

**To Work for Yourself, for Others, or Not At All?  
How Disability Benefits Affect the Employment Decisions of Older Veterans**

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**Abstract**

The Department of Veterans Affairs Disability Compensation (DC) program provides disability benefits to nearly one in five veterans in the US and has annual expenditures of \$60 Billion, yet it has received little attention from economists. We examine how the receipt of DC benefits affects the employment decisions of older veterans. We make use of variation in program eligibility resulting from a 2001 policy change that increased access to the program for Vietnam veterans who served with “boots on the ground” in the Vietnam theater but not for other veterans of that era. We find that the expansion of the program led to a decrease in labor force participation and to an even larger switch from wage employment to self-employment. We estimate that one in four veterans who entered the DC program due to this policy change left the labor force, estimates in the same range as those from recent studies of the Social Security Disability Insurance (SSDI) program.

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Nearly one-third of American men age 55 and above are veterans of U.S. military service. In 2015, the labor force participation rate of male veterans age 55 to 64 was 10 percentage points lower than that of comparable non-veterans, 62 vs. 72 percent. This represents a startling reversal from earlier years – in 2001, for example, the participation rate of older male veterans was 0.4 points higher than that of their non-veteran counterparts (68.2 versus 67.8 percent).<sup>1</sup>

There are several possible reasons for the emergence of this gap, including differences in health or in labor market experiences during the recent recession. Another candidate is the growth in the U.S. Department of Veterans Affairs' Disability Compensation (DC) program. The DC program provides benefits to veterans with service-connected disabilities, in order to compensate them for expected earnings losses due to disability. The DC program has grown rapidly in recent years, with the share of veterans receiving benefits rising from 9 percent in 2001 to 19 percent by 2015 and program expenditures reaching \$60 Billion by the end of this period.<sup>2</sup> As Coile, Duggan, and Guo (2015; hereafter CDG) discuss, this growth in the DC program is due in part to a 2001 liberalization of medical eligibility requirements, when diabetes was made a service-connected condition for Vietnam-era veterans with "boots on the ground" (BOG) in the Vietnam theater due to concerns about a possible link between Agent Orange exposure and diabetes.

The availability of DC benefits may affect veterans' employment decisions. While DC benefits are not reduced if the recipient has labor earnings, the receipt of benefits – which

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<sup>1</sup> Calculations from the Bureau of Labor Statistics' *Employment Situation of Veterans*, 2015 and August 2003 editions (<http://www.bls.gov/news.release/vet.nr0.htm> -- Table 2b; [http://www.bls.gov/news.release/history/vet\\_06282002.txt](http://www.bls.gov/news.release/history/vet_06282002.txt) -- Table 2).

<sup>2</sup> Calculation from Veterans Benefits Administration's Annual Benefits Report, 2015 and 2001 editions, and from VetPop Model 2014.

varied from \$133 to \$2,907 per month in 2016 depending on severity of disability and are not subject to income or payroll taxes – would be expected to decrease labor supply through an income effect. This possibility highlights a classic tradeoff in disability insurance program design. Benefits provide valuable protection against the loss of earnings that may result from disability. However, due to the difficulty of accurately determining disability status, access to benefits may also discourage labor supply among some that are capable of working. An empirical literature going back at least to Parsons (1980) has sought to estimate the share of Social Security Disability Insurance (SSDI) recipients that would have worked in the absence of benefits. More recently, Maestas, Mullen, and Strand (2013) estimate that nearly 30 percent of marginal SSDI recipients could have worked.

The receipt of disability benefits may also affect veterans' decisions regarding whether to be self-employed or work for others. Government programs that provide a guaranteed steady stream of income, even at a relatively low level, may encourage workers to choose self-employment by reducing the risk associated with leaving wage employment. Olds (2016a, 2016b) finds that eligibility for two government programs that provide in-kind benefits, the Supplemental Nutrition Assistance Program (SNAP) and State Children's Health Insurance Program (SCHIP), is associated with an increase in the probability of self-employment.

While these studies of other government programs suggest that the DC program might affect the employment decisions of veterans, the literature on the DC program itself is very limited, particularly in light of the program's size and recent growth. CDG (2015) show that patterns in the labor force participation of veterans and non-veterans over time

are consistent with a role for the DC program, as the timing of the decline in veterans' participation lines up with DC program growth, especially when looking by age group. However, it is difficult to completely rule out the possibility that participation could be trending differently for veterans and non-veterans for reasons unrelated to the growth of the DC program. Autor, Duggan, Greenberg, and Lyle (2016; hereafter ADGL) compare changes in labor supply after 2001 for BOG and non-BOG (or NOG) veterans of the Vietnam era; since the Agent Orange decision only affected BOG veterans, NOG veterans can function as a control group. Using this approach, they estimate that DC benefit receipt reduces the probability of being in the labor force by 18 percentage points. An important limitation of the ADGL study is that – given the construction of their analysis sample - they are only able to follow veterans through 2007, when the oldest veterans in their sample are age 61. As a result, their study period ends before much of the post-2001 growth in the program is realized and before the most common retirement ages. Their outcome measures are also limited to individual earnings, so they are unable to examine transitions to self-employment or effects on spousal labor supply.

Like ADGL, our study makes use of quasi-experimental variation in program eligibility arising from the 2001 Agent Orange decision, which expanded DC eligibility for Vietnam veterans serving in theater (BOG) but not for other veterans of this era, to estimate the effect of the DC program on employment. We have a number of contributions relative to the previous literature. We use the Veterans Supplement to the Current Population Survey (CPS), allowing us to analyze data through 2015 and to follow affected veterans through their sixties and beyond. This is potentially important because the effects of the Agent Orange decision may be strengthening over time as DC enrollment continued

to grow after 2007 and because veterans close to retirement age may be more responsive to benefit receipt. Additionally, we look at a wider range of employment outcomes than ADGL, including working in self-employment versus working for others, as well as whether DC receipt affects spousal labor supply and family income. Our sample also includes veterans of all service branches rather than just the Army as in ADGL.

We have several key findings. First, DC receipt rises by 10.3 percentage points more for BOG Vietnam-era veterans than for their NOG counterparts in the decade or so between the Agent Orange decision and the last part of our sample period (2010-2015). This confirms that the decision dramatically increased access to DC benefits for BOG veterans. Second, labor force participation falls by 2.5 percentage points more for BOG veterans than for NOG veterans over this period, consistent with the hypothesis that DC benefit receipt reduces employment. Importantly, we find that there is an even larger shift in type of employment, with the probability of self-employment actually *rising* by 4.1 points and the probability of working for others falling by 6.5 points for BOG relative to NOG veterans over this period. There are also larger decreases in hours and earnings for BOG veterans. There are no significant effects of DC program growth on spousal labor supply, but there is a decline in total family earnings and income. Our findings are generally robust to the inclusion of controls for differential trends in outcomes for BOG and NOG veterans prior to the Agent Orange decision. Overall, our estimates suggest that 24 percent of marginal DC beneficiaries would have been in the labor force during the 2010-15 period in the absence of DC benefits.

In the remainder of the paper, we first provide some background on the DC program and on previous studies relevant to our work. We then discuss our empirical strategy, data,

and results. We conclude with a discussion of the possible policy implications of our work and directions for future research.

### *I. Background on the DC Program*

The DC program pays benefits to veterans with medical conditions that were caused by or aggravated during their military service. DC recipients also have prioritized access to medical care from the Veterans Health Administration (VHA). DC benefits are not subject to income or payroll taxes and are indexed to the Consumer Price Index. The receipt of labor earnings does not reduce DC benefits for most recipients; in fact, DC benefits can be received simultaneously with earnings, SSDI benefits, Social Security old age benefits, and (in some cases) a military pension.<sup>3</sup>

To apply for DC benefits, a veteran first submits an application to a regional office of the Veterans Benefit Administration (VBA). The veteran can claim multiple conditions on the application. The regional office collects information about the veteran's military service and previous health care utilization from the VHA and private providers. This information is used by a Rating Board to decide whether each condition is service-connected, and if so, to set a disability rating for it between 0 and 100 percent using established guidelines.<sup>4</sup> Often

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<sup>3</sup> Benefits are reduced against labor earnings for beneficiaries with the "Individual Unemployability" designation, as discussed below. The rules for concurrent receipt of military retirement pay and DC benefits are complex. Prior to 2003, retirement pay was essentially reduced dollar-for-dollar against DC benefits. Since 2003, some dual eligibles (those whose disabilities arose from combat or who retired with 20 or more years of service and a CDR of 50 percent or above) have been able to collect both benefits concurrently without offset. Of the nation's 2 million military retirees, about 400,000 currently benefit from these exemptions, while roughly 600,000 face an offset (<https://www.cbo.gov/budget-options/2013/44744>).

<sup>4</sup> Ratings are in 10 percent increments (0, 10, 20, etc.), though for any given condition, the Board is typically deciding between a few possible ratings, such as 0, 30, or 60 percent. If a veteran is awarded a 0 percent rating for a service-connected disability, he does not receive cash benefits but does qualify for prioritized medical care through the VHA. However, receiving a 0 percent rating for multiple conditions can result in a 10 percent disability payment (Economic Systems Inc., 2004).

some conditions are approved and others rejected, and the veteran can appeal a rejection or an unexpectedly low rating. The average DC recipient from the Vietnam era had 3.7 service-connected disabilities in 2015. The most common approved conditions for veterans of this era are tinnitus, hearing loss, post-traumatic stress disorder, and diabetes, each affecting around 30 percent of veterans (Veterans Benefits Administration, 2015).

The ratings for approved conditions are used to determine the veteran's combined disability rating (CDR), using a formula that is similar to adding the individual ratings but has a maximum of 100 percent.<sup>5</sup> The monthly benefit depends only on the CDR and family status, not on past earnings. This reflects Congressional intent to provide compensation for the average, not individual, loss in earnings capacity due to disability (Economic Systems Inc., 2004). The monthly benefit amount is an increasing function of the CDR, with benefits rising more or less linearly from the 10 percent (\$133 per month in 2016) to 90 percent (\$1,743 per month) rating, before jumping to \$2,906 per month for those with a 100 percent rating.<sup>6</sup> If his disabilities preclude substantial gainful employment, a veteran may receive the 100 percent CDR benefit even though his CDR is lower, through the Individual Unemployability (IU) designation.<sup>7</sup> The fraction of DC recipients with an IU designation rose

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<sup>5</sup> If only one condition is approved, the CDR is simply the rating for that condition. If two conditions are approved, then the rating is equal to  $R_1 + (R_2 * (1 - R_1))$ , with  $R_1$  and  $R_2$  equal to the rating for conditions 1 and 2, and the CDR is rounded to the closest 10 percent increment. For example, if a veteran had one condition rated at 40 percent and a second at 20 percent, then the CDR would be rounded down from 52 to 50 percent. If the second condition had a 30 percent rating, the CDR would be rounded up from 58 to 60 percent. When there are three or more ratings, then the CDR formula is defined similarly, with the rating for the third condition multiplied by  $1 - (R_1 + (R_2 * (1 - R_1)))$ .

<sup>6</sup> Benefits for recipients with families are modestly higher. For example, a veteran with a 60 percent CDR would receive a monthly benefit of \$1,059 if single, \$1,156 if married, and \$1,227 if married with children.

<sup>7</sup> To be eligible for the IU designation, the beneficiary must either have one condition rated at 60 percent or more or have a CDR of 70 percent or more along with at least one condition that has at least a 40 percent rating. See [http://www.benefits.va.gov/COMPENSATION/claims-special-individual\\_unemployability.asp](http://www.benefits.va.gov/COMPENSATION/claims-special-individual_unemployability.asp) for additional information about the IU designation.

from 5 percent in 2000 to 9 percent by 2013 (CBO, 2014). IU designees do face a loss of benefits if they have labor earnings, as being unable to work is a condition of their higher benefit receipt.

