THE IMPACT OF NEARLY UNIVERSAL INSURANCE COVERAGE ON HEALTH CARE UTILIZATION: EVIDENCE FROM MEDICARE*

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ABSTRACT

The onset of Medicare eligibility at age 65 leads to sharp changes in the health insurance status of the U.S. population. The fraction of people with coverage rises from 90% to nearly 100%, with most of the gains concentrated among less educated and minority groups. There is also a large increase in the incidence of multiple coverage and a reduction in managed care – particularly for higher educated and non-minority groups – as people with insurance prior to 65 enroll in fee-for-service Medicare and supplementary coverage plans. These changes lead to discrete increases in the use of medical services, with a pattern of gains across groups that varies with the type of services. Routine doctor visits increase more for groups that previously lacked insurance, consistent with an insurance coverage channel. In contrast, increases in hospital admissions for relatively expensive, discretionary procedures like bypass surgery and joint replacement are bigger for previously insured groups that are more likely to have supplementary coverage after 65, reflecting the relative generosity of their combined insurance package under Medicare.

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One fifth of non-elderly adults in the United States lacked health insurance coverage in 2005. Most of these were from lower-income families, and nearly one-half were African American or Hispanic (DeNavas-Walt, Proctor, and Lee, 2005). Many analysts have argued that unequal insurance coverage contributes to disparities in health care utilization and health outcomes across socio-economic groups. Even among the insured there are differences in co-payments, deductibles, and other features that affect service use. Nevertheless, credible evidence that better insurance causes better health outcomes is limited (Brown et al., 1998; Levy and Meltzer, 2001). Both the supply and demand for insurance depend on health status, confounding observational comparisons between people with different insurance characteristics.

In contrast to the heterogeneity among the non-elderly, fewer than 1% of the elderly population are uninsured, and most have fee-for-service Medicare coverage. The transition occurs abruptly at age 65, the threshold for Medicare eligibility. Building on this fact, in this paper we use a regression-discontinuity framework to compare health-related outcomes among people just before and just after 65. Our analysis extends existing research on the effects of the age 65 threshold (Lichtenberg, 2002; Dow, 2002; Decker and Rapaport, 2002; Decker, 2002a, 2002b; and McWilliams et al., 2003) in two main ways. First, we examine a wider range of outcomes. We use survey data from the National Health Interview Survey (NHIS) to analyze changes in self-reported access to care, and in the number of recent doctor visits and hospital stays. We supplement these data with hospital discharge records from California, Florida, and New York, which allow us to measure changes in hospital admissions for specific conditions and procedures, and by hospital type. Second, we focus on the differential effects of Medicare eligibility on the health outcomes of different subgroups, and use the pattern of inter-group differences to assess whether these impacts arise through changes in insurance coverage, insurance generosity, or other channels. We also quantify the extent to which the onset of Medicare eligibility reduces or increases disparities in use of different types of services.

Our main finding is that Medicare eligibility causes a sharp increase in the use of health care services, with a pattern of gains across groups that varies by the type of service. For relatively low cost services, such as routine doctor visits, the onset of Medicare eligibility leads to increases in utilization that are concentrated among groups with the lowest rates of insurance coverage pre-65. For relatively high cost procedures – including hospitalizations for procedures like bypass surgery and hip and knee replacement – the gains are concentrated among groups that are more likely to have supplementary insurance coverage after 65. These patterns, coupled with evidence of a redistribution of patients across hospital ownership categories once Medicare is available, suggest that the distribution of gains in use of health services is driven by an *interaction* between supply-side incentives and shifts in insurance characteristics for different socio-economic groups.

I. Measuring the Causal Effect of Health Insurance

We work with a simple reduced form model of the causal effects of health insurance status:

$$(1) \qquad y_{ija} = X_{ija}\alpha + f_j(a;\beta) + \sum_k C^k_{ija}\delta^k + u_{ija} ,$$

where y_{ija} is a measure of health care use for individual i in socioeconomic group j at age a, u_{ija} is an unobserved error component, X_{ija} is a set of covariates (e.g., gender and region), $f_j(a;\beta)$ is a smooth function representing the age profile of outcome y for group j, and C^k_{ija} (k=1,2,…,K) are characteristics of the insurance coverage held by the individual. These can include a simple coverage indicator as well as variables summarizing other features such as co-payment rates or the presence of gatekeeper restrictions.

A fundamental problem for the estimation of equation (1) is that insurance coverage is endogenous. The age threshold for Medicare eligibility at 65 provides a credible source of exogenous variation in insurance status. To illustrate this claim, Figure 1 shows the age profiles of health insurance coverage estimated with data from the pooled 1999-2003 NHIS, where age is measured in quarters. Overall coverage rates (plotted with open diamonds) rise from 85% to 96% at age 65. Even more striking is the impact of Medicare eligibility on differences across socio-economic groups. Prior to age 65 less-educated minorities (blacks, Asians, and Hispanics with under 12 years of education) have 25 percentage points lower coverage rates than highly-educated whites. After 65 the gap falls to 10 points or less.

Figure 1 also shows the fractions of individuals with two or more insurance policies. Before age 65, multiple coverage is relatively rare. The incidence rises at 65, with a bigger gain for highly educated whites, reflecting a greater likelihood of enrollment in supplemental "Medigap" policies (see Section II, below). Thus, Medicare eligibility is associated with a narrowing of disparities in the probability of any coverage, but a widening of disparities in at least one indicator of the generosity of coverage.

To proceed, suppose that a person's health insurance coverage can be summarized by two indicator variables: C^1_{ija} indicating any coverage, and C^2_{ija} indicating a relatively generous insurance package (i.e., low co-payments and few gate-keeper restrictions). Consider linear probability models for the events of any coverage and generous coverage of the form:

(2a) $C^1_{ija} = X_{ija} \beta^1_j + g^1_j(a) + D_a \pi^1_j + v^1_{ija}$,

(2b) $C^2_{ija} = X_{ija} \beta^2_j + g^2_j(a) + D_a \pi^2_j + v^2_{ija}$,

where β^1_j and β^2_j are group-specific coefficients, $g^1_j(a)$ and $g^2_j(a)$ are smooth age profiles for group j, and D_a denotes an indicator for being age 65 or older. Combining equations (2a) and (2b) with equation (1), the reduced form model for outcome y is:

(3) $y_{ija} = X_{ija} (\alpha_j + \beta^1_j \delta^1_j + \beta^2_j \delta^2_j) + h_j(a) + D_a \pi^y_j + v^y_{ija}$,

where $h_j(a)=f_j(a)+\delta^1_j g^1_j(a)+\delta^2_j g^2_j(a)$ represents the reduced form age profile for group j, $\pi^y_j = \pi^1_j\delta^1 + \pi^2_j\delta^2$ is the discontinuity in y for group j at age 65, and $v^y_{ija}= u_{ija}+v^1_{ija}\delta^1_j+v^2_{ija}\delta^2_j$ is an error term. Assuming that the profiles $f_j(a)$, $g^1_j(a)$, and $g^2_j(a)$ are all smooth, any discontinuity in y at age 65 can be attributed to the discontinuity in insurance provisions. The magnitude depends on the changes in coverage and generosity at 65 (π^1_j and π^2_j), and on the causal effects of these two dimensions of insurance status (δ^1 and δ^2).

For some basic health care services – for example, routine doctor visits – it is arguable that only the presence of insurance matters. In this case, the implied discontinuity in y at age 65 for group j will be proportional to the change in insurance coverage experienced by the group. For other more expensive or discretionary services the generosity of coverage may also matter, if patients are unwilling to cover the required co-payment or if managed care programs will not cover the service. This creates a potential identification problem in interpreting the discontinuity in y for any one group. However, since π^y_j is a linear combination of the discontinuities in coverage and generosity, δ^1 and δ^2 can be estimated by a regression across groups of the form:

(4) $$\pi^y_j = \delta^0 + \delta^1 \pi^1_j + \delta^2 \pi^2_j + e_j .$$

where e_j is an error term reflecting a combination of the sampling errors in π^y_j , π^1_j, and π^2_j.

This framework can be extended to include additional dimensions of insurance coverage. In practice, however, a key limitation is the lack of information on the insurance packages held by different individuals. In the absence of more complete data, we use the presence of at least two forms of coverage as an indicator of "generous" coverage. We also explore a simple measure of gatekeeper limitations, based on whether an individual's primary insurer is a managed care provider.

In our empirical analysis, we fit regression discontinuity (RD) models like (2a), (2b) and (3) by demographic subgroup to individual data using OLS estimators. We then combine the estimates across groups in the final section of the paper to estimate models like (4). We follow DiNardo and Lee (2004) and assume the age profiles in equations (1), (2a) and (2b) are continuous polynomials with potential discontinuities in the derivatives at age 65. In the online appendix we present estimated discontinuities for many of our key outcomes obtained using alternative local linear regression procedures (as suggested by Hahn, Todd and van der Klaauw, 2001), and discuss the sensitivity of our estimates to various specification choices. In general we find that the estimated discontinuities are robust to the method and specification choices, reflecting the relative smoothness of the age profiles in insurance features and health outcomes, and the relatively large samples we use for most of our analyses.

II. Changes in Insurance Coverage at Age 65

Medicare is available to people who are at least 65 and have worked 40 quarters or more in covered employment (or have a spouse who did).[1] Coverage is also available to younger people with severe kidney disease and recipients of Social Security Disability Insurance (DI). Eligible individuals can obtain Medicare hospital insurance (Part A) free of charge, and medical insurance (Part B) for a modest monthly premium. Individuals receive notice of their impending eligibility for Medicare shortly before

[1] Individuals who do not qualify may still enroll in Medicare at age 65 by paying monthly premiums for both Part A and Part B

their 65th birthday, and are informed that they have to enroll in the program and choose whether or not to accept Part B coverage. Coverage begins on the 1st day of the month in which they turn 65.

Table 1 shows the effects of reaching age 65 on five insurance-related variables: the probability of Medicare coverage, the probability of any health insurance coverage, the probability of private coverage, the probability of two or more forms of coverage, and the probability that an individual's primary health insurance is a managed care program. The data for this analysis are drawn from the 1999-2003 NHIS surveys. For each characteristic we show the incidence rate at age 63-64, and the change at age 65, based on a version of equations (2a/2b) that includes a quadratic in age, fully interacted with a post-65 dummy.[2]

Medicare coverage rises by 60 percentage points at age 65, from a base level of 12% among 63-64 year olds. Consistent with DI enrollment patterns (Autor and Duggan, 2003), Medicare enrollment prior to 65 is higher for minorities and people with below-average schooling and these groups experience relatively smaller gains at age 65 (see rows 2-7). The pattern is reversed for the probability of any insurance coverage (cols. 3 and 4): groups with lower insurance coverage rates prior to 65 experience larger gains at age 65. There is still some disparity in insurance coverage after 65, but the 28 point gap between more-educated whites and less-educated minorities narrows to about 10 points. Similarly, as shown in rows 8-10, the 21 point gap in coverage between whites and Hispanics before age 65 closes to only 12 points after. Thus, the onset of Medicare eligibility dramatically reduces disparities in insurance coverage.

Columns 5 and 6 present information on the prevalence of private insurance coverage (i.e., employer-provided or purchased coverage). Prior to age 65 private coverage rates range from 33% for less educated minorities to 86% for better-educated whites. The RD estimates in column 6 show that these differences are hardly affected by the onset of Medicare eligibility. This stability reflects the fact that most people who hold private coverage before 65 transition to a combination of Medicare and

coverage. This option is limited to U.S. citizens and legal aliens with at least five years of residency in the U.S.

[2] The models also include controls for gender, education, race/ethnicity, region, and sample year. The samples include people between 55.25 and 75 years of age (measuring age in quarters). See the online appendix for alternative specifications.

supplemental coverage, either through an employer-provided plan or an individually purchased Medigap policy.[3] Columns 7 and 8 of Table 1 analyze the age patterns of multiple coverage (i.e., reporting two or more policies). Prior to age 65, the rate of multiple coverage is quite low (around 11%) and similar across groups. As shown in column 8, the overall rate of dual coverage rises by about 44 percentage points at age 65, with gains close to 60 percentage points for better-educated whites, but only on the order of 20 percentage points for less educated minorities. Thus, significant disparities in dual coverage arise after age 65 (see also Figure 1).

Another important dimension of coverage is managed care versus indemnity coverage. The entries in column 9 of Table 1 show that among 63-64 year olds with insurance coverage, nearly 60% have managed care, with higher rates for whites and better educated groups. At age 65, the overall fraction of people with managed care for their primary insurance drops sharply, with larger declines for groups with higher rates prior to 65, leading to rough convergence in managed care rates across groups. This decline reflects the relatively low enrollment in Medicare managed care: about 85% of 65-66 year old Medicare recipients are enrolled in fee-for-service Medicare, which offers patients and providers substantial leeway over the use of services.

Overall, there are major changes in health insurance at age 65. Many of those who lacked insurance prior to 65 obtain coverage, equalizing coverage rates across groups. There is also a sharp rise in multiple coverage, particularly among whites and the better-educated. Coupled with the shift from managed care to fee-for-service coverage, it appears that the relative "generosity" of insurance coverage among more advantaged groups actually increases with the onset of Medicare eligibility.

