



A Win-Win for Working Families and State Budgets

Pairing Medicaid Expansion and a \$10.10 Minimum Wage

By Rachel West and Michael Reich October 2014



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Introduction and summary

How do minimum wage increases affect expenditures on means-tested public assistance programs?

At a time when concern over income inequality is growing—and there is contentious debate about government deficit spending—the possibility that a higher minimum wage may affect public assistance spending holds great relevance for both the public and policymakers. This possibility is particularly salient in the 24 states that have not expanded Medicaid under the Affordable Care Act, or ACA, as of January 2014.¹

In this paper, we suggest a strategy whereby states can simultaneously expand health care, boost the income of working families, and generate savings in their state budget by raising the minimum wage in conjunction with expanding Medicaid. Higher minimum wages will boost income among struggling working families. Medicaid expansion will lead to wider health care coverage, as well as a reduction in the number of uninsured and the significant public costs associated with the care of the uninsured.

This report finds that higher minimum wages lead to a statistically significant enrollment reduction in traditional Medicaid—that is, the portion of Medicaid for which states have always paid a substantial share of the cost. Specifically, the results of the econometric analysis developed in this report imply that a 10 percent increase in the minimum wage reduces traditional Medicaid enrollment among the non-elderly and non-disabled by 0.31 percentage points.

Thus, considered alongside Medicaid savings for states, the dual policy package of Medicaid expansion and higher minimum wages represents a win-win situation for state policymakers and low-income working families. Unlike states' traditional Medicaid programs, the federal government pays the full cost of care for those who are newly eligible for the first three years—and the lion's share thereafter—under the Medicaid expansion.² This reduction in enrollment will lead states and their residents to save money on traditional Medicaid.

For the 24 states that did not expand Medicaid under the ACA beginning in 2014—the so-called nonexpansion states—our results imply that if implemented in 2014, a \$10.10 per hour minimum wage coupled with Medicaid expansion would reduce states’ pre-ACA Medicaid expenditures by more than \$2.5 billion per year. This represents a spending decrease of more than 1.5 percent among the nonexpansion states and 0.6 percent relative to national 2012 Medicaid expenditures. To arrive at these findings, we take account of the states’ 2014 minimum wage levels and use baseline Medicaid enrollment data from the year 2012, the most recent year for which data are available in our set.

If states chose to index their minimum wages to a measure of inflation—ensuring that the purchasing power afforded by the minimum wage would rise at the same rate as prices in the future—their respective minimum wages would increase at the same rate as Medicaid eligibility thresholds, which are tied to the federal poverty level, or FPL. Accordingly, the savings over a decade would be about 10 times greater than the one-year savings. In 2014 dollars, the 10-year savings across nonexpansion states would total approximately \$25.1 billion.

The report proceeds as follows:

- Section 1 provides background information on minimum wage policies and on the Medicaid program and discusses the interaction between them.
- Section 2 describes the data we use and discusses our methods.
- Section 3 provides our main results. We present a state-by-state simulation of the savings to states from increasing minimum wages to \$10.10 per hour during Medicaid expansion.
- Section 4 presents our conclusion.

Further details are provided in a series of appendices.

Background

By definition, government spending on a means-tested program should decline when income among the program’s target population rises. For the group of Medicaid recipients we focus on here—the non-disabled and non-elderly, who are most likely to be affected by a minimum wage increase—income thresholds determine Medicaid eligibility. In most states, eligibility for the full benefits of the program is contingent upon income being below a specified level.³

Nonetheless, it is not clear to what extent minimum wage policy—which aims to enhance the income of low-wage workers—affects Medicaid eligibility. On the one hand, low-wage workers and their families are disproportionately eligible for—and enrolled in—Medicaid. If many enrolled workers have incomes that bring them close to becoming ineligible for the program, a higher minimum wage that leads to an income increase among these families could decrease enrollment, and thereby reduce Medicaid program expenditures. On the other hand, if most working families’ earnings are far enough below the threshold that their Medicaid eligibility remains unaffected—or if increasing the minimum wage has little or no impact on their income—then overall Medicaid enrollment will be unresponsive to the minimum wage. Finally, if minimum wage increases cause firms to cut jobs or reduce their employees’ working hours, higher minimum wages could cause greater Medicaid enrollment among families. For these reasons and others, the net effect of a minimum wage increase on Medicaid enrollment is not self-evident: the question must be addressed with a careful causal analysis.

Related research

Much of the large literature on the impact of minimum wage increases has focused on earnings and employment effects. Very few studies have explored the relationship between the minimum wage and public assistance programs—much less quantified the causal effects of minimum wage policy on enrollment or expenditures in these programs. Research economist Sylvia Allegretto and her University of California,

Berkeley, colleagues show that low-wage workers—and, in particular, fast-food workers—are far more likely to be recipients of public assistance programs than other workers.⁴ However, their study does not attempt a causal analysis of the effects of minimum wages on such programs.

Our previous study is the first—to our knowledge—to examine the causal impact of minimum wage policy on the SNAP program.⁵ Examining data from the past two decades, we find that a 10 percent increase in the minimum wage reduces SNAP enrollment between 2.4 percent and 3.2 percent and reduces expenditures by an estimated 1.9 percent. These findings imply that a minimum wage increase to \$10.10 per hour would reduce SNAP enrollment nationally by 3.3 million to 3.8 million, and reduce expenditures by nearly \$4.6 billion per year.⁶

University of Massachusetts, Amherst professor Arindrajit Dube’s research on the causal effect of the minimum wage on family poverty is perhaps both the most relevant and the most methodologically similar study to this report.⁷ Dube finds that a \$10.10 federal minimum wage would lift the income of about 4.6 million non-elderly Americans above federal poverty level.⁸ Since eligibility and benefit levels for many public assistance programs, including Medicaid, are tied to the FPL, Dube’s findings have direct implications for this study.

Some of the literature on safety net programs concerns interactions among the programs. For example, Aaron Yelowitz, a nationally known economist, finds that changes in enrollment requirements for Medicaid had spillover effects on enrollments in SNAP.⁹ For every 10 newly eligible families who enrolled for Medicaid benefits, 4 also enrolled in SNAP. As Yelowitz suggests, families may first become aware of their SNAP eligibility when they apply for Medicaid. Thus, enrollment may increase simply by making it easier to apply for multiple programs at the same time. Harvard professor Katherine Baicker and her colleagues find that enrollment in Medicaid has no effect on employment or earnings, but does increase the probability of SNAP receipt by 10 percentage points.¹⁰

The minimum wage

Although there are states in every region of the United States that have adopted higher minimum wages than the federal level, state-level minimum wage legislation is not distributed randomly by geography. In the 2013 study “Credible Research Designs for Minimum Wage Studies,” economist Sylvia Allegretto and her

colleagues show that states enacting minimum wage policy vary systematically from the other states in a number of characteristics that affect low-wage employment trends, but are not themselves related to minimum wage policy.¹¹