DC recipients can raise their monthly benefit over time if they successfully apply for new health conditions or for a higher rating for existing conditions. ADGL (2016) find that average real monthly benefits increased by 77 percent between 2000 and 2006, from \$976 to \$1,725, for Vietnam-era Army veterans who first received benefits in 2000. The CDR for DC recipients rarely declines and the payments typically continue until death.<sup>8</sup>

While the medical eligibility criteria for the DC program are generally the same for all veterans and do not change much over time, a major departure from this occurred in July 2001, when the VA liberalized the program's medical eligibility criteria to make diabetes a presumptively service-connected condition for veterans who had served during the Vietnam War era (August 1964 to April 1975) in Vietnam, Cambodia, or Laos. This group encompassed nearly 40 percent of all active duty armed forces who served during the Vietnam War era (3.4 million out of 8.7 million).<sup>9</sup> The VA's action was prompted by a high-profile report that concluded there is "limited/suggestive" evidence of an association between the use of herbicides such as Agent Orange and Type 2 diabetes (Institute of Medicine, 2000). A presumptive service connection "relieves the veteran of the burden of producing evidence that directly establishes service connection for a specific condition," as

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<sup>8</sup> While the VA can require medical reexamination for DC recipients if it "determines there is a need to verify either the continued existence of the current severity of a disability," in practice the regulations governing reexaminations would seem to ensure that benefits are fairly secure for most recipients. Of particular relevance here, reexaminations are prohibited for veterans over 55 years of age, except in unusual circumstances. [www.benefits.va.gov/warms/docs/regs/38cfr/bookb/part3/s3\\_327.doc](http://www.benefits.va.gov/warms/docs/regs/38cfr/bookb/part3/s3_327.doc)

<sup>9</sup> [http://www.va.gov/opa/publications/factsheets/fs\\_americas\\_wars.pdf](http://www.va.gov/opa/publications/factsheets/fs_americas_wars.pdf)



he need only show that he has the condition and served in the relevant time and place (Panangala and Shedd, 2014). While the Agent Orange decision was likely the most consequential change to medical eligibility for Vietnam-era veterans, there have been other more recent changes, such as the 2010 addition of ischemic heart disease, Parkinson's disease, and B-cell leukemia to the set of service-connected conditions for BOG veterans, as well as the elimination of the need to document specific events leading to post-traumatic stress disorder for all veterans, also in 2010.<sup>10</sup>

The DC program has expanded rapidly since the Agent Orange decision. As Figure 1 illustrates, the share of Vietnam veterans receiving DC benefits rose by 2 percentage points in the 15 years before the decision, from 7 to 9 percent, but has doubled in the 15 years since, to 19 percent in 2015. Not only has the number of beneficiaries (from all service eras) grown rapidly over time, from 2.2 million in 1986 to 4.2 million in 2015, but the growth has been concentrated in the higher CDRs, as seen in Figure 2. While the number of beneficiaries with a 10 or 20 percent rating has been flat over the past 30 years at 1.2 million, the number with a rating of 70 or above has grown five-fold, to almost 1.5 million, while the number with a 50 to 60 percent rating has nearly tripled, to over 600,000. This shift to higher CDRs has an extra effect on program expenditures (Figure 3), as the monthly benefit amount is an increasing function of the CDR. Finally, Figure 4 shows that real DC benefits grew more rapidly than real SSDI benefits between 1999 and 2015, by 63 percent versus 10 percent, and that the average monthly DC benefit is now higher than the corresponding average SSDI benefit. The rapid rise in real DC benefits may reflect both

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<sup>10</sup> There are other conditions that are presumptively service-connected for Vietnam era veterans, including some granted this status before 2001, though they are much less common than diabetes. For a complete list, see Appendix B of Panangala and Shedd (2014).

that new DC recipients have higher CDRs and that existing recipients are raising their CDRs over time through appeals and applications for new conditions. In short, the tremendous growth in the DC program among America's veterans since 2001 underscores the need to understand the program's effect on employment decisions.

## *II. Previous Literature*

Three strands of the past literature are relevant for our work. The first is the literature on the employment effects of Social Security Disability Insurance (SSDI), as this is the largest disability program in the US and one that has long been studied by researchers. Several recent papers generate plausibly causal estimates of the effect of SSDI receipt on employment by exploiting variation in the assignment of cases to disability examiners and judges for review, as individuals vary in how strict they are in granting benefits to applicants with similar health profiles.<sup>11</sup> Maestas, Mullen, and Strand (2013) use the initial assignment to a disability examiner, while French and Song (2014) use the assignment to administrative law judges during the appeals process; Autor et al. (2015) apply a similar strategy in the Norwegian context. Both US studies find that SSDI benefit receipt reduces employment or labor force participation for the marginal applicant by a similar amount, 26 to 28 percent. Unfortunately, it is difficult to know how useful these studies might be for predicting the effect of DC receipt on veterans' employment. While there are similarities between the two programs, there are key differences as well, for example the existence of partial disability benefits in the DC program or the fact that DC benefits are not reduced

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<sup>11</sup> Papers that precede these recent studies but also contribute to our understanding of the employment effects of SSDI include: Black et al, 2002; Autor and Duggan, 2003; Duggan et al, 2007; Chen and van der Klaauw, 2008; von Wachter et al, 2011.

against earnings; moreover, there may be important differences in the characteristics of applicants to the two programs.

More relevant to our study is the past literature on the DC program. However, as noted earlier, this literature is quite limited. CDG (2015) use data from the March Current Population Survey (CPS) for the period 1980 to 2014. They estimate models of labor force participation that include a veteran indicator variable along with age and year indicators. Their key question of interest is how the estimated coefficient on the veteran dummy changes over time, particularly for different age groups. They find that the participation of male veterans age 25 to 74 has fallen by about 5 percentage points since the late 1990s relative to that of their non-veteran counterparts. The timing of the decline lines up well with the 2001 Agent Orange decision and other changes that facilitated access to the program. This is particularly true when looking by age group – participation began to fall shortly after 2001 in the older age groups that were populated by Vietnam-era veterans, but fell only starting in 2010 for younger age groups, when similar changes affecting Gulf War veterans went into effect. CDG also find that veterans have become more sensitive to economic shocks in recent years, as the DC program has grown. While this study is highly suggestive of a role for the DC program in veterans' employment decisions, it cannot rule out the possibility that other factors may have also contributed to the emerging gap in participation between veterans and non-veterans.

Autor et al. (2016, or ADGL) is the most relevant for our study, in that it also makes use of variation in DC eligibility arising from the 2001 Agent Orange decision to estimate the employment effects of the program. ADGL use administrative data to construct a large sample of Army veterans born between 1946 and 1951. They find a sharp acceleration in

DC enrollment among BOG relative to NOG veterans following the 2001 policy change, primarily due to an influx of new diabetes awards; by 2006, enrollment had risen by an additional 7 percentage points for BOG veterans. They also document that participation fell by an additional 2 percentage points between 2001 and 2007 for BOG vs. NOG veterans. They estimate that 18 percent of individuals who became eligible for the DC program due to the Agent Orange decision dropped out of the labor force, an effect about two-thirds as large as estimates from the SSDI literature.

As noted earlier, the current study offers a number of innovations relative to ADGL. First, we are able to use more recent data and data on older veterans, which may be important if the Agent Orange decision's impact has continued to grow over time or if the labor supply of older workers is more responsive to benefit receipt. Our data includes veterans from all service branches, and thus may better reflect the response of the veteran population as a whole. Second, we can look at other employment outcomes beyond own earnings, including spousal and household earnings and income. In lauding the importance of examining family outcomes, Autor et al. (2015) note that there are relatively few studies that consider labor supply responses to income changes in a household context, in part because of the difficulty in identifying a shock to the income of one spouse that does not directly affect the other spouse. The plausibly exogenous variation in DC access arising from the Agent Orange decision may provide such a shock given that the vast majority (more than 98 percent) of Vietnam era veterans are male.

Another novel aspect of our study is that we explore the effect of DC receipt on the decision of whether to be self-employed or work for others. This focus makes the literature on entrepreneurship of interest here and so we review it briefly. As Olds (2016b) notes,

social insurance programs can support entry into entrepreneurship by freeing up resources to fund business start-up costs (the “credit channel”) and by providing insurance against the consumption shocks that may occur due to the greater volatility of self-employment income (the “risk channel”). While we are not aware of any previous study that has looked at the effect of DC receipt on self-employment, there are a number of papers that shed light on the importance of these two channels.

Individuals with greater personal wealth may be more likely to start a business, as they are more able to self-finance the initial capital investment. Evans and Leighton (1989) and Evans and Jovanovic (1989) find that the probability of entering self-employment increases with assets. To assess the causality of this association, Holtz-Eakin et al. (1994a,1994b) and Blanchflower and Oswald (1998) use inheritance receipt as a shock to wealth and find that the probability both of becoming and succeeding as an entrepreneur is increasing in the size of the inheritance. But Hurst and Lusardi (2004) cast doubt on the role of credit constraints by documenting that wealth affects entry into entrepreneurship only at the very top of the income distribution, that wealth is not associated with an increase in the relative likelihood of starting a business in a more capital-intensive industry, and that future inheritances are as predictive of entrepreneurship as past inheritances. They conclude “[borrowing] constraints are not empirically important in deterring the majority of small business formation in the United States.”

Individuals with access to a steady source of income apart from their wages may also be more likely to become entrepreneurs, due to the protection it offers against drops in consumption. In two recent studies, Olds (2016a, 2016b) suggests that government policies that provide in-kind benefits – food assistance through the Supplemental Nutrition

Assistance Program and health insurance through the State Children's Health Insurance Program – are associated with increases in the probability of entrepreneurship. Both studies make use of changes in eligibility for the programs over time and data from the March CPS. Olds concludes that SNAP and SCHIP eligibility have similar effects on the probability of self-employment, raising it by 1 to 2 percentage points, or 15 to 20 percent.

Few studies have explored the effect of government programs that provide cash rather than in-kind benefits on self-employment. Most cash assistance programs, unlike the DC program, are limited to those with low incomes. Those who start successful new businesses lose eligibility for benefits as their incomes increase, so it will be difficult to find an empirical association between benefit receipt and entrepreneurship without access to longitudinal data. Moreover, the programs that have been examined are not similar to the DC program. The UK's Enterprise Allowance Scheme of the 1980s provided cash benefits for up to a year to unemployed people if they started a business (Parker, 2009), so receipt was conditional on entering self-employment. Gottlieb et al. (2016) find that a Canadian reform that extended job-protected maternity leave increased the probability that women would start a business; while this study supports the idea that risk reduction is important, there were no cash benefits involved. Bianchi and Bobba (2013) show that the Progresa conditional cash transfer program in Mexico increased entrepreneurship, but these findings may not translate to a developed country context.

In sum, the past literature suggests that the provision of cash benefits could increase entrepreneurship by reducing consumption risk, but to our knowledge there are no empirical studies that explore this for the DC program or other similar programs. Our

paper therefore adds to the literature on entrepreneurship by providing an opportunity to explore this hypothesis.

### *III. Data and Empirical Strategy*

The data for the analysis comes from the Veteran's Supplement to the Current Population Survey (VETCPS), which is produced by the U.S. Bureau of Labor Statistics. Importantly for our strategy, this survey asks respondents detailed questions about their military service, allowing for the identification of veterans who served in theater ("Boots on the Ground," or BOG) during the Vietnam War. The supplement has been administered in July, August, or September every other year from 1995 to 2009 and yearly since 2009. This allows us to construct a sample that covers the period 1995 to 2015 and includes years before and after the Agent Orange decision.

One challenge in using the VETCPS arises in identifying service era consistently throughout the sample period. Prior to 2005, respondents were only able to report one service era. As a result, those who served in multiple eras, such as in both the Korean and Vietnam wars, might not be identified as Vietnam-era veterans in the data. To surmount this difficulty, we define Vietnam-era veteran for the purpose of this paper as including all veterans with a year of birth (defined as survey year minus age at survey) between 1944 and 1953, regardless of whether they report that they served in Vietnam. To arrive at this choice, we first combine VETCPS data for those survey years where respondents could indicate multiple service eras, 2005 to 2015. In Table 1, we report the share of veterans in each birth cohort in these survey years that report serving in Vietnam. To maximize the probability that those in our sample served during the Vietnam era while obtaining the

largest sample possible, we implement a decision rule where those cohorts in which at least 75 percent of veterans served during Vietnam are included in the sample. The resulting sample includes the 1944 to 1953 birth cohorts; while we use a 75 percent cutoff, the share serving in Vietnam is over 90 percent for most of these cohorts. Since our sample definition could potentially classify non-Vietnam era veterans as NOG veterans, we test the robustness of our findings to the cutoff used, and we obtain qualitatively similar results.

