Health Information and the Timing of Social Security Benefit Entitlements*

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Abstract

This study examines whether new health information obtained through medical screening affects entitlements to Social Security benefits. Random assignment of information is derived from a unique feature of the Continuous National Health and Nutrition Examination Survey. The survey data are matched to administrative data from the Social Security Administration. The results suggest that new health information led to delays in benefit entitlements, particularly among workers near the early entitlement age. The results are consistent with employment lock, whereby workers delay retirement and continue to work to obtain employer-based health insurance.

Keywords: Social Security, health, retirement, medical screening, job lock, employment lock
JEL Codes: H55, I18

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1 Introduction

The timing of retirement is one of the most important in decisions in a worker's lifetime, and health is a critical factor. In a review of retirement, Lumsdaine and Mitchell (1999) discuss how health affects retirement, the difficulties of identifying health's causal effects, and directions for future research.[1] As they note, poor health can affect retirement by reducing productivity, increasing absenteeism, and altering preferences for leisure versus work, with an ambiguous net effect. The difficulty in identifying causal effects is complicated by at least two factors. First, health is intrinsically unobservable, requiring researchers to rely on imperfect proxies; second, health may be endogenous in models of retirement, because retirement may causally impact health, or because other unobserved factors may affect both health and retirement.[2] Given that health investment and labor supply can be jointly determined, Lumsdaine and Mitchell (1999) encourage researchers to explore how workers respond to different treatment paths and how health and work evolve simultaneously.

To contribute to the literature, this study examines the role of health information on the timing of Social Security entitlements. The distinction of information is important, as health is often conceptualized by its effect on the ability to work, whereas health information includes knowledge of medical conditions that may be asymptomatic. While health information may not affect the ability to work directly, it could affect labor market outcomes indirectly by changing investments in health capital and by altering expectations of medical expenditures and mortality. These effects have numerous implications, including for life-cycle models of economic behavior, policy regarding health insurance and healthcare, and guidelines for medical screening.[3]

To identify the effect of health information, this study exploits a unique feature

[1] For a discussion of health and labor market outcomes more generally, see Currie and Madrian (1999)

[2] For example, a recent study finds that male mortality increases just after the early entitlement age of 62 (Fitzpatrick and Moore, 2018).

[3] The US Preventive Services Task Force provides medical screening guidelines for numerous health conditions and diseases, including diabetes, hypertension, and certain cancers. These guidelines reflect the cost and efficacy of screening and the benefit of early medical intervention. They do not account for the effects of new health information on economic behavior.

of the National Health and Nutrition Examination Survey (NHANES). Unlike other health surveys, the NHANES is designed to measure the prevalence of both diagnosed and undiagnosed medical conditions. To do so, survey participants first report if they have ever been diagnosed with certain conditions and then submit to laboratory testing for these conditions. Importantly, the results of the tests are revealed to participants. Participants who report that they have never been diagnosed with a particular condition, but who subsequently test positive for the condition through the survey's laboratory tests, are assumed to have gained new information of their health status.

Experimental variation in health information is generated by the data collection process. To reduce respondent burden and ensure completion of the medical examination, certain components of the examination were conducted on subsamples (National Center for Health Statistics, 2012). Specifically, medical exams were scheduled in either the morning or afternoon, and three laboratory tests – fasting plasma glucose, LDL (bad) cholesterol, and triglycerides – were administered only during morning examinations. This is because these three tests require fasting, which is best achieved overnight. As a result, participants assigned to a morning exam received information about their levels of fasting plasma glucose, LDL cholesterol, and triglycerides, whereas respondents assigned to an afternoon exam did not. To preserve the representativeness of morning examinees, exam time was assigned randomly. Thus, the effect of new health information on economic outcomes can be measured as the difference in outcomes between the two exam groups.

The outcome of interest is the timing of Social Security entitlements. The Social Security Administration (SSA) defines the date of benefit entitlement as the date SSA determines an applicant first qualifies for benefits, which requires both an application by the claimant and an administrative determination by SSA.[4] Entitlement differs from receipt be-

[4] According to SSA documentation,"A person classified as having been awarded a benefit means that the person has become entitled to a certain type of benefit... Awards encompass individuals with entitlement that is retroactive to the point at which an award decision has been made, as well as entitlements that begin in the same month as the award is effective. Retroactive entitlements are especially prevalent in claims involving an alleged disability, as the disability evaluation process can be lengthy, particularly in cases where the claimant appeals a finding that the claimant is not disabled. In cases of retroactive entitlement, benefits

cause payments may be suspended due to the earnings test (Rust and Phelan, 1997) and differs from award because entitlement can be retroactive, which is often the case with disability benefits. Benefit entitlement spikes at the early entitlement age of 62, when workers first become eligible for OA benefits, and at the full retirement age of 65 for individuals born before 1938, when OA benefits are not reduced for early claiming. Although workers can retire without becoming entitled to benefits, and entitled beneficiaries may continue to work, benefit entitlement is associated with non-labor force participation. For example, Gustman and Steinmeier (2001) report that, among individuals working past 62, only 11.5 percent accept Social Security benefits. Nonetheless, to measure employment more directly, though still imprecisely, the analysis examines Social Security quarters of coverage, which reflect annual earnings subject to Social Security taxation.

The results suggest that new health information delayed entitlements to SSA benefits. This finding comes from event-study models before and after the survey as well as single-period models only after the survey. Delayed entitlements are most evident among survey participants who were aged 59 to 61 at the time of the survey, just before the early entitlement age. Regarding benefit type, the estimated delays are most evident old age (OA) and disability insurance (DI) benefits compared to spousal and survivor (SS) benefits, though the differences are not statistically significant. The estimated delays are also larger for individuals who have more education (some college or more); who are DI insured, an indication of greater attachment to the labor force; and who self-report not having been diagnosed with diabetes, a condition the treatment group had been tested for, but the control group had not.

To understand the mechanism for the results, it is important to consider how new health information combines with previous expectations to alter future behavior. On one hand, an individual may have suspected they had a health condition, but the test result is negative. However, prior research suggests that individuals may be overly optimistic about

are payable for months of entitlement prior to when the award is effective."

their health risks (Oster et al., 2013), limiting the plausibility of this case. On the other hand, an individual may have suspected they did not have a health condition, but the test result is positive. This case is more plausible with respect to the empirical findings of this study, specifically for new diagnoses for diabetes. One reason is that benefit delays are concentrated among individuals who self-report not having been diagnosed with diabetes in the survey. Another reason is that, in a related study, Benitez-Silva and Dwyer (2005) find that a newly reported diabetes diagnosis increased the expected retirement age.

The delays in benefit entitlements due to a newly diagnosed condition may occur through two mechanisms. First, a new medical diagnosis could encourage investment in health capital, resulting in greater productivity (if the substitution effect dominates the income effect), lower absenteeism, and greater preferences for work. This mechanism is consistent with Edwards (2018), who examines whether a new diabetes diagnosis affects medication use and physical activity. He finds that individuals who were newly diagnosed with diabetes subsequently increased physical activity and decreased self-reported weight. Second, a new medical diagnosis may increase the demand for health care, and this demand encourages employment either to obtain or retain employer-provided health insurance. This mechanism is commonly referred to as job and employment lock (Gruber and Madrian, 1995; Garthwaite et al., 2014). Regarding retirement, Rust and Phelan (1997) argue that health insurance constraints combined with risk aversion cause individuals to work until Medicare eligibility at age 65, accounting for the spike in OA entitlements at that age.

The employment lock mechanism is also more plausible if treatment for a newly diagnosed condition is costly. For diabetes, average medical expenditures in 2012 of persons with diabetes in the US were $13,700, $7,900 of which were directly attributable to diabetes (American Diabetes Association, 2013).[5] Standard care for diabetes can cost up to $1,400 per year, and care for diabetes complications can cost significantly more (Zhuo et al., 2013).[6]

[5]These figures are derived, in part, from the Medical Expenditure Panel Survey. Expenditures from the survey reflect total payments, including out-of-pocket payments and payments by private insurance, Medicaid, Medicare, and other sources.

[6]Standard care for diabetes includes medications ($597), physician visits ($522), and self-testing devices

For example, treatment for angina – chest discomfort due to poor blood flow – can cost $8,464 at the time of onset and $2,187 per year thereafter (O'Brien et al., 2003).[7] Treatment for end-stage renal disease can cost approximately $78,795 per year.

There are at least three important limitations to the analysis. First, despite the attempt to randomize the examination time, there are some observable differences between the exam groups, especially with more restricted samples. These differences may reflect random sampling, random assignment, or sample selection due to non-compliance, though it was "extremely rare" for survey participants to appoint outside their fasting assignment. Second, the sample sizes are not large, likely due to the administrative costs to administer medical examinations to all participants. Thus, throughout the analysis, the standard errors do not rule out a wide range of effects. Finally, the data do not contain longitudinal information on health insurance coverage, health care utilization, or health behaviors, which would be useful to identify the underlying mechanisms of the causal effect of health information on entitlement delays.

This study contributes directly to the literature on the timing of retirement and SSA benefit entitlement and receipt. While many studies focus on the role of financial incentives, including Gustman and Steinmeier (2005) and Stock and Wise (1990), other studies emphasize the importance of health. Coile et al. (2002) discuss how the interaction of mortality expecations and financial incentives may impact claiming behavior and, consistent with predictions, find that men with longer life expectancies also have longer delays in claiming. Hurd et al. (2004) further explore how subjective survival affects both Social Security claiming and retirement. In a dynamic programming model, Rust and Phelan (1997) argue that health insurance constraints induce some individuals to work until Medicare eligibility at age 65.

This study also relates to a growing literature on the effects of medical diagnoses

($278).

[7] This figure is derived from administrative data in Canada and reflects acute care hospital costs, specifically accommodation, ancillary services, emergency room, operating room, diagnostic and therapeutic procedures, and physician costs.

on economic and health outcomes, including Alalouf et al. (2019), Hertzberg et al. (2021), Iizuka et al. (2022), and Persson et al. (2021). A very relevant study is by Benitez-Silva and Dwyer (2005), who examine how new information affects retirement expectations. Using longitudinal data, new health information is identified by transitions in self-reported medical conditions. They find that a newly reported diabetes diagnosis increased the expected retirement age, consistent with delayed entitlements found in this study. In comparison to the related literature, this study is unique in focusing on entitlements to Social Security benefits.

2 Empirical Strategy

2.1 Identification

To identify the effect of health information on benefit entitlements, the empirical strategy exploits random assignment of medical screenings during the NHANES data collection process.

The NHANES survey combined with medical screenings is intended to measure the prevalence of both diagnosed and undiagnosed medical conditions. First, survey participants answer questions regarding demographic characteristics, socioeconomic status, labor supply, dietary habits, and previously diagnosed health conditions. The survey occurs in a participant's home. Then, survey participants submit to a medical exam, which includes physical assessments, dental assessments, and laboratory tests. The medical exam occurs in a Mobile Examination Center (MEC), a medical clinic constructed from mobile trailers and staffed with medical personnel. Both the survey and medical exams are cross-sectional, and the medical exams are performed after the survey.[8] Medical conditions that are not

[8] The average time between the at-home interview and the medical exam is two weeks, with 89.9 percent of exams are performed by two months after the at-home interview. This figure is calculated from public-use data by comparing the age in months at the interview to the age in months at the time of the exam.

reported during the at-home survey, but are subsequently revealed during the medical exam, are deemed undiagnosed.

Importantly, survey participants are notified of their exam results, thus providing health information. Results that are immediately available – such as physical measurements, blood pressure, and dental assessments – are provided upon exiting the MEC. Results that are not immediately available are provided by mail, usually within 12 to 16 weeks after the exam. If the exam identifies a condition that requires medical attention, MEC personnel may offer to contact a physician for follow-up care, but do not themselves provide clinical treatments or interventions.

Experimental variation in health information is generated by random assignment. Specifically, survey participants were randomly assigned with equal likelihood to either a morning or an afternoon exam, and three additional tests – plasma glucose, LDL (bad) cholesterol, and triglycerides – were administered only during morning exams. This is because these tests require fasting, which is best achieved overnight. These tests are used to diagnose type 2 diabetes (plasma fasting glucose) and to assess risk for a heart attack or stroke (LDL cholesterol and triglycerides). As a result, morning examinees received more health information relative to afternoon examinees. Because morning exams were randomly assigned, the effect of new health information on economic outcomes can be measured by the difference in outcomes between exam groups.

Although random assignment provides identifying variation, three issues require mention. The first issue is whether examinees complied with their assigned exam time. As stated, the exam time was assigned during the at-home survey. To ensure compliance, the schedule was flexible to allow survey participants to choose a variety of exam dates. The MEC remained open for approximately 6 weeks, for five days a week, and the days of closure changed weekly. Once the date and time of the examination were scheduled, survey participants received two reminders, one by mail a week before the scheduled exam, and another by phone 48 hours before the exam. If the participant could not make the scheduled appointment, an alternative appointment was arranged with an expressed attempt to preserve exam assignment. According to an NCHS administrator, participants appointing outside their fasting assignment was "extremely rare."[9]

The second issue is that, although afternoon examinees were not directly tested for fasting plasma glucose, LDL cholesterol, and triglycerides, both exam groups were administered tests that are predictive of diabetes and high LDL cholesterol. A list of laboratory tests by examination group are provided in Appendix Table 1. Specifically, both groups were administered tests for glycohemoglobin A1C, a measure of average blood glucose during the past three months, and for total cholesterol and HDL (good) cholesterol, which are correlated with high LDL cholesterol.

Despite these tests, morning examinees received strictly more health information. First, at the time of the survey, the test of glycohemoglobin A1C was used only to monitor blood glucose levels, not to diagnose diabetes.[10] A definitive diagnosis required a test of fasting plasma glucose. Second, LDL cholesterol is considered a better measure of risk for a heart attack or stroke than total cholesterol and HDL cholesterol combined. In fact, medical guidelines recommend total and HDL cholesterol tests for initial screening of dyslipidemia; abnormal levels would justify a test of LDL cholesterol, which is more expensive and requires fasting (US Preventive Services Task Force, 2008).[11] Additionally, LDL cholesterol is the focus of cholesterol-lowering treatments (Grundy et al., 2019).

The third issue relates to the difference in health information between morning and afternoon examinees. Morning examinees would not have received new health information if the test results were consistent with their priors, and afternoon examinees could have

[9] The author received an email from an NCHS administrator stating that non-compliance was extremely rare. The email was made available to the editor and referees in the Appendix for the peer review process.

[10] In 1997 and 2003, an expert committee recommended against using hypoglycemic A1C levels to diagnose diabetes (Expert Committee, 1997, 2003). This recommendation was reversed in 2009, when a separate committee published guidelines on hypoglycemic A1C as a diagnostic tool (International Expert Committee, 2009).

