

Self-Employment in the Veteran and Service-Disabled Veteran Population

by

Open Blue Solutions

for



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Purpose

The factors that influence lower rates of self-employment among the service-disabled veteran population are not well-understood, in part because service-disabled veterans are seldom identified as a distinct group when studies of veteran entrepreneurship are performed. This study uses the Bureau of Labor Statistics' Current Population Survey (CPS) to examine the self-employment choices of veterans and service-disabled veterans.

This study also examines how computer technology relates to veteran self-employment. A deeper understanding of this interaction is required in order to assist veterans with the successful development of their own businesses. It is especially important that policymakers understand the effect that information-age tools like the Internet have had on the self-employment choices of service-disabled veterans, whose numbers are growing. This paper provides information about veteran entrepreneurship and illustrates the experiences of self-employed veterans in the information-based economy.

Data collected in the Census Bureau's 2002 Survey of Business Owners and Self-Employed Individuals (SBO), part of its Economic Census conducted every five years, indicate that 7.2 percent of non-employer, veteran business owner respondents were service-disabled. The Department of Veterans Affairs (VA) reported that in the same year 9.4 percent of all veterans were receiving compensation due to a service-connected disability. The VA's 2001 National Survey of Veterans reported that 13.8

percent of veterans identified themselves as having a service-related disability (though not necessarily receiving compensation). So, using "non-employers" as a proxy for self-employed individuals, it can be said that service-disabled veterans are self-employed at a rate approximately one-quarter to one-half lower than their percentage in the veteran population in general would otherwise suggest.

Overall Findings

- Veterans with service-connected disabilities are self-employed at lower rates than veterans without such disabilities. Substantially all of the difference between the self-employment rates of service-disabled veterans and those of other veterans results from the service-connected disabilities themselves, and not to differences in demographic or other characteristics.
- Approximately one-half to two-thirds of the difference in these self-employment rates is due to service-disabled veterans not working at all. Controlling for the effects of service-connected disabilities results in nearly identical rates of labor-force participation among service-disabled veterans and those without such disabilities.
- Computer use is correlated with higher employment rates among all veterans, with additional benefits for the service-disabled. Computer use also increases self-employment rates among all veterans, but there is no additional effect on the self-employment choices of service-disabled veterans beyond that observed for all veterans.

Highlights

- During the eighteen years observed (1988-2005), there has been a steady increase in the percentage of veterans not employed, which is potentially due to an overall aging of the veterans population.
- Self-employment rates are lower for service-disabled veterans than for non-service-disabled veterans in all years and in both disability definitions used for this study.
- The study's models predict that the employment rate of service-disabled veterans would be over ten percentage points higher if service-connected disabilities did not interfere with employment. This would represent a 25 to 28 percent increase in their employment rate.
- These models further predict that the self-employment rate of service-disabled veterans would increase by about three percentage points if their disabilities were not a barrier. This would represent a 60 to 90 percent increase in their self-employment rate, depending on the model.
- The study's analysis predicts that, if all service-disabled veterans were computer owners, their employment rate would increase by over five percentage points, representing about an 11 percent increase in that rate.
- The study's models also predict that the self-employment rate of service-disabled veterans would increase by slightly more than one percentage point if all such veterans were computer owners, representing about a 23 percent increase in the self-employment rate.

Scope and methodology

Data for this study were drawn from three sections of the Current Population Survey (CPS) conducted by the U.S. Census Bureau for the Department of Labor's Bureau of Labor Statistics between 1985 and 2005. These included the CPS's annual March demographic supplements, its biennial Veterans Supplements, and its Computer and Internet Use Supplement from 2001. Datasets were created for each survey month in which data was drawn. SAS programs developed by the National Bureau of Economic Research were used to assemble the raw CPS data. In order to fill gaps in the available SAS extraction programs and to account for year-to-year

differences in the structure of the datasets, the authors developed their own data extraction program for the March 1995 data and for survey years prior to 1988.

Tabulations and summary statistics are presented that identify the effects of particular factors, such as demographic variables (including age, gender, and race/ethnicity) and service-connected disability, on the propensity for veterans to become self-employed. The results are presented by implementing a bivariate probit model of veteran self-employment, in which the veteran makes a two-stage choice between employment and not working, and then between self-employment and other employment if employment is chosen in the first stage. The model provides formal hypothesis tests for the statistical significance of the factors tabulated. The research conducts simulations and provides estimates of the practical significance of the effects of service-connected disabilities on the self-employment outcomes of veterans.

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Section 1: Summary

Introduction

The first Strategic Goal of the Department of Veterans Affairs (VA) is to "Restore the capability of veterans with disabilities to the greatest extent possible and improve the quality of their lives and that of their families."¹ With this goal in mind, in 2004 the VA gave a special task force the job of performing a complete review of the Department's Vocational Rehabilitation and Education (VRE) program. The VA Vocational and Rehabilitation Task Force recommended that the VRE program develop a five-track system for providing service-disabled veterans with rehabilitation services.² This system would include one track devoted to self-employment options for entrepreneurial service-disabled veterans.

Data collected in the Census Bureau's 2002 Survey of Business Owners and Self-Employed Individuals (SBO), part of its Economic Census conducted every five years, indicate that 7.2 percent of non-employer veteran business owners are service-disabled.³ VA reported that in the same year 9.4 percent of all veterans were receiving compensation due to a service-connected disability.⁴ The VA's 2001 National Survey of Veterans reported that 13.8 percent of veterans identified themselves as having a service-related disability (though not necessarily receiving compensation).⁵ So, using "non-employers" as a proxy for self-employed individuals, we can say that service-disabled veterans choose self-employment at a rate approximately one-quarter to one-half lower than their percentage in the veteran population in general would otherwise suggest.

The factors that influence lower rates of self-employment among the service-disabled veteran population are not well understood, in part because service-disabled veterans are seldom identified as a distinct group when studies of veteran entrepreneurship are performed. This study uses the Bureau of Labor Statistics' Current Population Survey (CPS) to examine cross-sectional statistics regarding the self-employment choices of veterans and service-disabled veterans in the United States.⁶ Data are drawn from the CPS's annual March demographic supplements, its biennial Veterans Supplements, and its Computer and Internet Use Supplement from 2001.

¹ Department of Veterans Affairs, "Department of Veterans Affairs Strategic Plan 2003-2008", which can be accessed at <http://www.va.gov/Partners/stratcap/>.

² VA Vocational Rehabilitation and Employment Task Force, "Report to the Secretary of Veterans Affairs, The Vocational Rehabilitation and Employment Program for the 21st Century Veteran," 2004, p. 61. This report can be accessed at http://www1.va.gov/op3/docs/VRE_Report.pdf.

³ U.S. Census Bureau, "2002 Survey of Business Owners and Self-Employed Individuals, Characteristics of Business Owners (CBO)," p. 25, Table 4. This table depicts the veterans status of respondent business owners, including breakouts of both employer and non-employer business owners. Census reports that 156,229 veteran, non-employer business owners were service-disabled, or approximately 7.2 percent of the total 2,161,506 veteran, non-employer business owner respondents. The CBO can be accessed at <http://www.census.gov/csd/sbo/>.

⁴ Data provided by the Department of Veterans Affairs and reported in the *Statistical Abstract of the United States, 2003* indicate that in 2002 there were 25.618 million veterans (p. 351, Table 530) and that 2.398 million, or 9.4 percent, of these veterans were receiving compensation for service-connected disabilities (p. 352, Table 531). These tables and related information can be accessed at <http://www.census.gov/prod/2004pubs/03statab/defense.pdf>.

⁵ Department of Veterans Affairs, "National Survey of Veterans – Final Report", pp. 4-11 & 4-12. This report can be accessed at http://www1.va.gov/vetdata/docs/survey_final.htm.

⁶ The Current Population Survey (CPS) is a monthly survey of households conducted by the U.S. Census Bureau for the Department of Labor's Bureau of Labor Statistics. Additional information on the CPS can be found at <http://www.bls.gov/cps/>.

A deeper understanding of how computer technology interacts with veteran self-employment is required in order to facilitate the development of resources to assist veterans with the successful development of their own businesses. It is especially important that policymakers understand the effect that information-age tools like the Internet have had on the self-employment choices of service-disabled veterans, whose numbers are growing as a result of the wars in Iraq and Afghanistan. Lack of information on these issues, among other factors, caused the General Accountability Office to designate VRE as a "high risk" program.⁷

The goal of this paper is to provide the Administration, the Congress, and other stakeholders with information about veteran entrepreneurship that illustrates the experiences of self-employed veterans in the information-based economy. This will assist with the development of a self-employment training track that reflects current economic conditions. In particular, we address the following questions:

- **Estimates of the Number of Service-Disabled Veteran Entrepreneurs.** Much past SBA research into veteran entrepreneurship has focused on veterans as a group, without distinguishing between those veterans who have a service-connected disability and those who do not. We investigate two methods of using CPS data for identifying veterans with service-connected disabilities and assess the quality of these determinations with reference to other sources, such as VA benefits data.
- **Relationships between demographic characteristics, service-connected disability, and self-employment.** The centerpiece of our analysis is an econometric model that estimates the propensity for veterans to be labor force participants and for labor force participants to be self-employed. Past studies of veteran populations have found that there are significant differences in rates of self-employment based on demographic characteristics, such as self-identified ethnic categories and gender.⁸ Local economic conditions might play a part in the decision to become self-employed, as could other demographic characteristics such as the age of the veteran. We estimate the effects of these characteristics on samples of veterans drawn from the CPS Veterans Supplements, the March CPS, and a matched group of veterans found in the CPS for August and September of 2001.
- **Relationships between Computer and Internet Technology and Service-Disabled Veteran Self-Employment and Entrepreneurship.** The use of computer technology offers disabled individuals opportunities for entrepreneurship they might not have chosen in earlier decades. Computer skills could also be one determinate of veterans, especially service-disabled veterans, finding employment. In order to investigate the role of computer technology in veteran self-employment, we match data from the CPS's August 2001 Veterans Supplement to its September 2001 Computer and Internet Use Supplement, producing a richer dataset that allows us to examine the interaction between computer ownership, service-connected disability, labor force participation and self-employment.

⁷ United States General Accounting Office, "VA Vocational Rehabilitation and Employment Program, GAO Comments on Key Task Force Findings and Recommendations." GAO-04-853; June, 2004; p.2. This report can be accessed at <http://www.gao.gov/new.items/d04853.pdf>.

⁸ Fairlie, Robert W., "Self-Employed Business Ownership Rates in the United States 1979-2003." December, 2004. This report can be accessed at <http://www.sba.gov/ADVO/research/rs243tot.pdf>, and its accompanying Research Summary at <http://www.sba.gov/ADVO/research/rs243.pdf>.

Following Section 1's summary, the remainder of this report is organized into four additional sections, followed by appendices. Section 2 describes the manner in which we gathered data on veterans from the Current Population Survey. This section includes tabulations and summary statistics that identify the effects of particular factors, such as demographic variables (including age, gender, and race/ethnicity) and service-connected disability, on the propensity for veterans to become self-employed. Section 3 formalizes the results presented in Section 2 by implementing a bivariate probit model of veteran self-employment, in which the veteran makes a two-stage choice between employment and not working, and then between self-employment and other employment if employment is chosen in the first stage. The model used in Section 3 provides formal hypothesis tests for the statistical significance of the factors that were tabulated in Section 2. Section 4 presents simulation results that provide estimates of the practical significance of the effects of service-connected disabilities on the self-employment outcomes of veterans. Section 5 presents results and conclusions that may be derived based on the work presented in earlier sections of the document.

To summarize our results, we find that:

- **Substantially all of the difference between the self-employment rates of service-disabled veterans and those of other veterans results from the service-connected disabilities themselves, and not to differences in demographic or other characteristics.** Veterans with service-connected disabilities are self-employed at lower rates than veterans without such disabilities. Approximately one-half to two-thirds of the difference in self-employment rates is due to service-disabled veterans not working at all. Controlling for the effects of service-connected disabilities results in nearly identical rates of labor-force participation among service-disabled veterans vis-à-vis those without service-connected disabilities.
- **Veterans with service-connected disabilities do not prefer self-employment to working for others.** If anything, service-disabled veterans who are employed choose to work for others at higher rates than non-service-disabled veterans who are employed. This preference accounts for one-third to one-half of the difference in self-employment rates among service-disabled veterans, suggesting that beneficial characteristics ascribed to self-employment, such as flexibility or proximity to home, are differentially less appealing to service-disabled veterans rather than more so.
- **Computer use is correlated with higher employment rates and higher self-employment rates among all veterans.** Computer use benefits the employment rates of all veterans, with additional benefits for those who are service-disabled. Computer use also increases self-employment percentages among all veterans, but there is no additional effect on the choices of service-disabled veterans beyond that observed for all veterans.