Other Changes at Age 65

The validity of our regression discontinuity approach rests on the assumption that other factors trend smoothly at age 65. An obvious concern is that there could be an abrupt change in the fraction of people working at 65 that leads to differences in health care utilization (if non-workers, for example, have

[3] Across the 6 groups in rows 2-7 of Table 1, for example, the correlation between the private coverage rate at ages 63-64 shown in column 5 and the fraction of 65-66 year olds with private supplemental Medicare coverage is 0.97.

more time to visit doctors).[4] A simple test for the potential impact of discontinuities in confounding variables like employment is fitting a model like (3) for the confounding variable and testing for jumps at age 65.

Table 2 presents estimation results for a set of models that test for discontinuities in the age profiles of employment, using data from the 1992-2003 NHIS (with age measured in quarters) and the 1996-2004 March Current Population Surveys (with age measured in years).[5] Using either data source, the estimated changes in employment-related outcomes are small in magnitude and statistically insignificant. In specification tests where we restrict the age window to 63-67, the estimated changes in employment are small, but statistically significant only for educated whites (see online appendix). Figure 3 displays the actual and fitted age profiles of employment for the overall NHIS sample and for highly educated whites and less educated minorities. These profiles all trend smoothly through age 65, though there is some evidence of a sharp drop at age 62, reflecting the relatively large fraction of people who retire as soon as Social Security benefits are available (e.g., Rust and Phelan, 1997).

One concern is that the smoothness in overall employment trends at 65 may be masking differences between men and women. The bottom two rows of Table 2 present results by gender, and show no large discontinuities for either men or women.[6] As an additional check, we used longitudinal data from the 2001 Survey of Income and Program Participation to estimate month-to-month changes in individual employment. Consistent with the results here, we found no evidence of a discontinuity in employment at age 65. We also investigated the age profiles of marriage, being classified as poor, and of receiving food stamps in the NHIS, as well as residential mobility, marital status, and the incidence of low income in the CPS. As summarized in the online appendix to this paper, none of these outcomes show significant discontinuities at age 65 for the overall sample or the subgroups used in Tables 1 and 2. Taken as a whole, we conclude that employment, family structure, family income, and location all trend

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[4] Lumsdaine, Stock and Wise (1995) report some evidence of a spike in the retirement hazard rate at age 65. More recent data from the Health and Retirement Study, however, show little or no spike at 65 (von Wachter, 2002, Figure 3). Moreover, a spike in the retirement *hazard* implies a discontinuity in the second derivative of the employment survivor function, rather than a discontinuity in the employment *rate*.

[5] We use employment in the survey week, hours worked in the survey week, and self-classification as “retired” in the labor force

relatively smoothly at age 65, and are unlikely to confound our analysis of the impact of Medicare eligibility.

III. Changes in Health Care Access and Utilization at Age 65

We now turn to an analysis of the effects of reaching age 65 on access to care and utilization of health care services. Since 1997 the NHIS has asked two questions: (1) "During the past 12 months has medical care been delayed for this person because of worry about the cost?" (2) "During the past 12 months was there any time when this person needed medical care but did not get it because (this person) could not afford it?" Columns 1 and 3 of Table 3 show the fractions of people age 63-64 in the pooled 1997-2003 NHIS samples who responded positively to these two questions. Overall, about 7% of the near-elderly reported delaying care, and 5% reported not getting care, with relatively higher rates for less educated minorities, and for Hispanics. Our RD estimates in columns 2 and 4 imply significant declines at age 65 in both measures of access problems, especially for less educated minorities and Hispanics. The onset of Medicare eligibility leads to a fall in cost-related access problems and a narrowing of inter-group disparities in access.[7]

The right-hand columns of Table 3 present results for two key measures of health care utilization: (1) "Did the individual have at least one doctor visit in the past year?" and (2) "Did the individual have one or more overnight hospital stays in the past year?" based on pooled samples of the 1992-2003 NHIS. Inspection of the utilization rates among 63-64 year olds shows a well-known fact: less educated and minority groups are *less* likely to have a routine doctor visit than better-educated and non-minority groups, but *more* likely to have had a hospital spell. The RD estimates in column 6 suggest that the age 65 threshold is associated with a (modest) increase in routine doctor visits, with relatively larger gains for the groups with lower rates before 65.[8] For example, among the near-elderly there is a 7.4 percentage point gap in the probability of a routine doctor visit in the previous year for better educated whites

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status of the survey week as our employment indicators.

[6] Graphs similar to Figure 2 by gender are available in our online appendix.

[7] Because the questions refer to the previous year, our estimates of the effect of reaching 65 on access problems may be attenuated. Specifically, people who recently turned 65 could have had problems in the past year but before their birthday. Such attenuation may be reduced if people tend to recall only their most recent experiences.

(87.6%) versus less-educated minorities (80.2%). The relatively large 5.0 percentage point gain for the latter group at 65 closes 5.0/7.4=68% of the pre-65 disparity.

The RD estimates in column 8 are harder to interpret. Overall, there is a rather large rise in hospitalization rates at 65 (on the order of 10%), but the gains are larger for better-educated whites than other groups. Indeed, the 2.1 percentage point RD at 65 represents a 20% increase in hospitalization for this group. The gains for other groups are smaller, and for blacks in particular are quite small, though somewhat imprecise. In the next section we use 100% samples of hospital discharge records from California, Florida, and New York to refine these estimates. These data have the advantages of very large sample sizes, and the ability to compare reasons for hospitalization, which turn out to be helpful in understanding the changes at age 65.

IV. Changes in Hospitalization - Evidence from Discharge Data

In this section we use hospital discharge records from 1992-2002 for people between the ages of 60 and 70 in California, Florida, and New York to examine changes in the number and characteristics of hospital admissions at 65.[9] For some of our analyses we convert the numbers of hospital admissions into rates, using population estimates derived from Census Bureau data as denominators. The advantage of hospitalization *rates* is that they can be compared across groups to evaluate disparities in the pre-65 population. The disadvantage is that the denominators must be interpolated from Census Bureau population estimates, introducing some noise in the age profiles of the hospitalization rates. For our RD models we therefore estimate discontinuities in the log of the number of admissions at age 65. Under the assumption that the underlying population counts trend smoothly, the estimated discontinuities in log admission counts can be interpreted as estimates of the percentage discontinuities in admission rates (see Card, Dobkin, and Maestas (2004) for a formal justification of this approach).[10]

Figure 3 shows the actual and fitted age profiles of hospital admission rates based on our pooled

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[8] Lichtenberg (2002) also found a discontinuous rise in physician visits in the National Ambulatory Medical Care Surveys, but did not disaggregate visits by race/ethnic group.
[9] We use patient age at admission. The data exclude hospitals not regulated by the states such as Veteran Administration hospitals. For our analysis, we drop patients that are admitted as transfers from other hospitals or medical facilities.
[10] Note that we are using 11 years of discharge records. Thus, the people in a given age group in our samples are actually drawn

data. The markers in the figure represent actual averages (by month of age) of the number of admissions divided by the estimated population of that age. The lines represent fitted regressions from models that assume a quadratic age profile with a full set of post-65 interactions. Overall admission rates rise steadily prior to age 65, then jump sharply at age 65. The increase appears to be "permanent," with no tendency after age 65 to revert to the previous level, as might occur if the jump in admissions represented only catch-up for deferred care.

Table 4 shows estimated hospital admission rates among 60-64 year olds in the three states, and the percentage changes in the numbers of admissions at age 65. The entry in row 1 shows that the jump in overall admissions in Figure 3 corresponds to a 7.6% increase, comparable to the national estimate of about 10% in Table 3.[11] Entries in the other columns show the average admission rates at age 60-64 (per 10,000 person-years) by race and ethnicity, and the increases in these rates at age 65. Hispanics have the lowest admission rates prior to age 65 but experience a slightly larger gain than whites (9.5%). Blacks, in contrast, have much higher admission rates prior to 65 but experience a much smaller gain (4.5%). On net, these estimates suggest that both the black-white and the Hispanic-white differences in admission rates narrow at age 65, as whites gain relative to blacks and Hispanics gain relative to whites.

For reference, the bottom row of Table 4 shows insurance coverage rates among 60-64 year olds in the three states, along with estimated jumps in insurance coverage at 65.[12] Coverage rates in the three states are below the national average prior to 65, but rise by more (15% versus a national average of about 10%). Consistent with the national data in Table 1, the gains in insurance coverage in the three states are largest for Hispanics (20.3% vs. 17.3% nationally), a little smaller for blacks (17.6% vs. 11.9% nationally) and smallest for whites (12.7% vs. 7.3% nationally).

A key advantage of our hospital data is that we can break down admissions by route into the hospital, and by admission diagnosis and primary procedure. A comparison of rows 2 and 3 in Table 4

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from 11 different age cohorts, smoothing any differences in cohort size.

[11] Lichtenberg (2002) found a similar jump in admissions in the 1972-1992 National Hospital Discharge Survey; however, unlike Lichtenberg, our more recent data (1992-2002) for CA, NY, and FL do not suggest that the jump at 65 is the result of postponement of hospitalizations in the prior two years.

[12] These data are drawn from the 1996-2004 CPS data for CA, NY, and FL. Given the small sample sizes and the coarseness of

show that most of the jump in admissions at age 65 is driven by non-emergency room admissions, although for each race/ethnic group there is also some increase in ER admissions.[13] Further insights can be gleaned from the admissions patterns across diagnoses. The most common admission diagnosis for near-elderly patients is chronic ischemic heart disease (IHD), which is often treated by coronary artery bypass surgery. There are substantial disparities in IHD admission rates prior to age 65, with a black-white relative admission rate of only 72% (see row 4). Overall admissions for this diagnosis rise by 12% at age 65, with the largest proportional rise for Hispanics (who have the lowest base rate), and the smallest gain for blacks. The onset of Medicare eligibility therefore leads to a surprising *widening* of the black-white disparity in admission rates for IHD, but a slight narrowing of the Hispanic-white disparity.

The second most common admission diagnosis is acute myocardial infarction (AMI or heart attack). AMI admission rates among 60-64 year olds are fairly similar for whites and blacks, but lower for Hispanics. There is a small rise in total AMI admissions at age 65 (4.6%), although estimates for the different race/ethnic groups are not precise enough to rule out equality across the groups.

The third most common admission diagnosis is heart failure (HF), a progressive disorder caused by deterioration of the functional capacity of the heart. Unlike IHD, there is no surgical treatment for HF: the main treatment is medication. HF is particularly prevalent among African Americans, and consistent with this fact, the data show that 60-64 year old blacks have a 280% higher admission rate for HF than whites. Interestingly, there is no evidence of a jump at age 65 for HF admissions for any group.

We can also classify admissions by the primary procedure (rows 11-16). The leading primary procedure is diagnostic procedures on the heart (such as cardiac catheterization, often performed for people admitted with AMI). Admissions for these procedures rise by about 9% at age 65, with the largest rise for Hispanics (16.6%), leading to a narrowing in Hispanic-white disparities. Blacks have somewhat higher admission rates for this procedure than whites prior to 65, but show a similar proportional increase

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the age measure in the CPS, we estimated the insurance RD's assuming a linear age profile but allowing a different slope before and after 65.

[13] ER admissions include extremely urgent cases (which one might expect to be unresponsive to insurance status) as well as patients who have presented at the ER without being referred by a physician. Some analysts have argued that provision of health insurance would reduce ER use and shift patients to outpatient care. Nevertheless, our results are consistent with the RAND

at 65.

Admission rates for the second most common group of procedures – removal of a coronary artery obstruction (including angioplasty and related procedures) – rise by around 11%. Again, the rise is larger for Hispanics than for whites, leading to a narrowing of the Hispanic-white disparity. The gains for blacks, by comparison, are small and statistically insignificant. Black admission rates for these interventions prior to 65 are notably below those for whites, so the changes associated with Medicare eligibility further increase an already large disparity. A similar pattern emerges for admissions for bypass surgeries, which rise by 19.4% for Hispanics, 16.2% for whites, but by only a statistically insignificant 5% for blacks, again leading to a widening of the black-white disparity in admission rates.

The fourth most common group of admission diagnoses is osteoarthrosis (degenerative joint disease), which has substantial overlap with admissions for hip and knee replacement surgery. The impact of Medicare on the age profile of hip/knee surgery admissions is revealing because on the one hand these procedures are readily deferred, and on the other, they are relatively expensive but "routine" interventions that are thought to have a beneficial effect on quality of life. Prior to 65 whites have a much higher admission rate for hip and knee replacements than blacks or Hispanics.[14] At 65, whites experience a large (23%) increase in admissions for these procedures. The proportional gain for Hispanics is about the same, but given their much lower base rate, the Hispanic-white disparity actually increases at age 65. Blacks show a much smaller gain than whites or Hispanics, and coupled with their lower rates pre-65, the net effect is a substantial widening in the black-white disparity in hip/knee replacement surgeries.

These conclusions are visually confirmed in Figure 3. Close inspection of the age profile for whites in Figure 3 also reveals a drop-off in procedure rates just prior to 65, coupled with a temporary surge shortly after 65. This pattern suggest that some people who are close to 65 delay knee and hip replacements until they become eligible for Medicare. A recent panel convened by the National Institutes of Health concluded that hip and knee replacement surgeries are under-performed in the U.S. If true, this

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Health Insurance Experiment, which found ER use as responsive to co-payment rates as use of outpatient care (Newhouse, 1993).