The structure of the CPS as a short panel allows us to create a large sample of person-month observations. In the CPS, each respondent is surveyed for 4 consecutive months, out of the survey for 8 months, and then surveyed again for 4 months. We include the matched veterans' responses from neighboring monthly CPS surveys, April to December. We are able to do this for every year except 1995, resulting in a total of 125,711 observations for the period 1995 to 2015. Of this sample 30,873 are unique individuals, and Appendix Figure 1 shows the age distribution of our sample.<sup>12</sup>

The CPS is a useful data source for our project because it includes data on DC receipt as well as on a wide range of employment outcomes. We look at labor force participation as well as its components, employment and unemployment. We also decompose employment into self-employment and working for others. We make use of data on usual hours worked and earnings, as well as spousal earnings and family earnings and income. Unfortunately, earnings data is only available for the 4<sup>th</sup> and 8<sup>th</sup> survey months, so each veteran only has one earnings observation per year, resulting in a smaller sample size for these regressions. Earnings are adjusted to 2014 dollars, and individuals who are

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<sup>12</sup> In the 2010-2015 surveys, the Veterans supplement was not collected for all respondents. Therefore, we adjust our sample by dropping missing observations and up-weighting non-missing observations by an adjustment factor determined by each respondent's age group and period of military service, the same methodology the Census Bureau used to create survey weights in 2015.



unemployed or out of the labor force receive a value of zero, while those individuals who are working but fail to report earnings are dropped from the earnings regressions (most notably, self-employment earnings are not recorded in the VETCPS so self-employed individuals are dropped from earnings regressions). Our analysis of spousal and family outcomes is limited to married veterans with non-missing earnings.

Our empirical strategy exploits variation in DC eligibility arising from the 2001 Agent Orange decision, which made diabetes a presumptively service-connected condition for veterans who served with “boots on the ground” in theater during the Vietnam war era. This policy change enhanced access to DC benefits by virtually guaranteeing a successful outcome for BOG veterans of this era with diabetes who were making their first application for DC benefits or applying to add diabetes as a new condition. Diabetes is a common health issue among the older population, with 12 percent of those ages 45 to 64 and 22 percent of those ages 65 to 74 having diagnosed cases in 2014.<sup>13</sup> A diagnosis of type 2 diabetes receives a disability rating of 10 percent from the VA if it is manageable by diet alone, but this rises if disease management involves the use of insulin (20 percent), regulation of activities (40 percent), hospitalizations or regular doctor visits (60), and loss of weight and strength or other complications (100).<sup>14</sup> Moreover, as veterans tend to apply with multiple conditions, even a veteran receiving a relatively low rating for their diabetes would have a higher CDR if approved for other conditions such as hearing loss. Thus, this policy change made it easier for some BOG veterans to receive a monthly benefit of hundreds or thousands of dollars, while leaving the landscape unchanged for their NOG

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<sup>13</sup> Source: <http://www.cdc.gov/diabetes/statistics/prev/national/figbyage.htm>

<sup>14</sup> The schedule for rating disabilities is available at: <http://www.benefits.va.gov/warms/bookc.asp#p>

counterparts. ADGL (2016) show that the share of Vietnam-era DC recipients with diabetes as a service-connected condition was virtually zero until 2001 for both BOG and NOG veterans; between 2001 and 2006, this share rose rapidly for BOG veterans but remained negligible for NOG veterans.

We make use of this quasi-experimental variation in DC access by estimating models of the following form for our sample of Vietnam-era veterans:

$$Y_{it} = \alpha_t + \gamma_0 BOG_i + \sum \gamma_t * BOG_i + X_{it}'\beta + \varepsilon_{it}$$

where Y is an outcome measure such as DC receipt or employment for individual i in year t,  $\alpha_t$  includes both year and month fixed effects, and BOG is an indicator set to one if the veteran served with boots on the ground. The next term represents the interaction between BOG and year. Including a separate interaction term for each year for which we have a Veterans Supplement (14 years in all) would generate imprecise estimates given our sample size. Therefore, we group our data into four (non-equal) periods: 1995-1997, 1999-2001, 2003-2009, and 2010-2015. We interact an indicator for each of these periods with BOG, except for 1999-2001, which we use as the reference period as it includes the years immediately before the decision took effect.<sup>15</sup> The coefficient on the main BOG variable captures the difference in outcomes between BOG and NOG veterans in the reference period, while the coefficients on the interaction terms allow us to see how the BOG-NOG difference evolves after the decision, both in the short and medium term (2003-09) and in the long term (2010-15). The interaction of BOG with the 1995-1997 indicator allows us to explore whether there is any significant trend in the BOG-NOG difference prior

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<sup>15</sup> The 2001 Veterans Supplement was collected in August, shortly after the VA's "final rule" on the Agent Orange decision on July 9, 2001. Thus data in the 2001 Supplement is unlikely to be affected by the decision.

to the Agent Orange decision. The period during which we can look for a pre-trend is somewhat constrained by the fact that the VETCPS begins in 1995. However, as an additional robustness check, we also include an interaction between BOG and a linear year pre-trend in some specifications, and find that our results are generally robust to the inclusion of this additional control (shown on only our first results table, for conciseness).<sup>16</sup> Finally,  $X$  is a vector of individual characteristics, including individual age fixed effects and race and education indicators. And because we include matched observations from neighboring months of the CPS survey, we cluster our regressions at the person level.

In Table 2, we provide summary statistics for the BOG and NOG veterans in our sample, using data only for the years prior to the policy change (1995-2001). BOG veterans make up 46 percent of our sample. The BOG sample is 88% white, 74% married, and a majority has either some college (25%) or a college degree (35%). The differences between the average characteristics of the BOG and NOG samples are fairly small but often statistically significant. In the analysis we include controls for race and high school education as well as a BOG indicator that controls for differences in outcomes between BOG and NOG veterans in the baseline period (1999-2001) that may occur for any reason. Our key identifying assumption is that there is no other reason for outcomes for BOG and NOG veterans to be trending differently over time besides the growth of the DC program. We provide some exploration of this issue with respect to health below.

Before moving to our results, we provide some additional motivation for our study and choice of cohorts. Figure 5 shows trends over time in the labor force participation rate of veterans and non-veterans in the 1944 through 1953 cohorts. The rates for veterans and

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<sup>16</sup> The linear year trend is defined to be year-2001 until 2001 and 0 thereafter.

non-veterans are virtually identical from 1995 through the early 2000s, declining over time (as expected) as the cohort ages. The drop for veterans is much more rapid thereafter, however, such that the participation rate of veterans is 10 percentage points lower than that of non-veterans by 2015. We can also examine how the participation rate for veterans and non-veterans in a specific age group, 55 to 69, is changing over time, as seen in Figure 6. This figure adjusts for age to address the possibility of different age composition in the veteran and non-veteran group. The two rates are very similar and rising until the early 2000s, but thereafter, the participation rate for non-veterans continues to climb while that for veterans does not. Thus whether focusing on a specific birth cohort or age group, the participation rates of veterans and non-veterans diverge after 2001.

Finally, Figure 7 shows the composition of new and total DC recipients by age in 2015. The shading represents the cohorts in our sample. Not only do these cohorts make up a large share of total DC recipients, there are also as many or more *new* DC beneficiaries from these cohorts in 2015 as from any other group, including young veterans of recent conflicts in the Middle East. The fact that veterans in their late 60s continue to join the program in large numbers more than a decade after the Agent Orange decision underscores the need to understand the DC program's effects on employment and well-being for many years beyond the 2001 policy change.

#### *IV. Results*

We now turn to the empirical analysis, beginning with the results for DC receipt in Table 3. We find that there is a baseline difference in DC receipt between BOG and NOG veterans in the reference period (1999-2001), with BOG veterans being 8.0 percentage

points more likely to be receiving benefits and 2.8 points more likely to have a CDR of 50 percent or more in our preferred specification (column 2). This difference likely reflects that those who served with boots-on-the-ground have more service-connected disabilities that qualify them for benefits. Of greater interest to us is how this difference is changing over time. We find that the share of BOG veterans receiving benefits is 2.8 percentage points higher in the short-term (2003-2009) and 10.3 points higher in the long-term (2010-2015) as compared to the baseline difference. As year fixed effects pick up any trends over time in receipt that are common to BOG and NOG veterans, these interaction terms show the differential increase for BOG veterans. We similarly find that the probability of having a CDR of 50 percent or above grows by an additional 3.9 percentage points in the short term and 8.7 points in the long term for BOG veterans. These effects are very large relative to the share of the sample receiving DC benefits, 15.3 percent, or to the share with a CDR of 50 percent or above, 6.1 percent. One likely explanation is that many BOG veterans who were already receiving DC benefits enjoyed an increase after 2001 as a result of the policy change. Thus the number receiving a high CDR reflects the effect both for new recipients and for incumbents who benefit from a “promotion” to a higher CDR. The inclusion of controls for pre-trends has little impact on the results and these coefficients are statistically insignificant. Overall, this table confirms that the effect of the Agent Orange decision on DC receipt is large and growing substantially over time.

In Table 4, we shift to employment outcomes. We find that BOG veterans are 2.9 percentage points less likely to be in the labor force in the reference period. This difference grows by 1.1 points in the short term, though the effect is insignificant, and by 2.5 points in the long term, an effect that is significant at the 10 percent level. Again, the coefficient on

the interaction of BOG and the earlier period (1995-97) show no indication of a differential trend in participation for BOG vs. NOG veterans prior to the reference period. As people can report that they are out of the labor force for various reasons, we also explore how the growth of the DC program is associated with a rise in non-participation of different types. We find that essentially all of the growth in non-participation occurs in people reporting themselves as retired, while there is virtually no increase in people reporting themselves as disabled or out of the labor force for other reasons. The result with respect to disability is important because it casts doubt on an alternative explanation for our findings, namely that the participation of BOG and NOG veterans trends differently over time because the health of BOG veterans is deteriorating more rapidly. If this were the case, we might expect BOG veterans to be increasingly likely to say they are out of the labor force due to disability, but we do not find that. In results not shown here, we investigate whether BOG veterans are increasingly likely to report that they have a work-limiting disability and also find no evidence of this.<sup>17</sup> Thus, it seems quite likely that the greater labor force withdrawal of BOG vs. NOG veterans after 2001 can be attributed to the growth of the DC program.

In Table 5, we look more closely at employment outcomes. The first and last sets of columns show that the post-2001 decrease in labor force participation occurred entirely via a decrease in employment, with no change in unemployment, although the interaction between BOG and the 2010-15 period indicator in the employment model is no longer significant. Of even greater interest, the two middle sets of columns indicate that the growth of the DC program after 2001 is associated with a 6.5 percentage point decrease in

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<sup>17</sup> ADGL also have an interesting test of this alternative explanation, where they split their sample by year of birth (YOB) and show that the break in outcomes between BOG and NOG veterans for both YOB groups occurs after 2001 and not when veterans reach any particular age – the latter would be more likely if declines in participation were health-related.

the probability of BOG veterans working for others in the long term (2010-15) and a 4.1 point *increase* in the probability of self-employment. The shift into self-employment is quite large relative to the 10.3 point mean rate in the sample, and also relative to the 2.5 point decrease in participation.