[11] According to Mount Sinai: "A total cholesterol of 180 to 200 mg/dL or less is considered best. You may not need more detailed cholesterol tests if your cholesterol is in this normal range." (Accessed July 19, 2023, at https://www.mountsinai.org/health-library/selfcare-instructions/cholesterol-testing-and-results.)

sought additional medical testing and treatment after the survey. For example, an afternoon examinee who was newly diagnosed with high total cholesterol may have independently sought testing for LDL cholesterol, thereby narrowing the disparity in health information between morning and afternoon examinees. For these reasons, the causal estimates from the identification strategy should be interpreted as intent-to-treat.

2.2 Models

The difference in benefit entitlements between exam groups is estimated using two models. The first is an event-study model that measures differences in benefit entitlements before and after the calendar year of the survey. The model has the following form:

$$Y_{it} = \alpha + \beta M_i + \sum_{t \neq -1} (\gamma_t P_t + \gamma_t^M P_t M_i) + \sum_a \delta^a A_i^a + \sum_a \sum_{t \neq -1} \delta^a A_i^a P_t + \theta X_i + \epsilon_{it} \quad (1)$$

The outcome variable Y_{it} indicates benefit entitlement of person i in period t, equaling one if entitled and zero otherwise. Periods are measured in calendar years, and period zero corresponds to the calendar year of the survey. The variable P_t is an indicator of the period relative to the interview year, equaling one if the observation is t calendar years from the survey year and zero otherwise. The left-out period is $t = -1$, the calendar year before the survey. The variable M_i is an indicator of exam time, equaling one if the participant completed a morning exam and zero otherwise. The differences in benefit entitlements between exam groups in each period are represented by the coefficients γ_t^M, which correspond to the interactions of P_t and M_i.

The model also controls for age and other observable characteristics. The variable A_i^a is an indicator of survey age, equaling one if individual i is age a at the survey interview and zero otherwise. The interactions of P_t and A_i^a allow the dynamic relationship of benefit entitlement by period to differ by survey age. This is important because individuals at survey age 61, for example, reach the earliest entitlement age for OA benefits in period one, whereas individuals at survey age 60 reach the earliest entitlement age in period two. The vector X_i is observable characteristics, which mitigates the concern that the two groups differ due to random sampling, random assignment, or non-compliance. The structual error ϵ_{it} is specified to account for heteroskedasticity.[12]

Given random assignment, the identification assumption is that, in the absence of additional health information, the difference in benefit entitlements between the exam groups after the survey would be zero. If so, γ_t^M in periods $t \geq 0$ represents the effect of additional health information among morning examinees.

The validity of the identification assumption is evaluated in two ways. First, to assess the comparability of morning and afternoon examinees, differences in observable characteristics are estimated and tested for statistical significance. Some differences are to be expected, however, due to random sampling and random assignment. Second, in equation (1), the coefficients γ_t^M should be zero before the survey, as treatment had not yet occurred.

The second model estimates the likelihood of benefit entitlement in a single period only after the survey. The advantage of a single period is the ease in estimating and presenting heterogeneous effects by demographic or other observable characteristics, which are estimated by interacting the morning examination indicator with indicators of demographic or other observable characteristics. The model has the following form:

$$Y_{it} = \alpha + \beta M_i + \gamma M_i I_i \sum_a \delta^a A_i^a + \theta X_i + \epsilon_{it}. \tag{2}$$

As before, Y_{it} indicates benefit entitlement, M_i is an indicator of a morning exam, A^a are survey age fixed effects, and the vector X_i is observable characteristics. I_i is an indicator of demographic or other observable characteristics for which heterogeneous effects are estimated.

[12] The models were also estimated with errors clustered at the individual level, which generally decreased the standard errors of the treatment effects. Thus, robust errors are relatively conservative.

2.3 Data

The primary data come from the NHANES. The survey is cross-sectional and representative of the US population, excluding persons in nursing homes, members of the armed forces, institutionalized persons, and US nationals living abroad, and oversamples Blacks, Mexican Americans, adolescents, and persons aged 60 and over.[13] The public-use data are released as pooled cross sections over two calendar years, with the first covering 1999 and 2000. This study utilizes the month and year in which a participant completed the survey, which are accessible through a US Census Bureau's Federal Statistical Research Data Center.

To measure benefit entitlelements, the NHANES data are matched to SSA's Master Beneficiary Record (MBR). The MBR is derived from administrative data from SSA and reports the date and type of initial and current entitlement to DI, OA, and SS benefits. While SSA's version of the MBR is constantly updated to reflect current entitlements, the data available for this study was last updated at the end of calendar year 2008. To estimate equations (1) and (2), the date of initial entitlement is used to construct the panel variable Y_{it}. Specifically, Y_{it} equals one in the year of initial entitlement and all years thereafter. Because the data are last updated in 2008, and last survey year is 2003, the outcome variable is available only five periods after the survey for the entire sample. The only time-varying regressors are the period indicators P_t and their interactions. All other regressors are time-invariant and derived from cross-sectional data.

The MBR also reports annual quarters of coverage from 1954 to 2007. Quarters of coverage reflect annual earnings covered by SSA taxation and thus serve as a measure of covered employment. The NHANES data are also matched to mortality data, which are derived from death certificates reported to the National Center for Health Statistics. Mortality data are available through calendar year 2006. SSA data are only available for NHANES in survey years 1999/2000, 2001/2002, and 2003/2004, so the analysis is necessarily restricted to these years.

[13] The number of observations by age approximately doubles from age 59 to 60.

3 Sample Summary

3.1 NHANES Sample

To provide empirical support for the identification strategy, differences in observable pre-treatment characteristics are estimated among the NHANES sample ages 20 and above (49.3 percent of the pooled sample).[14] The sample is further restricted to participants who completed a MEC exam (92.7 percent of the remaining sample). The remaining sample contains 14,213 participants, approximately half (48.8 percent) of whom completed a morning exam.[15] The roughly equal split of participants into morning and afternoon examinations is consistent with compliance to fasting assignments.

Differences in observable characteristics are estimated along several dimensions: demographic characteristics, labor supply and health insurance coverage, self-reported health, laboratory and examination results, new health diagnoses, and SSA outcomes. The estimates and their differences are provided in Appendix Tables 2A through 2F. In general, morning and afternoon examinees appear similar along many dimensions. Out of 50 differences, only three are statistically significant.[16] In Table 2B, morning examinees were 1.42 percentage points more likely to have income above five times the poverty line, compared to a sample mean of 17.84 percent. In Table 2D, morning examinees were 2.13 percentage points less likely to test positive for at least borderline high total cholesterol, compared to a sample mean of 50.65 percent.[17] In Table 2E, morning examinees were 2.29 percentage points less likely to be newly diagnosed with at least borderline high total cholesterol, compared to a

[14] Age 20 was chosen as the youngest age in the full sample since the survey questions on education are different between children and youth aged 16 to 19 and adults aged 20 and older.

[15] The survey data does not explicitly report the exam assignment. Instead, assignment is determined by whether the survey participant is contained in the data file that reports plasma-glucose results. This file is labeled "LAB10AM" according to the survey documentation.

[16] With 50 differences, some differences are expected to be statistically significant by chance due to random sampling.

[17] An index is constructed to test for differences across all self-reported health conditions (Finkelstein et al., 2012; Kling et al., 2007). The p-value of the Chi-square test is 0.17, so the null hypothesis cannot be rejected.

sample mean of 32.99 percent.[18] All other differences appear relatively small and statistically insignificant.

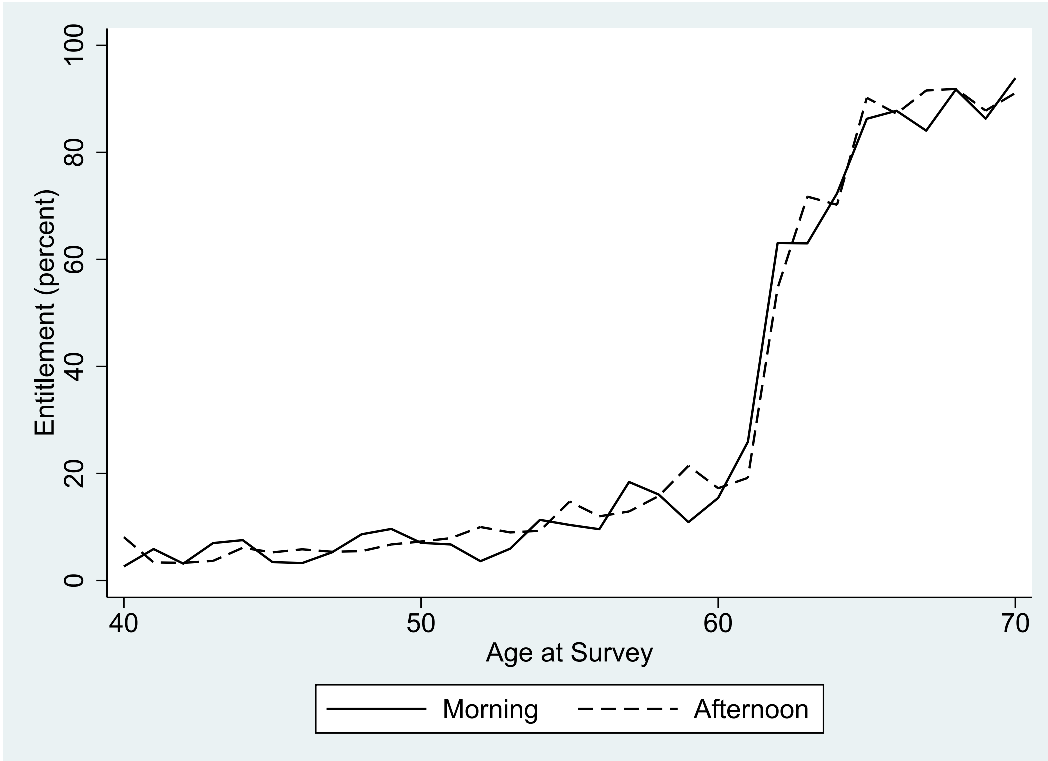
3.2 Analysis Sample

To derive the analysis sample, two restrictions are placed on the sample above. First, by necessity, the sample is restricted to survey participants who are matched to SSA records, which requires consent from the participant. The match rate among morning and afternoon examinees is 84.70 percent and 85.67 percent, respectively (Appendix Table 2F). Second, the sample is restricted to participants at ages 50 to 61 at the time of the survey. The restriction is motivated by Figure 1, which illustrates the percent of survey participants who were receiving SSA benefits in the month prior to the survey interview separately by exam time. As shown, benefit entitlement remains relatively flat through the mid 50s, so including ages 49 and under would not contribute substantively to the analysis given the inclusion of the early 50s. Additionally, entitlement spikes at age 62, the earliest entitlement age for OA benefits, limiting the scope of a behavioral response at 62 and older. These patterns of entitlement are evident for both males and females, as illustrated in Appendix Figure 1. The share of morning and afternoon examinees at ages 50 to 61 is 14.53 percent and 13.93 percent, respectively.

Summary statistics of the analysis sample are presented in Tables 1 to 5. Out of 48 differences, only six are statistically significant. In Table 1, morning examinees were 0.44 years older, compared to a sample mean of 55.50, and 4.77 percentage points less likely to be Black, compared to a sample mean of 19.54 percent. The other differences with respect to sex, race, marital status, and family composition are statistically insignificant. In Table 2, morning examinees were 2.80 percentage points less likely to have family income below the poverty line, compared to a sample mean of 14.25 percent. The differences with

[18] Newly diagnosed is defined as not reporting having been diagnosed with high cholesterol (Appendix Table 2C), but testing postive for at least borderline high cholesterol (Appendix Table 2D).

Figure 1: Entitlement to Social Security Benefits before NHANES Survey



The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were matched to SSA data. Entitlement is defined by whether an individual had been entitled to Social Security benefits before the month and year of the survey.

respect to labor supply, quarters of coverage, and health insurance coverage are statistically insignificant. In Table 3, morning examinees were 5.55 percentage points more likely to report arthritis, 1.59 percentage points more likely to have emphysema, and 3.62 percentage points more likely to have any health condition listed, including borderline diabetes. In Table 4, there are no statistically significant differences. Finally, in Table 5, morning examinees were 4.40 percentage points less likely to be newly diagnosed with high total cholesterol, including borderline cases, but this difference decreases to just 0.29 percentage points when borderline cases are excluded. A new diagnosis is defined as not self-reporting a health condition in the survey, but subsequently testing positive for the condition during the medical examination.

Table 1: Demographics, Ages 50 to 61

	Morning	Afternoon	Difference
Age (years)	55.72	55.28	0.44
	(0.11)	(0.12)	(0.16)*
Male	49.26	50.84	-1.58
	(1.57)	(1.57)	(2.22)
White	55.50	52.71	2.79
	(1.57)	(1.57)	(2.22)
Black	17.15	21.92	-4.77
	(1.19)	(1.30)	(1.76)*
Other race	27.35	25.37	1.98
	(1.40)	(1.37)	(1.96)
Less than high school	31.25	28.85	2.40
	(1.46)	(1.42)	(2.04)
High school	21.73	22.33	-0.61
	(1.30)	(1.31)	(1.85)
Some college or more	47.02	48.81	-1.79
	(1.57)	(1.57)	(2.22)
Married	66.94	65.77	1.17
	(1.51)	(1.53)	(2.15)
Single	8.75	11.27	-2.52
	(0.91)	(1.02)	(1.36)
Other marital status	24.30	22.96	1.35
	(1.38)	(1.35)	(1.93)
Married & three or	30.79	33.20	-2.40
more family members	(1.48)	(1.52)	(2.12)
Observations	1,009	1,013	

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were ages 50 to 61 at the time of the survey and who were matched to SSA data. Estimates are conditional on non-missing values and are in percentage points, unless otherwise noted. Standard errors are in parentheses. In the difference column, * indicates significance at the 5 percent level.

3.3 New Health Information

It is important to consider how medical screening revealed new information, and specifically how health information differed between morning and afternoon examinees.

