Do states adjust Medicaid enrollment in response to capitation rates? Evidence from the Medicare Part D clawback

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Abstract

To curb rising Medicaid costs at the federal level, a number of recent policy proposals suggest capitation financing, under which program costs are fixed per beneficiary. This study examines to what extent more generous capitated federal subsidies would likely cause states to increase Medicaid enrollment. To answer this question, the analysis identifies a component of Medicaid that currently relies on capitation financing – the clawback provision in Medicare Part D – and uses that provision to estimate state responses to capitation rates. Specifically, the clawback requires states to pay the federal government a lump sum for each Medicaid enrollee who is also eligible for Medicare (dual-eligible). The size of the lump sum varies across states, based on a historical artifact: state-level prescription drug spending for dual-eligibles in 2003. Thus, the price of enrollment in any year after 2006, when Part D went into effect, is exogenous conditional on the 2003 price. The analysis shows that this within-state rigidity in the clawback formula creates substantial transfers between the federal government and the states, as well as among the states. It further finds that increasing clawback payments per dual-eligible by $100 would lead to a 2-percentage-point decrease in the share of dual-eligibles enrolled in Medicaid.

Introduction

Medicaid is one of the most expensive items in state budgets. In 2016, the program averaged 29 percent of total expenditures for the 50 states, more than doubling since 1990 (Medicaid and CHIP Payment Access Commission 2018; and National Association of State Budget Officers 2016). Since the federal government contributes a certain amount for every Medicaid dollar a state spends, growth in Medicaid costs also puts pressure on the federal budget. This pressure has led to calls for shifting a greater share of costs to the states. To accomplish this shift, a number of recent proposals to limit the growth of federal Medicaid spending would replace the current financing structure with per-beneficiary transfers from the federal government to the states.[1]

Academics and policymakers have long recognized that per-beneficiary financing structures would affect the number of people that states are willing to enroll in Medicaid (Cody 2005; Rosenbaum et al. 2016; and Clemens and Ippolito 2018). Efforts to pin down the elasticity of enrollment with regard to capitation rates have proven difficult because per-beneficiary financing has not been widely applied in the Medicaid setting to date.[2] This paper identifies a component of Medicaid that is currently paid for through capitation, and uses that provision to examine how enrollment responds to the generosity of federal transfers.

The analysis takes advantage of an often-overlooked element of state Medicaid spending known as the clawback. The clawback is a consequence of the Medicare Modernization and Prescription Drug Act (MMA), enacted in December 2003, which created Medicare Part D. Although Part D is largely funded by the federal government, the MMA reallocates some costs to

[1] For example, Rep. Paul Ryan's *A Better Way* offered states the option of choosing a per-beneficiary financing method, while the House of Representatives-approved American Health Care Act would have capped federal spending per beneficiary. Recent similar proposals include the Health Accessibility, Empowerment, and Liberty Act of 2016, proposed by Rep. Pete Sessions and Sen. Bill Cassidy; the Patient Freedom Act of 2017, proposed by Sen. Bill Cassidy and Susan Collins; and the House budget proposal "A Brighter American Future," proposed in 2018 by Rep. Steve Womack.

[2] Capitation is widely used in Medicare Advantage (MA), however. See, for example, Cabral, Geruso, and Mahoney (2018) for a thorough analysis of the effects of capitation in that context. Many differences between the settings of Medicaid and MA prevent straightforward application of estimates from one to the other. The most crucial difference is that MA involves private insurers competing with each other and charging premiums, while Medicaid is a state-run single insurer with generally no premiums. Profit maximization incentives in the former would not apply to Medicaid, and fiscal constraints on Medicaid would not apply to MA plans. Furthermore, Medicaid managed care also applies capitation, however this financing arrangement is between states and healthcare providers, rather than the federal government and the states.

the states.[3] The justification for this reallocation is that when the MMA went into effect in 2006, dual-eligibles (individuals who are eligible for both Medicare and Medicaid) were automatically enrolled in a Part D prescription drug plan. The transition to Part D shifted the cost of prescription drug coverage from Medicaid to Medicare – and from states to the federal government. To offset this transfer, states are required to pay a clawback equal to a portion of the costs assumed by the federal government. Because Medicaid expenditures are so large, the clawback is an easy budget item to miss. Yet, in absolute terms it involves substantial transfers from the states to the federal government. In 2016, the transfers averaged $187 million per state (over $9.3 billion in total), ranging from $12 million in Wyoming to $1.7 billion in California.[4]

The clawback mirrors federal capitation proposals, but inverts their estimated effects. Under capitation, states would receive a fixed payment per enrollee and bear the risk of any variation in per-enrollee costs. In contrast, the clawback absolves states of all prescription drug-related risk, but requires them to remit a fixed cost per-enrollee to the federal government. Hence, when states decide whether to encourage Medicaid enrollment, they must consider both the fixed cost of covering another beneficiary (the clawback) as well as a variable cost (non-drug Medicaid spending) that is influenced by the federal match rate.

