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Health Spending Slowdown Is Mostly Due To Economic Factors, Not Structural Change In The Health Care Sector

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ABSTRACT The source of the recent slowdown in health spending growth remains unclear. We used new and unique data on privately insured people to estimate the effect of the economic slowdown that began in December 2007 on the rate of growth in health spending. By exploiting regional variations in the severity of the slowdown, we determined that the economic slowdown explained approximately 70 percent of the slowdown in health spending growth for the people in our sample. This suggests that the recent decline is not primarily the result of structural changes in the health sector or of components of the Affordable Care Act, and that—absent other changes in the health care system—an economic recovery will result in increased health spending.

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Health spending increased from 4.4 percent of the US gross domestic product (GDP) in 1950 to 17.7 percent in 2011. During this time health expenditures grew approximately 2.4 percentage points per year faster than GDP. Given historical trends, health spending has been projected to consume approximately 20 percent of GDP by 2021.¹ However, these projections are in doubt given the recent slowdown in the growth of health spending. From 2000 to 2007 annual health expenditures grew at a rate of 6.6 percent, but this growth rate slowed to an average of only 3.3 percent per year from 2008 to 2011.²

The ultimate source of this slowdown remains an open question. Potential explanations include a decline in medical innovations, recent patent expirations for popular and expensive pharmaceuticals, various features of the Affordable Care Act (ACA), and the economic slowdown that began in December 2007. This article joins a number of previous studies that have attempted to measure how much of the decline in the growth of health spending can be explained by that economic slowdown.³⁻⁵ Understanding the slowdown's relative role will provide an upper

bound on the effect of other factors.

Previous studies attempted to answer this question by modeling how GDP affected national health spending before the most recent economic slowdown and using the results to estimate how the recent slowdown affected current health spending.^{5,6} Taking this approach, the Kaiser Family Foundation concluded that declines in health spending that were attributable to the most recent downturn in GDP growth accounted for 75 percent of the overall health spending slowdown.⁵ In contrast, David Cutler and Nikhil Sahni estimated that only 37 percent of the change in health spending from 2008 to 2010 resulted from the downturn in GDP growth.³ The different estimates of the relative role of the macroeconomy are primarily the result of different definitions of the timing and severity of the most recent recession.

We took a different analytic approach by exploiting variation in the regional severity of the economic slowdown: We compared trends in spending in metropolitan areas that experienced sharp economic declines and trends in spending in areas that saw little if any decline. Thus, we were able to estimate the effect of the slowdown on spending based on what actually occurred

during the slowdown, instead of using projections from past macroeconomic shocks. To accomplish this, we used new data from the Health Care Cost Institute (HCCI), an independent, nonprofit entity that has obtained insurance claims data from Aetna, Humana, and UnitedHealthcare.

In addition to adopting a new empirical strategy, we departed from previous work by measuring macroeconomic conditions using the employment-to-population ratio—the percentage of the working-age population that was actually working—instead of GDP. We did this in part because our empirical strategy exploited local economic variation, and GDP is not reliably measured at the local level. Of equal importance, there are good theoretical reasons, discussed below, to use employment instead of GDP to predict health spending.

Our analytical approach has both advantages and disadvantages when compared with previous work. Previous studies generally assume that the statistical relationship between GDP and health spending that prevailed during prior economic slowdowns continues in the current economy. This assumption may be problematic, however, because the most recent slowdown has been characterized by an economically meaningful difference between the recovery in employment and GDP growth that is unlike what occurred in historical business cycles.

Our approach avoids making any assumptions about the continuation of past relationships. In addition, we can separately control for contemporaneous national trends in health care spending that are unrelated to the slowdown.⁷

However, this benefit comes with two primary costs. First, employment is a potentially preferable measure of the local economic climate during the most recent slowdown, but our results are not directly comparable to other studies that rely on national GDP. Second, because we used HCCI data, our findings may not be generalizable to the entire US population.