Stated above, survey participants who do not report having been diagnosed with

Table 2: Labor Supply and Health Insurance Coverage, Ages 50 to 61

	Morning	Afternoon	Difference
Labor force participation	66.60	63.57	3.03
	(1.49)	(1.51)	(1.82)
Employed	61.05	58.14	2.91
	(1.54)	(1.55)	(1.95)
Employed full time	44.20	43.77	0.43
	(1.56)	(1.56)	(2.01)
SSA Data:			
Quarters of Coverage - Any	65.11	62.19	2.92
	(1.50)	(1.52)	(1.86)
DI Insured	69.38	68.11	1.26
	(1.45)	(1.46)	(1.73)
Family income to poverty ratio:			
<1	12.86	15.65	-2.80
	(1.09)	(1.19)	(1.10)*
1-2.99	33.40	33.12	0.28
	(1.53)	(1.54)	(1.93)
3-4.99	24.66	23.75	0.91
	(1.40)	(1.39)	(1.60)
5+	29.08	27.48	1.61
	(1.48)	(1.46)	(1.76)
Health insurance:			
Any	83.57	81.79	1.77
	(1.17)	(1.22)	(1.21)
Private	69.38	67.63	1.75
	(1.46)	(1.48)	(1.75)
Employer	65.99	67.20	-1.21
	(3.38)	(3.42)	(64.98)
Observations	1,009	1,013	

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were ages 50 to 61 at the time of the survey and who were matched to SSA data. Estimates are conditional on non-missing values and are in percentage points, unless otherwise noted. Standard errors are in parentheses. In the difference column, * indicates significance at the 5 percent level.

a health condition, but test positive for the condition by laboratory testing, are deemed undiagnosed. Table 3 provides estimates of self-reported health conditions. Among morning and afternoon examinees, self-reported diabetes is 13.18 percent and 15.40 percent, respec-

Table 3: Self-Reported Health, Ages 50 to 61

	Morning	Afternoon	Difference
Diabetes (+borderline)	15.26	16.68	-1.42
	(1.13)	(1.17)	(1.63)
Diabetes	13.18	15.40	-2.22
	(1.07)	(1.13)	(1.56)
High cholesterol	42.20	38.44	3.77
	(1.56)	(1.53)	(2.18)
High blood pressure	41.53	42.59	-1.05
	(1.56)	(1.56)	(2.20)
Arthritis	37.10	31.55	5.55
	(1.52)	(1.46)	(2.11)*
Heart failure	3.78	2.97	0.81
	(0.60)	(0.53)	(0.80)
Heart disease	5.66	5.05	0.61
	(0.73)	(0.69)	(1.00)
Angina	3.88	4.16	-0.28
	(0.61)	(0.63)	(0.88)
Heart attack	5.36	4.55	0.81
	(0.71)	(0.66)	(0.97)
Stroke	3.17	2.86	0.31
	(0.55)	(0.52)	(0.76)
Emphysema	3.08	1.48	1.59
	(0.54)	(0.38)	(0.66)*
Overweight	38.16	38.54	-0.38
	(1.53)	(1.53)	(2.16)
Chronic bronchitis	7.65	6.44	1.22
	(0.84)	(0.77)	(1.14)
Liver condition	4.86	5.24	-0.38
	(0.68)	(0.70)	(0.98)
Any condition (+ borderline diabetes)	81.36	77.73	3.62
	(1.24)	(1.32)	(1.81)*
Total conditions above	2.08	1.97	0.11
	(0.05)	(0.05)	(0.08)
Observations	1,009	1,013	

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were ages 50 to 61 at the time of the survey and who were matched to SSA data. Estimates are conditional on non-missing values and are in percentage points, unless otherwise noted. Standard errors are in parentheses. In the difference column, * indicates significance at the 5 percent level.

Table 4: Laboratory and Examination Results, Ages 50 to 61

	Morning	Afternoon	Difference
Diabetes (+borderline)	51.02		
	(1.60)		
Diabetes	14.55		
	(1.13)		
High LDL cholesterol (+borderline)	43.04		
	(1.673)		
High LDL cholesterol	16.78		
	(1.26)		
High triglycerides (+borderline)	43.41		
	(1.60)		
High triglycerides	25.73		
	(1.41)		
Any condition above (+borderline)	80.80		
	(1.33)		
Any condition above	41.26		
	(1.67)		
Total conditions above (+borderline)	1.33		
	(0.031)		
Total conditions above	0.51		
	(0.02)		
High glycohemoglobin	12.64	14.24	-1.60
	(1.06)	(1.12)	(1.55)
High total cholesterol (+borderline)	58.62	62.84	-4.22
	(1.59)	(1.57)	(2.23)
High total cholesterol	21.73	23.37	-1.63
	(1.33)	(1.37)	(1.91)
Low HDL cholesterol	74.30	72.62	1.67
	(1.73)	(1.79)	(2.49)
High blood pressure	25.00	25.18	-0.18
	(1.40)	(1.40)	(1.98)
Body mass index	29.09	29.54	-0.45
	(0.20)	(0.21)	(0.29)
Observations	1,009	1,013	

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were ages 50 to 61 at the time of the survey and who were matched to SSA data. Estimates are conditional on non-missing values and are in percentage points, unless otherwise noted. Standard errors are in parentheses. In the difference column, * indicates significance at the 5 percent level.

Table 5: New Diagnoses, Ages 50 to 61

	Morning	Afternoon	Difference
Diabetes (+borderline)	38.01		
	(1.55)		
Diabetes	4.41		
	(0.66)		
High LDL cholesterol (+borderline)	22.43		
	(1.41)		
High LDL cholesterol	7.67		
	(0.90)		
High triglycerides (+borderline)	20.65		
	(1.31)		
High triglycerides	10.69		
	(1.00)		
Any condition above (+borderline)	57.73		
	(1.67)		
Any condition above	19.01		
	(1.33)		
Total conditions above (+borderline)	80.99		
	(2.85)		
Total conditions above	0.21		
	(0.016)		
High total cholesterol (+borderline)	29.84	34.25	-4.40
	(1.48)	(1.54)	(2.14)*
High total cholesterol	12.88	13.17	-0.29
	(1.08)	(1.10)	(1.54)
Observations	1,009	1,013	

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were ages 50 to 61 at the time of the survey and who were matched to SSA data. A new diagnosis is defined as not reporting a health condition during the at-home survey, but subsequently testing positive for the condition through the medical examination. Estimates are conditional on non-missing values and are in percentage points, unless otherwise noted. Standard errors are in parentheses. In the difference column, * indicates significance at the 5 percent level.

tively, and self-reported high cholesterol is 42.20 percent and 38.44 percent, respectively. Differences between exam groups are not statistically significant.

Table 4 provides estimates from the medical exam and laboratory tests. Only morning examinees were administered tests for fasting plasma glucose, high LDL cholesterol, and triglycerides. Based on the laboratory results, 51.02 percent of morning examinees are diagnosed with at least borderline diabetes, 43.04 percent with borderline high LDL cholesterol, and 43.41 percent with borderline high triglycerides. Excluding borderline cases, 14.55 percent are diagnosed with diabetes, 16.78 percent are diagnosed with high LDL cholesterol, and 25.73 percent are diagnosed with high triglycerides. Some examinees were diagnosed with two or more of these conditions so that, excluding borderline cases, 41.26 percent are diagnosed with either diabetes, high LDL cholesterol, or high triglycerides.

Table 5 reveals the extent to which morning examinees received new information. Regarding diabetes, 38.01 percent of morning examinees had been undiagnosed with at least borderline diabetes, and 4.41 percent had been undiagnosed with diabetes. Regarding cholesterol, 22.43 percent of morning examinees had been undiagnosed with at least borderline high LDL cholesterol, and 7.67 percent had been undiagnosed with high LDL cholesterol.

A comparison of Tables 4 and 5 indicates that a substantial share of conditions that were diagnosed during the medical exam were previously undiagnosed. Regarding diabetes, 14.55 percent of survey respondents tested positive for diabetes, and 4.41 were undiagnosed, indicating that approximately 30.31 percent of persons with diabetes in the sample were undiagnosed.[19] Importantly, participants who report having been diagnosed with a health condition do not necessarily test positive for the condition during the medical examination. These false-positive reports may reflect reporting error, a misdiagnosis by a doctor, or improved health.

3.4 Additional Sample and Model Considerations

There are three additional considerations when estimating equations (1) and (2). First, equation (2) can be estimated by including or excluding survey participants who were

[19]The Center for Disease Control and Prevention, National Center for Health Statistics, calculates a similar share of undiagnosed diabetes among US adults in 2013 to 2016 (Mendola et al., 2018): the prevalence of diabetes (diagnosed and undiagnosed) was 14.0 percent, with 4.3 percent of cases undiagnosed, yielding a share of undiagnosed of 30.7 percent.

entitled to SSA benefits prior to the survey; however, this should not impact the results since entitlements before the survey should be independent of exam assignment. While the discussion will focus primarily on the inclusion of survey participants who were entitled to SSA benefits prior to the survey, companion results with the exclusion of these particpants are provided in the Appendix. Summary statistics of the analysis sample excluding survey participants who were previously entitled to SSA benefits are reported in Appendix Tables 3A to 3E.

Second, the models include control variables which are enumerated in Appendix Table 4. The control variables are a subset of the variables in Tables 1 through 4 and include results from tests administered to both morning and afternoon examinees, which are exogenous to exam assignment and are likely correlated with health and other factors that affect benefit entitlements.

Third, according to the mortality data, some survey participants die after the survey. For example, by five calendar years after the survey, the percent deceased was 8.35 among morning examinees and 9.02 among afternoon examinees. Importantly, the differences in mortality between examine groups are not statistically significant. When estimating the models, individual-by-year observations are dropped in the calendar year of death and all calendar years thereafter.

Sample sizes by exam assignment and period relative to the survey are reported in Appendix Table 5. As shown, there are 19,982 person by period observations across 2,013 participants. The decline in observations after period zero results from death.

4 Results

4.1 Event-Study Analysis

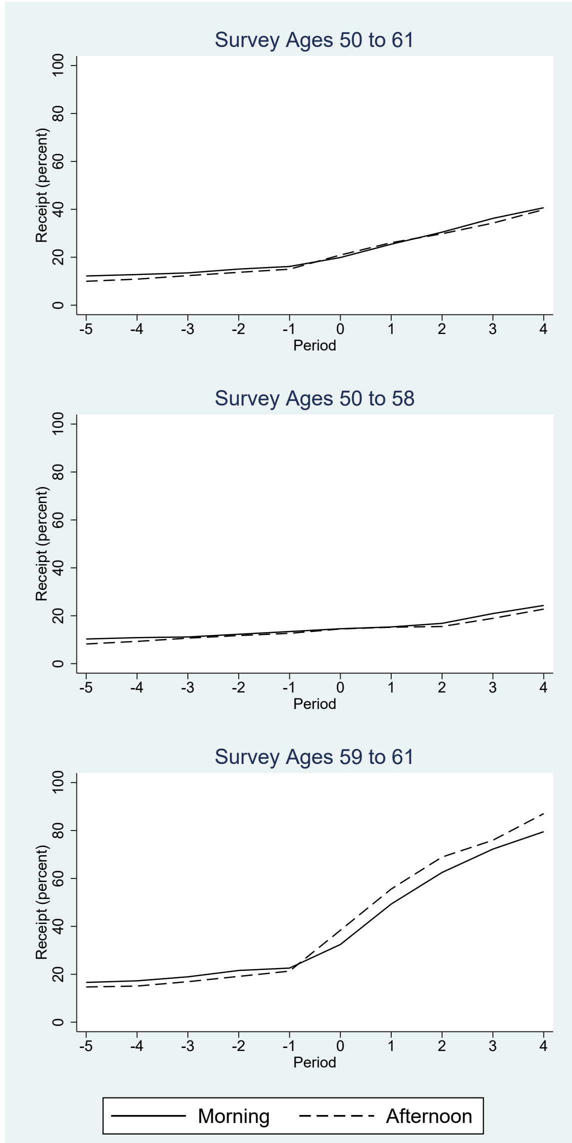
To motivate the event-study analysis, Figure 2 plots rates of entitlement to DI, OA, or SS benefits by exam group and calendar years before and after the survey year. The top panel corresponds to survey ages 50 to 61; the middle panel corresponds to survey ages 50 to 58; and the bottom panel corresponds to survey ages 59 to 61. The sample is separated by age because individuals in the older category became increasingly eligible for OA benefits after the survey year as they surpass the earliest entitlement age of 62.

The figure suggests that additional health information led to delays in benefit entitlements up to four periods after the survey, particularly among participants who were aged 59 to 61 at the time of the survey. Before the survey, the rates of entitlement increased steadily among all age categories, and the levels and trends were similar for both exam groups. After the survey, the patterns differ by age categories. At survey ages 50 to 58, the rate of entitlement continued along pre-existing trends, and there is no noticeable difference between morning and afternoon examinees. At survey ages 59 to 61, the trend in benefit entitlement increased substantially after the survey, and the rates of entitlement between exam groups diverged, with lower rates of entitlement among morning examinees.

The estimates from the event-study model in equation (1) are reported in Figure 3, which plots the coefficients and the 95 percent confidence intervals on the interactions between the period indicators and the indicator of a morning examination.[20] The results are consistent with Figure 2. As shown in the first panel, where the sample is restricted to survey ages 50 to 61, the rate of entitlement is lower among morning examinees only after the survey, though none of the estimates are statistically insignificant. This lower rate appears attributable solely to individuals who were ages 59 to 61 at the time of the survey, as shown

[20]In all models, the coefficient on the morning exam indicator, which measures the difference in entitlements in period -1, is small and statistically insignificant.

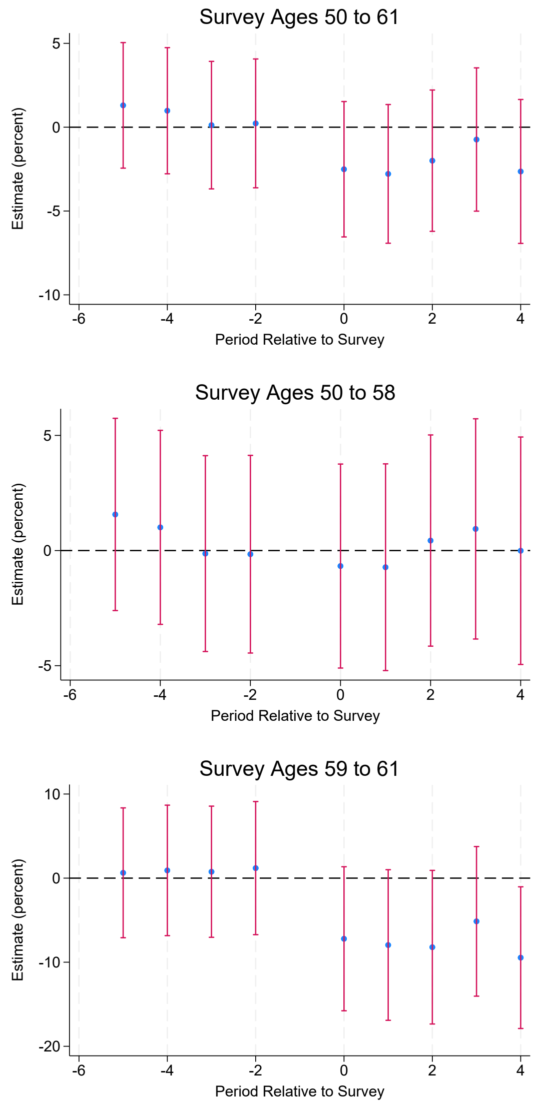
Figure 2: Entitlement to Social Security Benefits Relative to Survey Year



The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were matched to SSA data. Entitlement reflects Social Security's Old Age, Disability, Survivor, and Spousal benefit programs. Entitlement is defined by whether an individual had been entitled to Social Security benefits at the end of the calendar relative to the survey year. The sample is limited to respondents who are matched to SSA data. Period corresponds to calendar years relative to the calendar year of the survey.

in the third panel. While most of the estimated differences after the survey are statistically significant at the 10 percent level, only the estimate in period 4 is statistically significant at the five percent level. In that period, the rate of entitlement was 9.46 percentage points lower among morning examinees.

