The Future of Social Security Disability Insurance
Technical Appendix

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This technical appendix explains the estimation method used in *FRBSF Economic Letter* 2013-17, "The Future of Social Security Disability Insurance" by Mary C. Daly, Brian Lucking, and Jonathan A. Schwabish.

http://www.frbsf.org/economic-research/publications/economic-letter/2013/june/future-social-security-disability-insurance-ssdi

Data sources

- Social Security Disability Insurance (SSDI) caseloads and covered workers data are from the *Annual Statistical Supplement to the Social Security Bulletin*.
  http://www.ssa.gov/policy/docs/statcomps/supplement/
- Social Security Administration (SSA) projections data are from "Short-Range Actuarial Projections of the Old-Age, Survivors, and Disability Insurance Program, 2010," by Michael L. Stephens and Chelsea A. Thomas, SSA Office of the Chief Actuary, Actuarial Study 121 (June 2011), reflecting results from the 2010 Trustees Report.
  http://www.socialsecurity.gov/oact/NOTES/pdf_studies/study121.pdf
- Historical population estimates are from the Bureau of Labor Statistics' Current Population Survey.[1] http://www.bls.gov/cps/
- Population projections are from the Census Bureau.[2]
  http://www.census.gov/population/projections/

Decomposing the recipiency rate

The recipiency rate is equal to the number of disabled worker caseloads as a share of the working-age population. The recipiency rate in year t, R_t can be expressed as:

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[1] Bureau of Labor Statistics population estimates differ from the Social Security Administration's "Social Security area" population estimates.
[2] Census Bureau population estimates differ from the Social Security Administration's "Social Security area" population estimates.

$$R_t = \sum_i \frac{C_{i,t}}{P_t},$$

where $C_{i,t}$ is the number of SSDI caseloads in demographic group i and year t and P_t is the size of the working-age population in year t.[3] We further decompose this ratio as

$$R_t = \sum_i \frac{C_{i,t}}{E_{i,t}} \times \frac{E_{i,t}}{P_{i,t}} \times \frac{P_{i,t}}{P_t},$$

where $E_{i,t}$ is the number of SSDI eligible workers in demographic group i and year t and $P_{i,t}$ is the size of the working-age population in demographic group i and year t.

Counterfactual recipiency rates

We consider several counterfactual scenarios of disability recipiency. The first and simplest is the scenario in which **the full retirement age is unchanged at 65**. We do not need a decomposition for this calculation. The counterfactual 2011 recipiency rate in this scenario, denoted $\tilde{R}_{2011}$, would be equal to the number of SSDI caseloads in 2011 for persons under the age of 65 divided by the working-age population in 2011.

Next consider the case in which caseloads evolve only due to the **aging of the population.** The counterfactual recipiency rate in this scenario is

$$\tilde{R}_{2011} = \sum_i \frac{C_{i,1980}}{E_{i,1980}} \times \frac{E_{i,1980}}{P_{i,1980}} \times \frac{P_{i,2011}}{P_{2011}} = \sum_i \frac{C_{i,1980}}{P_{i,1980}} \times \frac{P_{i,2011}}{P_{2011}}.$$

Now consider the case in which caseloads evolve only due to the **increase in women's labor force attachment.** This causes the share of SSDI eligible women in each age group to increase. For this exercise we let i index age groups and we differentiate between genders using the superscript m for males and f for females. Then,

$$R_t = \sum_i \frac{C_{i,t}{}^m}{E_{i,t}{}^m} \times \frac{E_{i,t}{}^m}{P_{i,t}{}^m} \times \frac{P_{i,t}{}^m}{P_t} + \frac{C_{i,t}{}^f}{E_{i,t}{}^f} \times \frac{E_{i,t}{}^f}{P_{i,t}{}^f} \times \frac{P_{i,t}{}^f}{P_t},$$

and the counterfactual recipiency rate is

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[3] We use the following age groups for men and women (14 total demographic groups): 20–29, 30–39, 40–44, 45–49, 50–54 55–59, and 60–64.

$$\tilde{R}_{2011} = \sum_i \frac{C_{i,2011}{}^m}{E_{i,2011}{}^m} \times \frac{E_{i,2011}{}^m}{P_{i,2011}{}^m} \times \frac{P_{i,2011}{}^m}{P_{2011}} + \frac{C_{i,2011}{}^f}{E_{i,2011}{}^f} \times \frac{E_{i,1980}{}^f}{P_{i,1980}{}^f} \times \frac{P_{i,2011}{}^f}{P_{2011}} \ .$$

In the special case in which we allow for the increase in women's labor force attachment to also include a **"catch-up" effect of women's disability receipt**, the above equation becomes

$$\tilde{R}_{2011} = \sum_i \frac{C_{i,2011}{}^m}{E_{i,2011}{}^m} \times \frac{E_{i,2011}{}^m}{P_{i,2011}{}^m} \times \frac{P_{i,2011}{}^m}{P_{2011}} + \frac{C_{i,2011}{}^f}{E_{i,2011}{}^f} \times \frac{E_{i,1980}{}^m}{P_{i,1980}{}^m} \times \frac{P_{i,2011}{}^f}{P_{2011}} \ .$$

Percentage point contribution to the increase in SSDI receipts

Now that we have these counterfactual recipiency rates, it is straightforward to calculate how much of the increase in total SSDI recipiency since 1980 can be explained by each factor. The percentage point contribution of each factor to total growth is calculated as

$$100 \times (\tilde{R}_{2011} - R_{1980})/(R_{2011} - R_{1980}).$$

Constructing an adjusted recipiency series

To create the "adjusted disability recipiency" series in Figure 3 we subtract from the actual recipiency rate the portion of growth that is attributed to the transitory factors outlined above. For example, we assign 56.2% of the growth in the recipiency rate from 1980 to 2011 to the transitory factors and 43.8% to residual factors. Because the recipiency rate rose by 2.4 percentage points over this period, from 2.3% to 4.7%, we subtract $0.562 \times 2.4 = 1.4$ percentage points from the actual recipiency rate. Thus, the adjusted rate in 2011 is 3.3%.

Projecting future adjusted recipiency rates

Because detailed SSDI caseload data from the *Annual Statistical Supplement* are only available through 2011, our projections of future recipiency rates begin in 2012. The lower dashed green line in Figure 2 assumes that adjusted disability recipiency will remain fixed at its 2011 value while the upper dashed green line assumes that adjusted disability recipiency will grow at the average annual rate observed from 1990 to 2010. To create an adjusted series from SSA's latest forecast, we use the detailed age-gender projections of disabled worker caseloads and SSDI-insured persons available in Stephens and Thomas 2011 (S&T). We combine these estimates

with Census Bureau population projections[4] and, adjust it using the same method we used for the adjusted disability recipiency series. We subtract from the S&T projection the growth that comes from the population aging, increased women's labor force participation, and the increased retirement age. Finally, because SSA updated their projections most recently in Board of Trustees of OASDI (2013) we scale the S&T adjusted series by the ratio of total caseloads in Board of Trustees of OASDI (2013) to total caseloads in S&T.

* The views in this summary are those of the authors and should not be considered those of the Congressional Budget Office, the Federal Reserve Bank of San Francisco, or the Board of Governors of the Federal Reserve System.

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[4] Census Bureau population estimates differ from the Social Security Administration's "Social Security area" population estimates.