27] We report robust standard errors with clustering.

more likely than the reference group to become self-employed (a 2.7 percentage-point increase) and the comparable figure for those in the highest 5th percentile of the wealth distribution is 131 percent (a 4.2 percentage-point increase).

Column 2 (model 2) of Table 2 reports the marginal effects of a fifth-order polynomial in wealth and confirms the finding of an increasing probability of becoming self-employed over the entire wealth distribution. All wealth terms in the polynomial model are statistically different from zero at the 5 percent significance level (and jointly significant at the 1 percent level). The marginal effect of wealth/100,000 is 0.003, indicating that a $100,000 increase in household net wealth would increase the probability of transitioning into self-employment by a 0.3 percentage points or by 10 percent.

To further illustrate the relationship between wealth and self-employment transitions, Figure 1 plots the predicted probability of transitioning into self-employment against wealth levels for the two specifications in models 1 and 2.[28] The first dotted vertical line indicates the location of the 80th percentile and the second line marks the 95th percentile. The graph clearly indicates the positive relationship between wealth and self-employment transitions across the entire wealth distribution. Although the increase in the self-employment transition probability in moving from the lowest wealth level to the 60th percentile in wealth is not as substantial as the increase thereafter, since the wealth distribution is highly skewed, a one percentile-point increase in wealth at higher wealth levels represents a substantially higher absolute change in wealth than a one percentile-point increase at lower wealth levels. The slope of the positive relationship between self-

[28] When computing predicted probabilities, all covariates except the wealth variables are set to their sample mean.

employment entry and wealth based on the fifth-order polynomial specification is fairly constant from the starting wealth level to around the 90th percentile of the wealth distribution. After the 90th percentile, the probability continues to increase, although at a modestly decreasing rate which is consistent with the hypothesis of binding liquidity constraints throughout the wealth distribution with the exception of extremely high levels of wealth where we would not expect liquidity constraints to be important.

Full regression results for models 1 and 2 in Table 2 are provided in Appendix Table A1. Estimates of the other covariates in the models are consistent with estimates from previous studies. For example, the likelihood of becoming self-employed increases with education, is higher for men than for women, is higher for workers with a work limiting health condition and those with no health insurance. There is no effect on self-employment transitions of age or of being non-white, less risk-averse or married. Occupation is a significant determinant of self-employment entry. Compared professionals and managers, workers in almost all other occupations (the exception is sales) at time *T* are less likely to be self-employed in time *T+2*, although the differences by occupation group are only significant for the administrative support occupations and the mechanic, construction, operator occupations.

FURTHER ANALYSES USING AN ALTERNATIVE WEALTH MEASURE AND ACCOUNTING FOR INDUSTRY STARTING CAPITAL COSTS

The amount of liquid wealth rather than total net wealth may be a more appropriate measure for assessing the relationship between wealth and self-employment transitions. Recall that liquid wealth includes individual retirement accounts, Keogh accounts, stocks, mutual funds, investment trusts, checking and saving accounts,

certificates of deposit, bonds and other savings.[29] We re-estimate models 1 and 2 in Table 2 using liquid wealth instead of total net wealth and illustrate our estimates in Figure 2. Again we find a positive and significant relationship between liquid wealth and the probability of becoming self-employed, a relationship that becomes flatter only at the highest wealth levels.[30]

Following Hurst and Lusardi (2004), we further investigate the relationship between wealth and self-employment transitions by the industry type of the self-employment job, using a similar classification scheme to sort businesses into high- and low-starting capital requirements. If liquidity constraints are binding, then wealth should matter more for transitions to businesses with high capital start-up requirements. Based on Hurst and Lusardi (2004), we designate industries in our sample as low-starting capital industries (namely services), high-starting capital industries (namely manufacturing; transportation, communication, and other public utilities; wholesale and retail trade; and finance, insurance and real estate) and the professionals industry.[31] In our sample, 29 percent of older wage and salary workers that transition to self-employment start a business in a low-starting capital industry, 37 percent in a high-starting capital industry and 18 percent in the professionals industry. The remaining 16 percent start a business in

[29] We did not subtract household debt from the liquid wealth because people are not required to pay off any of their debts before using their liquid wealth.

[30] In the first model specification, there is a negative and insignificant coefficient on the dummy for the 20th to 40th percentile of the liquid wealth distribution relative to the reference group (0 to 20th percentile), hence the pattern plotted in Figure 2.

[31] Hurst and Lusardi (2004) determined the industry type using median starting capital of various industries from the 1987 National Survey of Small Business Finances (NSSBF). For the group of low-starting capital industries, the median and 75th percentile of start-up capital are $20,000 and $63,000, respectively. The comparable figures for the high-starting capital industries are $45,000 and $120,000. The professionals industry group is treated as a separate group because no information on required starting capital for professionals is available in the 1987 NSSBF (Hurst and Lusardi 2004).

agriculture or mining and construction, a group that is excluded for purposes of this analysis.[32]

Again, we estimate a multivariate model of self-employment entry on a fifth-order polynomial of total household wealth and covariates (same as before), now with the outcome successively defined as a transition to self-employment in a low-starting capital, high-starting capital, or professionals industry. The fifth-order polynomial of wealth is jointly significant at the 5 percent level for both high- and low-starting capital industry groups but not for the professionals industry. Figure 3 plots the predicted probability of self-employment entry against total household net wealth separately for low- and high-starting capital industries and the professionals industry.

In contrast to Hurst and Lusardi (2004), the pattern in Figure 3 is consistent with the importance of liquidity constraints. Notably, for both low- and high-starting capital industries, there is a positive relationship between wealth and self-employment entry at least to the 80th percentile of the wealth distribution. For low-starting capital industries, at high wealth levels (after the 80th percentile of wealth), the probability of a transition to self-employment increases at a decreasing rate and eventually begins to decline, while the probability of a transition to a high-starting capital industry continues to increase at high wealth levels. After the 95th percentile, the probability of self-employment transitions in a high-starting capital industry continues to increase. This analysis of the relationship

[32] As with Hurst and Lusardi (2004), the agriculture industry is not included in our analysis. In addition the HRS data combine construction and mining industries which are classified respectively by Hurst and Lusardi (2004) in the low-starting and high-starting capital groups. For our main results, we exclude this combined industry group from the analysis. However, in a sensitivity analysis, we estimated models where the combined mining and construction sectors are assigned to either the high- or low-starting capital group. Our main results do not change with this assignment to either group.

between transitions to self-employment and wealth by industry group therefore provides further evidence supporting the existence and significance of liquidity constraints.

In contrast to our findings for other industry groups, we find no relationship between wealth and self-employment transitions into professional businesses (see Figure 3). The estimated coefficients on the wealth polynomial terms for transitions to the professionals industry are small and not jointly significant. Again, this result differs from that reported by Hurst and Lusardi (2004). However, among older workers, the transition rate into self-employment in the professionals industry is lower than the transition rate into either the low- or high-starting capital industries. Thus, the lack of significance may result from low power.

SELF-EMPLOYMENT ENTRY AND PENSION CASH-OUT

Interpreting the relationship between wealth and movements into self-employment is complicated by the fact that the amount of household wealth may be influenced by unobservable factors that may also be correlated with the likelihood of becoming self-employed. Although the richness of the HRS data allows us to control for some of these confounding factors, such as the degree of risk aversion, we cannot rule out the possibility that wealth levels are endogenous. Previous studies have explored proxies for liquidity such as the receipt of an inheritance (e.g. Holtz-Eakin, Joulfaian and Rosen 1994; Blanchflower and Oswald 1998; Zissimopoulos and Karoly 2007) and instruments for household wealth such as house value appreciation (Hurst and Lusardi 2004; Fairlie and Krashinsky 2006). Hurst and Lusardi (2004) conclude that inheritance receipt is a poor instrument for changes in household liquidity because both past and future

inheritances predict self-employment transitions. Using housing capital gains at the census region level as an instrument for wealth, they find no relationship between wealth and entrepreneurship entry. In contrast, Fairlie and Krashinsky (2006) use a similar sample and housing gains at the MSA level as an instrument for wealth and find a positive and significant relationship between wealth and entrepreneurship entry.

We analyze a new proxy for liquidity particularly relevant for older workers: the availability of a pension cash-out or LSO. Among older workers, pension wealth can be an important component of total household wealth. For example, using data from the 1998 Survey of Consumer Finance, Jianakoplos and Bajtelsmit (2002) reported that private pension wealth accounts for 20 percent of total household wealth for people 51-59 years old. Although not all pension plans have the option to cash out the entire or partial balance, those with an LSO have access to a source of liquid wealth that could be used to finance a start-up business. For this to be a valid proxy, we must assume that the availability of a pension plan with an LSO is not correlated with the error term in the regression model after controlling for other observable differences.

We employ all seven waves (1992-2004) of the HRS to determine for each worker the availability of an LSO on their current wage and salary job.[33] In each wave, pension holders are asked a set of questions regarding the characteristics of their pension plan that vary by whether the pension is a defined benefit plan (DB), a defined contribution plan (DC) or a plan with both features (DB-DC). Depending on pension type, separate questions about LSO status are asked. For example, in survey wave 6 (year 2002), workers with a DB plan or a DB-DC plan are asked "Rather than regular

[33] We exclude from this analysis the few workers from the AHEAD cohort (born in or before 1923) because of difficultly determining the LSO status of their pension plans.

retirement benefits, could you choose to receive a lump-sum settlement from this plan when you retire?" Respondents with a DC plan are asked, "Does this plan allow you to receive benefits in the form of a lump sum payment?" The answer to these questions could be: "Yes," "Yes, partial," or "No." We construct LSO status equal to 1 if the answer is "Yes" or "Yes, partial" and 0 otherwise.[34] Respondents may have multiple pension plans on the current job. For the first 4 waves of the HRS, respondents are queried about up to 3 pension plans and up to 4 pension plans in subsequent waves. We determine the LSO status of each pension plan in each wave.

