Capturing the Elusive Working-Age Population with Disabilities: Who the Six-Question Sequence in CPS-BMS and ACS Captures and Who It Misses

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ABSTRACT

Bureau of Labor Statistics employment statistics for the population with disabilities have been based on a sequence of six impairment/activity-limitation questions since they were added to the CPS in 2008. Against the advice of the then American Statistical Association President, none of these questions specifically reference an individual's "difficulty working." Taking advantage of the CPS survey design that questions those in the same dwelling over 16 months, we compare working-age respondents in the March 2010 CPS-ASEC who answer the traditional work-activity limitation question, the six-question disability sequence concurrently or in another month of the CPS-BMS. By most standards, SSDI and SSI beneficiaries should be captured in a working-age population with disabilities. In a face validity test, we show the six-question sequence captures 63.3 percent of the CPS-ASEC population reporting such benefits. Adding the work-activity limitation question population increases the percentage captured by 28.7 percentage points. Testing the robustness of employment rate levels and trends (2007-2010) using the disability populations based on the six-question sequence, work-activity limitation question, and a combined seven-question sequence, we find significant differences in levels of employment rates but not in trends between the first two, and no significant differences in either between the first and third.

INTRODUCTION

Work is the primary socially expected activity undertaken by most working-age Americans to support themselves and their families. Social Security Disability Insurance (SSDI) and Supplemental Security Income-Adult Disability (SSI) are the major federal government programs protecting working-age people who because of their physical, mental, or emotional conditions are no longer able to "perform any substantial gainful activity." Academics and public policymakers are interested in knowing about the employment of those with disabilities, their public program use when they cannot work, and their economic well-being in either case. Thus it is critical for the major data sets policymakers' use to measure the employment, program participation, and economic well-being of Americans to also capture a representative sample of working-age Americans with disabilities that is large enough to allow an accurate estimate of these outcomes.

The emergence of the World Health Organization (WHO) International Classification of Functioning, Disability and Health (ICF) (see WHO, 2001) as a systematic and comprehensive way of conceptualizing the population with disabilities has resulted in an international effort to use the ICF to better capture the population with disabilities in government-sponsored socio-economic data sets (Swanson, Carrothers, and Mulhorn, 2003). After a decade-long effort to do so, in 2008 the two most important federal government surveys used by academics and policymakers to measure the socio-economic characteristics of Americans—the Current Population Survey (CPS) and the American Community Survey (ACS)—added a sequence of six impairment/activity limitation questions which is now used by the U.S. Bureau of Labor Statistics (BLS) to capture the population with disabilities and estimate the employment rates (a.k.a., employment-to-population ratio) of this population (BLS, 2009).

The goal of this six-question sequence is to identify the American population aged 16 and older who are currently experiencing physical, mental, and/or emotional conditions that cause serious difficulty with their daily activities. An affirmative response to any of the questions in this sequence indicates a disability. CPS data on the employment status of people with disabilities has been published on the Bureau of Labor Statistics website since February 2009 for people 16 years and older (BLS, 2009). Here we focus on the working-age population of non-institutionalized civilians ages 25-61, but our results are consistent with those using the 16 and over population considered by BLS in their published reports.

Somewhat controversially, none of the six questions in the new impairment/activity limitation sequence specifically reference "difficulty working." Critics of this lack of a work-activity limitation question argue that its absence may result not only in this sequence's failure to capture the full population with disabilities but also may introduce bias both with respect to levels and trends in the employment and program participation rates of people with disabilities, as well as in their general economic well-being by systematically undercounting those with medical condition-based work-activity limitations who are potential or even actual SSDI and SSI recipients.

In this paper we take full advantage of two components of the CPS program sample design to compare men and women aged 25-61 who answered both the six-question impairment/activity limitation sequence in the CPS-Basic Monthly Survey (BMS) and a work-activity limitation question in the CPS-Annual Social and Economic Supplement (ASEC). Doing so provides a first look at how a disability population captured by the new six-question sequence differs from one using the work activity limitation question and how both differ from a broader seven-question sequence which includes the current CPS-ASEC work-activity limitation

question as well as the CPS-BMS six-question sequence. Using the 2010 March CPS-ASEC survey supplemented with the six-question sequence responses from the CPS-BMS survey, we show that while the new sequence of six questions captures portions of the adult population with disabilities missed by the work-activity limitation question, the loss of information on the population with work-activity limitations not captured by the new six-question sequence results in something short of an unambiguous overall improvement in capturing the full population with disabilities if only these six questions in the CPS are used. Even worse, unlike the CPS where one can broaden the overall disability population by using the March CPS-ASEC work-activity limitation question, this option is not available in the ACS, which now only provides this six-question sequence.

While the use of the work-activity limitation question in the CPS-ASEC is controversial, we show that using the six-question sequence alone to capture a disability population will only include 63.3 percent of those receiving SSDI and SSI benefits in the CPS-ASEC. Adding the work-activity limitation question to these six questions increased the percentage of SSDI and SSI beneficiaries captured in the data by 28.7 percentage points. This face validity test documents the exclusion of a large share of the population which the Social Security Administration (SSA) has certified to be unable to perform any substantial gainful activity, and suggests that depending on the current six-question disability sequence in the CPS-BMS or ACS is likely to dramatically understate the program participation of the true working-age population with disabilities.

Finally, we more systematically show the sensitivity of levels and trends in employment rates over the Great Recession years (2007-2010) to these three alternative samples of working-age people with disabilities. We find that while the six-question sequence population has significantly higher employment rates over this recession period than the work-limitation

population, their negative trends in employment rates are not significantly different. Comparing the six- and seven-question populations over this period, we find no significant difference in level or trend. While limitations in the data prevents a similar statistical test of levels and trends in program participation, observationally it appears that the six-question sequence has substantially lower SSDI-SSI program participation rates over this period than the work-activity limitation population but the increasing trends are similar. There appears to be little difference between the six- and seven-question sequence populations in program participation rate levels and trends.

CONCEPTS OF DISABILITY

Attempts to capture the population with disabilities in large federal government surveys date back to the 1830 decennial census (Brault, Stern, and Raglin, 2007). Questions related to disability were asked in every decennial census from 1830-1910, except in 1870 and 1900. With the introduction of the census long-form, disability information was once again collected for a subsample of Americans from 1970-2000.

The emergence of the ICF a systematic and comprehensive way of conceptualizing the population with disabilities has resulted in an international effort to use these classifications to better capture the population with disabilities in government-sponsored data sets (Swanson, Carrothers and Mulhorn, 2003). The ICF conceptual models recognize disability as a dynamic process that involves the interaction of a person's health condition and personal characteristics with the physical and social environments.

In the ICF framework, a *health condition* is a prerequisite for a disability. Examples of health conditions are listed in the International Classification of Diseases, Tenth Edition (ICD-10), and they encompass diseases, injuries, health disorders, and other health-related conditions.