Our findings may be summarized as follows: In our sample of insured patients (described below), annual growth in health spending in the period 2009–11 was 2.6 percent below growth in the period 2007–09. We estimate that each percentage-point decrease in the employment-to-population ratio is associated with a statistically significant 0.84 percent decline in mean health spending per patient during 2007–11. Based on the overall decline in employment, we calculate that if the economic slowdown had not occurred, annual growth in aggregate health expenditures from 2009 to 2011 among our sample would have been approximately 1.8 percentage points higher. This implies that the economic slow-

down explained approximately 70 percent of the reduction in health care spending for our sample.

The Relationship Between The Macroeconomy And Health Spending

According to long-standing tradition, GDP is used to define a recession. But GDP may not be an ideal predictor of health spending in the years since the latest economic slowdown. The benefits of GDP growth in the recovery following the 2007–09 recession appear to have been concentrated among the wealthy.⁸ However, overall trends in health spending might be more likely to reflect the decisions of the entire population than just those of the wealthy.

For many people, the negative effects of the slowdown have lasted long after the official end of the recession in June 2009. Indeed, two years after GDP growth signaled the official “end,” the unemployment rate remained approximately 65 percent above the pre-recession level. Similarly, throughout 2011 the University of Michigan’s Index of Consumer Sentiment, a summary measure of consumers’ expectations about the economy, remained at roughly the same average level as during the official period of the recession. This rate was well below the average level in the year before the recession began.⁹ The difference between GDP growth and other outcomes such as employment and median income following a slowdown is a relatively new phenomenon that has often been described as a “jobless recovery.”¹⁰ For these reasons, it is important to consider alternative macroeconomic measures to GDP that could be predictive of health spending.

When we considered other measures, we observed that changes in the macroeconomy might affect health spending through several channels: Such changes affect current income and expected lifetime wealth (also called “permanent income”), both of which might affect health spending in turn. In the following discussion we use the term *wealth* broadly, to refer to both current and permanent income.

There are many channels through which wealth could affect health spending. First, wealth might directly affect demand for health services, if both health and insurance status are held constant, because nearly all people make some direct payments for medical care. If consumers have less wealth, they may purchase fewer health services.¹¹

Second, wealth might indirectly affect spending through the choice of insurance. A person who suffers a decline in wealth might prefer to

Future economic growth will cause health spending to be higher than it would have been if the economy remained stagnant.

purchase a less generous policy for a lower premium or to go without coverage altogether.

Third, wealth might directly affect health status. Several studies suggest that lower wealth may cause poorer health.^{12,13} It is hypothesized, for example, that people who lose their jobs may experience stress, which in turn leads to poorer health.¹⁴ These health declines could translate to higher health spending.^{15–17}

Finally, wealth might affect the rate of the adoption of and change in available technologies. In the short run, providers may be reluctant to adopt costly new technologies if patients are reluctant to pay for them. Thus, local supply may respond to local demand.^{18,19} And in the long run, medical research and development spending might fall in the wake of a decline in demand. The latter effect, which we would not expect to appear in our short time horizon, should be felt in roughly equal proportions in all markets (except to the extent that the adoption of new technology varies by market, as discussed above).

Given the breadth and depth of the most recent economic slowdown, the channels described above likely affected the health spending of even people who retained employer-provided insurance. Some of these people—or perhaps more likely their family members—may have lost their jobs. Others may perceive a much greater risk of losing their jobs and thus meaningfully alter their expectations of permanent income. Beyond the direct effect on earnings, the slowdown caused large decreases in the value of people's homes—often a major component of their wealth.

In light of these points, we used the employment-to-population ratio as our measure of the economic impact of the slowdown. Not only does this ratio capture the direct effect of the slowdown on earnings, but it is also correlated with changes in housing wealth. Thus, local employ-

ment is a good proxy for the broader effect of the slowdown. And, as a practical matter, employment can be reliably measured at the level of the Core Based Statistical Area (CBSA), which allowed us to implement our empirical strategy.

Study Data And Methods

DATA SOURCES Our data on health spending in the period 2007–11 came from the HCCI. In addition to aggregate health spending, the data contained monthly enrollment and disenrollment figures, rudimentary plan characteristics, and geographic market identifiers. The *geographic market* is defined as either the CBSA or the state for people who reside outside of a CBSA.

