Labor Market Conditions and Medicare Utilization and Spending: Evidence from Microdata

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Several studies report that health outcomes improve and mortality declines when macroeconomic conditions deteriorate (e.g., Ruhm 2000, 2003, 2007; Charles and DeCicca 2008). These patterns could result from the direct effects of unemployment (if individuals who lose their jobs devote more time to health production) or indirect effects (if all persons residing in an area are affected by economic downturns). Using Medicare Current Beneficiary Survey (MCBS) data from 1999 through 2006, we test for indirect effects by examining the relationship between state unemployment rates and individual healthcare utilization among elderly Medicare recipients, a population with low rates of employment whose time and income are much less sensitive to local labor market conditions. We test this relationship using a richer set of utilization measures than prior research, and document evidence consistent with an indirect effect of recessions on utilization observed in inpatient care, outpatient care, and physician office visits.

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I. Introduction

Several studies report that mortality declines and health outcomes improve when macroeconomic conditions deteriorate (e.g., Ruhm, 2000, 2003, 2007; Charles and De Cicca, 2008; Miller et al., 2009). For working-age individuals in the labor force, these patterns could result from direct effects of unemployment. For example, individuals who lose their jobs may devote more time to health production. However, the finding that macroeconomic conditions impact mortality (and health outcomes) is not limited to working-age individuals in the labor force. For example, there is evidence that mortality rates for infants and the elderly decline when macroeconomic conditions deteriorate (see, e.g., Miller et al. 2009, Chay and Greenstone, 2003). Therefore, there appears to be an indirect effect of recessions on mortality and health outcomes. That is, economic downturns affect all persons residing in an area. In this paper, we provide evidence of one mechanism through which recessions have an *indirect* effect on health.

We focus our attention on the elderly because elderly Medicare beneficiaries are largely out of the labor force and always insured through Medicare. Since employment status does not change, we do not observe a corresponding change in the amount of time available to devote to health production. Similarly, health insurance for the elderly is not tied to an individual's current employer—the elderly retain Medicare coverage regardless of employment status. Therefore, we assert that any observed conditional correlation between the macroeconomy and health and mortality among elderly Medicare beneficiaries can be attributed to the indirect effect of recessions.

In this paper we are able to test one mechanism which might underlie the observed indirect effects—increased healthcare utilization. This is motivated by the following observation concerning spending and utilization in the most recent recession. Although per capita spending fell overall (Cauchon, 2010) and there was deceleration in the growth of spending by households, private business, and the Medicaid program (Hartman et al. 2010, p. 152), Medicare spending and utilization grew. Medicare spending grew

by 8.6% in 2008, up from 7.1% growth in the prior year (Hartman et al., 2010), and there were increases in inpatient admissions and outpatient visits. Total Medicare outpatient visits grew by 4.4 percentage points in 2008, representing the "largest single-year increase in the last 10 years" (MedPAC, 2010, p. 81) while inpatient admissions increased by 1.3 percentage points, and these trends hold even when considered on a per capita basis.

To test whether recessions are correlated with increased healthcare utilization among the elderly, we acquired restricted use Medicare Current Beneficiary Survey (MCBS) data for the years 1999-2006. The MCBS contains rich information on healthcare utilization as well as beneficiary demographic characteristics, labor and income, and self-reported measures of general health. We first confirm that recessions are likely to have only an indirect effect on the health and healthcare of elderly Medicare beneficiaries. We show this by documenting no statistically significant relationship between the likelihood an individual is employed, or has supplemental health insurance coverage, and state unemployment rates, even when we allow the relationship between state macroeconomic conditions and the outcome of interest to be more flexible.

We next quantify the indirect effect of recessions on self-reported general health. We show that among elderly Medicare beneficiaries, general health *worsens* during recessions. This is consistent with recessions reducing mortality, which brings down the average health of the elderly population. A remaining question in the literature is what mechanism underlies reduced mortality—especially for the elderly. We test whether healthcare use increases during recessions. We document an increase in the likelihood of having an inpatient stay as well as a rise in the number of outpatient procedures (conditional on having any). We observe smaller effects for physician office visits.

II. Background

The previous literature provides evidence consistent with both direct effects of recessions and indirect effects. Individuals who lose their jobs—or who are in families where a worker loses his or her job—are directly affected by recessions. The expected effect of recessions on health and healthcare use for those directly impacted is ambiguous. When out of work, individuals have more time to devote to health production, so increased exercise or home-cooked healthy meals may improve health outcomes. On the other hand, households have fewer resources following job loss and many lose access to employer-sponsored health insurance, which may decrease healthcare utilization.