Figure 3: Entitlement to Social Security Benefits Relative to Survey Year



The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were matched to SSA data. SSA entitlement reflects Old Age, Disability, Spousal, and Survivor programs. Periods correspond to calendar years relative to the survey. The model includes period by survey age fixed effects. Additional control variables are listed in the appendix and include demographic characteristics, labor force participation, health insurance coverage, self-reported health conditions, and and laboratory and examination results. Robust standard errors are in parentheses. * indicates significance at the 5 percent level.

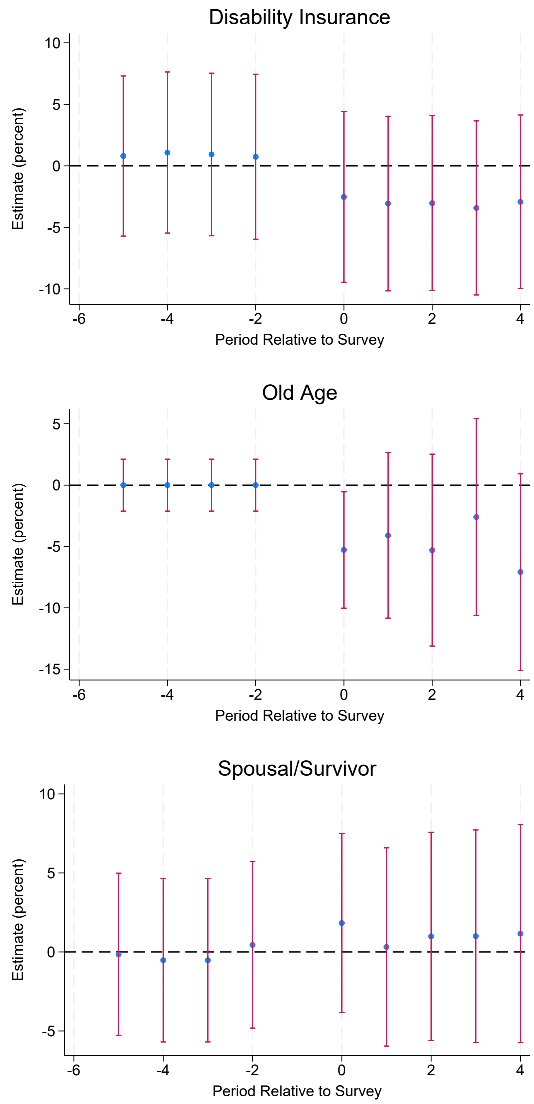
To examine benefit entitlement separately by program, the event-study model model in equation (1) is estimated separately for DI, OA, and SS benefits. The sample is restricted to survey ages 59 to 61, ages at which entitlement delays after the survey were most evident. The estimates, reported in Figure 4, suggest that entitlement delays are attributable more to DI and OA and less to SS. As shown in the first and second panels, which correspond to DI and OA, respectively, the rate of entitlement is lower among morning examinees only after the survey. For DI, none of the estimates are statistically significant. For OA, the estimate in period one is -5.28 percentage points and is statistically significant at the five percent level, and the estimate in period four is -7.09 percentage points and is statistically significant at the ten percent level. In the third panel, which corresponds to SS, the estimates are consistently positive after the survey, though are small and statistically insignificant.

Because the difference in benefit entitlement is most pronounced at survey ages 59 to 61, an important question is whether exam groups at these ages differ substantially with respect to observable characteristics. To address this question, summary statistics are reported by exam group in Appendix Tables 6A through 6E. As shown, most of the differences between exam groups are negligible, and the larger differences are statistically insignificant. For example, in Appendix Table 6C, morning examinees were 4.34 percentage points less likely to self-report diabetes and 9.34 percentage points more likely to self-report high cholesterol, though neither difference is statistically significant. The only statistically significant difference is BMI, reported in Appendix Table 6D, which is 1.03 lower among morning examinees.

4.2 Benefit Entitlement in Period Two

Using equation (2), the probability of benefit entitlement is estimated in period two, the second calendar after the survey year. The analysis sample is restricted to survey ages 59 to 61. By the end of period two, most respondents at these ages would have surpassed the earliest entitlement age of 62 but not the normal retirement age of 65, by which nearly

Figure 4: Entitlement to Social Security Benefits Relative to Survey Year



The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were matched to SSA data. Periods correspond to calendar years relative to the survey. The model includes period by survey age fixed effects. Additional control variables are listed in the appendix and include demographic characteristics, labor force participation, health insurance coverage, self-reported health conditions, and and laboratory and examination results. Robust standard errors are in parentheses. * indicates significance at the 5 percent level.

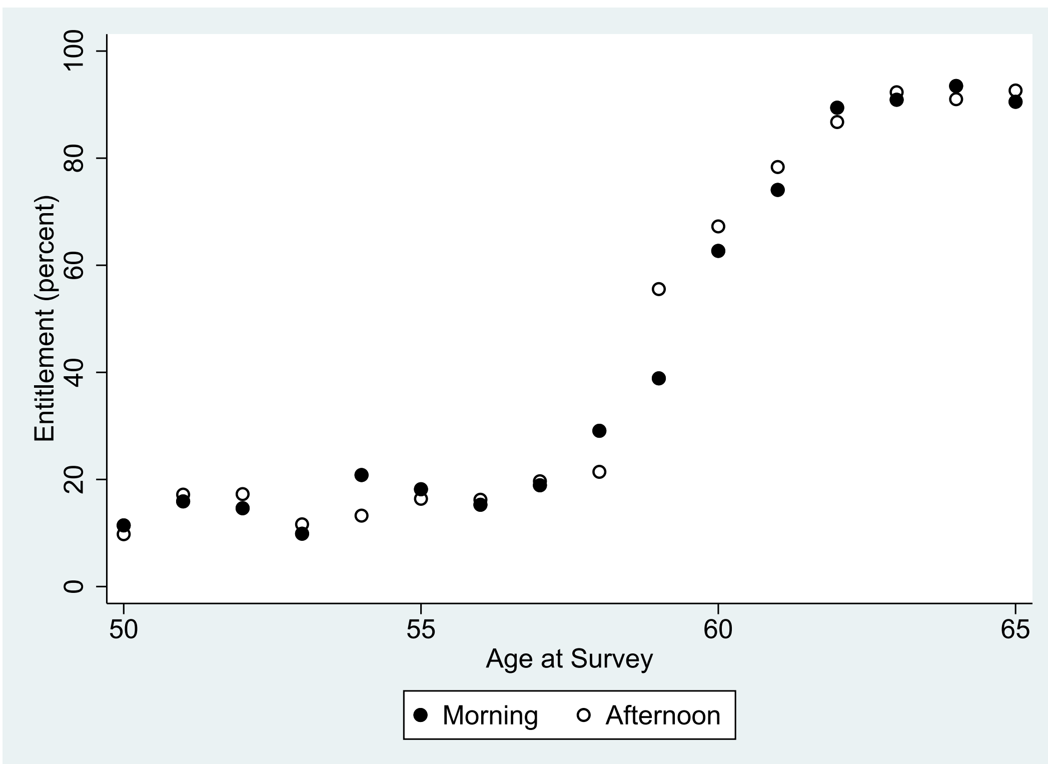
all individuals are entitled to Social Security benefits (Figure 1).[21]

Figure 5 illustrates unadjusted rates of benefit entitlement by period two by survey

[21] Specifically, respondents who were ages 59 (61) during the survey reached ages 61 and 62 (63 and 64) at the end of period two.

age separately for morning and afternoon examinees. The figure reveals entitlement delays among morning examinees at each survey age between 59 to 61, inclusive, reflected by lower rates of entitlement. The largest difference in entitlement is among survey participants at survey age 59, many of whom reached the early entitlement age of 62 in period two. There is no systematically positive or negative difference in entitlement between morning and afternoon examinees at survey ages 50 to 58 and 62 to 65. In the former category, most survey respondents would not have reached the earliest entitlement age of 62 by the end of period two; in the latter category, most survey respondents would have surpassed the normal retirement age of 65 and become eligible for Medicare coverage.

Figure 5: Entitlement to Social Security Benefits in Period Two



The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were matched to SSA data. Entitlement reflect Social Security's Old Age, Disability, Survivor, and Spousal benefit programs. Entitlement is defined by whether an individual had been entitled to Social Security benefits at the end of period two. Period two is defined as the second calendar year after the survey year. The sample is limited to respondents who were matched to SSA data.

Appendix Figure 2 presents rates of benefit entitlement by period two excluding

Table 6: Linear Probability Model of SSA Entitlement by Period Two

Specification	(1)	(2)	(3)	(4)	(5)
Morning	-1.20	1.03	1.47	1.41	-7.79
	(1.79)	(1.95)	(1.77)	(1.76)	(3.74)*
Morning*I(Age=59 to 61)		-7.83	-8.13		
		(4.38)	(4.06)*		
Survey ages	50 to 61	50 to 61	50 to 61	50 to 58	59 to 61
Survey age fixed effects	Yes	Yes	Yes	Yes	Yes
Control variables	No	No	Yes	Yes	Yes
Mean dependent variable	30.15	30.15	30.15	16.16	65.54
R-square	0.25	0.26	0.40	0.23	0.28
Observations	1,977	1,977	1,977	1,417	560

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were matched to SSA data. SSA entitlement reflects Old Age, Disability, Spousal, and Survivor programs. Entitlement is measured in period two, two calendar years after the survey. The model includes survey age fixed effects. Additional control variables are listed in the appendix and include demographic characteristics, labor force participation, health insurance coverage, self-reported health conditions, and and laboratory and examination results. Robust standard errors are in parentheses. * indicates significance at the 5 percent level.

survey participants who were already entitled to SSA benefit prior to the survey. The figure is consistent with Figure 5, indicating consistently lower rates of benefit entitlements among morning examinees at survey ages 59 to 61. This indicates that the differences in entitlement rates observed in Figure 5 arise only after the survey.

Several models of equation (2) are used to estimate the likelihood of benefit entitlement in period two. The results, presented in Table 6, are consistent with Figure 5.[22] In the column (1), the sample is restricted to ages 50 to 61, and the model includes age fixed effects, but excludes other observable characteristics. On average, morning examinees are 1.20 percentage points less likely to receive benefits by period two than afternoon examinees, though the estimate is statistically insignificant. In the column (2), the exam time is interacted with an indicator of age 59 to 61 at the time of the survey. At ages 50 to 58, morning examinees

[22]Appendix Table 6 shows the results excluding survey participants who were already entitled to SSA benefit prior to the survey.

1.03 percentage points more likely to receive benefits, but the estimate is statistically insignificant. Relative to these ages, morning examinees at ages 59 to 61 were 7.83 percentage points less likely to receive benefits, and the estimate is statistically significant at the ten percent level. In column (3), the model includes observable characteristics, which increases the magnitude at ages 59 to 61 from -7.83 to -8.13 and decreases the standard error, yielding statistical significance at the five percent level. The robustness of the point estimates with the inclusion of control variables is consistent with random assignment, which is intended to balance both observable and unobservable characteristics between exam groups. In fact, the increase in the magnitude of the estimate after controlling for observables, if only slight, suggests that the entitlement delays are not likely due to selection from non-compliance. If non-compliance and selection were driving the results, controlling for observable would make the estimate less negative, not more negative. In columns (4) and (5), the model is estimated separately by age categories, which allows the effects of the observable characteristics to vary by age group. As shown, delays in benefit receipt appear only at ages 59 to 61, consistent with columns (2) and (3). Specifically, morning examinees at ages 59 to 61 were 7.79 percentage points less likely to receive benefits, compared to a mean of 65.54 percent.[23]

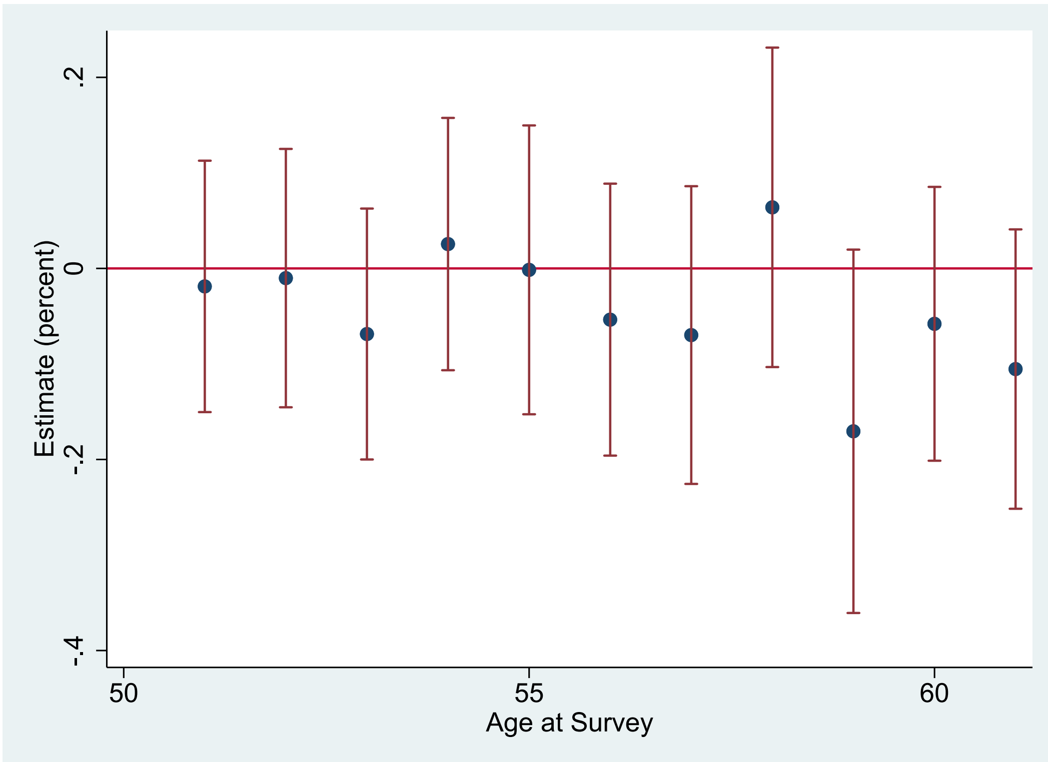
To estimate the effect by each survey age, corresponding to the unadjusted differences in Figure 5, the indicator of a morning exam is interacted with individual age fixed effects. The coefficients of these interaction terms, and their corresponding 95 percent confidence intervals, are plotted by age in Figure 6.[24] As shown, the largest coefficient is at survey age 59, which corresponds to benefit entitlements at ages 61 to 62 by period two. Specifically, the estimated difference in benefit entitlement is -17.05 percentage points and statistically significant at the 10 percent level. At survey ages 60 and 61, the estimated differences are -5.80 and -10.54 percentage points, respectively, though are statistically insignificant. While these results suggest that the entitlement delays are not driven by a single

[23] Although statistically significant, the confidence interval does not rule out a wide range of effects, ranging from -0.44 to -15.14 percentage points.