We restricted our analysis to people ages 26–64²⁰ with employer-sponsored nongroup health insurance of one of the following types: exclusive provider organization, health maintenance organization, point-of-service plan, or preferred provider organization.²¹ We assigned people to a fixed CBSA as of their entry month into the sample, and we excluded people who resided outside of a CBSA, who had gaps in coverage, or who had inconsistencies in the data (such as different birth years). This gave us a sample of nearly forty-seven million enrollees during the study period.

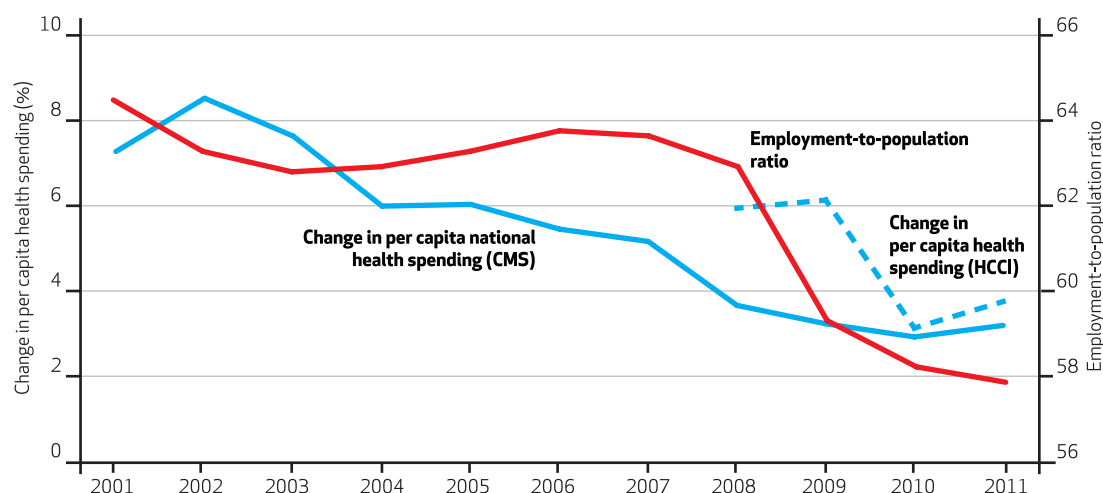
Using the HCCI claims data, we measured mean total health care expenditures in each CBSA and quarter.²² We also determined in each CBSA and quarter the number of enrollees, the average age of the insured person, and the share of enrollees who were insured through their spouses.

The annual rate of growth in national health expenditures declined from 2002 to 2011 (Exhibit 1). In 2008 there was a sudden drop in the annual growth rate, which remained depressed through 2011. Our sample of HCCI claims data covers only the period 2007–11. As expected, spending growth for our sample of insured people was generally higher than overall health spending growth. However, the pattern of the changes in health spending after 2008 for our sample was broadly similar to that of the national estimates.²³ Given the substantial slowdown in spending by the insured people in our sample, it is clear that insurance losses among people who lost employment cannot be the only explanation for the overall slowdown in health spending.

To measure the severity of the recession for each CBSA, we used employment data from the Local Area Unemployment Statistics of the Bureau of Labor Statistics. We then used census estimates to calculate the employment-to-population ratio for each CBSA.²⁴ The red line in

EXHIBIT 1

Per Capita Health Spending Growth And Employment-To-Population Ratio, 2001–11



SOURCE Authors' analysis of 2007–11 data from the the Health Care Cost Institute (HCCI), 2000–11 national health expenditure data from the Centers for Medicare and Medicaid Services, 2001–11 June employment data from the Local Area Unemployment Statistics of the Bureau of Labor Statistics, and 2001–11 annual working-age population data from the Census Bureau. **NOTES** Per capita HCCI health spending growth is for our sample population. The red solid line (employment-to-population ratio) relates to the right-hand y axis. The blue solid and dotted lines (change in health spending) relate to the left-hand y axis.