When considering working-age individuals, findings in the previous literature are consistent with recessions reducing mortality. For example, Ruhm (2000) documents that a one percentage point increase in the unemployment rate leads to a .54 percent decrease in mortality, a finding recently corroborated by Miller et al. (2009).[1] However, findings concerning the relationship between recessions and general health are mixed. Ruhm (2003) provides evidence of countercyclical variation in physical health among prime-age individuals. In contrast, Charles and DeCicca (2008) document that both mental health and weight-related health decline as local unemployment rates rise. Thus, the direct effect of recessions on health is that recessions improve longevity, with mixed effects on health.

In contrast, the estimated direct effect of recessions on healthcare use is negative. Using microdata, Ruhm (2000, 2003) finds evidence that utilization is procyclical, and Lusardi et al. (2010) document the reduction of routine non-emergency medical care during the most recent recession. This evidence is all consistent with the direct effect of a recession reducing healthcare use.

[1] Miller et al. (2009) find that a one percentage point increase in the unemployment rate leads to a .43 decline in the mortality rate.

The previous literature also offers evidence of an indirect effect of recessions.[2] That is, all persons residing in an area are affected by economic downturns. Chay and Greenstone (2003) document that pollution declined after plants closed as a result of the recession of 1981-1982, and there was a corresponding decline in infant mortality rates. Another mechanism by which recessions may have an indirect effect is through fewer instances of motor vehicle accidents. During times of lower economic activity, fewer cars are on the road during rush hour and there are fewer auto accidents. This has been shown most recently by Miller et al. (2009), who note that the decline in auto accidents is not just observed among the working-age population but in fact spans all age groups, including the elderly who are largely non-working.

There is additional evidence of an indirect effect of recessions on mortality that cannot be explained by these narratives of reduced pollution or lighter traffic. Miller et al. (2009) document that mortality is countercyclical for individuals of *all* age groups, not just working-age persons. Ruhm (2007) documents countercyclical coronary heart disease mortality rates for the elderly. Studies also provide suggestive evidence of a potential mechanism underlying these results—increased healthcare utilization. Using aggregate data for the elderly from the Dartmouth Atlas of Healthcare Project, Ruhm (2007) studies state-level discharge patterns while McInerney and Mellor (2010) examine discharges at the level of the hospital referral region. Together, these papers provide evidence that for certain procedures, inpatient surgical discharges are countercyclical. In this paper, we contribute to this literature by documenting patterns of use among a broader set of medical utilization. In addition to inpatient care, we also study outpatient procedures and physician office visits.

[2] Dehejia and Lleras-Muney (2004) document a countercyclical pattern in infant health outcomes. They attribute part of these improvements to better prenatal care taken by mothers during recessions. If expecting mothers would have taken better care of themselves during recessions even if they were not pregnant, then this would be a by-product of the direct effect of recessions. Alternatively, the results can be viewed as additional evidence of the indirect effect of recessions.

In this paper, we focus on the indirect effects of the macroeconomy on medical utilization in an attempt to provide additional evidence of a mechanism behind the indirect effect of recessions on health. The indirect effects of declining macroeconomic conditions might make healthcare easier to acquire for the insured. That is, with more individuals losing health insurance, physicians may have more time for their insured patients. To test for the presence of indirect effects of recessions on healthcare use, we will focus on detailed measures of healthcare utilization among the elderly. We choose to focus on elderly Medicare recipients because these individuals do not face a change in the amount of time available, income, or insurance when the unemployment rate rises. Fewer elderly individuals are working, so the amount of time to devote to health production is unchanged for this population, and income to devote to health production is also relatively unchanged. Elderly Medicare beneficiaries do not lose health insurance when macroeconomic conditions deteriorate, so the cost of healthcare does not change either. Thus, any increase in utilization among Medicare beneficiaries as a function of a decline in macroeconomic conditions is a result of indirect effects.

III. Empirical Strategy

First, we confirm that recessions have only an indirect effect on the elderly. We regress the state unemployment rate on indicators for employment status and the presence and type of supplemental insurance, as in equation (1).

$$(1)\quad EMPLOYED_{i,s,t} = \alpha + \beta UNEM_{s,t} + \lambda X_{i,s,t} + \tau_{s,t} + \gamma_s + \gamma_t + \varepsilon_{i,s,t}$$

The coefficient of interest is β, which captures the conditional correlation between state unemployment rates and employment (or supplemental insurance coverage). A finding that β is indistinguishable from zero will be consistent with recessions having only an indirect effect for the elderly. We also control for individual characteristics that might impact the likelihood an individual works (or has supplemental

insurance coverage), such as age, gender, marital status, level of education, and household income. We include state fixed effects to capture permanent differences in employment among the elderly (or supplemental insurance coverage) across states, and year fixed effects to capture nationwide changes over time. We also include state-specific time trends to control for any changes within a state over time.