Pooling all waves together, the percentage of LSO availability in our sample of wage and salary workers at time *T* is 46 percent for DB plan participants, 81 percent for DC plan participants and 62 percent for participants in DB-DC plans.[35] By way of comparison, only a few studies report the rate of LSO availability by pension type. Using the Employee Benefit Supplements (EBS) to the Current Population Survey (CPS), Burman et al. (1999) found that LSO availability, as reported by individual workers, was 58 percent for DB plan holders and 79 percent for DC plan holders as of 1993 (excluding respondents who do not know whether they have such an option). Blostin (2003), based on the 2000 National Compensation Survey administered to employers in the private sector only, reported that 44 percent of people with a DB plan and 83 percent of people

[34] Not all respondents answer these questions in each wave. The LSO questions are asked for all new respondents to the HRS survey and those respondents that changed jobs between waves. Respondents who have the same job as the prior wave are asked whether the rules governing their pension plan on the current job have changed. If the rules change, respondents are asked the LSO questions. If the rules do not change, however, only a limited number of questions are asked about their pension plan and the LSO questions are skipped. In these cases, we carry over the LSO status in previous waves to the current wave. The exceptions are wave 1 and wave 7 when all respondents answered the same pension questions, including those pertaining to LSO.

[35] These percentage calculations are based on the primary pension plan only. Those with missing LSO status are excluded from the calculations.

with a DC plan have an LSO.[36] Our estimates for the HRS sample fall in the middle of the range reported by these two studies.

Pension holders with either DC plans or DB-DC plans can cash out the pension balance any time if LSO is allowed, although cashing out before a certain age (specifically age 59 ½) is subject to a penalty. DB plans, however, typically do not allow cashing out before early or normal retirement age even if an LSO is allowed. If the age of the respondent is at or above the normal retirement age and the plan allows for an LSO, we characterize the respondent as having access to an LSO. In sum, those who we define as having no LSO access—in other words, they cannot cash out any part of their pension balance during the transition window—includes workers that have no LSO of any type on their primary pension plan, as well as those DB plan holders with an LSO on their primary pension but who are not yet eligible for pension benefits as of time *T+2* (the end point of the transition window). Thus, workers that have the option to cash out pension balances are those who have an LSO on a primary DC or DB-DC plan and those retirement age-eligible DB plan holders with an LSO. We use LSO availability and eligibility based on the primary pension plan from the current job under the assumption that most pension wealth from the current job is associated with the primary plan. The majority of respondents (77 percent) in our sample has only one pension plan on their current job (the primary plan).

As with the earlier models, we use a probit specification to estimate the effect of having an LSO—the option to cash-out a pension balance in the form of a lump sum—on self-employment entry. The model specification includes an LSO dummy, an indicator

[36] Cases with a missing LSO value were not excluded in the reported rates of LSO access. If missing cases are excluded, the corresponding percentages are 46 percent for DB plan holders and 94 percent for DC plan holders.

variable for more than one pension, six quantiles of net total household wealth as with model 2, and all other covariates included in the previous regression models (again, full results are provided in Appendix Table A1). As reported in Table 2 (see model 3), the estimates indicate that, compared to those with no pension cash-out option, workers with an LSO are 0.8 percentage points more likely to enter self-employment in the next wave than pension holders without an LSO, an effect that is significant at the 5 percent level. This is a substantial effect, representing a 25 percent increase from the base probability of transitioning to self-employment of 3.2 percent. A comparison of models 2 and 3 shows that the estimated relationship of self-employment transitions and household wealth remains virtually unchanged from previous models. This significant and substantial marginal effect of an LSO among pension holder provides further evidence to the existence and importance of liquidity constraints. Workers with no pension on the current job are more likely to be self-employed than workers with a pension but no LSO. The positive estimated effect of not having a pension may indicate that workers with low quality jobs (in terms of compensation and stability) are pushed into self-employment as has been consistently found in other studies (Fuchs 1982; Zissimopoulos and Karoly 2007).

CONCLUSION

Insufficient starting capital to fund new businesses can be a significant obstacle for nascent entrepreneurs. Thus, a substantial research literature has emerged to investigate whether liquidity constraints bind and if they do, whether the existence of liquidity constraints is important enough to justify public intervention. Although past

research has provided a strong empirical base confirming the importance of binding liquidity constraints, the issue is far from settled as recently demonstrated by the contrasting findings of Hurst and Lusardi (2004) and Fairlie and Krashinsky (2006).

However, just as Fairlie and Krashinsky demonstrate that pooling all workers together in models of business formation can obscure the relationship with wealth for important subgroups—in their case job losers vs. nonlosers—our study shows the relevance of examining the importance of liquidity constraints specifically for middle age and older workers. Older workers are known to have higher rates of self-employment than younger workers, and the HRS provides rich, longitudinal data, including high quality measures of wealth. Indeed, our findings, specific to the population of workers over age 50 captured in the HRS, add further evidence in support of the existence of liquidity constraints for business formation.

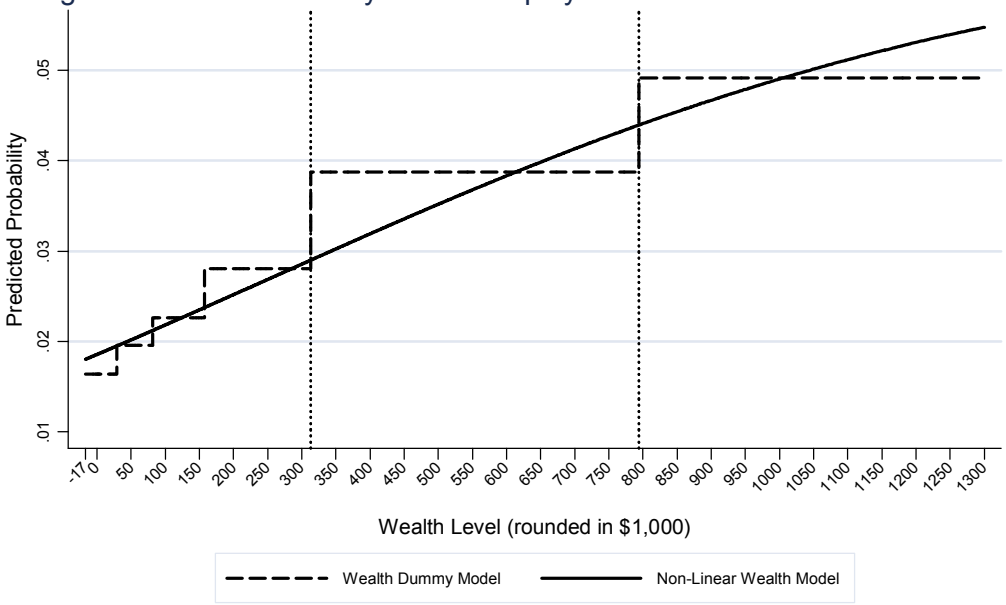
First, we find a positive relationship between wealth and transitions to self-employment over the entire wealth distribution, one that weakens only at the highest wealth levels—a pattern consistent with the existence of liquidity constraints. This pattern holds whether we use a measure of total net worth or of liquid wealth. Second, we find that wealth matters more for transitions to self-employment in industries that require high levels of starting capital compared with those industries that have low starting-capital requirements, another pattern consistent with the importance of liquidity constraints.

Third, we find that the availability of an LSO—the option to cash out a pension benefit when eligible rather than receive an annuity—is also positively associated with transitions to self-employment among older workers. To the extent that third factors can

cause households to accumulate wealth and be more likely to start a new business, we view access to an LSO as an alternative measure of liquidity, one that can be used to fund the start-up of a new business but one that is less subject to endogeneity bias. Compared with workers with no LSO in their pension plan, we find that workers with an LSO are 27 percent more likely to transition from wage and salary work to self-employment over a two-year period.

While the results of this paper confirm the importance of liquidity constraints in the decision for older workers to start a new business, other dimensions of the relationship between wealth and entrepreneurship at older ages are relevant for policy analysis. For example, do liquidity constraints keep potential business owners with a low chance of success from putting their retirement assets at risk? More generally, what are the implications of starting a new business for income security at older ages? Answers to these questions are relevant for older and younger workers alike and will increase our understanding of the decision to become self-employed and the implications for the well-being of individuals and families.

Fig.1 Predicted Probability of Self-Employment as a Function of Total Wealth

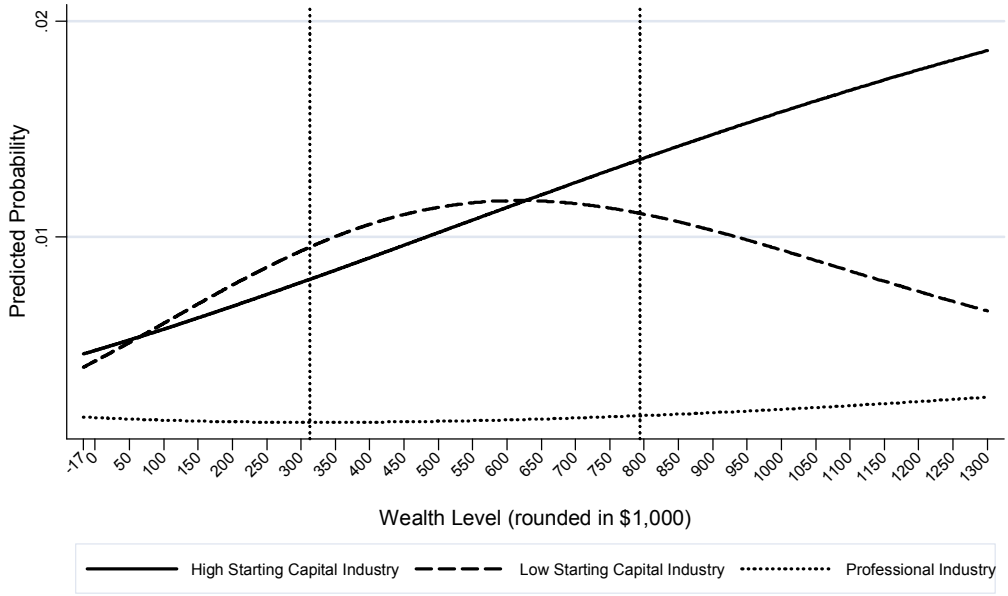


SOURCE: Authors' calculations using the HRS.
NOTE: The first and second dashed vertical lines mark the 80th and 95th percentiles of the wealth distribution, respectively.