Exhibit 1 shows changes in the national employment-to-population ratio from 2001 to 2011.

This ratio was relatively flat until 2008, when it experienced a large drop. The decline was concurrent with the dating of the 2007–09 recession by the National Bureau of Economic Research.²⁵ However, employment remained depressed through 2012—well after the recession officially ended, in June 2009. This may explain why growth in health spending remained muted well beyond 2009.

ANALYSIS We gauged the local intensity of the most recent economic slowdown by calculating the total absolute change in the employment-to-population ratio from January 2008 to January 2010 in each CBSA. This represents the change from the approximate peak to the approximate trough in the employment-to-population ratio.

To make our results easier to interpret, we multiplied this measure by -1 , so areas that were hit hardest by the slowdown had higher (more positive) values on the measure. For the 366 CBSAs in our sample, this variable ranged from 0.6 to 8.6. The mean was 4.4, and the interquartile range was 3.1–5.9.²⁶ This demonstrates that there was substantial regional variation in the impact of the economic slowdown on employment.²⁷

LIMITATIONS As discussed above, one limitation of our approach was that we studied only privately insured people. However, this group is both important and interesting. In 2011, 64 per-

cent of all Americans had private insurance, and approximately half of all health expenditures of insured people were paid by private insurers. Therefore, understanding the health spending of the privately insured is critical to understanding total health expenditures.

It is possible that our estimates were driven by a change in the composition of the insured population during the slowdown.²⁸ Unfortunately, the data did not permit us to fully explore this possibility. However, we could document that the local severity of the slowdown was unrelated to the average age of enrollees, the total number of enrollees in an area, or the share of enrollees who were insured through their spouses. Nor did including these variables as controls affect the magnitude of our estimates. This suggests that changes in the composition of the insurance pool did not drive our results.

Study Results

We begin with a simple observation from our data set: Insured people residing in areas that were hardest hit by the economic slowdown experienced the smallest increases in health spending. For example, from 2008 to 2009, Las Vegas, Nevada, and Birmingham, Alabama—two particularly hard-hit CBSAs—experienced declines in their employment-to-population ratios of 5.6 percentage points and 5.9 percentage points, respectively. From 2007 to 2011, the changes in health spending in these areas were only

5.4 percent and 7.2 percent, respectively. In contrast, in the same periods Trenton, New Jersey, and Dallas, Texas, saw employment-to-population ratio declines of 1.6 percentage points and 3.0 percentage points and health spending increases of 29 percent and 28 percent, respectively.

Exhibit 2 compares changes in health spending and changes in the employment-to-population ratio for the hundred largest CBSAs in our sample. The green line in the exhibit represents a weighted regression of the change in health spending on the change in the employment-to-population ratio. This shows that each percentage-point decrease in the ratio from January 2008 to January 2010 is associated with a 0.84-percentage-point decline (95% confidence interval: 0.477, 1.2) in the change in mean health spending per enrollee from 2007 to 2011. To place the magnitude of this estimated change in context, a CBSA with an employment decline in the 75th percentile would have had 2.1 percentage points lower health spending growth