We then allow the relationship between macroeconomic conditions and employment to take on a more flexible form. In addition to including a linear measure of the unemployment rate, we also include the squared term, as in equation (2).

$$(2)\quad EMPLOYED_{i,s,t} = \alpha + \beta_1 UNEM_{s,t} + \beta_2 UNEM^2_{s,t} + \lambda X_{i,s,t} + \tau_{s,t} + \gamma_s + \gamma_t + \varepsilon_{i,s,t}$$

We next document the indirect effect of recessions on self-reported general health, as in equations (3) and (4), where we now include controls for an individual's employment status and supplemental insurance coverage.

$$(3)\quad HEALTH_{i,s,t} = \alpha + \beta UNEM_{s,t} + \theta_1 EMPL_i + \theta_2 PRIV_i + \theta_3 MCAID_i + \lambda X_{i,s,t} + \tau_{s,t} + \gamma_s + \gamma_t + \varepsilon_{i,s,t}$$

$$(4)\quad HEALTH_{i,s,t} = \alpha + \beta UNEM_{s,t} + \beta_2 UNEM^2_{s,t} + \theta_1 EMP_i + \theta_2 PRIV_i + \theta_3 MCAID_i + \lambda X_{i,s,t} + \tau_{s,t} + \gamma_s + \gamma_t + \varepsilon_{i,s,t}$$

The focus of this paper is the relationship between macroeconomic conditions and healthcare utilization, so we examine several measures of utilization of inpatient, outpatient, and office visit care. Consistent with the prior literature, we present baseline estimates, as in equation (3). We then enrich specification (3) by including a series of variables measuring an individual's existing chronic conditions. Those individuals diagnosed with chronic conditions are likely to use more medical services, and if health declines—and the presence of chronic conditions rises—during difficult economic times, then estimates of the effect of unemployment from models which omit measures of health would be biased upwards. In contrast, if general health—and the presence of chronic conditions—is procyclical—then omitting these controls would result in a downward bias on our estimate of β. Previous studies of the relationship

between macroeconomic conditions and utilization have not included controls for the presence of chronic conditions.[3]

We observe several detailed measures of utilization that allow us to pinpoint,to an even finer degree how changes in macroeconomic conditions impact specific measures of utilization. We examine changes to both the extensive and intensive margins. We first test for an impact over the extensive margin and document whether the individual has any inpatient stay. We then show, conditional on having an inpatient stay, what happens to the number of inpatient stays, thus examining the intensive margin. We conduct analogous exercises for outpatient care and physician office visits.

We also add to the prior literature by allowing the relationship between the unemployment rate and our observed measures of utilization to be even more flexible. We include the square of the unemployment rate to allow the relationship between macroeconomic conditions and utilization to be nonlinear, as in equations (2) and (4).

IV. Data

To document the indirect effect of recessions on healthcare utilization, we acquired restricted use data from the Medicare Current Beneficiary Survey (MCBS) Cost and Use files from the Centers for Medicare and Medicaid Services. The MCBS is a nationally representative survey of Medicare beneficiaries.[4] Researchers receive information both from the survey and from events files. Survey responses provide us with detailed information about the respondent's demographic and household characteristics, residential

[3] Studies which quantify the relationship between measures of utilization and local unemployment rates for the elderly rely on aggregate discharge data, which do not contain details about the underlying conditions for those who receive the care (Ruhm (2007); McInerney and Mellor (2010)).

[4] Although the MCBS has a longitudinal component, we treat the data as a repeated cross-section. Individuals are interviewed three times a year over four years.

location, general health, the presence of chronic conditions, aggregate usage information for inpatient, outpatient, and physician office care, and measures of preventive care such as flu shots and mammograms. From the events files we construct detailed measures of the type of inpatient and outpatient care an individual receives in a given year.

We use the MCBS for the years 1999 through 2006. We restrict our sample to elderly beneficiaries who live in the community (i.e., not in a facility), and we focus our attention on individuals enrolled in fee-for-service Medicare for the entire calendar year. Since we observe detailed information about health insurance coverage, we also restrict attention to those fee-for-service beneficiaries who have both Medicare Part A and B coverage, since some of the outcomes we explore are covered only under Medicare Part B (i.e., outpatient care, physician office visits, different types of preventive care). We merge annual state unemployment rates to the MCBS data; unemployment data were acquired from the Bureau of Labor Statistics Local Area Unemployment Statistics program. However, state of residence is missing for 1,282 observations in the MCBS, so we exclude these individuals from the analysis. We also restrict attention to those states with 100 or more observations in the sample between 1999 and 2006, which reduces the sample by 47 individuals.[5] Additional details on sample construction are in Appendix A.