These results suggest that the promotion of veteran entrepreneurship among the service-disabled veteran population must address why service-disabled veterans appear to prefer working for someone else to self-employment. Also, the promotion of veteran entrepreneurship, especially among service-disabled veterans, should take into account the importance of the large percentage of service-disabled veterans who are not employed at all. Technological factors appear to be able to address some, but not all, of the gap in entrepreneurship, leading to the hypothesis that successful policies to increase veteran self-employment and entrepreneurship will need to include technology training as one of several components designed to address different facets of this issue.

Finally, this study has shown the benefit to combining data from various portions of the CPS into a single dataset. Specifically, we use data from the August 2001 Veteran Supplement and the September 2001 Computer and Internet Use Supplement to investigate the technological issues discussed above. The possibility of combining these datasets was, in this instance, due more to good fortune than to design. We suggest that a single key question from each of these supplements be added to either the Veterans Supplements or to the March CPS to improve the quality of CPS data for research into veteran entrepreneurship. A complete discussion of this point is included in our Results and Conclusions section.

Section 2: Data and Tabulations

Obtaining Data from Current Population Survey

The Current Population Survey (CPS) has recently been used successfully by SBA-sponsored researchers to address issues of veteran entrepreneurship, including yearly trends in veteran self-employment rates.⁹ There are several reasons for the usefulness of the CPS to the study of veteran entrepreneurship and self-employment. The CPS comprises one of the longest-running, consistently administered data gathering efforts in the United States. It has been administered monthly for over five decades, and currently the CPS gathers data on about 57,000 households each month.¹⁰ Furthermore, the CPS gathers information on veteran status as part of its standard set of questions, and additional information on veterans is gathered biennially using a special Veterans Supplement. Finally, the Computer and Internet Use Supplements gather data on computer ownership patterns that are potentially useful in relation to veteran self-employment.

The primary focus of this work extends CPS research already performed for the SBA Office of Advocacy. In "Self-Employed Business Ownership Rates in the United States: 1979-2003,"¹¹ Dr. Robert Fairlie uses microdata from the CPS to provide a detailed portrait of the self-employed in the United States. In a second, related paper,¹² Dr. Fairlie examines the probability that individuals will make the transition to self-employment conditional on computer ownership in the home. Using CPS data including the Computer and Internet Usage Supplements (CIUS), this study finds that ownership of a computer in the home increases the probability of transition to self-employment over a period of approximately one year by 0.6 percentage points for men and 0.7 percentage points for women.

Data for this study were drawn from three sections of the CPS administered between 1985 and 2005. The variables selected for analysis are presented in Appendix I. Datasets were created for each survey month from which we drew data. SAS programs developed by the National Bureau of Economic Research were used to assemble the raw CPS data. In order to fill gaps in the available SAS extraction programs and to account for year-to-year differences in the structure of the datasets, we developed our own data extraction program for the March 1995 data and for survey years prior to 1988. The CPS is structured so that in each month one-eighth of the sample is new, and one-eighth of the sample is in the last month of the survey, so that eight months of data are gathered for the same group of addresses, with an eight-month gap between the first four survey months and the last four for each household surveyed. This survey structure makes it possible to match two surveys administered to the same household and to identify some of the individuals participating in the matched surveys. This type of matching will be required when we examine computer and Internet use. Appendix I contains a complete list of the variables extracted from the various CPS survey months used in the analysis presented here.

Three definitional issues must be addressed in order to perform the analysis below. These are: (1) who is a service-disabled veteran; (2) what is the population of self-employed

⁹ Fairlie, *Ibid.*

¹⁰ U.S. Bureau of the Census, "Current Population Survey 2006 Annual Social and Economic (ASEC) Supplement," p. 2-1. This report can be accessed at <http://www.census.gov/apsd/techdoc/cps/cpsmar06.pdf>.

¹¹ Fairlie, *Op. cit.*

¹² Fairlie, Robert W., "Technology and Entrepreneurship: A Cross-Industry Analysis of Access to Computers and Self-Employment." June, 2005. This report can be accessed at <http://www.sba.gov/ADVO/research/rs259tot.pdf>, and its accompanying Research Summary at <http://www.sba.gov/ADVO/research/rs259.pdf>.

people; and (3) what is the definition of self-employment. These definitions are explained in detail before we turn to the descriptive statistical results.

Identifying Service-Disabled Veterans

The Department of Veterans Affairs (VA) reports that there were approximately 2.398 million service-disabled veterans receiving compensation in 2002, or 9.4 percent of the 25.618 million total veterans in that year.¹³ VA's 2001 National Survey of Veterans found that approximately 13.8 percent of veteran respondents identified themselves as having a service-connected disability, nearly half again as many as those actually receiving compensation.¹⁴ While it is not possible to match veterans in the CPS to their benefit records to determine if the data is consistent, the level of service-connected disabilities observed using different definitions of disability may be examined to determine whether the aggregate number of CPS veterans identified as service-disabled is close to the expected population. We examine the correspondence between the expected levels of those with service-connected disabilities to evaluate two methods of identifying service-disabled veterans. The first method uses the results of direct questions asked in the Veterans Supplements, while the second method uses indirect financial measures of potentially service-connected disabilities found in the March CPS.

Using the Veterans Supplements

The CPS Veterans Supplements were administered in August of 1995, 2001 and 2003, and in September of 1997 and 1999. They contain all of the basic monthly survey questions, together with information on veteran status and service-connected disability. As a result, these data provide a basis for examination of veteran entrepreneurship and the effects of service-connected disability on an ongoing basis for approximately a decade.

As part of the biennial Veterans Supplements, veterans are asked the following question:

*"Has the Department of Veteran Affairs (VA) or the Department of Defense determined that you have a service-connected disability; that is, a health condition or impairment caused or made worse by military service?"*¹⁵

We use affirmative responses to this question as an indicator of service-connected disability for these datasets.

Identifying Service-Disabled Veterans using the March Demographic Supplements

While the Veteran Supplements provide useful direct information on the presence of service-connected disability, the supplements themselves are limited to only five recent years of data and are spaced two years apart. Other methods that provide a longer and more frequent series of observations might have the potential to improve the quality of conclusions that could be drawn from the CPS.

An alternative to the "direct" questioning of the CPS Veterans Supplements is the use of a proxy measure for service-disabled veteran status based on receipt of veterans disability benefits. The March supplement includes specific financial questions related to the sources of household income that include service-connected disability benefits as one of the potential income sources. The use of March CPS data to create a proxy measure would

¹³ As reported in the *Statistical Abstract of the United States, 2003*. See footnote 4.

¹⁴ Department of Veterans Affairs, "National Survey of Veterans – Final Report." See footnote 5.

¹⁵ U.S. Bureau of the Census, "Current Population Survey Veteran Supplement File, August 2001 Technical Documentation," page 9-4. This document can be accessed at <http://www.census.gov/apsd/techdoc/cps/cpsaug01.pdf>.

have several benefits over the use of Veterans Supplement data, including increased frequency of response and better information on the financial situation of the veteran, based on the additional questions included in the March Supplement.

Comparing Direct and Proxy Methods of Identification

Table 1 below presents estimates of the number of veterans and service-disabled veterans identified in the March CPS and CPS Veterans Supplements. Results are organized by calendar year, with Veterans Supplements from August or September appearing alongside March supplements from the same calendar year.

Table 1: Percentage of Service-Disabled Veterans In Two CPS Datasets

March CPS	% Vets Service-Disabled	# Vets Service-Disabled	Total Veterans	CPS Vet Supplements	% Vets Service-Disabled	# Vets Service-Disabled	Total Veterans
Mar-88	5.8%	1,582,223	27,069,969				
Mar-89	4.9%	1,314,248	26,903,700				
Mar-90	5.2%	1,381,038	26,733,204				
Mar-91	5.1%	1,358,243	26,712,424				
Mar-92	5.3%	1,424,456	26,636,680				
Mar-93	5.0%	1,301,243	26,200,254				
Mar-94	5.0%	1,298,372	26,056,534				
Mar-95	5.2%	1,358,607	26,009,748	Aug-95	8.8%	2,276,436	26,008,936
Mar-96	5.2%	1,328,992	25,465,072				
Mar-97	4.8%	1,195,793	25,143,506	Sep-97	9.1%	2,283,095	25,013,908
Mar-98	4.9%	1,233,152	25,133,679				
Mar-99	4.9%	1,196,624	24,336,295	Sep-99	9.1%	2,240,113	24,559,739
Mar-00	5.5%	1,320,568	24,224,204				
Mar-01	5.0%	1,190,195	23,630,666	Aug-01	9.1%	2,117,900	23,304,071
Mar-02	5.5%	1,309,277	23,697,471				
Mar-03	5.5%	1,269,635	23,078,360	Aug-03	9.1%	2,081,474	22,769,539
Mar-04	5.1%	1,151,792	22,750,080				
Mar-05	5.7%	1,277,572	22,525,162				

Table 1 shows that the weighted percentage of veterans reported to be receiving compensation for service-connected disabilities in the March CPS is approximately 5 percent for the eighteen years in which this type of financial data is available. This is not a good match with the 8 to 11 percent range estimated by the VA for this timeframe.¹⁶ In contrast, approximately 9 percent of veterans identified themselves as having a service-connected disability in the CPS Veterans Supplements, which approximates closely the VA estimates for the comparable timeframe of 1995-2003.¹⁷

It appears from this tabulation that the financial information provided in the March CPS does not identify all veterans receiving benefits due to a service-connected disability, and that the understatement of the number of veterans receiving these occurs in all sample years. This systematic underreporting could be due in part to mistaken identification of veteran's

¹⁶ Data provided by the Department of Veterans Affairs and reported in the *Statistical Abstract of the United States* for the various years in the period 1988 – 2005 show a decreasing total number of veterans in this timeframe, but an increasing number of service-disabled veterans. VA estimated that there were 27.155 million veterans in 1988, a number which gradually decreased to 24.128 million in 2005. In the same period, there were estimated to be 2.199 million veterans receiving compensation for service-connected disabilities in 1988, a number which gradually increased to 2.637 million in 2005. Accordingly, the percentage of compensated service-disabled veterans rose from 8.1 percent in 1988 to 10.9 percent in 2005.

¹⁷ Ibid. The share of compensated service-disabled veterans ranged from 8.5 percent in 1995 to 9.9 percent in 2003.

disability benefits as other types of veteran's benefits or as disability benefits not due to a service-connected disability. Regardless of the source of the error, the March CPS income questions consistently misidentify the source of some income attributed to service-disabled veterans.

It is also important to note that the percentage of veterans with a service-connected disability in the CPS Veterans Supplements is nearly equal to the number of veterans with *compensated* disabilities reported by the VA. However, as described above, nearly 14 percent of veterans identified themselves as service-disabled in the VA's 2001 National Survey of Veterans, although many do not necessarily receive compensation as a result of such disabilities.¹⁸ Accordingly, it is not completely clear that either definition of disability presented above is flawless, although the direct questions posed in the CPS Veteran Supplements appear to yield results superior to the proxy method using March CPS data.

In order to test the robustness of the results produced below with respect to disability definitions, we will estimate models using both data sources and compare the conclusions to determine if definitional issues influence the results. Obtaining similar results from both samples would indicate that the results are robust to the choice of definition of service-connected disability. To foreshadow our results, we do not find material differences in our conclusions based on disability definitions.