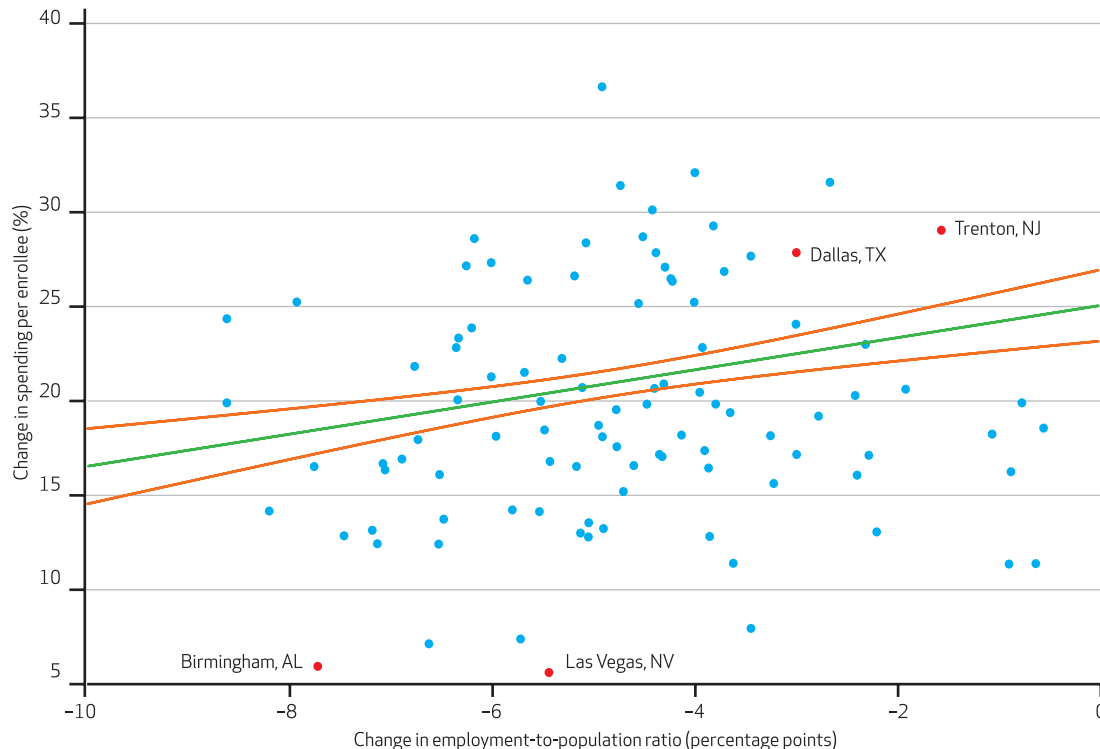
from 2007 to 2011 than a CBSA with an employment decline in the 25th percentile.

We cannot fully rely on the results depicted in Exhibit 2, because the differential trend in spending growth in geographic areas that were harder hit by the economic slowdown may have been a continuation of a previous trend that was unrelated to the recession. To rule out this possibility, we performed an additional regression analysis that included a variable for each quarter year in our sample that was interacted with our measure of the slowdown—that is, the “peak to trough” decline in the employment-to-population ratio for the CBSA. The coefficient on each interaction term told us how the economic slowdown affected the level of health spending in that quarter relative to the first quarter of 2007.²⁹

Given the large number of coefficients produced by our regression analysis, we summarize our estimates graphically in Exhibit 3. If the relationship depicted in Exhibit 2 was caused by the slowdown as opposed to some unrelated previous trend, the coefficients in Exhibit 3 should

EXHIBIT 2

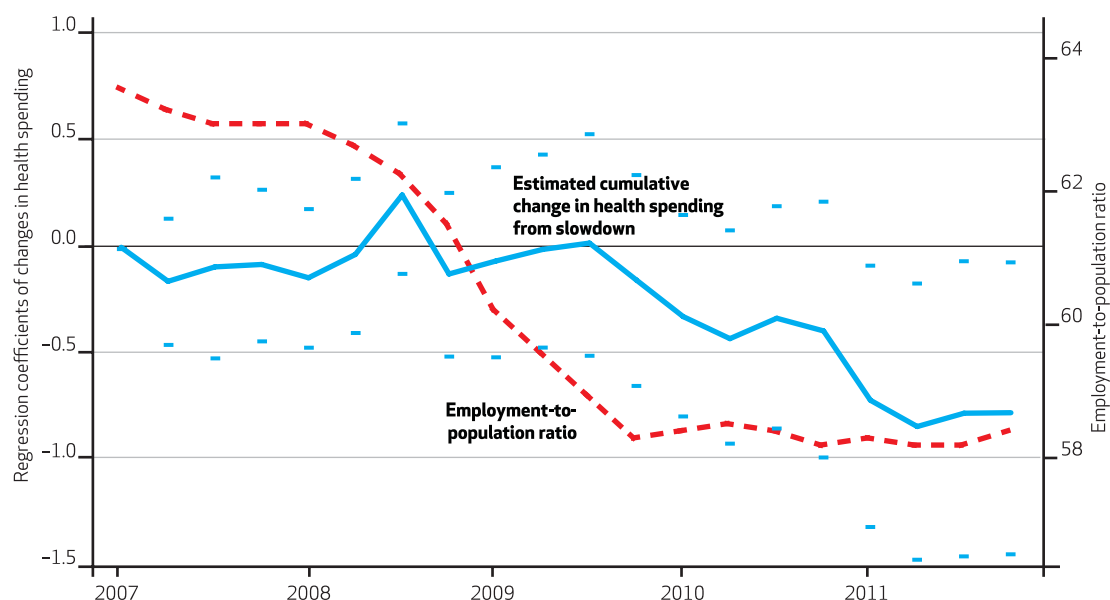
Effect Of Changes In The Employment-To-Population Ratio, January 2008–January 2010, On Changes In Per Capita Health Spending, 2007–11