We present descriptive statistics for key dependent and independent variables in Table 1. These descriptive statistics support recessions having an indirect effect on the elderly because employment rates are low and supplemental insurance coverage is high. Only 10 percent of the Medicare beneficiaries work. Approximately three-quarters of respondents purchase private Medigap coverage with the balance split roughly evenly between those who are dual-eligible for Medicaid and Medicare and those who do not have any supplemental coverage.

[5] Results are not sensitive to this sample restriction.

Nearly twenty percent of our sample has at least one inpatient stay, and those who have at least one inpatient stay have an average of 1.6 stays per year. Far more individuals have outpatient visits, with nearly seventy percent of the sample reporting at least one outpatient visit. Of those who have outpatient visits, they have about five, on average. Roughly 85% of the respondents reported having an office visit during the year, and conditional on going to the doctor, beneficiaries report nearly eight visits per year.

V. Results

The Indirect Effect of Recessions on Medicare Beneficiaries

We have asserted that examining the relationship between state unemployment rates and health and healthcare use among the elderly will illustrate the indirect effect of recessions. This claim rests on the assumption that the time and resources available to the elderly to devote to health production are not impacted by a recession. This would be violated if, for example, in response to economic downturns elderly individuals seek employment, drop private supplemental coverage, or are more likely to become dual-eligible for both Medicare and Medicaid. In Table 2, we examine this in detail. In columns (1) and (2) we examine the relationship between the state unemployment rate and the probability an individual is employed. In column (1), we present marginal effects from probit models where the independent variable of interest is the state unemployment rate. The coefficient estimate is small and not statistically significant. In column (2), we allow this relationship to be even more flexible and also include the square of the state unemployment rate. We still observe no statistically significant relationship. Confirming that elderly Medicare beneficiaries are no more or less likely to work during recessions is consistent with any subsequent findings representing the indirect effect of recessions because we find no employment-related change in the amount of time available to devote to health production.

To provide further support for our results illustrating the indirect effect of recessions, we also test whether supplemental insurance coverage is related to state unemployment rates. In columns (3) and (4) we examine the likelihood of having private Medigap coverage, and observe no statistically significant change in the likelihood of having this supplemental insurance. If recessions cause an individual's resources to dwindle, we might expect to see more individuals become dual-eligible, that is, eligible for both Medicare and Medicaid. We explore this issue in columns (5) and (6) and again observe no statistically significant relationship between the state unemployment rate and the likelihood of dual eligibility. Thus, in addition to observing no change in employment status—or time available to devote to health production—we observe no change in the presence of supplemental insurance during recessions, either. We now quantify the indirect effect of recessions on health and healthcare.

Recessions and General Health

In Table 5, we present the conditional correlation between measures of general health and macroeconomic conditions. We measure general health in three ways: the likelihood that self-reported general health is "fair" or "poor", the likelihood that the respondent's health limited his or her social life within the past month, and an indicator for respondents who note that their health has worsened compared with one year ago. In column (1), we document no statistically significant relationship between the state unemployment rate and whether an individual's self-reported health is poor or fair. In column (2), we allow the relationship between the state unemployment rate and this measure of general health to be more flexible and we also include the square of the unemployment rate. When we allow for this more flexible relationship, we now observe that when macroeconomic conditions improve, self-reported general health ***worsens***. In columns (3) through (6) we observe the same pattern of results for our two other measures of general health.

At first, these findings seem to stand in contrast with the extant literature which finds a countercyclical relationship between state unemployment conditions and general health (see, e.g., Ruhm (2003), Ruhm (2007)). However, this may be consistent with the countercyclical relationship between mortality and state unemployment conditions, especially for the elderly (see, e.g., Ruhm (2000), Miller et al. (2009)). If increased longevity among the elderly means more years lived in poorer health, then the average general health of the remaining population declines. Our estimates can be thought of as the reduced form relationship between state unemployment rates and general health, where higher unemployment is found to reduce mortality. In the next section, we examine one potential mechanism through which recessions may reduce mortality—increased healthcare utilization.

Recessions and Healthcare Use

One mechanism through which we might see increased longevity is through increased use of healthcare. We examine changes on the extensive and intensive margins separately for utilization in inpatient, outpatient, and physician office settings. In Table 4, Panel A reports the coefficients describing the conditional correlation between the state unemployment rate and measures of inpatient care.[6] In columns (1)-(3), we examine the extensive margin, and whether increased unemployment results in a higher likelihood of receiving inpatient care. Column (1) reports results of the baseline model used in the previous literature, and we find that among elderly Medicare beneficiaries, when the unemployment rate increases by one percentage point, individuals are one percentage point more likely to have an inpatient