Identification of the Sample Population and Self-Employed Individuals

Creation of a self-employment rate requires that the potential population of self-employed individuals be specified and that a definition of self-employment be created. In defining the population of veterans who are potentially self-employed, we use a population definition based on previous CPS studies of self-employment published by the SBA. The population of potentially self-employed individuals is limited to those who identify themselves as veterans. Self-employed individuals may be either incorporated or not incorporated. The next step in the categorization is to determine whether the veteran is either employed or not employed. Employed veterans met the following criteria:

- Worked 15 hours or more in the CPS reference week
- Primary occupation is not an agricultural field (as classified by North American Industry Classification System [NAICS] codes)
- Primary occupation is not as an unpaid family worker

Working veterans are further categorized as working for themselves (self-employed) or working for someone else (other employed). Self-employed veterans are those who report themselves as self-employed on the CPS "class of worker" question.

Describing Employment and Self-Employment Rates

Studies of self-employment and entrepreneurship often define a self-employment rate as the ratio of self-employed individuals to all individuals who are working. While these self-employment rates are often sufficient for groups with high labor force participation, such as prime-age males without disabilities, the issue of labor force participation itself should be taken into consideration when examining the self-employment outcomes for groups where not working is a more prevalent outcome. When examining the careers of disabled individuals, there is a strong possibility that the individual in question might not be employed

¹⁸ See footnote 5.

due to a disability. While disability is defined by some programs as a condition that prevents any work at all, the disability determination process for veterans is more subtle, and takes into account the possibility that a particular medical condition caused or aggravated by military service might limit some work choices, but might not prevent all kinds of employment. As a result, service-disabled individuals might be self-employed, working for someone else, or not employed. In order to capture all of these potential states, the work we present below includes information on those veterans, whether service-disabled or not, who are not employed.¹⁹

The first set of columns in Table 2 below, illustrates self-employment rates computed for those veterans who are likely to be service-disabled, as identified by the CPS March income proxy variable, versus those who are not. The second set of columns presents similar results for veterans found in the CPS Veterans Supplement samples. Several trends in the employment outcomes of veterans can be observed in the March CPS results. First, in the eighteen years observed, there has been a steady increase in the percentage of veterans who are not employed. This is potentially due to an overall aging of the veteran population, as shown in the columns providing the average age. Second, self-employment percentages are lower for service-disabled veterans than for non-service-disabled veterans for all years and all definitions of service-connected disability. Finally, while non-service-disabled veterans have shown a fairly steady decline in their level of employment by others from a high in 1988 of 52.9 percent to a low in 2005 of 41.7 percent, the rate of employment by others of service-disabled veterans has remained near thirty percent for most of the time period examined. Similar employment patterns are evident between the March CPS data and the Veterans Supplements, including potential age effects on employment outcomes.

Computing the average self-employment rate for the March CPS years in which Veteran Supplement data are available yields an average self-employment rate of 3.8 percent for service-disabled veterans and 7.2 percent for non-service-disabled veterans. Both of these figures are lower than the values for the Veterans Supplements, indicating the potential for seasonal effects to result in differences in findings between the samples.²⁰

¹⁹ As noted, studies on self-employment and entrepreneurship often define a self-employment rate as the ratio of self-employed individuals to all individuals who are working (i.e., who are in the labor force). We depart from this "standard" usage in this study for the reasons explained above and instead use three categories of employment status (not employed, self-employed, and employed by others). However, to facilitate the comparison of our findings with other research, we have included in Appendix IV three tables which display in a "standardized" format the percentage shares **within the veteran labor force** for those veterans who are self-employed and those who are employed by others. These three tables correspond with Tables 2, 3, and 4 in the main report.

²⁰ All of the CPS Veterans Supplements were administered in August and September 2001.

Table 2: Employment Rates for Service-Disabled and Non-Service-Disabled Veterans

Service-Disabled Veterans								
Year	March CPS				CPS Veterans Supplements			
	Not Employed	Self-Employed	Other Employed	Average Age	Not Employed	Self-Employed	Other Employed	Average Age
1988	60.7%	5.4%	33.9%	57.0				
1989	63.5%	5.6%	30.9%	57.5				
1990	65.8%	5.0%	29.2%	57.6				
1991	65.5%	4.7%	29.8%	58.0				
1992	64.8%	4.4%	30.7%	58.6				
1993	66.2%	5.4%	28.4%	59.2				
1994	66.3%	5.9%	27.8%	59.8				
1995	60.5%	5.1%	34.4%	59.0	62.1%	5.2%	32.7%	58.0
1996	60.3%	4.8%	34.8%	58.4				
1997	64.5%	3.1%	32.4%	59.7	58.5%	5.0%	36.5%	57.8
1998	63.6%	2.7%	33.7%	58.9				
1999	62.6%	3.9%	33.5%	59.0	58.9%	5.8%	35.3%	58.3
2000	62.0%	3.0%	34.9%	58.5				
2001	65.1%	2.8%	32.2%	59.8	56.3%	4.3%	39.4%	58.1
2002	62.0%	3.2%	34.8%	57.4				
2003	62.3%	3.9%	33.8%	57.0	62.4%	3.6%	34.1%	59.6
2004	66.9%	3.1%	30.0%	57.6				
2005	67.3%	2.8%	29.9%	58.0				
MEAN	63.9%	4.2%	32.0%	58.4	59.6%	4.8%	35.6%	58.4
Non-Service-Disabled Veterans								
Year	March CPS				CPS Veterans Supplements			
	Not Employed	Self-Employed	Other Employed	Average Age	Not Employed	Self-Employed	Other Employed	Average Age
1988	37.9%	9.2%	52.9%	52.1				
1989	37.9%	9.6%	52.5%	52.5				
1990	38.8%	9.3%	51.9%	53.2				
1991	41.6%	9.1%	49.3%	53.7				
1992	42.7%	8.7%	48.6%	53.9				
1993	44.3%	8.6%	47.1%	54.6				
1994	44.7%	8.2%	47.1%	54.9				
1995	45.1%	7.9%	47.0%	55.4	46.0%	8.8%	45.3%	55.4
1996	46.1%	7.8%	46.1%	56.0				
1997	46.1%	7.8%	46.1%	56.1	45.9%	8.5%	45.6%	56.7
1998	46.3%	7.4%	46.3%	56.5				
1999	46.7%	6.8%	46.5%	57.0	45.9%	7.7%	46.3%	57.5
2000	46.8%	6.9%	46.2%	57.5				
2001	48.4%	6.7%	44.9%	58.0	49.6%	6.9%	43.5%	58.2
2002	50.1%	6.3%	43.6%	56.4				
2003	50.4%	6.7%	43.0%	56.9	51.8%	6.7%	41.5%	59.4
2004	50.9%	7.0%	42.1%	57.5				
2005	51.5%	6.8%	41.7%	58.0				
MEAN	45.3%	7.8%	46.8%	55.6	47.8%	7.7%	44.4%	57.5

Demographic Characteristics and Their Effects on Veteran Self-Employment

As shown in Table 2 above, age appears to be one factor that affects the employment choices of veterans. Other demographic factors that have been used in previous studies of self-employment include gender and self-identified ethnic or racial category. In keeping with these studies, we create categories for veterans who self-identify as black, Hispanic, or white/Asian/other, and an indicator variable for female versus male veterans. Table 3 below displays the weighted average employment rates observed for service-disabled and non-service-disabled veterans by gender. The results are broken out by age group in order to capture the age effects discussed in Table 2.²¹

²¹ Data for March CPS values in Table 3 and Table 4 are drawn from years 1988-2005, inclusive. Data for the Veterans Supplement values are drawn from surveys administered in August 1995, September 1997, September 1999, August 2001 and August 2003. Data were pooled and weighted averages were obtained over all observations for all available years.

Table 3: Demographic Characteristics and Effects on Veteran Self-Employment

Service-Disabled Veterans							
	Age Group	March CPS			CPS Veterans Supplements		
		Not Employed	Self-Employed	Other Employed	Not Employed	Self-Employed	Other Employed
Males	<30	29.7%	2.1%	68.1%	18.0%	3.7%	78.3%
	30-<40	29.1%	4.8%	66.1%	25.2%	4.9%	69.9%
	40-<50	34.3%	6.3%	59.4%	31.3%	6.6%	62.2%
	50-<60	45.9%	6.1%	48.0%	40.8%	8.1%	51.1%
	60+	87.7%	2.9%	9.4%	89.0%	2.8%	8.1%
	All Males	64.1%	4.3%	31.7%	60.0%	4.9%	35.1%
Females	<30	52.9%	0.7%	46.4%	39.3%	6.3%	54.5%
	30-<40	41.2%	1.3%	57.5%	29.7%	5.1%	65.3%
	40-<50	48.4%	2.4%	49.2%	47.4%	2.6%	50.1%
	50-<60	56.8%	8.6%	34.6%	69.4%	0.0%	30.6%
	60+	97.7%	0.8%	1.5%	94.8%	2.4%	2.8%
	All Females	58.2%	2.4%	39.4%	52.4%	3.3%	44.3%
ALL	ALL	63.8%	4.2%	32.0%	59.7%	4.8%	35.6%
Non-Service-Disabled Veterans							
Year	Age Group	March CPS			CPS Veterans Supplements		
		Not Employed	Self-Employed	Other Employed	Not Employed	Self-Employed	Other Employed
Males	<30	21.0%	3.0%	76.0%	16.0%	2.7%	81.3%
	30-<40	16.1%	6.3%	77.5%	14.2%	6.5%	79.3%
	40-<50	15.9%	10.3%	73.9%	17.9%	9.5%	72.6%
	50-<60	23.8%	12.4%	63.8%	25.1%	12.3%	62.6%
	60+	77.9%	5.9%	16.2%	79.2%	6.1%	14.7%
	All Males	45.0%	8.1%	46.9%	47.8%	8.0%	44.2%
Females	<30	40.0%	1.7%	58.3%	36.8%	0.8%	62.4%
	30-<40	29.9%	3.7%	66.5%	30.2%	3.3%	66.5%
	40-<50	26.6%	3.7%	69.7%	30.6%	5.6%	63.9%
	50-<60	36.7%	5.8%	57.5%	37.1%	3.7%	59.2%
	60+	88.7%	1.6%	9.7%	87.4%	1.5%	11.1%
	All Females	46.9%	3.1%	50.0%	47.1%	3.1%	49.8%
ALL	ALL	45.1%	7.9%	47.0%	47.7%	7.8%	44.5%

As shown in Table 3, females in all age cohorts are less likely to be employed than males for both samples.²² Service-connected disability increases the percentage of both males and females not employed, with the higher rate of non-employment observed for both service-disabled and non-service-disabled females. Service-disabled females also exhibit lower self-employment percentages than service-disabled males, and non-service-disabled females exhibit lower self-employment rates than non-service-disabled men.

Table 4 below is constructed in the same manner as Table 3. It displays employment and self-employment results by self-identified ethnic/racial group.

²² Note that in three of the four age summations by gender, female veterans are *more* likely to work than male veterans, in terms of absolute numbers. This is due to composition effects such that, when all age cohorts are totaled, larger numbers of male veterans in older age cohorts offset the absolute numbers of female veterans in younger age cohorts.