The nonrandom distribution of minimum wage policy has important implications for studying the effects of the minimum wage on outcomes such as employment and earnings. In particular, national panel studies that attempt to uncover these effects using state and time fixed effect models—such as a 1992 study by David Neumark and William Wascher—will spuriously estimate negative employment effects.¹² Indeed, the results in that particular study are attributable to pre-existing trends: tests for pre-existing employment trends reveal that low-wage employment had been declining as much as two years before higher minimum wages were implemented. These pre-trends violate a key assumption of the research design, biasing the results. However, researchers can eliminate these pre-existing trends by making a statistically large number of local comparisons that account for heterogeneity among states and over time. For this reason, we conduct tests for pre-existing trends in our enrollment measures and use model specifications that include local comparisons as done in the study by Allegretto and her colleagues.¹³ (see Appendix B)

The Medicaid program before the ACA

Medicaid was established to provide specific groups of disadvantaged and lower-income individuals with access to health care services. Although the program is voluntary, all states participate. Each state administers its own Medicaid program consistent with federal law, and the federal government and the states jointly fund the program. For the United States as a whole, the federal share of Medicaid spending in fiscal year 2012 was 57 percent and the state share was 43 percent.¹⁴ However, the federal share—which is determined based on states' per capita income levels—varies from a low of 50 percent in 10 states to a high of 74 percent in Mississippi.¹⁵

In the past, states had broad discretion to determine eligibility criteria, although a state must cover individuals in certain mandatory eligibility groups called “categorically needy” under federal law.¹⁶ As a result, states' Medicaid programs vary widely. According to the Centers for Medicare & Medicaid Services: “Each state establishes its own eligibility standards, benefits package, payment rates and program administration under broad federal guidelines. As a result, there are essentially 56 different Medicaid programs—one for each state, territory and the District of Columbia.”¹⁷

As of 2012, all states had extended Medicaid coverage beyond the minimum federal requirements in one or more ways: by using waivers to test new delivery and payment methods, for example, and by offering coverage to medically needy populations and poor young adults.¹⁸ Importantly, as of 2012, all states offered Medicaid to certain poor employed and unemployed parents of dependent children. Twelve states and Washington, D.C. had also extended coverage to certain poor childless adults. While the data used in this analysis include all non-elderly groups, the majority of families whose Medicaid eligibility would be affected by a minimum wage increase will likely be families that include such parenting or nonparenting adults rather than the categorically needy or medically needy.

The degree of coverage for such adults—that is, for non-disabled, non-elderly adults—is governed primarily by income, measured relative to the FPL. The eligibility threshold may also vary according to employment status and number of dependent children. In some states, these thresholds put families who would be affected by the minimum wages at the margin of eligibility. A worker with a single child earning a minimum wage of \$7.25—thus earning about \$15,080 per year, just under the FPL in 2012—would have been eligible for Medicaid in 26 states. Two adults earning minimum wage while supporting two children would have earned about 138 percent of the FPL in 2012, and would have been eligible for Medicaid in 20 states.

Medicaid enrollment is lower than the Medicaid-eligible population. Although Medicaid take-up rates are difficult to measure, they are known to be substantially less than 100 percent and to vary both by state and over time. In 2005, Amy Davidoff and her colleagues at the Urban Institute used the 2002 National Survey of America's Families, or NSAF, to analyze adult Medicaid take-up rates. They estimate a take-up rate of 52 percent nationally, with a range from 32 percent in Texas to 76 percent in Massachusetts. Other national estimates have been both lower and higher.¹⁹ The preferred specification that we present in the report includes statistical controls for heterogeneity across states, regions, and time. We therefore effectively eliminate variation in take-up rates that is unrelated to minimum wage effects.

Changes to Medicaid under the ACA

The ACA required states to expand their existing Medicaid programs by extending coverage to all individuals and families with incomes effectively under 138 percent of the FPL. In 2012, the Supreme Court held that the decision to expand Medicaid

was optional for states.²⁰ As of January 2014, the baseline for this economic model—26 states and Washington, D.C.—had chosen to expand their Medicaid programs under the ACA.²¹ The federal matching rate for the Medicaid expansion is 100 percent from 2014 through 2016. Thereafter, states will contribute a small share of expansion costs, which will be capped at 10 percent by 2020.²²

In our policy analysis, we consider the effects of the minimum wage on Medicaid enrollments in states that did not expand Medicaid under the ACA as of January 2014.²³ Since Medicaid programs in nonexpansion states have not undergone broad structural change since 2012—the final year of our historical data—we are able to apply the findings of our analysis directly in these states.

Because this policy exercise is developed for 2014, we include Pennsylvania among the nonexpansion states. Pennsylvania approved Medicaid expansion in late 2014, but expansion will not take effect until 2015. Below, we discuss the sensitivity of the results to the exclusion of Pennsylvania.

Data and methods

This study uses the variation in binding minimum wage changes across states and time to estimate the causal impact of minimum wage policy on enrollment in traditional Medicaid.

Data on Medicaid participation among families during the 15-year inclusive period from 1998 to 2012 are taken from the Annual Social and Economic Supplement of the Current Population Survey, commonly called the March CPS.²⁴ The March CPS is an annual Census Bureau survey that includes information at the individual, family, and household levels on participation in and income from various transfer programs. We track Medicaid enrollment at the family level, using an indicator for whether any non-elderly members of the family were enrolled in Medicaid during the survey year.²⁵

We also construct a time series of state-level Medicaid income eligibility thresholds for two groups—employed parents of dependent children and unemployed parents of dependent children—based on the Henry J. Kaiser Family Foundation survey data.²⁶ As noted above, states' Medicaid programs differ widely in terms of the subpopulations they cover and the levels of service they provide these subpopulations. These two income eligibility thresholds serve as indices of program generosity across states and time.²⁷

To these variables we merge a state-level data set on minimum wages, unemployment rates, employment to population ratios, and median family income levels. Minimum wage data are available from the Bureau of Labor Statistics, or BLS. For state minimum wage changes enacted at times other than the beginning of the calendar year, we use an average value for the year. Annual unemployment and employment data are also taken from the BLS, and state-level population series come from the inter-decennial Census releases. We also employ a standard set of demographic controls from the March CPS such as family size and composition, as well as racial and ethnic identification.

Sample description

The March CPS comprises responses from the residents of 50,000 to 60,000 dwelling places surveyed each year and contains detailed information on the residents' employment and income, including income from transfer payments. The sample for our Medicaid analysis, which includes only family units with at least one non-elderly adult, consists of more than 866,000 observations during the inclusive period from 1998 to 2012. Nationwide, throughout all the years in the sample, 15.6 percent of families in the March CPS sample reported that at least one non-elderly member received Medicaid. Medicaid enrollment has increased substantially over the decade we examine: In 1998, the proportion of families that had at least one enrolled member was 11.9 percent. By 2012, reported enrollment among families across the nation had reached 20.8 percent of the population. Table 1 displays average values of key variables at the state level—including Medicaid enrollment and expenditures—for both the entire span of our Medicaid analysis and the most recent year of data in 2012. For purposes of the policy analysis in the fourth section of this report, the table also provides the same information separately for the 24 states that had not expanded Medicaid under the ACA as of January 2014.

It is well known that reported benefits in the March CPS—including Medicaid receipt—are substantially lower than enrollment recorded by administrative sources. The extent of underreporting and its treatment in this analysis are discussed in Appendix A.