[6] In results not shown, we exploit the detailed geographic information available on the restricted use MCBS and test the relationship between the county unemployment rate and measures of utilization. Results are qualitatively similar, though effect sizes are smaller, when we regress measures of utilization on county unemployment (with state fixed effects). Once we control for permanent differences across counties, the change in the county-level unemployment rate over time has a smaller impact on utilization. The results for inpatient use retain statistical significance, and the results for outpatient use lose significance because the coefficients fall in size—the standard errors also get smaller. We confirm that it is not the case that permanent differences across counties drive all of the results presented thus far in this paper. In specifications not shown, when we include county fixed effects and examine the state unemployment rate, the main qualitative results persist. All results available upon request.

stay. This corresponds to a roughly 5 percent increase in the likelihood of having an inpatient stay, from a mean of 20 percent of the sample having inpatient stays. In column (2), we add controls for various chronic conditions and the coefficient on the unemployment rate becomes even larger. In column (3), we also include the square of the state unemployment rate and see that the conditional correlation between the unemployment rate and the likelihood of having any inpatient stay is increasing, but at a decreasing rate.

Columns (4) through (6) of Panel A look instead at the intensive margin where now the dependent variable is the log of the number of inpatient stays, conditional on having any inpatient stay.[7] When we also include the squared term in column (6), we observe that the relationship between state unemployment rates and the number of inpatient stays is *decreasing* at an increasing rate. This is consistent with changes in the macroeconomy impacting the extensive margin for hospital stays. Although individuals may be more likely to have an inpatient stay, the stock of individuals having inpatient stays includes individuals who have less severe conditions—and fewer inpatient stays.

In Panel B, we examine outpatient procedures. We find no evidence that the likelihood of having any outpatient procedure is countercyclical—in columns (1) through (3) the coefficients are small and not statistically significant. However, the standard errors are large enough that we cannot reject effects of substantial magnitude. In columns (4) through (6), we explore the intensive margin. Once we include controls for the presence of chronic conditions and the square of the unemployment rate, we document a positive and statistically significant relationship between the state unemployment rate and the log of the number of outpatient visits (conditional on having at least one).

[7] In results not shown, we also examine results for the number of inpatient, outpatient, and physician office visits using Tobit, poisson, and negative binomial models. Results are qualitatively similar. Results available upon request.

In our baseline specifications, we observe a countercyclical relationship for both inpatient and outpatient visits, and we now turn to physician office visits. In Panel C, we observe no statistically significant relationship between the state unemployment rate and the propensity to go to the doctor, or the frequency of those visits. However, as before, the standard errors are large enough that we cannot reject effects of substantial magnitude.

Heterogeneous Effects

The results in Table 4 are presented for the full sample of Medicare fee-for-service beneficiaries who have both Part A and B coverage. The sample includes individuals who have private supplemental coverage, Medicaid (in addition to Medicare), or no supplemental insurance. We would expect the effects of economic downturns to be strongest among those elderly beneficiaries who have private supplemental coverage (and thus face lower costs associated with additional healthcare), so we next test for the presence of heterogeneous effects among this subsample.[8]

In Table 5, we present results from our preferred specifications for the subsample of Medicaid fee-for-service recipients who have private Medigap insurance. For comparison purposes, we present the analogous results from Table 4 in columns (1), (3), (5), and (7). In Panel A, we present results for inpatient stays. Medicare beneficiaries having supplemental private coverage face the lowest amount of cost-sharing. Thus, we would expect that the relationship between recessions and inpatient stays would be even larger among this subset of Medicare recipients, which we find to be the case over the extensive margin (see columns (2) and (4)). We observe a different pattern for the intensive margin, or, the number of inpatient visits conditional on having any inpatient visit. Among the entire fee-for-service sample, we observed a decline in the number of inpatient visits, which was consistent with more individuals being

[8] We exclude dual-eligible recipients because these Medicare beneficiaries have very different baseline levels of health and very different patterns of utilization than the general Medicare population.

induced to have an inpatient stay and the marginal patients having fewer inpatient stays, bringing the total of stays down. When we now look only among those fee-for-service beneficiaries who also have private supplemental insurance, we no longer observe that decline in total number of inpatient stays. This suggests that more people are having inpatient visits, but there is no corresponding decline in the average number of visits a patient is having. This is not surprising since individuals who have private supplemental insurance face the lowest amount of cost sharing.

In Panel B, we examine outpatient procedures. We observe no statistically significant relationship between the unemployment rate and the likelihood of having an outpatient procedure, even when we include unemployment and its quadratic. However, we do observe an increase in the number of outpatient procedures, conditional on having at least one outpatient procedure. This is consistent with recessions increasing outpatient utilization along the intensive margin.