[24] Appendix Figure 3 shows the results excluding survey participants who were already entitled to SSA benefit prior to the survey.

outlier, the limitation of this exercise is that the sample sizes at each age are very small, so the standard errors can not rule out a wide range of effects.

Figure 6: Entitlement to Social Security Benefits by Period Two



The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were matched to SSA data. Entitlement reflect Social Security's Old Age, Disability, Survivor, and Spousal benefit programs. Entitlement is defined by whether an individual had been entitled to Social Security benefits at the end of period two. Period two is defined as the second calendar year after the survey year. The estimates are derived from a linear probability model that includes interactions between survey age and a morning examination, and the vertical lines indicate the 95 percent confidence interval. The sample is limited to respondents who were matched to SSA data.

To examine entitlements by program, Table 7 reports estimates from equation separately for DI, OA, and SS benefits. The models are directly comparable to column (3) of Table 8, which includes an interaction term between the indicator of a morning exam and an indicator of survey age from 59 to 61. The point estimates indicate that the entitlement delays at survey ages 59 to 61 were larger for DI and OA benefits, though none of the estimates are statistically significant.

Table 7: Linear Probability Model of SSA Entitlement by Period Two

Specification	(1)	(2)	(3)
Outcome Variable	Disability Insurance	Old Age	Spousal/Survivor
Morning	0.59	0.13	1.38
	(1.56)	(0.40)	(1.10)
Morning*I(Age=59 to 61)	-3.33	-6.20	1.40
	(3.23)	(4.03)	(3.02)
Survey ages	50-61	50-61	50-61
Survey age fixed effects	Yes	Yes	Yes
Control variables	Yes	Yes	Yes
Mean dependent variable	14.01	11.13	7.59
R-square	0.26	0.36	0.18
Observations	1,977	1,977	1,977

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were matched to SSA data. Entitlement is measured in period two, two calendar years after the survey. The model includes survey age fixed effects. Additional control variables are listed in the appendix and include demographic characteristics, labor force participation, health insurance coverage, self-reported health conditions, and and laboratory and examination results. Robust standard errors are in parentheses. * indicates significance at the 5 percent level.

5 Mechanisms

The baseline results suggest that new health information delayed entitlements to SSA benefits. One possible mechanism is that the detection of a latent medical condition increases the demand for health care, and this demand increases employment to obtain or retain employer provided health insurance. Another mechanism is that the detection of a latent medical condition increases health investment, resulting in improved health and prolonged employment. These potential mechanisms motivate the following subsections, which explore heterogeneous treatment effects, alternative outcomes, and alternative specifications.

5.1 Demographic Characteristics

Heterogeneous effects of health information are estimated across three demographic categories: sex, marital status, and educational attainment. Given the proposed mechanisms, the effects may be greater among the more educated. First, Coile et al. (2002) show that the association between wealth and entitlement delays is inverse U-shaped. This means that the potential to delay is greatest at the lowest and highest levels of wealth, for which education serves as a proxy. Second, according to (Grossman, 1972), education increases the efficiency of health production as well as the returns to investing in health capital, the latter due to increased labor market productivity. Predictions of the effects by sex and marital status are not obvious and, among married individuals, depend on the relative age and employment status of each spouse as well as the availability of spousal health insurance.

Effects by sex, marital status, and education are estimated using the model and specifications in column (5) of Table 6 as a baseline.[25] In this baseline case, the sample is restricted to ages 59 to 61, and the model includes observable characteristics. To estimate heterogeneous effects, the morning indicator is interacted with indicator variables for being male, married, and more educated, the latter defined as having any education beyond a high school diploma. Due to the small sample size, the model is estimated separately for each demographic characteristic, rather than simultaneously within the same model.

According to the results presented in Table 8, the effect of health information on benefit entitlement does not appear to differ by sex or marital status. In column (1), female morning examinees were 8.91 percentage points less likely to be entitled compared to female afternoon examinees. The differential difference among males is 2.25 percentage points, so that male morning examinees were 6.66 percentage points less likely to be entitled compared to male afternoon examinees. The differential difference, however, is not statistically significant. In column (2), non-married morning examinees were 7.95 percentage points less likely to receive benefits compared to non-married afternoon examinees, and the differential difference is only 0.25 percentage points among married examinees. Again, the difference is statistically insignificant.

The results by educational attainment, reported in column (3), indicate the entitle-

[25] Appendix Table 8 presents results excluding survey participants who were already entitled to SSA benefit prior to the survey.

ment delays were concentrated among the more educated. Less-educated morning examinees were only 1.02 percentage points less likely to receive benefits compared to less-educated afternoon examinees; however, the differential difference among more educated examinees is -17.10 percentage points. While the differential difference is statistically significant at the five percent level, the standard error does not rule out a wide range of effects.

5.2 Labor Supply

Heterogeneous effects are also estimated across measures of labor force attachment. Given the proposed mechanisms, the effects may be greater among individuals with greater attachment. The reason is that obtaining or retaining health insurance through formal employment is costly, and these costs are presumably lower for individuals who are employed or are covered by employer-provided health insurance (Madrian 1994). To test these predictions, the morning indicator is interacted with two measures of labor supply: labor force participation and DI insured status based on SSA quarters of coverage, both measured at the time of the survey. DI insured status is calculated using the MBR data and is defined as having at least 20 quarters of Social Security covered earnings during the past ten years prior to the survey and thus serves as a more general measure of labor force attachment than labor force participation in a single period. The results for each measure are presented in columns (4) and (5) of Table 8. The point estimates indicate that the entitlement delays were greater among individuals who were in the labor force and were insured for DI benefits. The largest estimated effect is among examinees who were DI insured, with morning examinees 11.73 percentage points less likely to be entitled than afternoon examinees. None of the estimates, however, are statistically significant.

Table 8: Linear Probability Model of SSA Entitlement - Period Two

Specification	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Interaction term	Male	Married	High education	Labor force	DI insured	High cholesterol	Diabetes (+borderline)
Morning	-8.91	-7.95	-1.02	-5.57	0.37	-8.52	-10.85
	(5.33)	(6.62)	(4.76)	(5.16)	(6.72)	(4.68)	(4.08)*
Morning*Interaction	2.25	0.25	-17.10	-3.91	-12.10	1.45	13.63
	(7.39)	(7.93)	(7.79)*	(7.48)	(8.19)	(5.22)	(7.12)
Survey ages	59 to 61	59 to 61	59 to 61	59 to 61	59 to 61	59 to 61	59 to 61
Survey age fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean dependent variable	65.54	65.54	65.54	65.54	65.54	65.54	65.54
R-square	0.28	0.28	0.29	0.28	0.29	0.28	0.29
Observations	560	560	560	560	560	560	560

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were matched to SSA data. Entitlement is measured in period two, two calendar years after the survey. The model includes survey age fixed effects. Additional control variables are listed in the appendix and include demographic characteristics, labor force participation, health insurance coverage, self-reported health conditions, and and laboratory and examination results. High education is defined as some college or more. Robust standard errors are in parentheses. * indicates significance at the 5 percent level.

5.3 Previous Diagnosis

Heterogeneous effects are also estimated by self-reported diagnoses at the time of the survey, specifically for high cholesterol and diabetes. If the delays are due to the diagnoses of previously undiagnosed conditions, then the delays should be concentrated among individuals who were not previously diagnosed.[26] To test this prediction, the morning indicator is interacted with a dummy for self-reported diagnoses of high cholesterol and diabetes. The results are presented in columns (6) and (7) of Table 8. Regarding high cholesterol, morning examinees who had never been diagnosed were 8.52 percentage points less likely to be entitled compared to similar examinees in the afternoon, and the differential difference among individuals who had been previously diagnosed is 1.45 percentage points. Regarding diabetes, morning examinees who had never been diagnosed were 10.85 percentage points less likely to receive benefits compared to non-diagnosed afternoon examinees, and the differential difference among individuals who had been previously diagnosed is 13.63 percentage points. Taken together, the results suggest that benefit delays could be attributable to new diabetes diagnoses, but not high cholesterol.

Three factors may account for the larger effects of new diabetes diagnoses in comparison to new high cholesterol diagnoses. First, according to Table 3, the prevalence of self-reported diabetes (including borderline cases) is substantially lower than high cholesterol: 15.26 percent versus 41.53 percent. Because diabetes is rarer, undiagnosed individuals may believe they are less likely to have latent diabetes than latent high cholesterol; if so, a diabetes diagnosis would come as a greater shock. Second, according to Table 5, morning examinees were more likely to be newly diagnosed with diabetes or borderline diabetes than high LDL cholesterol or borderline high LDL cholesterol: 38.01 percent versus 22.43 percent. This means that the scope to which medical testing revealed new information is greater for diabetes. Finally, medical expenditures are likely greater for diabetes than high

[26] It is not possible to determine if the delays are concentrated among morning examinees who were newly diagnosed because the counterfactual is not observed: afternoon examinees who would have been newly diagnosed had they been tested but not informed.

cholesterol, which would lead to greater demand for health insurance coverage. As previously stated, among individuals with diabetes, average medical expenditures that are attributable to diabetes is $7,900. In contrast, many low-cost generic drugs are available to treat high cholesterol.

If entitlement delays are attributable to new diabetes diagnoses, then the treatment effect estimates can be scaled by share of individuals who were newly diagnosed. In column (5) of Table 6, a morning examination decreased benefit entitlement by approximately 7.79 percentage points. In Table 5, 38.01 percent of morning examinees were newly diagnosed with at least borderline diabetes. Thus, if the entire delay in benefit entitlements is due to new diabetes diagnoses, including borderline cases, then approximately 20.5 percent of individuals with new diagnoses delayed benefit entitlements.

5.4 Social Security Covered Earnings

Given the proposed mechanisms, benefit entitlement should correspond with increased or prolonged labor force participation and employment to obtain or retain employer-provided health insurance. To test this prediction, the event-study model given by equation (1) is used to estimate changes in Social Security covered earnings between exam groups both before and after the survey. The MBR does not report covered earnings in levels, but does report quarters of coverage annually. Given this limitation, the outcome variable is defined as having at least one quarter of coverage in a period. In 1999, an individual earned one quarter of coverage for every $740 in covered earnings, up to four quarters each year. While any quarters of coverage is tied to employment, it is an imperfect measure, as earnings in the public sector are generally not subject to Social Security taxation.

Consistent with predictions, the results suggest that morning examinees were more likely to be employed after the survey compared to afternoon examinees, particularly at survey ages 59 to 61. The results are presented in Table 9. In columns (1) and (2), the sample is restricted to ages 50 to 61 and 50 to 58, respectively. In both cases, none of the estimates are statistically significant. In contrast, in column (3), where the sample is restricted to ages 59 to 61, the estimates become positive and statistically significant only after the survey. By period two, for example, morning examinees were 9.11 percentage points more likely to have any quarters of coverage.

The increases in employment in Table 9, column (3), can be directly compared to the delays in benefit entitlement in Figure 3. By period 2, morning examinees were 9.11 percentage points more likely to have any quarters of coverage and were 8.21 percentage points less likely to be entitled to benefits. Combined, the results suggest nearly a one-to-one relationship between a decrease in benefit entitlement and an increase in employment.

5.5 Entitlement near Age 62

The results thus far suggest that benefit delays are most evident near the early entitlement age of 62, specifically among participants who were ages 59 to 61 during the survey. Another consideration is whether benefit entitlement differ by exam group near age 62 at other survey ages. Effects by age are estimated using equation (2), with the outcome defined in the calendar year in which an individual reaches age 62. For example, the sample is restricted to one year after the survey for individuals at survey age 61 and to two years after the survey for individuals at survey age 60. The data on benefit entitlement are available up to year 2008, so the youngest survey age for this analysis is survey age 53 in survey year 1999. The analysis must exclude age 53 in survey year 2000, and survey years thereafter, since age 62 corresponds to calendar year 2009, for which data are not available. This severely limits the sample size: there are only six morning examinees and seven afternoon examinees at survey age 53 in survey year 1999.

The results, presented in Table 10, suggest that entitlement delays at age 62 are evident only among individuals at survey ages 59 to 61, though all the estimates are imprecise due to small sample sizes. In column (1), the treatment effect is assumed constant at age 62 regardless of survey age. In that model, morning examinees were 2.67 percentage points less

Table 9: Linear Probability Model of Any Social Security Quarters of Coverage - Event Study

Specification	(1)	(2)	(3)
Morning	1.45	2.33	0.28
	(1.43)	(1.67)	(2.68)
*Period -5	-2.38	-3.33	0.02
	(1.86)	(2.16)	(3.60)
*Period -4	-1.44	-2.67	1.66
	(1.90)	(2.21)	(3.62)
*Period -3	-0.73	-1.76	1.86
	(1.93)	(2.26)	(3.61)
*Period -2	1.67	1.60	1.87
	(1.96)	(2.27)	(3.72)
*Period 0	1.39	0.85	2.65
	(2.02)	(2.35)	(3.80)
*Period 1	3.94	0.97	11.30
	(2.10)	(2.44)	(4.01)*
*Period 2	2.23	-0.53	9.11
	(2.16)	(2.48)	(4.23)*
*Period 3	2.52	0.21	8.23
	(2.27)	(2.61)	(4.45)
Survey ages	50 to 61	50 to 58	59 to 61
Survey age fixed effects	Yes	Yes	Yes
Control variables	Yes	Yes	Yes
Mean dependent variable	63.08	66.29	54.96
R-Square	0.56	0.57	0.56
Observations	18,053	12,938	5,115

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were matched to SSA data. Employment is measured as having at least one SSA quarters of coverage. Periods correspond to calendar years relative to the survey. The model includes period by survey age fixed effects. Additional control variables are listed in the appendix and include demographic characteristics, labor force participation, health insurance coverage, self-reported health conditions, and and laboratory and examination results. Robust standard errors are in parentheses. * indicates significance at the 5 percent level.

likely to be entitled to benefits at age 62 compared to morning examinees. In column (2), the treatment effect is allowed to differ at survey ages 59 to 61, versus 53 to 58, by interacting an age indicator with a morning examination. As shown, delays at age 62 are evident only at survey ages 59 to 61. On one hand, the results suggest that entitlement delays among morning examinees at survey ages 59 to 61 are not likely attributable to unobserved selection, as delays are not evident among younger morning examinees. On the other hand, the results raise the question as to why delays may be evident at survey ages 59 to 61, but not survey ages 53 to 58. One possibility is that individuals with new diagnoses invest in health capital at younger ages, reducing or eliminating the health risks and expenditures posed by a new diagnosis by age 62. Of course, the results are not definitive given the imprecise estimates, and any suggested mechanism is speculative.