Fig.2 Predicted Probability of Self-Employment as a Function of Liquid Wealth

SOURCE: Authors' calculations using the HRS.
NOTE: The first and second dashed vertical lines mark the 80th and 95th percentiles of the wealth distribution, respectively.

Fig.3 Predicted Probability of Self-Employment as a Function of Total Wealth by Industry



SOURCE: Authors' calculations using the HRS.
NOTE: The first and second dashed vertical lines mark the 80th and 95th percentiles of the wealth distribution, respectively.

Table 3.1: Descriptive Statistics of Self-Employment Entrants and Non-Entrants

Variable (measured at time *T*)	Entrants (N=705)	Non Entrants (N=21,658)	P-Value
Age	59.0	57.9	0.00
Education Level			
Less Than High School*	0.19	0.22	0.05
High School Graduate*	0.26	0.33	0.00
Some College*	0.24	0.22	0.28
College and Above*	0.30	0.23	0.00
Non-White*	0.13	0.19	0.00
Female*	0.38	0.52	0.00
Married*	0.83	0.78	0.00
Less Risk Averse*	0.24	0.22	0.11
Has Work-Limiting Health Condition*	0.12	0.08	0.00
Covered by Any Health Insurance*	0.86	0.93	0.00
Covered by Government Health Insurance*	0.18	0.13	0.00
Covered by EHI*	0.54	0.69	0.00
Covered by Spouse's EHI*	0.19	0.17	0.12
Covered by Other Health Insurance*	0.14	0.10	0.00
Has Pension Plan on Wage & Salary Job*	0.43	0.64	0.00
Occupation of Wage & Salary Job			
Professional and Managerial*	0.37	0.32	0.00
Sales*	0.14	0.08	0.00
Clerical and Administrative Support*	0.10	0.19	0.00
Services*	0.15	0.16	0.67
Farming, Forestry, Fisheries*	0.02	0.02	0.44
Mechanic, Construction, Operator*	0.21	0.24	0.04
Industry of Wage & Salary Job			
Agriculture, Forestry, Fishery*	0.02	0.02	0.76
Mining and Construction*	0.08	0.04	0.00
Manufacturing*	0.13	0.18	0.00
Transportation*	0.07	0.07	0.77
Wholesale and Retail*	0.17	0.15	0.17
Finance, Insurance, Real Estate*	0.08	0.06	0.08
Business/Repair Services*	0.08	0.05	0.01
Personal Services*	0.05	0.03	0.02
Entertainment/Recreation*	0.02	0.02	0.70
Professional/Related Services*	0.26	0.32	0.00
Public Administration*	0.04	0.06	0.03
Family Labor Income	$55,843	$47,032	0.00
Mean Value of Total Net Wealth (Net Worth)	$384,783	$220,003	0.00
Median Value of Total Net Wealth (Net Worth)	$169,440	$111,968	0.00
Mean Net Value of Primary Residence	$93,332	$75,143	0.00
Median Net Value of Primary Residence	$61,698	$55,000	0.04
Mean Value of Liquid Assets	$157,961	$85,873	0.00
Median Value of Liquid Assets	$31,800	$19,296	0.00

SOURCE: Authors' calculations using the HRS.

NOTE: Sample size is 22,363. The sample includes all respondents in the HRS who had a wage-

and-salary job at time *T* and subsequently remain in the HRS and continue to work at time *T*+*2*, using the first seven wave of the HRS. Standard deviations are listed in parentheses. P-values of difference between entrants and non-entrants are listed in the last column. * indicates a dummy variable. EHI=employer-provided health insurance.

Table 3.2: Regression Coefficients and Marginal Effects of Probit Models

	Model 1	Model 2	Model 3
	Wealth Dummies	5th-order Polynomial	LSO Proxy
Control variables included	Yes	Yes	Yes
Total Net Wealth			
Wealth/100,000		0.070***	
		(0.015)	
(Wealth/100,000)^2		-0.003***	
		(0.001)	
(Wealth/100,000)^3		7.52E-5**	
		(3.21E-5)	
(Wealth/100,000)^4		-5.86E-7**	
		(2.71E-7)	
(Wealth/100,000)^5		1.11E-9**	
		(5.30E-10)	
Total Net Wealth [0th–20th Percentile]			
20th–40th Percentile	0.072		0.083
	(0.062)		(0.062)
40th–60th Percentile	0.132**		0.142**
	(0.065)		(0.065)
60th–80th Percentile	0.224***		0.230***
	(0.064)		(0.064)
80th–95th Percentile	0.369***		0.361***
	(0.068)		(0.068)
Above 95th Percentile	0.482***		0.491***
	(0.084)		(0.084)
LSO Available on Primary Pension Plan			0.135**
			(0.055)
Marginal Effects			
Wealth [0th–20th Percentile]			
20th–40th Percentile	0.004		0.005
40th–60th Percentile	0.008		0.009
60th–80th Percentile	0.015		0.015
80th–95th Percentile	0.027		0.026
Above 95th Percentile	0.042		0.043
LSO Available			0.008
Increase Wealth/100,000		0.003	
P-value of joint significance of all wealth variables	0.000	0.000	0.000
Pseudo R^2	0.069	0.071	0.070

SOURCE: Authors' calculations using the HRS.

NOTE: Sample size is 22,363. The sample includes all respondents in the HRS who had a wage-and-salary job at time *T* and subsequently remain in the HRS and continue to work at time *T+2*, using the first seven waves of the HRS. Robust standard errors are listed in parentheses. See Table A1 for results for control variables in all models. Marginal effect of the fifth-order polynomial is calculated for each observation and averaged across observations. The percentage of observations in the sample that transit into self-employment in the next wave is 0.03. Reference groups for polytomous covariates are shown in brackets.

Statistically significant at the * 10 percent level, ** 5 percent level, *** 1 percent level.

Appendix A3.1: Marginal Effects for Probit Regression Models

Covariate (measured at time *T*)	Model 1 Wealth Dummies	Model 2 5th-order Polynomial	Model 3 LSO Proxy
Age	0.005	0.005	0.005
	(0.004)	(0.003)	(0.004)
Age Squared	-4.05E-5	-4.21E-5	-3.78E-5
	(2.96E-5)	(2.88E-5)	(2.95E-5)
Education Level [Less Than High School]			
High School Graduate	0.002	0.002	0.002
	(0.003)	(0.003)	(0.003)
Some College	0.009**	0.010***	0.009**
	(0.004)	(0.004)	(0.004)
College and Above	0.013***	0.013***	0.013***
	(0.005)	(0.005)	(0.005)
Non-White	-0.004	-0.004	-0.003
	(0.003)	(0.003)	(0.003)
Female	-0.014***	-0.014***	-0.014***
	(0.003)	(0.002)	(0.003)
Married	1.82E-4	2.28E-4	2.86E-4
	(0.003)	(0.003)	(0.003)
Less Risk Averse	0.002	0.001	0.001
	(0.002)	(0.002)	(0.002)
Has Work-Limiting Health Condition	0.012***	0.012***	0.012***
	(0.004)	(0.004)	(0.004)
Covered by Any Health Insurance	-0.023***	-0.021***	-0.022***
	(0.008)	(0.008)	(0.008)
Covered by Government Health Insurance	-0.002	-0.001	-0.002
	(0.004)	(0.004)	(0.004)
Covered by EHI	-0.003	-0.003	-0.003
	(0.004)	(0.004)	(0.004)
Covered by Spouse's EHI	0.005	0.005	0.005
	(0.004)	(0.004)	(0.004)
Covered by Other Health Insurance	0.008**	0.008**	0.008**
	(0.004)	(0.004)	(0.004)
Has Pension Plan on Wage & Salary Job	-0.019***	-0.019***	-0.023***
	(0.003)	(0.003)	(0.004)
Occupation [Professional/Managerial]			
Sales	0.013***	0.013***	0.013***
	(0.006)	(0.006)	(0.006)
Administrative Support	-0.010***	-0.010***	-0.010***
	(0.003)	(0.003)	(0.003)
Services	-0.002	-0.002	-0.001
	(0.004)	(0.003)	(0.004)
Farming, Forestry, Fisheries	-0.003	-0.003	-0.002
	(0.010)	(0.010)	(0.011)
Mechanic, Construction, Operator	-0.008**	-0.008**	-0.008**
	(0.003)	(0.003)	(0.003)