An *impairment* is defined as a significant deviation or loss in body function or structure. For example, the loss of a limb or vision deterioration may be classified as impairments. An *activity limitation* is defined as the difficulty an individual may have in executing activities. For example, a person who experiences difficulty dressing, bathing or performing other activities of daily living due to a health condition may be classified as having an activity limitation. A *participation restriction* is defined as an issue that an individual may experience in involvement in life situations. For example, a working-age person with a health condition may have difficulty participating in employment as a result of the physical environment (e.g., lack of reasonable accommodations) or the social environment (e.g., discrimination).

In the ICF framework, the term *disability* describes the presence of an *impairment*, *activity limitation* and/or *participation restriction*. It is possible that a person may have a *participation restriction* without an *activity limitation* or *impairment*. For example, a person diagnosed as being HIV positive may not have an evident *impairment* or *activity limitation*, but may not be able to find employment due to discrimination resulting from his or her *health condition*. Similarly, a person with a history of mental illness but who no longer has a loss of capacity or an *activity limitation* may also be unable to find employment due to discrimination resulting from his or her *health condition*. While there is an overlap across these concepts, it is possible that one of them can occur without a relation to the others.

ICF-RELATED QUESTIONS IN HEALTH DATASETS

As Martin, Schoeni and Andreski (2010) state, "health is a multidimensional concept, and accordingly, no single indicator fully captures all aspects of health" (p. S17). Demographers and other researchers who are interested in the morbidity and mortality of particular populations are focusing on health-centered datasets that have many different types of questions— biomarkers,

self-reported disability, health and limitation questions and mortality data (Martin, Schoeni and Andreski, 2010).

Biomarkers are physiological indicators of diseases that are often the cause of functional limitations and death (Finch, Vaupel and Kinsella, 2001). One reason researchers are interested in looking at biomarkers such as cholesterol and the C-reactive protein is that they may manifest before the disablement phase (Crimmins, 2004). Crimmins, Kim and Vasunilashorn (2010) state that including biological information in large population surveys is a way to increase the understanding regarding demographic differences in health. One of the major health datasets that uses biomarkers is the National Health and Nutrition Examination Survey (NHANES). The NHANES has self-reported information on health and medication use, but also uses body measurements and blood samples to track biomarkers, including high C-reactive protein, cholesterol and high glycated hemoglobin (NCHS, 2009).

Other health-centered surveys have limited information on biomarkers, but a wealth of self-reported information on various limitations in physical, sensory and cognitive functions, activities of daily living (ADLs) and instrumental activities of daily living (IADLs). An example of such a dataset is the National Health Interview Survey (NHIS), a nationally representative survey of the non-institutionalized population. A time series with methodologically consistent questions is available from 1997 onward. The NHIS has questions on various types of functioning such as walking one-quarter mile, stooping and kneeling, grasping an object, use of a hearing aid and mental health measures (NHIS, 2009). But because these health-centered data sets lack detailed information on employment, program participation and economic well-being or are of much smaller size than the ACS, they are of much less use for policymakers and researchers interested in these outcomes for the working-age population with disabilities.

INCORPORATING ICF-RELATED QUESTIONS INTO THE CPS AND ACS

The CPS is a national socio-economic survey focusing on the employment and income of households as is the ACS, which replaced the long-form of the Census, and hence has a large enough sample size to provide information at the state level on various population groups (U.S. Census Bureau, 2003). Both surveys have questions on disability, but because of survey focus and space constraints, the number of disability questions is much lower in the CPS and the ACS than in the health-centered datasets discussed above. Another difficultly in capturing health information in socio-economic based surveys is that the context of the questions within them has an effect on responses. For example, participants are less likely to respond affirmatively to disability questions in a general socio-economic survey than in a health-based survey (BLS, 2010). Despite their limitations, a great deal of effort has been put into including additional disability questions based on an ICF framework into these datasets to better determine the employment, program participation and income of this population and hence close the gap between the very high-quality information on health in the health-centered data sets discussed above and these two important socio-economic-centered data sets that are used to annually track success parameters of "at risk" groups.

Disability Questions in the ACS

The ACS was introduced in 2000, and has collected information on disability from the beginning.[1] According to Brault (2009) and Brault, Stern and Raglin (2007), the interagency subcommittee that developed the initial set of revised ACS questions used the ICF as a conceptual guide. According to Miller and DeMaio (2006), the subcommittee determined that, in order to measure prevalence, the concept of disability would be defined as a mental or

[1] Starting in 2010, pooled years of the annual ACS have replaced the long-form of the Census.

physical impairment that substantially limits at least one major life activity. The subcommittee concluded that a short set of questions organized by domains of limitation would adequately generate a population estimate that would allow for the evaluation of the equalization of opportunity for those with disabilities (e.g., housing and employment opportunity). The limitation domains included sensory (vision and hearing), motor function (lower body mobility), cognition, activities of daily living, instrumental activities of daily living, and lastly work. From 2000- 2007, hearing and vision limitations were grouped together as "sensory" limitations and work-activity limitation was part of the group of disability questions.

In 2008, the ACS disability questions were substantially revised, splitting hearing and vision into separate questions and more controversially removing the work-activity limitation question. The scientific evidence for using the six-questions sequence contained in the revised ACS was based on cognitive testing of how well respondents understood the questions and provided accurate answers. These tests were conducted over five rounds by the Census Bureau and National Center for Health Statistics (NCHS) using a small non-representative sample. The decision to remove the work-activity question in the ACS was made in the third round based on a small sample (Miller and DeMaio, 2006).

Reviewing these same small sample tests, Brault, Stern, and Raglin (2007) report that the work-activity limitation question was found to suffer from excessive misinterpretation and misreporting. They state that many false-positive were made because of question misinterpretation. In some cases, respondents who reported not having a work-activity limitation were receiving disability payments (Brault, Stern, and Raglin, 2007, p. B32). However, the lack of a work-activity limitation question in the ACS did not go unnoticed. In an April 20, 2006, letter to Census Bureau Director C. Louis Kincannon, Sallie Keller-McNulty, the President of

the American Statistical Association, urged that research on technical and methodological adjustments to a work-activity limitation question continue so that it could be added to the ACS to improve the measurement of work disability. (Keller-McNulty, 2006). This advice was not followed.

Disability Questions in the CPS

Beginning in 1981, a disability-related work-activity limitation question was added to the CPS-ASEC (informally known as the March Income Supplement) to facilitate the identification of individuals receiving disability-related sources of income. The work-activity limitation question focuses on work as the activity that may be limited due to a health condition. Similar questions are used in other surveys and reflect the longstanding connection between disability-related government programs and the capacity of an individual to work and maintain economic self-sufficiency. Table 1 includes the exact wording of this question.

The work-activity limitation question in the CPS was criticized in a similar manner to the work-activity limitation in the ACS.[2] A process was set in motion to develop a set of disability-related questions to potentially include in the CPS that would align the questions with ICF-related concepts (McMenamin, Hale, Kruse, and Kim, 2005; McMenamin, Miller, and Polivka, 2006; Barnow, 2008). Beginning in June 2008, a six-question sequence very similar to the design of the 2008 ACS was included in the CPS-BMS.[3] Like the ACS disability sequence, the sequence includes questions on hearing difficulties; vision difficulties; difficulties with concentrating, remembering and making decisions; physical limitation; self care limitations

[2] See, e.g. Hale (2001). A response by Burkhauser et al. (2002) found that the work limitation question of the CPS can be used to monitor trends in outcomes of those with disabilities, and that the employment trends of the work limitation based disability conceptualization is not significantly different from the employment trends of the larger impairment-based population of the NHIS.