5.6 Entitlement near Age 65

A final consideration is whether entitlement delays are evident near age 65. This is because Medicare coverage becomes universal at this age, obviating the need for employment-based health insurance. To test this possibility, benefit entitlement at survey ages 59 to 61 is estimated by period 5, when most survey participants would have reached age 65. Again, the sample size is limited by the fact that entitlement data are only available up to calendar year 2008. Specifically, the sample must be restricted to survey year 2003 and before, since period 5 for survey year 2004 is 2009. The results suggest that entitlement delays diminish near age 65: the estimated difference between morning and afternoon examinees in period five is 1.8 percentage points, with a standard error of 3.1.

6 Conclusion

The aim of this study is to examine how health information affected the timing of Social Security entitlements. The results suggest that new health information led to de-

Table 10: Linear Probability Model of SSA Entitlement near Age 62

Specification	(1)	(2)
Morning	-2.67	3.19
	(2.86)	(4.48)
Morning*I(Age=59 to 61)		-10.34
		(5.84)
Survey ages	53 to 61	53 to 61
Survey age fixed effects	Yes	Yes
Control variables	Yes	Yes
Mean dependent variable	62.81	62.81
R-Square	0.22	0.23
Observations	995	995

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were matched to SSA data. SSA entitlement reflects Old Age, Disability, Spousal, and Survivor programs. Entitlement is measured in the period in which the survey participant attains age 62. The model includes survey age fixed effects. Additional control variables are listed in the appendix and include demographic characteristics, labor force participation, health insurance coverage, self-reported health conditions, and and laboratory and examination results. Robust standard errors are in parentheses. * indicates significance at the 5 percent level.

lays in entitlements, specifically among individuals who were given new health information just before the earliest entitlement age of 62. One possible mechanism is that the detection of a latent medical condition increases demand for health insurance coverage, and this demand encourages employment either to obtain or retain employer provided health insurance. Another mechanism is that the detection of a latent medical condition increases health investment, resulting in improved health and prolonged employment.

While only suggestive, auxiliary analysis supports these mechanisms. First, the additional health information includes levels of fasting plasma glucose, a diagnostic test for diabetes, and the entitlement delays occurred predominately among individuals who were not previously diagnosed with diabetes at the time of the survey. Second, entitlement delays occurred predominately among the more educated, who presumably have greater incentive and discretion to delay benefit receipt. Third, entitlement delays coincided with an increase in employment, consistent with the incentive to obtain or retain employer-provided health insurance. Additional research is necessary to further link the empirical findings to the proposed mechanism, including an analysis of health insurance coverage and investments in health capital.

If correct, the proposed mechanism raises additional questions regarding when and how health information is collected over the life cycle. As several studies show, economic incentives influence the detection of latent medical conditions. Kubik (1999) shows that an expansion of Supplemental Security Income benefits for disabled children encouraged the detection and treatment of mental health conditions among children; Cullen (2003) finds that a change in supplement funding for schools to accommodate disabled children affected the percent of children defined as disabled; Thornton (2008) shows that monetary incentives affected the decision to learn one's HIV status; Singleton (2009) shows that an expansion of disability benefits for Vietnam veterans with diabetes increased the prevalence and treatment of diabetes; and Einav et al. (2020) examine compliance to breast cancer screening at the recommended age of 40. Understanding how health information is acquired over the life cycle, and how this information affects economic outcomes, is an important area for further research.

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Appendix

Appendix Table 1: Diagnostic Criteria

Condition	Criteria	Morning	Afternoon
Diabetes (+borderline), fasting plasma glucose	>100 mg/dL	Yes	No
Diabetes, fasting plasma glucose	>160 mg/dL	Yes	No
High LDL cholesterol (+borderline)	>130 mg/dL	Yes	No
High LDL cholesterol	>160 mg/dL	Yes	No
High triglycerides (+borderline)	>150	Yes	No
High triglycerides	>200	Yes	No
High glycohemoglobin (A1C)	>6.4 percent	Yes	Yes
High total cholesterol (+borderline)	>200 mg/dL	Yes	Yes
High total cholesterol	>240 mg/dL	Yes	Yes
Low HDL cholesterol	<59 mg/dL	Yes	Yes
High blood pressure	>140/90 mmHg	Yes	Yes

The criteria for diabetes and high glycohemoglobin A1C come from the National Institute of Diabetes, Digestive, and Kidney Diseases. The criteria for cholesterol come from the National Heart, Blood, and Lung Institute. In regards to the criteria for blood pressure, the numerator refers to systolic, and the denominator refers to diastolic.

Appendix Table 2A: Demographics, Ages 20 and Older

	Morning	Afternoon	Difference
Age (years)	50.04	49.51	0.53
	(0.23)	(0.23)	(0.32)
Male	47.26	47.51	-0.25
	(0.60)	(0.59)	(0.84)
White	49.88	50.04	-0.16
	(0.60)	(0.59)	(0.84)
Black	19.47	19.19	0.28
	(0.48)	(0.46)	(0.66)
Other race	30.65	30.77	-0.12
	(0.553)	(0.54)	(0.77)
Less than high school	32.94	32.65	0.29
	(0.56)	(0.55)	(0.79)
High school	23.48	24.05	-0.57
	(0.51)	(0.50)	(0.72)
Some college or more	43.58	43.30	0.28
	(0.60)	(0.58)	(0.83)
Married	56.74	55.30	1.44
	(0.61)	(0.59)	(0.85)
Single	21.03	22.19	-1.16
	(0.50)	(0.50)	(0.70)
Other marital status	22.23	22.51	-0.28
	(0.51)	(0.50)	(0.71)
Married & three or	32.88	32.65	0.22
more family members	(0.57)	(0.56)	(0.80)
Observations	6,943	7,270	

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were ages 20 and older at the time of the survey. Estimates are conditional on non-missing values and are in percentage points, unless otherwise noted. Standard errors are in parentheses. In the difference column, * indicates significance at the 5 percent level.

Appendix Table 2B: Labor Supply and
Health Insurance Coverage, Ages 20 and Older

	Morning	Afternoon	Difference
Labor force participation	56.06	55.83	0.23
	(0.60)	(0.58)	(0.83)
Employed	51.98	51.12	0.86
	(0.60)	(0.59)	(0.84)
Employed full time	36.58	36.42	0.16
	(0.58)	(0.56)	(0.81)
Family income to poverty ratio:			
<1	18.28	19.21	-0.93
	(0.49)	(0.48)	(0.69)
1-2.99	42.06	43.13	-1.08
	(0.62)	(0.61)	(0.87)
3-4.99	21.09	20.51	0.59
	(0.51)	(0.50)	(0.71)
5+	18.57	17.15	1.42
	(0.49)	(0.46)	(0.67)*
Health insurance:			
Any	80.36	80.53	-0.16
	(0.48)	(0.47)	(0.67)
Private	57.78	57.68	0.10
	(0.60)	(0.59)	(0.84)
Employer	63.38	60.40	2.98
	(1.39)	(1.41)	(1.98)
Observations	6,943	7,270	

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were ages 20 and older at the time of the survey. Estimates are conditional on non-missing values and are in percentage points, unless otherwise noted. Standard errors are in parentheses. In the difference column, * indicates significance at the 5 percent level.

Appendix Table 2C: Self-Reported Health, Ages 20 and Older

	Morning	Afternoon	Difference
Diabetes (+borderline)	10.89	11.68	-0.79
	(0.37)	(0.38)	(0.87)
Diabetes	9.74	10.17	-0.43
	(0.36)	(0.35)	(0.84)
High cholesterol	27.28	25.71	1.57
	(0.53)	(0.51)	(1.02)
High blood pressure	31.92	31.61	0.31
	(0.56)	(0.55)	(1.05)
Arthritis	26.56	24.52	2.04
	(0.53)	(0.51)	(1.02)
Heart failure	3.41	3.15	0.26
	(0.22)	(0.21)	(0.65)
Heart disease	4.22	4.73	-0.52
	(0.24)	(0.25)	(0.70)
Angina	3.56	3.90	-0.34
	(0.22)	(0.23)	(0.67)
Heart attack	4.53	4.69	-0.16
	(0.25)	(0.25)	(0.71)
Stroke	3.73	3.46	0.28
	(0.23)	(0.21)	(0.66)
Emphysema	2.06	1.80	0.26
	(0.17)	(0.16)	(0.57)
Overweight	28.96	29.07	-0.10
	(0.54)	(0.53)	(1.04)
Chronic bronchitis	6.12	5.91	0.21
	(0.29)	(0.28)	(0.75)
Liver condition	3.32	3.12	0.20
	(0.22)	(0.20)	(0.65)
Any condition (+ borderline diabetes)	63.87	62.62	1.25
	(0.59)	(0.58)	(1.08)
Total conditions above	1.54	1.49	0.04
	(0.02)	(0.02)	(0.20)
Observations	6,943	7,270	

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were ages 20 and older at the time of the survey. Estimates are conditional on non-missing values and are in percentage points, unless otherwise noted. Standard errors are in parentheses. In the difference column, * indicates significance at the 5 percent level.

Appendix Table 2D: Laboratory and Examination Results, Ages 20 and Older

	Morning	Afternoon	Difference
Diabetes (+borderline)	38.24		
	(0.60)		
Diabetes	9.91		
	(0.37)		
High LDL cholesterol (+borderline)	37.46		
	(0.63)		
High LDL cholesterol	13.44		
	(0.44)		
High triglycerides (+borderline)	36.26		
	(0.60)		
High triglycerides	20.26		
	(0.50)		
Any condition above (+borderline)	69.24		
	(0.60)		
Any condition above	32.83		
	(0.61)		
Total conditions above (+borderline)	1.08		
	(0.01)		
Total conditions above	0.39		
	(0.01)		
High glycohemoglobin	8.68	9.36	-0.67
	(0.35)	(0.35)	(0.49)
High total cholesterol (+borderline)	49.56	51.70	-2.13
	(0.62)	(0.61)	(0.87)*
High total cholesterol	17.32	18.43	-1.11
	(0.47)	(0.47)	(0.66)
Low HDL cholesterol	74.58	73.03	1.55
	(0.66)	(0.67)	(0.94)
High blood pressure	22.36	21.48	0.88
	(0.51)	(0.50)	(0.72)
Body mass index	28.29	28.36	-0.07
	(0.08)	(0.08)	(0.11)
Observations	6,943	7,270	

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were ages 20 and older at the time of the survey. Estimates are conditional on non-missing values and are in percentage points, unless otherwise noted. Standard errors are in parentheses. In the difference column, * indicates significance at the 5 percent level.

Appendix Table 2E: New Diagnoses, Ages 20 and Older

	Full Sample		
	Morning	Afternoon	Difference
Diabetes (+borderline)	29.03		
	(0.56)		
Diabetes	3.08		
	(0.21)		
High LDL cholesterol (+borderline)	23.96		
	(0.55)		
High LDL cholesterol	7.38		
	(0.34)		
High triglycerides (+borderline)	22.43		
	(0.52)		
High triglycerides	11.79		
	(0.40)		
Any condition above (+borderline)	53.66		
	(0.65)		
Any condition above	18.57		
	(0.50)		
Total conditions above (+borderline)	0.74		
	(0.01)		
Total conditions above	0.21		
	(0.01)		
High total cholesterol (+borderline)	31.83	34.12	-2.29
	(0.58)	(0.58)	(0.82)*
High total cholesterol	7.96	7.88	0.08
	(0.34)	(0.33)	(0.47)
Observations	6,943	7,270	

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were ages 20 and older at the time of the survey. A new diagnosis is defined as not reporting a health condition during the at-home survey, but subsequently testing positive for the condition through the medical examination. Estimates are conditional on non-missing values and are in percentage points, unless otherwise noted. Standard errors are in parentheses. In the difference column, * indicates significance at the 5 percent level.

Appendix Table 2F: Social Security Administrative Data, Ages 20 and Older

	Full Sample		
	Morning	Afternoon	Difference
Match to Social Security data	84.70	85.67	-0.96
	(0.43)	(0.41)	(0.60)
Entitled to Social Security benefits before NHANES	32.05	32.26	-0.21
	(0.61)	(0.59)	(0.85)
Any quarters of coverage	56.47	55.65	0.82
	(0.65)	(0.63)	(0.90)
Insured for Disability Insurance	53.72	53.47	0.25
	(0.65)	(0.63)	(0.91)
Observations	6,943	7,270	

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were ages 20 and older at the time of the survey. Estimates are conditional on non-missing values and are in percentage points, unless otherwise noted. Standard errors are in parentheses. In the difference column, * indicates significance at the 5 percent level.

Appendix Table 3A: Demographics, Ages 50 to 61

	Morning	Afternoon	Difference
Age (years)	55.49	55.10	0.39
	(0.12)	(0.12)	(0.17)*
Male	48.02	49.77	-1.76
	(1.68)	(1.68)	(2.38)
White	57.08	53.73	3.35
	(1.67)	(1.68)	(2.36)
Black	15.52	20.14	-4.62
	(1.22)	(1.35)	(1.82)*
Other race	27.41	26.13	1.28
	(1.50)	(1.48)	(2.11)
Less than high school	28.34	27.07	1.28
	(1.52)	(1.50)	(2.13)
High school	20.98	21.86	-0.88
	(1.37)	(1.39)	(1.95)
Some college or more	50.68	51.08	-0.40
	(1.68)	(1.68)	(2.38)
Married	70.08	68.08	2.00
	(1.57)	(1.60)	(2.24)
Single	8.01	10.95	-2.94
	(0.93)	(1.07)	(1.42)
Other marital status	21.91	20.97	0.94
	(1.42)	(1.40)	(1.99)
Married & three or	31.21	34.39	-3.18
more family members	(1.59)	(1.63)	(2.28)
Observations	883	884	

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were ages 50 to 61 at the time of the survey, who were matched to SSA data, and who were not entitled to SSA benefits prior to the survey. Estimates are conditional on non-missing values and are in percentage points, unless otherwise noted. Standard errors are in parentheses. In the difference column, * indicates significance at the 5 percent level.