[14] Racial disparities in the rates of hip and knee replacement surgery among Medicare recipients have been well documented in

implies that the rise in admissions for these procedures at age 65 may be due to stringent limitations in the insurance coverage available prior to age 65, rather than to excessive generosity of Medicare.

Looking across the patterns in Table 4 by diagnosis and procedure, an interesting contrast emerges between conditions that typically are treated with medication or bed rest (HF, bronchitis and pneumonia), and those that are treated with specific procedures (IHD, osteoarthrosis, gall bladder removal). The first group of admissions tend to increase only slightly at age 65, with similar gains across groups. The second group rises by more, with a pattern that often widens existing racial/ethnic disparities -- especially between blacks and whites. This contrast suggests there is an interaction between the availability and generosity of insurance, on one hand, and the existence of specific surgical procedures, on the other, that lead to differences in rises in hospital admissions once Medicare becomes available. In this light, it is interesting to note that the increase in admissions for people who receive no procedures is below the overall growth in admissions (5.8% versus an overall average of 7.6%).

Further evidence that supply-side reactions to the changes in insurance status at age 65 play a role is presented in Figure 4, which plots the age profiles of hospital admissions by hospital ownership type in California.[15] Private non-profit hospitals (the largest category) and private for-profits (the second largest category) experience relatively large increases in admissions at age 65. By comparison, hospitals owned by Kaiser Permanente (a large and long-established HMO) show little change in admissions at age 65, and county hospitals experience a sharp decline. These patterns point to two important conclusions. First, the jump at age 65 in overall hospital admissions masks a significant redistribution of caseloads across hospitals. Once Medicare is available some no longer have to use county hospitals and choose a private alternative. Second, the lack of any discontinuity at the Kaiser hospitals suggests that changes in managed care status may have some role in explaining the rises in admissions in the hospital system as a whole. In particular, Kaiser patients remain under a similar managed care regime before and after 65, and these patients show no rise in hospitalization at 65, whereas other patients appear to be entering the hospital more frequently after 65 and at the same time switching between hospitals. Moreover,

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the medical literature (e.g., see Charleson and Allegrante (2000)).

physicians at Kaiser are salaried and face no particular incentives to seek out Medicare patients for high-cost procedures.

VI. Summary of Patterns across Groups

To summarize our findings, we use the framework of equation (4) to relate changes in insurance characteristics at 65 to the changes in health related outcomes. The entries in column 1 of Table 5 represent estimates of the coefficients δ^1 or δ^2, obtained by regressing the estimated discontinuities in the outcome variable indicated in the row heading on the discontinuities in insurance coverage (Panel A) or insurance "generosity" (measured by the incidence of multiple coverage, Panel B) across six ethnicity-education groups (rows 1-4) or nine state-ethnicity groups (rows 5-8 and 9-12).[16] Column 2 reports the corresponding R-squared coefficients. These should be close to 1 if the change in the outcome variable at age 65 is driven by the measured change in insurance status. Columns 3-5 summarize the pre-65 disparities, while columns 6-8 show the predicted changes in the disparities at 65, computed by multiplying the estimate of δ^1 or δ^2 by the difference in the jumps in coverage or generosity for the disparate groups (from column 4 of Table 1).

Looking first at the measures of access to care in rows 1-3, it appears that the changes across groups at age 65 are closely related to the corresponding changes in insurance coverage. Reaching the Medicare eligibility age is estimated to close 25-40% of the inter-group disparity in delaying or not getting care, and 74% of the gap in the likelihood of a regular doctor visit. This contrasts with the estimated changes in the probability of a hospital stay (row 4), which are slightly *negatively* related to the increases in insurance coverage. We also fit versions of equation (4) that related these outcomes to the discontinuities in multiple insurance coverage and managed care, but these had less explanatory power.

In contrast to access to care, the entries in rows 5-8 show no evidence of a link between insurance coverage and hospital admissions. If anything, there appears to be a negative relationship between

[15] Hospital ownership data are available in our California files only.

[16] We use weighted least squares, weighting each observation by the inverse sampling variance of the estimated discontinuity in the outcome. Since the estimated discontinuities are independent, this procedure is efficient. The models based on hospital data include state dummies to control for unobserved state-wide factors that affect the responsiveness of health care providers to the onset of Medicare.

increases in insurance coverage and the size of the RD in admissions for bypasses and hip/knee replacements. The results in Panel B yield a similar conclusion for the link between multiple coverage and overall admissions, or admissions for diagnostic heart procedures. For bypass surgery and hip/knee replacement surgery, however, there is more consistent evidence of a link. The R-squared coefficient is particularly high for hip and knee surgery, suggesting that the widening disparities in admissions for hip and knee replacements are attributable to the fact that whites are more likely to obtain supplemental coverage after 65 than blacks or Hispanics.

VII. Conclusions

In this paper we use the discrete changes generated by the rules of the Medicare program to identify the impact of health insurance on access to care and utilization. The Medicare eligibility threshold at age 65 is associated with an increase in overall insurance coverage and a narrowing of coverage disparities across different subgroups. There is also an increase in the incidence of multiple coverage and a reduction in managed care, concentrated among higher educated and non-minority groups, as people with insurance prior to 65 enroll in fee-for-service Medicare and supplementary coverage plans.

We find that the onset of Medicare eligibility leads to increases in the use of medical care services, with a pattern of gains across groups that varies with the type of service. Routine doctor visits and access to care increase more for groups that previously lacked coverage, and experience the largest gains in coverage at age 65. Overall hospitalizations increase sharply, but the patterns of gains across groups differ by type of admission. For certain elective hospital admissions, including hip and knee replacements and bypass surgery, the increases are larger for groups that are more likely to have Medicare combined with supplemental coverage after 65. For other conditions like heart failure that are mainly treated by drugs, all groups show very small increases in hospitalization rates at 65. Coupled with evidence of a redistribution of the caseload across hospitals of different ownership types, these patterns suggest that the rise in hospitalization at 65 is driven by an interaction between the increase in insurance "generosity" at 65 – specifically for groups who move to fee-for-service Medicare with supplemental coverage – and the existence of profitable treatments (like bypass surgery) for certain diagnoses.

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Table 1: Insurance Characteristics Just Before Age 65 and Estimated Discontinuities at Age 65

	On Medicare		Any Insurance		Private Coverage		2+ Forms Coverage		Managed Care	
	Age 63-4	RD at 65	Age 63-4	RD at 65	Age 63-4	RD at 65	Age 63-4	RD at 65	Age 63-4	RD at 65
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1. Overall Sample	12.3	59.7	87.9	9.5	71.8	-2.9	10.8	44.1	59.4	-28.4
		(4.1)		(0.6)		(1.1)		(2.8)		(2.1)
Classified by Ethnicity and Education:										
White Non-Hispanic:										
2. High School Dropout	21.1	58.5	84.1	13.0	63.5	-6.2	15.0	44.5	48.1	-25.0
		(4.6)		(2.7)		(3.3)		(4.0)		(4.5)
3. High School Graduate	11.4	64.7	92.0	7.6	80.5	-1.9	10.1	51.8	58.9	-30.3
		(5.0)		(0.7)		(1.6)		(3.8)		(2.6)
4. At Least Some College	6.1	68.4	94.6	4.4	85.6	-2.3	8.8	55.1	69.1	-40.1
		(4.7)		(0.5)		(1.8)		(4.0)		(2.6)
Minority:										
5. High School Dropout	19.5	44.5	66.8	21.5	33.2	-1.2	11.4	19.4	39.1	-8.3
		(3.1)		(2.1)		(2.5)		(1.9)		(3.1)
6. High School Graduate	16.7	44.6	85.2	8.9	60.9	-5.8	13.6	23.4	54.2	-15.4
		(4.7)		(2.8)		(5.1)		(4.8)		(3.5)
7. At Least Some College	10.3	52.1	89.1	5.8	73.3	-5.4	11.1	38.4	66.2	-22.3
		(4.9)		(2.0)		(4.3)		(3.8)		(7.2)
Classified by Ethnicity Only:										
8. White Non-Hispanic	10.8	65.2	91.8	7.3	79.7	-2.8	10.4	51.9	61.9	-33.6
		(4.6)		(0.5)		(1.4)		(3.5)		(2.3)
9. Black Non-Hispanic (All)	17.9	48.5	84.6	11.9	57.1	-4.2	13.4	27.8	48.2	-13.5
		(3.6)		(2.0)		(2.8)		(3.7)		(3.7)
10. Hispanic (All)	16.0	44.4	70.0	17.3	42.5	-2.0	10.8	21.7	52.9	-12.1
		(3.7)		(3.0)		(1.7)		(2.1)		(3.7)

Note: Entries in odd-numbered columns are percentages of age 63-64 year olds in group with insurance characteristic shown in column heading. Entries in even-numbered columns are estimated regression discontinuities at age 65, from models that include quadratic control for age, fully interacted with dummy for age 65 or older. Other controls include indicators for gender, race/ethnicity, education, region, and sample year. Estimates are based on linear probability models fit to pooled samples of 1999-2003 NHIS.

Table 2: Estimated Discontinuities in Employment Measures at Age 65

	Data From NHIS		Data from March CPS			
	Employed (1)	Full Time (2)	Employed (3)	Hours/Wk (4)	Retired (5)	Earnings (1000s) (6)
1. Overall Sample	0.3	0.8	1.8	1.3	-1.6	-0.2
	(0.8)	(1.2)	(1.1)	(0.7)	(1.7)	(0.4)
Classified by Ethnicity and Education:						
White Non-Hispanic:						
2. High School Dropout	1.0	1.1	1.9	1.8	-3.7	0.3
	(1.4)	(1.9)	(1.1)	(0.5)	(2.4)	(0.8)
3. High School Graduate	1.7	2.4	2.3	1.4	-2.5	-0.2
	(1.0)	(1.8)	(1.5)	(0.7)	(2.3)	(0.5)
4. At Least Some College	-1.6	-0.4	0.9	0.9	-0.6	-1.5
	(1.5)	(2.0)	(1.4)	(1.0)	(1.7)	(0.8)
Minority:						
5. High School Dropout	2.6	1.5	1.2	0.7	-0.3	0.1
	(1.6)	(2.0)	(1.3)	(0.5)	(2.4)	(0.4)
6. High School Graduate	0.0	0.2	6.1	2.5	-5.3	0.7
	(3.2)	(2.6)	(2.3)	(1.1)	(1.5)	(0.6)
7. At Least Some College	-4.6	-2.6	-1.2	0.1	2.4	0.7
	(2.6)	(3.0)	(1.5)	(0.6)	(1.8)	(1.4)
Classified by Ethnicity Only:						
8. White Non-Hispanic	0.2	0.9	1.6	1.3	-1.7	-0.5
	(0.9)	(1.3)	(1.2)	(0.7)	(2.0)	(0.5)
9. Black Non-Hispanic (All)	1.3	0.1	5.7	2.2	-4.6	1.3
	(2.6)	(2.0)	(1.4)	(0.5)	(0.9)	(0.4)
10. Hispanic (All)	-0.5	0.7	-0.4	0.8	-0.7	-1.1
	(2.0)	(2.0)	(1.7)	(0.9)	(1.7)	(1.2)
Classified by Gender:						
11. Men	1.7	3.0	2.8	1.7	-1.6	-0.5
	(1.3)	(1.6)	(1.5)	(0.9)	(1.6)	(0.6)
12. Women	-1.0	-1.2	0.9	0.9	-1.4	0.1
	(1.1)	(1.2)	(1.0)	(0.6)	(2.0)	(0.3)

Note: Entries are estimated regression discontinuities at age 65, from models that include quadratic controls for age fully interacted with dummy for age 65 or older. Other controls include indicators for gender, race/ethnicity, education, region, and sample year. Estimates in columns 1-2 are from models fit to pooled samples of 1992-2003 NHIS. Estimates in columns 3-6 are from models fit to pooled samples of 1996-2004 March CPS. Samples include people with ages 55-75 only. Standard errors in parentheses are clustered by quarter (columns 1-2) or year (columns 3-6) of age.