Table 4: Employment by Self-Identified Ethnic/Racial Group

Service-Disabled Veterans							
	Age Group	March CPS			CPS Veterans Supplements		
		Not Employed	Self-Employed	Other Employed	Not Employed	Self-Employed	Other Employed
Black	<30	44.6%	0.0%	55.4%	21.1%	8.1%	70.8%
	30-<40	46.0%	3.8%	50.3%	31.3%	0.0%	68.7%
	40-<50	47.9%	1.5%	50.6%	40.1%	4.5%	55.4%
	50-<60	64.4%	1.1%	34.5%	57.1%	2.7%	40.2%
	60+	89.1%	2.4%	8.5%	88.3%	0.1%	11.6%
	All Blacks	66.2%	2.0%	31.8%	56.4%	2.3%	41.3%
Hispanic	<30	13.4%	0.0%	86.6%	13.4%	14.2%	72.4%
	30-<40	34.2%	1.4%	64.4%	33.2%	4.1%	62.7%
	40-<50	39.0%	7.7%	53.3%	29.6%	5.1%	65.3%
	50-<60	51.4%	2.7%	45.9%	44.1%	1.8%	54.1%
	60+	88.2%	1.8%	10.0%	85.2%	0.9%	13.8%
	All Hispanics	62.0%	3.4%	34.7%	52.4%	3.1%	44.4%
White / Asian / Other	<30	33.3%	2.2%	64.5%	22.4%	2.8%	74.8%
	30-<40	27.1%	4.6%	68.3%	24.2%	5.9%	69.9%
	40-<50	33.1%	6.6%	60.3%	31.5%	6.6%	61.9%
	50-<60	43.3%	7.0%	49.7%	39.1%	9.0%	51.9%
	60+	87.8%	2.9%	9.3%	89.4%	3.1%	7.6%
	All W / A / O	63.6%	4.5%	31.9%	60.4%	5.2%	34.3%
ALL	ALL	63.8%	4.2%	32.0%	59.7%	4.8%	35.6%
Non-Service-Disabled Veterans							
	Age Group	March CPS			CPS Veterans Supplements		
		Not Employed	Self-Employed	Other Employed	Not Employed	Self-Employed	Other Employed
Black	<30	31.0%	1.5%	67.5%	24.2%	0.5%	75.3%
	30-<40	24.0%	2.5%	73.6%	19.1%	3.2%	77.7%
	40-<50	23.7%	3.8%	72.6%	25.3%	4.8%	69.9%
	50-<60	34.0%	3.9%	62.1%	29.2%	5.6%	65.2%
	60+	79.2%	2.6%	18.2%	82.1%	2.5%	15.4%
	All Blacks	42.3%	3.0%	54.7%	41.5%	3.6%	55.0%
Hispanic	<30	23.8%	2.3%	73.9%	21.0%	1.8%	77.2%
	30-<40	17.9%	4.1%	78.0%	14.8%	6.6%	78.6%
	40-<50	17.5%	6.7%	75.8%	21.3%	8.3%	70.4%
	50-<60	25.4%	8.7%	65.9%	26.6%	8.9%	64.5%
	60+	77.1%	4.3%	18.5%	77.7%	4.1%	18.2%
	All Hispanics	36.8%	5.5%	57.7%	39.0%	6.2%	54.8%
White / Asian / Other	<30	21.9%	3.2%	74.9%	17.5%	3.0%	79.6%
	30-<40	16.2%	7.0%	76.8%	15.5%	6.8%	77.7%
	40-<50	15.4%	10.9%	73.7%	17.6%	10.1%	72.4%
	50-<60	23.2%	13.1%	63.7%	25.0%	12.8%	62.2%
	60+	78.1%	6.1%	15.8%	79.3%	6.3%	14.5%
	All W/A/O	45.7%	8.5%	45.8%	48.8%	8.3%	42.9%
ALL	ALL	45.1%	7.9%	47.0%	47.7%	7.8%	44.5%

As shown in Table 4, for most age cohorts the percentage of service-disabled blacks who are not employed is higher in the March CPS data than the corresponding statistics for Hispanics, or those for whites and other racial/ethnic categories. The exception to this is for veterans 60 years of age or older, where employment percentages are similar across groups. Hispanics appear to have slightly lower rates of employment when compared with the whites/Asians/others group, but these rates are about equal for those over the age of 60. Self-employment percentages are difficult to evaluate across age groups and ethnic groups due to the small number of observations in some cells. The overall percentages indicate that both black and Hispanic veterans are less likely to be self-employed than other veterans.

Turning to the CPS Veterans Supplement percentages for service-disabled veterans, these results are broadly similar to the March CPS results, but black employment percentages appear higher in this sample for blacks less than 60 years of age. Self-employment results for service-disabled veterans are difficult to compare between groups due to the smaller number of veterans who both belong to racial/ethnic minorities and are service-disabled. Overall averages by racial/ethnic group appear consistent across samples.

In the March CPS results for non-service-disabled veterans, Hispanics and whites/Asians/others have higher employment percentages than blacks, except for those veterans who are 60 years of age or older, for whom employment rates are similar across groups. Hispanics show a slightly lower employment rate than whites/Asians/others, again with the exception of those individuals over the age of 60. Self-employment percentages in the March CPS for non-service-disabled veterans are lowest for blacks, followed by Hispanics. Whites/Asians/others have the highest self-employment percentages.

The results observed for non-service-disabled veterans in the CPS Veterans Supplement sample are broadly consistent with those observed in the March CPS. As in the case of service-disabled veterans, blacks under the age of 40 appear to have higher employment rates in the Veterans Supplements versus the March CPS, and overall self-employment percentages for blacks appear to be slightly higher in the Veteran Supplement vs. the March CPS for black veterans.

Computer and Internet Technology and its Relationship to Service-Disabled Veteran Entrepreneurship

The use of computer technology offers disabled individuals opportunities for entrepreneurship in new industries and in industries they might not have chosen in earlier decades. In this section we present tabular statistics regarding the effects of computer ownership on self-employment outcomes for service-disabled and non-service-disabled veterans. We expect that if computer technology assists service-disabled veterans with employment outcomes, especially self-employment, that service-disabled veterans should be employed at higher rates if they have access to a computer. We examine both the overall level of veteran employment and levels of self-employment to determine whether computer ownership increases the number of veterans who are employed or increases the number of employed veterans who are self-employed or both.

The CPS Computer and Internet Use Survey (CIUS) was administered in various months in 1994, 1997, 1998, 2000, 2001, and 2003. This survey does not include specific questions directed towards veteran disability status and entrepreneurship. However, due to the structure of the CPS, we were able to match respondents to the CIUS with respondents to CPS Veterans Supplement surveys based on identifying information in the surveys. This

matching was accomplished using methods described by Madrian and Lefgren (1999).²³ By far the most complete and useful match occurred in 2001, when the Veterans Supplement and CIUS were administered in August and September, respectively. This survey pair resulted in the largest number of matched veterans and only a small number of spoiled records due to inconsistent data identified after the match. We focus here exclusively on this dataset due to its superior quality.

Table 5: Computer Ownership and Employment Status

Service-Disabled Veterans			
Year	CIUS / Veterans Supplement		
	Not Employed	Self-Employed	Other Employed
Computer User	42.3%	7.2%	50.6%
Non-Computer User	75.7%	3.0%	21.3%
ALL	57.7%	5.2%	37.1%
Non-Service-Disabled Veterans			
Year	CIUS / Veterans Supplement		
	Not Employed	Self-Employed	Other Employed
Computer User	35.9%	10.1%	54.0%
Non-Computer User	61.3%	5.3%	33.5%
ALL	47.9%	7.8%	44.3%

As shown above, employment percentages are higher for veterans who have access to computers, both for service-disabled and non-service-disabled veterans. Also, rates of self-employment are higher for those who have a computer in the home versus those that do not.

It is important to note that the table above and the econometric models that follow do not distinguish the direction of causality between computer ownership and labor force participation or self-employment. For instance, labor force participation may increase an individual's likelihood of computer ownership because workers may be better able to afford a computer than those without an income from employment. Conversely, not owning a computer may increase an individual's chances of not working, as it may be true that individuals who do not own computers lack certain technological skills that facilitate employment. It is also possible that there are additional factors that affect both computer ownership rates and employment, such as demographic characteristics, as discussed below.

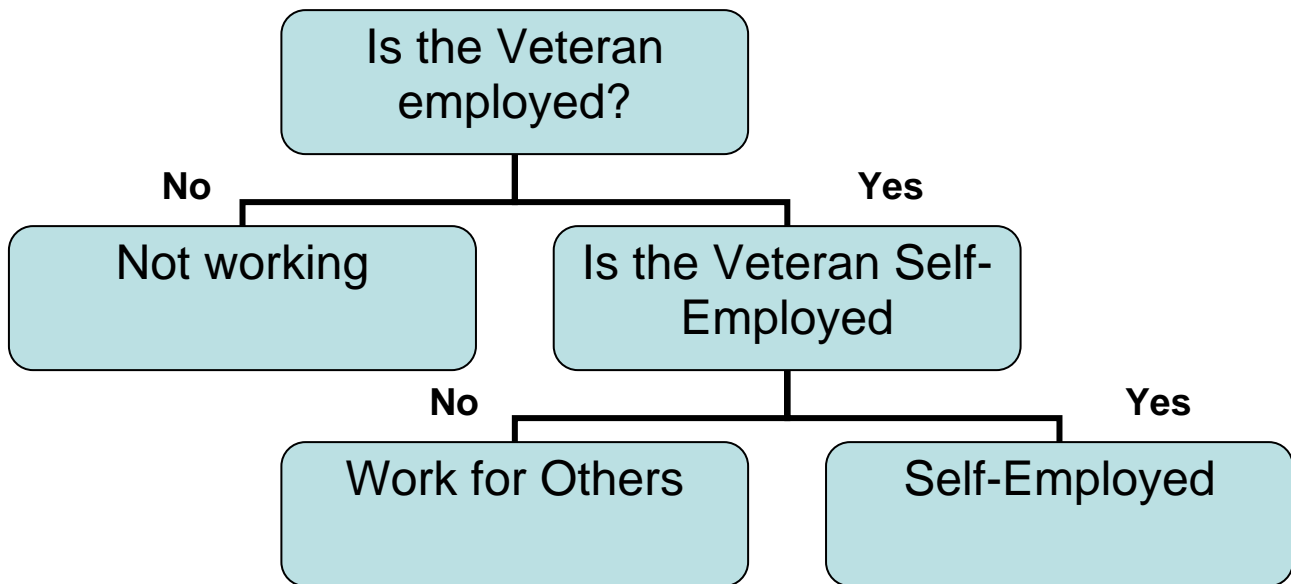
²³ Madrian, Brigette C., and Lars John Lefgren.; "A Note on Longitudinally Matching Current Population Survey (CPS) Respondents"; National Bureau of Economic Research Technical Working Paper 247, 1999. This paper can be accessed at <http://www.nber.org/>.

Section 3: Econometric Modeling

The previous section of this paper presented a tabular analysis of the employment and self-employment outcomes achieved by veterans, both service-disabled and non-service disabled. This section formalizes that earlier analysis through the use of an econometric model that captures all of the factors examined above in a system of two related equations. The goal of this section is to confirm the insights presented in the tables above by presenting simultaneously estimated coefficients that summarize their effects while providing standardized hypothesis tests that may be used to determine their statistical validity. The econometric model is also used in the simulation section that follows in order to provide an assessment of the economic importance of the factors we examine.

We model the self-employment decision as a two-step process. In the first step, the veteran decides whether or not to pursue employment, either working for someone else or as a self-employed person.²⁴ As a second step, veterans who have decided to take a job then decide whether to work for someone else or work for themselves.

Figure 1: Self-Employment Decision Tree



The decision tree for the model therefore appears above. In order to investigate the effects of service-related disability and other factors on veteran entrepreneurship, we have created bivariate probit models for a total of eleven datasets. Five of these datasets are drawn from the CPS Veterans Supplements for 1995, 1997, 1999, 2001 and 2003. The rest were drawn from the March CPS. The following variables were used in the regression equations:

²⁴ The definition of labor force participation typically includes some individuals who might not be working at a particular time as participating in the labor force. For instance, veterans who are actively looking for a job would be classified as labor force participants in typical studies. Here we follow the definition of labor force participation used in earlier research on self-employment sponsored by the SBA and include only workers in the count of labor force participants.

Table 6: Variables Used in Econometric Models

Variable Name	Description
SERV_DISABLED	(0/1) Whether the veteran answered affirmatively to the service-connected disability question on the Veteran Supplement.
BLACK	(0/1) Self-identified ethnic/racial category = 1 if Black; = 0 otherwise.
HISPANIC	(0/1) Self-identified ethnic/racial category = 1 if Hispanic, = 0 otherwise.
FEMALE	(0/1) =1 if the veteran is female
AGE	Age of the veteran (in years) during the survey year
AGE_60	(0/AGE) = AGE if the veteran is 60 years of age or older, = 0 otherwise.
SCM_SE_RATE	Local self-employment rate for non-veterans
SCM_LF RATE	Local labor-force participation rate for non-veterans
COMPUTER_USE	(0/1) =1 if the veteran has access to a computer in the survey household, =0 otherwise
SD_COMPUTER	(0/1) =1 if veteran identifies a service-connected-disability AND COMPUTER_USE=1.

As shown in Table 6, the econometric models include indicator variables capturing self-identification as black or Hispanic, with the omitted category comprising the white/Asian/other group; a dummy variable capturing the gender of the veteran; and two variables to represent the age of the veteran, one of which captures potentially increasing or decreasing effects of age on behavior at or near the typical age of retirement. The econometric models also include an indicator variable for whether the veteran reported a service-connected disability. The demographic variables used in the regressions are described in the same manner as the variables used for the descriptive statistics, above. Omitted categories for self-identified ethnic or racial identity include white/Asian/other.