Appendix Table 3B: Labor Supply and Health Insurance Coverage, Ages 50 to 61

	Morning	Afternoon	Difference
Labor force participation	73.39	70.70	2.68
	(1.49)	(1.53)	(2.14)
Employed	67.72	64.82	2.90
	(1.57)	(1.61)	(2.25)
Employed full time	49.60	49.26	0.34
	(1.68)	(1.68)	(2.38)
SSA Data:			
Quarters of Coverage - Any	71.35	68.44	2.91
	(1.52)	(1.56)	(2.18)
DI Insured	72.71	70.25	2.46
	(1.50)	(1.54)	(2.15)
Family income to poverty ratio:			
<1	10.84	13.52	-2.68
	(1.08)	(1.19)	(1.61)
1-2.99	30.00	30.21	-0.21
	(1.59)	(1.60)	(2.26)
3-4.99	26.87	25.82	1.05
	(1.54)	(1.53)	(2.17)
5+	32.29	30.45	1.84
	(1.62)	(1.61)	(2.28)
Health insurance:			
Any	83.03	81.16	1.87
	(1.27)	(1.32)	(1.83)
Private	73.74	72.25	1.49
	(1.49)	(1.52)	(2.13)
Employer	66.84	67.58	-0.74
	(3.40)	(3.48)	(4.86)
Observations	883	884	

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were ages 50 to 61 at the time of the survey, who were matched to SSA data, and who were not entitled to SSA benefits prior to the survey. Estimates are conditional on non-missing values and are in percentage points, unless otherwise noted. Standard errors are in parentheses. In the difference column, * indicates significance at the 5 percent level.

Appendix Table 3C: Self-Reported Health, Ages 50 to 61

	Morning	Afternoon	Difference
Diabetes (+borderline)	13.36	14.93	-1.57
	(1.15)	(1.20)	(1.66)
Diabetes	11.55	13.80	-2.25
	(1.08)	(1.16)	(1.58)
High cholesterol	40.66	38.01	2.65
	(1.65)	(1.63)	(2.32)
High blood pressure	39.18	40.02	-0.84
	(1.65)	(1.66)	(2.34)
Arthritis	32.54	28.20	4.34
	(1.58)	(1.52)	(2.19)
Heart failure	2.38	1.81	0.57
	(0.51)	(0.45)	(0.68)
Heart disease	4.42	3.97	0.44
	(0.69)	(0.66)	(0.96)
Angina	2.84	2.95	-0.11
	(0.56)	(0.57)	(0.80)
Heart attack	4.42	3.62	0.80
	(0.69)	(0.63)	(0.93)
Stroke	2.15	1.47	0.68
	(0.49)	(0.41)	(0.63)
Emphysema	2.60	1.13	1.47
	(0.54)	(0.36)	(0.64)
Overweight	37.26	37.15	0.11
	(1.63)	(1.63)	(2.30)
Chronic bronchitis	7.05	6.02	1.03
	(0.86)	(0.80)	(1.18)
Liver condition	4.08	4.99	-0.91
	(0.67)	(0.73)	(0.99)
Any condition (+ borderline diabetes)	79.72	75.95	3.77
	(1.37)	(1.45)	(1.99)
Total conditions above	1.90	1.82	0.08
	(0.05)	(0.05)	(0.08)
Observations	883	884	

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were ages 50 to 61 at the time of the survey, who were matched to SSA data, and who were not entitled to SSA benefits prior to the survey. Estimates are conditional on non-missing values and are in percentage points, unless otherwise noted. Standard errors are in parentheses. In the difference column, * indicates significance at the 5 percent level.

Appendix Table 3D: Laboratory and Examination Results, Ages 50 to 61

	Morning	Afternoon	Difference
Diabetes (+borderline)	50.64		
	(1.71)		
Diabetes	14.04		
	(1.19)		
High LDL cholesterol (+borderline)	43.28		
	(1.78)		
High LDL cholesterol	16.80		
	(1.34)		
High triglycerides (+borderline)	42.74		
	(1.71)		
High triglycerides	25.00		
	(1.49)		
Any condition above (+borderline)	80.72		
	(1.42)		
Any condition above	41.40		
	(1.77)		
Total conditions above (+borderline)	1.33		
	(0.03)		
Total conditions above	0.51		
	(0.02)		
High glycohemoglobin	11.74	13.31	-1.57
	(1.10)	(1.17)	(1.60)
High total cholesterol (+borderline)	59.76	63.75	-3.98
	(1.69)	(1.67)	(2.38)
High total cholesterol	22.02	23.17	-1.15
	(1.43)	(1.46)	(2.05)
Low HDL cholesterol	72.95	72.69	0.26
	(1.86)	(1.90)	(2.65)
High blood pressure	24.25	24.40	-0.15
	(1.48)	(1.48)	(2.10)
Body mass index	28.99	29.31	-0.32
	(0.21)	(0.22)	(0.30)
Observations	883	884	

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were ages 50 to 61 at the time of the survey, who were matched to SSA data, and who were not entitled to SSA benefits prior to the survey. Estimates are conditional on non-missing values and are in percentage points, unless otherwise noted. Standard errors are in parentheses. In the difference column, * indicates significance at the 5 percent level.

Appendix Table 3E: New Diagnoses, Ages 50 to 61

	Morning	Afternoon	Difference
Diabetes (+borderline)	38.60		
	(1.67)		
Diabetes	4.33		
	(070)		
High LDL cholesterol (+borderline)	23.00		
	(1.51)		
High LDL cholesterol	8.14		
	(0.98)		
High triglycerides (+borderline)	21.43		
	(1.42)		
High triglycerides	11.07		
	(1.08)		
Any condition above (+borderline)	58.09		
	(1.78)		
Any condition above	20.05		
	(1.44)		
Total conditions above (+borderline)	0.83		
	(0.03)		
Total conditions above	0.22		
	(0.02)		
High total cholesterol (+borderline)	31.31	34.81	-3.50
	(1.60)	(1.65)	(2.30)
High total cholesterol	12.38	13.09	-0.70
	(1.14)	(1.17)	(1.63)
Observations	883	884	

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were ages 50 to 61 at the time of the survey, who were matched to SSA data, and who were not entitled to SSA benefits prior to the survey. A new diagnosis is defined as not reporting a health condition during the at-home survey, but subsequently testing positive for the condition through the medical examination. Estimates are conditional on non-missing values and are in percentage points, unless otherwise noted. Standard errors are in parentheses. In the difference column, * indicates significance at the 5 percent level.

Appendix Table 4: Control Variables and Definitions

Variable	Variable name	Definitions
Age	RIDAGEYR	Integer fixed effects
Sex	RIAGENDR	(1) Male, (2) Female
Race	RIDRETH1	(1) White, (2) Black, (3) Other, (4) Missing
Education	DMDEDUC2	(1) Less than high school, (2) High School, (3) Some college or more, (4) Missing
Marital status	DMDMARTL	(1) Married, (2) Single, (3) Other, (4) Missing
Married with household size>2	DMDMARTL, DMDHHSIZ	(1) Married and household size greater than two
Labor force participant	OCQ150	(1) Working at a job or business, with job but not at work, and looking for work, (2) Not looking, (3) Missing
Employed full-time	OCQ150, OCQ180	(1) Working at a job or business and hours worked last week greater than 40, (2) Not working full time, (3) Missing
Family poverty-to-income ratio	INDFMPIR	(1) <1, (2) 1-2.99, (3) 3-4.99, (4) >5, (5) Missing
Health insurance	HID010	(1) Any health insurance, (2) Missing
Arthritis	MCQ160A	(1) Yes, (2) No, (3) Missing
Congestive heart failure	MCQ160B	(1) Yes, (2) No, (3) Missing
Coronary heart disease	MCQ160C	(1) Yes, (2) No, (3) Missing
Angina	MCQ160D	(1) Yes, (2) No, (3) Missing
Heart attack	MCQ160E	(1) Yes, (2) No, (3) Missing
Stroke	MCQ160F	(1) Yes, (2) No, (3) Missing
Emphysema	MCQ160G	(1) Yes, (2) No, (3) Missing
Overweight	MCQ160J	(1) Yes, (2) No, (3) Missing
Chronic bronchitis	MCQ160K	(1) Yes, (2) No, (3) Missing
Liver condition	MCQ160L	(1) Yes, (2) No, (3) Missing
Glycohemoglobin A1C	LBXGH	(1) Yes, (2) No, (3) Missing
Borderline total cholesterol	LBXTC	(1) Yes, (2) No, (3) Missing
Total cholesterol	LBXTC	(1) Yes, (2) No, (3) Missing
HDL cholesterol	LBDHDL	(1) Yes, (2) No, (3) Missing
Borderline HDL cholesterol	LBDHDL	(1) Yes, (2) No, (3) Missing
High blood pressure	BPXSAR, BPXDAR	(1) Yes, (2) No, (3) Missing
Body Mass Index	Body Mass Index	(1) BMI linearly
DI insured	QC_YYYY	(1) Yes, (2) No

Appendix Table 5: Sample Sizes by Period and Exam Assignment

Survey Ages	50 to 61		50 to 58		59 to 61	
Exam Time	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
Period						
-5	1009	1013	741	708	268	305
-4	1009	1013	741	708	268	305
-3	1009	1013	741	708	268	305
-2	1009	1013	741	708	268	305
-1	1009	1013	741	708	268	305
0	1005	1008	737	706	268	302
1	1002	997	729	704	273	293
2	991	986	722	695	269	291
3	980	975	713	688	267	287
4	971	957	702	683	269	274

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were matched to SSA data. Attrition reflects mortality.

Appendix Table 6A: Demographics, Ages 59 to 61

	Morning	Afternoon	Difference
Age (years)	60.18	60.16	0.02
	(0.04)	(0.04)	(0.06)
Male	49.50	51.84	-2.34
	(2.89)	(3.04)	(4.19)
White	51.16	46.69	4.47
	(2.89)	(3.03)	(4.18)
Black	18.27	22.43	-4.15
	(2.23)	(2.53)	(3.38)
Other race	30.56	30.88	-0.32
	(2.66)	(2.81)	(3.87)
Less than high school	36.88	38.38	-1.50
	(2.79)	(2.96)	(4.06)
High school	22.26	21.40	0.86
	(2.40)	(2.50)	(3.46)
Some college or more	40.86	40.22	0.64
	(2.84)	(2.98)	(4.12)
Married	64.75	65.90	-1.15
	(2.79)	(2.94)	(4.05)
Single	7.80	9.96	-2.17
	(1.56)	(1.86)	(2.43)
Other marital status	27.46	24.14	3.32
	(2.60)	(2.65)	(3.72)
Married & three or	22.03	28.74	-6.70
more family members	(2.42)	(2.81)	(3.70)
Observations	301	272	

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were ages 59 to 61 at the time of the survey and who were matched to SSA data. Estimates are conditional on non-missing values and are in percentage points, unless otherwise noted. Standard errors are in parentheses. In the difference column, * indicates significance at the 5 percent level.

Appendix Table 6B: Labor Supply and
Health Insurance Coverage, Ages 59 to 61

	Morning	Afternoon	Difference
Labor force participation	55.48	55.51	-0.03
	(2.87)	(3.02)	(4.16)
Employed	50.83	50.37	0.46
	(2.89)	(3.04)	(4.19)
Employed full time	34.22	36.76	-2.55
	(2.74)	(2.93)	(4.01)
SSA Data:			
Quarters of Coverage - Any	55.15	56.25	-1.10
	(2.87)	(3.01)	(4.16)
DI Insured	64.78	67.28	-2.50
	(2.76)	(2.85)	(3.97)
Family income to poverty ratio:			
<1	13.48	16.54	-3.06
	(2.04)	(2.34)	(3.10)
1-2.99	41.13	38.98	2.16
	(2.94)	(3.07)	(4.24)
3-4.99	23.05	21.65	1.40
	(2.51)	(2.59)	(3.61)
5+	22.34	22.83	-0.49
	(2.48)	(2.64)	(3.62)
Health insurance:			
Any	83.39	82.29	1.10
	(2.15)	(2.32)	(3.16)
Private	63.67	61.99	1.67
	(2.78)	(2.95)	(4.06)
Employer	56.00	60.00	-4.00
	(7.09)	(7.39)	(10.24)
Observations	301	272	

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were ages 59 to 61 at the time of the survey and who were matched to SSA data. Estimates are conditional on non-missing values and are in percentage points, unless otherwise noted. Standard errors are in parentheses. In the difference column, * indicates significance at the 5 percent level.

Appendix Table 6C: Self-Reported Health, Ages 59 to 61

	Morning	Afternoon	Difference
Diabetes (+borderline)	20.60	22.43	-1.83
	(2.33)	(2.53)	(3.45)
Diabetes	16.61	20.96	-4.34
	(2.15)	(2.47)	(3.28)
High cholesterol	50.67	41.33	9.34
	(2.89)	(3.00)	(4.16)
High blood pressure	49.67	50.55	-0.89
	(2.89)	(3.04)	(4.20)
Arthritis	44.00	38.97	5.03
	(2.87)	(2.96)	(4.13)
Heart failure	3.68	5.88	-2.20
	(1.09)	(1.43)	(1.80)
Heart disease	6.33	7.81	-1.47
	(1.41)	(1.64)	(2.16)
Angina	3.34	4.43	-1.08
	(1.04)	(1.25)	(1.63)
Heart attack	6.31	6.25	0.06
	(1.40)	(1.47)	(2.03)
Stroke	3.99	3.68	0.31
	(1.13)	(1.14)	(1.61)
Emphysema	2.99	1.47	1.52
	(0.98)	(0.73)	(1.23)
Overweight	40.86	40.22	0.64
	(2.84)	(2.98)	(4.12)
Chronic bronchitis	5.32	7.72	-2.40
	(1.30)	(1.62)	(2.08)
Liver condition	5.00	4.80	0.20
	(1.26)	(1.30)	(1.81)
Any condition (+ borderline diabetes)	88.10	83.33	4.76
	(1.89)	(2.30)	(2.98)
Total conditions above	2.37	2.31	0.06
	(0.10)	(0.11)	(0.15)
Observations	301	272	

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were ages 59 to 61 at the time of the survey and who were matched to SSA data. Estimates are conditional on non-missing values and are in percentage points, unless otherwise noted. Standard errors are in parentheses. In the difference column, * indicates significance at the 5 percent level.

Appendix Table 6D: Laboratory and Examination Results, Ages 59 to 61

	Morning	Afternoon	Difference
Diabetes (+borderline)	55.17		
	(2.93)		
Diabetes	17.24		
	(2.22)		
High LDL cholesterol (+borderline)	45.77		
	(3.10)		
High LDL cholesterol	16.92		
	(2.33)		
High triglycerides (+borderline)	49.65		
	(2.98)		
High triglycerides	27.30		
	(2.66)		
Any condition above (+borderline)	86.15		
	(2.15)		
Any condition above	44.23		
	(3.09)		
Total conditions above (+borderline)	1.45		
	(0.06)		
Total conditions above	0.57		
	(0.05)		
High glycohemoglobin	16.49	22.01	-5.51
	(2.18)	(2.58)	(3.38)
High total cholesterol (+borderline)	60.07	63.75	-3.67
	(2.92)	(3.04)	(4.21)
High total cholesterol	21.20	25.10	-3.90
	(2.43)	(2.74)	(3.67)
Low HDL cholesterol	74.19	73.51	0.68
	(3.22)	(3.60)	(4.83)
High blood pressure	33.22	34.22	-1.00
	(2.78)	(2.93)	(4.04)
Body mass index	29.22	30.25	-1.03
	(0.34)	(0.38)	(0.51)*
Observations	301	272	

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were ages 59 to 61 at the time of the survey and who were matched to SSA data. Estimates are conditional on non-missing values and are in percentage points, unless otherwise noted. Standard errors are in parentheses. In the difference column, * indicates significance at the 5 percent level.