[3] The ACS questionnaire does not include the lead-in stem that focuses the attention of respondents on "serious difficulty with their daily activities."

(dressing and bathing); and independent-living limitations (that is, going on an errand or to a doctor's appointment). An affirmative response to any of the six questions in the sequence indicates that the person has a disability. (See Table 1 for the wording to these six questions.)

However, unlike the ACS, which removed its work-activity limitation question, the six impairment/activity limitation question sequence was added to the CPS-BMS, while the work-activity limitation question remains in the CPS-ASEC.

This paper takes advantage of the linked nature of the CPS components to compare the disability population captured using the six-question impairment/activity limitation question sequence in the CPS with the population captured with the work-activity limitation question. Our results are not intended to show that the work-activity limitation question formerly used in the ACS and still used in the CPS-ASEC is a flawless question. In fact, consistent with the Census Bureau/NCHS findings reported by Miller and DeMaio (2006), and Brault, Stern, and Raglin (2007), we find using CPS data that some SSDI and SSI program participants do not report having a work-activity limitation. But we also show that a far larger percent of those on the SSDI and SSI programs do not report having one of the impairment/activity limitations captured in the six-question sequence.

DATA

Although our findings are relevant to the six-question sequence of disability in both the ACS and the CPS-BMS, we only analyze data from the CPS here since the work-activity limitation question is no longer available in the ACS. However, as discussed above, besides a different lead-in to the questions, the sequence is the same in the two datasets, which facilitates comparison.

The data used to compare the set of six impairment/activity limitation sequence-based measure of disability and the work-activity limitation measure are derived from the CPS-BMS and CPS-ASEC, respectively. The CPS is a joint effort of the BLS and Census Bureau. It is the primary source of the monthly labor force data, including employment, unemployment, earnings from work, and hours of work, by various demographic characteristics, such as age, gender, race, marital status, and educational attainment. The questionnaire used to collect these data is known as the BMS and the questionnaire used to collect income, poverty, and health insurance data is called the ASEC.

The CPS samples housing units to obtain a representative sample of the U.S. civilian, non-institutionalized population. A multistage stratified sampling process is used to ensure representative coverage across the country. Sample housing units are surveyed monthly for four consecutive months and for an additional four consecutive months eight months later (i.e., four months in the sample—eight months out of the sample—four months in the sample).[4] A rotation system is used to refresh the sample so that each month a new sub-sample (roughly one-eighth of the overall sample) is receiving its first monthly survey and roughly one-eighth of the sample is receiving its last monthly survey.[5]

The BMS sample is about 50,000 households a month. The ASEC sample is about 90,000 households from the March BMS, with some additional sample being drawn from some of the households in the February and April samples that are not in the March sample. Sample

[4] The longitudinal component of the CPS is only applicable to the housing unit. Individuals that leave a housing unit are not followed and thus exit the sample. Conversely, individuals that take up residence in a housing unit during the 16 months are introduced into the sample.

[5] The first monthly survey and fifth month-in-sample are known as the "incoming rotation" months, and the fourth month-in-sample and eighth month-in-sample are known as the "outgoing rotation" months. Additional sets of questions are included on the CPS-BMS questionnaires of incoming and outgoing rotation months.

weights are provided in the public-use data files that allow for the estimation of nationally representative population statistics.

We use the 2010 ASEC sample and our analysis focuses on the 102,817 working-age civilians ages 25 through 61 years to avoid confusing reductions in work or economic well-being associated with disability with reductions or declines associated with retirement at older ages or initial transitions in and out of the labor force related to job shopping at younger ages. All respondents in the ASEC will be asked the work-activity limitation question and either concurrently or previously will have been asked the six impairment/activity limitation questions. The ASEC also includes demographic information on age, sex, race/ethnicity and educational attainment.

Employment. There are numerous employment measures available from the CPS program. In Table 1 we define a weekly measure of employment and two measures of employment based on the previous year—worked at least 52 hours or worked full time.

Income and Poverty. We use two income-based measures of economic outcomes: poverty and household size-adjusted income. For each individual in our CPS-ASEC sample, we calculate household size-adjusted income, which is a measure of the amount of financial resources at his or her disposal. Algebraically, household income is the sum of each household member's income divided by the square root of the number of household members. Like per capita income, this measure assumes that everyone in the household has access to the same amount of income, but unlike the per capita measure each additional member does not have the same impact but rather a smaller impact. This is a standard method of measuring the individual resources of individuals within household units. (See Atkinson, Rainwater, and Smeeding, 1995;

and more recently Burkhauser, Feng, Jenkins, and Larrimore, forthcoming, for a discussion of this method).

We also use whether a family's income falls below the poverty line as a measure of economic well-being. The Census Bureau calculates poverty thresholds for different types of families (total size, number of members under 18 years old, and number of members 65 years or older), along with standard poverty thresholds, to construct a poverty measure (See Ruggles, 1990, and Citro and Michael, 1995, for a discussion of this method).

RESULTS

Population Size

Table 2 provides estimated population size and corresponding prevalence rates by disability measures. Somewhat surprisingly the six-question sequence captures about the same size population as that captured by the single work-activity limitation question. Of the 151,398,934 working-age non-institutionalized civilians, 11,934,894 (7.9 percent) reported at least one of the six impairments/activity limitations in the sequence and 12,531,314 (8.3 percent) reported a work-activity limitation. While this may suggest that the prevalence of disability in the working-age population is relatively insensitive to the questions used to capture it, we will soon show that this similarity conceals dramatic differences in the people captured by these two measures of disability as well as in their socio-economic characteristics.

Demographics

The demographics of the two populations are quite similar, also shown in Table 2. The proportions of the populations that are female are quite similar: 51.4 percent of the six-question sequence population and 51.3 percent of the work-activity limitation population. The age distribution is also similar, with the percentages in any specific-age subgroup never being more

than a full percentage point different between the two populations. Racial/ethnic distributions in the two populations are also similar, although the six-question sequence has a higher percentage of white respondents than the work-activity limitation group. Educational attainment appears to slightly differ between the two populations, with the six-question sequence population more likely to have some college or a bachelor's degree or higher, when compared to the work-activity limitation population.

Economic Outcomes and Disability-Related Programs

Table 3 compares employment, economic well-being and program participation of these two populations. The six-question sequence population is much more likely to be employed across all of our measures of employment and hence not surprisingly to have greater average income and a lower risk of poverty. Table 3 also contains the percentage of individuals receiving income from several disability-related programs within each of the two populations. Once again the differences are stark. The six-question sequence population is much less likely to receive any of the major disability related program benefits than the work limited population – 41.8 percent versus 53.1 percent, respectively.

