Measuring the Spillover to Disability Insurance due to the Rise in the Full Retirement Age

Norma B. Coe & Kelly Haverstick

Center for Retirement Research
Boston College
140 Commonwealth Ave
Chestnut Hill, MA 02467

Acknowledgements:
The research reported herein was pursuant to a grant from the U.S. Social Security Administration (SSA) funded as part of the Retirement Research Consortium (RRC). The findings and conclusions expressed are solely those of the authors and do not represent the views of the SSA, any agency of the federal government, the RRC, or Boston College. The authors would like to thank Christopher Sullivan for excellent research assistance; Anirban Basu, Rena Conti, Mark Duggan, Tamara Konetzka, Perry Singleton, Will Manning, Matthew Rutledge, Meghan Skira, and April Yanyuan Wu for helpful suggestions. All errors are our own.

Corresponding author: Norma B. Coe, Center for Retirement Research at Boston College, Hovey House, 258 Hammond St, Chestnut Hill, MA 02467 Tel: (617) 552-8782 Fax: (617) 552-0191 e-mail: Norma.Coe@bc.edu

Abstract:

The increase in the Social Security program's Full Retirement Age provides exogenous variation in the generosity of the Social Security Disability Insurance (DI) program, based only on birth year. We exploit this variation to estimate the responsiveness of DI applications to the financial incentive to apply. We find that a 1-percentage-point decrease in the retirement-to-disability benefit ratio leads to a 0.25-percentage-point increase in the two-year DI application rate for the sample, which represents an 8-percent increase in applications. We estimate that this change in the financial incentive accounted for almost 6 percent of the DI applications in 2009. However, our estimates suggest that most of these induced applications were denied, so the effect on DI receipt is much smaller than on applications. In addition, we find little systematic difference in the covariates among individuals who eventually receive DI, suggesting that the screening process is consistent over time, even with the increase in applications.

1. Introduction

The Social Security Amendments of 1983 increased the Full Retirement Age (FRA) from 65 to 67, incrementally by birth year; people born in 1937 or earlier still have an FRA of 65, those born between 1938 and 1959 face a rising FRA, and those born in 1960 or later face an FRA of 67. These later cohorts also face a greater actuarial reduction in their Social Security benefits if they claim between the Earliest Eligibility Age (EEA) of 62 and their FRA. The amendments did not change the Social Security Disability Insurance (DI) program directly, but made the DI program relatively more attractive for the later birth cohorts by increasing their benefits relative to retirement benefits.

Since 1985, the DI rolls have increased dramatically, and the growth in the relative generosity of DI compared to Old Age retirement benefits is an often-cited reason (Autor and Duggan 2006). One component of this generosity increase is driven by the FRA increase. While the early literature (Mitchell and Phillips 2000 and Bound et al. 2004) predicted a negligible behavioral response, more recent work has found larger behavioral responses among the birth cohorts currently reaching retirement age. Duggan et al. (2007) use administrative data on DI enrollment and find that the 1983 amendments have led to an additional 0.6 percent of men (0.9 percent of women) ages 45-64 receiving DI benefits in 2005. However, because they use aggregate data, the authors are unable assess how the composition of the DI enrollees has changed over time, and have a harder time ruling out other macro-level changes that may be occurring at the same time, such as changes in insurance coverage, changes in the screening criteria of the DI program, or differences in the underlying health of the younger cohorts. Li and Maestas (2008) use

the *Health and Retirement Study* (HRS) and find that the increased FRA impacts the probability of applying for DI (0.04-0.30-percentage-point increase in the two-year application rate). However, they do not control for DI insurance status, which turns out to be very important, especially for married women. This paper also extends Li and Maestas (2008) by estimating the impact on total applications, determining the characteristics of the marginal applicant, and by testing the reasonableness of our application estimates by examining how DI receipt is impacted by these increased applications, which can be compared to Duggan et al. (2007).

The paper proceeds as follows. Section 2 describes the interaction between the two Social Security Administration (SSA) programs, DI and retirement. Section 3 discusses the model and data. Section 4 evaluates who is insured for DI and whether earlier birth cohorts are comparable to older cohorts, and Section 5 provides the results for DI applications and the impact on the SSA workload. Section 6 provides further analysis quantifying who is the marginal applicant and what impact these additional applications have on the DI caseload. Conclusions follow in Section 7.

2. The Interaction between DI and Retirement Benefits

Social Security retirement benefits are a function of an individual's earnings history and the age at which he or she claims benefits. The 1983 amendments, by slowly increasing the FRA, added birth year to the benefit determination formula for individuals born from 1937-1960. This variation is akin to the much-studied Social Security "notch" birth cohort of 1917-1921; it is borne of legislative design and is not a function of factors under individual control. Individuals with exactly the same earning histories and age of claiming benefits will get different benefit amounts based solely on their birth year.

Figure 1 illustrates this relationship. Individuals born in 1935 will get 80 percent of their full retirement benefit or Primary Insurance Amount (PIA) if they claim at age 62 or their full PIA at age 65. Individuals born in 1943, however, will get 75 percent of their PIA if they claim at age 62 or 93 percent at age 65, and only get their full PIA if they claim at age 66.

The DI program allows people who can no longer work to get their full-retirement benefit (100 percent of their PIA) early, at the age of disability instead of having to wait until their FRA. The 1983 amendments did not change the DI benefits; they did, however, impact the *relative* benefit for applying for DI. At age 62, someone born in 1935 has the choice of applying for DI and, if accepted, getting 100 percent of his or her PIA, or opting for early retirement and getting 80 percent of his or her PIA. Someone born in 1943, at the same age has the option of trying for 100 percent of his or her PIA through the DI program, or claiming early retirement benefits and receiving 75 percent of his or her PIA. This paper tests the responsiveness of the DI application decision to financial incentives by exploiting this legislation-induced variation in the relative financial benefit of claiming DI.

3. Model and Data

We start with a very simplified model of the decision of whether an individual should apply for DI benefits. Let us assume that the individual cannot work any longer, making leisure independent of the DI application decision and removing any job search effort from the model. A person is accepted to the program with probability p. The decision then simplifies to whether the net benefits from DI are greater than the next best option, which in this case is claiming Social Security retirement benefits immediately (or

at the earliest age possible).[1] The net DI benefits are the present discounted value of the future DI benefits over their lifetime starting immediately, equal to the full PIA, minus the costs of application, *c*. This cost may include monetized measures of time, doctors' visits, or stigma, and prevents people who have little-to-no chance of getting into DI from applying. Claiming Social Security retirement benefits can be done with minimal application costs (set equal to zero), but early retirement claimers face an actuarial reduction in their benefits for the rest of their lives. Thus, one applies at age *t* if and only if:

$$p*PDV(PIA) + (1-p)*PDV(\alpha_{yt}PIA) - c > PDV(\alpha_{yt}PIA) \quad (1)$$

which simplifies to:

$$PDV(PIA) - PDV(\alpha_{yt}PIA) > c/p \quad (2)$$

where PDV is the present discounted value, PIA is the primary insurance amount or the full retirement benefits, α_{yt} is the actuarial adjustment an individual in birth year *y* faces by applying for retirement benefits at age *t.*

The identification strategy for this paper relies on the fact that the actuarial adjustment factor is a function of birth year, and $\alpha_{y,t}>\alpha_{y+1,t}$. Thus, all else equal, an individual in a later birth cohort may be more likely to apply at a given age, and more likely to apply overall, because he or she has a greater relative financial gain by applying to the program.