TABLE 1
Descriptive statistics

Average across states	All states				Non-Medicaid expansion states			
	1998 to 2012		2012 only		1998 to 2012		2012 only	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Medicaid enrollment rate (persons)	11.2%	3.7%	14.3%	3.6%	11.0%	3.4%	14.2%	3.5%
Medicaid enrollment rate (families)	15.7%	5.3%	20.8%	4.5%	15.6%	5.0%	21.2%	4.4%
Medicaid expenditures (in millions of dollars)	\$4,661	\$6,932	\$7,777	\$10,100	\$3,885	\$4,353	\$6,911	\$6,773
State minimum wage	\$5.50	\$1.20	\$7.43	\$0.36	\$5.33	\$1.08	\$7.32	\$0.15
Federal minimum wage	\$5.33	\$1.05	\$7.25	—	\$5.33	\$1.05	\$7.25	—
Unemployment rate	5.7%	1.9%	8.7%	2.0%	5.5%	1.8%	7.0%	1.5%
Median family income	\$49,250	\$11,374	\$59,044	\$8,459	\$46,895	\$9,847	\$57,987	\$6,453
Employment-to-population ratio	70.3%	4.9%	66.3%	4.9%	70.3%	4.8%	66.8%	5.1%

Note: "All states" includes 50 states and Washington, D.C. All states are equally weighted. "Non-Medicaid expansion states" includes the 24 states that have not expanded Medicaid under the Affordable Care Act as of 2014. We count as a family unit any individual residing on his or her own; two or more persons residing together, who do not belong to a family in the March CPS sample, are constructed as one family in this analysis. Medicaid enrollment rates are derived from the March CPS and are not adjusted for undercounting.

Source: Authors' calculations from the Bureau of Labor Statistics, "March Current Population Survey" (Washington, Bureau of Economic Analysis, 2014), available at http://www.bea.gov/scb/pdf/2014/03%20March/D%20Pages/0314dpg_a.pdf.

Methods

Our primary empirical strategy examines the sensitivity of families' participation in Medicaid to minimum wage policy. Our approach identifies the effects of minimum wage policy on the external margin—that is, the effect of the minimum wage on the likelihood that a family participates in the Medicaid program at all, holding other relevant characteristics and conditions constant.

For several reasons, we do not attempt to explore the direct impact of minimum wage policy on the amount of Medicaid spending on recipient families—that is, the internal margin. Unlike the case with SNAP, the majority of Medicaid benefits do not vary systematically with income. Moreover, the relationship between eligibility and family expenditures on health care is not deterministic. Although the variance in expenditures per enrollee is high, a small share of the enrollees—in particular, disabled enrollees—account for a very large portion of program spending. The variance in Medicaid expenditures among the non-elderly and non-disabled is thus much smaller.

Furthermore, health care needs and health care usage may differ significantly by income. It is unclear whether income increases—such as what might result from minimum wage changes—would lead families that maintained eligibility to consume more or fewer Medicaid services. It is additionally unclear whether families whose incomes are close to the eligibility threshold—that is, those who would be most likely to become ineligible under a wage increase—generate more or less in costs to the Medicaid program than families whose incomes are far below the eligibility threshold.

Distinguishing causation from correlation

It is crucial to ensure that our analysis does not pick up spurious correlations between minimum wage policy and public assistance program activity. We must be careful, for example, that our analysis is not simply detecting the tendency of more economically vibrant states to adopt higher minimum wages. Distinguishing correlation and policy endogeneity from true causal effects is the primary motivation for econometric analysis. In an ideal experiment, researchers would begin with two states—states that are alike in every respect prior to the policy— and “treat” only one of these states with a higher minimum wage. They would attempt to shield this pair of states from any influence that could obscure their understanding of the minimum wage’s direct effect on program activity and then observe the unperturbed impact of the wage change on program activity.

For better or worse, researchers cannot conduct such experiments. However, we can use statistical methods to control simultaneously for the independent effects of confounding factors—for example, state employment conditions, state income levels, and family characteristics—on Medicaid activity. Furthermore, we can use common trajectories among states within the same Census division, effectively limiting our comparisons to groups of states that are geographically similar, and accounting for regional differences across the United States. By ensuring similarity along all of these dimensions, we maximize the likelihood that program activity in any two comparison states would indeed have been comparable in the absence of a minimum wage change. Thus, if a new minimum wage policy were implemented in one state only, we could attribute all of the difference we observe in program activity to the new minimum wage policy.

To control for time-varying heterogeneity among states, our preferred specifications allow each state to have a separate intercept and linear time trend. To facilitate comparison between regions and time periods that are maximally alike, we also

include separate effects by Census division and time. In other words we approximate the ideal experiment by using nonexperimental statistical methods. The desirable pre-existing similarities between states that we have defined above inform our choice of control variables in a statistical setting. More precisely—in our multiple regression models—we use median family income, the unemployment rate, the employment-to-population ratio, and regional and time identifiers to construct an appropriate group of peers for each state on the eve of a policy change.

Model specification

We estimate the effect of the minimum wage on enrollment in traditional, pre-ACA Medicaid using family-level data on program participation. For family i residing in state s during year t , we estimate an equation of the following form:

$$Y_{ist} = \alpha + \beta_1 \log(MW_{st}) + \beta_2 X_{st} + \beta_3 Z_i + \gamma_s + \phi_{dt} + \delta_s^* t + \varepsilon_{ist} \quad (1)$$

Y_{ist} is a binary variable that is set equal to 1 if at least one member of family i was enrolled in Medicaid during the survey year. X_{st} is a set of state-level characteristics, including annual averages of the unemployment rate, the employment-to-population ratio, and the natural log of median family income. We also test the effect of including Medicaid income eligibility thresholds for employed and unemployed parents of dependent children—expressed as a percent of the FPL—in the vector X_{st} . However, the inclusion of these controls has no significant effect on our estimates. Z_i is a vector of family attributes, including indicators for the race and marital status of the family head, size of the family, the presence of children, and the presence of an adult male. State fixed effects are captured by γ_s . To control for time-varying heterogeneity, our preferred model specification also includes year fixed effects that vary by Census division (ϕ_{dt}); we also test specifications in which year effects are restricted to be the same for all Census divisions. Finally, our preferred model specification includes a linear time trend for each state, $\delta_s^* t$. Appendix C contains a discussion of our approach to geographic heterogeneity over time and a comparison of our results to those obtained using alternative sets of controls.

The effect of interest, which is captured by β_1 , is the expected change in the probability of being enrolled in Medicaid with respect to a change in the log of the binding minimum wage in state during year t . Robust standard errors are clustered at the state level. We estimate the parameters using linear regression thus producing a linear probability model. Details of the model selection process are covered in Appendix C.