Results from Tables 2 and 3 show that while the overall prevalence of disability using the six-question sequence is approximately the same as the prevalence of disability using a single work-activity limitation question, as are the broad demographic characteristics (age, race, gender and education) of these populations, there are dramatic differences in the employment, program participation, and economic well-being of these two populations.

A Fuller Measure of the Disability Population

The reason for these dramatic differences in the employment, program participation, and

economic well-being of these two populations is found in Figure 1. The total population found using the broader seven-question sequence is denoted by "A + B + C" in Figure 1. However, only 40 percent of the people in this broader disability category are the same people (that is, have answered affirmatively to both a question in the six-question sequence and the work-activity limitation question – "B" in the diagram). Again, in Figure 1, the six-question sequence population is "A + B" and the work-activity limitation population is "B + C". Using either of these disability definitions will dramatically understate the population with disabilities captured by a seven-question sequence that includes the six-question sequence and the work-activity limitation question, "A + B + C".

But even more important, as shown in Table 4, the 30 percent of this broader seven-question disability population who report a work-activity limitation only ("C" in Figure 1) are significantly different in their employment and program participation than the 30 percent of this broader population who report one of the impairment/activity limitations captured by the other six questions but who do not have a work-activity limitation ("A" in Figure 1). For instance, as can be seen in row 4 of Table 4, the work-activity limitation only population ("C" in Figure 1) has an employment rate of 22.8 percent, much lower than the 57.3 percent employment rate of the population who in row 5 of Table 4 only reported one of the six disabilities ("A" in Figure 1). Similarly, the work-activity limitation only population in row 4 ("C") has a program participation rate of 37.6 percent, much higher than the 11.6 percent program participation rate for the six-sequence only population ("A") found in row 5.

Thus using either the broad six-question sequence ("A + B" in Figure 1) or the work-activity limitation population ("B + C" in Figure 1) will not only understate the larger population with disabilities captured by the seven-question sequence questions ("A + B + C" in Figure 1)

but may create biased estimates of the employment, program participation, and economic well-being of the overall population with disabilities as well. As can further be seen in Table 4, comparisons of employment or SSDI-SSI program participation rates in the six-question population in row 1 of Table 4 ("A + B") with the work-activity limitation question in row 2 ("B + C") show smaller but still substantial differences than those between "A" and "C" since both questions include a common set of individuals found in row 6 ("B" in Figure 1) with substantially lower employment rates and substantially higher program participation rates.

A Face Validity Test

Both the SSDI and the SSI programs are targeted to working-age people with disabilities who are unable to perform any substantial gainful activity based on an impairment stemming from their health condition (the SSA's set of medical listings). The severity of the work-activity limitation required for entry onto this program is clearly within the ICF definition of a disability. Hence one face validity test of any sequence of questions used to capture the population with disabilities is its ability to capture this part of the disability population. Figure 2 is a Venn diagram that divides the population receiving SSDI or SSI benefits based on their responses to the seven disability-based questions in the March CPS population. The six impairment/activity limitation questions ("A + B") are only able to capture 63.3 percent of this population, missing the 28.7 percent of this population that only report a work-activity limitation ("C"). Likewise, while the work-activity limitation question ("B + C") captures 84.1 percent of this population, it still misses the 7.9 percent of this population that only reports one of the six impairment/activity limitations questions ("A"). Together, the broader seven-question measure ("A + B + C") captures 92.0 percent of the SSDI/SSI population.

These results provide a face validity test of the ability of these two alternative measures of disability to capture a "true part" of the disability population. We find that despite its greater number of disability questions, the six-question sequence is less able to identify SSDI and SSI beneficiaries than the work-activity limitation question alone. This suggests that the failure to include some form of work-activity limitation question in a set of questions aiming to capture the broader disability population will substantially undercount the number of persons actually receiving SSDI or SSI benefits. But it also suggests that using the work-activity limitation question alone will also fail to capture the entire SSDI/SSI population and that adding the six-question sequence to it will marginally improve the share of the SSDI/SSI population captured. Because the employment rates of these missing SSDI-SSI beneficiaries are likely to be substantially lower than those of the rest of the working-age population with disabilities, their absence from the officially measured population with disabilities in the six-question sequence ("A + B") is also likely to upwardly bias the employment rates in this population as well as downwardly bias its program participation rates in SSDI-SSI as captured in the 2010 CPS-ASEC data.

Trend Analysis

Our analysis above focused on the levels of employment, program participation and economic well-being found in the 2010 CPS-ASEC data. An important question is whether definitional difference influence major conclusions about the economic status of people with disabilities. Below, we look more systematically at how sensitive reported levels and trends in employment and program participation are across these alternative measures of the working-age population with disabilities over the Great Recession years 2007-2010, taking fuller advantage of the longitudinal nature of the CPS data. In doing so we test for significant differences in

employment rates of the working-age population with disabilities using the now-official BLS six-question sequence (A + B), the work-activity limitation question (B + C) and the broader seven-question sequence (A + B + C).

The six-question disability sequence was first introduced into the CPS-BMS survey in June 2008 and given to all respondents taking part in that month's survey. Thereafter this sequence of disability questions has been asked of each new respondent in their first month-in-sample and again in their fifth month-in-sample. In contrast, the CPS-ASEC work-activity limitation question, and the series of questions on SSDI and SSI program participation, employment, and income in the previous year have been asked of all respondents since 1981. Because some part of this March population is in its first or fifth month-in-sample they are also asked the CPS-BMS six-question disability sequence. Hence the work-activity limitation and the six-question disability sequence were asked contemporaneously in March 2009 and March 2010 to the 25 percent of the CPS-ASEC population who were also in their first or fifth month-in-sample. This was not the case in March 2007 or March 2008 since the six-question sequence did not exist until June 2008. Therefore, no persons in our March 2007 or March 2008 CPS-ASEC sample will have contemporaneous six-question sequence information.

Despite this we will be able to increase the sample size of all four of our CPS-ASEC work-activity limitation populations who also responded to the six-question sequence by including those who did not contemporaneously report their six-question sequences. In the case of March 2007 and 2008 respondents, we do so by pulling that information off their subsequent responses to the six-question sequence in either June 2008 or during their first or fifth month-in-sequence. In the case of the March 2009 and 2010 respondents we do so using either previous or subsequent responses.

That is, when looking at employment rate trends, we use respondents who at any point in their interview cycle answered employment questions, the work-activity limitation question, and the six-question sequence of disability. In this part of the paper, we focus on current employment questions (that is, whether the respondent "worked last week") and the six-question sequence of disability which are asked every month in the CPS-BMS survey. But in doing so, two limitations arise. As discussed above, the six-question sequence of disability commenced in June 2008 and therefore, the first cohort in which it is possible to find responses to all three of these question sets consists of March 2007 respondents who were in month-in-sample 1 when they answered the work-activity limitation question and month-in-sample 8 (June 2008) when they answered the six-question sequence. The second limitation of this technique is that the work-activity limitation question is only asked in March. Coupled with the 4-month-in followed by the 8-month-out followed by the 4-month-in interview sequence, this means that people who were interviewed in March (and therefore, answered the work-activity limitation question) were never interviewed from July- November. So, we can only look at employment trends for those who reported their contemporaneous weekly employment from December–June, for 2007-2010. To try to control for this gap in our information on employment, and recognizing that employment rates systematically vary across a calendar year, we split these seven available months into four-month periods – December to March and March to June for each available year to better control for seasonality. As a result we are able to provide estimate employment rates for seven discrete points in time between March 2007 and March 2010 as reported in Figure 3.