Appendix Table A3.1: Marginal Effects for Probit Regression Models, Continued

Covariate (measured at time *T*)	Model 1 Wealth Dummies	Model 2 5th-order Polynomial	Model 3 LSO Proxy
Industry [Agriculture, Forestry, Fishery]			
Mining and Construction	0.042**	0.041**	0.042**
	(0.026)	(0.026)	(0.026)
Manufacturing	0.009	0.009	0.009
	(0.014)	(0.014)	(0.014)
Transportation	0.015	0.016	0.016
	(0.017)	(0.017)	(0.018)
Whole Sale and Retail	0.005	0.005	0.005
	(0.013)	(0.013)	(0.013)
Finance, Insurance, Real Estate	0.018	0.017	0.018
	(0.018)	(0.018)	(0.018)
Business/Repair Services	0.019	0.019	0.019
	(0.019)	(0.019)	(0.019)
Personal Services	0.025	0.024	0.024
	(0.022)	(0.021)	(0.021)
Recreation/Entertainment Services	0.002	0.002	0.002
	(0.014)	(0.013)	(0.013)
Professional Services	0.006	0.006	0.006
	(0.013)	(0.012)	(0.013)
Public Administration	0.003	0.003	0.004
	(0.014)	(0.014)	(0.014)
Log of Family Labor Income	-0.001***	-0.001**	-0.001***
	(4.97E-4)	(4.85E-4)	(4.92E-4)
Total Net Wealth [0th–20th Percentile]			
20th–40th Percentile	0.004		0.005
	(0.004)		(0.004)
40th–60th Percentile	0.008**		0.009**
	(0.004)		(0.004)
60th–80th Percentile	0.015***		0.015***
	(0.005)		(0.005)
80th–95th Percentile	0.027***		0.026***
	(0.006)		(0.006)
Above 95th Percentile	0.042***		0.043***
	(0.010)		(0.010)
Net Total Wealth			
Wealth/100,000		0.004***	
		(0.001)	
(Wealth/100,000)^2		-1.90E-4***	
		(6.8E-5)	
(Wealth/100,000)^3		4.17E-6**	
		(1.72E-6)	
(Wealth/100,000)^4		-3.25E-8**	
		(1.45E-8)	
(Wealth/100,000)^5		6.14E-11**	
		(2.84E-11)	

Appendix Table A3.1: Marginal Effects for Probit Regression Models, Continued

Covariate (measured at time *T*)	Model 1 Wealth Dummies	Model 2 5th-order Polynomial	Model 3 LSO Proxy
LSO Available on Primary Pension Plan			0.008**
			(0.004)
More Than One Pension Plan on Wage & Salary Job			-3.44E-4
			(0.003)
Pseudo R2	0.069	0.071	0.070
Base Probability	0.032	0.032	0.032
Sample Size	22,363	22,363	22,363

SOURCE: Authors' calculations using the HRS.

NOTE: The sample includes all respondents in the HRS who had a wage-and-salary job at time *T* and subsequently remain in the HRS and continue to work at time *T+2*, using the first seven waves of the HRS. Robust standard errors are listed in parentheses. Reference groups for polytomous covariates are shown in brackets. Statistically significant the * 10 percent level, ** 5 percent level, *** 1 percent level. EHI=employer-provided health insurance.

Chapter 4
Employment Status Trajectories of Self-Employed Older Workers

Introduction

Self-employment is an important part of the workforce in the United States. About 12 percent of the economically active workforce in U.S. was self-employed in 2006 (Zissimopoulos and Karoly, 2008). The self-employment rate, however, differs substantially among age groups. Older workers have higher rates of self-employment than younger workers: rates of self-employment among workers over age 50 are 20 percent while the rates for all workers over age 16 peaked in 1994 at 12 percent (Zissimopoulos and Karoly, 2008). In their long career path, older workers have accumulated more financial capital as well as human capital that could make starting self-employment less demanding. Older workers enter self-employment at different times. Some of them have been self-employed for a long time, beginning their self-employment at younger ages; others enter self-employment after a long wage and salary career at the latter stages of their working life.

Older workers may have heterogeneous expectations when they start self-employment. Some older workers enter self-employment as a part of a transition into full retirement. Self-employment may provide those workers with benefits such as additional wealth for retirement and the gradual adjustment to a retirement lifestyle. Other older workers entering self-employment expect to work in self-employment for a longer period of time, without a plan for retirement in the near future. Self-employed older workers may have very different needs in terms of business support compared with younger self-employed

workers. In addition, older workers with different objectives entering self-employment may have a variety of objectives which result in heterogeneous needs for business support. Policymakers need to recognize the heterogeneity among the self-employed older workers in order to design effective policies to support them.

Self-employment transition at older ages has important economic implications. Compared with wage and salary workers, self-employed workers are more likely to work longer and retire later (Zissimopoulos and Karoly, 2006). Considering the financial imbalance of the Social Security system and the financial uncertainty of define-contribution pension plans, self-employment at an older age could potentially increase the financial security of workers at retirement age. The product, service and job opportunities created by the self-employed older workers could contribute to economic growth. However, the level of these potential benefits associated with self-employment at older ages depends on the length older workers stay in self-employment after entrance and the performance of their business. Older workers expecting to work in self-employment for a longer time are more likely to realize a higher level of these economic benefits than those who expect to retire. Starting a new business requires certain upfront capital investment. Since the expected number of remaining healthy working years is lower on average for self-employed older workers compared with self-employed younger workers, they have less time to recoup capital losses from a failed business. Retirement assets of self-employed workers could be jeopardized by the poor economic performance of the small business they start. Retirement financial security of self-employed workers should be a concern for policymakers when they design public policies relevant to self-employment at older ages.

However, we do not know much about older workers' labor force participation after transition into self-employment. We are not aware of any previous research that studied the self-employment experience of workers who transition into self-employment at older ages. The goal of this paper is to shed some light on this important research question by analyzing the longitudinal employment status of self-employed older workers. In the first part of this study, we document the employment status trajectories of the older workers at different years after their self-employment entrance. On average, self-employed older workers expecting to retire soon will stay a shorter period of time in self-employment. However, some older workers may exit self-employment because of business failure, new opportunities in the wage and salary sector and other unexpected shocks, even if they want to work in self-employment for a longer period of time. Therefore, in the second part, we use the self-reported probability of working full-time after ages 62 and 65 to infer self-employment expectations. We expect that older workers expecting to retire soon will report lower probability of working full-time at older ages.

We also attempt to identify the determining factors of self-employment survival of older workers. We are especially interested in the effect of expectation at the time of self-employment entrance and the initial business conditions on the probability of surviving in self-employment.

Our analysis indicates that less than one third of the self-employed older workers survived in self-employment for six or more years after entrance. The survival rate of self-employment among older workers is 20 percentage points lower than that of the young self-employed workers. The lower survival rate of self-employment at older age may reflect the fact that many self-employed older workers are nearing their desired

retirement age when they enter self-employment. Most of the self-employed older workers (77.78%) made one or zero transitions after entrance. Among workers who made multiple transitions, many of them had experienced unretirement. In this analysis, however, we do not have information about business failure. Business failures and other unexpected personal events (like financial or health shocks) may force workers to exit self-employment prematurely. New opportunities in the wage and salary section could also lead older workers to exit self-employment. An analysis using the self-reported probability of working in the next 5-10 years as a proxy measure of expectation at self-employment entrance indicates that most of the self-employed older workers do not expect to work for a longer period of time when they enter self-employment. Self-employed workers reporting higher probabilities of working in the next 5-10 years are more likely to survive in self-employment and less likely to retire, than self-employed older workers reporting lower probabilities of working in the next 5-10 years. The regression analysis highlights the importance of self-reported probability of working and the initial business conditions on self-employment survival among older workers.

The rest of paper is organized as follows. Section two provides a brief review of literature related to this analysis. Section three presents a descriptive analysis of employment status trajectories of self-employed older workers. Section four introduces the self-reported probability of working in the next 5-10 years as a measure of older workers' expectation and compares the employment status trajectories of older workers with different levels of this reported probability. Section five analyses the factors contributing to self-employment survival among older workers. The last section concludes this paper.

Background

Population aging in the U.S. and other developed countries has changed the structure of labor force dramatically in the past decades. The share of the U.S. labor force comprised of older workers. is projected to increase from 12 percent in 1990 to over 23 percent by 2030 (Maestas and Zissimopoulos, forthcoming). Policymakers are concerned with future labor shortages and a shrinking tax revenue base for the Social Security program as a result of these demographic trends. There is substantial interest among policymakers to support and promote labor force participation among older workers as a way to offset the adverse economic impact of labor force aging. In the meantime, labor participation among older workers continues to increase. The labor force participation rate is projected to grow from 56 to 66 percent for the 55-64 age group, from 17 to 28 percent for the 65-74 age group, and from 4 to 11 percent for the 75 and older age group (Maestas and Zissimopoulos, forthcoming). Many factors contribute to the rising participation rates of older workers: the rise in educational attainment of the U.S. workforce, the increase of Social Security full retirement age and the rise of dual-earner family (Maestas and Zissimopoulos, forthcoming).

Labor force dynamics and forms of employment are very diverse among older workers. First, for many older workers, retirement is no longer a permanent exit from the labor force. Using HRS data, Maestas (2004) reported that nearly one-half of retirees experienced partial retirement and/or unretirement, and the unretirment rate is 24 percent among older workers at least five years after their first retirement. Interestingly, more than 90 percent of the unretired workers anticipated and planned to come out of

retirement. Second, more and more older workers become self-employed instead of working for someone else. One of the major factors that contribute to the rising self-employment rate at older ages is the lower rates of retirement from self-employment than those from wage and salary jobs. Maestas and Li (2006) reported that, while many older workers are actively seeking for a job, only half of them have successfully attained one, and about 13% of these older job seekers become a discouraged worker (meaning that they are willing to work at the prevailing wage, but they are unable to find a job). Age discrimination, skill mismatch and overall economic conditions could all contribute to the unsatisfactory job search outcome in the wage and salary for older workers (Maestas and Li, 2006). Older workers also have a preference for a flexible working schedule that most wage and salary jobs do not allow. Many older workers desire part-time work and plan to reduce hours as they get older. Older workers who desire to work at older ages may choose self-employment because of the rigidities in the wage and salary sector. In the meantime, however, many self-employed older workers may choose to enter self-employment because they prefer working for themselves instead of for someone else (Maestas and Zissimopoulos, forthcoming).