Results

Estimated minimum wage effects on Medicaid enrollment

The third column of Table 5 displays the estimates from our preferred model for Medicaid enrollment.²⁸ (see Appendix C) Our parameter of interest—the coefficient of the minimum wage term—indicates that a 10 percent increase in the minimum wage leads to a decrease of about 31 basis points, or 0.31 percentage points, in the Medicaid enrollment rate among families.²⁹

To put this estimate in context, we can compute the change in Medicaid activity predicted for a particular wage scenario. For example, in Georgia—where the current minimum wage is \$7.25—the Medicaid enrollment rate for non-elderly families in 2012 was 19.93 percent prior to adjusting for underreporting. Thus, a 10 percent increase in the minimum wage from \$7.25 to about \$7.98 per hour would have decreased the share of families that reported participating in Georgia’s traditional Medicaid program to 19.65 percent—a decrease of 28 basis points, or 1.5 percent.³⁰ To carry out the policy simulation below, we subsequently adjust such calculated enrollment rate predictions for underreporting in the March CPS—as described in Appendix A—and we then calculate the associated reduction in Medicaid spending. In Georgia, the annual expenditure associated with this enrollment reduction is \$39.5 million, nearly 0.5 percent of 2012 Medicaid spending in that state.

National and state-level predicted impacts from a \$10.10 minimum wage

We next apply our findings to predict how Medicaid activity would change if states raised their minimum wages to \$10.10 in 2014. In order to make this inference, we account for the fact that the current minimum wage varies by state. At the beginning of 2014, 21 states maintained higher minimum wages than \$7.25. The reduction in Medicaid activity resulting from a new minimum wage will be greater in low-wage states than in high-wage states, all else equal. In order to account for this properly,

we calculate the percentage wage change that would result from a \$10.10 minimum wage on a state-by-state basis. We then apply the estimated parameters from the preferred model presented above to compute the expected decrease in traditional, pre-ACA Medicaid activity for each state. In this exercise we use states' 2014 minimum wage levels in combination with the latest available data on Medicaid enrollment from the year 2012.

Workers earning less than \$10.10 per hour would not be the only persons affected by the minimum wage change. Other low-wage workers earning somewhat above \$10.10 would likely also benefit from a wage increase. For example, the Congressional Budget Office, or CBO, recently projected that in addition to the 17 million workers who would be making less than \$10.10 in 2016—and would therefore be directly affected by the policy change—another 8 million workers earning between \$10.10 per hour and \$11.50 per hour were also likely to experience a wage increase.³¹ Our estimates include both the direct and indirect impacts of the minimum wage on Medicaid activity.

Effects on Medicaid in the nonexpansion states

As discussed previously, more than half of the states, as well as Washington, D.C., had chosen to expand their Medicaid programs under the ACA beginning in January 2014.³² Under the expansion, all individuals and families with incomes below 138 percent of the FPL become eligible for Medicaid. This higher cutoff level significantly changes the composition of the marginally eligible group of Medicaid recipients—that is, those whose incomes are close to the eligibility cutoff. Furthermore, because states had very different eligibility rules prior to the ACA, the extent of the change differs by both family category and state; for certain populations, such as childless adults, the expansion extends eligibility far beyond the pre-ACA level.

In states with Medicaid programs that were less generous prior to expansion, the group of families whose incomes are close to 138 percent of the FPL may differ in important ways from the marginal group whose enrollment activity is examined in the preceding analysis. For example, they may differ in labor-force participation, earnings profiles, family structure, and behavioral responses to wage changes and health care access. Families who earn close to the newly expanded eligibility cutoffs may not be affected by a minimum wage change in the same way as families earning close to the lower eligibility ceilings of earlier years.

However, in states that have not yet expanded Medicaid, real incomes of marginally eligible families today are similar to those of marginally eligible families at the end of our estimation period in 2012. For the 24 nonexpansion states as of January 2014, we apply the findings of our analysis to examine how Medicaid activity would be affected when states jointly enact Medicaid expansion and a minimum wage increase. In this exercise we use nonexpansion states' 2014 minimum wage levels and their Medicaid enrollment and expenditures in 2012—the latest year for which our data are available.

Key values for the nonexpansion states are provided in Table 1 in the second section of this report. In comparison to expansion states, nonexpansion states are disproportionately likely to maintain lower minimum wages and to be relatively low income. In all but 4 of the 24 nonexpansion states—Alaska, Florida, Maine, and Montana—minimum wages are currently equal to the federal minimum of \$7.25. The average minimum wage among these states is \$7.31, compared to \$7.74 in expansion states.³³ A \$10.10 hourly minimum wage would therefore represent a pay increase of 39.3 percent for minimum wage workers in most of these states. Median annual family income for our sample of March CPS families was nearly 10 percent greater in expansion states in 2012, averaging \$57,096 in nonexpansion states and \$62,780 in expansion states. These economic and labor conditions imply that a minimum wage increase would have a greater impact on both income and public assistance expenditures in nonexpansion states.

However, nonexpansion states also have less generous Medicaid programs: income eligibility cutoffs are lower and fewer noncategorically eligible groups are covered. Thus, initial enrollment rates are lower in these states and expenditures per participating family are less. On average in 2012, nonexpansion states covered employed parents up to only 70 percent of the FPL compared to 166 percent in expansion states. Income thresholds for unemployed parents were similarly lower: 48 percent FPL compared to 143 percent of the FPL. Average expenditures per family for non-disabled, non-elderly enrollees was about 9.1 percent lower in nonexpansion states than in expansion states.

Table 6 in Appendix D reports the estimated effects on pre-ACA Medicaid expenditures that each nonexpansion state would experience under a \$10.10 minimum wage if fully implemented in 2014. To arrive at these expenditure changes, we first compute enrollment changes for non-disabled families by applying the estimated minimum wage parameter from the preferred regression model, as discussed earlier, to the natural logarithm of the wage change that each state would experience under the

bill. We then adjusted enrollment rates for underreporting in the March CPS as described in Appendix A. Since an increase in the minimum wage would primarily affect the incomes of the non-disabled and non-elderly, the enrollment rates are for non-disabled, non-elderly families including children in such recipient families.

Non-disabled, non-elderly individuals make up 26.4 percent of enrollees in nonexpansion states and account for one-third of Medicaid spending.³⁴ To compute the change in Medicaid spending resulting from reduced enrollment, we assume that each state's recent level of spending per non-disabled, non-elderly enrollee will remain constant before and after the policy change.³⁵

Table 2 summarizes total expected program changes in nonexpansion states—including Pennsylvania—under a \$10.10 minimum wage, as well as under several other possible wage scenarios. If nonexpansion states were to implement the dual policy package of a \$10.10 per hour minimum wage increase and an expansion of Medicaid in 2014, the shift in families from traditional Medicaid to expansion Medicaid would cause traditional Medicaid expenditures to fall by more than \$2.5 billion per year—a decrease of 1.5 percent of spending among the nonexpansion states and 0.6 percent relative to overall Medicaid program expenditures.

Pennsylvania, which will expand Medicaid beginning in January of 2015, accounts for 9.2 percent of this reduction. Excluding Pennsylvania, single-year Medicaid savings for nonexpansion states would be nearly \$2.3 billion. Not surprisingly, the greatest expenditure reductions come in states with large populations, such as Texas at \$537 million, Florida at \$204 million, and North Carolina at \$200 million.