Appendix Table 6E: New Diagnoses, Ages 59 to 61

	Morning	Afternoon	Difference
Diabetes (+borderline)	37.93		
	(2.85)		
Diabetes	5.52		
	(1.34)		
High LDL cholesterol (+borderline)	23.17		
	(2.63)		
High LDL cholesterol	7.72		
	(1.66)		
High triglycerides (+borderline)	20.64		
	(2.42)		
High triglycerides	9.96		
	(1.79)		
Any condition above (+borderline)	57.53		
	(3.08)		
Any condition above	20.08		
	(2.49)		
Total conditions above (+borderline)	0.81		
	(0.05)		
Total conditions above	0.23		
	(0.03)		
High total cholesterol (+borderline)	27.30	34.00	-6.70
	(2.66)	(3.00)	(4.01)
High total cholesterol	13.12	11.60	1.52
	(2.01)	(2.03)	(2.86)
Observations	301	272	

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were ages 59 to 61 at the time of the survey and who were matched to SSA data. A new diagnosis is defined as not reporting a health condition during the at-home survey, but subsequently testing positive for the condition through the medical examination. Estimates are conditional on non-missing values and are in percentage points, unless otherwise noted. Standard errors are in parentheses. In the difference column, * indicates significance at the 5 percent level.

Appendix Table 7: Linear Probability Model of SSA Entitlement by Period Two

Specification	(1)	(2)	(3)	(4)	(5)
Morning	-0.49	2.02	1.48	1.50	-9.03
	(1.61)	(1.46)	(1.48)	(1.44)	(4.42)*
Morning*I(Age=59 to 61)		-9.54	-9.49		
		(4.74)*	(4.57)*		
Survey ages	50 to 61	50 to 61	50 to 61	50 to 58	59 to 61
Survey age fixed effects	Yes	Yes	Yes	Yes	Yes
Control variables	No	No	Yes	Yes	Yes
Mean dependent variable	20.68	20.68	20.68	7.40	57.86
R-square	0.32	0.33	0.39	0.12	0.28
Observations	1,741	1,741	1,741	1,283	458

The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were matched to SSA data and who were not receiving SSA benefits prior to the survey. Entitlements are measured at period year two and reflect Social Security's old age, disability, survivor, and spousal benefit programs. Control variables include race, educational attainment, marital status, labor force participation, family income, self-reported health conditions, laboratory exam results, and indicators for missing values. A description of the control variables are provided in the Appendix. Estimates are in percentage points. * indicates significance at the 5 percent level.

Appendix Table 8: Linear Probability Model of SSA Entitlement by Period Two

Specification	(1)	(2)	(3)
Outcome Variable	Disability Insurance	Old Age	Spousal/Survivor
Morning	0.79	-0.19	1.20
	(1.05)	(0.40)	(1.09)
Morning*I(Age=59 to 61)	-3.95	-6.65	1.30
	(1.99)	(4.52)	(3.23)
Survey ages	50-61	50-61	50-61
Survey age fixed effects	Yes	Yes	Yes
Control variables	Yes	Yes	Yes
Mean dependent variable	3.62	12.52	6.72
R-square	0.12	0.46	0.18
Observations	1,741	1,741	1,741

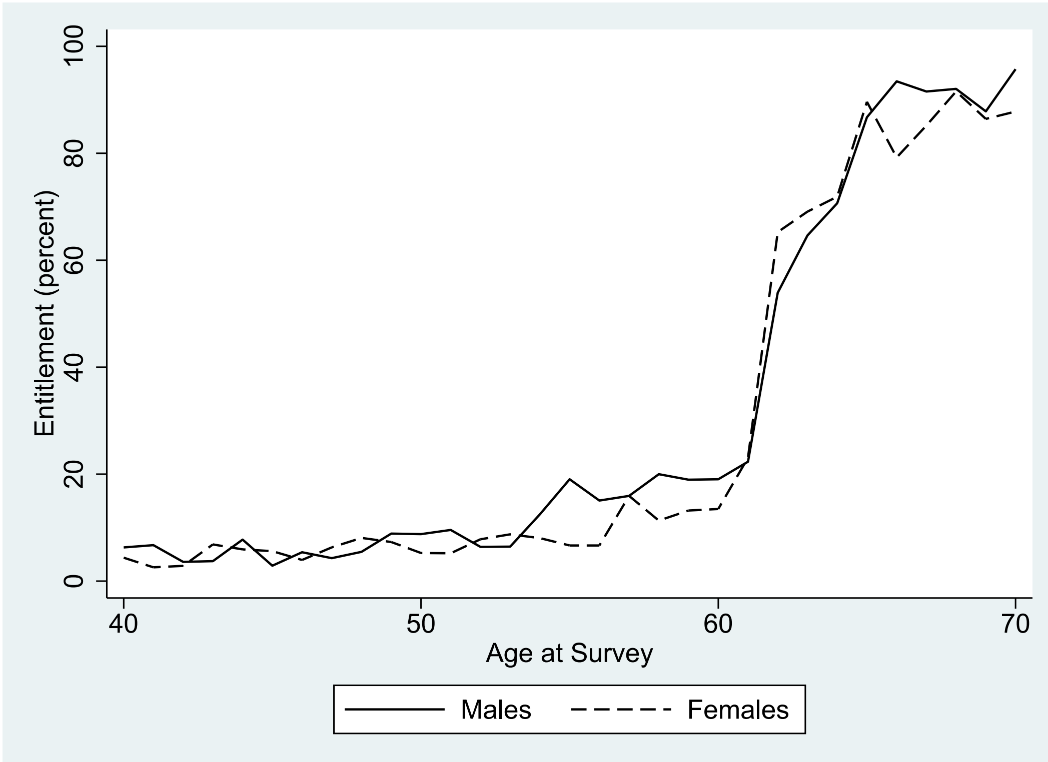
The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were matched to SSA data and who were not receiving SSA benefits prior to the survey. Entitlements are measured at period year two and reflect Social Security's old age, disability, survivor, and spousal benefit programs. Control variables include race, educational attainment, marital status, labor force participation, family income, self-reported health conditions, laboratory exam results, and indicators for missing values. A description of the control variables are provided in the Appendix. Estimates are in percentage points. * indicates significance at the 5 percent level.

Appendix Table 9: Linear Probability Model of SSA Entitlement by Period Two

Specification	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Interaction term	Male	Married	High education	Labor force	DI insured	High cholesterol	Diabetes (+borderline)
Morning	-9.0	-10.7	-1.4	-4.1	2.8	-12.1*	-08.5
	(6.2)	(8.8)	(5.9)	(6.9)	(8.3)	(4.7)	(5.4)
Morning*Interaction	-0.10	2.4	-17.7	-7.7	-16.7	15.7	-1.2
	(8.9)	(10.1)	(9.1)	(9.0)	(9.8)	(9.1)	(6.0)
Survey ages	59 to 61	59 to 61	59 to 61	59 to 61	59 to 61	59 to 61	59 to 61
Survey age fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean dependent variable	57.86	57.86	57.86	57.86	57.86	57.86	57.86
R-square	0.277	0.277	0.284	0.278	0.282	0.282	0.277
Observations	458	458	458	458	458	458	458

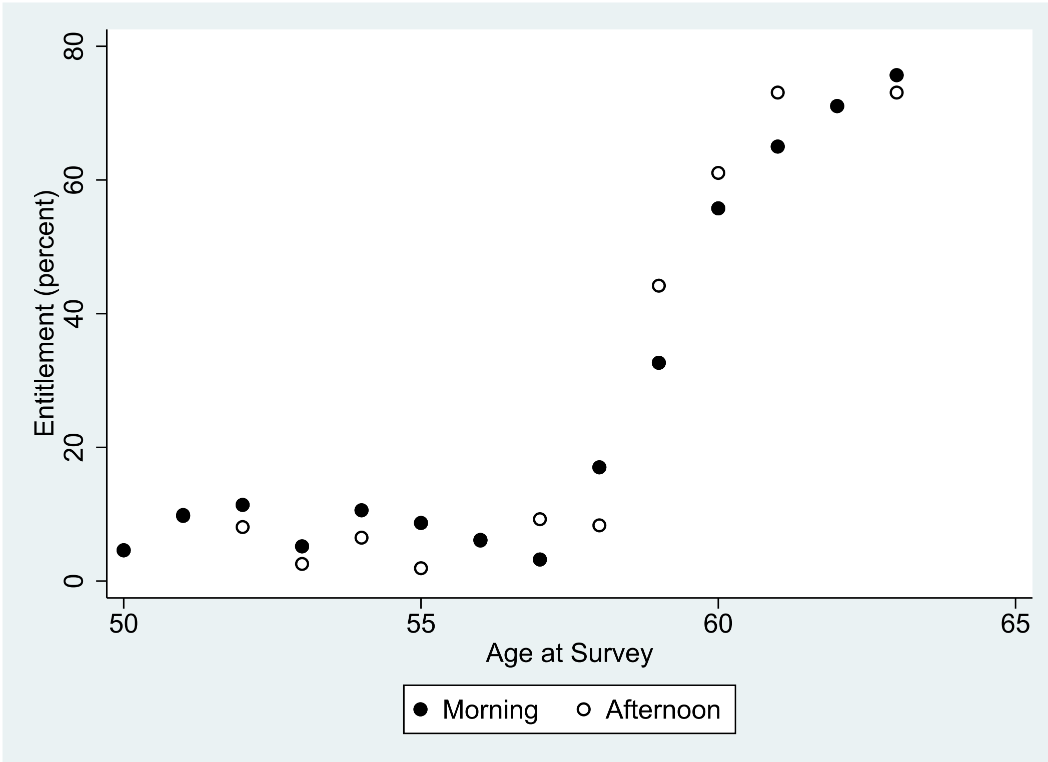
The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were matched to SSA data and who were not receiving SSA benefits prior to the survey. Entitlements are measured at period year two and reflect Social Security's old age, disability, survivor, and spousal benefit programs. Control variables include race, educational attainment, marital status, labor force participation, family income, self-reported health conditions, laboratory exam results, and indicators for missing values. A description of the control variables are provided in the Appendix. Estimates are in percentage points. * indicates significance at the 5 percent level.

Appendix Figure 1: Entitlement of Social Security Benefits before NHANES Survey



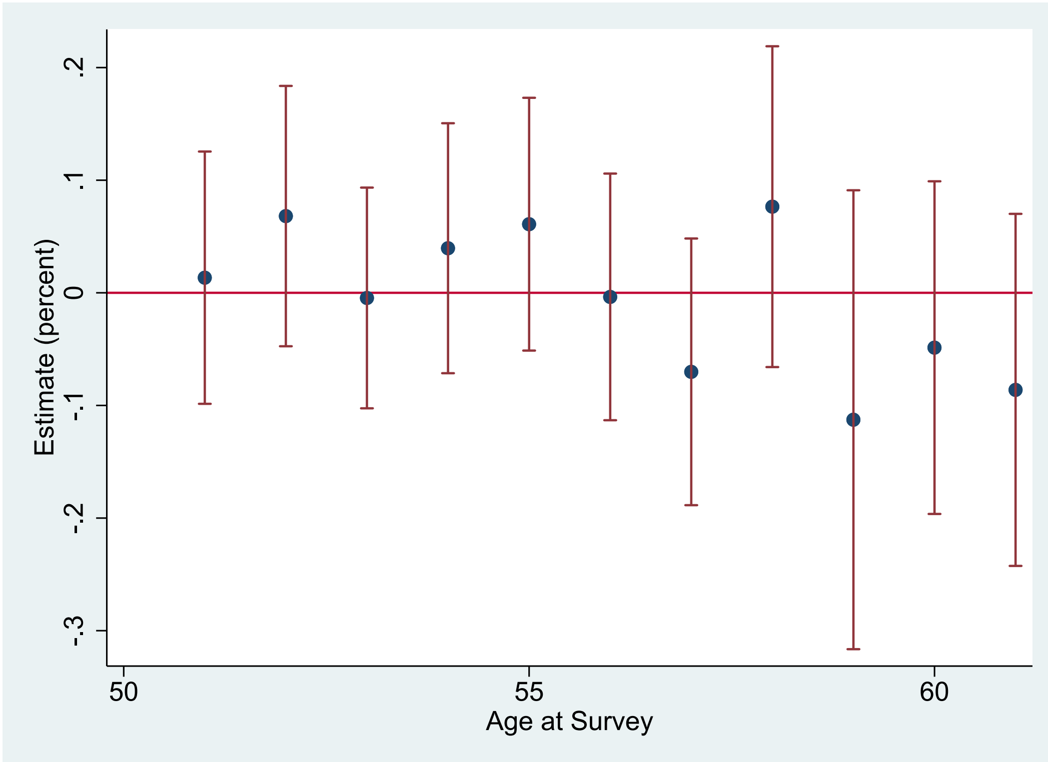
The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were matched to SSA data. Entitlement reflects Social Security's Old Age, Disability, Survivor, and Spousal benefit programs. Entitlement is defined by whether an individual had been entitled to Social Security benefits before the month and year of the survey.

Appendix Figure 2: Entitlement of Social Security Benefits by Period Two



The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were matched to SSA data and who were not receiving SSA benefits prior to the survey. Entitlement reflect Social Security's Old Age, Disability, Survivor, and Spousal benefit programs. Entitlement is defined by whether an individual had been entitled to Social Security benefits at the end of period two. Period two is defined as the second calendar year after the survey year. The sample is limited to respondents who were matched to SSA data.

Appendix Figure 3: Entitlement of Social Security Benefits by Period Two



The sample is derived from the Continuous National Health and Nutrition Examination Survey, years 1999/2000, 2001/2002, and 2003/2004. The sample is restricted to respondents who were matched to SSA data and who were not receiving SSA benefits prior to the survey. Entitlement reflect Social Security's Old Age, Disability, Survivor, and Spousal benefit programs. Entitlement is defined by whether an individual had been entitled to Social Security benefits at the end of period two. Period two is defined as the second calendar year after the survey year. The estimates are derived from a linear probability model that includes interactions between survey age and a morning examination, and the vertical lines indicate the 95 percent confidence interval. The sample is limited to respondents who were matched to SSA data and who were not entitled to SSA benefits prior to the survey.