The formulation of the AGE and AGE_60 variable is intended to capture the effects of age on retirement choice and to allow for differential rates of retirement among the self-employed. Age 60 was chosen as the first year for the potential onset of retirement based on an examination of retirement rates in the raw data. The AGE_60 variable will capture changes to labor-force participation rates in addition to the changes explained by the variable AGE (i.e., if $AGE_60 = 0.5 * AGE$, then the effect of an additional year of age on labor force participation propensity is 150 percent as great at 60 and beyond). The interpretation of these coefficients on self-employment propensity must take into account that the self-employment decision is conditional on the labor-force participation decision. Therefore, AGE and AGE_60 will have positive coefficients if self-employment becomes *relatively* more attractive as the veteran grows older.

The demographic characteristics described above could be expected to have an effect on both the labor-force participation decision and on the self-employment decision. In order to improve identification of the effects of the variables of interest, we create two additional variables, one of which is included in the equation for labor-force participation, and one of which is included in the equation for self-employment. The variable included in the labor-force participation equation is an estimate of the percentage of non-veterans in the veteran's local area that are self-employed or working for others. This estimate is obtained by using the data on non-veterans available in the CPS for the same month that the

observation on the veteran was generated. For the self-employment equation, we include a variable capturing the percentage of labor-force participants who are self-employed in the veteran's locale in the month investigated. As in the case of labor-force participation, the definition of self-employment is the same for non-veterans as it is for veterans. We would expect that the coefficients on both of these variables would be positive in sign, indicating that they are proxies for the health of the local economy and local variation in the factors that contribute to the ease of starting or continuing a small business. Given that these variables are included solely for the purpose of improving estimation quality, we do not investigate the results in depth below.

The final two variables in Table 6 are designed to identify correlations between service-disabled veteran status, availability of home computer technology, and the choice of self-employment by service-disabled and non-service-disabled veterans. In order to identify those veterans who have access to a computer, we use supplemental information from the CPS survey on Internet Use and Computer Ownership that was administered in September of 2001. This survey supplement examined the extent to which individuals interviewed for the CPS used a computer for their work or leisure activities and the extent to which they took part in the use of the Internet. This survey supplement included the following question:

'Is there a computer or laptop in this household?'

We use the results of this question to construct an indicator variable for whether the respondent reports having a computer available for use. The variable SD_COMPUTER is an interaction variable that is equal to one for service-disabled veterans who have access to a computer and zero otherwise. This variable may be used to determine if there are differential effects of technology on service-disabled versus non-service-disabled veterans.

Table 7 below presents the results of four bivariate probit models. The column labeled "CPS Veteran" presents the results obtained by pooling data for veterans interviewed as part of the CPS Veterans Supplements. The column labeled "March CPS" presents results obtained for veterans identified in March CPS sample months for the same years in which data was obtained for the Veterans Supplements, i.e., 1995, 1997, 1999, 2001 and 2003. The two columns labeled "CIUS" and "CIUS 2" present results for the matched 2001 Veterans Supplement and CIUS supplements. The first CIUS column presents results for a model of the same form as the Veteran and March models, while the CIUS 2 model includes data for computer use that is unavailable in the overall Veteran and March samples.²⁵

²⁵ Preliminary results estimated for each survey month independently did not reveal substantial differences obtained from each of the six CPS Veteran datasets or March CPS datasets. As a result, we present the pooled results.

Table 7: Econometric Modeling Results ²⁶

	CPS Veteran	March CPS	CIUS	CIUS 2
Self-Employment				
SE_RATE	0.0287 (0.00264)	0.0255 (0.00305)	0.0315 (0.00783)	0.0325 (0.00793)
SERVICE_DISABLED	-0.0884 (0.0676)	-0.232 (0.0659)	-0.190 (0.104)	-0.193 (0.283)
BLACK	-0.376 (0.0542)	-0.553 (0.0499)	-0.348 (0.108)	-0.297 (0.109)
HISPANIC	-0.174 (0.0645)	-0.244 (0.0498)	-0.272 (0.161)	-0.228 (0.165)
AGE	0.0254 (0.00327)	0.0232 (0.00217)	0.0184 (0.00432)	0.0198 (0.00437)
AGE_60	0.00141 (0.00271)	-0.000975 (0.00186)	-0.00427 (0.00279)	-0.00364 (0.00283)
FEMALE	-0.273 (0.0882)	-0.327 (0.0687)	-0.503 (0.163)	-0.495 (0.165)
COMPUTER_USER	---	---	---	0.283 (0.0681)
SERVICE_DISABLED_COMPUTER_USER	---	---	---	-0.00637 (0.302)
INTERCEPT	-2.62 (0.0917)	-2.55 (0.0855)	-2.45 (0.221)	-2.75 (0.220)
Labor Force Participation				
LFP_RATE	0.0164 (0.00122)	0.0153 (0.00108)	0.0132 (0.00341)	0.0115 (0.00339)
SERVICE_DISABLED	-0.393 (0.0239)	-0.394 (0.0315)	-0.290 (0.0594)	-0.470 (0.108)
BLACK	-0.204 (0.0248)	-0.251 (0.0251)	-0.136 (0.0667)	-0.0639 (0.0670)
HISPANIC	-0.0703 (0.0418)	-0.0041892 (0.0308)	-0.0638 (0.103)	-0.0304 (0.103)
AGE	-0.0273 (0.00104)	-0.0232 (0.000985)	-0.0274 (0.00278)	-0.0257 (0.00277)
AGE_60	-0.0152 (0.000384)	-0.0166 (0.000374)	-0.0158 (0.00102)	-0.0153 (0.00101)
FEMALE	-0.517 (0.0323)	-0.484 (0.0310)	-0.534 (0.0873)	-0.528 (0.0865)
COMPUTER_USER	---	---	---	0.325 (0.0393)
SERVICE_DISABLED_COMPUTER_USER	---	---	---	0.253 -0.131
INTERCEPT	1.20 (0.0871)	1.05 (0.0786)	1.43 (0.248)	1.21 (0.246)
Correlation				
RHO	0.00613 (0.247)	0.215 (0.158)	0.471 (0.220)	0.451 (0.234)
Observations				
Total	61432	64596	9131	9131
Censored	30188	31218	4487	4487
Uncensored	31244	33378	4644	4644

²⁶ Coefficients that are significant at the 5 percent level are indicated in bold text.

Model CPS Veteran: Coefficient Results

Employment Effects

Turning to the coefficients estimated for the CPS Veteran model, we find that the presence of a service-connected disability is highly correlated with lower levels of employment. This result is similar to that found in Table 2, where we found that more service-disabled veterans were not employed compared to non-service-disabled veterans (59.6 percent vs. 47.8 percent, respectively).

As shown in Tables 2, 3 and 4, employment rates are lower for veterans as they get older, with a more rapid decrease in employment past the age of sixty, as indicated by the negative coefficients on AGE and AGE_60. This effect is similar to that found in Table 2, where the average age of veterans is correlated with lower employment rates for non-service-disabled veterans, although this effect is less clear in the tabulations for service-disabled veterans. The negative coefficient on AGE_60 indicates that there is an increased effect of additional years of age on employment past the age of 60, which captures increasing retirements at that point and beyond. The negative and statistically significant coefficients on BLACK, and FEMALE show that demographic characteristics also play a role in veteran employment levels, while the coefficient on HISPANIC is not statistically significant. Veterans who are female or black are statistically less likely to be employed than other veterans, as observed in Tables 3 and 4, respectively.

Finally, the variable LFP_RATE, which captures the employment rate of non-veterans in the respondent's local area, is positively correlated with veteran employment, indicating that improved local labor market outcomes benefit veterans as well as non-veterans.

Self-Employment Choice

We next turn to the estimated effects of the included covariates on the self-employment levels of veterans who are employed. The same variables are included in this simultaneously-estimated equation, with the exception of SE_RATE, which captures the veteran's local rate of self-employment among the employed.

In contrast to the employment equation, service-connected disability does not appear to be as strongly linked statistically to lower rates of self-employment, although it does have the expected sign. This shows a similar effect to that observed in Table 2, but does not establish statistical significance. The simulation results for the CPS Veteran model, presented in the following section, will estimate the economic impact of this factor on self-employment rates.

The demographic variables included in the equation for self-employment (BLACK, HISPANIC, and FEMALE) are statistically significant, and their coefficients are negative in sign indicating that each of these factors is correlated with lower rates of self-employment among veterans, as shown in Tables 3 and 4.

Age affects the self-employment decision differently than it does the decision to be employed. In the self-employment equation, AGE is positive in sign and statistically significant, while AGE_60 is not statistically significant. This pattern of coefficients indicates that while employment rates are negatively affected by an additional year of age, self-employment rates for those who remain employed are higher with each additional year of age. This means that, as veterans age, self-employment becomes a relatively more important mode of employment.

Model March CPS: Sensitivity Testing of Disability Definitions

As described earlier in this paper, we have developed two definitions of service-connected disability in order to test the sensitivity of our results to the method used to identify service-disabled veterans. Results for the “March CPS” model shown in the second column of coefficients were estimated over datasets of a similar size and composition to those estimated in the “CPS Veteran” column. Data were drawn from the March CPS in the same years as CPS Veteran Supplement data were made available. The total number of observations is nearly identical between the March CPS and CPS Veteran models (64,596 vs. 61,432 observations, respectively), as are the estimated levels of overall employment, which are slightly above 50 percent for both models.

The coefficient estimates produced by the March CPS model support the assertion that the definition of service-connected disability is not a determinant of the results found in the CPS Veteran model, with one potential exception. For the employment equation, the signs, statistical significance, and magnitudes of all of the coefficients of the March CPS model are very close to the results produced by the CPS Veteran model, even though both models were estimated independently. This provides strong confirmation that the effects of the included factors do not depend on the definition of disability insofar as the employment estimates are concerned. The coefficients on the self-employment equation in the March CPS model exhibit the same pattern of sign, significance and magnitude as those in the CPS Veteran model, with the exception of the coefficient on `SERVICE_DISABLED`, capturing the effects of service-connected disabilities.

The effect of service-connected disability on self-employment is negative in both the CPS Veteran and March CPS models, but in the March CPS model the coefficient on this variable is statistically significant at the 5 percent level and larger in magnitude. As described in the table statistics presented earlier, the March CPS definition of disability, which is based on the receipt of disability benefits, identifies a smaller fraction of veterans as service-disabled. As veterans with lower levels of disability receive smaller levels of benefits (if any), the financial definition of service-connected disability is likely to identify those veterans with more severe levels of disability in comparison to the indicator variable. If the magnitude of disability is a significant predictor of self-employment, this could explain the difference in coefficient estimates.

Models CIUS and CIUS2: Incorporating Computer Use

Models CIUS and CIUS2 are estimated over the sample obtained by matching veteran respondents to the August 2001 Veterans Supplement with respondents to the September 2001 Computer and Internet Use Supplement. As a result, the total number of observations obtained for this model is significantly smaller than for the March CPS and CPS Veteran models, with data collected on 9,131 veterans, of whom 4,644 were employed.

As a first step, we investigate the results for the CIUS model, which displays the results for the matched sample without additional variables capturing computer use. This model is intended to uncover any differences between the results for the CIUS sample and the March CPS and CPS Veteran samples that might be indicative of changes to sample composition due to the month-to-month matching process.

CIUS Employment

As shown in the CIUS column, it appears that the overall pattern of significance and magnitude for the coefficients appears similar to the earlier CPS Veterans Supplement regressions and the corresponding results obtained using both the Veterans Supplements and the March CPS. Turning first to employment, the local rate of employment by non-veterans again is a highly statistically significant predictor of veteran employment.

Service-connected disability is again correlated with lower levels of employment and is highly statistically significant beyond the 1 percent level. Veterans who self-identify as black are less likely to be employed veterans than whites and Asians, while Hispanics do not have a statistically significant difference in their level of employment versus that of whites. Age is negatively correlated with employment, with a slight decrease in the decline in employment following age 60. Finally, as in the CPS Veteran and March CPS models, female veterans are much less likely to be labor-force participants than male veterans.