To estimate how responsive DI applications are to financial incentives, we use the publicly available HRS from 1992 through 2008, merged with the SSA Detailed Earnings

[1] Since the benefit formula is actuarially fair, the assuming that the next possible age of claiming benefits is the next best option seems reasonable both due to potential liquidity constraints and because the PIA adjustment is actuarially fair on average, and DI applicants may have shorter-than-average life expectancy. We also test the difference between DI benefits and claiming SSA retirement benefits at the optimal age.

Records (HRS-SSA – the administrative earnings records are available through 2005). By using the Social Security administrative data, we can correctly determine DI insurance status based on employment history, calculate the Social Security and Disability benefits accurately, and create a measure of lifetime earnings. The SSA's earnings records span from 1951 to the last year the respondent gave permission to link the data, and provides each respondent's annual earnings and a running total of the number of Social Security covered quarters. For those who last gave permission to match to Social Security data before the end of the survey, we supplement the earnings history with self-reported data, averaging earnings for two adjacent waves for the intervening years, and cap earnings at the Social Security taxable maximum. The number of covered quarters is updated based on the annual earnings and the earnings threshold set by SSA.[2]

Table 1 delineates the sample cuts made to the dataset. Almost 32 percent of the total sample is lost because they do not match with administrative records.[3] We further limit the sample to those born between 1935 and 1943, inclusive. We lose 5 percent of these person-wave observations by examining behavior between ages 55 and 66. Only 74 percent of the individuals and 68 percent of these person-wave observations are insured by DI, by having worked the required number of quarters based on age, and 20 quarters within the last 10 years. One hundred ninety-eight individuals are dropped because they are already applying for or receiving DI benefits when first seen in the data, and 127 are dropped because they are not observed twice, and thus we cannot determine if they apply for DI benefits. We also drop individuals who were interviewed before their cohort was

[2] While the rules always refer to "covered quarters," it has been a misnomer since 1978. Covered quarters are calculated by the amount one makes in a calendar year, not the amount of time one was employed. In 2010, earnings of $1,120 are required to earn one quarter of coverage.
[3]Previous research (Olson 1999; Haider and Solon 2000; Kapteyn et al. 2006) has shown that failure to match to the SSA data does not substantially affect the representativeness of the sample.

selected based on the age of their spouses and a few respondents due to item non-response. These cuts leave 3,791 individuals or 12,259 person-wave observations in the sample.

The model highlights that the DI application decision should be based on three factors: (1) the financial incentives (PDV(PIA) – PDV(α_{yt}PIA)); (2) the likelihood of success (p); and (3) the opportunity cost of applying (c). Table 2 presents the descriptive statistics for covariates related to each of these factors for the entire sample and separately by gender. The statistics presented are based on person-wave observations and are not weighted for sampling design. The dependent variable in our regression analysis indicates whether a respondent applies for DI between the date of his or her interview (t) and the next two full calendar years ($t+1$).[4] Only 3 percent of the sample applies during any two-year period; which is driven by single men in the sample. In total, 8.8 percent of our sample applies at any time during the observation period.

Financial Incentives: there are many ways to measure the financial incentives to apply for DI. Our baseline measure is the ratio of retirement benefits to DI benefits at time $t+1$, $\alpha_{\delta t}$, as illustrated in Figure 1 and first introduced in Duggan et al. (2007). It ranges from 75 percent to 93 percent, and averages around 80 percent for the sample. Alternative measures of this ratio include the ratio of the present discounted value of retirement at time $t+1$ and disability benefits, or the ratio of the present discounted value of the maximum retirement benefit (achieved by claiming at t*) and the disability benefits. These ratios are slightly lower, on average, 71 percent and 79 percent,

[4] If the respondent was uncertain whether he had applied for DI or Supplemental Security Insurance (SSI), or the RAND files indicate a probable incorrect response, we assume that individuals who are eligible for DI applied for DI, because the financial benefit is significantly higher than SSI and the disability determination criteria is identical.

respectively. However, due to the progressive nature of the benefits formula, these two calculations are a function of both the increase in the FRA and an individual's earnings history, which may be endogenous. We use these last two measures as robustness checks.

The model proposed in Section 2 emphasizes that difference in the present discounted value of future benefits might be the relevant margin, not the ratio. The difference in benefits between retirement at time $t+1$ and DI ranges between $48,000 and over $71,000, on average. The difference in benefits between retirement at t^* and DI ranges between $34,000 and $54,000. However, these two measures are also a function of both earnings history and birth year, so we also use these specifications as robustness checks.

Likelihood of Success (p): health and disability status are expected to be the strongest determinants in the DI application decision. Activities of daily living (ADL) measure the respondent's inability to do 13 routine daily tasks without difficulty.[5] Self-reported health is measured on a five-point scale, and 15 percent of the sample reports being in the lowest two categories of fair or poor health. Twenty to 25 percent, on average, report having frequent pain. A useful benchmark for longevity expectations is the ratio between self-reported longevity predictions and the statistical probability from standard life tables. While the average self-assessed longevity expectations for men are in line with the life tables, women estimate their longevity to be significantly less than the life tables (89-90 percent, on average). The average respondent in the sample has 1.2

[5] The daily activities include: bathing, dressing, eating, toileting, getting up from bed, sitting for two hours, climbing one flight of stairs, climbing several flights of stairs, getting up from a chair, stooping and kneeling, walking one block, walking several blocks, and pushing large objects.

self-reported major health conditions – high blood pressure, diabetes, cancer, lung disease, heart problems, stroke, psychological problems, or arthritis. There are known reporting errors with self-reported height and weight measures and conceptual problems with using the body mass index (BMI) as a measure of health (Cawley and Burkhauser 2006). Therefore, we use measured height and weight from the 2004 and 2006 waves, and correct the self-reported BMI measure by race, gender, years of education, and self-reported health. Corrected BMI measures equal to or greater than 30 are considered obese; approximately one-third of the sample is obese. The single women in our sample tend to be in the worst health. They have more ADLs and other functional limitations, more health conditions, higher percentage of obesity, and assess their mortality to be higher than the life table.

Age and education could impact the probability of acceptance directly through the retraining criteria. The general picture shows that there is little difference in the age and education between men and women.

Opportunity Costs (c): there are many factors that may be correlated with the opportunity cost of applying for DI. Labor market attachment (number of Social Security covered quarters), wages at last job, type of job, or lifetime earnings (PIA), might capture the attractiveness of alternative sources of income, if the individual can work at all.[6] All four measures vary considerably by gender. While the average benefit amount is $1,150, there is quite a bit of variation between men and women: the average benefit of married

[6]The PIA is calculated using the benefit formula and individual the earnings histories, we calculate the Primary Insurance Amount (PIA), the monthly benefit amount the respondent would receive were he to become disabled immediately and receive DI. The variation in PIA is solely a function of individual work history, and is a good summary measure of lifetime income.

men ($1,451) is almost twice that of married women ($819).[7] Further, women have worked an average of eight fewer years than the men in the sample. Job characteristics may also impact the DI application decision, both because of the likelihood to be injured and the ease of performing a job with a disability. Blue- and white-collar job determination is based on the occupation code of the current job if the respondent is working, and the last job if they are not. About one-third of the sample has a blue-collar job, with men about 20 percent more likely to have a blue-collar job than women of their same marital status.