Table 3: Measures of Access to Care Just Before 65 and Estimated Discontinuities at 65

	1997-2003 NHIS				1992-2003 NHIS			
	Delayed Care Last Year		Did Not Get Care Last Year		Saw Doctor Last Year		Hospital Stay Last Year	
	Age 63-64 (1)	RD at 65 (2)	Age 63-64 (3)	RD at 65 (4)	Age 63-64 (5)	RD at 65 (6)	Age 63-64 (7)	RD at 65 (8)
1. Overall Sample	7.2	-1.8	4.9	-1.3	84.8	1.3	11.8	1.2
		(0.4)		(0.3)		(0.7)		(0.4)
<u>Classified by Ethnicity and Education:</u>								
White Non-Hispanic:								
2. High School Dropout	11.6	-1.5	7.9	-0.2	81.7	3.1	14.4	1.6
		(1.1)		(1.0)		(1.3)		(1.3)
3. High School Graduate	7.1	0.3	5.5	-1.3	85.1	-0.4	12.0	0.3
		(2.8)		(2.8)		(1.5)		(0.7)
4. At Least Some College	6.0	-1.5	3.7	-1.4	87.6	0.0	9.8	2.1
		(0.4)		(0.3)		(1.3)		(0.7)
Minority:								
5. High School Dropout	13.6	-5.3	11.7	-4.2	80.2	5.0	14.5	0.0
		(1.0)		(0.9)		(2.2)		(1.4)
6. High School Graduate	4.3	-3.8	1.2	1.5	84.8	1.9	11.4	1.8
		(3.2)		(3.7)		(2.7)		(1.4)
7. At Least Some College	5.4	-0.6	4.8	-0.2	85.0	3.7	9.5	0.7
		(1.1)		(0.8)		(3.9)		(2.0)
<u>Classified by Ethnicity Only:</u>								
8. White Non-Hispanic	6.9	-1.6	4.4	-1.2	85.3	0.6	11.6	1.3
		(0.4)		(0.3)		(0.8)		(0.5)
9. Black Non-Hispanic (All)	7.3	-1.9	6.4	-0.3	84.2	3.6	14.4	0.5
		(1.1)		(1.1)		(1.9)		(1.1)
10. Hispanic (All)	11.1	-4.9	9.3	-3.8	79.4	8.2	11.8	1.0
		(0.8)		(0.7)		(0.8)		(1.6)

Note: Entries in odd numbered columns are mean of variable in column heading among people ages 63-64. Entries in even numbered columns are estimated regression discontinuities at age 65, from models that include linear control for age interacted with dummy for age 65 or older (cols. 2, 4) or quadratic control for age, interacted with dummy for age 65 and older (cols. 6, 8). Other controls in models include indicators for gender, race/ethnicity, education, region, and sample year. Sample in columns 1-4 is pooled 1997-2003 NHIS. Sample in columns 5-8 is pooled 1992-2003 NHIS. Samples for regression models include people ages 55-75 only. Standard errors (in parentheses) are clustered by quarter of age.

Table 4. Hospital Admissions and Insurance Coverage at Age 65: California, Florida and New York

	All		Whites		Hispanics		Blacks	
	Rate Age 60-64	RD at 65	Rate Age 60-64	RD at 65	Rate Age 60-64	RD at 65	Rate Age 60-64	RD at 65
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Hospital Admissions								
1. All Admissions	1443	7.60	1406	7.74	1262	9.47	2008	4.39
		(0.29)		(0.33)		(0.55)		(0.71)
By Route into Hospital								
2. ER Admission	761	3.30	688	3.70	774	2.63	1313	1.93
		(0.39)		(0.40)		(0.92)		(0.95)
3. Non ER Admission	682	12.16	718	11.51	488	19.89	695	8.92
		(0.46)		(0.49)		(1.05)		(1.04)
By Admission Diagnosis								
4. Chronic Ischemic Heart Disease	83	11.58	90	11.05	59	18.45	65	8.29
		(0.96)		(1.16)		(2.45)		(2.78)
5. AMI	48	4.41	50	5.31	38	3.90	45	-3.43
		(1.43)		(1.65)		(3.33)		(4.78)
6. Heart Failure	56	0.44	45	2.33	62	-4.85	130	-1.47
		(1.11)		(1.24)		(2.63)		(2.43)
7. Chronic Bronchitis	34	7.50	36	6.50	19	9.76	38	13.05
		(1.51)		(1.52)		(5.58)		(4.43)
8. Osteoarthrosis	34	26.97	38	27.16	18	29.27	27	22.08
		(1.39)		(1.64)		(5.05)		(4.01)
9. Pneumonia	34	2.44	32	2.05	30	3.39	50	3.81
		(1.42)		(1.74)		(4.34)		(3.21)
By Primary Procedure								
10. None	419	5.70	400	5.73	388	7.23	614	3.86
		(0.33)		(0.40)		(1.23)		(1.25)
11. Diagnostic Procedures on Heart	51	9.18	53	8.17	40	16.78	58	8.76
		(1.03)		(1.20)		(3.21)		(3.32)
12. Removal of Coronary Artery Obstruction	38	10.67	43	10.49	23	18.77	22	0.49
		(1.46)		(1.60)		(3.94)		(5.33)
13. Bypass Anastomosis of Heart	26	15.91	29	16.17	17	18.97	13	5.15
		(1.39)		(1.44)		(5.62)		(6.09)
14. Joint Replacement Lower Extremity	41	22.69	46	23.16	22	26.40	33	12.14
		(1.47)		(1.60)		(4.69)		(4.20)
15. Diagnostic Procedure on Small Intestine	34	7.35	31	6.60	37	13.07	58	4.09
		(1.27)		(1.47)		(3.27)		(3.13)
16. Cholecystectomy (Gall Bladder removal)	26	17.93	26	16.00	29	29.25	18	12.27
		(2.10)		(1.84)		(5.11)		(7.50)
Insurance Coverage								
17. Probability of Coverage	82.7	15.0	86.7	12.7	69.1	20.3	79.0	17.6
(March CPS data)		(0.8)		(0.8)		(2.7)		(2.7)

Notes: Insurance estimates are based on pooled March CPS 1996-2004 data for California, Florida, and New York. Entries in top row columns 1,3,5,7 are fractions of 60-64 year olds with insurance coverage. Entries in top row columns 2, 4, 6, 8 represent regression discontinuity estimates (×100) of the increase in coverage at age 65 from a model with a quadratic in age, fully interacted with a post-65 dummy. Entries in lower rows columns 1,3,5,7 are hospital admission rates (per 10,000 person years for 60 to 64 year olds) for California, Florida, and New York 1992-2002. Entries in lower rows columns 2, 4, 6, 8 are regression discontinuity estimates (×100) of the increase in the log of the number of admissions at age 65, from models with a quadratic in age, fully interacted with a post-65 dummy. Standard errors are in parenthesis.

Table 5: Summary of Effects of Insurance Coverage on Socio-Economic Disparities

Outcome	Coefficient on Coverage RD (1)	R^2 (2)	Disparities at Ages 63-64: Low-Ed Minority-Hi-Ed Whites (3)	Disparities at Ages 63-64: Black White (4)	Disparities at Ages 63-64: Hispanic-White (5)	Percent Change in Disparity Due to Change in Coverage at 65: Low-Ed Minority-Hi-Ed Whites (6)	Percent Change in Disparity Due to Change in Coverage at 65: Black White (7)	Percent Change in Disparity Due to Change in Coverage at 65: Hispanic-White (8)
A. Based on Change in Insurance Coverage at 65								
1. Delay in Care Last Year	-0.19 (0.06)	0.72	7.6	--	--	-42.8	--	--
2. No Care Last Year	-0.12 (0.06)	0.39	8.0	--	--	-25.7	--	--
3. Regular Dr. Visit Last Year	0.32 (0.09)	0.77	-7.4	--	--	-73.9	--	--
4. Hospital Stay Last Year	-0.09 (0.08)	0.26	4.7	--	--	-32.7	--	--
5. Total Hospital Admissions	0.06 (0.18)	0.74	--	724	-193	--	1.8	-0.5
6. Diagnostic Procedures of the Heart	0.59 (0.31)	0.62	--	9	-25	--	35.6	4.5
7. Bypass Anastomosis of Heart	-0.54 (0.93)	0.54	--	-18	-14	--	-4.9	-4.8
8. Joint Replacement Lower of Extremity	-0.19 (0.64)	0.89	--	-7	-28	--	2.7	-2.3
B. Based on Change in Incidence of Multiple Coverage at 65								
9. Total Hospital Admissions	0.03 (0.08)	0.74	--	724	-193	--	-0.1	5.8
10. Diagnostic Procedures of the Heart	-0.21 (0.14)	0.55	--	9	-25	--	22.3	-18.7
11. Bypass Anastomosis of Heart	0.46 (0.34)	0.64	--	-18	-14	--	29.4	37.1
12. Joint Replacement Lower of Extremity	0.42 (0.21)	0.94	--	-7	-28	--	59.4	25.7

Notes: Each entry in Panel A, column 1 is estimated coefficient from regression of RDs in listed health outcome on RDs in insurance coverage over 6 ethnicity/education groups (rows 1-4) or 9 state-ethnicity groups (rows 5-8). All regressions weighted by the inverse sampling variance of the estimated discontinuity in each outcome, and regressions in rows 5-12 include state dummies. Entries in column 2 are corresponding R-squared coefficients from each regression. Entries in columns 3, 4, and 5 are the observed disparities in each health outcome at ages 63-64, and entries in columns 6, 7, and 8 are the percent change in the disparity attributable to the change in insurance coverage based on the coefficient in column 1. Health disparities measured in the NHIS are characterized in terms low-ed minorities versus hi-ed whites, whereas health disparities measured in the hospital discharge data are characterized in terms of black-white or hispanic-white differences. Panel B is similar to Panel A except that the RDs in each health outcome are regressed on the RDs in the incidence of multiple coverage at 65. Panel B regressions are based on data for New York and Florida only (i.e., 6 state-ethnicity groups).

Figure 1: Coverage by Any Insurance and by Two or More Policies, By Age and Demographic Group

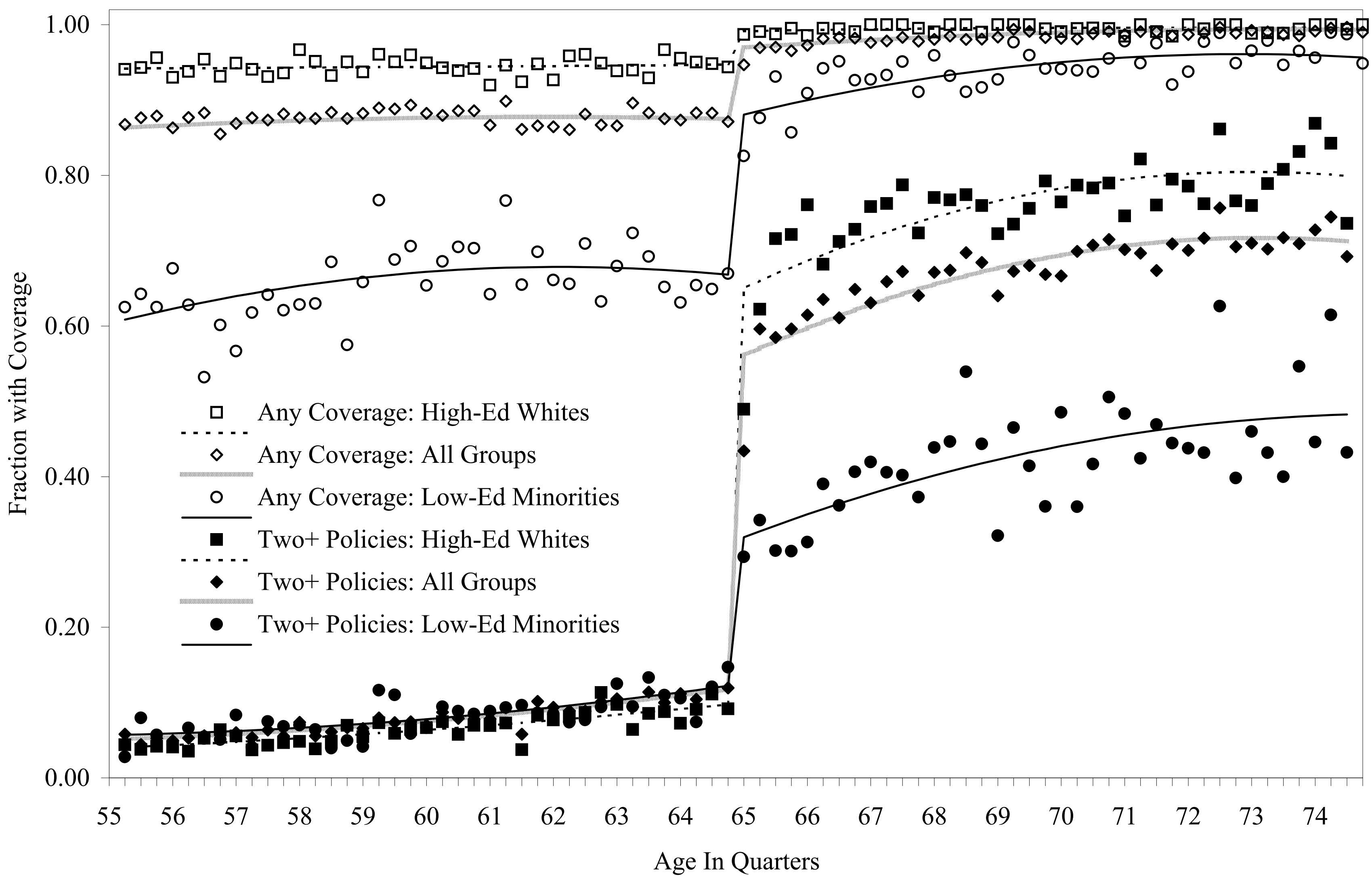


Figure 2: Employment Rates by Age and Demographic Group (1992-2003 NHIS)