CIUS Self-Employment

The self-employment choices of veterans who are employed appear to be affected by the same variables in the CIUS model that were found to be statistically significant in the March CPS and CPS Veteran models. The local rate of self-employment for employed non-veterans is again positively correlated with the rate of self-employment among employed veterans and is highly statistically significant. Females are much less likely to be self-employed than males, and this effect is highly statistically significant. Likewise, black labor-force participants are much less likely to be self-employed than whites, and this effect is highly statistically significant. Hispanic employed veterans appear to be less likely to be self-employed, but this finding is only weakly statistically significant at approximately the 10 percent level, a difference from the earlier models that could be explained in part by the much smaller sample used to estimate the CIUS model. As in the case with the Veterans Supplement and March CPS models, it appears that age has a differential effect on self-employment, with older individuals more likely to choose self-employment, conditional on employment.

As in the CPS Veteran model, service-connected disability does not appear to be a statistically significant influence on self-employment, although it is similar in magnitude and sign to the results obtained in that model. In part this could be due to an increase in the standard errors on the coefficient estimates, based on a reduction in the overall sample size by a factor of at least four, which has the effect of doubling the size of the expected standard errors in the CIUS model versus the March CPS and CPS Veteran models.

Model CIUS2

The CIUS 2 model presents model results for the matched sample incorporating the indicator variables for computer ownership and the interaction between service-connected disability and computer ownership. These results broadly echo the statistics presented in Table 5, while controlling for the demographic factors as is done in the other models.

Employment

First, computer use appears to be a highly statistically significant predictor of employment. Veterans who have a computer in their household are much more likely to be self-employed than those who do not have a computer at home. Furthermore, it appears that the employment of service-disabled veterans is more heavily correlated to computer ownership than that of non-service-disabled veterans, with service-disabled veterans exhibiting an additional positive and statistically significant employment effect related to computer use.

With regard to the remaining covariates that are common to all four models, employment follows the same pattern of statistically significant coefficients and magnitudes as found in the CIUS model, with one notable difference found in the demographic variables. In the CIUS model (without indicator variables for computer use), with statistical significance blacks were less likely than whites/Asians to be employed veterans. This effect is not significant in the CIUS 2 model, where computer use is explicitly modeled. This suggests that there is a correlation between computer use and self-identified ethnic category.

Self-Employment

Turning to self-employment probabilities for employed veterans, the CIUS 2 model shows a similar pattern of significant predictors when compared to the other models displayed. As is the case in the CPS Veteran and CIUS models, service-connected disability is not correlated to lower rates of self-employment with statistical significance. However, unlike the observation of the CIUS 2 employment equation in the preceding section, those who self-identify as black veterans remain with statistical significance less likely to be self-employed than those who self-identify as white or Asian. Computer ownership is a significant predictor of self-employment for veterans who are employed, but there does not appear to be a statistically significant difference in this effect between service-disabled veterans and non-service-disabled veterans.

Section 4: Simulation Results

The econometric models presented above provide estimates of the directions and magnitudes of the effects of various factors on the propensity for veterans to be employed and for employed veterans to be self-employed. These coefficient estimates and hypothesis tests provide evidence of the *statistical* significance of demographic and other factors as potential influences on the employment choices of veterans, both service-disabled and non-service-disabled. In order to gauge the economic impact of these factors, the econometric models can be used to predict levels of employment and self-employment that would occur if there were changes to the covariates we examined in Section 3.

This section presents simulations for a variety of scenarios intended to illustrate the sensitivity of the model to changes in parameters that reflect potential policy approaches to promotion of entrepreneurship among service-disabled veterans. The scenarios examined include the following:

Table 8: Scenario Descriptions

Scenario	Description
Actual	Observed weighted levels of labor force participation and self-employment
Predicted	In-sample predictions of levels of labor force participation and self-employment
Scenario I	Simulate employment and self-employment effects of service-connected disabilities
Scenario II	Simulate self-employment effects only of service-connected disabilities
Scenario III	Simulate results of all service-disabled veterans having computers in the household

In order to provide a test of the robustness of the simulation results, Scenarios I and II are implemented over all four of the models. Scenario III relies on data from the CIUS that is only available in one model that incorporates that data. As a result, we report simulation results for that model only for Scenario III.

Calibrating the Model: Predicted versus Actual Levels of Veteran Labor Market Activity

The first step in a simulation analysis of this kind is to benchmark the performance of the model versus what is observed in the data that generated the coefficients. The results predicted by the model should be close to what is observed, as these coefficients have been chosen for that purpose.

Turning first to the simulation results for the CPS Veterans Supplements, **we find that the model predicts levels of veteran labor force participation and self-employment to within 0.1 percent of their actual values for each of the three models.** This is an in-sample prediction, so this level of consistency should be expected, as the parameter estimates have been chosen to produce overall results that are close to the averages found in the sample. Based on a comparison of these predictions with predictions obtained from changing the characteristics of the sample and then recreating the predicted levels of these outcome variables, we can assess the relative economic importance of various factors that could be influenced by policy towards veteran entrepreneurship.

Scenario I: Effects of Service-Connected Disabilities on Veteran Employment and Self-Employment

The first simulation we perform is to determine what the overall predicted impact of service-connected disabilities is on the population of veteran entrepreneurs who pursue self-employment. The first scenario measures the combined impact of service-connected disabilities on labor force participation and on the choice of self-employment for those service-disabled veterans who are labor force participants. Service-connected disability is strongly correlated with lower labor force participation rates in the CPS Veterans Supplement model. It is not a statistically significant predictor of self-employment decisions, but the sign and magnitude of the coefficient in that model indicate that it could be an economically significant predictor of self-employment activity.

Table 9: Predicted versus Actual Simulation Results

CPS Veteran Model						
	Service-Disabled Veterans			Non-Service-Disabled Veterans		
	Not Employed	Self-Employed	Other Employed	Not Employed	Self-Employed	Other Employed
Actual	59.6%	4.8%	35.5%	47.7%	7.8%	44.5%
Predicted	59.7%	4.8%	35.5%	47.9%	7.8%	44.2%
Difference	0.0%	0.0%	0.1%	-0.2%	0.0%	0.3%
March CPS Model						
	Service-Disabled Veterans			Non-Service-Disabled Veterans		
	Not Employed	Self-Employed	Other Employed	Not Employed	Self-Employed	Other Employed
Actual	63.3%	3.7%	32.9%	48.0%	7.1%	44.9%
Predicted	63.2%	3.7%	33.1%	48.2%	7.2%	44.6%
Difference	0.1%	0.0%	-0.2%	-0.2%	-0.1%	0.3%
CIUS 2 Model						
	Service-Disabled Veterans			Non-Service-Disabled Veterans		
	Not Employed	Self-Employed	Other Employed	Not Employed	Self-Employed	Other Employed
Actual	53.7%	4.6%	41.6%	48.5%	6.9%	44.5%
Predicted	53.8%	4.7%	41.6%	48.8%	7.0%	44.2%
Difference	0.0%	-0.1%	0.1%	-0.2%	-0.1%	0.3%

As shown in Table 9, the predicted versus actual rates of employment, self-employment and other employment for both service-disabled and non-service-disabled veterans are very close for each of the models investigated.²⁷

The tabulations and econometric models presented in Sections 2 and 3 have illustrated that there is a connection between service-connected disabilities and the employment rate of veterans. There is also an observed effect of service-connected disability on self-employment choice, although the statistical significance of this effect is not established in all econometric models shown above.

²⁷ To simplify the presentation we have not included the CIUS model.

The first set of simulations removes service-connected disability as a potential cause for lower levels of employment and self-employment. In effect, this simulation is an exploration of what the expected statistical results would be if there were no effects of service-connected disability on employment or self-employment. The results of the simulation therefore reflect only differences in underlying demographic and environmental characteristics between service-disabled veterans and other veterans. Table 10 illustrates the changes to the expected level of employment and self-employment among veterans with service-connected disabilities.

Table 10: Scenario I -- Effects of Service-Connected Disabilities on Veteran Employment and Self-Employment

CPS Veteran Model						
	Service-Disabled Veterans			Non-Service-Disabled Veterans		
	Not Employed	Self-Employed	Other Employed	Not Employed	Self-Employed	Other Employed
Base	59.7%	4.8%	35.5%	47.9%	7.8%	44.2%
Scenario I	49.3%	7.6%	43.2%	47.9%	7.8%	44.2%
Difference	-10.4%	2.7%	7.7%	0.0%	0.0%	0.0%
March CPS Model						
	Service-Disabled Veterans			Non-Service-Disabled Veterans		
	Not Employed	Self-Employed	Other Employed	Not Employed	Self-Employed	Other Employed
Base	63.2%	3.7%	33.1%	48.2%	7.2%	44.6%
Scenario I	52.7%	7.0%	40.3%	48.2%	7.2%	44.6%
Difference	-10.5%	3.3%	7.2%	0.0%	0.0%	0.0%
CIUS 2 Model						
	Service-Disabled Veterans			Non-Service-Disabled Veterans		
	Not Employed	Self-Employed	Other Employed	Not Employed	Self-Employed	Other Employed
Actual	53.8%	4.7%	41.6%	48.8%	7.0%	44.2%
Scenario I	42.3%	7.6%	50.2%	48.8%	7.0%	44.2%
Difference	-11.5%	2.9%	8.6%	0.0%	0.0%	0.0%

The results of the simulation for the CPS Veteran Supplement indicate that **when service-connected disability is removed as a factor in employment and self-employment choices, the resulting distributions of employment and self-employment are remarkably similar for service-disabled veterans and non-service-disabled veterans alike.** The simulations predict that veterans with service-connected disabilities would have an employment rate that would be over ten percentage points higher if service-connected disabilities did not interfere with employment. The predicted lower level of non-employment (49.3 percent) is almost exactly the level that would be predicted for non-service-disabled veterans (47.9 percent). This indicates that potentially correlated demographic or environmental factors play little or no role in the difference in employment rates between these groups, even though they are statistically significant predictors of employment outcomes. Furthermore, it appears that service-connected disabilities explain nearly all of the difference in entrepreneurial activity between service-disabled veterans and veterans in general. The predicted levels of self-employment among veterans with service-connected

disabilities would be 7.6 percent if these disabilities were not a barrier to employment and self-employment. This increase in self-employment of 2.7 percentage points results in a self-employment level that is very close to the self-employment level of 7.8 percent for the sample of non-service-disabled veterans.

The effects of service-connected disability appear to be robust to the “CPS Veterans” methodology for identifying individuals with service-connected disabilities. Using the “proxy” method for identifying veterans with service-connected disabilities with March CPS data, we again find that service-connected disabilities explain most of the differences in labor-force participation and self-employment rates between service-disabled and non-service-disabled veterans. Labor force participation again improves by ten percentage points in the simulated results. Self-employment percentages also increase by approximately 3 percent in the March results if service-connected disability is removed as a potential impediment. Similar results are observed in the matched 2001 Veteran Supplement and CIUS data.

Scenario II: Economic Impact of Service-Connected Disability on Self-Employment

The effects of service-connected disabilities impact the model results in two places: first in the overall labor-force participation rate, and then at the level of the self-employment/other employment decision. The second simulation investigates the extent to which self-employment by service-disabled veterans could be increased if only the decision of self-employment versus working for someone else could be addressed, with labor force participation remaining constant. Results for Scenario II are presented in Table 11 below.