To explore these results further, in Table 6 we break self-employment down into incorporated and unincorporated self-employment; incorporating is generally viewed as reflecting a more serious commitment to the new venture (Olds, 2016a). We find that the probability of both incorporated and unincorporated self-employment rise for BOG vs. NOG veterans in the long term, with increases of 1.4 and 2.7 points, respectively. We also look at the rise by industry type, breaking out the two most common industries for the self-employed in our sample, construction and professional/business services, from all other industries.<sup>18</sup> We find that for BOG veterans, self-employment in professional/business services rises by 1.3 points and in all other industries rises by 2.7 points; there is no differential increase over time in self-employment in construction. By showing rises in incorporated and unincorporated self-employment and in different industries, the results on this table confirm that the shift to self-employment is an important part of veterans' response to the growth of the DC program. And although self-employment earnings are not observed in the VETCPS, Appendix Figure 3 compares the distribution of log annual earnings for self-employed and not self-employed Vietnam Era veterans in the March CPS. While there is a greater mass of zero earnings for the self-employed, their mean log earnings are relatively close to the mean for other workers.

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<sup>18</sup> Appendix Figure 2 shows the industry breakdown for veterans both self-employed and working for others.

Finally, we turn to the effects of DC program growth on hours and earnings, as reported in Table 7, and on spousal and household outcomes, as reported in Table 8.<sup>19</sup> In the long-term (2010-15), usual hours per week falls by an additional 1.1 hours for BOG veterans. Most of this decrease can be explained by the 2.5 percentage point drop in participation reported on Table 3, which would cause usual hours per week to fall by 1 hour if all veterans worked 40 hours per week. This suggests that there may have been little labor supply response on the intensive margin, which we confirm in results not shown here. The probability of any weekly earnings falls by a significant 4.2 points for BOG veterans in the long term, a bit more than the estimated participation effect, though this is estimated using a smaller sample; mean weekly earnings fall by an insignificant \$23, which can be compared to a mean of \$656, and log earnings fall as well. Overall, the earnings results confirm that there is a reduction in work for BOG veterans after the expansion of the DC program.

The results for spousal earnings are suggestive of a decrease in spousal employment, which is consistent with a positive shock to household income due to the growth of the DC program. However, while the magnitudes of the coefficients are similar to those for the veterans themselves, the coefficients are not statistically significant. The results on Table 8 do show a 2.7 percentage point increase in the long-term in the probability of having family income less than \$50,000 and a large decrease in log wages for BOG veterans, both of which are statistically significant. The former suggests that even though families may be receiving more in DC benefits, this is not sufficient to make up for

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<sup>19</sup> We were also interested in exploring the heterogeneity in the effects of DC program growth by education level. Unfortunately, due at least in part to the size of our sample, the coefficients from models using education sub-samples or interaction terms were too imprecisely estimated for us to be able to conclude much from this exercise.



the loss of earnings, leading some families to fall below the \$50,000 threshold. To the extent that decreases in participation are voluntary, this reflects families choosing to have more leisure and lower income as a result of the enhanced access to DC benefits.

## *V. Discussion*

In this study, we explore the effect of DC benefits on employment outcomes, exploiting variation in benefit access arising from the 2001 Agent Orange decision, which affected only Vietnam-era veterans who served with boots-on-the-ground in the Vietnam theater. We estimate that by the latter part of our sample period (2010-2015), there was a 10.3 percentage point increase in program participation for the BOG veterans as a result of the Agent Orange decision, which increased access to the DC program. We further find that labor force participation fell by 2.5 percentage points for this group (relative to the change for NOG veterans) by the end of the sample period. The implied effect of program receipt for the marginal recipient is to decrease labor force participation by 24 percentage points. This effect is one-third larger than that previously estimated by ADGL for the DC program, with the difference likely due to our study's ability to follow veterans for more years after the Agent Orange decision and to include older veterans in the sample. The effect here is similar to those estimated by Maestas et al (2013) and French and Song (2014) for the SSDI program, despite significant differences between the DC and SSDI programs both in program provisions and recipient characteristics.

Our other central finding is that the growth of the DC program was associated with a significant shift away from working for others and into self-employment. Specifically, we find that by the end of our sample period, there was a 4.1 percentage point *increase* in self-

employment for BOG veterans, whose DC eligibility may have been affected by the Agent Orange decision. By the same logic used above, this implies that 40 percent of those induced to go on the DC program by the easier access to DC benefits switched to self-employment. This is a novel finding – while Olds (2016a, 2016b) finds that several in-kind benefit programs are associated with an increase in entrepreneurship, ours is the first study to our knowledge to find that an unconditional cash transfer program encourages recipients to start their own business. Further research to see if these results generalize to other benefits programs offered to younger or non-veteran workers would be helpful.

Our estimates can be used to conduct a “back-of-the-envelope” calculation of the share of the recent decline in the labor force participation of Vietnam-era Veterans that can be attributed to the growth of the DC program. Between 2000 and 2013 (the mid-points of our pre-policy reference period and final sample period, respectively), DC enrollment climbed by 9.3 percentage points for NOG veterans and for 19.6 percentage points for BOG veterans, according to our estimates.<sup>20</sup> We estimate that DC receipt decreases labor force participation by 24 percentage points for the marginal BOG recipient, and we assume for the purpose of this calculation that the labor supply response would be the same for NOG recipients. Combining these values along with the share of BOG and NOG veterans in the population, we estimate that the growth in the DC program led to a 3.2 percentage point decline in the labor force participation of Vietnam-era veterans, of which 1.9 points is the decrease in participation for BOG veterans and 1.3 points is the decrease for BOG

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<sup>20</sup> We obtain a value of 9.3 by taking the average of the individual year coefficients for 2010-2015 from the DC receipt models in Table 3 (year coefficients not shown on the table); as 1999-2001 is the omitted period, this represents the growth in DC receipt for NOG veterans since this time. In these models, we estimate that DC enrollment grew by an *additional* 10.3 percentage points for BOG veterans. This results in a total growth in DC enrollment of 19.6 percentage points for BOG veterans between 2000 and 2013.

veterans.<sup>21</sup> BOG veterans are only 40 percent of the veteran population, but have twice as large an increase in DC receipt, and thus contribute more to the decline in participation. The gap in participation between veterans and non-veterans rose by 10.6 percentage points during this period, as calculated from the data underlying Figure 5. This suggests that the growth of the DC program can explain nearly one-third of the gap in labor force participation between older veterans and non-veterans that emerged during this period.

Our study provides new estimates of the income effects of unconditional cash transfers on labor force participation. Studies of the DC program offer a unique opportunity to estimate income effects because benefits are not generally reduced against earnings, as they are for many other government programs. Some policy makers and public intellectuals have recently called for replacing some traditional welfare and social insurance programs with an unconditional cash transfer to all families. Our estimates may shed some light on the possible effects of such a policy, though we caution that it is difficult to know how well our findings would generalize beyond the population we study, which is an older veteran population.

We also note that our study is only one piece of the work that would be necessary to provide a complete welfare analysis of the DC program. Veterans who may be induced to withdraw from the labor force by enhanced access to DC benefits receive more leisure, which has a value to them that we do not estimate in our study. The increase in leisure will have even greater value if these veterans are in poor health and have a high disutility of work, as may be likely. The ability to shift to self-employment may reflect another benefit

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<sup>21</sup> These calculations are made as follows. For BOG veterans: 19.6% rise in DC enrollment x 24% participation effect x 40% share in population = 1.88. For NOG veterans: 9.3% x 24% x 60% = 1.34.

of the DC program, newly discovered in this study. To the extent that failures in credit markets or other market failures impede individuals' ability to start a business and the DC program eases these constraints, the value of this benefit also needs to be estimated and incorporated in any welfare analysis. Another important piece of the puzzle are the interactions between the DC program and other government programs, particularly the SSDI program. Muller et al (2014) find that many of the most disabled DC recipients were receiving SSDI benefits prior to their DC award, a scenario that may affect the value of the DC award to those recipients. The interactions between the DC and SSDI programs represent a fruitful area for research, and one we continue to pursue in ongoing work.

Programs such as DC where benefits may be collected even if recipients have labor earnings have income effects but no substitution effects. As a result, there are welfare losses from raising the tax revenues needed to pay DC benefits, currently \$60 Billion per year, but not from the changes in veterans' participation induced by the change in program incentives. Indeed, although the DC program is intended to replace average earnings losses due to disability, the fact that benefits generally last until death, long past the traditional age of retirement, and that medical reexaminations are essentially prohibited past age 55 suggests that providing insurance against the earnings losses that follow a work-limiting disability may not be the program's true or only intent. Indeed, the use of "compensation" in the title of the program suggests that the goal of the program may be as much to compensate veterans for injuries suffered in service of the country as to make up for earnings losses. Clearly, much more work is needed to understand all the implications of this program, which serves a rapidly-growing share of the veteran population with a correspondingly fast-rising price tag.