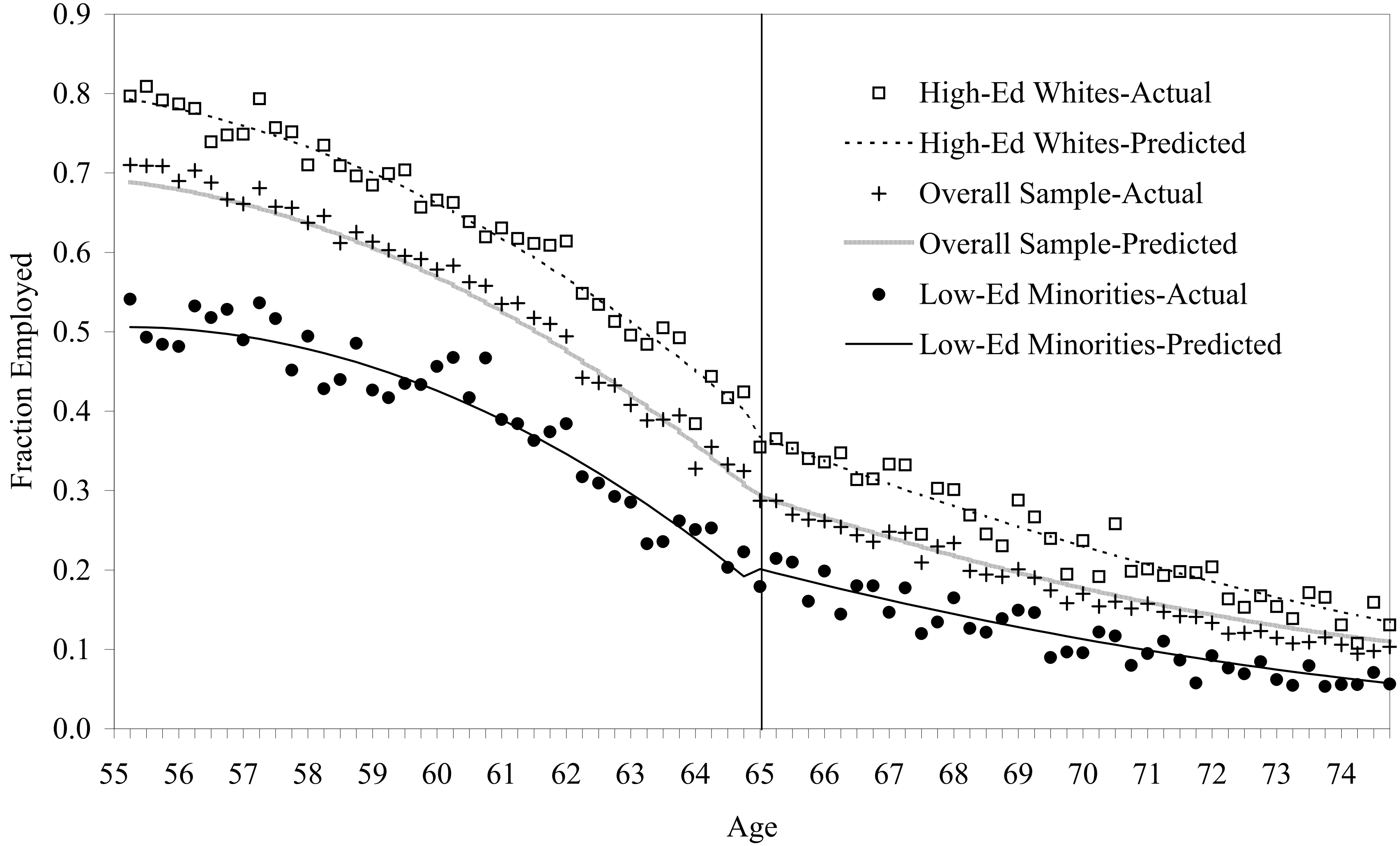


Figure 3: Hospital Admission Rates by Race/Ethnicity

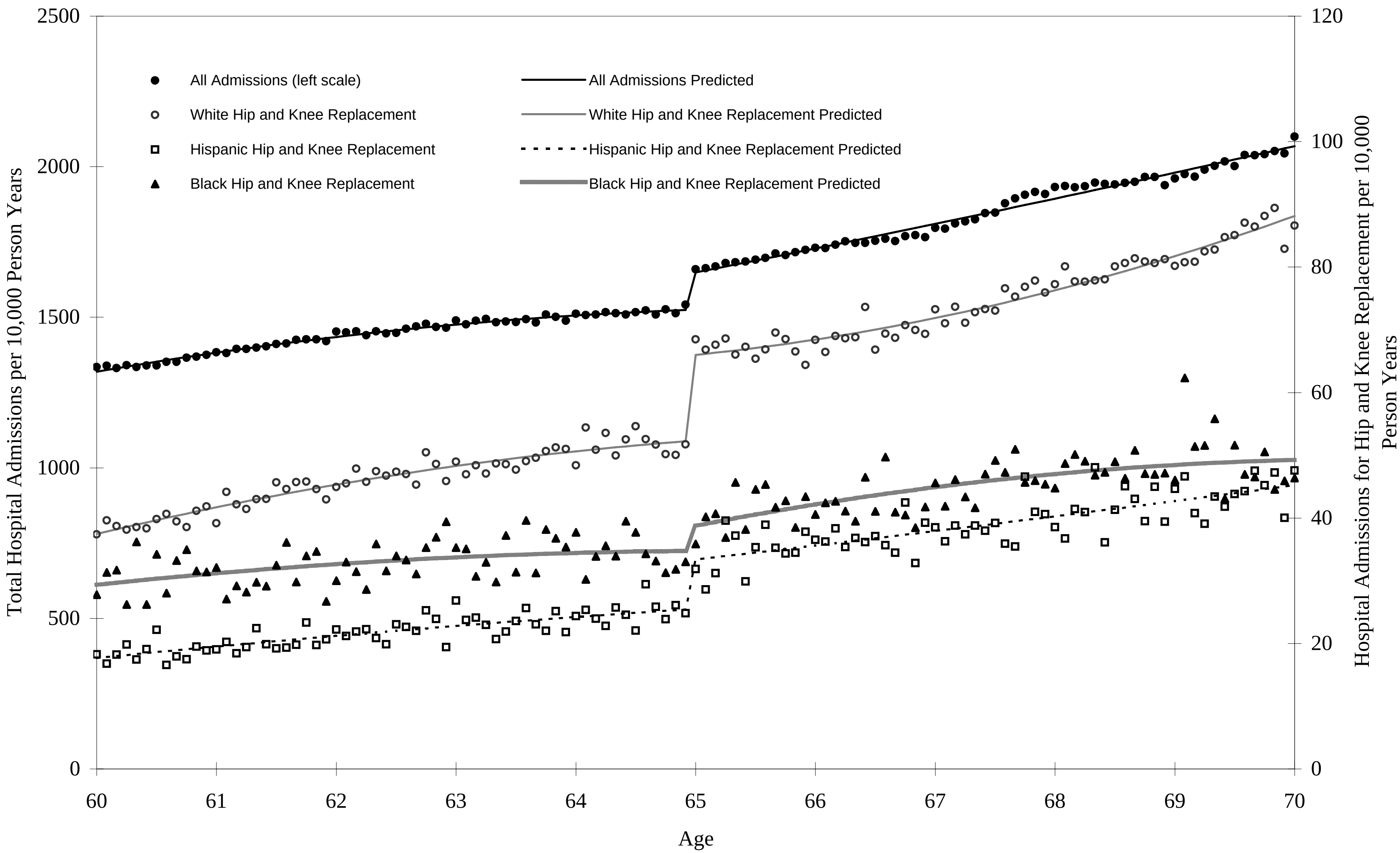
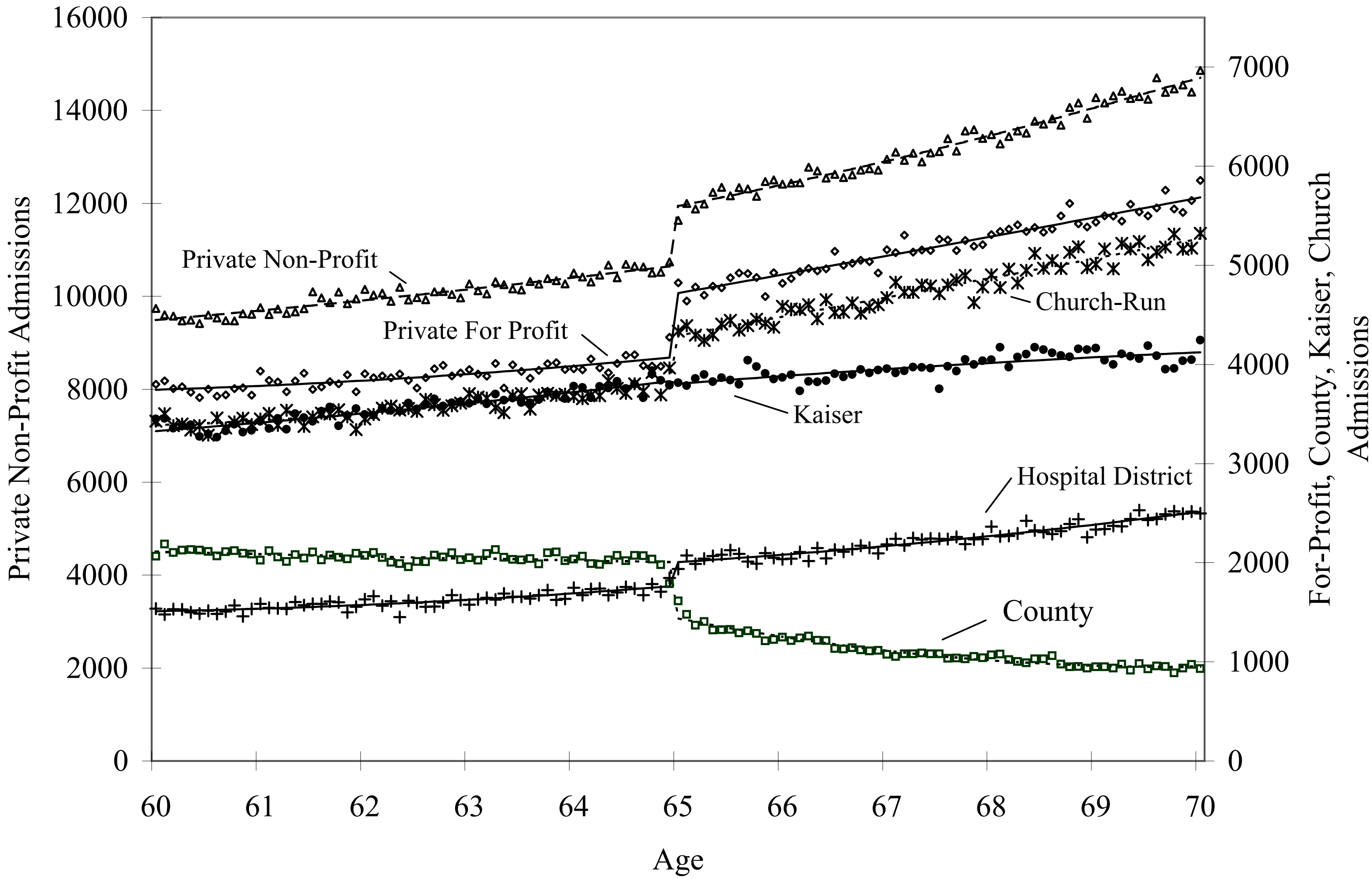


Figure 4: Hospital Admission in California by Ownership Type (1992-2002)



The Impact of Nearly Universal Insurance Coverage on Health Care Utilization: Evidence from Medicare

Appendix

Overview of Data Files Used

a. National Health Interview Survey (NHIS)

We use the NHIS individual and sample person records files for 1992-2003. Individuals report their birth year and birth month and the calendar quarter of the interview. We use this information to construct age in quarters at the time of the interview. By our dating convention, the sample of people who are coded as exactly 65 years and 0 quarters of age includes those who will reach their 65^{th} birthday in the interview quarter. Assuming interviews are approximately uniformly distributed over the quarter, this means that about 1/2 the sample are 0-6 weeks younger than 65, and 1/2 are 0-6 weeks older than 65.

Our sample includes people who are over 55 and under 75: the final sample size is 160,821, although there are missing values for some variables. Around age 65, the age distribution has about 2,000 people per quarter of age. Sample counts, and mean percentages of people with health insurance, with Medicare, and working are reported in Table A.

Employment status and indicators for whether the interviewee saw a doctor last year or stayed overnight in hospital are available for 1992-2003. We use the entire 1992-2003 sample for these outcomes. There are 160,499 observations available for employment, 110,876 for seeing a doctor last year, and 160,552 observations for a hospital visit last year.

Full time employment status, and indicators for whether the interviewee delayed care or did not get care last year for cost reasons are only available for 1997 and later: thus, results for these outcomes are based on 1997-2003 data. There are 89,748 observations available for full time employment and 90,070 for delaying or not receiving care.

Detailed insurance data are only available from 1999 onward. Thus, Table 1 is based on data for 1999-2003. The sample size for insurance coverage is 63,321. Sample sizes for some other outcomes are slightly smaller.

b. March Current Population Survey (CPS)

We use the March CPS files for 1996-2004. Individuals report their age in years as of the interview. Our sample includes people who are between 55 and 75 years of age: the final sample size is 211,927. Around age 65, the age distribution has about 9,600 people per year of age. Table B shows sample counts at each age, the mean percentages of people with health insurance and Medicare, the percentages who are working or retired at the interview, and average hours worked per week (set to 0 for non-workers).

c. Survey of Income and Program Participation (SIPP)

We use the 2001 SIPP for the analysis in Appendix Figures 3 and 4. This survey includes data for up to 36 months for each interviewee. Individuals report their birth year and birth month, and the calendar month of the interview. We use this information to construct age in months at the time of the interview, assuming that the interview was conducted at the end of the month.

Under this convention, people coded as age 65 and 0 months are between 2 weeks younger than their 65th birthday and 2 weeks older.