Table 11: Scenario II -- Economic Impact of Service-Connected Disability on Self-Employment

CPS Veteran Model						
	Service-Disabled Veterans			Non-Service-Disabled Veterans		
	Not Employed	Self-Employed	Other Employed	Not Employed	Self-Employed	Other Employed
Actual	59.7%	4.8%	35.5%	47.9%	7.8%	44.2%
Predicted	59.7%	5.5%	34.8%	47.9%	7.8%	44.2%
Difference	0.0%	0.7%	-0.7%	0.0%	0.0%	0.0%
March CPS Model						
	Service-Disabled Veterans			Non-Service-Disabled Veterans		
	Not Employed	Self-Employed	Other Employed	Not Employed	Self-Employed	Other Employed
Actual	63.2%	3.7%	33.1%	48.2%	7.2%	44.6%
Predicted	63.2%	5.3%	31.5%	48.2%	7.2%	44.6%
Difference	0.0%	1.6%	-1.6%	0.0%	0.0%	0.0%
CIUS 2 Model						
	Service-Disabled Veterans			Non-Service-Disabled Veterans		
	Not Employed	Self-Employed	Other Employed	Not Employed	Self-Employed	Other Employed
Actual	53.8%	4.7%	41.6%	48.8%	7.0%	44.2%
Predicted	53.8%	6.4%	39.8%	48.8%	7.0%	44.2%
Difference	0.0%	1.7%	-1.7%	0.0%	0.0%	0.0%

The CPS Veteran Supplement results for this simulation show that promotion of self-employment could shift self-employment percentages approximately one percentage point (0.7 percent). This change would result in a symmetrical reduction in the percentage of service-disabled veterans working for others. This result is also robust to the definition of service-connected disability and the model used, although the March CPS and matched CIUS models show slightly higher changes to the percent of veterans with service-connected disabilities choosing self-employment versus working for someone else.

Scenario II illustrates that more of the impact of service-connected disability on self-employment occurs due to impediments to labor force participation itself than due to impediments to self-employment for those who do work. This indicates that policies intended to target veteran self-employment among the service-disabled must not only address issues of self-employment, but must also address issues that prevent veterans with service-connected disabilities from participating in the labor market at all. One of these potential issues is access to and use of computer technology, which is investigated in Simulation III below.

Scenario III: Impact of Computer Technology on Veteran Self-Employment

Scenario III investigates the impact of computer technology on self-employment. As computer technology is only modeled in the matched 2001 Veterans Supplement/CIUS data, results are only available for that sample. In Scenario III, all service-disabled veterans who did not report having a computer in the household are assumed to have one. This will impact both labor force participation and self-employment propensity.

Table 12: Scenario III -- Computer Technology Used by All Service-Disabled Veterans

CIUS 2 Model						
	Service-Disabled Veterans			Non-Service-Disabled Veterans		
	Not Employed	Self-Employed	Other Employed	Not Employed	Self-Employed	Other Employed
Actual	53.8%	4.7%	41.6%	48.8%	7.0%	44.2%
Predicted	48.6%	5.8%	45.6%	48.8%	7.0%	44.2%
Difference	-5.2%	1.1%	4.0%	0.0%	0.0%	0.0%

Scenario III illustrates that an approximate increase of one percentage point in veteran self-employment could occur if all service-disabled veterans were computer owners. This represents an upper bound on the potential changes, as it does not take into consideration whether all veterans would be able to successfully use computers if they were available, and whether computer use is equally effective for all service-disabled veterans at increasing employment opportunities. There would be an expected four percentage point increase in the level of veterans with service-connected disabilities working for others.

It should be noted that Scenario III clearly illustrates that technological improvements do not appear to be a complete solution for bridging the gap between service-disabled veteran entrepreneurship and levels of self-employment observed for other veterans or for the population at large. The exploration of the prospective effects of additional remedies to low service-disabled veteran self-employment should be an area for future research.

Section 5: Conclusions

We have examined the self-employment and entrepreneurship choices of veterans using multiple samples drawn from the Current Population Survey conducted by the U.S. Census Bureau. We may draw the following conclusions from the research presented above.

- **Substantially all of the difference between the self-employment rates of service-disabled veterans and other veterans may be ascribed to service-connected disabilities, and not to differences in demographic or other characteristics.** Controlling for the effects of service-connected disabilities results in nearly identical rates of labor-force participation among service-disabled veterans vis-à-vis those veterans without service-connected disabilities.
- **A substantial portion of the gap in self-employment levels between service-disabled veterans and veterans without service-connected disabilities is due to lower rates of employment in general, not to differential rates of self-employment for those who are employed.** Approximately one-half to two-thirds of this gap is explained by veterans with service-connected disabilities participating in the overall workforce at lower rates than veterans without service-connected disabilities.
- **Veterans with service-connected disabilities do not prefer self-employment to working for others. If anything, service-disabled veterans who do work choose to work for others at higher rates than non-service-disabled veterans who are employed.** This suggests that beneficial characteristics ascribed to self-employment, such as flexibility or proximity to home, are differentially less appealing to service-disabled veterans versus non-service-disabled veterans.
- **Computer technology is correlated with higher levels of employment among all veterans, and exhibits a greater positive effect on service-disabled veterans.** We do not examine whether computer ownership causes labor force participation or results from it, but other research using similar data suggests computer ownership is a cause for positive labor market outcomes.
- **Computer technology is correlated with higher self-employment rates among veterans.** However, both service-disabled veterans and non-service-disabled veterans exhibit an increased propensity to be self-employed if a computer is present in the home. There appears to be no difference in the magnitude of this effect between service-disabled and non-service-disabled veterans.

Finally, this study has shown the value and necessity of considering a multitude of factors when investigating veteran self-employment and entrepreneurship, especially among service-disabled veterans. By merging two successive months of CPS data from 2001, we were able to provide a dataset with information on both disability status and computer and Internet use. There is a statistically and practically significant interaction between these variables, but the CPS is not currently structured to gather data on them concurrently. Furthermore, our examination of the March CPS versus CPS Veterans Supplements indicates that service-connected disability benefits are not cleanly identified in any of the

March CPS samples we examined. Future research using the CPS would benefit greatly from a revision of the veteran supplement to address computer skills and training, as well as financial characteristics of veterans, in order to provide a more complete basis for studying veteran employment and entrepreneurship. Alternatively, additional questions on computer ownership and service-connected disability could be added to the March CPS.

Appendix I: Variables Used and Data Dictionaries

March CPS Supplements			
CPS Variable	Variable Description	Years Valid	Notes
A_SEX	Gender	1985-1994, 1996-2005	
PESEX	Gender	1995	
A_AGE	Age	1985-1994, 1996-2005	
PEAGE	Age	1995	
A_VET	Veteran Status	1985-1994, 1996-2005	Recoded in 1988 to allow women to claim veteran status
PEAFWHEN	Veteran Status	1995	
PRDTRACE	Race	2003-2005	Updated version of A_RACE to allow for multiple races
A_RACE	Race	1985-1994, 1996-2002	Recoded in 1989
PERACE	Race	1995	
PEHSPNON	Hispanic Origin Indicator	2003-2005	
A_REORGN	Hispanic Origin Indicator	1985-1994, 1996-2002	
PRORIGIN	Hispanic Origin Indicator	1995	
VET_TYP1	Receipt of Service-Disability Compensation	1985-2005	
A_CLSWKR	Class of Worker	1985-2005	
A_HRS1	Hours Worked in Reference Week	1985-1994, 1996-2005	
PEHRACTT	Hours Worked in Reference Week	1995	
PEIOIND	Industry Code	2003-2005	
A_IND	Industry Code	1985-1994, 1996-2002	Recoded in 1992
PEI01ICD	Industry Code	1995	
A_MJIND	Major Industry Code	1985-1994, 1996-2005	Recoded in 1988 and 2003
PRMJIND1	Major Industry Code	1995	
MARSUPWT	Final Sample Weight - March Supplement	1985-2005	

CPS Veteran Supplements			
CPS Variable	Variable Description	Years Valid	Notes
PESEX	Gender	1995-2003	
PRTAGE	Age	2003	
PEAGE	Age	1995-2001	
PEEDUCA	Highest Education Level	1005-2003	
PEAFWHEN	Veteran Status	1995-2003	
PTDTRACE	Race	2003	
PERACE	Race	1995-2001	
PEHSPNON	Hispanic Origin Indicator	2003	
PRORIGIN	Hispanic Origin Indicator	1995-2001	
PES4	VA or DoD Determined Service Disability	1995-2003	
PES7	Whether Service Disability Ever Affected Ability to Hold a Job	2001, 2003	
PES8 (post-2000)	Whether Service Disability Currently Affects Ability to Hold a Job	2003	Variable included in 2001 file, but all records have invalid entry
PES8 (pre-2000)	Whether Service Disability Ever Affected Ability to Hold a Job	1995-1999	
PES9	Whether Service Disability Currently Affects Ability to Hold a Job	1995-1999	
PES10	Year of Final Separation or Retirement from Service	2001, 2003	
PES11a	Whether Individual attended any TAP workshops	1999	
PES11a - PES11h	Whether Individual attended any TAP workshops	1995, 1997	
PES12 (post-2000)	Whether Individual attended any TAP workshops	2001, 2003	
PES12 (pre-2000)	Year of Final Separation or Retirement from Service	1995-1999	
PRS5	Service-Connected Disability Rating	1995-1999, 2003	Variable included in 2001 file, but all records have invalid entry
PEIO1COW	Class of Worker	1995-2003	
PEHRACT1	Hours Worked in Reference Week	1995-2003	
PEIO1ICD	Industry Code	1995-2003	
PRMJIND1	Major Industry Code	1995-2003	
PWSSWGT	Final Sample Weight	1995-2003	

Computer and Internet Usage Supplements			
CPS Variable	Variable Description	Years Valid	Notes
PESEX	Gender	1998-2001	
PEAGE	Age	1998-2001	
PEAFWHEN	Veteran Status	1998-2001	
PERACE	Race	1998-2001	
PRORIGIN	Hispanic Origin Indicator	1998-2001	
PEIO1COW	Class of Worker	1998-2001	
PEHRACT1	Hours Worked in Reference Week	1998-2001	
PEIO1ICD	Industry Code	1998-2001	
PRMJIND1	Major Industry Code	1998-2001	
PWSSWGT	Final Sample Weight	1998-2001	
HESC1	Computer Ownership	2001	
HESCU1A	Computer Ownership	1998-2000	

Variables Used to Match Records across Supplements		
CPS Variable	Variable Description	Supplements Valid
H_IDNUM	Household Identification Number	All Merged March Supplements
H_HHNUM	Household Number	All Merged March Supplements
A_LINENO	Individual Line Number	All Merged March Supplements
H_MIS	Household Month in Sample	All Merged March Supplements
HRHHID	Household Identification Number	All Merged CIUS and Veteran Supplements
HUHHNUM	Household Number	All Merged CIUS and Veteran Supplements
PULINENO	Individual Line Number	All Merged CIUS and Veteran Supplements
HRMIS	Household Month in Sample	All Merged CIUS and Veteran Supplements

Appendix II: Matching CPS Data

Following the methodology undertaken by Madrian and Lefgren (1999),²⁸ we matched respondents from the CIUS survey years to available survey results for the CPS Veteran Supplement or CPS March demographic survey months. First, the pattern of survey months was analyzed for each of the CIUS, Veteran Supplement and March CPS files. Certain of these files would have observations where data was gathered for the same individual in more than one of these survey months. This overlap would be based on the month in survey (MIS) for the respondent in each of the surveys compared. For instance, for the Dec 98 Computer Supplement, those who were MIS = 1 should be in both the March 99 file (with MIS = 4 in March 99) and March 00 (with MIS = 8 in March 00). Those with MIS = 2 or 3 in Dec 98 Supplement do not match any of our other files. Those with MIS = 4 match the Sept 99 Veteran Supplement (in which their MIS = 5), etc.

The overlapping files (e.g., Computer Supplement September 2001 and Veteran Supplement August 2001) were merged together based on household ID (H_IDNUM for March Supplements and HRHHID for Veterans and CIUS Supplements), person line number (A_LINENO for March Supplements and PULINENO for Veterans and CIUS Supplements), and household number (H_HHNUM for March Supplements and HUHHNUM for Veterans and CIUS Supplements), as described in Madrian and Lefgren. There are a number of “false” matches based on these three identifiers. In order to remove erroneous matches, we then compare the age, race, and sex reported in the two merged files. If any of the three variables change from survey to survey, it is considered a false match, and the record is deleted from the merged file. Race and gender must match exactly across records to be considered a match, while the ages stated in the two surveys must be no more than two years apart to be considered a match.

The largest matched set observations occurred between the August 2001 Veteran Supplement and the September 2001 CIUS. When combined, these yielded 102,863 matching cases based on the individual identifiers available in the CPS.²⁹ Inconsistencies in demographic information eliminated 736 of these matches, or less than 1 percent of the cases. A total of 9,153 veterans were found in the matched sample, 885 of whom were identified as having a service-connected disability based on the “direct” question asked in the August 2001 Veteran Supplement. The percent of veterans who report a service-connected disability is 8.8 percent, which is very close to the 9.1 percent expected for the “full” August 2001 sample, which indicates that the matching process did not result in a substantial change in the character of the sample with respect to service-connected disabilities.