Health insurance, and where health insurance coverage is accessed, could be determinants in the DI application decision (Autor and Duggan 2006; Gruber and Kubik 2002). While 82 percent of the total sample has health insurance, singles are much less likely to have health insurance than their married counterparts. This is not surprising considering the sizable portion of married individuals covered through their spouse's employer.[8] Individuals getting health insurance through their own employer may be less likely to apply out of fear of losing insurance, while uninsured individuals may be more drawn to apply for the Medicare benefits.

Given the long wait for benefits and the size of the financial gain to application, household income could impact the decision to apply to DI. Household non-labor income represents alimony, other income, and lump sum payments from insurance, pension, and inheritance, and does not include income from wages from either spouse. Net worth includes all financial wealth and the primary residence, but excludes Social

[7] We do not take into account spousal benefits in these calculations; this is only the benefit based on one's own earnings history. Thus it reflects individual work history, not household work history.
[8] Some respondents continue to receive insurance coverage from a spouse's employer despite a divorce or the death of their spouse. These categories of health insurance are not exclusive.

Security and defined benefit pension wealth. The women are poorer than the men in the sample in all three of these measures, with the only exception being married women have higher net worth, on average.

Familiarity with the DI program, as measured by previous applications, is also likely to impact the decision to apply again (Benitez-Silva et al. 1999). Singles in our sample are more likely to have applied in the past and been denied than their married counterparts. However, while single women are the most likely to have applied for DI in the past, single men are more likely to apply during our observation period.

Just under half of our sample is female and just over one-quarter is not married. There are substantial racial differences among these groups; almost 36 percent of the single-women sample is a minority, while less than 20 percent of the married sample is a minority.[9]

4. Who is Insured for DI?

Because one's birth year is immutable, the 1983 amendments set up a quasi-natural experiment that allows us to estimate the responsiveness of the DI application decision to financial incentives, relying solely on exogenous variation to identify this effect. Simple comparisons by birth year are suitable as long as these birth cohorts are similar on other dimensions. One concern, however, is that there might have been shifts in labor force participation rates between birth cohorts, leading to varying DI insurance

[9] These rates are higher than in the general population because of the HRS survey design to oversample minority groups, and these descriptive statistics are not weighted to correct for survey design. We do weight the marginal effects to take into account the sample design in section 5.3 when we discuss the impact of the law changes on the total number of DI applications.

coverage rates.[10] Numerous studies document the changing labor force participation rates, for both men and women (for example, Juhn and Potter 2006), and there has been some work documenting differing DI insurance rates (Mitchell and Phillips 2001; Autor and Duggan 2006). If there are unobservable characteristics that are driving differing DI coverage rates, and these unobserved characteristics also are correlated with the DI application decision, the estimation strategy would be invalid.

In order to test this concern, we calculate DI insurance status at age 55. Table 3 presents the percent covered by DI by birth year, broken down by gender and marital status. It is clear that there are statistical differences in the average insurance coverage rates, especially for married women. When we control for observable characteristics, such as educational attainment, marital history (ever divorced or ever widowed), and the age one had his or her last child, there is no longer a statistical difference for men or single women. However, there remains an unexplainable variation in the insurance coverage rates by birth year for married women. Only once we allow for a linear trend in insurance coverage rates does the difference between birth cohorts become negligible. In the DI application model, we will thus include a linear trend for married women and all of the covariates that predict insurance status.

5. Impact on DI Applications

We estimate the effect of the DI generosity on the two-year DI application decision using person-wave data. We model the decision to apply using a probit regression:

[10] In order to be insured for DI, one must have worked a total of (age-22) quarters and have worked 20 quarters in the last 10 years.

$$A_{it}^{*} = \beta_1 FG_{it} + \beta_2 p_{it} + \beta_3 c_{it} + \beta_4 W_{it} + y_t + \epsilon_{it} \qquad (3)$$

where $A_{it} = 1\ if\ A_{it}^{*} > 0, A_{it} = 0\ if\ A_{it}^{*} < 0$ is the observed two-year application decision for individual *i* between time *t* and *t+1* and $\epsilon_{it} \sim N(0,1)$. FG_{it} is the variable of interest, the measure of the relative financial gain to applying for DI benefits. p is a vector of observable characteristics that determine probability of success. c is a vector of observable characteristics that influence the opportunity costs of application. W is the vector of individual characteristics that were important in explaining differences in insurance status by birth year. Finally, the regressions also include year indicator variables, which capture the macroeconomic conditions that are correlated with the decision to apply for DI (Autor and Duggan 2006). Because the underlying variation in our regressor of interest is based on year of birth, we cluster the standard errors on birth year.

We present the baseline results for an individual's decision to apply for DI in Table 4. In the first column, the pooled results are shown, while columns 2-5 present the estimation with single men, married men, single women, and married women, respectively.

The first thing to note in Table 4 is the very significant and relatively large impact that the relative DI generosity has on the DI application decision. There also seems to be variation in responsiveness based on gender and marital status. We calculate the average of the marginal effect for individuals (Bartus 2005), and find that a 1-percentage-point decrease in the benefit ratio leads to a 0.25-percentage-point increase in the DI application rate for the sample as a whole, with a 0.36-percentage-point increase for married men and a 0.34-percentage-point increase for married women in the sample.

The average of the marginal effects is estimated to be even larger for single men (0.53) and close to zero for single women (0.09), but statistically insignificant for both. Based on an average two-year application rate of 3.1 percent for the entire sample, this represents an 8-percent increase in total applications, 13-percent increase for married men, and a 12-percent increase for married women. To determine the impact of the change in the financial incentives at the population level, we weight the sample when calculating the marginal effects to take into account the sampling design of the HRS. The marginal effects are largely not sensitive to the weighting, and we report the marginal effects weighted to the 1998 population.

In general, bad health is positively related to DI applications, as expected.[11] Women overall are less likely to apply to DI, and there are no race patterns evident in the application patterns after controlling for all the health, wealth, and employment factors in the DI application decision. There is a negative education gradient to the application probability for married women. While the impact of the variables measuring the opportunity cost is negligible, determinants of the DI insurance status do seem to be important in the application decision as well. Marital history (divorce, widowhood) and the linear trend in insurance status for married women are all statistically significant. If we had omitted these controls, we would have underestimated the impact of the financial incentive to apply, especially for women. The estimated marginal effects without

[11]The colinearity of the myriad of the health variables is a concern. We conducted a principal component analysis of 20 health variables and included the first principal component as a summary measure of health in the regression analysis. The health variables are: self-reported health, heart attack, stroke, cancer, arthritis, lung disease, heart failure, angina, high blood pressure, diabetes, incontinence, incontinence missing, married, psych problems, cognition, cognition missing, ADL limitations, probability of living to 75, probability of living to 75 missing, and pain frequency. Since the results are virtually unchanged, we keep the individual health variables in the regressions for ease of interpretation.

insurance status controls are 0.35 and 0.25 for married men and married women, respectively.