Figure 3 shows the employment trends of working-age males across the Great Recession years of 2007-2010.[6] As expected, given the substantial drops in employment over this period, the employment rates for March-June 2007, before the start of the Great Recession, are the

[6] Trends for females are available from the authors.

highest recorded over the entire period. As the recession became more prolonged, employment rates fell with some seasonal variation. Employment rates are highest for those who report no disabilities based on the seven-question sequence. Nonetheless the employment rate of this non-disabled population falls continuously over this period from a high of 92.4 percent in March-June 2007 to 84.5 percent in March-June 2010. The employment rates of this non-disabled population are somewhat above the average employment rates for the entire population which fall from 86.5 in March-June 2007 to 78.0 in March-June in 2010.

The employment rates of all three of our alternative measures of the working-age population with disabilities—the six-question sequence (A + B), the work-activity limitation question (B + C) and the seven question sequence (A + B + C) —are dramatically lower than those non-disabled or entire population. As was the case in the March 2010 sample discussed above, the employment level in the six- and seven-question sequences are similar and both are substantially below the employment rate in the work-activity limitation population but we now see that all three of the employment rates trend downward over the 2007-2010 period.

Below we test for significant differences in both levels and trends between the official six-question BLS working-age population with disabilities and our other two formulations. Since the same respondents are in multiple waves of data, the errors may be heteroskedastic. To correct for this, we estimate our employment rate model using weighted least squares (with the weight being the reciprocal of the variance of the measurement) and regress the employment rate on an indicator variable (showing whether the employment rate was for the six-question of disability sample or the seven-question sample),[7] a time trend and the interaction between the indicator and the time trend.

[7] When comparing the work limitation question and six-question trends, the indicator variable would be whether the employment rate was for the six-question sample or the work limited sample.

Using this method we show that employment rate levels found in work-activity limitation sequence are significantly lower than in the six-question sequence population but there is no significant difference in their trends. We then show that there is no significant difference in levels or trends in the employment rates of the seven- and six-question sequence populations. The complete regression results are reported in Table A1.

Figure 4 shows the program participation trends for working-age males. Disability program participation questions only occur in the March CPS and cover SSI/SSDI receipt in the previous year. Because of this, there are only three points of time covered in Figure 4 – 2007, 2008 and 2009. As was the case for our March 2010 sample, our work-activity limitation sample has a much higher program participation rate than the six-question sequence sample or the broader seven-question sequence. There are not enough observations to run regressions to compare trends, but visually, the trends look similar.

Figure 3 shows that the employment rates captured in the official BLS six-question sequence working-age population with disabilities are significantly higher than those found in the work-activity limitation-based working-age population with disabilities. But during the Great Recession the negative employment trends found in these two populations were not significantly different. Adding the work-activity limitation question to the six-question sequence of disability will capture an important portion of the disabled population that is not being captured by the six-question sequence but will not significantly affect the levels and trends in employment rates. While our data are too thin to do significance testing, Figure 4 provides observational evidence that the six question sequence population has substantially lower program participation rates in SSDI-SSI than does the work-activity limitation population but the increasing trends found in both populations were not very different. As was the case for

employment rates, the differences in program participation in the six- and seven-question sequence populations were not very great.

CONCLUSIONS AND ADDITIONAL RESEARCH

The CPS survey design allows researchers to compare populations who have both answered a traditional work-activity limitation question asked in the March CPS-ASEC and the new impairment/activity limitation six-question sequence concurrently or in a previous month of the CPS-BMS. Taking full advantage of this design, we provide plausible evidence that the decade-long effort to introduce ICF-consistent questions regarding disability into two of the most important federal government surveys used by academics and policymakers (e.g. Department of Labor) to measure the socio-economic characteristics of Americans—the CPS-BMS and the ACS—has resulted in a set of six questions which significantly understate the size of the working-age population with disabilities. (These questions are now being included in the American Housing Survey and are being considered for other national surveys.) And more seriously, when used without some measure of work-activity limitation, this six-question sequence of disability will overstate the employment rates, understate the SSDI and SSI program participation numbers, and understate the poverty rates of the broader working-age population with disabilities.

The reason is that only about 40 percent of the union of those who report either a work-activity limitation and/or one of the impairment/activity limitations in the six-question sequence are the same people. Using either one or the other of these disability definitions will dramatically understate the population with disabilities captured by the broader seven-question sequence that includes the six-question sequence and the work-activity limitation question ("A + B + C" in all of previous tables and figures). But even more important, the disability population

who report a work-activity limitation but are missed by the six-question sequence ("C") are significantly different in their employment, program participation, and economic well-being than those who report not having a work-activity limitation but do report having one of the impairment/activity limitations captured by the other six questions ("A"). Thus using either subsample will significantly differ from the population values found in the overall sample ("A + B + C") and may create biased estimates of the employment, program participation, and economic well-being relative to the overall population with disabilities as shown in Table 4. When we more formally track levels and trends in the employment and SSDI-SSI program participation over the Great Recession (2007-2010), we find significant differences in the employment rates in the six question and work-activity limitation populations but not in their negative trends. But we find no differences in the levels and trends in employment rates in the six and seven question populations.

The use of the work-activity limitation question in the CPS is somewhat controversial but we argue that ignoring this aspect of disability in the six-question CPS/ACS disability sequence is also controversial. Based on ICF standards, SSDI and SSI beneficiaries should be captured in a working-age population with disabilities. Using this face validity test, we show that using the six-question sequence to capture a disability population will only include 63.3 percent of those receiving SSDI and SSI benefits in the CPS-ASEC. Adding the work-activity limitation question to these six questions increased the percentage of SSDI and SSI beneficiaries captured in the data by 28.7 percentage points. This finding does not suggest that the work-activity limitation question is flawless, for example it misses the 7.9 percent of SSDI-SSI population that only reports one of the six impairment/activity limitations questions. Rather we argue that it is the best measure that we have currently to identify program participants. Excluding this question

from the broader disability sequence has damaged our ability to capture an important non-random component of the overall working-age population with disabilities that includes those with substantially lower employment rates, higher program participation rates and lower income levels than found in the six-question sequence-based population.