²⁸ Madrian, Brigitte C., and Lars John Lefgren; *op. cit.*

²⁹ As part of our preliminary research we identified all potential pairs of CPS Veteran Supplements and CIUS supplements based on the structure of the CPS as described above. The match between August 2001 and September 2001 was preferred to any of the alternatives because this is the only instance in which the two supplements are implemented in successive months. This maximizes the number of veterans who appear in both samples while minimizing family composition changes and relocations that cause individuals to be found in one month but not in another.

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³⁰ All studies sponsored by SBA's Office of Advocacy can be accessed at <http://www.sba.gov/ADVO/research/veterans.html>.

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Appendix IV: “Standardized” Self-Employment Rates

As noted in Section 2, studies on self-employment and entrepreneurship often define a self-employment rate as the ratio of self-employed individuals to all individuals who are working (i.e., who are in the labor force). We depart from this “standard” usage in this study for the reasons explained in Section 2, and instead use in our analyses three categories of employment status: not employed, self-employed, and employed by others. However, to facilitate comparisons with other research, we include here three tables which display in a “standardized” format the percentage shares **within the veteran labor force** for those veterans who are self-employed and those who are employed by others. These three tables correspond with Tables 2, 3, and 4 in the main report.

Table 2A: “Standardized” Employment Rates for Service-Disabled and Non-Service-Disabled Veterans

Service-Disabled Veterans						
Year	March CPS			CPS Veterans Supplements		
	Self-Employed	Other Employed	Average Age	Self-Employed	Other Employed	Average Age
1988	13.7%	86.3%	57.0			
1989	15.3%	84.7%	57.5			
1990	14.5%	85.5%	57.6			
1991	13.5%	86.5%	58.0			
1992	12.6%	87.4%	58.6			
1993	16.0%	84.0%	59.2			
1994	17.6%	82.4%	59.8			
1995	13.0%	87.0%	59.0	13.7%	86.3%	58.0
1996	12.1%	87.9%	58.4			
1997	8.8%	91.2%	59.7	12.0%	88.0%	57.8
1998	7.4%	92.6%	58.9			
1999	10.4%	89.6%	59.0	14.1%	85.9%	58.3
2000	8.0%	92.0%	58.5			
2001	7.9%	92.1%	59.8	9.9%	90.1%	58.1
2002	8.4%	91.6%	57.4			
2003	10.2%	89.8%	57.0	9.5%	90.5%	59.6
2004	9.3%	90.7%	57.6			
2005	8.6%	91.4%	58.0			
MEAN	11.5%	88.5%	58.4	11.9%	88.1%	58.4
Non-Service-Disabled Veterans						
Year	March CPS			CPS Veterans Supplements		
	Self-Employed	Other Employed	Average Age	Self-Employed	Other Employed	Average Age
1988	14.8%	85.2%	52.1			
1989	15.5%	84.5%	52.5			
1990	15.2%	84.8%	53.2			
1991	15.5%	84.5%	53.7			
1992	15.2%	84.8%	53.9			
1993	15.5%	84.5%	54.6			
1994	14.7%	85.3%	54.9			
1995	14.4%	85.6%	55.4	16.2%	83.8%	55.4
1996	14.5%	85.5%	56.0			
1997	14.5%	85.5%	56.1	15.7%	84.3%	56.7
1998	13.8%	86.2%	56.5			
1999	12.8%	87.2%	57.0	14.3%	85.7%	57.5
2000	13.0%	87.0%	57.5			
2001	13.0%	87.0%	58.0	13.7%	86.3%	58.2
2002	12.6%	87.4%	56.4			
2003	13.5%	86.5%	56.9	13.9%	86.1%	59.4
2004	14.3%	85.7%	57.5			
2005	14.0%	86.0%	58.0			
MEAN	14.3%	85.7%	55.6	14.8%	85.2%	57.5

Table 3A: “Standardized” Demographic Characteristics and Their Effects on Veteran Self-Employment

Service-Disabled Veterans					
	Age Group	March CPS		Veterans Supplements	
		Self-Employed	Other Employed	Self-Employed	Other Employed
Males	<30	3.0%	97.0%	4.5%	95.5%
	30-<40	6.8%	93.2%	6.5%	93.5%
	40-<50	9.5%	90.5%	9.6%	90.4%
	50-<60	11.2%	88.8%	13.6%	86.4%
	60+	23.6%	76.4%	25.8%	74.2%
	All Males	11.9%	88.1%	12.2%	87.8%
Females	<30	1.5%	98.5%	10.3%	89.7%
	30-<40	2.2%	97.8%	7.2%	92.8%
	40-<50	4.7%	95.3%	4.9%	95.1%
	50-<60	20.0%	80.0%	0.0%	100.0%
	60+	34.5%	65.5%	45.6%	54.4%
	All Females	5.6%	94.4%	7.0%	93.0%
ALL	ALL	11.6%	88.4%	7.0%	93.0%
Non-Service-Disabled Veterans					
Year		March CPS		Veterans Supplements	
		Self-Employed	Other Employed	Self-Employed	Other Employed
Males	<30	3.8%	96.2%	3.2%	96.8%
	30-<40	7.5%	92.5%	7.6%	92.4%
	40-<50	12.2%	87.8%	11.6%	88.4%
	50-<60	16.3%	83.7%	16.4%	83.6%
	60+	26.8%	73.2%	29.3%	70.7%
	All Males	14.8%	85.2%	15.4%	84.6%
Females	<30	2.8%	97.2%	1.2%	98.8%
	30-<40	5.3%	94.7%	4.7%	95.3%
	40-<50	5.1%	94.9%	8.0%	92.0%
	50-<60	9.2%	90.8%	5.9%	94.1%
	60+	14.2%	85.8%	11.8%	88.2%
	All Females	5.8%	94.2%	5.9%	94.1%
ALL	ALL	14.3%	85.7%	14.9%	85.1%

Table 4A: “Standardized” Employment by Self-Identified Ethnic/Racial Group

Service-Disabled Veterans					
	Age Group	March CPS		Veterans Supplements	
		Self-Employed	Other Employed	Self-Employed	Other Employed
Black	<30	0.0%	100.0%	10.3%	89.7%
	30-<40	7.0%	93.0%	0.0%	100.0%
	40-<50	2.9%	97.1%	7.4%	92.6%
	50-<60	3.1%	96.9%	6.4%	93.6%
	60+	22.4%	77.6%	0.9%	99.1%
	All Blacks	5.9%	94.1%	5.3%	94.7%
Hispanic	<30	0.0%	100.0%	16.4%	83.6%
	30-<40	2.1%	97.9%	6.1%	93.9%
	40-<50	12.6%	87.4%	7.2%	92.8%
	50-<60	5.5%	94.5%	3.3%	96.7%
	60+	15.2%	84.8%	6.4%	93.6%
	All Hispanics	8.8%	91.2%	6.5%	93.5%
White / Asian / Other	<30	3.4%	96.6%	3.6%	96.4%
	30-<40	6.3%	93.7%	7.8%	92.2%
	40-<50	9.9%	90.1%	9.7%	90.3%
	50-<60	12.4%	87.6%	14.8%	85.2%
	60+	24.0%	76.0%	29.1%	70.9%
	All W / A / O	12.4%	87.6%	13.2%	86.8%
ALL	ALL	11.6%	88.4%	11.9%	88.1%
Non-Service-Disabled Veterans					
Year	Age Group	March CPS		Veterans Supplements	
		Self-Employed	Other Employed	Self-Employed	Other Employed
Black	<30	2.1%	97.9%	0.6%	99.4%
	30-<40	3.2%	96.8%	3.9%	96.1%
	40-<50	5.0%	95.0%	6.4%	93.6%
	50-<60	5.9%	94.1%	7.9%	92.1%
	60+	12.6%	87.4%	14.0%	86.0%
	All Blacks	5.1%	94.9%	6.1%	93.9%
Hispanic	<30	3.0%	97.0%	2.2%	97.8%
	30-<40	4.9%	95.1%	7.8%	92.2%
	40-<50	8.1%	91.9%	10.5%	89.5%
	50-<60	11.7%	88.3%	12.1%	87.9%
	60+	19.0%	81.0%	18.3%	81.7%
	All Hispanics	8.7%	91.3%	10.2%	89.8%
White / Asian / Other	<30	4.1%	95.9%	3.6%	96.4%
	30-<40	8.3%	91.7%	8.1%	91.9%
	40-<50	12.9%	87.1%	12.2%	87.8%
	50-<60	17.0%	83.0%	17.0%	83.0%
	60+	27.7%	72.3%	30.2%	69.8%
	All W / A / O	15.6%	84.4%	16.2%	83.8%
ALL	ALL	14.3%	85.7%	14.9%	85.1%

Appendix V: Additional Considerations

During the course of this research, the authors conferred with a number of professionals with extensive knowledge and experience relating to veterans entrepreneurship research, including staff in SBA's Office of Advocacy and SBA's Office of Veterans Business Development, representatives of veterans service organizations, and other researchers. These discussions raised several issues which, although beyond the scope this study, were sufficiently related to it that they could potentially impact our findings. We do not believe that these factors change the analyses presented in this paper, which are bounded by the methodology and parameters previously described, but we present them here as possible focal points for future research:

- **The variables available to create the disability index may differ across years** – in general, more complete information is available for later years. This effect is clearly seen when using income data from the March CPS to identify service-disabled veterans. Identification of those receiving disability benefits from the Department of Veterans Affairs (VA) is only possible from 1988 to present, which is a limitation of this work. Furthermore, the use of “direct” questions regarding service-connected disabilities is only possible for the five years in which CPS Veterans Supplement data is available. As a result, the use of these forms of service-disabled veteran identification is limited in the number of years that can be examined. Additional disability variables were examined as part of our preliminary analysis, such as the percentage of disability reported, but our initial examination of them did not yield better results than the simpler forms of identification which we employed.
- **The system of identifying the extent of service-related disabilities and determining the appropriate level of benefits to be provided due to them is complex and non-linear.** As a result, the creation of the disability index based on the amount of benefits received by a veteran does not necessarily have a one-to-one correspondence with the extent of disability. One way to address this issue would be to retrospectively apply VA rules for disability benefits to family structures over time to obtain the amount of funds the service-disabled veteran should receive, and compare that to the amount reported in the CPS. This would serve as a useful test of the accuracy of the reported data. However, the issues with omitted disability income is of much greater importance, as many veterans do not identify their disability benefits as service-connected, when in many cases they must be. As a result, the CPS Veterans Supplements appear to provide a much cleaner identification of individuals with service-connected disabilities.
- **Service-disabled veterans might choose self-employment for reasons other than monetary compensation.** While mainstream economic theory states that individuals will choose the form of employment that offers them the highest overall level of satisfaction, empirical researchers often will choose to use the wage rate or yearly level of compensation as a proxy for job satisfaction. In this case, such a proxy might be inappropriate. The measures used in this paper capture the outcomes chosen by veterans and service-disabled veterans, so this issue has a limited influence on the results presented here.

- **Health insurance and health status play a different role in the employment choices of service-disabled veterans when compared with the effect of these factors on the population as a whole.** Based on their level of disability (if any), their age, location and other factors, veterans may receive a substantial portion (or all) of their medical care from VA medical facilities. Because such medical coverage would be available whether or not self-employment was chosen, this could make the transition into self-employment easier for veterans vs. non-veterans. A comparative study of this possibility is beyond the scope of this research, as it would require an analysis of the self-employment choices of both veterans and non-veterans based on their health insurance and health profiles.
- **The definition and levels of disability for service-disabled veterans were developed in the mostly industrial economy of the middle and late 20th century.** Over the past fifty years, the service sector of the economy has grown rapidly, and such disability definitions might not be accurate measures of actual economic impairment today. Our research has found that computer ownership in the household is correlated with higher employment and self-employment rates among veterans, both service-disabled and non-service-disabled. This could have implications for both the empirical research presented here and for policy recommendations related to the promotion of entrepreneurial activity among service-disabled veterans.