5.1 Heterogeneous Effects

We explore potential avenues for heterogeneous effects of the financial incentives on the DI application decision by including interaction terms in the regression. In addition to the marital status differences reported above, we find heterogeneous effects based on job characteristics presented in Table 5. We checked for differences based on job characteristics (blue-collar workers, like your job, hiring and firing control in the job), attitude (measured as reported feeling that things are beyond your control and motivated by previous work on the relationship between personality and financial outcomes, such as Judge et al. 1999; Roberts et al. 2007; Duckworth and Weir 2010, source of health insurance (Autor and Duggan 2006; Gruber and Kubik 2002), and individuals experiencing lower-than-average wage growth (Autor and Duggan 2006). We found no signs of heterogeneity based on age or education. For married men, white-collar workers are less responsive (average marginal effect of 0.2 vs. 0.3) while the white-collar workers seem to be driving the responsiveness for married women (average marginal effect of 0.44). Those who do not make decisions on the job are driving the increase in applications for both married men and married women, while individuals who do make hiring and firing decisions on the job are actually less likely to apply to DI due to the increase in the retirement age. Married men who do not enjoy their job are more responsive to the financial incentives (average of the marginal effect is 0.44) and individuals who do not get their health insurance from their employers are also more likely to respond (0.64 marginal effect for married men; 0.37 for married women).

Surprisingly, married men who have average or higher wage growth are actually more likely to respond (0.27 marginal effect), as are individuals who feel like they have control over things that happen in their lives (average of the marginal effects are 0.41 for married men and 0.30 for married women).

5.2 Specification Checks

The specification above uses the ratio of retirement benefits to disability benefits, whose main variation comes from birth year. We could, instead, use other measures of the financial incentive, or include birth year directly into the regression. The significance and pattern to the results remain, as shown in Table 6. Using the ratio of the present discounted value of retirement benefits at *t+1* to DI benefits ($\alpha_{\delta,t+1}$) yields almost identical estimated marginal effects as the baseline case (-0.36 [-0.35] for married men and -0.34 [-0.37] for married women, respectively). If we instead ignore liquidity constraints and use the ratio of the present discounted value of maximum retirement benefits to DI benefits achieved by claiming at t*, the estimated marginal effects are slightly larger (0.51 for married men; 0.45 for married women) and for the first and only time are significantly different from zero for single men (0.59 marginal effect).

When we use the difference in the wealth variables, we still get significant differences in the marginal effects for married men, and sometimes married women. For every $100,000 change in the difference in wealth, there is a 0.04 (0.05)-percentage-point increase in the application rate for married men (married women).

Finally, we present the results of the probit regression with the birth year directly in the equation. We find that married men have a continuously increasing propensity to apply to DI by birth year, compared to those born from 1935-1937. Men born in 1938,

who had an increase in their FRA of three months, are 0.02 percent more likely to apply for DI; this percent increases tenfold to 0.2 for those born in 1943 and had their FRA increased to 66. Surprisingly, married women seem unresponsive in this specification, but this may be because the linear trend in imposed insurance status is soaking up this variation.

We have also tested specifications that excluded individuals who have a history of DI application from the sample, either with a rejection or receipt, in order to see if this prior interaction with the program is driving the measured results. Benitez-Silva et al. (1999) show that previously applying is a strong predictor for future applications, but previous appliers may differ on other dimensions as well. The results are quantitatively unchanged when the previous applicants are omitted from the sample.

5.3 Quantifying the Effects: Total Increase in Applications

So far we have documented that DI applications are sensitive to the financial incentives to use DI as a labor force exit route, primarily for married individuals. In order to quantify the results, we use our estimates to calculate the number of new applications by birth year in Table 7. Column 1 shows the percentage-point decrease in the retirement-to-disability benefit ratio, by birth year. The average marginal effect for the two-year application decision is 0.36 for men (Panel A) and 0.35 for women (Panel B), which then gives us the percentage-point increase in the number of applications in column 2. From the *Current Population Survey*, we tally the number of married men and married women in each birth cohort in the year they turn age 55, and assume an average DI insurance rate of 86 percent for married men and 69 percent for married women, based on our earlier estimates (Table 3), giving us the number of DI insured 55-year-olds

in each birth year in column 3. Multiplying columns 2 and 3 gives us the total number of additional DI applications for each birth year in a two-year period. Those born in 1938 experience a relatively small decrease in benefits – 0.8 percentage points – leading to very few additional applications (2,032 married men and 1,262 women). Those born in 1943, however, experience a 5-percentage-point decrease in SS benefits, and thus our estimates suggest an increase of 16,635 applications from married men and 9,874 applications from married women over two years. If we then assume that this is a constant increase per two-year period, we can then calculate the total number of additional DI applications during the 10-year period between ages 55 and 65, by birth year. This simple calculation means an additional 261,000 applications. If the birth years between 1944 and 1954 respond similarly to those born in 1943 (they all have the same FRA of 66 years) it totals an additional 166,400 applications in the year 2009. To put this number in perspective, the SSA processed 2.8 million applications that year, so almost 6 percent of that year's workload was induced by the financial incentives.

6. Marginal Applicants: Characteristics and Acceptance Rates

6.1 Who is the Marginal Applicant?

We want to test to see who is the marginal applicant. We have already shown that married individuals are responding to this change in the financial incentive. Now we want to see if these marginal applicants are observably different from their younger counterparts. We limit the sample to the 315 people who applied for DI benefits between ages 56 and 66. Table 8 tests for differences in the characteristics of these applicants

based on their birth year. Panel A is for all applicants, Panel B is for accepted applicants, and Panel C presents the average characteristics for rejected applicants.

Table 8, Panel A suggests that there are few observable differences in applicants between the birth cohorts. Male applicants born in 1938 or after are more likely to report high blood pressure and less likely to report having cancer, but that is the only statistical difference. For female applicants, those born in 1938 or later are more likely to have arthritis, be obese, have health insurance coverage through spousal employment (as a substitute to veteran's coverage), yet have longer self-reported life expectancy. The post-1937 birth year applicants also are more likely to be women, but the (unadjusted) acceptance rate onto the program is almost identical for pre-1938 and post-1937 birth years.

6.2 What happens to the marginal applicant? Effect on DI Benefit Receipt

Duggan et al. (2007) use administrative records to measure the impact of the increase in the FRA on DI benefit receipt. They find that an additional 0.6 (0.9) percent of men (women) ages 45-64 are receiving DI benefits in 2005 due to the increase in the FRA. While using the administrative record instead of survey data is superior in terms of quality and sample size, the HRS allows us to control for other characteristics not observed in the administrative data, such as insurance status at age 55. Additionally, by testing if our estimates of the impact on benefit receipt are similar to Duggan et al. (2007) provides an additional check on the plausibility of our application results.

First, we test for differences in the characteristics based on the outcome of the application. While the characteristics of the applicant pool seem roughly similar, interesting differences appear when we compare the accepted and rejected pool of

applicants based on their birth year (Table 8, Panels B and C). Panel B shows that the accepted male applicants born in 1938 or later are still more likely to have high blood pressure and less likely to have cancer. Panel C shows that the rejected applicants born after 1937 are younger when they apply. Because there is no differential acceptance rate based on birth year and no difference based on characteristics we found to be important in the responsiveness of the application decision, this suggests that the marginal male applicants induced by the financial incentives are not overwhelmingly different from others.

Women also show no differential acceptance rate based on birth year. However, when we examine the characteristics of those accepted and those rejected, interesting patterns emerge. The accepted women applicants born after 1937 are more likely to be obese. The rejected women applicants born after 1937 are much more likely to be married and to have spousal health insurance. Because the induced applications due to the changes in the retirement system were coming from married women, this suggests that the marginal female applicant is actually more likely to be rejected.