Our calculation also assumes that states will index the minimum wage to the rate of inflation. The FPL, on which Medicaid eligibility criteria are based, is also indexed to inflation. Consequently, if nonexpansion states do not alter their eligibility thresholds, the savings over 10 years would be 10 times the single-year savings—approximately \$25.1 billion in today's dollars.³⁶

As noted above, funding for those who are eligible by virtue of the Medicaid expansion differs from funding for traditional, pre-ACA Medicaid enrollees. Unlike traditional Medicaid—for which states pay a substantial portion of the costs—costs for those eligible under the expansion are predominately federally financed. Thus, while low-income working families would maintain access to Medicaid in the event of a minimum wage increase, the shift in eligibility from traditional to expansion Medicaid would lead states to save money on traditional Medicaid.

The budgetary savings that nonexpansion states would experience in traditional Medicaid from jointly implementing this policy package—that is, Medicaid expansion along with a minimum wage increase—certainly understate the economic benefits associated with Medicaid expansion. A recent White House report finds that states will obtain substantial economic benefits from expanding Medicaid.³⁷ For example, the savings above do not account for the cost that uninsurance currently imposes on states and localities. Uninsured individuals are much less likely than the insured to pay for health care services received, and are more likely to make greater use of comparatively expensive emergency services. The costs of uncompensated care are partially funded by state and local dollars.³⁸ Individuals who are currently ineligible for Medicaid but cannot afford insurance make up a large portion of the uninsured. Many such individuals would become insured under Medicaid expansion when coverage is available for those with incomes up to 138 percent of the FPL. States would bear no costs from such newly eligible individuals in the first three years after expansion—and never more than 10 percent of costs thereafter—but would benefit from reductions in the social cost of uninsurance.

The policy simulation above also omits other indirect sources of savings. Multiple studies indicate that the effects of Medicaid expansion on job creation and state tax revenues could be substantial. A 2012 Virginia study suggested that such macroeconomic effects would result in economic benefits of \$1.33 billion to Virginia over the period from 2010 to 2022, nearly five times the \$280 million cost for expanding the program over the same period.³⁹

Finally, publicity about changes under the ACA, as well as recruiting strategies to enroll families who are newly eligible for the Medicaid program, have resulted in additional enrollments among families who were previously eligible yet unenrolled in both expansion and nonexpansion states. The Medicaid literature often refers to this enrollment increase as the “woodwork effect,” indicating families who come “out of the woodwork” to take up Medicaid programs for which they were already eligible.⁴⁰ The woodwork effect is already evident in both expansion and nonex-

TABLE 2
Summary of traditional Medicaid expenditures in nonexpansion states under wage scenarios

If nonexpansion states had minimum wages of:	Expenditures (in millions of dollars)	
	Predicted	Change
Recent levels (2012)	\$165,856	
\$7.25	\$165,909	\$53
\$8.00	\$165,149	-\$707
\$9.00	\$164,240	-\$1,616
\$10.00	\$163,427	-\$2,429
\$10.10	\$163,350	-\$2,506
\$11.00	\$162,691	-\$3,164

Note: Calculations assume constant spending per non-aged, nondisabled enrollee remains the same in each state before and after the minimum-wage change. Enrollment is adjusted for underreporting in the March CPS, as described in Section 2.

pansion states.⁴¹ By virtue of the individual mandate, media attention, and outreach efforts, enrollment jumped during the first half of 2014 in most of the nonexpansion states.⁴² Altogether, the Medicaid and Children's Health Insurance Program, or CHIP, enrollment in these 24 states climbed by 975,000 enrollments, including increases of 16 percent in Georgia, 10 percent in Montana, and 9 percent in Idaho.⁴³ A minimum wage increase would thus reduce the burden of the woodwork effect in the nonexpansion states. If states were to raise their minimum wages and expand Medicaid, woodworkers who lost eligibility for traditional Medicaid could nonetheless access affordable health coverage—either by qualifying for Medicaid under the expansion or qualifying for financial assistance in the marketplaces—and at a cheaper rate for states than under traditional, pre-ACA Medicaid. For this reason and others, the findings in this report can be viewed as a conservative estimate of the expenditure reduction that would result from higher minimum wages.

Conclusion

Using 15 years of variation in state and federal minimum wages, we find that minimum wage increases lead to reductions in traditional Medicaid enrollment among families. We apply our results to predict the effect of a \$10.10 per hour minimum wage in the 24 states that had not yet expanded Medicaid under the ACA as of January 2014. A minimum wage increase would shift some families from eligibility under states' traditional Medicaid programs to the expansion category for which funding is predominately provided by the federal government. If the minimum wage were increased to \$10.10 per hour we estimate that state savings for traditional Medicaid in nonexpansion states would be approximately \$2.5 billion per year, or \$25.1 billion over the coming decade. These savings represent more than 1.5 percent of Medicaid spending among nonexpansion states and 0.6 percent relative to all 2012 Medicaid expenditures.

The minimum wage represents a low-cost, high-benefit policy option to complement Medicaid expansion. This dual policy package would not only boost income and increase access to health care among low-wage working families, but would also provide a boon to state budgets.

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Appendix A:

Underreporting in the March CPS

As noted above, it is well known that reported benefits in the March CPS are substantially lower than enrollment data in administrative sources.⁴⁴ A recent Robert Wood Johnson Foundation study estimated a 31.4 percent undercount in the 2001 CPS.⁴⁵ The undercount was somewhat smaller for lower-income families. The underreporting of benefits in the CPS has increased over time: The ratio of reported benefits to administrative benefits fell from 0.73 in 1990 to 0.54 in 2007.⁴⁶ Lower reporting rates in recent years—when state-level minimum wage increases have been frequent and have tended to be larger—could pose a threat to our identifying strategy. The allowance we make for state-level linear time trends counterbalance this concern.

Insofar as participation in Medicaid is being underreported, the estimated elasticities from the regression analysis presented below will be representative for reporting families only. However, so long as reporting error is not systematically related to the state-level minimum wage or its correlates, our estimate of the effect of interest will not be biased. If the undercount in the March CPS is relatively constant over time and by state, our regression estimates will not be affected because we estimate changes in enrollment rather than levels. Unfortunately, the undercount literature does not indicate clearly whether Medicaid undercounts vary by state and over time. If they do vary, however, these changes will likely be absorbed by our controls for state-specific trends.

For purposes of the policy simulations below, we address underreporting by applying parameter estimates to state-level administrative totals rather than survey data totals. For the Medicaid program, we use information data compiled by the Henry J. Kaiser Family Foundation on the number of non-aged individuals ever enrolled—that is, enrolled for at least one day—during 2010, the latest year for which data are available. By comparing this number to weighted March CPS totals for the same year, we compute an underreporting ratio for each state. Assuming that this ratio remains constant between 2010 and 2012, we scale up the March CPS enrollment rates for each state accordingly to account for underreporting. Using these methods, we estimate that the March CPS had a reporting ratio of 74.6 percent for Medicaid enrollment. The average state had a reporting ratio of 77.8 percent.

Appendix B: Pre-trend falsification test

Recent minimum wage research highlights a common flaw in previous studies: failure to verify that the outcome variable is free of negative pre-existing trends in the dependent variable.⁴⁷ If, for example, program enrollment were already declining in states that raised their minimum wages before the minimum wage changes came into effect, then a standard regression analysis with state and time fixed effects could, mistakenly, attribute that reduction to the minimum wage. We check for such pre-existing trends by introducing variables that represent the subsequent year's value, or lead, of the minimum wage. If the model estimates the minimum wage to have an effect on the outcome variable before the wage change went into effect, then an unobserved factor, not the minimum wage change, caused the change in program activity.