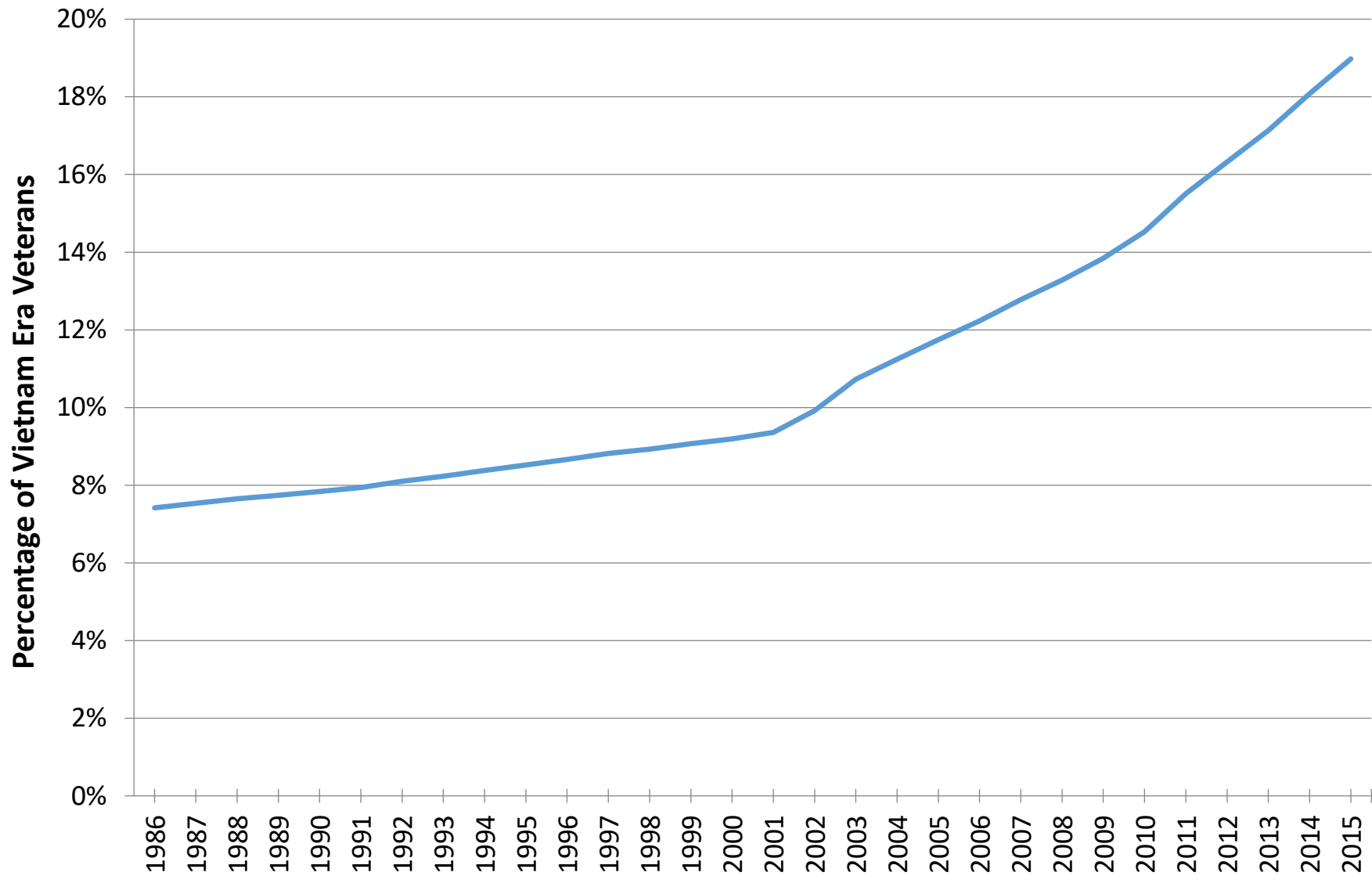
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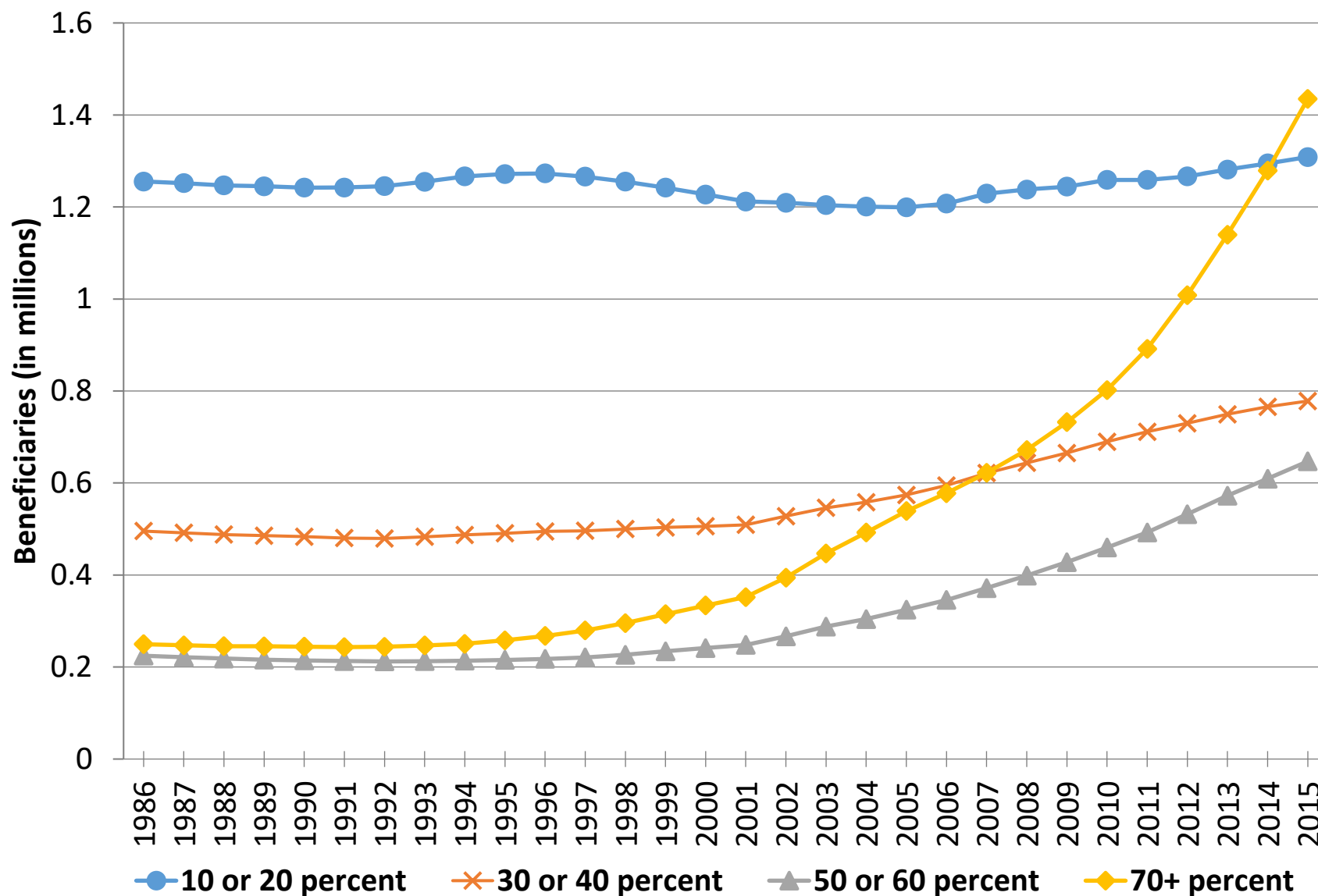
**Figure 1: Growth in Vietnam Era DC Recipients, 1986-2015**



Source: Statistical Abstracts of the U.S. (1986-1999), VetPop Model 2014, and VBA Annual Benefits Reports (1999-2015)

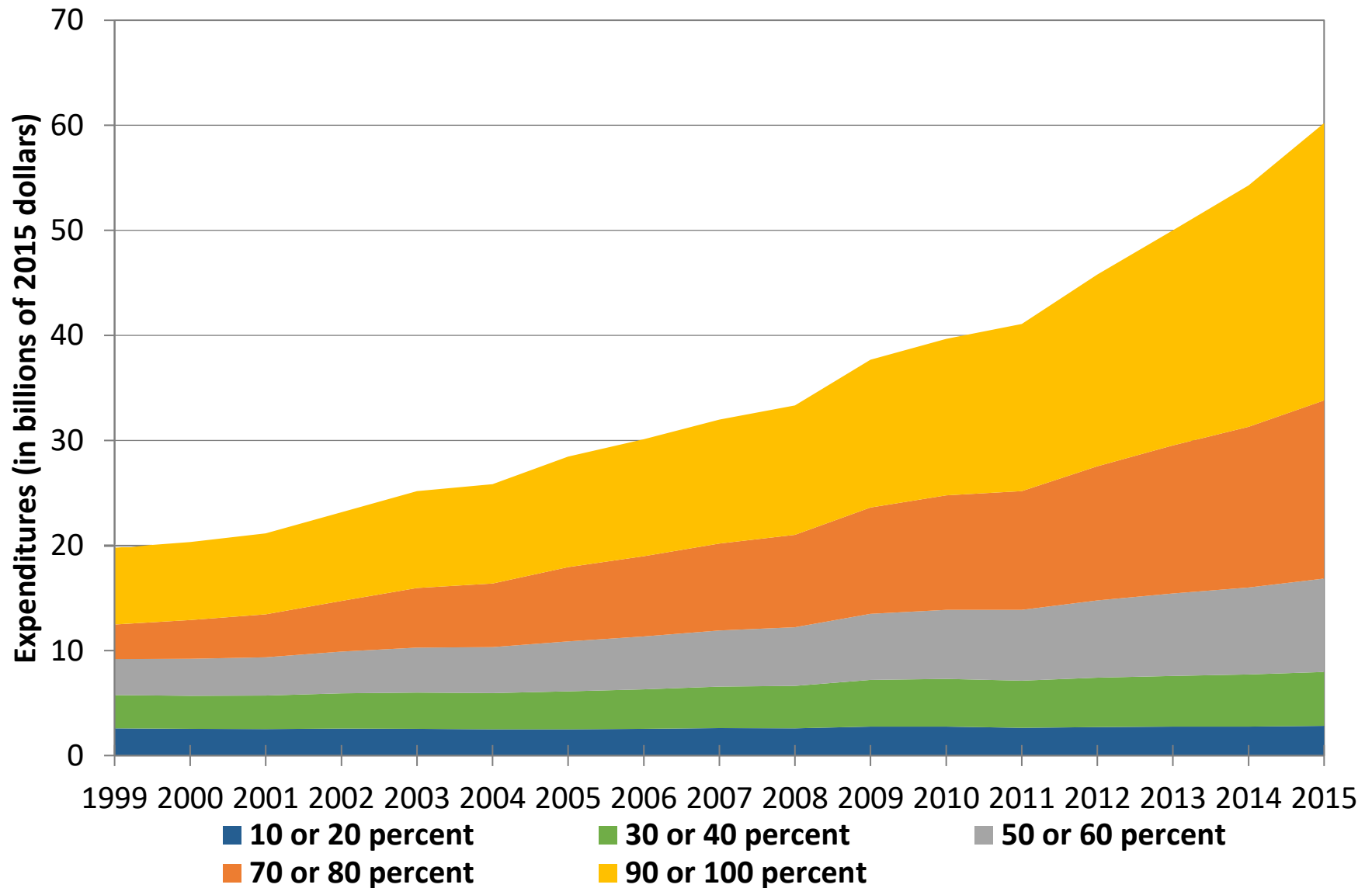


**Figure 2: Growth in DC Beneficiaries by CDR, 1986-2015**



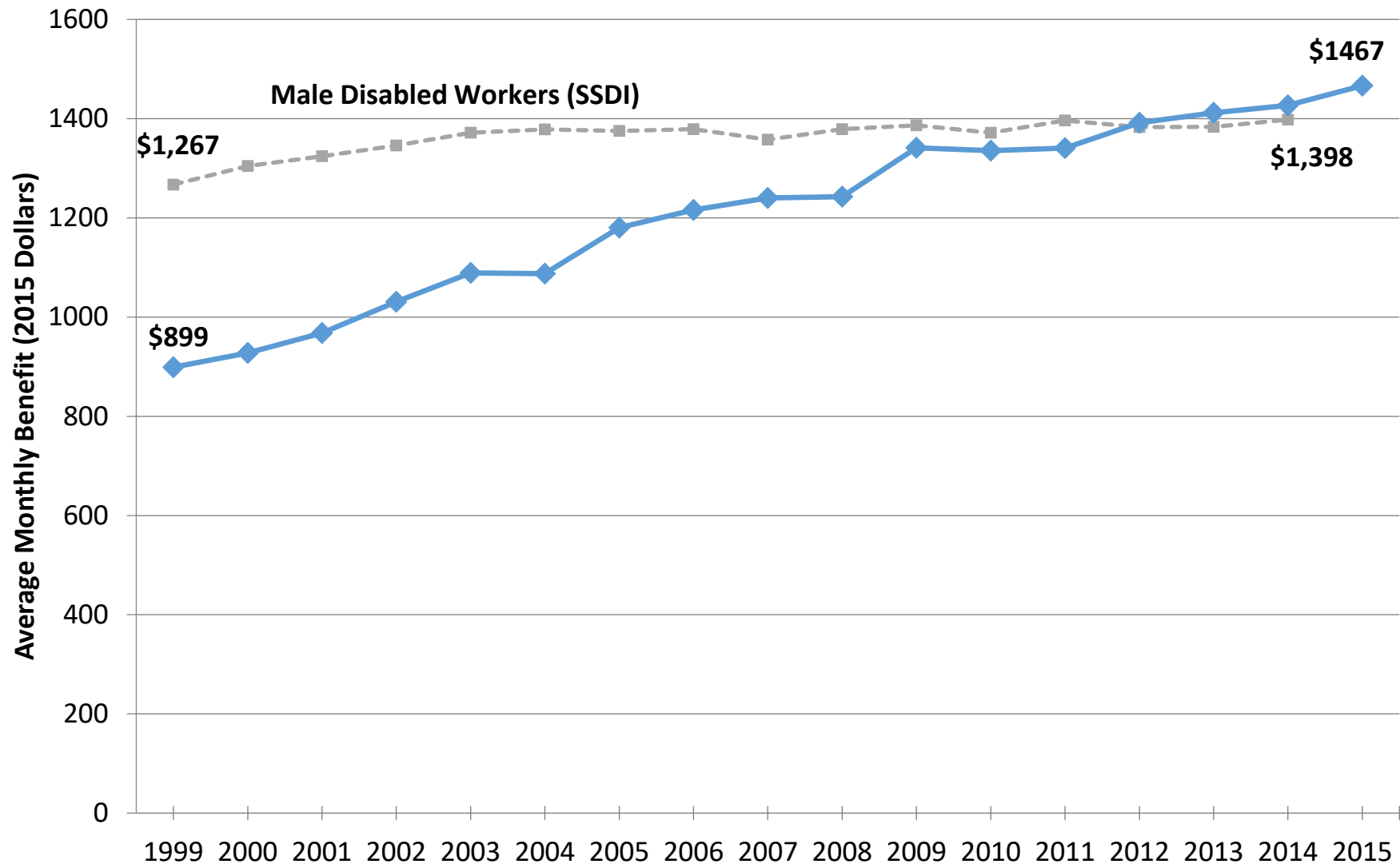
Source: COIN CP-127 Reports (1986-1998); VBA Annual Benefits Reports (1999-2015)