We combine the longitudinal data for each person into a file of person-month observations. We use all person-month observations in which the person is between the ages of 60 years and 0 months, and 70 years and 0 months. For the analysis of changes in status (Appendix Figure 3) we only use person months with reported data for the previous calendar month. The sample contains 9,500 individuals who are between 60 and 70 at some point in the survey.

Table C shows the number of person-month observations for each age, the mean percentages of people with health insurance and Medicare, the percentages who are working, and average monthly earnings (set to 0 for non-workers).

d. Hospital Discharge Files

We use hospital discharge files from California, New York and Florida 1992-2002. For the three files we have age in months at the time of admission. The files are a census of discharges from state regulated hospitals. People admitted to federally regulated hospitals such as VA hospitals are not included. Our sample includes people that are 60 to 70 years old. The number of discharges for California, New York and Florida are respectively 4,017,325, 3,121,721 and 2,793,547 for a total sample of 9,932,593. To estimate the hospital admission rates in the figures we constructed population denominators using the "Estimates of the Population of States by Age, Sex, Race and Hispanic Origin" from the U.S. Census Bureau. To get estimates of the population by age in months we interpolated linearly. The regressions in the paper are estimated off the log of admission counts rather than the rates.

Table A: Sample Sizes and Characteristics by Quarter of Age: NHIS Sample

Age Group	Number of Observations	Percentage of Age Group: With Health Insurance	With Medicare	Working
All	160,821	92.8	45.0	39.1
55.25	2,666	87.2	4.7	71.0
55.50	2,550	87.6	4.1	70.9
55.75	2,664	87.9	4.5	70.9
56.00	2,646	87.1	4.2	69.0
56.25	2,575	87.6	4.8	70.3
56.50	2,506	88.0	5.0	68.8
56.75	2,427	87.2	5.0	66.7
57.00	2,547	87.3	5.4	66.1
57.25	2,481	86.7	5.4	68.1
57.50	2,395	87.2	5.0	65.7
57.75	2,361	88.3	5.7	65.6
58.00	2,377	87.5	6.4	63.7
58.25	2,353	88.1	6.2	64.6
58.50	2,258	87.3	7.0	61.2
58.75	2,279	86.9	5.7	62.5
59.00	2,295	88.3	5.9	61.3
59.25	2,328	89.4	7.1	60.3
59.50	2,197	88.5	6.9	59.6
59.75	2,325	89.4	6.4	59.2
60.00	2,262	88.7	7.1	57.8
60.25	2,320	88.2	7.9	58.3
60.50	2,240	88.6	6.9	56.2
60.75	2,177	88.3	7.5	55.8
61.00	2,100	87.9	7.7	53.5
61.25	2,044	89.2	7.8	53.6
61.50	2,088	87.0	7.7	51.8
61.75	1,982	87.4	8.3	51.0
62.00	2,237	88.1	9.5	49.4
62.25	2,068	87.8	10.3	44.2
62.50	2,043	89.2	8.9	43.6
62.75	2,070	87.4	9.9	43.3
63.00	2,018	87.7	10.0	40.8
63.25	1,993	89.0	10.4	38.9
63.50	2,017	87.9	11.0	38.9
63.75	2,060	87.8	9.6	39.5
64.00	1,991	87.6	12.6	32.8
64.25	1,970	88.8	13.9	35.5
64.50	2,045	88.4	16.4	33.3
64.75	2,085	89.3	20.6	32.5
65.00	2,036	94.5	61.7	28.7
65.25	2,054	97.4	81.5	28.7
65.50	2,024	97.8	83.2	27.0
65.75	1,941	97.6	83.9	26.4
66.00	2,028	98.0	85.6	26.2
66.25	1,960	98.5	87.4	25.4

66.50	1,901	98.5	86.7	24.4
66.75	1,938	98.2	87.6	23.6
67.00	1,957	98.4	89.0	24.8
67.25	1,956	98.5	88.6	24.7
67.50	1,942	99.0	90.4	20.9
67.75	1,907	98.3	89.0	23.0
68.00	1,883	98.4	89.7	23.4
68.25	1,869	98.7	89.9	19.9
68.50	1,908	98.7	90.4	19.4
68.75	1,881	98.5	89.5	19.1
69.00	1,917	98.6	90.2	20.1
69.25	1,850	99.0	91.2	19.0
69.50	1,818	98.9	92.1	17.4
69.75	1,855	98.8	92.4	15.8
70.00	1,838	98.6	90.8	17.0
70.25	1,966	98.7	92.4	15.4
70.50	1,850	98.9	91.3	16.0
70.75	1,811	99.1	93.2	15.2
71.00	1,830	99.0	93.8	15.8
71.25	1,770	99.2	93.0	14.7
71.50	1,727	99.1	92.1	14.2
71.75	1,729	99.2	93.8	14.1
72.00	1,710	98.9	93.1	13.3
72.25	1,752	99.3	93.4	12.0
72.50	1,609	99.2	94.4	12.1
72.75	1,710	99.2	93.3	12.3
73.00	1,740	99.4	94.0	11.4
73.25	1,657	99.4	93.0	10.7
73.50	1,584	99.1	93.3	10.9
73.75	1,627	99.0	93.9	11.5
74.00	1,514	99.2	95.1	10.6
74.25	1,597	99.3	94.9	9.5
74.50	1,542	99.6	94.2	9.8
74.75	1,593	99.1	95.1	10.3

Note: unweighted tabulations from 1992-2003 National Health Interview Surveys.

Table B: Sample Sizes and Characteristics by Quarter of Age: CPS Sample

Age Group	Number of Observations	Percentage of Age Group: With Health Insurance	With Medicare	Working	Retired	Hours per Week
All	211,927	90.9	46.7	41.0	44.7	14.5
55	15,100	85.4	4.7	72.8	7.6	28.4
56	13,967	85.3	5.4	70.1	9.9	27.2
57	12,804	85.9	6.2	67.6	11.9	26.0
58	12,022	85.1	7.0	65.2	14.0	25.0
59	11,498	84.9	7.5	62.6	16.6	23.7
60	11,417	84.6	8.5	58.0	21.9	21.8
61	10,822	84.8	8.8	54.9	26.1	20.1
62	10,445	84.6	11.6	46.1	37.5	16.0
63	10,155	84.0	14.1	40.6	43.6	13.6
64	9,621	83.9	16.9	36.2	49.3	11.8
65	9,939	97.0	85.0	30.1	58.3	9.4
66	9,501	98.1	91.4	26.7	63.2	7.8
67	9,148	98.0	93.2	24.0	66.4	6.9
68	8,926	98.4	94.6	21.1	69.7	5.7
69	8,597	98.6	95.3	19.2	72.0	5.1
70	8,560	98.6	96.2	16.2	76.3	4.1
71	8,348	98.9	96.7	14.9	77.9	3.8
72	8,002	98.9	97.0	13.5	79.2	3.4
73	7,897	99.0	97.2	12.2	80.9	2.9
74	7,646	98.7	97.1	10.4	82.9	2.6
75	7,512	98.9	97.2	9.3	83.5	2.3

Note: unweighted tabulations from 1996-2004 March Current Population Surveys.

Table C: Sample Sizes and Characteristics by Month of Age: 2001 SIPP Sample

Age:		Number of	Percentage of Age Group:			Mean Monthly
Years	Months	Observations	With Health Insurance	Medicare	Working	Earnings
60	0	1,971	88.7	7.8	64.7	1946
60	1	1,977	88.7	7.7	65.0	2012
60	2	1,973	88.7	7.6	64.8	2025
60	3	1,981	88.7	7.3	64.1	2020
60	4	1,961	88.5	7.3	63.7	2014
60	5	1,918	88.6	7.2	64.0	1963
60	6	1,911	88.5	7.6	63.4	1813
60	7	1,905	88.6	7.7	63.2	1780
60	8	1,888	88.9	7.8	62.4	1818
60	9	1,856	89.7	7.5	61.6	1778
60	10	1,842	89.8	7.6	61.3	1783
60	11	1,799	89.3	7.7	60.9	1678
61	0	1,784	89.3	7.8	60.3	1702
61	1	1,791	89.1	7.9	59.9	1685
61	2	1,762	88.8	7.8	59.7	1713
61	3	1,756	88.3	8.2	58.9	1735
61	4	1,751	88.2	8.0	58.7	1677
61	5	1,718	88.7	8.0	58.0	1684
61	6	1,725	88.5	8.2	57.9	1624
61	7	1,731	89.0	8.0	58.1	1626
61	8	1,720	89.0	8.5	57.6	1600
61	9	1,726	89.7	8.7	57.1	1579
61	10	1,724	89.4	9.0	56.6	1597
61	11	1,703	89.7	9.5	55.3	1522
62	0	1,710	89.4	9.6	54.5	1491
62	1	1,701	88.9	9.8	54.0	1482
62	2	1,686	88.9	10.1	52.4	1338
62	3	1,681	88.7	10.5	51.6	1271
62	4	1,682	89.1	10.8	51.1	1304
62	5	1,670	89.2	12.2	49.6	1325
62	6	1,650	89.2	12.3	49.3	1255
62	7	1,662	89.5	12.8	47.8	1207
62	8	1,647	90.3	13.5	47.5	1223
62	9	1,670	89.9	13.3	47.8	1185
62	10	1,670	89.8	13.7	47.4	1199
62	11	1,655	89.4	13.8	47.4	1249
63	0	1,645	89.2	13.9	46.6	1189
63	1	1,635	89.2	14.1	45.9	1206
63	2	1,643	89.4	14.2	44.6	1130
63	3	1,626	89.1	15.4	44.1	1037
63	4	1,618	88.6	16.0	43.8	1000
63	5	1,624	88.6	15.9	43.8	1050

63	6	1,614	88.7	16.2	43.6	1025
63	7	1,603	88.7	16.3	43.2	1100
63	8	1,605	89.2	17.3	42.3	984
63	9	1,596	89.1	17.5	42.4	987
63	10	1,577	89.3	18.1	41.7	941
63	11	1,580	89.3	18.5	41.1	967
64	0	1,587	89.0	18.6	41.0	918
64	1	1,583	88.9	18.9	40.4	970
64	2	1,600	88.7	18.7	39.6	934
64	3	1,605	88.6	18.6	39.3	912
64	4	1,601	88.6	18.6	38.4	873
64	5	1,618	88.3	19.1	38.5	874
64	6	1,613	88.1	20.1	37.9	851
64	7	1,602	88.3	21.7	37.1	865
64	8	1,598	88.9	21.8	37.0	863
64	9	1,597	91.7	37.6	37.1	804
64	10	1,605	93.3	51.3	36.4	805
64	11	1,615	95.8	65.8	35.9	767
65	0	1,614	97.5	82.9	35.2	754
65	1	1,611	97.2	84.0	34.8	771
65	2	1,616	97.3	85.5	34.1	781
65	3	1,617	97.6	87.3	33.2	733
65	4	1,590	97.7	89.1	33.8	700
65	5	1,610	97.8	89.8	33.5	668
65	6	1,616	97.9	89.7	33.0	675
65	7	1,609	97.9	90.0	32.8	655
65	8	1,606	98.1	89.9	32.0	662
65	9	1,619	98.2	89.6	31.9	643
65	10	1,629	98.3	89.7	32.5	649
65	11	1,615	98.5	90.0	32.3	645
66	0	1,598	98.7	90.2	32.0	652
66	1	1,572	98.8	90.6	31.6	642
66	2	1,565	98.7	91.1	30.7	657
66	3	1,581	98.5	91.1	30.8	622
66	4	1,582	98.4	91.7	30.5	621
66	5	1,582	98.3	91.8	29.8	595
66	6	1,576	98.4	92.0	29.4	634
66	7	1,573	98.5	92.1	29.6	665
66	8	1,561	98.9	92.2	29.8	627
66	9	1,561	98.8	92.7	30.2	620
66	10	1,562	98.7	92.7	30.3	589
66	11	1,554	98.8	92.9	29.9	608
67	0	1,542	98.7	92.9	29.9	569
67	1	1,531	99.1	92.7	29.3	531
67	2	1,527	99.1	93.1	29.2	604
67	3	1,506	99.0	92.8	28.8	562
67	4	1,502	99.2	93.1	28.4	588
67	5	1,485	99.1	93.1	29.0	635
67	6	1,497	98.7	92.5	28.3	588

67	7	1,489	98.7	92.4	27.4	561
67	8	1,477	98.6	92.3	26.5	513
67	9	1,478	98.7	92.4	26.5	473
67	10	1,467	99.1	92.9	26.6	490
67	11	1,447	99.1	93.2	27.0	510
68	0	1,440	99.2	93.5	26.8	492
68	1	1,434	99.0	93.5	25.6	487
68	2	1,423	99.2	93.7	25.7	433
68	3	1,419	99.1	93.9	25.9	482
68	4	1,420	99.1	93.8	25.4	461
68	5	1,407	99.4	94.0	25.0	490
68	6	1,388	99.2	93.8	24.7	457
68	7	1,403	99.1	93.9	23.9	431
68	8	1,388	98.8	93.7	23.6	425
68	9	1,391	98.7	93.3	22.7	404
68	10	1,376	98.9	93.9	22.7	374
68	11	1,368	99.0	93.9	22.1	342
69	0	1,363	99.1	93.8	22.5	345
69	1	1,349	99.2	94.1	21.9	336
69	2	1,359	99.2	93.8	21.9	361
69	3	1,346	99.0	94.2	22.4	314
69	4	1,344	99.0	94.4	22.2	292
69	5	1,339	99.1	95.0	22.2	312
69	6	1,346	98.8	94.9	22.0	307
69	7	1,374	98.6	94.8	22.1	346
69	8	1,370	98.5	94.6	22.2	348
69	9	1,354	98.2	94.5	22.2	390
69	10	1,335	98.4	94.8	22.2	355
69	11	1,353	98.6	94.7	22.1	355

Note: unweighted counts and averages of person-month observations in 2001 SIPP.