Finally, we test if there are significant differences in the acceptance rate by birth year. When we estimate a probit regression on the outcome of the application and control for the same observable characteristics as in the application regressions, we do not find significant differences in the acceptance rates based on the baseline measure of the financial incentive to apply. Our standard errors are large, however, and we cannot rule out effects along the lines of Duggan et al. (2007). However, if we use birth year directly in the regressions, we find that the 1940 birth-year applicants are driving the increase in the DI rolls (marginal effect is 0.096 and significant at the 0.005 level). This is the *only*

birth year that we find has a differential acceptance rate. This might be suggestive of a one-time bump in acceptance rates, for whatever reason, and calls into question whether this is actually a trend that will continue.

7. Conclusion

The increase in the FRA was a measure to improve the long-term financial outlook of the Social Security trust funds. The effectiveness of this policy change depends not only on how it impacts an individual's work and claiming decisions, but also on his or her decision to apply for DI benefits.

We have shown that the spillover into the DI application pool is non-trivial. Our baseline estimate is that a decrease in the retirement-to-disability benefit ratio by 1 percentage point leads to a 0.25-percentage-point increase in the two-year DI application rate, or an 8-percent increase. This effect appears to be driven by married individuals. These estimates suggest that the characteristics of the DI application pool could change dramatically due to the increase in the FRA. Indeed, we do find significant differences in the applicants based on birth year. The DI recipient pool does not seem to change as much; we find that DI applications are much more sensitive to the financial incentives than are the DI rolls.

References:

Autor, David and Mark Duggan. 2006. "The Growth in the Social Security Disability Rolls: A Fiscal Crisis Unfolding." *Journal of Economic Perspectives* 20(3): 71-96.

Bartus, Tamas. 2005. "Estimation of Marginal Effects using Margeff." *The Stata Journal* 5(3): 209-329.

Benitez-Silva, Hugo, Moshe Buchinsky, Hiu Man Chan, John Rust, and Sofia Sheidvasser. 1999. "An Empirical Analysis of the Social Security Disability Application, Appeal, and Award Process." *Labour Economics* (6): 147-178.

Cawley, John and Richard V. Burkhauser. 2006. "Beyond BMI: The Value of More Accurate Measures of Fatness and Obesity in Social Science Research." Working Paper 12291. Cambridge, MA: National Bureau of Economic Research.

Duckworth, Angela and David Weir. 2010. "Personality, Lifetime Earnings, and Retirement Wealth." Presentation at the 12th Annual Retirement Research Consortium Conference, National Press Club, Washington DC, August 6.

Duggan, Mark, Perry Singleton, and Jae Song (2007). "Aching to Retire? The Rise in the Full Retirement Age and Its Impact on the Social Security Disability Rolls." *Journal of Public Economics* (91): 1327-1350.

Gruber, Jonathan, Jeffrey Kubik. 2002. "Health Insurance Coverage and the Disability Insurance Application Decision," NBER Working Papers 9148, National Bureau of Economic Research.

Haider, Steven and Gary Solon. 2000. "Nonrandom Selection in the HRS Social Security Earnings Sample." Working Paper No. 00-01, RAND Labor and Population Program.

Judge, Timothy, Chad Higgins, Carl Thoresen, and Murray Barrick. 1999. "The Big Five Personality Traits, General Mental Ability, and Career Success Across the Life Span." *Personnel Psychology* (52): 621-652.

Juhn, Chinhui and Simon Potter. 2006. "Changes in Labor Force Participation in the United States." *The Journal of Economic Perspectives* 20(3): 27-46.

Kapteyn, Arie, Pierre-Carl Michaud, James Smith, and Arthur Van Soest. 2006. "Survey Attrition and Non-Response in the Health and Retirement Study." IZA Discussion Paper Series 2246.

Li, Xiaoyan and Nicole Maestas. 2008. "Does the Rise in the Full Retirement Age Encourage Disability Benefit Applications? Evidence from the Health and Retirement Study." Working Paper WP 2008-198. Ann Arbor, MI: University of Michigan Retirement Research Center.

Mitchell, Olivia S. and John W.R. Phillips. 2001. "Eligibility for Social Security Disability Insurance." Working Paper WP 2001-011. Ann Arbor, MI: University of Michigan Retirement Research Center.

Norton, Edward, Hua Wang, and Chunrong Ai. 2004. "Computing Interaction Effects and Standard Errors in Logit and Probit Models." *The Stata Journal* 4(2): 154-167.

Olson, Janice A. 1999. "Linkages with Data from Social Security Administrative Records in the Health and Retirement Study." *Social Security Bulletin* 62(2): 73-85.

Roberts, Brent, Nathan Kuncel, Rebecca Shiner, Avshalom Caspi and Lewis Goldberg. 2007. "The Power of Personality: The Comparative Validity of Personality Traits, Socioeconomic Status, and

Cognitive Ability for Predicting Important Life Outcomes." *Perspectives on Psychological Science* (2): 313-345.

Song, Jae and Joyce Manchester. 2007. "Have People Delayed Claiming Retirement Benefits? Responses to Changes in Social Security Rules." *Social Security Bulletin* 67(2).

Figure 1: Ratio of Retirement Benefits to Disability Benefits, by Age and Birth Year