**Figure 3: Growth in DC Expenditures by CDR, 1999-2015**



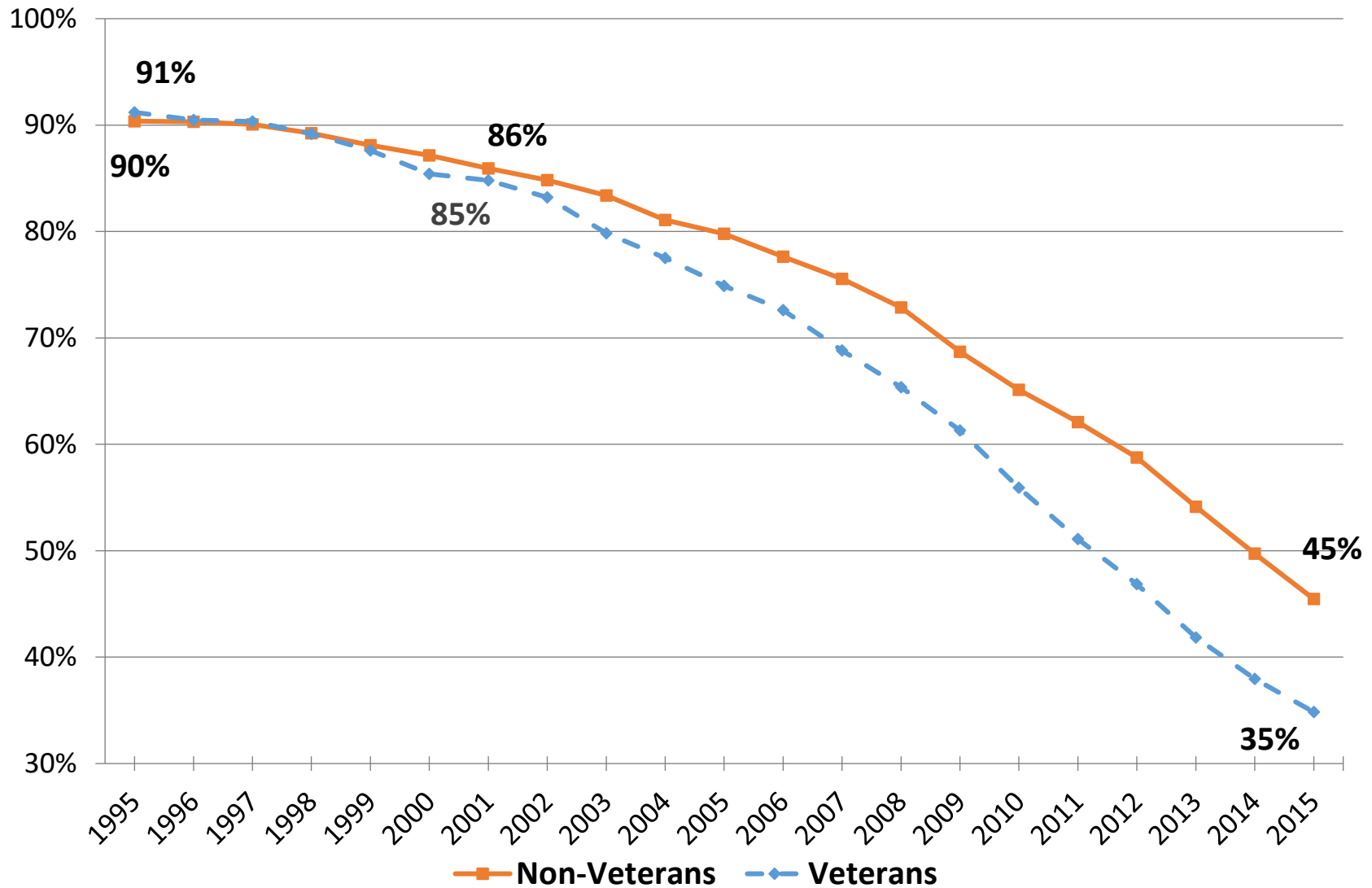
Source: VBA Annual Benefits Reports (1999-2015) and BLS CPI-U

**Figure 4: Average Monthly Benefit for Vietnam Era DC Recipients,  
1999-2015**



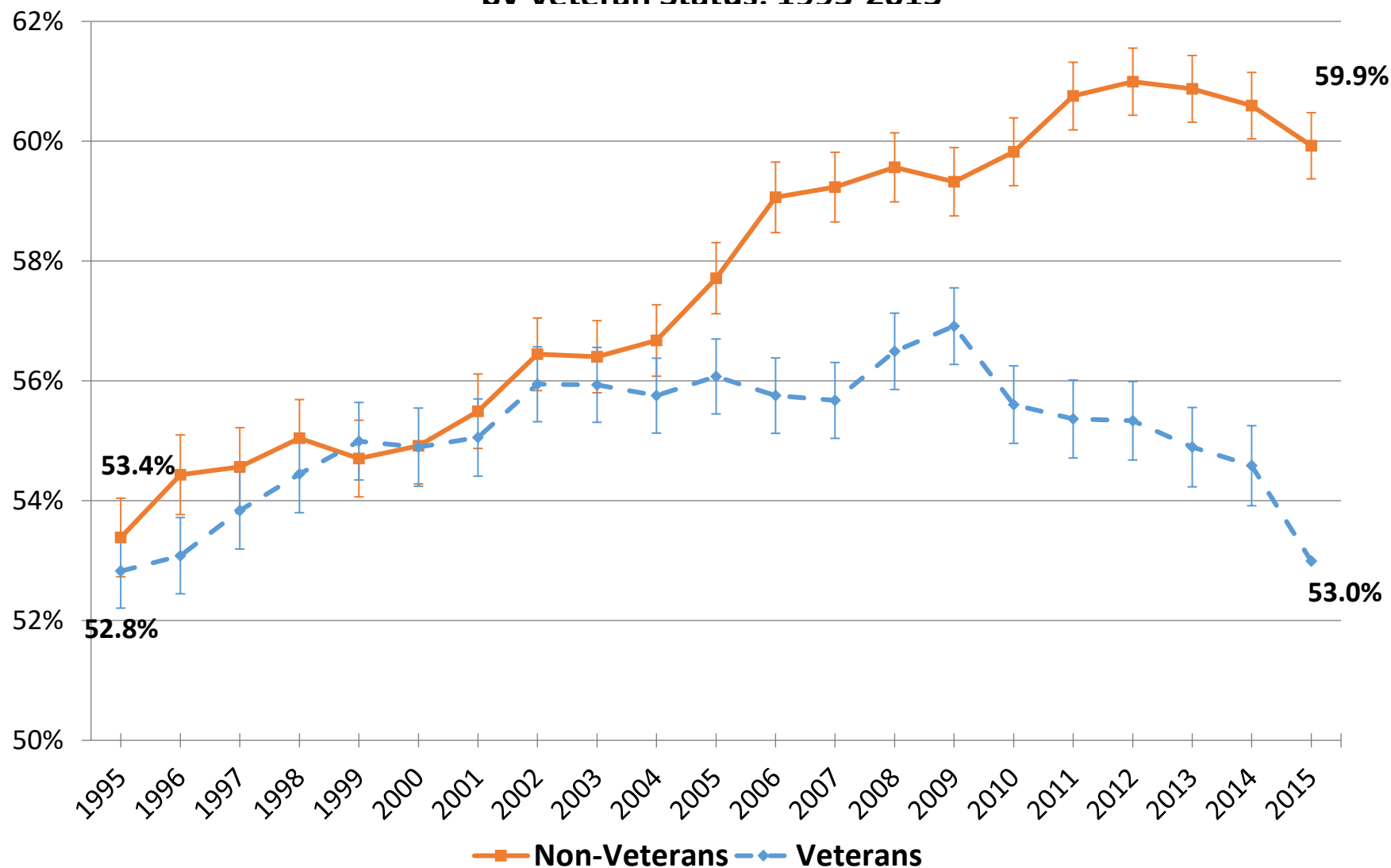
Source: VBA Annual Benefits Reports (1999-2015) and BLS CPI-U; Annual Statistical Report on the Social Security Disability Insurance Program, Table 36

**Figure 5: Labor Force Participation for Males Born 1944 - 1953,  
by Veteran Status, 1995-2015**



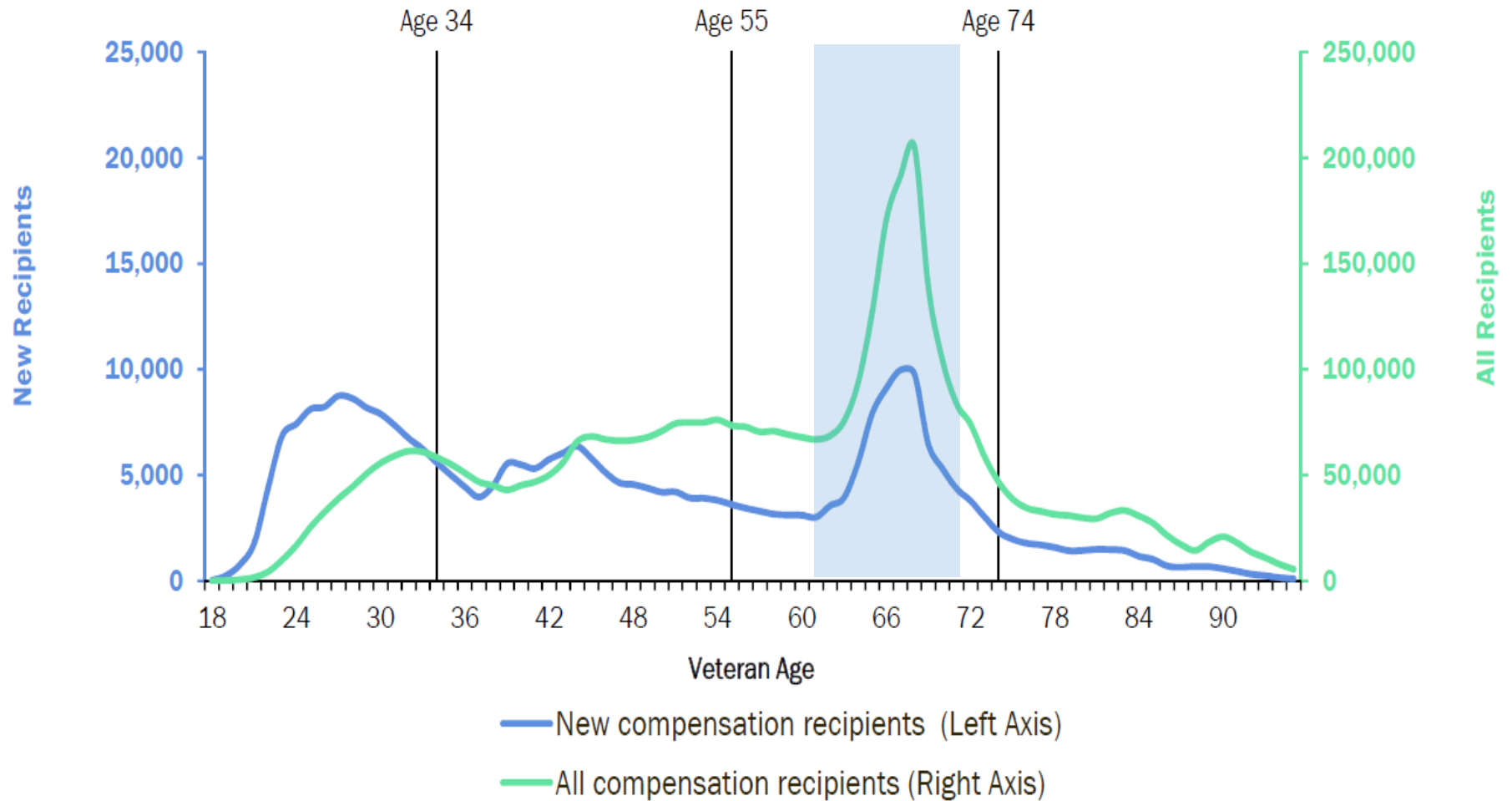
Annual averages for males with YOB 1944-1953 (defined as survey year minus age) in monthly CPS surveys from January 1995 to December 2015.