In Panel C, we turn to receipt of physician office visits. When we include unemployment and its square, as in column (4), there is an increase in the likelihood of a physician office visit, or a change over the extensive margin. In column (8), we examine the intensive margin, that is, the relationship between the state unemployment rate and the number of office visits conditional on having any. We document no change in the number of visits. It is important to note that the coefficient on the linear unemployment term is negative, which is what we would expect with changes over the extensive margin if those beneficiaries who are now induced to go to the doctor make fewer visits per year than beneficiaries who go to the doctor every year.

Describing Utilization

In Tables 4 and 5, we documented that medical care utilization increases in response to rising unemployment rates. In Table 6 we now attempt to illustrate more fully what types of medical care are

reflected by this increased utilization. The results in Table 6 present the reduced form relationship between measures of local macroeconomic conditions and different forms of utilization. In Panel A, we consider measures of inpatient and outpatient use. Columns (1) and (2) examine the likelihood of having one of the thirty most common elective inpatient procedures, as defined by CMS, conditional on having any inpatient stay.[9] A positive coefficient on the unemployment rate would be consistent with elective inpatient stays arising as a result of macroeconomic conditions. As shown in columns (1) and (2), conditional on having an inpatient stay, there is no statistically significant relationship between the unemployment rate and the likelihood of having one of the top 30 elective procedures. This suggests that inpatient stays induced by macroeconomic conditions are not necessarily for these top 30 elective procedures. In future work, we will explore the events files in the MCBS even further to better document what type of inpatient care is being induced by changes in macroeconomic conditions.

We now turn to the common outpatient procedures of cataract surgery, endoscopy, and colonoscopy in columns (3) through (8). Conditional on having any outpatient procedure, we observe no relationship between the unemployment rate and the propensity to have one of these three procedures. As for inpatient utilization, in future work we will attempt to find additional ways to characterize the type of outpatient care received.

In Panel B, we turn to procedures that would be prescribed or administered in the course of a physician office visit: flu shot, mammogram and pap smear (for women), and digital rectal exam (for men). These are measures of utilization that have been examined before in the literature (see, e.g., Ruhm, 2000). Consistent with the prior literature, we find no relationship between the unemployment rate and these measures of utilization. We document increased utilization among inpatient stays, outpatient procedures,

[9] Top 30 procedures for 2005 and top 31 procedures for 2006 available at this link. https://www.cms.gov/HealthCareConInit/02_Hospital.asp. Viewed February 25, 2011.

and physician office visits, but find no evidence of trends related to what type of care individuals receive. Further work is needed to better characterize the types of increased utilization we observe.

VI. Conclusion

In this paper, we provide additional evidence of an indirect effect of recessions on health and healthcare utilization by focusing on the relationship between state unemployment rates and self-reported measures of health and detailed measures of healthcare utilization for the elderly. We first show that employment and supplemental insurance coverage for the elderly are not correlated with state unemployment rates. We observe a relationship between state economic conditions and self-reported measures of general health, consistent with recessions reducing mortality. If mortality declines during recessions, but individuals have poorer health as a result of the increased longevity, we would expect to see average health outcomes decline during recessions as the stock of individuals becomes less healthy.

We then document one mechanism that might be underlying this relationship—increased healthcare utilization. We first observe increased utilization of inpatient care among all elderly Medicare fee-for-service beneficiaries. We test for the presence of heterogeneous effects by examining the subsample of Medicare recipients who purchase private supplemental insurance. In general, we find the effects are strongest among those Medicare beneficiaries who purchase supplemental private insurance, which is not surprising since these beneficiaries face the lowest level of cost sharing. Among this sample, we document increased outpatient visits and physician office visits.

We then attempt to document what types of utilization individuals are acquiring as a result of this increased utilization brought about by recessions. We examine common elective inpatient procedures, common outpatient procedures, and tests or preventive care that would be administered or prescribed in the course of a routine office visit. We observe no relationship between the unemployment rate and the

likelihood of having one of these eight types of procedures. We leave further exploration of what types of additional procedures individuals are having as a route for further research.

We document the presence of an indirect effect of recessions on health and offer suggestive evidence for the mechanism underlying this phenomenon, increased healthcare utilization. In related work, we will attempt to explore potential mechanisms that would cause Medicare beneficiaries to *increase* utilization during times of recession. One possibility we will explore is the potential for supplier-induced demand. That is, as a physician's patient base loses those covered by private employer-sponsored insurance coverage during recessions, we might observe physicians being more likely to substitute care towards insured Medicare beneficiaries.