SOURCE Authors' analysis of 2007–11 data from the Health Care Cost Institute (HCCI), January 2008 and January 2010 employment data from the Local Area Unemployment Statistics of the Bureau of Labor Statistics, and 2007–11 annual working-age population data from the Census Bureau. **NOTES** The scatter plot depicts the hundred largest Core Based Statistical Areas (CBSAs) in the sample. The population-weighted regression line (the green line) and the lines indicating the 95 percent confidence interval (the orange lines) are for our entire sample of 366 CBSAs.

EXHIBIT 3

Regression Estimates Of The Effect Of The Economic Slowdown On The Change In Health Spending, By Quarter, 2007–11



SOURCE Authors' analysis of 2007–11 data from the Health Care Cost Institute (HCCI), 2007–11 employment data from the Local Area Unemployment Statistics of the Bureau of Labor Statistics, and 2007–11 annual working-age population data from the Census Bureau.

NOTES Trough-to-peak change is from January 2008 to January 2010. The cumulative effect is based on a percentage-point drop in the employment-to-population ratio. The solid blue line indicates the coefficients, and the blue tick marks indicate the 95 percent confidence intervals; these relate to the left-hand y axis. The national employment-to-population ratio is in red; this relates to the right-hand y axis.

be near zero before the economic slowdown. That is, health spending changes should not have foreshadowed the impending economic crisis. Once the slowdown hit, the coefficients

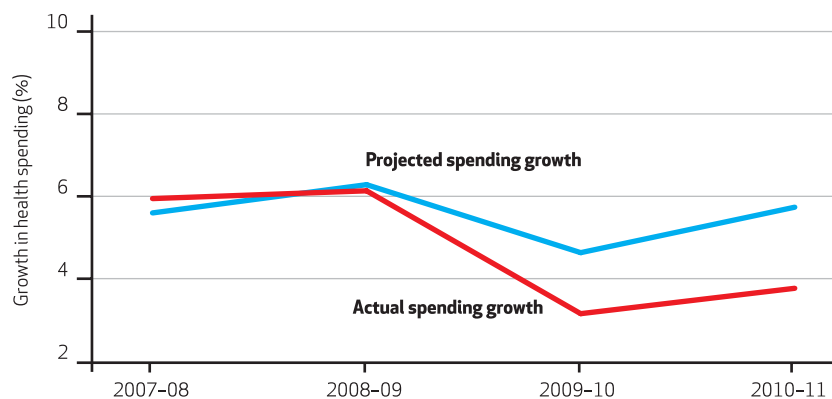
should be negative, and their absolute magnitude should increase over time as the effects of the slowdown mount. This expected pattern of coefficients is exactly what we observed, and thus we can rule out unrelated prior trends as the drivers of our main results.^{30,31}

Our goal was to assess the extent to which the recent economic slowdown has contributed to the slowdown in health spending. Thus, we performed a simple counterfactual exercise whose results are summarized in Exhibit 4. From 2009 to 2011 the actual growth rate in per capita health spending was 2.6 percentage points slower than the actual growth rate in per capita health spending from 2007 to 2009. We predicted that the average decline in spending would have been only 0.8 percentage points if the economy had not faltered in 2008. Therefore, we conclude that approximately 70 percent of the decline in spending growth in our sample can be attributed to the recent slowdown.