Because the CPS data does not provide information on SSDI and SSI beneficiaries' health conditions, we are not able to provide more nuanced information on the types of health condition-based impairment/activity limitations that are most likely to be missed by the six-question sequence in the CPS and ACS and hence provide some method of testing the value of alternative CPS questions in better capturing this population. But linking SSA records to the CPS and ACS would allow one to do such face validity tests. We urge the SSA and the Census to work together to create these merged data sets and make them available to the research community. Alternatively, it would be useful to include all seven questions in the NHIS or the new NHATS (National Health and Aging Trends Study) to see how well this short sequence matches the more detailed morbidity population that can be created in such health-centered surveys.

Doing so would belatedly follow the advice of the President of the American Statistical Association, who in 2006 urged that research on technical and methodological adjustments to a work-activity limitation question continue until it could be added to the ACS to improve its measurement of work disability.

Table 1: Disability and employment questions in the Current Population Survey

Question	Question wording
Disability Questions	
Work-activity limitation (CPS - ACES)	Does anyone in this household have a health problem or disability which prevents them from working or which limits the kind or amount of work they can do?
Hearing difficulty (CPS - BMS)	Is anyone deaf or does anyone have serious difficulty hearing?
Vision difficulty (CPS - BMS)	Is anyone blind or does anyone have serious difficulty seeing even when wearing glasses?
Difficulty concentrating, remembering (CPS-BMS)	Because of a physical, mental, or emotional condition, does anyone have serious difficulty concentrating, remembering or making decisions?
Physical difficulty (CPS-BMS)	Does anyone have serious difficulty walking or climbing stairs?
Self care difficulty (CPS - BMS)	Does anyone have difficulty dressing or bathing?
Independent living difficulty (CPS-BMS)	Because of a physical, mental or emotional condition, does anyone have difficulty doing errands alone such as visiting a doctor's office or shopping?
Employment Questions	
Percentage currently employed (CPS - BMS)	Last week, did [person] do any work for either pay or profit?
Percentage working at least 52 hours in the prior calendar year (CPS - ACES)	Work hours > = 52. To construct this variable, use the following two questions: (1) During [the previous calendar year] in how many weeks did [person] work even for a few hours? Include paid vacation and sick leave as work, and (2) In the weeks that [person] worked [the previous calendar year], how many hours did [person] usually work per week?
Percentage that worked full-time, full-year in the prior calendar year (CPS - ACES)	Work hours per week >= 35 and work weeks per year >= 50. To construct this variable, use the following two questions: (1) During [the previous calendar year] in how many weeks did [person] work even for a few hours? Include paid vacation and sick leave as work, and (2) in the weeks that [person] worked [the previous calendar year], how many hours did [person] usually work per week?

Table 2: Population size, prevalence rate and demographics of non-institutionalized civilians ages 25-61, by disability measure

	Six-question sequence	Work-activity limitation
Population size	11,934,894	12,531,314
Prevalence Rate	7.9%	8.3%
Gender		
Male	48.6%	48.7%
Female	51.4%	51.3%
Age		
25 to 29 years	6.6%	6.9%
30 to 34 years	6.1%	6.4%
35 to 39 years	7.5%	7.8%
40 to 44 years	11.0%	11.0%
45 to 49 years	15.6%	15.8%
50 to 54 years	20.9%	20.1%
55 to 59 years	22.4%	21.9%
60 to 61 years	9.9%	10.1%
Race/Ethnicity		
White non-Hispanic	68.2%	65.2%
Black non-Hispanic	15.2%	18.3%
Other race non-Hispanic	4.6%	4.7%
Hispanic	11.8%	11.6%
Educational Attainment		
Less than high school	20.7%	22.3%
High school or equivalent	36.3%	37.7%
Some college	28.4%	27.3%
Bachelor's degree or more	14.7%	12.7%

Source: Authors' calculations using March 2010 Current Population Survey
Note: Sample weights are used to compute representative estimates

Table 3: Socio-economic outcomes and program participation of non-institutionalized civilians ages 25-61, by disability measure

Economic outcome/Program Participation	Six-question sequence	Work-activity limitation
Percentage currently employed	30.8%	16.6%
Percentage currently in the labor force	36.5%	20.6%
Percentage working more than 52 hours in the prior calendar year	37.9%	23.4%
Percentage that worked full-time, full-year in the prior calendar year	20.4%	7.5%
Median wages and salaries of full-time, full-year workers	$35,152	$32,120
Poverty rate	25.6%	30.1%
Median household size-adjusted income	$22,066	$19,486
Social Security Disability Insurance (SSDI)	25.5%	32.3%
Supplemental Security Income (SSI)	16.8%	20.8%
SSDI and/or SSI	38.9%	49.2%
Workers' Compensation	1.1%	1.7%
Veterans Disability	3.1%	3.8%
Any of the above programs	41.8%	53.1%

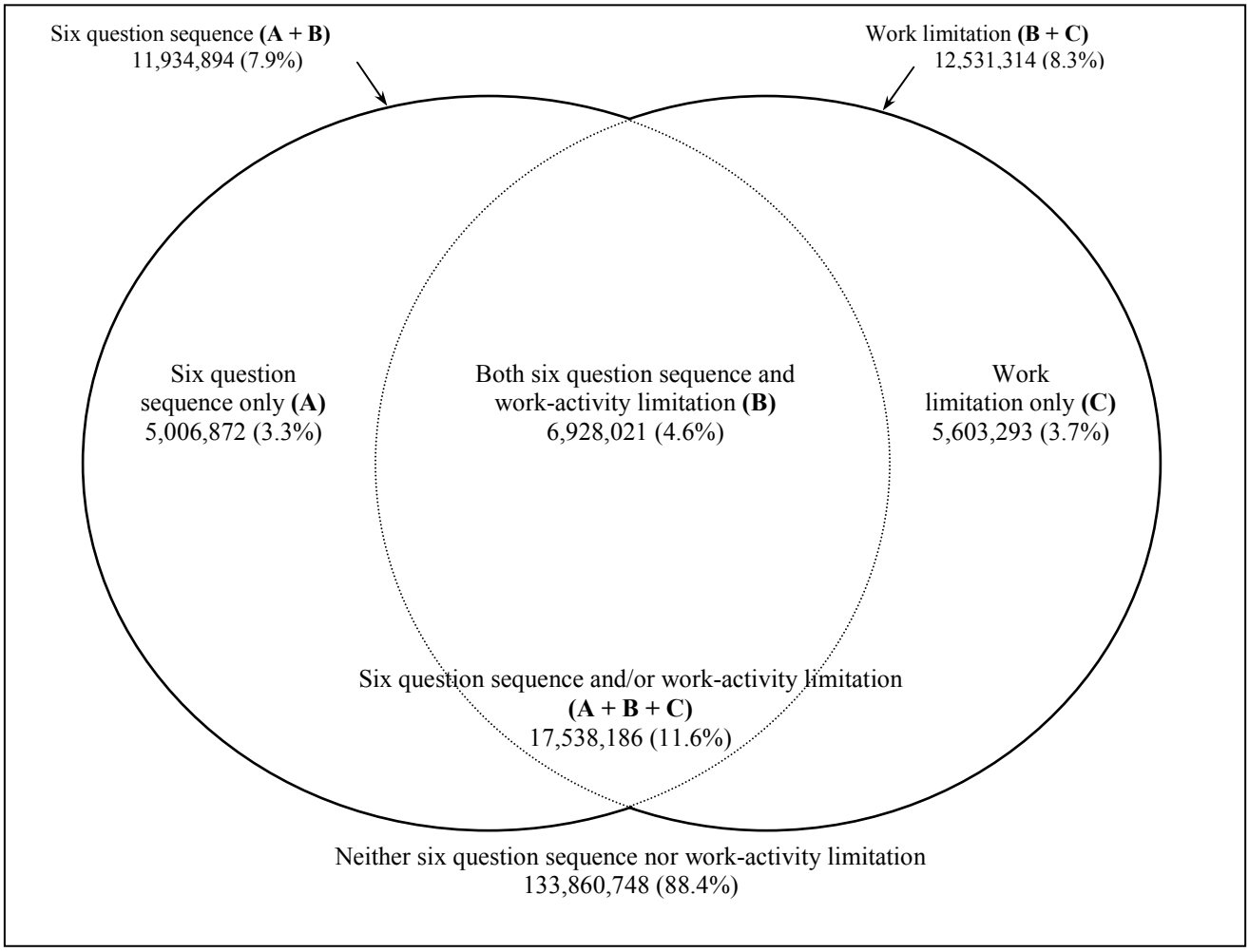
Source: Authors' calculations using March 2010 Current Population Survey
Note: Sample weights are used to compute representative estimates