We test the Medicaid specifications for pre-trends by including a one-year lead of the minimum wage. Table 3 displays the effect of including the lead in regression specifications 1, 2, and 3, all of which contain a full set of control variables. In none of the three specifications does the leading minimum wage term attain statistical significance: the standard errors are larger than the leading coefficient estimates in all three specifications. We nonetheless have some concerns about specification 1: The magnitude of the leading coefficient is close to that of the concurrent wage and is negative in sign, possibly suggesting a pre-existing downward trend. Moving across the columns of Table 3 to increasingly saturated specifications, the concurrent minimum wage regains its statistical precision in the presence of local controls and the lead term becomes tiny, imprecise, and positive. This observation supports our preference for specification 3: The concurrent minimum wage—rather than the wage level in subsequent periods—underlies the changes in Medicaid enrollment.

TABLE 3
Pre-trends test on leading coefficients: Medicaid enrollment

	(1)	(2)	(3)
Log minimum wage	0.0142 (0.0191)	-0.0144 (0.0145)	-0.0303** (0.0143)
One-year lead of log minimum wage	-0.0129 (0.0178)	-0.0081 (0.0174)	-0.0041 (0.0177)
N	806,075	806,075	806,075
State fixed effects	Y	Y	Y
Year fixed effects	Y		
Division x year fixed effects		Y	Y
State-specific linear trends			Y

* p<0.1, ** p<0.05, *** p<0.01

Note: Robust standard errors in parentheses. Observations clustered at the state level. State-level control variables are the unemployment rate, median income, and employment-to-population ratio. Family-level controls include family size, race, and marital status of the family head, presence of children, and presence of an adult male.

Appendix C:

Model estimation process

Following the process suggested by the minimum wage literature, and described in “The Effects of Minimum Wages on SNAP Enrollments and Expenditures,” we test three methods to control for unobserved geographic- and time-varying characteristics that might influence public assistance activity.⁴⁸ First, we include only independent state-specific fixed effects and year-specific fixed effects. This specification—specification 1—implicitly assumes that families in any state constitute an equally good statistical control group for those in any randomly chosen state after accounting for various characteristics such as median income and unemployment rate, among others. Similarly, simple time fixed effects assume that families surveyed in any year can credibly serve as a control group for families surveyed in every other year of the sample.

In other words, specification 1 assumes that a state’s immediate neighbor provides no better a counterfactual for the effect of a minimum wage change than does a state across the country. We relax this restrictive specification in two steps. In specification 2, we replace simple year fixed effects with fixed effects for each Census division-year combination. By using division-year effects, we remove the assumption that families in each state are equally good statistical controls for all other families. Rather, we allow for the possibility that families in similar geographic regions—for example, the South, or the Northeast—may be more similar to one another than families farther away. Finally, in specification 3, we add state-specific time trends to the previous specification. Thus, specification 3 allows each state to have its own time-varying trends rather than imposing the restriction that states evolve identically over the many years in the sample. Specification 3 is the most rigorous model specification in that it allows for heterogeneity along three dimensions.

We begin building each of the specifications above from a simple unconditional model, regressing Medicaid enrollment on the log of the minimum wage and the set of geographic- and time-specific effects particular to specifications 1, 2, or 3 above. Table 4 displays this process for the case of specification 3; the first column of this table contains the unconditional estimation. We then add covariates

sequentially to these models. These covariates include first the vector of family-level controls—such as family size, race and ethnicity, and marital status—followed by each of several state-level covariates in turn: the unemployment rate, log of median family income, and the employment-to-population ratio.

As anticipated, the unconditional models suggest that the relationship between the minimum wage and Medicaid enrollment is a more complex one than is captured by simple correlation, perhaps influenced by other factors. In the unconditional model, the coefficient on the variable of interest—the log of the minimum wage—is not statistically different from zero, and is of trivial magnitude. However, once we account for the influence of labor-market conditions and variation in income levels on program participation—by including unemployment rate and median family income control variables, respectively—the effect of the minimum wage on Medicaid enrollment is precisely estimated. These results indicate that including the selected controls improves identification of the independent effect of the minimum wage on Medicaid enrollment separate from variation introduced by confounding factors. Furthermore, the minimum wage coefficient increases somewhat in practical importance: In specification 3, for example, the coefficient grows in magnitude from -0.0272 to -0.0306. Similar results are obtained for specifications 1 and 2, leading us to prefer a full set of covariates to less restricted models.

Having settled on a set of external control variables, we return to the other dimension of model selection—the choice among specifications 1, 2, and 3. Table 5 compares the primary coefficients of interest in each of the three alternative effects specifications, estimated using the full set of control variables discussed above. Minimum wage effect sizes are smallest for specification 1, intermediate for specification 2, and largest in specification 3. With the exception of the unemployment rate—which has a tenuous link to Medicaid eligibility, but serves to control for changes in the states’ economic climates—the standard errors on the variables are much smaller in specifications 2 and 3 than in specification 1. On the basis of coefficient significance, both joint and individual, specification 3 is strictly preferred to specification 1, which constrains each state and each period to serve as controls for all other states and all other time periods, respectively, and to specification 2, which does not allow states’ outcomes to exhibit separate trajectories over time.

One concern with specification 3 is that trend controls, such as state-specific linear trends, may incorrectly absorb some of the delayed impact of a minimum wage.⁴⁹ When we test this issue by including lagged minimum wages, we do not find that delayed effects are significant. Another concern with more saturated

models is that they use less of the variation in the data, which could reduce the statistical power of the results. However, there is no evidence of this issue in our results. On the contrary, in moving from specification 2 to specification 3 in Table 5, the inclusion of state linear trends yields a coefficient estimate that is both larger in magnitude and more statistically precise. In addition to the superiority of specification 3 from a statistical standpoint, the importance of constructing appropriate comparison groups by employing a maximally flexible set of local controls—as pointed out by economist Sylvia Allegretto and her colleagues—leads us to conclude that specification 3 is most credible.⁵⁰

TABLE 4
Medicaid enrollment (family-level, linear probability model)

	(3a)	(3b)	(3c)	(3d)	(3e)
Log minimum wage	-0.0272 (0.0202)	-0.0275 (0.0165)	-0.0277 (0.0166)	-0.0296* (0.0167)	-0.0306* (0.0171)
Unemployment rate (/100)			-0.0118 (0.1384)	-0.0950 (0.1369)	-0.1359 (0.1503)
Log median income				-0.0549*** (0.0159)	-0.0509*** (0.0158)
Employment-to-population ratio					-0.0873 (0.0582)
N	866,355	866,355	866,355	866,355	866,355

* p<0.1, ** p<0.05, *** p<0.01

Note: Robust standard errors in parentheses. Observations clustered at the state level. Outcome variable is binary—equal to one if any non-elderly family member is enrolled in Medicaid. Annual data from March Current Population Survey (1998-2012). Estimation includes CPS probability weights. All models include state fixed effects, Census division x-year fixed effects, and state-specific linear time trends. All specifications except (3a) include additional controls for family size, race, and marital status of the family head, presence of children, and presence of an adult male.