Appendix Table 1a: Regression Discontinuities in Insurance Characteristics and Employment from Alternative Specifications

	On Medicare (1)	Any Insurance (2)	Private Coverage (3)	2+ Forms of Coverage (4)	Managed Care (5)	Employed (6)	Employed Full Time (7)
1. Overall Sample							
a. Basic RD	59.7	9.5	-2.9	44.1	-28.4	0.3	0.8
	(4.1)	(0.6)	(1.1)	(2.8)	(2.1)	(0.8)	(1.2)
b. No Controls	59.7	9.2	-3.8	43.9	-28.7	-0.2	0.3
	(4.0)	(0.6)	(1.2)	(2.8)	(2.1)	(0.8)	(1.2)
c. Short Window	53.5	8.8	-1.9	39.8	-26.3	-2.1	-2.6
(ages 63-67)	6.4	(0.8)	(1.8)	(4.3)	(3.5)	(0.7)	(1.0)
Local Linear Regression Estimates							
d. Expectation from Left	14.8	88.0	70.0	11.8	56.5	31.1	21.6
	(0.6)	(0.6)	(0.7)	(0.4)	(0.8)	(0.9)	(0.7)
e. Expectation from Right	64.7	95.8	66.2	50.6	29.5	28.9	19.4
	(0.9)	(0.3)	(0.6)	(0.9)	(0.8)	(0.6)	(0.7)
f. Difference	49.9	7.8	-3.8	38.8	-27.1	-2.2	-2.2
	(1.1)	(0.7)	(0.9)	(1.0)	(1.2)	(1.1)	(1.0)
2. White non-Hispanics with at Least Some College							
a. Basic RD	68.4	4.4	-2.3	55.1	-40.1	-1.6	-0.4
	(4.7)	(0.5)	(1.8)	(4.0)	(2.6)	(1.5)	(2.0)
b. No Controls	68.4	4.4	-2.4	55.0	-39.7	-1.7	-0.6
	(4.7)	(0.5)	(1.8)	(4.0)	(2.6)	(1.4)	(2.1)
c. Short Window	62.8	3.7	-4.3	48.6	-41.7	-3.5	-3.5
(ages 63-67)	(7.5)	(0.6)	(3.0)	(5.3)	(4.1)	(1.6)	(2.7)
Local Linear Regression Estimates							
d. Expectation from Left	6.7	95.1	85.8	9.8	68.5	39.8	25.4
	(0.6)	(0.6)	(0.9)	(0.5)	(1.2)	(1.3)	(1.0)
e. Expectation from Right	67.7	98.8	81.8	57.0	29.5	36.1	23.2
	(1.4)	(0.2)	(1.0)	(1.6)	(1.4)	(1.2)	(1.3)
f. Difference	60.9	3.7	-4.0	47.2	-39.0	-3.7	-2.2
	(1.6)	(0.6)	(1.4)	(1.7)	(1.8)	(1.8)	(1.6)
3. Minority Dropouts							
a. Basic RD	44.5	21.5	-1.2	19.4	-8.3	2.6	1.5
	(3.1)	(2.1)	(2.5)	(1.9)	(3.1)	(1.6)	(2.0)
b. No Controls	44.3	22.6	-1.3	19.9	-8.5	2.3	1.6
	(3.1)	(2.1)	(2.3)	(2.0)	(3.1)	(1.5)	(1.9)
c. Short Window	42.6	21.5	-2.2	16.4	-6.6	-0.7	-1.9
(ages 63-67)	(4.0)	(2.8)	(3.5)	(2.4)	(4.6)	(2.0)	(2.4)
Local Linear Regression Estimates							
d. Expectation from Left	20.7	65.0	28.7	12.2	34.5	21.1	14.6
	(1.5)	(2.6)	(2.1)	(1.1)	(3.2)	(1.7)	(1.4)
e. Expectation from Right	59.6	85.7	31.3	29.8	26.6	19.9	14.6
	(2.1)	(1.4)	(1.6)	(1.8)	(1.7)	(1.2)	(1.2)
f. Difference	38.9	20.7	2.6	17.5	-7.8	-1.2	0.0
	(2.6)	(2.9)	(2.7)	(2.1)	(3.6)	(2.0)	(1.9)

Notes: Basic RD estimates are reproduced from Tables 1 and 2. No controls estimates exclude any covariates. Short window estimates use restricted age window ($63 \leq age \leq 67$) and include linear controls for age, interacted with post-65 dummy, as well as other controls used in basic RD models. Local linear regression estimates are obtained using a triangular kernel and a bandwidth estimated by the rule of thumb procedure suggested by Fan and Gijbels (1996). Estimated standard errors in parentheses.

Appendix Table 1b: Regression Discontinuities in Hospital Admissions at Age 65 from Alternative Specifications

	All Admissions (1)	Bypass Anastomosis of Heart (2)	Joint Replacement Lower Extremity (3)
1. Overall Sample			
a. Basic RD	7.570	15.905	22.694
	(0.286)	(1.389)	(1.465)
b. Cubic Specification	8.791	18.686	25.284
	(0.435)	(1.904)	(1.748)
c. Short Window	7.822	17.900	26.071
(ages 63 - 66)	(0.492)	(2.286)	(1.912)
Local Linear Regression Estimates			
d. Expectation from Left	1109.230	709.031	761.223
	(0.318)	(0.959)	(1.014)
e. Expectation from Right	1117.240	726.190	784.924
	(0.074)	(0.891)	(0.722)
f. Difference	8.015	17.159	23.701
	(0.327)	(1.309)	(1.245)
2. White non-Hispanics			
a. Basic RD	7.742	16.174	23.163
	(0.325)	(1.437)	(1.596)
b. Cubic Specification	9.093	18.572	25.625
	(0.471)	(1.848)	(1.811)
c. Short Window	8.432	17.698	27.298
(Ages 63 - 66)	(0.559)	(2.143)	(1.903)
Local Linear Regression Estimates			
d. Expectation from Left	1080.850	695.236	746.000
	(0.337)	(1.039)	(1.012)
e. Expectation from Right	1089.300	712.359	770.403
	(0.109)	(0.881)	(0.846)
f. Difference	8.451	17.122	24.403
	(0.354)	(1.362)	(1.319)
3. Black non-Hispanics			
a. Basic RD	4.393	5.150	12.144
	(0.714)	(6.089)	(4.201)
b. Cubic Specification	5.660	6.667	19.412
	(0.997)	(7.076)	(5.329)
c. Short Window	4.160	6.572	18.078
(Ages 63 - 66)	(1.249)	(7.405)	(5.172)
Local Linear Regression Estimates			
d. Expectation from Left	899.255	395.877	490.107
	(0.592)	(4.023)	(3.117)
e. Expectation from Right	903.832	400.223	505.890
	(0.349)	(3.943)	(2.87)
f. Difference	4.577	4.347	15.783
	(0.688)	(5.633)	(4.237)
4. Hispanics			
a. Basic RD	9.465	18.974	26.395
	(0.547)	(5.618)	(4.691)
b. Cubic Specification	10.109	25.513	25.904
	(0.677)	(8.006)	(6.265)
c. Short Window	7.666	24.846	17.653
(Ages 63 - 66)	(0.773)	(9.896)	(7.003)
Local Linear Regression Estimates			
d. Expectation from Left	901.091	463.660	501.660
	(0.376)	(3.803)	(2.674)
e. Expectation from Right	909.842	486.620	524.268
	(0.342)	(2.182)	(3.271)
f. Difference	8.751	22.959	22.608
	(0.508)	(4.384)	(4.225)

Notes: Basic RD estimates and include linear and quadratic controls for age, interacted with post-65 dummy. Short window estimates use restricted age window (63<age<=66). Local linear regression estimates are obtained using a triangular kernel and a bandwidth estimated by the rule of thumb procedure suggested by Fan and Gijbels (1996). Estimated standard errors in parentheses.

Appendix Table 2: Characteristics of 65-66 Year Old Medicare Recipients

	Enrolled Parts A and B (1)	Covered by Supplemental Insurance: Any (including Medicaid) (2)	Private or Military (3)	Medicare-HMO (4)
1. Overall Sample	91.3	74.6	67.4	17.1
	(0.5)	(0.8)	(0.9)	(0.6)
Classified by Ethnicity and Education:				
White Non-Hispanic:				
2. High School Dropout	90.6	74.9	62.5	14.9
	(1.3)	(2.1)	(2.3)	(1.4)
3. High School Graduate	94.1	79.4	76.7	15.4
	(0.8)	(1.5)	(1.5)	(1.1)
4. At Least Some College	90.3	84.7	82.5	15.3
	(0.9)	(1.2)	(1.3)	(1.0)
Minority:				
5. High School Dropout	89.6	46.3	28.0	21.0
	(1.6)	(2.7)	(2.4)	(1.8)
6. High School Graduate	93.6	59.4	47.1	26.3
	(1.9)	(4.0)	(4.0)	(2.9)
7. At Least Some College	86.6	73.0	62.6	23.4
	(2.5)	(3.4)	(3.7)	(2.7)
Classified by Ethnicity Only:				
8. White Non-Hispanic	91.8	80.7	76.1	15.3
	(0.6)	(0.9)	(0.9)	(0.6)
9. Black Non-Hispanic (All)	90.6	58.1	43.9	18.9
	(1.5)	(2.8)	(2.9)	(1.8)
10. Hispanic (All)	90.5	53.1	37.3	27.0
	(1.6)	(2.8)	(2.8)	(2.1)

Note: Standard errors in parentheses. Estimates are obtained from samples of people between the ages of 65 and 66 who are on Medicare in pooled samples of 1999-2003 NHIS.

Appendix Table 3: Excess Monthly Changes in Employment and Insurance Status at Age 65

	Medicare (1)	Health Insurance (2)	Employment (3)
1. Overall Sample	12.7	1.9	0.2
	(0.6)	(0.3)	(0.1)
<u>Classified by Ethnicity and Education:</u>			
White Non-Hispanic:			
2. High School Dropout	12.9	3.4	0.4
	(1.3)	(0.6)	(0.2)
3. High School Graduate	14.5	1.8	0.3
	(0.7)	(0.5)	(0.2)
4. At Least Some College	14.3	1.3	0.2
	(1.2)	(0.3)	(0.2)
Minority:			
5. High School Dropout	6.2	1.8	0.0
	(0.7)	(0.5)	(0.2)
6. High School Graduate	10.0	3.1	0.2
	(0.4)	(0.5)	(0.4)
7. At Least Some College	9.1	1.9	-0.6
	(1.1)	(0.5)	(0.6)
<u>Classified by Ethnicity Only:</u>			
8. White Non-Hispanic	14.2	1.8	0.2
	(0.7)	(0.3)	(0.1)
9. Black Non-Hispanic (All)	8.7	2.5	-0.2
	(1.2)	(0.4)	(0.3)
10. Hispanic (All)	8.6	2.0	0.0
	(1.2)	(0.8)	(0.3)