Table 4: Employment- and Disability-related program participation rates among non-institutionalized civilians age 25-61, by specific disability measure

Disability measure	Employment rate	SSI-DI rate
Six-question sequence of disability (A + B)	30.8%	38.9%
Work-activity limitation question (B + C)	16.6%	49.2%
Either six-question or work-activity limitation (A + B + C)	28.2%	38.5%
Work-activity limitation but no six-question sequence (C)	22.8%	37.6%
Six-question sequence but no work-activity limitation (A)	57.3%	11.6%
Both work-activity limitation and six-question sequence (B)	11.7%	58.6%

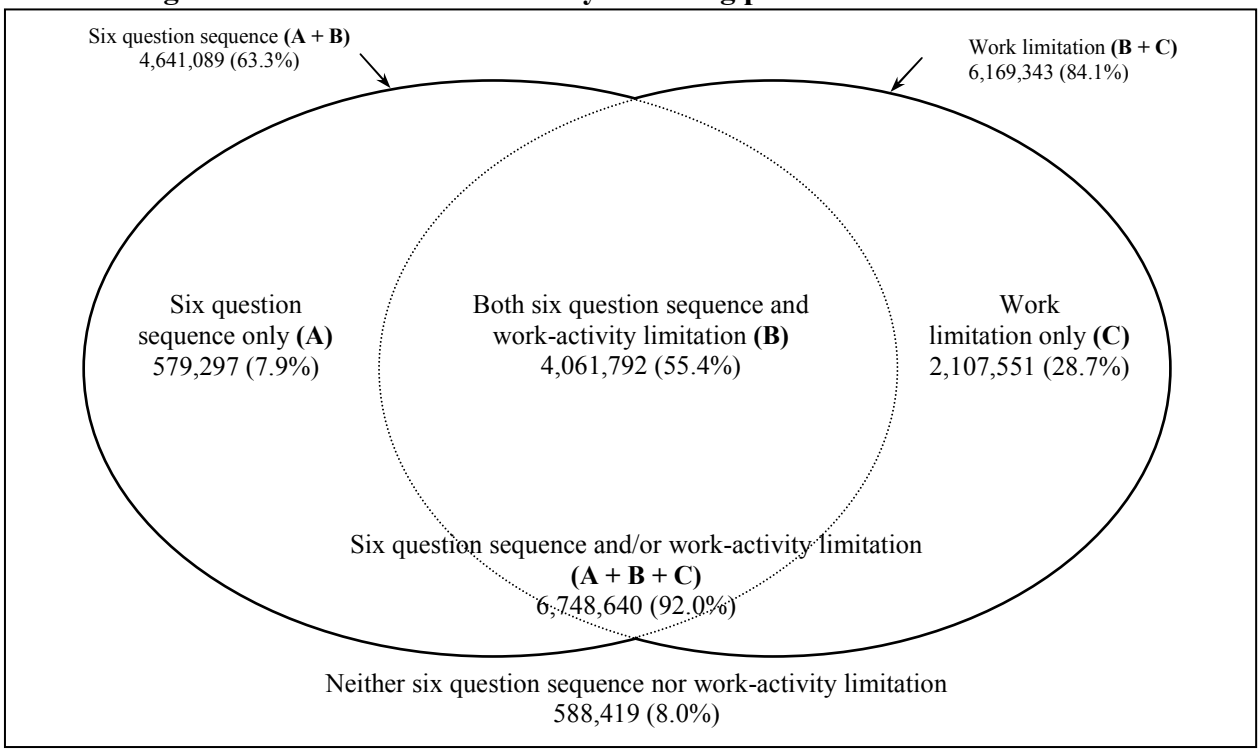
Source: Authors' calculations using March 2010 Current Population Survey
Note: Sample weights are used to compute representative estimates

Figure 1: Population size and prevalence rate (in parentheses) of non-institutionalized civilians ages 25-61, by six question sequence and work-activity limitation



Source: Authors' calculations using the 2010 March Current Population Survey.
Note: Sample weights are used to obtain representative estimates.

Figure 2: Number and percentage of the 7,337,059 non-institutionalized civilians ages 25-61 receiving SSDI/SSI income who identify as having particular disabilities



Source: Authors' calculations using the 2010 March Current Population Survey.
Note: Sample weights are used to obtain representative estimates.