The importance of self-employment as one of the major forms of labor participation at older ages received relatively little attention from policy researchers and policymakers. While studies mentioned above provide significant insights into the employment experience of older workers in general, we do not know much about the older workers' experience of self-employment. For example, we do not know whether self-employment at older ages is a temporary state of employment or whether older workers anticipant and plan their timing to exit self-employment. Previous studies on self-employment at older

ages have reported the importance of flexibility of work and the prior self-employment and managerial experience in the self-employment choices of older workers (Quinn, 1980; Fuchs, 1982). Some recent research has studied the effect of the portability of health insurance on self-employment transition at older ages, with mixed results (Bruce et al, 2000). Karoly and Zissimopoulos (2004) presented an overview of the current situation and important characteristics of self-employed older workers. They reported that the characteristics of self-employed older workers are similar to the general self-employment population in terms of gender, education, race, marital status, wealth and health condition. Zissimopoulos and Karoly (2007) provided a comprehensive assessment of the factors that determine the transition from wage and salary jobs to self-employment at older ages. Their multivariate regression models highlight the importance of health condition, wealth, pension and health insurance coverage in the self-employment transition. Zissimopoulos, Karoly and Gu (2008) reported the existence and importance of liquidity constraint on self-employment transition at older ages while also confirming many results from Zissimopoulos and Karoly (2007).

In sum, the paucity of research on self-employed older workers does not match the importance of self-employment as one of the major forms of labor participation at older ages. We need substantial research effort in this area to provide empirical evidences that policymakers can rely on. This paper contributes to the current literature on self-employment at older ages by studying the labor force participation of self-employed older workers after their self-employment entrance.

Data

We use the Health and Retirement Study to study the longitudinal employment status of self-employed older workers. HRS is a nationally representative survey of middle-aged and older Americans. It surveys more than 22,000 Americans over the age of 50 and their spouses (with no age restriction) every two years. Besides the original HRS cohort (born 1931-1941), several additional birth cohorts were added in the subsequent survey years. This paper uses the first seven waves (1992 to 2004) of the HRS data.

HRS provides detailed longitudinal information on older workers' employment transitions over a long time span. In each wave of the HRS survey, individuals are asked if they are currently working for pay. Those working for pay are then asked whether they are self-employed or work for someone else on their main job. For individuals not working, additional information is obtained about the reasons for not working. The self-reported reason could be retirement, unemployment, disability or other movement out of the labor force. The vast majority of workers with "not working" status are either retired or not in the labor force. The percentage of retirement and not in labor force within the "not working" status is well above 90%. Therefore, we will use "not working" and retirement as exchangeable terms. Based on this information about employment, we assign individuals into three mutually exclusive employment statuses: Wage and Salary Workers (WS), Self-Employed Workers (SE) and Not Working (NW). To determine whether an individual is WS or SE, we rely on his or her employment status on the main job only. Therefore, wage and salary workers (on their primary job) who are also self-employed on a second job or have other stakes in business ownership are not assigned as self-employed workers. This definition is consistent with previous studies and the official labor statistics. Individuals in the NW group include those retired, unemployed, or

disabled and hence not in the labor force. For self-employed workers, additional questions about their self-employment are asked. The HRS also has a great deal of information about the individual and household characteristics associated with self-employment transitions, including demographic characteristics, occupation and industry, risk-aversion, health, expectation of working at older ages and health insurance availability, etc.

In this paper, we focus on the self-employment transition at older ages. Specifically, we are interested in workers' transitions from a wage and salary job to a self-employed job after age 50. Individuals younger than 50 years at the transition are excluded from the sample. Individuals in the analytical sample have a wage and salary job at one wave and enter self-employment one wave later. The analysis below uses a sample of 280 self-employed older workers who were wage and salary workers at the baseline wave, entered self-employment at the next wave and had non-missing employment status for at least three waves after the entrance.

Descriptive Analysis of Employment Trajectories

Table 1 presents an overall distribution of employment status of self-employed older workers after their entrance into the self-employed work force[37]. We track down the employment status of these older workers to 6 years after their self-employment

[37] The sample in table 1 is restricted to workers younger than 65 years old. The reason to make this restriction is that (1) workers 65 years old and above may have quite different trajectories than younger older workers and (2) there are only 37 transitions for workers 65 years old and above, which is too few to produce a reliable estimate. Similar age restriction is also applied to table 2. Among the 37 workers 65 years old and above, the survival rate of self-employment is lower than that of younger older workers in table 1 (4 percentage points lower at 2 year; and around 10 percentage points lower at 4 and 6 years after transition). Not surprisingly, we find that workers 65 years old and above who exit self-employment are more likely to enter retirement, compared with younger older workers..

entrance[38]. Over forty percent of the workers left self-employment within the first two years. Around half of these workers withdraw from active employment, and the other half went back to work for someone else. The percentage of workers who stay in self-employment keeps decreasing in subsequent waves. Only slightly less than forty percent of the older workers were still working in self-employment at 6 years after the entrance. In the meantime, the percentages of older workers' transition back into wage and salary work and to not working at all both keep increasing across the 6-year span.

While Table 1 presented the distribution of employment status at particular points in time, it did not provide useful information on the flow or change of the status over time. Table 2 presents the detailed six-year track of employment status of self-employed older workers after their entrance. The tracks are created based on the same sample used in Table 1. We designate three types of employment status: SE (self-employment), WS (wage and salary jobs) and NW (not working, including individuals retired, unemployed, disabled, or not in labor force). All tracks start with SE. The tracks update and expand when individuals change their employment status in subsequent waves and stay the same if there is no new status change. The tracks indicate wave-to-wave employment status change only.

The majority of self-employed older workers made zero or only one transition during the six-year period of time (77.78%). Multiple transitions are relatively rare. Only 56.79% of the older workers survived in self-employment after two years. And the percentage dropped to 41.98% at four years since entrance. At six years after the transition, only 32.51% of the older workers have survived in self-employment and have

[38] Older workers who have missing employment status (all of them are not surveyed that year, not because they do not know or refuse to answer) during the 6-year period are excluded from the analysis. The percentage of older workers with missing employment status is 15.73 for the 6-year track.

never changed employment status in the interim. If self-employed older workers left self-employment, it is most likely to occur within the first 2 years after entrance. The longer they stay in self-employment, the less likely the self-employed older workers leave self-employment in subsequent years. We can compare the survival rate reported in table 2 with results from previous studies. We are not aware of any previous study that has reported survival rates of self-employment by older workers. Therefore, we use the survival rate of the general (or younger) self-employment population as the baseline. Using a sample of young workers, Evans and Leighton (1989) reported that 79.4 percent of self-employed workers stay in self-employment at 2 years since self-employment entry; 61.5 percent at 4 years; and 51.4 percent at 6 years. The survival rate of self-employment among older workers is around 20 percentage points lower than that of the young self-employment population. The substantially lower survival rate of self-employment at older age may reflect the fact that many self-employed older workers are nearing their desired retirement age when they enter self-employment. However, based on this comparison, we do not know how self-employed older workers perform as compared to young workers because (1) we do not know how many of these self-employment exits are a result of business failure and; (2) self-employment survival in this analysis is not measured from the actual starting date of self-employment, but from the date of first survey administration after self-employment entry. Readers need to bear this consideration in mind when understanding the results of this analysis. Self-employed older workers may choose to retire or sell their successful small business and thus exit self-employment. In the meantime, business failure or other unexpected personal events may end self-employment prematurely. For older workers, health condition is a

significant concern when they make labor participation decisions. A health shock such as the onset of a serious illness or a dramatic change in health status could be a big reason for a premature exit of self-employment.

The lower panel of table 2 classifies the various tracks into mutually-exclusive categories for a more meaningful presentation. Around a quarter of the self-employed older workers retired and remained retired during the six years. Another one fifth of those workers went back to wage and salary jobs and stay there. Coming out of retirement is a popular transition among those workers who have made multiple transitions: over 15% of self-employed older workers have experienced unretirement during the six-year period following the entrance. Workers who have made multiple transitions between active working statuses (either wage and salary job or self-employment) are relatively rare. Together, around half (44%) of the self-employed older workers have experienced retirement during the six-year period; 37.9% of these workers have transitioned into wage and salary jobs at least once.

Intent of the Self-employment Entrance

To our knowledge, there is no previous study that has attempted to pinpoint older workers' intended length of working after self-employment entrance. The best way to measure their intent is to ask these older workers directly. However, there is no data available that have asked about workers' intended length of working explicitly. Therefore, it is necessary to infer their intent implicitly from other relevant information.

In this section, we propose to use the self-reported probability of working full-time as the benchmark to group workers' intented length of working. In each wave, HRS

respondents reported their probability of working full-time after age 62 and again after age 65. (We will call them P62 question and P65 question, respectively.)[39] The answer is a scale ranging from 0 (absolutely no chance) to 100 (absolutely will). A caveat of using this self-reported probability is that it indicates the probability of full-time working, not necessarily working in self-employment only. However, since this probability was reported at the time of starting a new self-employment, we assume it reflects the workers' expectation of working in self-employment relatively well.

Hurd and McGarry (1993) reported that the subjective probability of working in HRS has predictive power for the actual future employment outcomes. A study by Chan and Stevens (2004) also argues that workers' actual behaviors are consistent with their subjective probability of working in HRS, and the predictive power is stronger when the age in question is closer to their current age. However, using either P62 or P65 alone would not yield a satisfactory benchmark since workers have different ages when they were asked the questions. For example, when a 51 years old worker answers P62 or P65, he/she is speculating on expectations on what will happen more than 10 years later. In contrast, for the same questions, a 61 year old worker is reporting his or her expectation on something that will happen in just a couple of years. They were reporting subjective probability on a quite different time horizon. Therefore, we combine P62 and P65 and create a new subjective probability variable: P5/10. For workers 52 to 55 years old, we assign the answer to P62 to P5/10; for workers 56 to 60 years old, P5/10 is assigned with the answer to P65. In this way, P5/10 measures the probability of working full-time in the

[39] The question is "Thinking about work generally and not just your present job, what do you think are the chances that you will be working full-time after you reach age 62/65?" (Questions are separate for age 62 and age 65.) Workers who are already 62 or 65 years old skipped the question. Workers reporting a zero on probability at 62 will be automatically assigned a zero on probability at 65.

next 7-10 years for the 52-55 age group and in the next 5-9 years for the 56-60 age group. Essentially, P5/10 combines the information from P62 and P65 and measures the probability of working full-time in the next 5-10 years. This treatment makes the time horizon of the subjective probability more homogeneous. A disadvantage to using P5/10 is that we have to impose stricter age restrictions because P5/10 is only applicable to workers 52 to 60 years old. All subjective probabilities are assessed at the time of self-employment transition.