In addition, the employed people in our sample may have been somewhat sheltered from the economic impact of the slowdown. Thus, our estimates may understate the impact of the change in macroeconomic conditions on the health spending of the entire population.

EXHIBIT 4

Actual Change In Per Capita Health Spending And Projected Change From One Year To The Next, Holding The Employment-To-Population Ratio Constant, 2007–11



SOURCE Authors' analysis of 2007–11 data from the Health Care Cost Institute (HCCI), January 2008 and January 2010 employment data from the Local Area Unemployment Statistics of the Bureau of Labor Statistics, and 2007–11 annual working-age population data from the Census Bureau. **NOTES** Actual spending growth is the actual annual change in per capita health spending in our sample from one year to the next, in the year pairs shown. Projected spending growth is the predicted annual change in per capita health spending in our sample, if the employment-to-population ratio had not changed.

Conclusion

Our estimates show that most of the recent slowdown in health spending growth, at least among the working population, can be attributed to the economic slowdown and not to other factors such as early responses to the ACA. However, it is important to note that our findings do not

automatically imply that spending will increase at a faster pace as the economy recovers, because the ACA (or other new factors) may offset future growth. That being said, our results indicate that future economic growth will cause health spending to be higher than it would have been if the economy remained stagnant. ■

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data, Jeffrey Parnaby and other staff members at Optum Insight for assistance with the data, Bob Doyle for setting up the necessary data security

protocols, and Tomasz Wisniewski and the Kellogg Data Center for hosting the data for this project. All remaining errors are those of the authors.

NOTES

- 1 CMS.gov. National health expenditure projections 2011–2012 [Internet]. Baltimore (MD): Centers for Medicare and Medicaid Services; [cited 2014 Jun 3]. Available from: <http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/Downloads/Proj2011PDF.pdf>
- 2 Authors' calculations based on the projections in Note 1.
- 3 Cutler DM, Sahni NR. If slow rate of health care spending growth persists, projections may be off by \$770 billion. *Health Aff (Millwood)*. 2013;32(5):841–50.
- 4 Ryu AJ, Gibson TB, McKellar MR, Chernew ME. The slowdown in health care spending in 2009–11 reflected factors other than the weak economy and thus may persist. *Health Aff (Millwood)*. 2013;32(5):835–40.
- 5 Kaiser Family Foundation. Assessing the effects of the economy on the recent slowdown in health spending. Menlo Park (CA): KFF; 2013 Apr 22 [cited 2014 Jun 3]. Available from: <http://kff.org/health-costs/issue-brief/assessing-the-effects-of-the-economy-on-the-recent-slowdown-in-health-spending-2/>
- 6 The Kaiser Family Foundation (Note 5) forecasts health spending as a function of lagged GDP growth and inflation using pre-recession data and uses its estimates of GDP growth and inflation during the recession to predict health spending. David Cutler and Nikhil Sahni (Note 3) base their predictions of health spending during the recession on a Centers for Medicare and Medicaid Services (CMS) model that also uses pre-recession data.
- 7 National trends will not bias our estimates unless regional departures from trends in health spending are correlated with the magnitude of the slowdown yet are not results of the slowdown. (In statistics parlance, “time-varying unobservable covariates” would be correlated with the magnitude of the slowdown.) One standard approach in the public economics literature for assessing this possibility is to look for substantial differences in trends prior to the recession across areas and to see whether or not trends prior to the recession are correlated with changes in the employment-to-population ratio. For example, in our setting we would be concerned if our pattern of coefficients on the quarterly variables were not flat and near zero before the recession. However, we found no such pattern.
- 8 For example, Emmanuel Saez estimates that from 2009 to 2012, average real incomes per family for the top 1 percent of families grew by 31.4 percent, while average real incomes per family for the bottom 99 of families grew by 0.4 percent. Saez E. Striking it richer: the evolution of top incomes in the United States (updated with 2012 preliminary estimates) [Internet]. 2013 Sep 3 [cited 2014 Jun 3]. Unpublished paper. Available from: <http://eml.berkeley.edu/~saez/saez-UStopincomes-2012.pdf>
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- 17 Two studies (Notes 15 and 16) that examined the aggregate relationship between the macroeconomy and health have found that mortality falls during recessions. This might suggest lower spending during a recession results from health status. However, Ann Stevens and co-authors (Note 16) found that these mortality changes during a recession occurred primarily among the elderly. This suggests that any confounding direct effects of the economy on health are less of a concern for our sample of nonelderly people.
- 18 Dranove D, Garthwaite C, Ody C. How do hospitals respond to negative financial shocks? The impact of the 2008 stock market crash. Cambridge (MA): National Bureau of Economic Research; 2013 Feb. (NBER Working Paper No. 18853).
- 19 Some hospitals may have experienced sharp declines in endowments during our study period, which might have led to reductions in investments (see Note 18). However, this effect should not be tied to local economic conditions.
- 20 We imposed this restriction because the ACA requires insurers to allow dependents ages 19–25 to be covered through their parents' insurance, which resulted in large enrollment changes in this age group during our study period.
- 21 We excluded people with a number