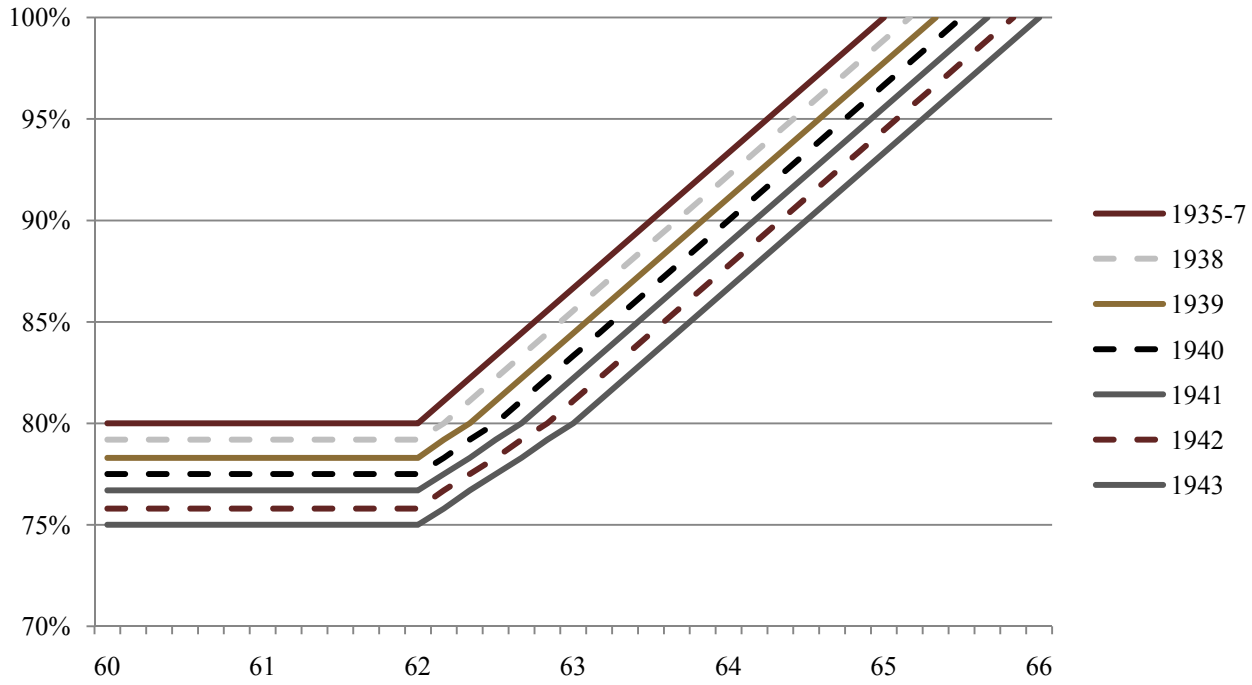

Table 1. Sample Selection Criteria

			Men		Women	
	Individuals	Person-Wave Observations	Individuals	Person-Wave Observations	Individuals	Person-Wave Observations
Number of people in RAND	30,546	--	13,253	--	17,293	--
Matched to SSA data	20,786	--	9,071	--	11,715	--
Birth Year Between 1935-1943	6,374	50,992	2,837	22,696	3,537	28,296
Age between 56 and 64	6,032	21,502	2,682	9,519	3,350	11,983
Eligible for SSDI at time t	4,458	14,568	2,274	7,535	2,184	7,033
Not currently on or applying for SSDI at time t	4,260	13,667	2,174	7,071	2,086	6,596
Re-surveyed after time t	4,133	13,229	2,104	6,830	2,029	6,399
Interviewed with cohort	3,815	12,341	2,046	6,657	1,769	5,684
Item non response	3,791	12,259	2,030	6,604	1,761	5,655

Table 2: Descriptive Statistics

	Whole Sample	Men		Women	
		Single	Married	Single	Married
Apply for SSDI between t and t+2	3.1%	4.7%	2.8%	3.4%	2.8%
Financial Incentives					
Retirement Benefit at t+1/DI Benefit	80.5%	80.5%	80.4%	80.5%	80.5%
PDV(Retirement Benefit at t+1)/PDV (DI Benefit)	71.2%	70.9%	70.8%	72.0%	71.5%
PDV(Retirement Benefit at t*)/PDV (DI Benefit)	79.2%	77.7%	77.9%	81.0%	80.5%
PDV(Retirement Benefit at t+1) - PDV (DI Benefit)	60,000	66,000	71,000	51,000	48,000
PDV(Retirement Benefit at t*) - PDV (DI Benefit)	45,000	51,000	54,000	36,000	34,000
Likelihood of Successful Application					
Sum of ADLs and Other Functional Limitations (0-13)	1.57	1.48	1.26	2.16	1.70
Self-Reported Fair or Poor Health	14.9%	19.7%	14.3%	18.8%	11.8%
Sum of Major Health Conditions (0-8)	1.22	1.20	1.14	1.47	1.20
Often Troubled with Pain	21.9%	19.4%	21.1%	24.9%	22.2%
Obese (Corrected BMI>=30)	35.2%	31.7%	36.4%	41.0%	30.8%
Subjective Probability of Living to 75+/Life Table Probability	94.6%	95.5%	99.3%	89.0%	90.2%
Age	59.2	59.3	59.2	59.3	59.2
Years of Education					
Less than high school	18.2%	23.3%	18.8%	20.2%	14.5%
GED	4.8%	5.9%	4.8%	4.4%	4.7%
High School graduate	33.9%	30.9%	31.0%	32.4%	40.3%
Some College	21.5%	16.1%	19.9%	23.5%	24.3%
College or more	21.7%	23.8%	25.6%	19.5%	16.1%
Opportunity Cost of Application					
Blue collar	34.7%	44.4%	42.8%	30.8%	21.1%
Lifetime Total Quarters of Coverage at t	130.8	144.5	147.5	115.4	109.8
3- year Average Labor income	22,767	23,983	30,667	18,367	16,358
PIA (Monthly SSDI Benefit Amount) at t	$1,153	$1,320	$1,451	$877	$819
Covered by Health Insurance	81.7%	71.0%	84.7%	74.4%	84.8%
Own job	62.6%	65.2%	68.0%	66.5%	50.5%
Spouses Job	18.4%	0.6%	16.8%	3.4%	36.1%
Government Program	6.5%	8.3%	6.9%	6.0%	5.6%
Household Non-Labor Income	$9,251	$8,655	$11,005	$8,162	$10,460
Household Net Worth	$179,090	$98,945	$218,505	$72,777	$240,094
Ever Applied for and Received SSDI before	1.4%	1.7%	1.3%	1.7%	1.4%
Ever Applied for but Failed to Receive SSDI before	2.8%	3.6%	2.5%	4.3%	1.9%
Demographics					
Female	46.1%				
Not Married	27.0%				
Nonwhite	22.7%	28.4%	18.7%	36.5%	18.4%
N (Person-waves)	12,259	1,104	5,500	2,203	3,452

Table 3: DI Insurance Status at age 55

	1935-1937	1938	1939	1940	1941	1942	1943
Single Men							
Mean	81.1%	87.0%	81.3%	82.9%	72.7%	80.8%	90.0%
Reg. Adjusted	81.1%	87.2%	81.2%	83.9%	72.9%	80.5%	90.1%
Married Men							
Mean	84.4%	87.3%	88.2%	87.0%	88.5% *	88.8%	84.4%
Reg. Adjusted	84.5%	87.7%	88.1%	87.1%	88.8% *	89.0%	84.5%
Single Women							
Mean	67.3%	60.0%	78.9% **	75.0%	72.4%	80.0%	71.1%
Reg. Adjusted	67.4%	61.7%	78.7% **	77.0%	74.1%	77.9%	68.2%
Married Women							
Mean	55.4%	60.8%	58.2%	64.0% **	59.5%	73.8% **	54.7%
Reg. Adjusted	55.9%	60.8%	57.7%	64.3% **	58.7%	74.5% **	54.8%
w/trend	55.9%	60.8%	57.7%	64.3%	58.7%	74.5%	54.8%

Predicted percent of the total age-55 population presented in each cell. The regression-adjusted rows controls for: the respondents education, whether the respondent has been divorced/widowed, age they had their last child, a variable if that age is unknown, and a variable of whether they have any children.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4: DI Application Decision Between Ages 55 and 66