In our sample, 197 workers reported useful answers to P62 with a mean of 48 and a median of 50; 204 workers reported useful answers to P65, with a mean of 35 and a median of 25. Naturally, people are less likely to work when they get older. The P5/10 variable has 164 useful observations, with a mean of 40 and a median of 40. For each probability, there are three clusters in the distribution: at 0, 50 and 100. We use 50 as the cutoff point of the benchmark. Workers with a P5/10 probability within 0 to 50 are assigned to one group, and those with probability within 51 to 100 are assigned to the other group[40]. Among the 164 workers with a useful answer to P5/10, 68 percent are in the lower probability group; the rest of them are in the higher probability group. We expect that workers in the group with lower probability are more likely to use self-employment as a bridge to retirement, and workers in the group with higher probability are more likely to enter self-employment expecting to work for a longer time. We will check the validity of this expectation by comparing the employment status trajectories after self-employment entrance of these two groups of workers. The self-employed older

[40] Kleinjans and van Soest (2007) reported that people who give 50 to these questions actually express uncertainly with phrases like "don't know" rather than an actual probability. As a sensitivity test, we also experimented by putting 50 in the higher probability group (0-49 vs. 50-100). The employment results based on this grouping are similar to those reported below.

workers in both groups are more likely to start a business in industries that are conductive to working for oneself, like service industry, professionals/related service industry and retail industry[41]. Older workers in the higher probability group, on average, work longer hours per week after they transition into self-employment, than those in the lower probability group. The average weekly working hours for both groups before transition into self-employment is around 40 hours. However, workers in the higher probability group work on average 44 hours per week after transition into self-employment, in contrast with 32 hours per week for workers in the lower probability group.

Table 3 shows the distribution of employment status at 2-6 years since the entrance for both groups. Apparently, the expectation of working is not fully consistent with the actual employment outcomes. Some workers reporting a lower probability may change their mind and decide to work longer. In contrast, some workers reporting a higher probability may retire prematurely because of expectation adjustment, business failure or health shock. For example, 13.46% of the workers reporting a higher probability of working in the next 5-10 years were prematurely retired at 6 years after the entrance.

Compared to lower probability group, self-employed older workers in the higher probability group are more likely to be self-employed at every subsequent wave. In addition, workers in the higher probability group are less likely to retire at each subsequent wave. The percentage holding wage and salary jobs, however, is not substantially different for the two groups. While the percentage of retirement increases steadily for the lower probability group, it remains relatively stable for the higher

[41] For the higher probability group, the most popular industries to start a business are personal service (19.2%), professionals/related service (19.2%), business service (15.4%) and retail trade (13.5%). For the lower probability group, the most popular industries to start a business are business service (16.1%), personal service (13.4%), retail trade (12.5%) and professionals/related service (12.5%).

probability group. In addition, the marginal drop of the self-employment rate between waves is much larger in the lower probability group than in the higher probability group. This comparison suggests that workers in the lower probability group are more likely to follow a retirement plan and thus use self-employment as a bridge to retirement while workers in the higher probability group are more likely to continue working in their self-employment job and retire when it is necessary in later years.

We can compare the employment paths of each group of self-employed older workers using data presented in table 4. As expected, both groups experience the largest drop within the first two years; then the survival rate drops at a decreasing rate in later years. The survival rate of self-employment of the higher probability group is substantially higher than that of the lower probability group. At every subsequent wave, the survival rate of the higher probability group is around 15-25 percentage points higher than that of the lower probability group, and the difference tends to be fairly constant after two years. In general, workers in the higher probability group are substantially less likely to make multiple transitions. For example, at six years after transition, around one-third of the workers in the lower probability group have made multiple transitions while less than one-tenth of those in the higher probability group have done that. This large difference mostly comes from the big difference in the percentage of people who have ever come out of retirement. This observation indicates that workers in the higher probability group are more stable in terms of employment status. For workers who have made only one transition, those in the lower probability group are more likely to retire and stay in retirement, and less likely to go back to wage and salary jobs and stay there, than the higher probability group.

We have demonstrated that older workers' working expectation at the time of self-employment entrance is consistent with their actual employment outcomes. In general, the comparisons above suggest that workers in the lower probability group are more likely to enter self-employment as a bridge to retirement. Based on this analysis, the majority of self-employed older workers entered self-employment as a bridge to retirement

Determinants of Self-Employment Survival

In this section, we formally analyze the effect of important factors that contribute to the survival of self-employment among older workers. A probit regression analysis is used to assess the effect of some important factors that would contribute to workers' survival in self-employment. The dependent variable of interest is a dummy of self-employment survival at 2 years, 4 years and 6 years after the entrance. The zero value of the dummy includes workers who have departed from self-employment at least once within 2/4/6 years, regardless whether they have ever re-entered self-employment or not. The sample size for the regression analysis is 280.

In the regression analysis, we are particularly interested in two types of factors. The first type of factor is the intended length of working when workers enter self-employment. Workers expecting to work for a longer time in self-employment are more likely to stay in self-employment after entrance. Using the p5/10 variable introduced above as the proxy for the reason for entrance, we expect that p5/10 is a significant determining factor to the dependent variable[42]. The second type of factor is the business

[42] P5/10 enters the regression model as a dummy: whether the reported value of p5/10 is larger than 50 or not.

condition at the start of the small business created by self-employed older workers. The business condition factors include: business assets, total self-employment income and number of employees. Each of these variables reflects an important aspect of the economic performance of a business. All these variables are assessed at the time of the first survey administration after the self-employment entrance[43]. In other words, these variables measure the performance of the new businesses at their very start. Of course, the economic performance of a business changes over time. However, since most of the new businesses fail at the beginning, the initial performance of a business is usually extremely important to their long-term survival. The business assets variable enters the regression as a set of dummies: no business asset, the lower half of the positive business asset and the higher half of the positive business assets[44]. The total self-employment income combines both profit and salary from self-employment and enters the model in the same way as business assets. We put in the model a dummy of whether the workers have other employees, excluding spouses.

The regression model also has many potentially important controlling variables. The demographic variables in the regressions include age dummies, race, gender, marital status and education. Previous business and managerial experience might help in the business creation process. We include two relevant variables: whether a worker has ever been self-employed before the age of 50 and whether a worker has managerial experience on the job for which he or she had the longest tenure. The amount of effort older workers

[43] All new transitions to self-employment occurred within two years before the newly reported self-employment status. However, transitions could occur at different time within that two-year period. The variables on business conditions may be reflecting how long the business has been operating.

[44] We divide the positive business assets into two groups instead of quartiles because the majority (73%) of the self-employed older workers does not have any business assets at the beginning.

put into self-employment may affect the survival of their small business. We use the weekly working hours as a proxy of workers' effort level in self-employment[45]. For older workers, health conditions and health insurance are great concerns regarding their employment choices. We include in the regression a variable on whether a worker has work-limiting health conditions and a dummy on their health insurance availability. The effect of having work-limiting health conditions may also depend on how much effort these workers are willing to put in self-employment. Therefore, we include interactions between working-limiting health conditions and weekly working hours. Non-business family wealth enters the regression to evaluate the effect of wealth other than those from self-employment. Industry has been reported as an important factor that determines the survival of new business (Shane, 2008). Therefore, several industry dummies enter the regression model. Other relevant independent variables include the level of risk-aversion and the availability of pension plans on the last wage and salary job that the worker held. Except for the availability of pension plans, all variables are assessed at the time of the first survey administration after the self-employment entrance

Table 5 reported the marginal effects of the probit regressions. The marginal effect of the higher p5/10 probability group (p5/10>50) is both significant and substantial for survival at 4 years and 6 years. Compared with workers with lower probability, workers with higher p5/10 probability are around 20 percentage points more likely to survive in self-employment, which represents a 55% increase from the observed survival rate at year 6. The marginal effect of the higher p5/10 probability group at year 2 is insignificant and substantially weaker than that at 4 and 6 years. This observation is consistent with

[45] The weekly working hours enter the regression model as a series of dummies: 16 hours or less (reference), 17-32 hours, 33-40 hours and over 40 hours.

our expectation since p5/10 measures the probability of working in the next 5-10 years. The marginal effect of p5/10 is consistent with the descriptive comparison of the survival rate between groups reporting a higher p5/10 and a lower p5/10.

Total income from self-employment is a significant predictor in the regression models. Workers with positive self-employment income are substantially (around 20 percentage points) more likely to stay in self-employment than those who have zero self-employment income, although some non-linear effect is evident. The marginal effect of total income from self-employment is relatively stable across different years since entry. Total income from self-employment, however, could reflect the quality of business idea. Better business ideas may lead to both higher income and better survival in self-employment. The effect of business assets is similar to that of the self-employment income in terms of marginal effect and non-linearity, although the effect of business assets is insignificant and much weaker at year 2 as compared to year 4 and 6. Compared to workers with no business assets, workers with positive business assets are much more likely to stay in self-employment. Whether the business hires employees, however, does not have a significant effect on staying in self-employment. In general, consistent with our expectation, business conditions at the very start are significant and strong predictors of staying in self-employment except for the conditions relating to whether the business hires employees. Businesses with a good start help older workers to survive in self-employment.

The regression analysis also indicates that working longer hours per week could help the new business to survive, but the effect is limited to those workers who work close to 40 hours per week. Other marginally significant predictors include prior self-employment

experience and the level of risk aversion[46]. Workers with self-employment experience before age 50 and workers with lower levels of risk aversion are substantially more likely to stay in self-employment.

Demographic variables like age, race, education and marital status are generally not significant determinants. Other variables, including the availability of health insurance, pension provided by the last wage and salary job, total household non-business assets, industry and prior managerial experience do not help workers survive in self-employment. The marginal effect of having working-limiting health problem is very large but not significant, as a result of a large standard error. The interaction between having work-limiting health problem and weekly working hours does not have a significant effect either. The industry as a whole does not have a significant effect on the survival of self-employment among older workers.