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Table 1: Sample Means

	Mean (Standard Deviation) [Median]
State Unemployment Rate	4.952 (1.061)
=1 if employed	.103
=1 if have Private Medigap coverage, no Medicaid	.757
=1 if have Medicaid coverage	.121
=1 if no supplemental coverage	.122
=1 if in fair or poor health	.222
=1 if health limited social life in past month	.134
=1 if health condition worse than one year ago	.222
=1 if have an inpatient stay	.197
# of inpatient stays, conditional on having at least one	1.620 (1.123) [1]
=1 if have outpatient procedure	.710
# of outpatient procedures, conditional on having at least one	5.200 (5.846) [3]
=1 if have any physician office visits	.863
# of physician office visits, conditional on having at least one	7.788 (6.463) [6]
=1 if have top 30 elective inpatient procedure, conditional on any inpatient	.167
=1 if cataract surgery, conditional on any outpatient visit	.026
=1 if colonscopy, conditional on any outpatient visit	.030
=1 if endoscopy, conditional on any outpatient visit	.016
=1 if flu shot, conditional on any physician office visit	.738
=1 if mammogram, conditional on any physician office visit (if female)	.522
=1 if pap smear, conditional on any physician office visit (if female)	.329
=1 if digital rectal exam, conditional on any physician office visit (if male)	.546
N	55,020

Table 2: Relationship Between State Macroeconomic Conditions and Employment, Medigap Coverage, and Dual Medicare-Medicaid Eligibility

	=1 if Employed		=1 if Have Medigap Coverage		=1 if Dual Eligible	
	(1)	(2)	(3)	(4)	(5)	(6)
State Unemployment Rate	-.004 (.004)	.006 (.017)	.006 (.010)	-.011 (.034)	-.001 (.001)	-.0001 (.0031)
State Unemployment Rate^2		-.001 (.002)	--	.002 (.003)	--	.0001 (.0003)
N	54,136		54,126		54,136	
Mean of Dependent Variable	.103		.758		.121	
p-value for test of joint significance		.458		.712		.524

Each regression includes age, age-squared, controls for educational attainment (no high school, some high school, some college, college or more, high school degree is the omitted category), female, race or ethnicity (black, other, Asian, Hispanic, Native American, white is the omitted category), veteran status, marital status (widowed, divorced, separated, never married, the omitted category is married), urban residence, income and its square, household composition, smoker, and BMI. Each regression also includes year and state fixed effects, and state specific time trends. Standard errors are clustered by state. Marginal effects from probit presented.

Table 3: Relationship Between Macroeconomic Conditions and General Health

	Health is Poor or Fair		Health Limited Social Life in Past Month		Health Worse Compared to One Year Ago	
	(1)	(2)	(3)	(4)	(5)	(6)
State Unemployment Rate	.008 (.008)	.067** (.020)	.010 (.007)	.044** (.020)	-.001 (.008)	.056** (.020)
State Unemployment Rate^2	--	-.005** (.001)	--	-.003* (.002)	--	-.005** (.002)
N	53,943		54,023		54,039	
Mean of Dependent Variable	.222		.134		.222	
p-value for test of joint significance		.001		.072		.003

See notes to Table 2.

Table 4: Measures of Utilization

	(1)	(2)	(3)	(4)	(5)	(6)
		Control for Chronic Conditions			*Control for chronic conditions*	
Panel A: Inpatient Stays						
	=1 if any inpatient stay			*Log(# Inpatient Stays), Conditional on Any*		
State Unemployment Rate	.009*	.010**	.041**	-.007	-.004	-.123**
	(.005)	(.005)	(.018)	(.018)	(.018)	(.051)
State Unemployment Rate^2	--	--	-.003*	--	--	.011**
			(.002)			(.004)
N	54,121	54,096	54,096	10,635	10,629	10,629
Mean of Dependent Variable		.197			.410 (.466)	
p-value test for joint significance			.030			.056
Panel B: Outpatient Procedures						
	=1 if any outpatient procedure			*Log(# of Outpatient Procedures), conditional on any*		
State Unemployment Rate	.002	.001	.023	-.002	-.002	.100**
	(.007)	(.007)	(.027)	(.015)	(.016)	(.048)
State Unemployment Rate^2	--	--	-.002	--	--	-.009**
			(.002)			(.004)
N	54,121	54,096	54,096	38,445	38,426	38,426
Mean of Dependent Variable		.710			1.251 (.890)	
p-value test for joint significance			.689			.072
Panel C: Physician Office Visits						
	=1 if any physician office visit			*Log(# of physician office visits), conditional on any*		
State Unemployment Rate	.001	.002	.027*	.012	.014	.025
	(.006)	(.005)	(.016)	(.020)	(.019)	(.062)
State Unemployment Rate^2	--	--	-.002	--	--	-.001
			(.002)			(.005)
N	54,121	54,096	54,096	48,056	48,035	48,035
Mean of Dependent Variable		.887			1.758 (.821)	
p-value test for joint significance			.175			.754

See notes to Table 3. Columns (2), (3), (5), and (6) also include controls for the following chronic conditions: arthritis, rheumatoid arthritis, emphysema, Alzheimer's disease, broken hip, cancer, skin cancer, Parkinson's disease, partial paralysis, psychological disorders, coronary heart disease, high blood pressure, diabetes, myocardial infarction, or stroke.