	Whole Sample	Single Men	Married Men	Single Women	Married Women
Financial Incentives					
$\alpha_{\delta, t+1}$	-4.700***	-8.085**	-5.853***	-1.676*	-9.826***
	(0.958)	(3.254)	(0.993)	(0.973)	(2.186)
Health and Disability Status					
Number of ADLs	0.075***	0.062	0.089***	0.081*	0.080**
	(0.020)	(0.056)	(0.010)	(0.043)	(0.033)
Self reported fair or poor health	0.223***	0.273	0.081	0.316**	0.311***
	(0.068)	(0.253)	(0.116)	(0.132)	(0.113)
Number of major conditions	0.095***	0.114	0.114*	-0.003	0.152***
	(0.018)	(0.084)	(0.060)	(0.077)	(0.028)
Frequently in pain	0.052	0.150	0.058	-0.023	0.090
	(0.072)	(0.234)	(0.043)	(0.157)	(0.144)
Obesity	0.019	-0.355**	0.030	0.128	0.110
	(0.062)	(0.172)	(0.073)	(0.179)	(0.113)
Subjective probability of living to	-0.110***	-0.280**	-0.159*	0.070	-0.057
75/ Life table probability	(0.031)	(0.137)	(0.091)	(0.156)	(0.052)
Age 57	0.185*	-0.165	0.173*	0.425**	0.010
	(0.098)	(0.239)	(0.099)	(0.199)	(0.192)
Age 58	0.026	-0.035	-0.161	0.005	-0.012
	(0.092)	(0.296)	(0.148)	(0.117)	(0.139)
Age 59	0.169	0.256	0.199*	0.231	-0.336
	(0.107)	(0.384)	(0.112)	(0.243)	(0.228)
Age 60	0.235***	0.698**	0.195	0.139	-0.354
	(0.071)	(0.285)	(0.152)	(0.150)	(0.279)
Age 61 or older	0.106	0.535	0.129	0.040	-0.847**
	(0.134)	(0.392)	(0.126)	(0.236)	(0.360)
GED	0.046	0.420*	-0.415*	0.332	0.187
	(0.100)	(0.253)	(0.215)	(0.220)	(0.213)
High school graduate	-0.066	-0.261	-0.033	0.294**	-0.278*
	(0.045)	(0.248)	(0.135)	(0.118)	(0.157)
Some college	-0.044	0.657***	-0.112	0.252**	-0.413***
	(0.053)	(0.196)	(0.149)	(0.108)	(0.148)
College or more	-0.277***	-0.013	-0.233	-0.206	-0.458***
	(0.082)	(0.286)	(0.212)	(0.264)	(0.145)
Opportunity Cost of Application					
Female	-0.207***				
	(0.069)				
Not white	-0.030	-0.235	0.112	0.039	-0.168
	(0.059)	(0.213)	(0.091)	(0.153)	(0.159)
Not married	0.084				
	(0.066)				
Total SSA covered quarters	0.134	1.016***	0.316	0.199	-0.141
	(0.165)	(0.361)	(0.347)	(0.272)	(0.304)
3-year average labor income	-0.001	0.004	-0.002	-0.010	0.009**
	(0.002)	(0.008)	(0.002)	(0.007)	(0.004)
DI benefit	-0.201	-0.991**	-0.156	0.044	-0.410
	(0.159)	(0.495)	(0.196)	(0.318)	(0.285)
Have any health insurance	-0.040	-0.292	0.099	-0.100	0.084
	(0.052)	(0.180)	(0.084)	(0.113)	(0.165)
Household non-labor income	-1.134	-554.430	-7.595	1.737	7.848
	(10.262)	(475.450)	(19.277)	(29.306)	(14.574)
Net worth	-1.466	-64.683	0.104	0.777	1.510
	(3.416)	(50.231)	(2.844)	(3.656)	(3.947)
Determinants of DI Insurance					

Previously received SSDI	0.452**	0.527*	0.547**	0.320	0.425
	(0.180)	(0.272)	(0.259)	(0.285)	(0.306)
Previously rejected by SSDI	0.278**	0.447	0.331	-0.002	0.303
	(0.113)	(0.323)	(0.269)	(0.239)	(0.199)
Have you ever been divorced	0.095	-0.178	0.054	0.328***	0.134
	(0.066)	(0.190)	(0.130)	(0.109)	(0.141)
Have you ever been widowed	-0.075	-0.289*	0.109	-0.042	0.108
	(0.095)	(0.161)	(0.300)	(0.114)	(0.227)
Age when last child born or adopted	0.004	0.008	0.004	0.005	0.002
	(0.003)	(0.007)	(0.007)	(0.009)	(0.009)
Missing age when last child born or adopted	-0.225	-0.324	-0.004		-0.154
	(0.170)	(0.618)	(0.235)		(0.624)
Trend for Married Women	0.013				-0.166**
	(0.014)				(0.074)
Constant	1.450*	4.654*	2.177*	-1.576*	5.932***
	(0.775)	(2.559)	(1.139)	(0.870)	(1.995)
Observations	12,259	1,104	5,500	2,186	3,452

Probit coefficients reported, with robust standard errors clustered on birth year in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%
Note: Regression also includes year indicator variables and an indicator variable for non-response to self-reported probability of living until age 75.

Table 5: Heterogeneous Responses to the Financial Incentives

	Whole sample		Single men		Married men		Single women		Married women	
$\alpha_{\delta,t+1}$	-4.15	***	-17.77	*	-3.19	**	-1.39		-9.71	***
	(1.21)		(9.40)		(1.43)		(1.20)		(2.81)	
	[-0.25]	***	[-1.08]		[-0.19]	**	[-0.07]		[-0.44]	**
Blue Collar * $\alpha_{\delta,t+1}$	-1.00		10.48		-4.34	*	-0.92		5.19	
	(1.67)		(9.03)		(2.41)		(2.35)		(4.74)	
	[-0.08]		[0.31]		[-0.31]	*	[-0.04]		[0.35]	
$\alpha_{\delta,t+1}$	-5.31	***	-8.08	**	-5.96	***	-3.18	***	-8.14	***
	(1.14)		(3.30)		(0.98)		(0.93)		(2.22)	
	[-0.32]	***	[-0.50]		[-0.37]	***	[-0.16]		[-0.37]	**
Make decisions * $\alpha_{\delta,t+1}$	6.09	***	2.10		2.47		9.84	***	10.27	***
	(1.99)		(3.74)		(1.83)		(3.31)		(2.78)	
	[0.37]	***	[0.34]		[0.21]	*	[0.76]		[0.52]	*
$\alpha_{\delta,t+1}$	-4.80	***	-4.28		-7.28	***	-5.48		-4.76	
	(1.75)		(3.02)		(2.42)		(4.77)		(4.07)	
	[-0.29]	***	[-0.26]		[-0.45]	***	[-0.27]		[-0.22]	
Enjoy job * $\alpha_{\delta,t+1}$	0.12		-6.88	*	1.95		4.36		-3.17	
	(1.64)		(4.11)		(2.09)		(5.41)		(4.66)	
	[0.03]		[-0.48]		[0.18]		[0.28]		[-0.18]	
$\alpha_{\delta,t+1}$	-3.69	***	-6.12	*	-4.37	**	-0.88		-6.30	**
	(1.13)		(3.15)		(1.90)		(1.96)		(2.80)	
	[-0.22]	***	[-0.38]		[-0.27]	**	[-0.04]		[-0.29]	
Low wage growth* $\alpha_{\delta,t+1}$	-2.92	*	-6.17		-3.51		-2.32		-2.62	
	(1.70)		(4.55)		(2.72)		(2.75)		(4.01)	
	[-0.22]		[-0.43]		[-0.30]		[-0.19]		[-0.11]	
$\alpha_{\delta,t+1}$	-4.55	***	-7.41	**	-10.39	***	0.51		-8.10	***
	(1.41)		(3.36)		(2.51)		(2.40)		(2.69)	
	[-0.28]	***	[-0.44]		[-0.64]	***	[0.02]		[-0.37]	*
Insurance from own job*	-0.19		-1.12		5.68	**	-4.97	*	2.24	
$\alpha_{\delta,t+1}$	(1.65)		(4.80)		(2.81)		(2.80)		(3.90)	
	[-0.11]		[-0.45]		[0.16]		[-0.48]		[0.05]	
N	12,559		1,104		5,500		2,203		3,452	
$\alpha_{\delta,t+1}$	-6.41	***	-18.68	**	-6.11	**	-3.98	*	-7.59	***
	(1.79)		(8.77)		(2.58)		(2.28)		(2.03)	
	[-0.35]	***	[-0.83]		[-0.41]	**	[-0.15]		[-0.30]	**
Beyond Control* $\alpha_{\delta,t+1}$	4.89	***	18.76	*	3.45		5.53		-2.55	
	(1.82)		(10.10)		(3.52)		(3.81)		(6.88)	
	[0.23]		[1.09]		[0.04]		[0.30]		[-0.07]	
N	9,443		768		4,172		1,684		2,819	

Probit coefficients reported,with robust standard errors clustered on birth year in parentheses; weighted average of the marginal effects in brackets.