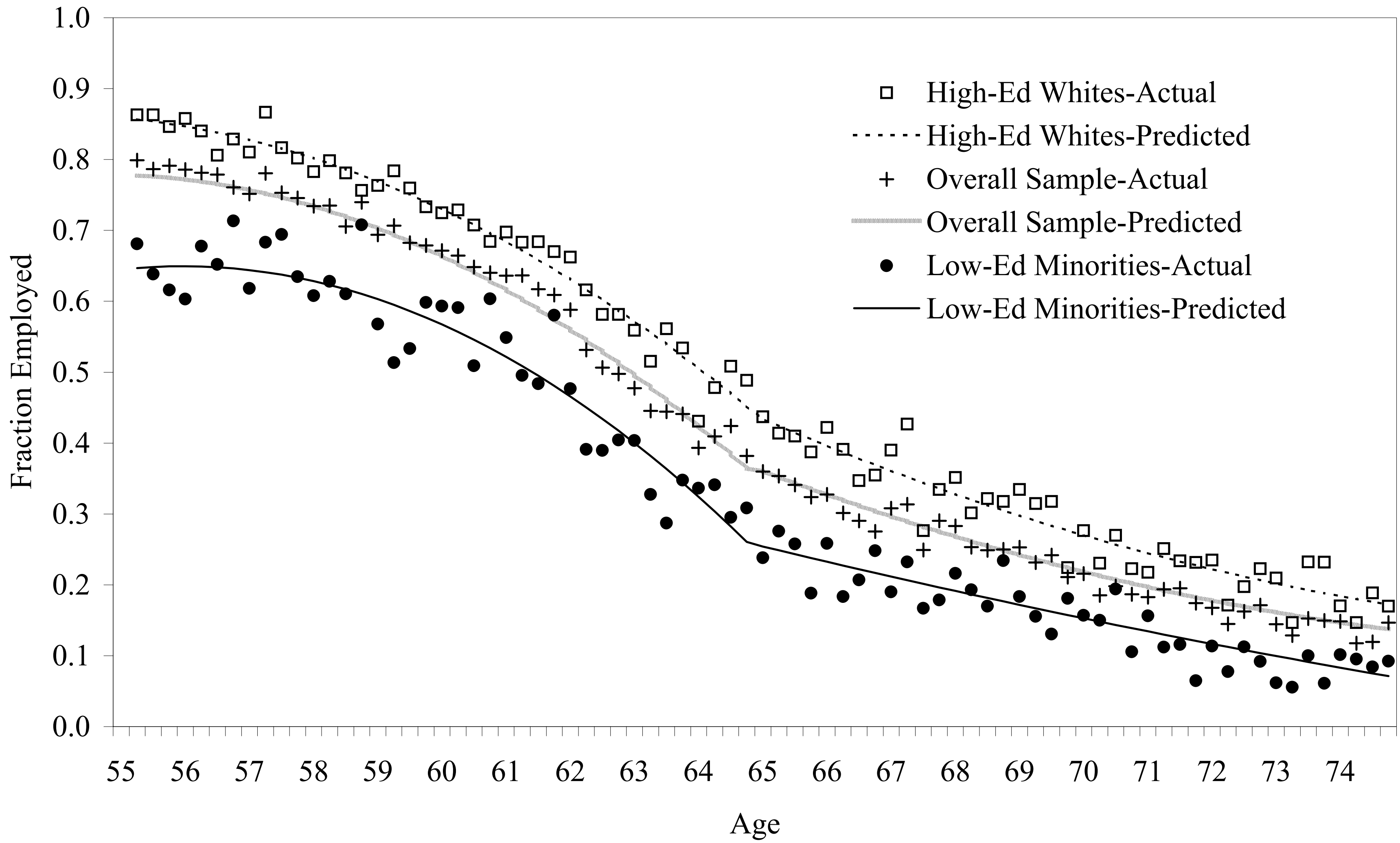
Note: Entries are estimated coefficients x100 of a dummy for age between 64.75 and 65 (in months). Model also include a quadratic in age, fully interacted with a dummy for age less than 64.75, and year dummies. Sample consists of 322,123 individual monthly changes in Medicare status health insurance status, and employment status, estimated for people in the 2001 SIPP who were between 55 and 71 when they entered the panel. Sample includes up to 35 monthly changes for 12,700 individuals. Standard errors (in parentheses) are clustered by age in months.

Appendix Table 4: Estimates of Discontinuities at Age 65 in Employment, Marriage, Family Income, and Mobility

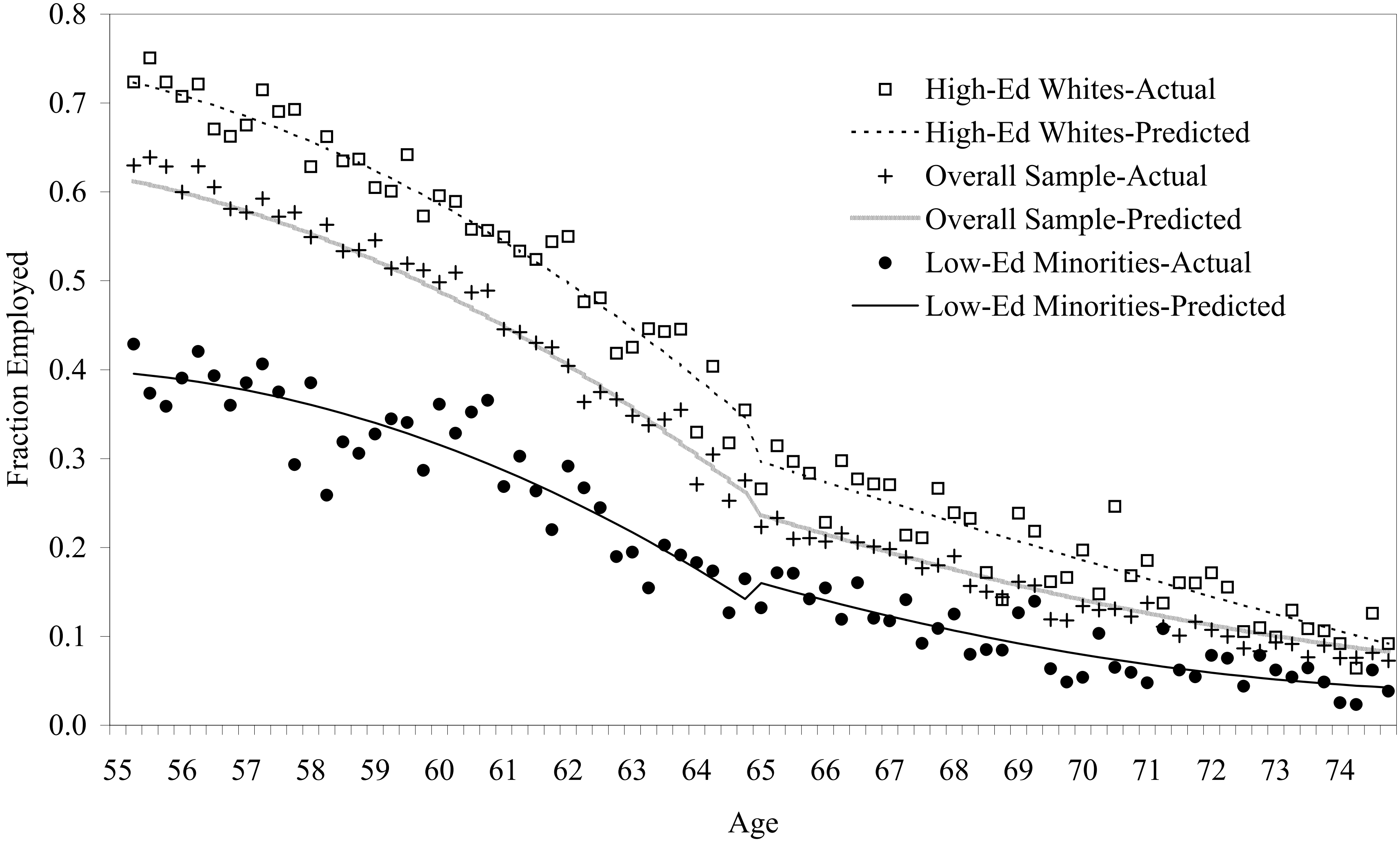
	Microdata from 1992-2001 NHIS: Employed (1)	Cell-Level Data From 1996-2002 March CPS: Employed (2)	Married Spouse Present (3)	Family Income <$10,000 (4)	Family Income <$15,000 (5)	Family Income <$20,000 (6)	Moved to New House in Past Year (7)
All	-0.44	-1.27	-0.91	-0.42	-0.78	-0.10	-0.48
	(0.96)	(1.01)	(0.70)	(0.45)	(0.63)	(0.63)	(0.33)
By Ethnicity/Education:							
High Education	-0.78	-1.08	-1.40	-0.64	-0.68	-0.09	-0.65
White Nonhispanic	(1.34)	(1.02)	(0.76)	(0.31)	(0.48)	(0.65)	(0.32)
High Education	-2.05	-1.15	-0.04	-0.76	-1.06	-0.42	-0.30
Minority	(2.64)	(2.19)	(1.78)	(1.10)	(1.39)	(1.36)	(1.38)
Low Education	0.07	-2.65	1.77	0.16	-0.35	-0.19	-0.20
White Nonhispanic	(1.71)	(1.45)	(1.91)	(1.18)	(1.82)	(1.58)	(1.02)
Low Education	3.50	-3.89	-0.86	1.64	-1.01	0.49	-0.27
Minority	(1.63)	(2.22)	(2.40)	(1.73)	(1.92)	(2.07)	(1.73)
By Ethnicity:							
White Non-Hispanics	-0.67	-1.14	-1.00	-0.54	-0.67	-0.06	-0.53
	(1.15)	(0.98)	(0.72)	(0.37)	(0.58)	(0.61)	(0.33)
Black Non-Hispanics	1.53	0.42	-1.25	1.60	-0.60	-1.07	0.12
	(2.05)	(1.90)	(2.48)	(1.67)	(1.77)	(2.00)	(1.13)
Hispanics	0.36	-2.86	0.74	-1.85	-2.68	-1.58	1.57
	(2.87)	(2.10)	(2.63)	(1.83)	(2.43)	(2.64)	(1.56)
By Gender:							
Men	1.12	-1.07	0.52	-1.37	-2.01	-1.19	-0.77
	(1.42)	(1.74)	(1.13)	(0.61)	(0.76)	(0.60)	(0.55)
Women	-1.83	-1.65	-2.25	0.44	0.30	0.88	-0.22
	(1.14)	(0.81)	(0.83)	(0.70)	(1.00)	(0.90)	(0.50)

Note: Table entries represent estimated coefficient of dummy for age 65 or older in models for outcome listed in column heading. Models in column (1) are fit to NHIS micro data; standard errors (in parentheses) are estimated assuming a cluster structure by age. Models in columns (2)-(7) are estimated using cell level data for ages 50-79 from March 1996-2002 CPS. Models include quadratic in age, fully interacted with a dummy for age 65 or older. Models in column (1) include same controls as models in column (3) of Table 3.

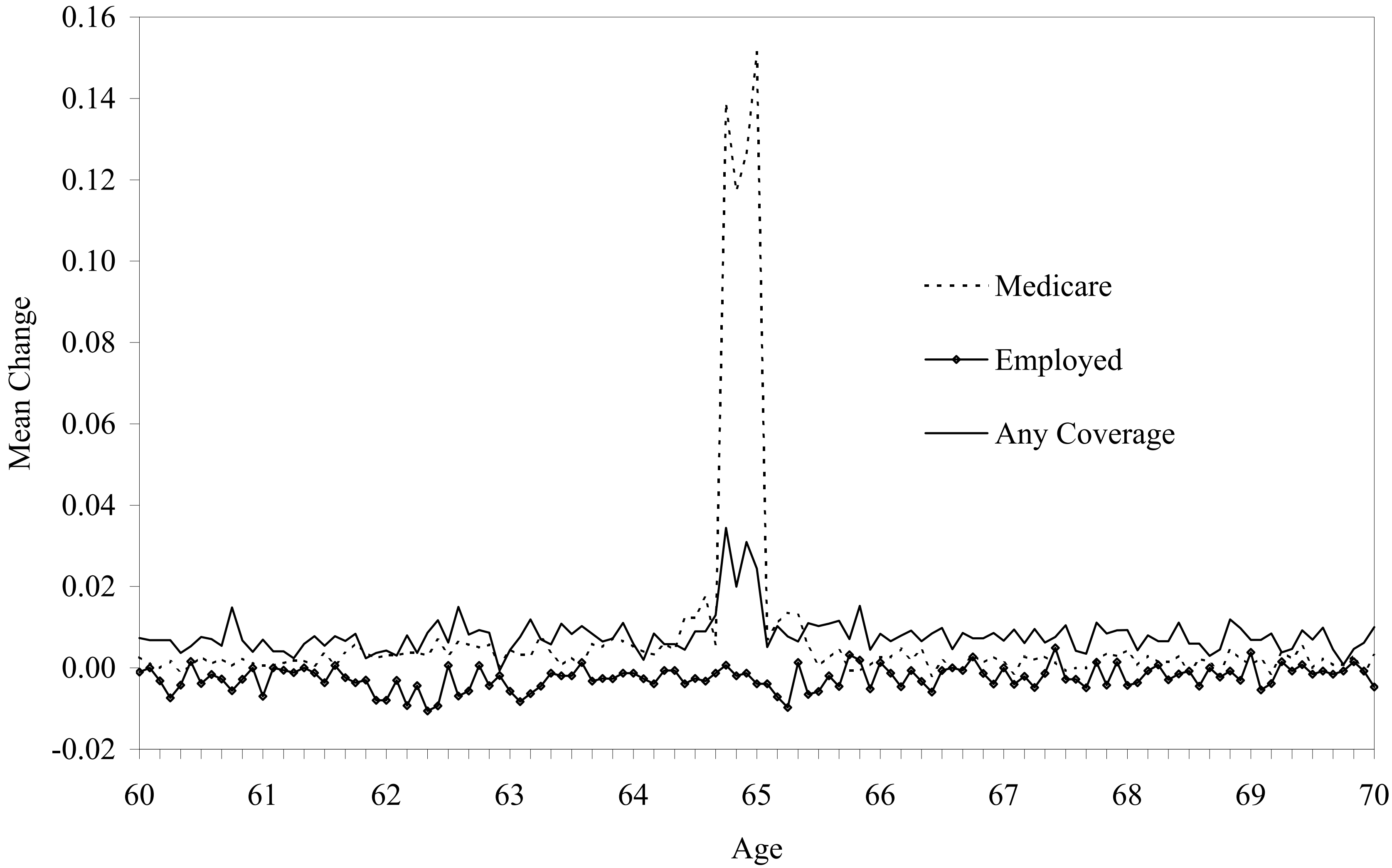
Appendix Figure 1: Employment Rates of Men by Age and Demographic Group



Appendix Figure 2: Employment Rates of Women by Age and Demographic Group



Appendix Figure 3: Monthly Changes in Employment and Health Insurance , 2001 SIPP Panel



Appendix Figure 4: Age Profile of Employment, 2001 SIPP (Person-month observations)