Conclusion

Self-employment is an important employment form among older American workers. Self-employed older workers, however, have different entry times into self-employment. Some of them have been self-employed for a long time, since a younger age; others enter self-employment from a long wage and salary career at the later stage of their working life. Older workers have heterogeneous expectations when they begin self-employment. Some older workers expect to retire soon after their self-employment entrance; others expect to work for a longer period of time in self-employment. Self-employed older workers with different expectations are likely to have different needs for business support

[46] The level of risk-aversion is not significant for predicting survival at year 4.

and make different contributions to the economy. The performance of the new businesses started by older workers is very important for their financial security after retirement. Retirement assets of self-employed older workers would be jeopardized from capital losses as a result of business failure.

In this paper, we use the Health and Retirement Study to study the longitudinal employment status of self-employed older workers. A descriptive analysis of the employment paths of the workers entering self-employment at older ages indicates that slightly less than one third of self-employed older workers have survived in self-employment at six years after entrance. Compared with younger workers, the survival rates in self-employment among older workers are 20 percentage points lower at 2 to 6 years since self-employment entry. The lower survival rate in self-employment at older age may reflect the fact that many self-employed older workers are nearing their desired retirement age when they enter self-employment. Based on this comparison, we do not know how self-employed older workers perform as compared to young workers because we have no information on how many of these self-employment exits are a result of business failure. We also propose to use the self-reported probability of working full-time at older ages to measure workers' expectations when they start self-employment. A self-reported probability of working full-time at the next 5-10 years is constructed by combing the probability of working full-time after age 62 and after age 65. We have demonstrated that older workers' working expectations at the time of self-employment entrance is consistent with their actual employment outcomes. Workers reporting a lower probability of working in the next 5-10 years are more likely to enter self-employment as a bridge to retirement. Based on this analysis, it seems the majority of self-employed

older workers were not expecting to be working in self-employment for a longer period time.

A probit regression analysis is used to formally assess the effect of important variables on the probability of older workers surviving in self-employment, with a focus on the effect of the self-reported probability of working and the business conditions at the beginning of self-employment, conditions including business assets, self-employment income and whether one has employees. Consistent with descriptive analysis, compared with workers with lower probability, workers with higher p5/10 probability have an over 20 percentage point higher probability of surviving in self-employment. In addition, many business condition variables (except whether has employee) are significant predictors of surviving in self-employment. The regression analysis also indicates that older workers with work-limiting health problems are more likely to survive in self-employment, although the effect is not significant, potentially as a result of their inability to enter wage and salary jobs. For these workers, self-employment may be the most viable way for them to remain engaged in the labor force. Other marginally significant predictors include prior self-employment experience, the level of risk aversion and the weekly working hours.

In general, this paper contributes to the current literature on self-employment at older ages by studying the labor force participation of self-employed older workers after their self-employment entrance. We find that self-employed older workers are a heterogeneous group in terms of their objective and expectation for self-employment. Based on their length of working since self-employment entry, many self-employed older workers may enter self-employment as a bridge to retirement; while others continue working in self-

employment as a regular job. Self-employed older workers with different objectives and expectations for self-employment may have different needs for business support. Policymakers need to consider the heterogeneity of the self-employed older population when designing relevant public programs. In addition, policymakers should be concerned with the retirement financial security of self-employed older workers because these workers are much more susceptible to adverse financial outcomes resulting from a business failure, especially for older workers using their retirement savings as the source for starting capital. Future research is needed to understand the challenges facing these different groups of self-employed older workers, whether they feel they need outside support and if so, what kind of support they need. In addition, more research is need to study the rate of business failure among self-employed older workers and compare this rate to that of young workers.

Table 4.1
Employment Status after Self-employment Entrance at Older Ages

Employment Status	2 Years Later (%)	4 Years Later (%)	6 Years Later (%)
Wage & Salary Workers	19.34	27.16	29.63
Self-Employed Workers	56.79	48.56	37.86
Not Working	23.87	24.28	32.51
Total	100	100	100

Source: Author's calculations from the 1992 to 2004 waves of the HRS data.

Note: The sample consists of 243 workers (ages 52 to 64 at the time of entrance) who were wage and salary workers at the baseline wave, entered self-employment at the next wave and had non-missing employment status for at least three waves after the entrance.

Table 4.2
Employment Paths at Six Years after Self-Employment Entrance at Older Ages

Employment Paths	Percent
SE (1)	32.51
SE->NW (2)	24.28
SE->WS (3)	20.99
SE->NW->WS (4)	6.17
SE->NW->SE (5)	3.70
SE->WS->NW (6)	3.29
SE->NW->WS->NW (7)	2.47
SE->NW->SE->NW (8)	1.65
SE->WS->SE (9)	1.65
SE->WS->NW->WS (10)	1.23
SE->WS->SE->NW (11)	0.82
SE->WS->SE->WS (12)	0.82
SE->NW->SE->WS (13)	0.41
Total	100
Summary Statistics*	
Self-Employment Only	32.51
Self-Employment to Retirement Only	24.28
Self-Employment to Wage & Salary Job Only	20.99
Multiple Transitions: Unretirement Experienced	15.63
Multiple Transitions: Work then Retire	4.11
Multiple Transitions: Keep Working	2.47
Total	100

2-Year Survival	56.79
4-Year Survival	41.98

Source: Author's calculations from the 1992 to 2004 waves of the HRS data.

Note: The sample consists of 243 workers (ages 52 to 64 at the entrance time) who was wage and salary workers at the baseline wave, entered self-employment at the next wave and had non-missing employment status for at least three waves after the entrance.SE: Self-Employed Workers; WS: Wage and Salary Workers; NW: Not Working.* "Self-Employment Only" includes Path 1; "Self-Employment to Retirement Only" includes Path 2; "Self-Employment to Wage & Salary Job Only" includes Path 3; "Multiple Transitions: Unretirement Experienced" includes Path 4,5,7,8,10 and 13; "Multiple Transitions: Work then Retire" includes Path 6 and 11; "Multiple Transitions: Keep Working" includes Path 9 and 12.

Table 4.3
Employment Status after Self-employment Entrance at Older Ages, by the Probability of Working Full-Time at 5-10 Years after Entrance

Employment Status	Prob. <= 50			Prob. > 50		
	2 Years Later (%)	4 Years Later (%)	6 Years Later (%)	2 Years Later (%)	4 Years Later (%)	6 Years Later (%)
Wage & Salary Workers	23.21	30.36	33.04	23.08	26.92	34.62
Self-Employed Workers	50.00	41.07	31.25	65.38	63.46	51.92
Not Working	26.79	28.57	35.71	11.54	9.62	13.46
Total	100	100	100	100	100	100
N	112			52		

Source: Author's calculations from the 1992 to 2004 waves of the HRS data.

Note: The sample consists of 164 workers (ages 52 to 60 at the baseline wave) who (1) were wage and salary workers at the baseline wave, entered self-employment at the next wave and had non-missing employment status for at least three waves after the entrance and (2) had non-missing probability of working full-time in the next 5-10 years at the time of entrance.

Table 4.4
Employment Paths at Four and Six Years after Self-Employment Entrance at Older Ages, by the Probability of Working Full-Time at 5-10 Years after Entrance

Employment Paths	Prob. <= 50		Prob. > 50	
	4 Years Later (%)	6 Years Later (%)	4 Years Later (%)	6 Years Later (%)
Self-Employment Only	33.93	25.00	57.69	48.08
Self-Employment to Retirement Only	25.00	23.21	7.69	13.46
Self-Employment to Wage & Salary Job Only	23.21	18.75	25.00	28.85
Multiple Transitions: Unretirement Experienced	10.71	20.55	7.69	9.61
Multiple Transitions: Work then Retire	3.57	8.04	1.92	0.00
Multiple Transitions: Keep Working	3.57	4.46	0.00	0.00
Total	100	100	100	100
Still Working (Either Self-Employment or Wage and Salary Job) and Never Retired	60.71	48.21	82.69	76.93
2-Year Survival	50.00		65.38	
N	112		52	

Source: Author's calculations from the 1992 to 2004 waves of the HRS data.

Note: The sample consists of 164 workers (ages 52 to 60 at the baseline wave) who (1) was wage and salary workers at the baseline wave, entered self-employment at the next wave and had non-missing employment status for at least three waves after the entrance; and (2) had non-missing probability of working full-time in the next 5-10 years at the time of entrance. The classification of the types of employment paths in table 4 is the same as that used in table 2.