To make sense of these incentives, the analysis begins by developing a simple model. Under reasonable assumptions, the model shows that increasing the clawback payment unequivocally reduces the number of dual-eligibles enrolled in Medicaid.[5]

The paper then turns to an empirical examination of the policy, which legislates state payments based on 2003 drug expenditures per dual-eligible. Specifically, clawback payments are based on each state's prescription drug spending per dual-eligible in 2003, indexed annually by the change in national drug spending, and adjusted for the state's legislated share of total Medicaid costs.

Since the clawback has been studied very little to date, the first half of the empirical analysis describes the implications of the clawback formula for state costs, with particular

[3] Part D is also financed by premiums paid by enrollees and manufacturer rebates.

[4] Clawback payments made up 6.5 percent of all 2016 state health and hospital expenditures. See National Association of State Budget Officers (2016) and U.S. Census Bureau (2016).

[5] The model also suggests a full flypaper effect, where the structure of Medicaid financing does not affect spending on other budget items (See Fisher and Papke (2000); Gordon (2004); Hines and Thaler (1995); and Knight (2002) for an overview). Unfortunately, data limitations prevent this study from exploring intensive margin responses and the flypaper effect.

emphasis on possible cross-subsidization between the federal government and the states. If drug spending for the dual-eligible population grows faster than drug spending overall, then the federal government subsidizes the states.[6] If drug spending for this population grows faster or slower than the national average in some states, then cross-state subsidies will emerge, with some states underpaying and others overpaying.[7] To assess these possibilities, the analysis compares actual clawback payments to counterfactual payments based on each state's drug spending for dual-eligibles in the previous year.

The descriptive analysis suggests that, between 2006 and 2012, the federal government subsidized the states beyond the standard match rate. Furthermore, some states benefitted disproportionately from this subsidy. In 2012, the federal subsidy totaled $1.5 billion, and cross-state subsidization ranged from 8.3-percent overpayment in Wyoming to 38-percent underpayment in Arizona.

The second half of the empirical analysis tests the implications of the theoretical model for enrollment when the federal government increases the fixed fee charged for each enrollee. This analysis relies on the exogenous portion of the clawback – the 2003 cost per dual-eligible – as an instrument for states' capitation rates. A dose-response model of Medicaid enrollment reveals that states facing a higher capitation price for enrolling dual-eligibles do, in fact, enroll a smaller share of them.[8] The estimates suggest that a $100 increase in a state's per-capita clawback payment decreases the fraction of elderly dual-eligibles enrolled in Medicaid by 2 percentage points.

The rest of the paper proceeds as follows. The next section provides background on the clawback's history, structure, and similarities to proposed financing mechanisms for Medicaid. Section 3 presents a simple conceptual framework for the analysis. Section 4 describes the data and empirical design for estimating the clawback's effect on dual-eligible enrollment. Section 5 describes the results of the analysis. Section 6 concludes that, as currently formulated, the

[6] States receive an aggregate transfer when the growth rate of prescription drug spending for low-income elderly and people with disabilities is greater than for the general population. This discrepancy could occur if health inequality by income leads low-income populations to require more prescription drug treatment than is required by the general public. A large literature documents inequality in health outcomes by income. See, for example, Cutler, Lleras-Muney, and Vogl (2012), and Chetty et al. (2016).

[7] Adler, Fiedler, and Gronniger (2017) show large variation in the growth of dual-eligible Medicaid spending between 2000 and 2011.

[8] Here and throughout the remainder of this paper, the share of dual-eligibles enrolled refers to those eligible for Medicaid under the federal government's minimal requirements. Thus, states can conceivably increase this share by relaxing state-level eligibility criteria, among other potential levers the state has to increase enrollment.

clawback results in cross-subsidization between the federal government and the states, and that states respond to the generosity of capitation rates by adjusting the extensive margin of coverage.

Background

Medicaid is a public, means-tested health insurance program. While the federal government establishes minimum coverage standards, the program is administered at the state level, resulting in wide variation in eligibility criteria, services covered, and bureaucratic details of application. Of particular importance for this paper, states have considerable influence over enrollment through their control of income and asset limits; categorical requirements (e.g., allowing childless individuals to enroll); and the ease of application (for example, by requiring more or less evidence of low income).

However, although states vary in the exact rules and procedures they use to determine benefit receipt, two groups that must be covered (at least to some extent) are low-income individuals receiving Social Security Disability Insurance or over age 65. These low-income individuals are called dual-eligibles, since they are also covered by the other main government-sponsored health insurance program, Medicare. This population is nevertheless still subject to state discretion in Medicaid outreach, as well as income and asset eligibility criteria. For example, enrollment rates among the elderly dual-eligibles vary widely across states, from a minimum of 31 percent to a maximum of 170 percent (in 2005, see Table 1).[9]

Medicare was established alongside Medicaid in 1965 to cover the aged and those with disabilities. Unlike state Medicaid programs, which have long provided prescription coverage, Medicare did not initially include coverage for outpatient prescription drugs, and this gap persisted until 2006. At that point, the MMA went into effect and established the Medicare Part D prescription drug benefit for all Medicare beneficiaries, including those simultaneously eligible for Medicaid.