**Figure 6: Age-Adjusted Labor Force Participation for Males Age 55-69,  
by Veteran Status. 1995-2015**



Includes all males aged 55-69 at time of survey in monthly CPS surveys from January 1995 to December 2015. Graphed are estimated labor force participation rates after conditioning for year and age fixed effects. The baseline estimate for the 55-69 age group is 53%.

**Figure 7: VADC Compensation Recipients by Age, FY 2015**



Our Veterans CPS analysis sample is aged 62 to 71 in 2015.

Source: VBA Annual Benefits Report, 2015

**Table 1: Distribution of Veterans by Year of Birth**

YOB	All Males	% Veterans	% (Vietnam Era   Vet)	% (BOG   Vietnam Era)
1939	6348	43.2%	32.9%	53.4%
1940	6879	39.7%	39.7%	49.1%
1941	6984	39.7%	50.0%	50.1%
1942	7804	39.7%	60.9%	50.5%
1943	8686	41.2%	74.4%	42.7%
1944	8317	40.4%	83.2%	45.8%
1945	8428	42.4%	92.0%	47.6%
1946	9066	45.7%	94.7%	51.5%
1947	12032	47.1%	97.3%	51.0%
1948	11201	43.1%	97.1%	52.7%
1949	11185	37.5%	95.3%	49.7%
1950	11684	30.3%	93.2%	46.4%
1951	11906	25.3%	91.0%	41.3%
1952	12355	20.7%	88.1%	34.6%
1953	12548	18.2%	78.8%	28.4%
1954	13047	16.1%	72.2%	28.2%
1955	13394	14.8%	64.4%	25.4%
1956	13513	14.6%	48.9%	24.0%
1957	13910	14.7%	25.3%	24.4%
1958	13602	13.1%	0.4%	60.0%
1944-1953	108722	34.2%	92.3%	46.9%

Sample includes males in Veterans Supplement of CPS (1995, 1997, 1999, 2001, 2003, 2005, 2007, 2009, and 2010-2015). Year of Birth defined as age at time of survey minus survey year. Veterans defined as having previously served in the Armed Forces. Columns 3&4 are limited to 2005 and later. Vietnam era defined as veterans who reported a service period of 1964-1975. BOG defined as Vietnam era veterans who reported active duty in Vietnam/Cambodia/Laos (or surrounding waters) any time from 1961 to 1975.

**Table 2: Characteristics of Sample in Pre-Policy Period (1995-2001)**

Variable	BOG	NOG	Difference
<i>Census Region</i>			
Northeast	18.8%	20.5%	-1.7**
Midwest	25.8%	24.9%	0.9
South	29.7%	31.1%	-1.4
West	25.7%	23.5%	2.2**
<i>Demographics</i>			
Age	50.20	49.73	0.47***
White	88.4%	89.5%	-1.1*
Black	8.7%	7.6%	1.2**
Hispanic	3.6%	2.5%	1.1***
Married	73.9%	75.5%	-1.5*
HSgrad or less	40.4%	36.6%	3.7***
College degree	34.8%	39.7%	-5.0***
Work-preventing Disability	7.3%	5.0%	2.3***
In Labor Force	86.8%	90.2%	-3.3***
Weekly Earnings (2014 \$)	917.35	992.28	-74.93***
<i>Service-Related</i>			
VADC Receipt	14.8%	6.3%	8.5***
CDR 50+	4.1%	1.0%	3.1***
Served 5+ years	16.8%	15.9%	0.9
Military Service since 1990	0.9%	3.1%	-2.2***

Sample includes 5,391 BOG and 6,198 NOG veterans from the Veterans Supplement to the CPS (1995, 1997, 1999, 2001). BOG is defined as Vietnam era veterans who reported active duty in Vietnam/Cambodia/ Laos (or surrounding waters) any time from 1961 to 1975. Weekly earnings data is only available for 4th and 8th month in sample.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 3: DC Receipt for BOG vs. NOG Veterans, 1995-2015**

	DC Receipt			CDR $\geq$ 50%		
	(1)	(2)	(3)	(4)	(5)	(6)
BOG	8.51*** (0.72)	7.98*** (0.94)	7.90*** (1.12)	2.75*** (0.40)	2.75*** (0.53)	2.98*** (0.60)
BOG*(1995-97)		1.38 (1.46)			-0.00 (0.80)	
BOG*(Year Pre-Trend)			-0.27 (0.34)			0.10 (0.18)
BOG*(2003-2009)	2.23** (1.04)	2.76** (1.21)	2.84** (1.35)	3.94*** (0.64)	3.93*** (0.73)	3.71*** (0.78)
BOG*(2010-2015)	9.80*** (1.18)	10.33*** (1.32)	10.41*** (1.45)	8.72*** (0.78)	8.72*** (0.86)	8.49*** (0.90)
Mean of Dependent Variable	15.27	15.27	15.27	6.07	6.07	6.07
Observations	125,711	125,711	125,711	125,711	125,711	125,711
R-Squared	0.06	0.06	0.06	0.05	0.05	0.05

**Notes:**

1. All specifications include year, month, and age fixed effects and indicators for White, Black, and HS graduate or less; regressions are weighted with vetcps weights. Models are estimated as linear probability models.
2. DC Receipt and CDR  $\geq$  50% are indicator variables equal to 100 for receiving DC benefits or having a combined disability rating of 50% or above.
3. BOG is an indicator variable for having Boots on the Ground. BOG\*(1995-97) is an interaction between BOG and an indicator for sample years 1995 and 1997; BOG interactions with 2003-2009 and 2010-2015 are defined similarly. There is no interaction between BOG and the sample years 1999 and 2001.
4. BOG\*(Year Pre-Trend) is an interaction between BOG and a linear year trend (year-2001 until 2001 and 0 thereafter).
5. Standard errors are clustered at the person level. Statistical significance at the 10%, 5%, and 1% level are indicated by \*, \*\*, and \*\*\*, respectively.



**Table 4: Labor Force Participation for BOG vs. NOG Veterans, 1995-2015**

	In Labor Force		Not in Labor Force: Disabled		Not in Labor Force: Retired		Not in Labor Force: Other	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
BOG	-2.75*** (0.75)	-2.85*** (1.02)	2.18*** (0.57)	2.26*** (0.78)	0.41 (0.42)	0.35 (0.61)	0.16 (0.25)	0.24 (0.31)
BOG*(1995-97)		0.24 (1.45)		-0.21 (1.11)		0.17 (0.79)		-0.19 (0.52)
BOG*(2003-2009)	-1.17 (1.20)	-1.08 (1.38)	0.88 (0.84)	0.80 (0.99)	0.47 (0.89)	0.53 (0.99)	-0.18 (0.33)	-0.26 (0.38)
BOG*(2010-2015)	-2.54* (1.30)	-2.45* (1.48)	0.45 (0.84)	0.37 (0.99)	2.18* (1.12)	2.24* (1.20)	-0.08 (0.32)	-0.15 (0.36)
Mean of Dependent Variable	63.80	63.80	8.41	8.41	25.81	25.81	1.98	1.98
Observations	125,711	125,711	125,711	125,711	125,711	125,711	125,711	125,711
R-Squared	0.21	0.21	0.03	0.03	0.26	0.26	0.00	0.00

**Notes:**

1. All specifications include year, month, and age fixed effects and indicators for White, Black, and HS graduate or less; regressions are weighted with vetcps weights. Models are estimated as linear probability models.
2. All dependent variables are indicator variables equal to 100. The means of In Labor Force and the three NILF variables sum to one.
3. BOG is an indicator variable for having Boots on the Ground. BOG\*(1995-97) is an interaction between BOG and an indicator for sample years 1995 and 1997; BOG interactions with 2003-2009 and 2010-2015 are defined similarly. There is no interaction between BOG and 1999 and 2001.
4. Standard errors are clustered at the person level. Statistical significance at the 10%, 5%, and 1% level are indicated by \*, \*\*, and \*\*\*, respectively.

**Table 5: Type of Employment for BOG vs. NOG Veterans, 1995-2015**

	Employed		Working for Others		Self-Employed		Unemployed	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
BOG	-3.43*** (0.80)	-2.93*** (1.08)	0.07 (1.02)	1.35 (1.34)	-3.50*** (0.75)	-4.28*** (0.97)	0.68** (0.29)	0.09 (0.37)
BOG*(1995-97)		-1.31 (1.57)		-3.33 (2.06)		2.02 (1.55)		1.55*** (0.60)
BOG*(2003-2009)	-1.41 (1.25)	-1.91 (1.45)	-2.76* (1.46)	-4.04** (1.70)	1.36 (1.01)	2.13* (1.18)	0.23 (0.43)	0.83* (0.49)
BOG*(2010-2015)	-1.87 (1.34)	-2.37 (1.52)	-5.23*** (1.45)	-6.50*** (1.69)	3.36*** (0.96)	4.13*** (1.14)	-0.68 (0.43)	-0.08 (0.48)
Mean of Dependent Variable	60.91	60.91	50.61	50.61	10.30	10.30	2.89	2.89
Observations	125,711	125,711	125,711	125,711	125,711	125,711	125,711	125,711
R-Squared	0.20	0.20	0.16	0.16	0.01	0.01	0.01	0.01

Notes:

1. All specifications include year, month, and age fixed effects and indicators for White, Black, and HS graduate or less; regressions are weighted with vetcps weigh Models are estimated as linear probability models.
2. All dependent variables are indicator variables equal to 100; the means of Working for Others and Self-Employed sum to the share Employed.
3. BOG is an indicator variable for having Boots on the Ground. BOG\*(1995-97) is an interaction between BOG and an indicator for sample years 1995 and 1997; BOG interactions with 2003-2009 and 2010-2015 are defined similarly. There is no interaction between BOG and 1999 and 2001.
4. Standard errors are clustered at the person level. Statistical significance at the 10%, 5%, and 1% level are indicated by \*, \*\*, and \*\*\*, respectively.

**Table 6: Types of Self Employment for BOG vs. NOG Veterans, 1995-2015**

	Incorporated		Unincorporated		Construction		Professional/Business Services		Other Industries	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
BOG	-1.47*** (0.46)	-1.48** (0.58)	-2.03*** (0.62)	-2.79*** (0.81)	-0.36 (0.36)	-0.67 (0.47)	-0.97** (0.39)	-1.07** (0.51)	-2.17*** (0.57)	-2.54*** (0.73)
BOG*(1995-97)		0.04 (0.97)		1.98 (1.27)		0.79 (0.74)		0.28 (0.79)		0.96 (1.20)
BOG*(2003-2009)	0.63 (0.64)	0.64 (0.73)	0.73 (0.83)	1.49 (0.97)	0.12 (0.49)	0.43 (0.57)	0.34 (0.51)	0.44 (0.61)	0.90 (0.78)	1.26 (0.91)
BOG*(2010-2015)	1.43** (0.58)	1.44** (0.68)	1.93** (0.79)	2.69*** (0.94)	-0.21 (0.44)	0.09 (0.53)	1.20** (0.50)	1.30** (0.60)	2.38*** (0.73)	2.74*** (0.86)
Mean of Dependent Variable	3.79	3.79	6.51	6.51	1.97	1.97	2.36	2.36	5.96	5.96
Observations	125,711	125,711	125,711	125,711	125,711	125,711	125,711	125,711	125,711	125,711
R-Squared	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01

Notes:

1. All specifications include year, month, and age fixed effects and indicators for White, Black, and HS graduate or less; regressions are weighted with vetcps weights. Models are estimated as linear probability models.
2. All dependent variables are indicator variables equal to 100, and the sum of Incorporated and Unincorporated equals the sum of Construction, Professional/Business Services, and Other Industries.
3. BOG is an indicator variable for having Boots on the Ground. BOG\*(1995-97) is an interaction between BOG and an indicator for sample years 1995 and 1997; BOG interactions with 2003-2009 and 2010-2015 are defined similarly. There is no interaction between BOG and 1999 and 2001.
4. Standard errors are clustered at the person level. Statistical significance at the 10%, 5%, and 1% level are indicated by \*, \*\*, and \*\*\*, respectively.