Table 4.5

Esimated Impact of Personal and Business Characteristics on Self-Employment Survival

Covariates	Marginal Effect		
	2 Years Later	4 Years Later	6 Years Later
Probability of working full-Time at 5-10 years after entrance (P5/10)			
[Reference:P5/10 <= 50]			
P5/10 > 50	0.110	0.215**	0.193**
	(0.093)	(0.097)	(0.094)
Age group			
[Reference: Age 52-55]			
Age 56-61	0.069	0.004	-0.005
	(0.092)	(0.090)	(0.081)
Age 62-67	-0.102	-0.117	-0.044
	(0.151)	(0.136)	(0.128)
Age 68 and above	0.229	0.018	-0.041
	(0.160)	(0.212)	(0.193)
Male	0.190**	0.112	0.082
	(0.083)	(0.079)	(0.071)
Race and ethnicity			
[Reference: Non-Hispanic white or other race]			
Non-Hispanic black	-0.002	-0.049	-0.012
	(0.126)	(0.124)	(0.111)
Hispanic	-0.121	-0.093	-0.043
	(0.157)	(0.136)	(0.124)
Education			
[Reference: Did not complete high school]			
High school graduate or some college	0.117	-0.021	-0.008
	(0.106)	(0.107)	(0.093)
College degreee or above	0.134	0.122	0.090
	(0.122)	(0.125)	(0.114)
Married	-0.135	-0.052	0.015
	(0.093)	(0.105)	(0.092)
Has been self-employed before age 50	0.183**	0.182**	0.141*
	(0.083)	(0.091)	(0.085)
Has managerial experience on job with the longest tenure	0.041	0.069	0.077
	(0.088)	(0.088)	(0.081)
Less risk-averse	0.208**	0.078	0.144*
	(0.076)	(0.087)	(0.082)
Has work-limiting health problem	-0.043	0.196	0.241
	(0.172)	(0.180)	(0.174)
Has pension on last wage and salary job	0.036	0.014	-0.020
	(0.071)	(0.070)	(0.062)

Coverd by health insurance (any type)	0.059	0.025	-0.059
	(0.076)	(0.077)	(0.070)
Business asset			
[Reference: Zero business asset]			
Positive business asset: lower 50 percentile	0.129	0.235**	0.158*
	(0.102)	(0.102)	(0.100)
Positive business asset: upper 50 percentile	0.090	0.200*	0.147
	(0.104)	(0.109)	(0.106)
Non-business family wealth			
[Reference: 1st quartile]			
2nd quartile	0.019	-0.107	0.005
	(0.106)	(0.098)	(0.092)
3rd quartile	0.108	-0.038	0.045
	(0.101)	(0.102)	(0.097)
4th quartile	0.143	0.056	0.011
	(0.109)	(0.116)	(0.101)
Self-employment income (salary and profit)			
[Reference: Zero income]			
Positive income: lower 50 percentile	0.265***	0.241***	0.216**
	(0.073)	(0.080)	(0.078)
Positive income: upper 50 percentile	0.235***	0.188**	0.158*
	(0.076)	(0.088)	(0.084)
Working hours per week			
[Reference: 16 hours or less]			
17-32 hours	0.077	0.094	-0.039
	(0.104)	(0.106)	(0.093)
33-40 hours	0.150	0.194*	0.181*
	(0.104)	(0.114)	(0.108)
More than 40 hours	0.185*	0.144	0.093
	(0.106)	(0.116)	(0.106)
Interaction: work-limiting health problem and working hours per week			
has work-limiting health problem and work 17-32 hr/wk	0.129	-0.051	0.061
	(0.211)	(0.225)	(0.221)
has work-limiting health problem and work 33-40 hr/wk	0.101	0.084	-0.117
	(0.328)	(0.358)	(0.219)
has work-limiting health problem and work over 40 hr/wk	0.236	-0.064	-0.083
	(0.209)	(0.259)	(0.199)
Has employees [excluding spouse]	0.039	0.089	0.055
	(0.074)	(0.074)	(0.066)
Industry [of the self-employment]			
[Reference: wholesale/retail trade]			
Agriculture/forestry/fishery	0.272*	0.034	0.062
	(0.132)	(0.195)	(0.186)
Mining and construction	-0.124	-0.170	-0.145
	(0.139)	(0.110)	(0.088)
Manufacturing	-0.057	-0.102	-0.132
	(0.177)	(0.142)	(0.115)
Transportation	-0.221	-0.279**	-0.190*

	(0.142)	(0.088)	(0.078)
Finance, insurance and real estate	0.113	0.110	0.061
	(0.100)	(0.108)	(0.098)
Service	-0.005	0.022	0.168
	(0.124)	(0.120)	(0.125)
Professionals and related service	0.003	-0.056	0.001
	(0.113)	(0.102)	(0.093)
Pseudo R-square	0.198	0.184	0.185

Source: Author's calculations from the 1992 to 2004 waves of the HRS data.

Note: The table reports marginal effects from a probit model, with robust stardard errors in parentheses. The model are estimated on a sample consists of 280 workers (ages 52 to 76 at the entrance time) who was wage and salary workers at the baseline wave, entered self-employment at the next wave and had non-missing employment status for at least three waves after the entrance. Variables are measured at the time of self-employment entrance. Health insurance includes insurances from government, employer (own or spousal) or other types of insurance. All wealth variables are measured in constant 1996 dollars. * p<0.1; ** p<0.05; *** p<0.01.

Chapter 5

Discussion and Policy Implications

Small businesses play a significant role in economic development and expansion in the United States. More than 99 percent of the firms in the United States are small businesses with less than 500 employees, and they have contributed to the majority of GDP and new job creations in the past decade (SBA Office of Advocacy, 2006). Recognized by their economic importance, small business ownership is a popular topic for policy debate among policymakers and academic researchers. The current studies on small business ownership and entrepreneurship policy focus almost exclusively on the general population of small business owners, especially the younger small business owners.

Older small business owners or self-employed workers are an important but often overlooked sub-group of the business owner population. Older workers have higher rates of self-employment than younger workers: rates of self-employment among workers over age 50 are 20 percent while the rates for all workers over age 16 peaked in 1994 at 12 percent (Zissimopoulos and Karoly, forthcoming). Older workers are also different than younger workers in ways that affect their likelihood of becoming business owners and their experiences as new business owners. For example, older workers have more wealth, different types of wealth and more work experience than younger workers when they start a new business. Older workers, however, may be less willing to take on the risk of business ownership, given that, compared to younger workers, they have fewer healthy work years remaining over which to recoup the losses of an unsuccessful business. Older workers may prefer the job autonomy and other non-pecuniary benefits of being a

business owner more than younger workers. On the other hand, older workers may be less willing to transition from wage and salary jobs that offer health insurance coverage.

In general, older workers may have quite different motivations and concerns when they make the decision to become a business owner. Surprisingly, however, only a few studies have focus on business ownership and self-employment among older workers. The importance of older workers as small business owners and their distinct characteristics warrant more sophisticated economic research on older small business owners.

In this dissertation, I conducted three related economic analyses on self-employment/business ownership specifically for older workers. The empirical evidence from each of these analyses has generated important policy implications that can contribute to the policymaking related to small business creation and entrepreneurship.

The first paper revealed the substantial public investment in a variety of small business assistance programs in the United States and the methodological challenges of the current evaluation studies for these programs. Most of the evaluation studies identified in this study provided descriptive analysis only. While descriptive analysis of these programs is useful, it can not provide the evidence of causal effect between program participation and post-program business performance. The fact that many studies have used descriptive analysis only is, in part, a result of data limitation. The less rigorous methodologies of these studies have compromised the positive program effect they reported to justify the substantial public investment in small business assistance programs. This analysis revealed an urgent need to conduct periodical and standard program performance evaluations for small business assistance programs. The first step for a rigorous and periodical evaluation is a significant investment to collect standardized, high quality data

on program implementation, participant demographics, and economic performance before and after the program. Data used in the current evaluation studies are typically a small, convenient sample of clients at a particular point in time for a local program, with limited information on program features and participant characteristics. Future evaluations will require a significant effort to collect standardized, longitudinal and national data on program implementation, clientele and performance. The collection of quality data makes it possible to use more rigorous methodologies to evaluate the causal effect of these programs. Researchers can also use these high quality data to answer important questions that have not been answered by the current studies: what features make the programs most effective, what features work best for a particular sub-group of the clients or at some particular locations, etc. The golden standard for program evaluation is the randomized control trial. However, a randomized control trial is often not feasible due to cost and logistical concerns. In order to infer a causal effect of the assistance programs, we need more demonstration/experimental programs that utilize a randomized control trial design.

The second paper highlights the existence and importance of liquidity constraints in older workers' decisions to start a new business, constraints that exist even though older workers have, on average, more wealth than younger workers. Federal, state and local government and commercial lenders can work together to provide necessary financial liquidity to older workers who need seed capital to start a new business venture. Older workers can also utilize the current programs described in chapter 2 to ease their liquidity constraints. These programs include but not limited to: the SBA 7(a), 504 and the microloan program.

This paper also revealed the possibility of using the pension benefit as a source of starting capital for older workers. To make this option available to more older workers, the government could support broader availability of lump-sum distribution of pension benefits and reduce the early-withdrawal penalty imposed on such distributions for older workers who need starting capital for their new business.

In considering the pros and cons of such a reform, however, retirement financial security should be a significant concern for policymakers. Most new small businesses fail in the first couple of years. And older workers are much more susceptible to adverse financial outcomes resulting from a business failure, especially for older workers using their pension benefits as the source for starting capital. A sophisticated small business policy for older workers should strike a balance between assisting older workers in starting new businesses and protecting the financial security of their retirement years. We could encourage older workers to utilize the currently available business assistance programs. Many services provided by these programs, like evaluating business plans and providing technical assistance, could potentially improve the economic performance and longevity of the new businesses started by older workers, although we need more rigorous studies to evaluate the true effect of these programs.

The third paper found that self-employed older workers are a heterogeneous group in terms of their objective and expectation for self-employment. Based on their length of working since self-employment entry, many self-employed older workers may enter self-employment as a bridge to retirement; while others continue working in self-employment as a regular job. Self-employed older workers with different objectives and expectations for self-employment may have different needs for business support. Policymakers need to

consider the heterogeneity of the self-employed older population when designing relevant public programs. In addition, policymakers should be concerned with the retirement financial security of self-employed older workers because these workers are much more susceptible to adverse financial outcomes resulting from a business failure, especially for older workers using their retirement savings as the source for starting capital. Future research is needed to understand the challenges facing these different groups of self-employed older workers, whether they feel they need outside support and if so, what kind of support they need. Based on this information, we can create new programs or expand current programs to better serve the heterogeneous business needs among older business owners. In addition, more research is need to study the rate of business failure among self-employed older workers and compare this rate to that of young workers.

In general, self-employment at older ages is an extremely important, yet understudied policy research area. This dissertation contributes to this research area by analyzing public efforts to promote business ownership, the liquidity constraints faced by older workers and the heterogeneity of the older self-employed population. Substantial future research effort is needed to provide more empirical evidence that will help policymakers to create better small business policies for older workers. We need these effective public policies to eliminate the barriers to successful self-employment and business ownership among older workers.

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