TABLE 5
Comparison of specifications: Medicaid enrollment
at the family-level, linear probability model

	(1)	(2)	(3)
Log minimum wage	-0.0023 (0.0191)	-0.0238 (0.0158)	-0.0306* (0.0171)
Unemployment rate (/100)	-0.1657* (0.0934)	-0.1425 (0.1391)	-0.1359 (0.1503)
Log median income	-0.0493** (0.0242)	-0.0365* (0.0208)	-0.0509*** (0.0158)
Employment-to-population ratio	-0.0675 (0.0728)	-0.1048 (0.0636)	-0.0873 (0.0582)
N	866,355	866,355	866,355
State fixed effects	Y	Y	Y
Year fixed effects	Y		
Division x year fixed effects		Y	Y
State-specific linear trends			Y

* p<0.1, ** p<0.05, *** p<0.01

Note: Robust standard errors in parentheses. Observations clustered at the state level. Outcome variable is binary—equal to one if any non-elderly family member is enrolled in Medicaid. Annual data from March Current Population Survey (1998-2012). Estimation includes CPS probability weights. All specifications include additional controls for family size, race, and marital status of the family head, presence of children, and presence of an adult male.

Appendix D:

Policy simulation results

A \$10.10 minimum wage in nonexpansion states

TABLE 6
Predicted changes to traditional Medicaid expenditures in nonexpansion states under a \$10.10 minimum wage

State	Minimum wage in 2014	Expenditures		
		Percent spending on non-disabled, non-elderly	2012 estimated change (in millions of dollars)	Percent estimated change
Alabama	\$7.25	33.1%	-\$66.0	-1.31%
Alaska	\$7.75	44.6%	-\$26.3	-1.89%
Florida	\$7.67	26.8%	-\$204.0	-1.12%
Georgia	\$7.25	32.9%	-\$137.5	-1.67%
Idaho	\$7.25	27.9%	-\$20.6	-1.35%
Kansas	\$7.25	25.2%	-\$34.7	-1.34%
Louisiana	\$7.25	31.7%	-\$75.9	-1.09%
Maine	\$7.50	17.5%	-\$12.6	-0.53%
Mississippi	\$7.25	26.6%	-\$40.5	-0.91%
Montana	\$7.65	34.8%	-\$16.2	-1.61%
Nebraska	\$7.25	32.9%	-\$45.0	-2.46%
North Carolina	\$7.25	37.1%	-\$200.4	-1.66%
Oklahoma	\$7.25	41.0%	-\$76.6	-1.65%
South Carolina	\$7.25	37.2%	-\$87.5	-1.84%
South Dakota	\$7.25	32.3%	-\$14.6	-1.92%
Tennessee	\$7.25	39.9%	-\$136.1	-1.56%
Texas	\$7.25	41.0%	-\$537.0	-1.94%
Wisconsin	\$7.25	31.0%	-\$90.5	-1.29%
Wyoming	\$7.25	27.9%	-\$10.0	-1.87%
Indiana	\$7.25	26.0%	-\$94.2	-1.16%
Missouri	\$7.25	35.8%	-\$162.3	-1.84%
Pennsylvania	\$7.25	26.6%	-\$231.5	-1.14%
Utah	\$7.25	43.3%	-\$41.3	-2.18%
Virginia	\$7.25	31.8%	-\$144.3	-2.06%

Note: To estimate expenditures, family enrollment rates are adjusted for CPS undercounting, as described in text.

Sources: Authors' estimates based on Bureau of Labor Statistics, "March Current Population Survey" (Washington: Bureau of Economic Analysis, 2014), available at <http://www.bls.gov/cps/>; U.S. Department of Labor, "Changes in Basic Minimum Wages in Non-farm Employment Under State Law: Selected Years 1968 to 2013," available at www.dol.gov/whd/state/stateMinWageHis.htm (last accessed July 2014); Bureau of Economic Analysis, "National Income and Product Accounts," Table SA35; The Henry J. Kaiser Family Foundation, "Medicaid per Enrollee Spending: Variation Across States," available at www.kff.org/report-section/medicaid-per-enrollee-spending-variation-across-states-appendices-8550 (last accessed July 2014).

Endnotes

- 1 In August of 2014, Pennsylvania Gov. Tom Corbett (R) expanded Medicaid under a Section 1115 waiver. However, as discussed further below, Pennsylvania is included among nonexpansion states for purposes of this analysis because its Medicaid expansion will not take effect until January 2015. The Henry J. Kaiser Family Foundation, "Status of State Action on the Medicaid Expansion Decision," available at <http://kff.org/medicaid/state-indicator/state-activity-around-expanding-medicaid-under-the-affordable-care-act> (last accessed August 2014).
- 2 The Henry J. Kaiser Family Foundation, "Status of State Action on the Medicaid Expansion Decision."
- 3 In most states, the income eligibility thresholds for non-elderly, non-disabled adults differ by employment and parenting status.
- 4 Sylvia Allegretto and others, "Fast Food, Poverty Wages: The Public Cost of Low-Wage Jobs in the Fast-Food Industry" (Berkeley, California: University of California, Berkley Center for Labor Research and Education, 2013), available at http://laborcenter.berkeley.edu/pdf/2013/fast_food_poverty_wages.pdf.
- 5 West and Reich, "The Effects of Minimum Wages on SNAP Enrollments and Expenditures."
- 6 Ibid.
- 7 Arindrajit Dube, "Minimum Wages and the Distribution of Family Income." Unpublished Working Paper (2013), available at dl.dropboxusercontent.com/u/15038936/Dube_MinimumWagesFamilyIncomes.pdf.
- 8 Ibid.
- 9 Aaron Yelowitz, "Did Recent Medicaid Reforms Cause the Caseload Explosion in the Food Stamps Program?" Working Paper 756 (University of California, Los Angeles Department of Economics, 1996), available at <http://www.econ.ucla.edu/workingpapers/wp756.pdf>.
- 10 Katherine Baicker and others, "The Impact of Medicaid on Labor Market Activity and Program Participation: Evidence from the Oregon Health Insurance Experiment," *American Economic Review: Papers & Proceedings* 104 (5) (2014): 322–328.
- 11 Allegretto and others, "Credible Research Designs for Minimum Wage Studies."
- 12 David Neumark and William Wascher, "Employment Effects of Minimum and Subminimum Wages: Panel Data on State Minimum Wage Laws," *Industrial and Labor Relations Review* 46 (1) (1992): 55–81, available at <http://www.uh.edu/~adkugler/Neumark%26Wascher.pdf>.
- 13 Allegretto and others, "Credible Research Designs for Minimum Wage Studies."
- 14 The Henry J. Kaiser Family Foundation, "Federal and State Share of Medicaid Spending," available at <http://www.kff.org/medicaid/state-indicator/federalstate-share-of-spending/> (last accessed August 2014).
- 15 Ibid.
- 16 As of 2012, the final year of the data in this study, categorically eligible groups included children under the age of 19 whose family income was at or below the federal poverty level, or FPL, and 133 percent of the FPL for children under 6; SSI recipients, primarily those who are disabled; families with children meeting the requirements for the program formally known as Aid to Families with Dependent Children, or AFDC; pregnant women with incomes at or under 133 percent of the FPL and their infants; and specific low-income Medicare beneficiaries. For a full list of mandatory categorically needy groups, see Medicaid, *List of Medicaid Eligibility Groups: Mandatory Categorically Needy* (2014) See <http://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Waivers/1115/Downloads/List-of-Eligibility-Groups.pdf>.
- 17 Centers for Medicare & Medicaid Services, *A Profile of Medicaid: Chartbook 2000* (U.S. Department of Health and Human Services, 2000), available at <http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/TheChartSeries/downloads/2tchartbk.pdf>.
- 18 Social Security Administration, *Annual Statistical Supplement on the Social Security Disability Insurance Program* (2013), available at www.socialsecurity.gov/policy/docs/statcomps/supplement/2013/medicaid.pdf.
- 19 For a more complete discussion, see Ben Sommers and others, "Understanding Participation Rates in Medicaid: Implications for the Affordable Care Act" (U.S. Department of Health and Human Services, 2012), available at <http://aspe.hhs.gov/health/reports/2012/medicaidtakeup/ib.pdf>.
- 20 The Henry J. Kaiser Family Foundation, "Status of State Action on the Medicaid Expansion Decision."
- 21 Ibid.
- 22 Ibid.
- 23 Ibid.
- 24 Medicaid changed significantly in 1997, when the passage of Title XXI of the Social Security Act created the Children's Health Insurance Plan, or CHIP. We restrict our analysis to the period immediately following this change. We have also tested the sensitivity of our results to starting the sample period two years before and after 1998. These adjustments do not substantially change our results.
- 25 We depart from the U.S. Bureau of the Census' definition of a family unit, which is "two people or more (one of whom is the householder) related by birth, marriage, or adoption and residing together." See U.S. Bureau of the Census, "Current Population Survey (CPS) - Definitions," available at <http://www.census.gov/cps/about/cpsdef.html> (last accessed February 2014). We count as a family unit any individual residing on his or her own; two or more persons residing together who do not belong to a family in the March CPS sample are constructed as one family in our analysis. Our expanded family definition thus includes these individuals and households, and makes our analysis more representative of the overall population.
- 26 We obtained income eligibility information for these two groups from Table 3 of the annual Henry J. Kaiser Family Foundation, or KFF, reports. Surveys were conducted for the years 2002 through 2012 (inclusive), with the exception of 2007 and 2010. Eligibility caps for non-survey years were constructed using data in the preceding and succeeding years, and information available in the footnotes of the KFF reports for these years. See The Henry J. Kaiser Family Foundation, "Annual Updates on Eligibility Rules, Enrollment and Renewal Procedures, and Cost-Sharing Practices in Medicaid and CHIP" (2000–2012), available at <http://kff.org/medicaid/report/annual-updates-on-eligibility-rules-enrollment-and/>; The Henry J. Kaiser Family Foundation, "Medicaid per Enrollee Spending: Variation