Table 5: Test for Heterogeneous Effects: All FFS versus FFS with Medigap

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All FFS		Medigap Coverage		All FFS		Medigap Coverage	
Panel A: Inpatient Stays								
	=1 if any inpatient stay				*Log(# Inpatient Stays), Condit. on Any*			
State Unemployment Rate	.010**	.041**	.016**	.054**	-.004	-.123**	-.015	-.097
	(.005)	(.018)	(.007)	(.025)	(.018)	(.051)	(.020)	(.068)
State Unemployment Rate^2	--	-.003*	--	-.003*	--	.011**	--	.007
		(.002)		(.002)		(.004)		(.006)
N	54,096		41,063		10,629		7,909	
Mean of Dependent Variable	.197		.193		.410		.391	
					(.466)		(.448)	
p-value, test of joint significance		.030		.026		.056		.352
Panel B: Outpatient Procedures								
	=1 if any outpatient visit				*Log(# Outpatient Visits), Condit. on Any*			
State Unemployment Rate	.001	.023	.007	.038	-.002	.100**	.001	.114**
	(.007)	(.027)	(.009)	(.033)	(.016)	(.048)	(.018)	(.054)
State Unemployment Rate^2	--	-.002	--	-.003	--	-.009**	--	-.010**
		(.002)		(.003)		(.004)		(.005)
N	54,096		41,063		38,426		29,906	
Mean of Dependent Variable	.710		.728		1.251		1.232	
					(.890)		(.877)	
p-value, test of joint significance		.689		.516		.072		.099
Panel C: Physician Office Visits								
	=1 if any physician office visit				*Log(# Office Visits), Condit. on Any*			
State Unemployment Rate	.002	.027*	.005	.035**	.014	.025	.016	-.012
	(.005)	(.016)	(.005)	(.014)	(.019)	(.062)	(.020)	(.066)
State Unemployment Rate^2	--	-.002	--	-.003**	--	-.001	--	.003
		(.002)		(.001)		(.005)		(.006)
N	54,096		41,063		48,035		37,707	
Mean of Dependent Variable	.887		.918		1.758		1.783	
					(.821)		(.811)	
p-value, test of joint significance		.175		.014		.754		.651

See notes to Table 4. Each regression includes controls for chronic conditions and in columns (3), (4), (7), and (8) dual-eligibles are excluded.

Table 6: Services Provided, Conditional on Any Utilization.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Inpatient and Outpatient Stays								
	Top 30 Inpatient Elective Procedures		Outpatient: Cataract Surgery		Outpatient: Colonoscopy		Outpatient: Endoscopy	
State Unemployment Rate	-.005	.052	-.002	-.001	-.003	.003	-.002	-.004
	(.020)	(.051)	(.006)	(.017)	(.005)	(.021)	(.004)	(.012)
State Unemployment Rate^2		-.005		-.0001		-.001		.0002
		(.004)		(.0016)		(.002)		(.0010)
p-value, test of joint significance		.506		.937		.773		.909
N	7,909		22,560		22,640		22,560	
Mean of Dependent Variable	.181		.026		.033		.017	
Panel B: Physician Office Visits								
	Flu shot		Mammogram		Pap Smear		Digital Rectal Exam	
State Unemployment Rate	.009	.063*	-.005	-.003	-.010	-.0004	-.020	.049
	(.009)	(.038)	(.015)	(.050)	(.019)	(.0437)	(.023)	(.058)
State Unemployment Rate^2		-.005		-.0001		-.001		-.006
		(.003)		(.0038)		(.004)		(.005)
p-value, test of joint significance		.173		.948		.868		.293
N	37,577		21,292		21,221		16,045	
Mean of Dependent Variable	.767		.559		.349		.566	

See notes to Table 5. In Panel A, columns (1) and (2) are the sample of individuals having any inpatient stay. In Panel A, columns (3) through (8) are conditional on any outpatient procedure. Panel B is conditional on any physician office visit (and female for columns (3)-(6), and male for columns (7)-(8)).

Appendix Table A: Sample Creation

	Sample Size
All MCBS respondents 1999-2006	100,260
Elderly only	83,336
Exclude those who live in facility	75,659
Exclude those for whom cannot match state unemployment rate (missing state)	74,377
Exclude those who are not enrolled in Medicare for entire year	69,904
Enrolled in Medicare Fee for Service	57,219
Enrolled in Medicare Parts A and B	55,067
At least 100 in state between 1999-2006	55,020
Privately Insured Subsample	41,674