Figure 3: Male Employment Rate, respondents ages 25-61, by disability type

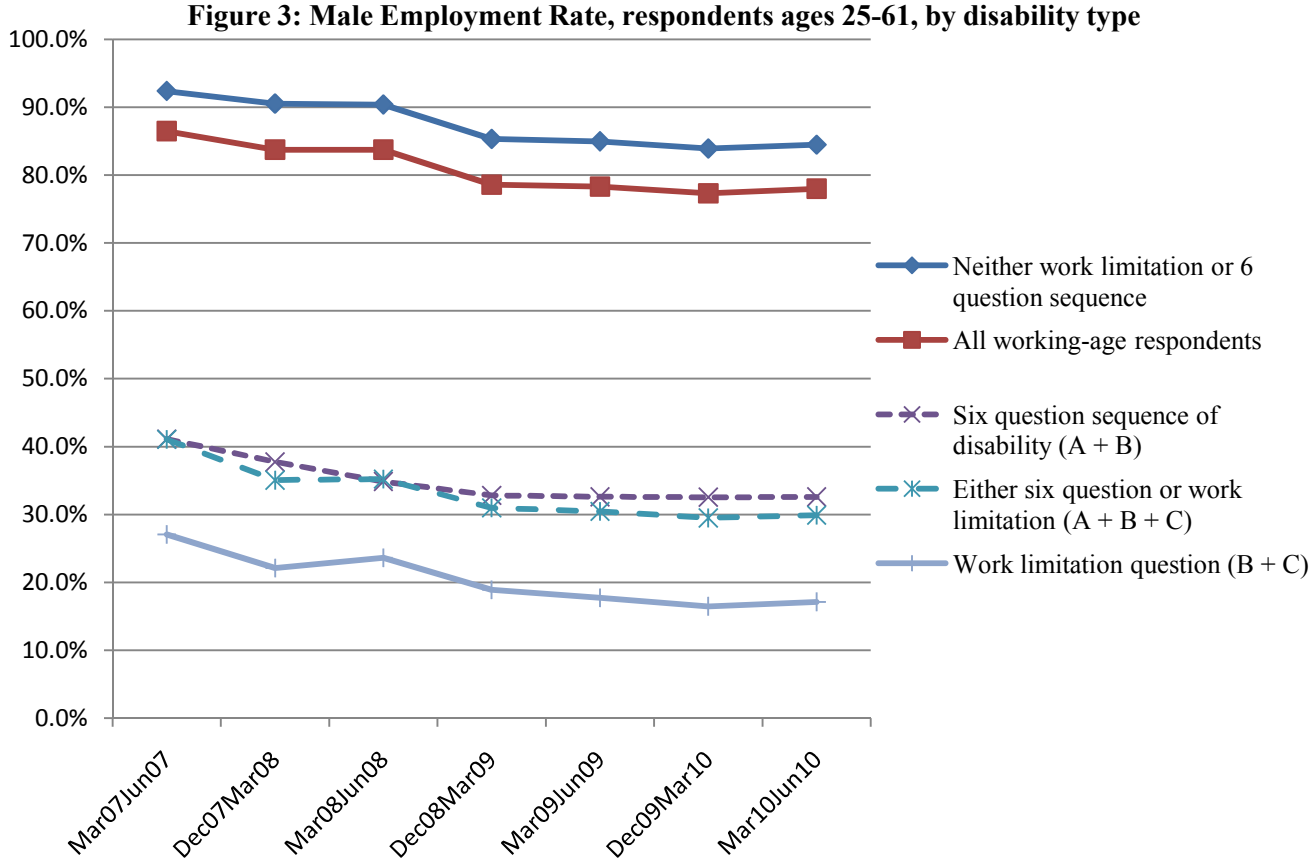


Figure 4: Male SSI-SSDI rates, respondents ages 25-61, by disability type

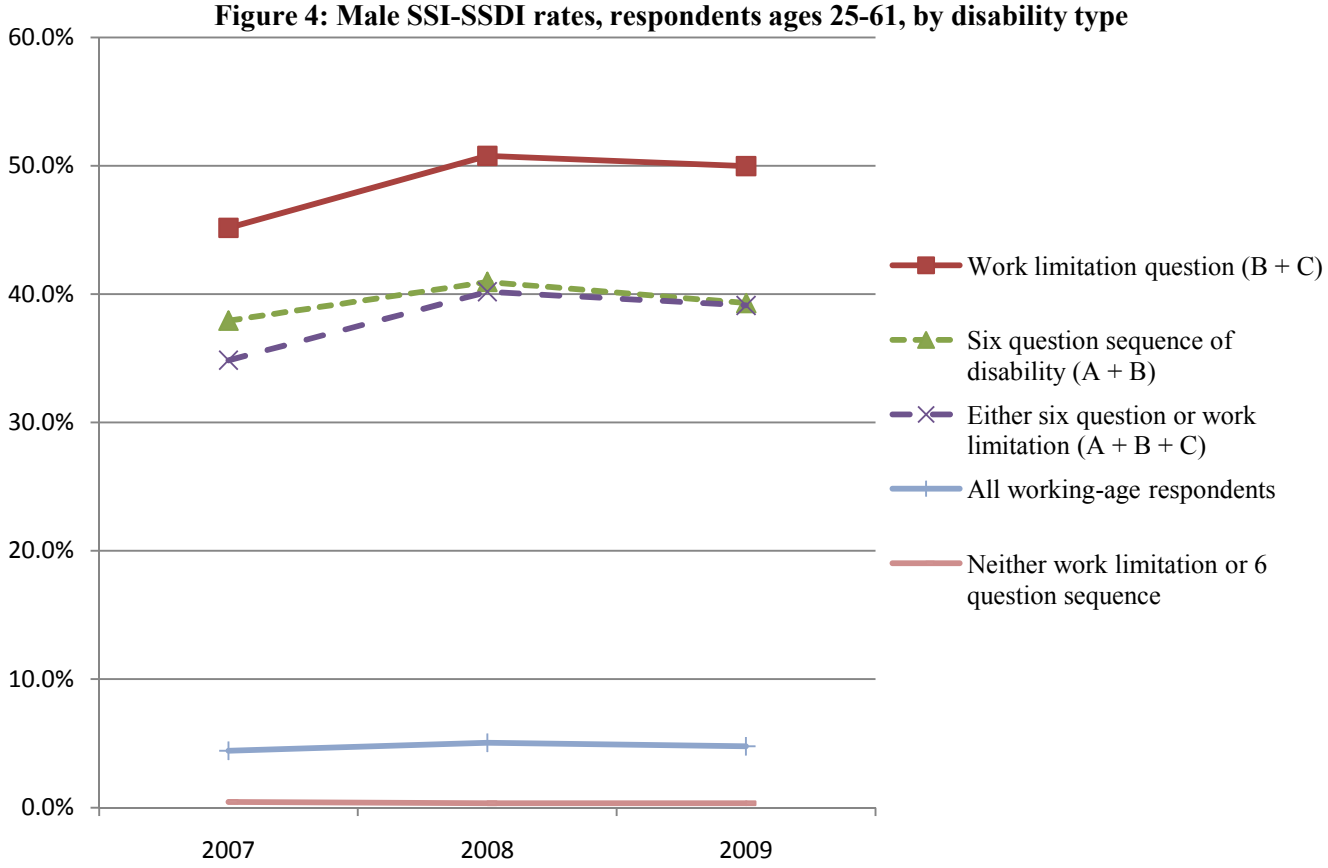


Table A1: Regression results for employment trend analysis, working-age men[1]

Comparing Work-activity limitation to Six-Question Sequence[2]

Variable	Parameter Estimate	t-value	pr > |t|
Intercept	0.399	18.75	< .0001
Year	-0.013	-2.81	0.0184
Work-activity limitation *(level)*	-0.134	-5.34	0.0003
WL * Year *(trend)*	-0.003	-0.55	0.5959

n = 14

Comparing Six-Question Sequence to the Seven-Question Sequence

Variable	Parameter Estimate	t-value	pr > |t|
Intercept	0.399	23.91	< .0001
Year	-0.013	-3.59	0.005
Seven *(level)*	-0.002	-0.09	0.9303
Seven * Year *(trend)*	-0.004	-0.78	0.4536

n = 14

[1] The results for working-age women is similar

[2] Comparing work-activity limitation to the seven question sequence leads to similar results

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