- across States” (2014), <http://kaiserfamilyfoundation.files.wordpress.com/2014/02/8550-medicaid-per-enrollee-spending-variation-across-states1.pdf>.
- 27 These two measures do not exhaustively capture variation in states’ practices. However, to the extent that states with generous Medicaid programs in these two respects are also generous to Medicaid-eligible populations in other respects, the eligibility threshold variables make useful proxies for overall Medicaid program generosity in each state. Importantly, including these threshold variables does not restrict the data sample to employed and unemployed parents, but is simply intended to capture two important sources of programmatic variation across states and time.
- 28 As noted above, we also tested models that included income eligibility thresholds for each state-year. Inclusion of these variables had no effect on other parameter estimates, and therefore no impact on inference.
- 29 That is, the precise predicted Medicaid decrease can be found by multiplying the estimated coefficient of 0.301 by the following calculated quantity: $\ln(\text{new minimum wage}) - \ln(\text{initial minimum wage})$. For small minimum wage increases, this calculated quantity is closely approximated by the percent increase in the minimum wage. For states that have a minimum wage of \$7.25 per hour, for example—a 10 percent increase in the wage to \$7.98—the predicted Medicaid enrollment decrease would be: $0.301 * [\ln(\$7.98) - \ln(\$7.25)] = 0.292$ percentage points. Basis points are a commonly used measure of the change in percentage points; one basis point is equal to one hundredth of a percentage point.
- 30 The minimum wage coefficient in the linear probability model predicts the percentage-point change in the probability that at least one member of a particular family will be enrolled in Medicaid, with respect to a change in the natural log of the minimum wage. When applied over a large number of families we are able to draw upon the law of iterated expectations, and interpret the estimated coefficient as a decrease in the mean of enrollment—that is, a decrease in the enrollment rate.
- 31 Congressional Budget Office, “The Effects of a Minimum Wage Increase on Employment and Family Income” (2014).
- 32 The Henry J. Kaiser Family Foundation, “Status of State Action on the Medicaid Expansion Decision.”
- 33 In this and subsequent comparisons of expansion and nonexpansion states, unless noted otherwise, states are weighted according to the number of resident families.
- 34 We draw upon data from fiscal year 2010 compiled by the Henry J. Kaiser Family Foundation to separate enrollment and spending into four groups: aged, disabled, adults, and children. See The Henry J. Kaiser Family Foundation, “Medicaid per Enrollee Spending: Variation across States” (2014), <http://kaiserfamilyfoundation.files.wordpress.com/2014/02/8550-medicaid-per-enrollee-spending-variation-across-states1.pdf>.
- 35 Federal Medical Assistance Percentages, or FMAPs, the percentage of Medicaid expenditures for which the federal government reimburses states, do change from year to year, but the changes are based primarily on per capita income, and are not substantial.
- 36 Excluding Pennsylvania, total expenditure reduction in nonexpansion states over one decade would be about \$22.7 billion.
- 37 Council of Economic Advisers, *Missed Opportunities: The Consequences of State Decisions Not to Expand Medicaid* (Executive Office of the President, 2014), available at www.whitehouse.gov/sites/default/files/docs/missed_opportunities_medicaid.pdf.
- 38 An Urban Institute study estimated that 18.5 percent of the costs of uncompensated care—\$10.6 billion in the year 2008—was borne by state and local governments. See John Holahan and Bowen Garrett, “The Cost of Uncompensated Care with and without Health Reform” (Washington: Urban Institute, 2010), available at http://www.urban.org/UploadedPDF/412045_cost_of_uncompensated.pdf.
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- 44 The problem of underreporting could not necessarily be circumvented by drawing upon alternative data sources: Meyer et al. (2009) report that similar underreporting is present across four other household datasets and nine other transfer programs.
- 45 Robert Wood Johnson Foundation, “Why Do Household Surveys Undercount Medicaid Enrollment?” (2011), available at http://www.rwjf.org/content/dam/farm/reports/program_results_reports/2011/rwjf69432.
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- 49 Justin Wolfers, “Did Unilateral Divorce Laws Raise Divorce Rates? A Reconciliation and New Results,” *American Economic Review* 96 (5) (2006): 1802–1820.
- 50 Allegretto and others, “Credible Research Designs for Minimum Wage Studies.”

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