**Table 7: Hours and Earnings for BOG vs. NOG Veterans, 1995-2015**

	Usual Hours		Any Weekly Earnings		Weekly Earnings		Log Weekly Earnings	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
BOG	-1.36*** (0.40)	-0.70 (0.53)	-2.41** (0.98)	-1.72 (1.28)	-62.06*** (19.25)	-45.51* (25.70)	-0.19*** (0.07)	-0.15 (0.09)
BOG*(1995-97)		-1.72** (0.80)		-1.82 (1.97)		-43.73 (38.21)		-0.13 (0.14)
BOG*(2003-2009)	-0.47 (0.59)	-1.12 (0.68)	-2.03 (1.49)	-2.72 (1.71)	-36.34 (26.91)	-52.91* (31.86)	-0.14 (0.10)	-0.18 (0.12)
BOG*(2010-2015)	-0.48 (0.59)	-1.14* (0.68)	-3.55** (1.41)	-4.24*** (1.63)	-6.31 (24.28)	-22.86 (29.65)	-0.21** (0.10)	-0.26** (0.11)
Mean of Dependent Variable	24.40	24.40	56.34	56.34	655.81	655.81	3.86	3.86
Observations	125,711	125,711	28,037	28,037	28,037	28,037	28,037	28,037
R-Squared	0.21	0.21	0.22	0.22	0.18	0.18	0.24	0.24

Notes:

1. All specifications include year, month, and age fixed effects and indicators for White, Black, and HS graduate or less; regressions are weighted with vetcps weights. Models are estimated as linear probability models.
2. Any Weekly Earnings is an indicator variable and the other dependent variables are continuous. Earnings data is only collected during the outgoing rotation month, and self-employment income is not observed (self-employed are dropped). Earnings equal zero for non-employed, and Log Earnings takes the natural log of (1+Weekly Earnings).
3. BOG is an indicator variable for having Boots on the Ground. BOG\*(1995-97) is an interaction between BOG and an indicator for sample years 1995 and 1997; BOG interactions with 2003-2009 and 2010-2015 are defined similarly. There is no interaction between BOG and 1999 and 2001.
4. Standard errors are clustered at the person level. Statistical significance at the 10%, 5%, and 1% level are indicated by \*, \*\*, and \*\*\*, respectively.

**Table 8: Spousal Employment Outcomes for BOG vs. NOG Veterans, 1995-2015**

	Family Income < \$50K		Spousal Weekly Earnings		Log Spousal Earnings		Log(Own + Spouse Earnings)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
BOG	-0.55*** (0.14)	-0.60*** (0.18)	0.27 (17.42)	13.24 (22.93)	0.00 (0.09)	0.13 (0.12)	-0.01 (0.06)	0.11 (0.08)
BOG*(1995-97)		0.12 (0.27)		-34.18 (35.40)		-0.35* (0.19)		-0.32*** (0.12)
BOG*(2003-2009)	0.23 (0.19)	0.27 (0.22)	-50.97** (24.19)	-63.93** (28.44)	-0.14 (0.13)	-0.27* (0.15)	-0.26*** (0.10)	-0.38*** (0.11)
BOG*(2010-2015)	2.65** (1.27)	2.70** (1.27)	-10.84 (22.47)	-23.80 (26.96)	-0.03 (0.12)	-0.17 (0.14)	-0.30*** (0.11)	-0.42*** (0.12)
Mean of Dependent Variable	15.56	15.56	440.84	440.84	3.55	3.55	5.29	5.29
Observations	92,830	92,830	19,348	19,348	19,348	19,348	19,348	19,348
R-Squared	0.27	0.27	0.06	0.06	0.11	0.11	0.23	0.23

Notes:

1. All specifications include year, month, and age fixed effects and indicators for White, Black, and HS graduate or less; regressions are weighted with vetcps weights. Models are estimated as linear probability models.
2. Family Income <\$50K is an indicator variable, and the other dependent variables are continuous. Earnings data is only collected during the outgoing rotation month and self-employment income is not observed (self-employed are dropped). Earnings equal zero for non-employed, and Log Spousal Earnings takes the natural log of (1 + Spousal Weekly Earnings); Log(Own+Spouse) does the same for (1 + Spouse + Own).
3. BOG is an indicator variable for having Boots on the Ground. BOG\*(1995-97) is an interaction between BOG and an indicator for sample years 1995 and 1997; BOG interactions with 2003-2009 and 2010-2015 are defined similarly. There is no interaction between BOG and 1999 and 2001.
4. Standard errors are clustered at the person level. Statistical significance at the 10%, 5%, and 1% level are indicated by \*, \*\*, and \*\*\*, respectively.

## Appendix Figures

**Figure A1: Age Distribution of Veterans CPS Sample**

	1995	1997	1999	2001	2003	2005	2007	2009	2010	2011	2012	2013	2014	2015	Total
42	167														167
43	217														217
44	226	188													414
45	292	167													459
46	352	194	138												684
47	456	237	184												877
48	485	274	201	186											1146
49	382	354	239	210											1185
50	298	446	305	259	203										1511
51	308	279	380	308	193										1468
52		242	418	351	229	176									1416
53		222	323	366	280	188									1379
54			290	458	323	247	159								1477
55			255	339	364	309	173								1440
56				290	440	296	210	154							1390
57				303	332	373	280	184	126						1598
58					274	395	331	234	157	126					1517
59					269	297	343	248	191	146	139				1633
60						263	434	287	222	190	149	132			1677
61						272	296	312	260	214	199	137	112		1802
62							244	418	271	242	177	163	154	106	1775
63							264	286	357	293	241	174	144	144	1903
64								236	234	316	261	225	196	152	1620
65								241	236	247	312	274	262	179	1751
66									205	205	244	306	296	232	1488
67										197	204	229	321	245	1196
68											169	218	236	287	910
69												155	208	225	588
70													164	174	338
71														152	152
<b>Total</b>	<b>3183</b>	<b>2603</b>	<b>2733</b>	<b>3070</b>	<b>2907</b>	<b>2816</b>	<b>2734</b>	<b>2600</b>	<b>2259</b>	<b>2176</b>	<b>2095</b>	<b>2013</b>	<b>2093</b>	<b>1896</b>	<b>35178</b>

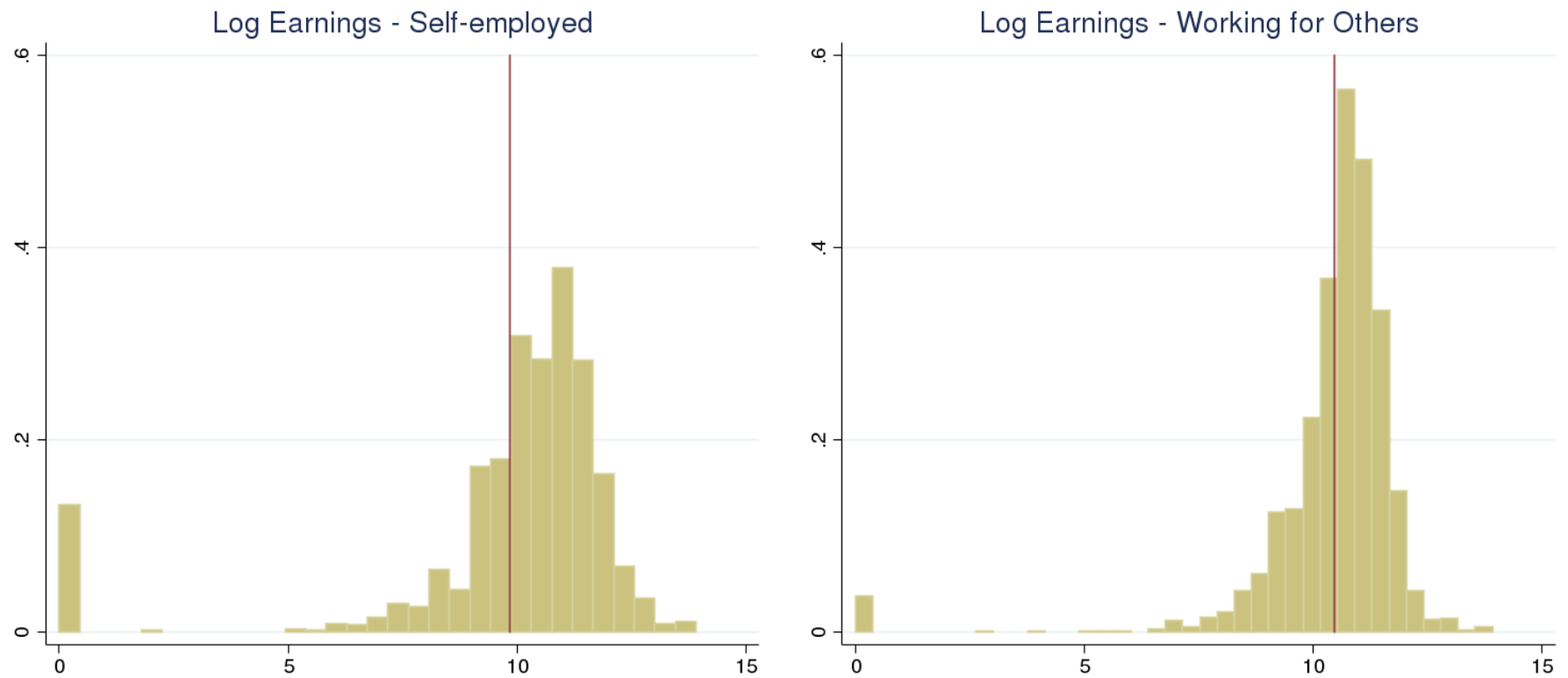
All male veterans in VETCPS with YOB 1944-1953, where YOB is defined as age at time of survey minus survey year. The drop in sample size in years 2010 - 2015 is due to nonresponse in the veterans supplement. We make up for this in our estimation by upweighting the remaining observations by age group and military service period.

**Figure A2: Industries for Self-Employed and Other Workers, 2003 - 2015**

Industry	<i>Non-Veteran</i>		<i>NOG</i>		<i>BOG</i>	
	Self-Employed	Other	Self-Employed	Other	Self-Employed	Other
Agriculture, Forestry, Fishing, Hunting	12.6%	1.7%	11.1%	1.4%	13.7%	1.1%
Mining	0.4%	1.3%	0.6%	1.2%	0.3%	1.3%
Construction	18.1%	8.4%	17.8%	7.6%	16.8%	8.1%
Manufacturing	4.4%	17.1%	5.6%	17.1%	4.8%	17.8%
Wholesale and Retail Trade	11.3%	13.9%	11.0%	12.9%	13.1%	13.8%
Transportation and Utilities	4.4%	8.8%	3.4%	11.3%	5.6%	13.7%
Information	1.3%	2.3%	1.2%	2.0%	0.7%	2.0%
Financial Activities	8.7%	5.8%	10.1%	5.5%	11.0%	4.7%
Professional and Business Services	20.9%	9.7%	21.5%	9.9%	19.4%	9.0%
Educational and Health Services	6.4%	15.3%	7.1%	13.2%	4.4%	11.9%
Leisure and Hospitality	5.8%	5.0%	3.6%	3.6%	3.6%	3.9%
Other Services	5.8%	4.4%	6.9%	4.1%	6.6%	3.4%
Public Administration	0.0%	6.4%	0.0%	10.1%	0.0%	9.3%
Armed Forces	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%

Sample includes INLF males with YOB 1944-1953 in the 2003 to 2015 VETCPS. YOB is defined as age at time of survey minus survey year, and Self-employed is defined as either "self-employed incorporated" or "self-employed unincorporated" worker classification.

**Figure A3: Log(1 + Annual Earnings) for Self-Employed versus Others in Labor Force, 2010 - 2015**



Sample includes employed males with YOB 1944-1953 and reporting Vietnam Era service in the 2010 to 2015 March CPS. YOB is defined as age at time of survey minus survey year, and Vietnam Era is defined as veterans who reported a service period of 1964-1975. Mean log earnings are graphed as a vertical line.