* significant at 10%; ** significant at 5%; *** significant at 1%

Note: Each Panel represents a different regression with a different heterogeneous effect tested. All regressions include all the covariates included in Table 4.

Table 6: Sensitivity to Measurement the Financial Incentive

	Single Men	Married Men	Single Women	Married Women
$\alpha_{\delta,t+1}$	-8.182**	-5.782***	-1.772*	-9.953***
	(3.296)	(0.975)	(0.973)	(2.357)
	[-0.530]	[-0.363]***	[-0.088]	[-0.344]**
PDV($\alpha_{\delta,t+1}$*PIA)/PDV(PIA)	-8.285**	-5.801***	-1.861*	-9.975***
	(3.368)	(0.993)	(0.962)	(2.401)
	[-0.503]	[-0.347]***	[-0.094]	[-0.369]***
PDV(α_{δ,t^*}*PIA)/PDV(PIA)	-11.170***	-8.280***	-6.837***	-9.719***
	(3.331)	(0.496)	(0.953)	(1.136)
	[-0.588]***	[-0.506]***	[-0.347]	[-0.446]**
PDV(PIA)-PDV($\alpha_{\delta,t+1}$*PIA)	0.130**	0.098***	-0.001	-0.047
	(0.051)	(0.031)	(0.035)	(0.051)
	[0.007]	[0.004]**	[0.001]	[-0.005]*
PDV(PIA)-PDV(α_{δ,t^*}*PIA)	0.342***	0.232***	0.226***	0.360***
	(0.042)	(0.028)	(0.055)	(0.050)
	[0.019]	[0.013]***	[0.009]	[0.012]**
Born in 1938	-0.486***	0.242***	0.368**	-0.052
	(0.176)	(0.067)	(0.176)	(0.174)
	[-0.031]	[0.017]***	[0.034]	[-0.005]
Born in 1939	0.294	0.346***	0.165	-0.069
	(0.306)	(0.096)	(0.266)	(0.259)
	[0.002]	[0.029]***	[0.015]	[-0.008]
Born in 1940	-0.331	0.552***	-0.058	0.113
	(0.342)	(0.147)	(0.346)	(0.337)
	[-0.016]	[0.047]***	[0.007]	[0.001]
Born in 1941	0.710	0.671***	0.253	0.066
	(0.520)	(0.165)	(0.388)	(0.415)
	[0.045]	[0.067]***	[0.021]	[-0.010]
Born in 1942	0.667	0.844***	0.271	-0.040
	(0.521)	(0.224)	(0.460)	(0.548)
	[0.003]	[0.076]**	[0.019]	[-0.010]
Born in 1943	1.327**	1.207***	0.343	0.585
	(0.675)	(0.248)	(0.544)	(0.585)
	[0.127]	[0.177]***	[0.025]	[0.000]
Observations	1,104	5,500	2,186	3,452

Probit coefficients reported with robust standard errors clustered on birth year in parentheses; weighted average of the marginal effects in brackets.
* significant at 10%; ** significant at 5%; *** significant at 1%
Note: Each Panel represents a different regression with a different measure to capture the financial incentive for application. All regressions include all covariates included in Table 4.

Table 7: Quantifying the Application Effect

Birth Year	Percentage Point Change in SS/DI benefits	Percentage point increase in applications	Number of Insured at age 55	Number of increased SSDI applications	Total increase between 55-66
Panel A: Married Men					
1938	-0.8	0.29	699,634	2,032	10,159
1939	-1.7	0.62	725,788	4,479	22,394
1940	-2.5	0.91	764,520	6,938	34,690
1941	-3.3	1.20	879,036	10,530	52,650
1942	-4.2	1.52	759,890	11,585	57,926
1943	-5.0	1.82	916,504	16,635	83,173
Panel B: Married Women					
1938	-0.8	0.28	458,572	1,262	6,310
1939	-1.7	0.58	474,825	2,777	13,884
1940	-2.5	0.86	501,229	4,311	21,553
1941	-3.3	1.14	515,397	5,851	29,254
1942	-4.2	1.44	489,548	7,073	35,365
1943	-5.0	1.72	574,062	9,874	49,369
					260,992

Table 8: Characteristics of Applicants by Birth Year

	All Applicants					Accepted					Rejected				
	Men		Women			Men		Women			Men		Women		
	<1938	≥1938	<1938	≥1938		<1938	≥1938	<1938	≥1938		<1938	≥1938	<1938	≥1938	
Measures of SSDI Generosity and Benefits															
SSR Benefit/SSDI Benefit at t+1	84.9	82.9	84.6	81.9	**	84.6	83.2	83.3	82.2		85.7	82.1	88.6	81.2	*
Health and Disability Status															
Sum of ADLs and Other Functional Limitations (0-13)	4.57	4.47	5.77	6.06		4.50	4.86	5.80	6.20		4.75	3.39	5.69	5.69	
Self-Reported Fair or Poor Health	63.5	65.1	70.8	70.0		66. 7	65.1	71.4	71.9		55.0	65.2	68.8	65.4	
Sum of Major Health Conditions (0-8)	1.99	2.12	2.32	2.49		1.96	2.21	2.22	2.59		2.05	1.87	2.63	2.23	
HBP	35.1	53.5	** 52.3	58.9		37.0	57.1	** 51.0	64.1		3.0	43.5	56.3	46.2	
Cancer	16.2	4.7	** 10.8	12.2		16.7	4.8	** 14.3	14.1		15.0	4.3	0.0	7.7	
Diabetes	17.6	22.1	18.5	20.0		18.5	23.8	16.3	18.8		15.0	17.4	25.0	23.1	
Psych	13.5	19.8	40.0	32.2		9.3	17.5	36.7	29.7		25.0	26.1	50.0	38.5	
Arthritis	52.7	59.3	56.9	83.3	***	53.7	61.9	57.1	85.9		5.0	52.2	56.3	76.9	
Often Troubled with Pain	50.7	61.6	67.7	75.6		54.7	61.9	67.3	73.4		4.0	60.9	68.8	80.8	
Obese (Corrected BMI>=30)	33.8	44.2	40.0	57.8	**	33.3	42.9	36.7	59.4	**	35.0	47.8	50.0	53.8	
Subjective Probability of Living to 75+/Life Table Probability	74.1	84.0	62.5	76.8	**	72.3	85.3	60.2	71.5		79.0	80.5	69.6	89.6	
Demographics, SES and Personality															
Age	60.2	59.9	59.8	59.7		60.0	60.3	59.6	59.8		60.9	58.7	** 60.5	59.3	
Not Married	21.6	22.1	43.1	44.4		18.5	20.6	34.7	46.9		30.0	26.1	68.8	38.5	*
Covered by Health Insurance	70.3	72.1	64.6	66. 7		77. 8	73.0	71.4	68.8		50.0	69.6	43.8	61.5	
Own Job	41.9	43.0	26.2	28.9		40.7	38.1	32.7	35.9		45.0	56.5	6.3	11.5	
Spouses Job	17.6	11.6	9.2	21.1	**	24.1	14.3	10.2	17.2		0.0	4.3	6.3	30.8	**
Government Program	24.3	26.7	30.8	20.0		31.5	31.7	30.6	20.3		5.0	13.0	31.3	19.2	
Acceptance Rate	74.3	71.1	75.4	74.4											
N (persons)	74	86	65	90		54	63	49	64		20	23	16	26	