- of plan types that rarely appear in the data, such as short-term health insurance plans or indemnity plans (most indemnity plans appear to be supplemental Medicare insurance).
- 22 One limitation of the HCCI data is the lack of prescription drug expenditures for enrollees whose employers use a third-party firm to administer their prescription drug benefits. In the data these enrollees are coded as not having drug coverage.
 - 23 Alexander Ryu and colleagues (Note 4) documented a very similar pattern in spending growth changes in the large employer market during the same time period. The striking similarity in trends should alleviate some concerns when our results are extrapolated to the private health insurance market in general.
 - 24 We used the employment-to-population ratio because it is not affected by decisions to enter the labor force and instead provides a local measure of changes in economic activity resulting from the slowdown. However, our results were broadly consistent with results using the local unemployment rate instead of the employment-to-population ratio.
 - 25 National Bureau of Economic Research. Business cycle dating committee [Internet]. Cambridge (MA): NBER; 2010 Sep 20 [cited 2014 Jun 3]. Available from: <http://www.nber.org/cycles/sept2010.html>
 - 26 We winsorized the changes in the employment-to-population ratio at the 5th and 95th percentiles largely to facilitate the graphical presentation of our results. Our conclusions did not change qualitatively when we did not winsorize the variable.
 - 27 Our measure of the absolute change explained the majority of the variation during this time period. In particular, if we estimated our model using a twelve-month smoothed moving average of the employment-to-population ratio as the dependent variable, then our measure of the absolute change during this time period explained over two-thirds of the variation not otherwise explained by the model.
 - 28 It is also possible that the changes in benefit design could lead to changes in health spending. We did not control for insurance plan type in our main regression. To the degree that the slowdown itself might have caused consumers to change to less generous insurance coverage and that this benefit design decreased health spending, this should be considered an effect of the slowdown and should not be controlled for in the regression. That said, when we did control for plan type, we obtained qualitatively similar results.
 - 29 We used the same peak-to-trough change in the employment-to-population ratio for each time period to avoid having to determine the lag between macroeconomic changes and health spending changes. When we used a moving average of period-by-period measures of employment, we obtained similar results. Our regression also included a full set of dummies for quarter years and CBSAs.
 - 30 Mian A, Sufi A. The consequences of mortgage credit expansion: evidence from the U.S. mortgage default crisis. *Q J Econ*. 2009;124(4):1449–96.
 - 31 This should not be surprising. Atif Mian and Amir Sufi (Note 30) have shown that changes in unemployment from 2007 to 2009 were strongly related to the amount of household debt relative to household income in the local economy before the recession—a variable that is unlikely to be correlated with the growth in health spending.