The need for a clawback emerged because of the different financing regimes of Medicare and Medicaid. Medicare Part D is financed primarily by the federal government, with some contribution of premiums paid by enrollees. In contrast, Medicaid is financed jointly by the federal government and the states through a matching structure. For every dollar that states

[9] The fraction of dual-eligibles enrolled can exceed 100 percent, since the fraction is based on the minimal federal eligibility criteria and states can choose to loosen those criteria.

spend on Medicaid enrollees, the federal government matches a certain number of dollars so that the share of federal spending out of total spending on an enrollee is determined by the Federal Medical Assistance Percentage (FMAP), which varies between a floor of 50 percent and a cap of 83 percent. The FMAP is inversely proportional to the ratio of state average income to national average income.[10]

The matching structure of Medicaid meant that, before Part D, states shouldered some of the costs of providing prescription drugs for their dual-eligibles. After Part D, had nothing been done, the entire burden would have fallen on the federal government. To offset this change, the states pay the federal government a lump sum per enrolled dual-eligible, with the size of the transfer for state *s* in year *t* determined by the formula:[11]

$$\begin{aligned} Clawback_{s,t} = [&Per\ Capita\ 2003\ Drug\ Cost\ for\ Dual\ Eligibles_s \\ &* Increase\ in\ National\ Drug\ Spending\ Since\ 2003_t \\ &* Phase\ Down\ Percent_{s,t} * State\ Medicaid\ Share_{s,t} \\ &* Medicare\ Drug\ Rebate\ Percent_t] \\ &* \ Number\ of\ Enrolled\ Dual\ Eligibles_{s,t} \end{aligned}$$

The important feature of this formula is that clawback payments are only loosely tied to a state's actual spending on prescription drugs for dual-eligibles. To see why, note that the price of the clawback per dual-eligible equals the state's actual spending in 2003, adjusted for the state's FMAP and increased annually by a federally determined growth factor that is constant across all states. In 2006, the first year of Medicare Part D, the Centers for Medicare and Medicaid Services (CMS) set this growth factor equal to the national growth in per-capita

[10] The formula is $FMAP = 1 - 0.45 * \frac{State\ per\ capita\ income^2}{U.S.\ per\ capita\ income^2}$, with a minimum of 0.5 and a maximum of 0.83. In practice the upper bound has not generally been binding. In 2018 Mississippi had the highest FMAP, of 75.65 percent.

[11] It is unclear whether the clawback was meant to fully offset the federal subsidy to the states, at least at first. The phase down in the clawback formula started at 90 percent in 2006 and gradually declined to 75 percent from 2015 and on. This would limit the gain the states could see from the transfer of costs to the federal government at least for the first few years of the Part D program. Furthermore, some states foresaw clawback payments eclipsing the cost reduction that would result from transferring responsibility for the prescription drug coverage of the dual eligibles. Political disputes over the clawback formula were presented to the Supreme Court, which ultimately chose not to take up the suit. For some details of these debates see Cody (2005) and Weeks (2007).

prescription drug expenditures,for all populations between 2003 and 2006 (Centers for Medicare and Medicaid Services 2016). After 2006, the growth factor has equaled the national growth in per-capita prescription drug expenditures for the Medicare Part D population (but still not the growth in drug spending per dual-eligible).[12] Consequently, the variation in the price is largely due to cross-state variation in 2003 per-capita drug costs, which is truly fixed. This cross-state variation in the price of enrolling dual-eligibles forms the basis for the empirical strategy elaborated in the methodology section.

Conceptual Framework

Before delving into the empirical analysis, it is helpful to have a simple conceptual framework for predicting how states choose the generosity of Medicaid insurance for dual-eligibles. The model developed in this section includes a fixed cost – similar in nature to the clawback payment – that states must pay per dual-eligible enrolled, leading to extensive margin incentives (e.g., limiting enrollment by tightening asset requirements). It also contains a variable cost of providing high-quality insurance to enrollees – similar to non-drug Medicaid expenditures where state spending is matched by the federal government – creating intensive margin incentives (e.g., increasing cost-sharing requirements on patients).

Specifically, let n be the share of dual-eligible residents enrolled in Medicaid; x the quality of their insurance; and c the spending by the state on other budgetary priorities. The state maximizes a utility function parameterized as the log of the product of the share enrolled and the quality of their coverage, as well as a separable, quasi-linear value derived from other spending, subject to some budget constraint, B:[13]

$$U(n, x, c) = \ln(xn) + c$$

$$\tau n + n\pi(x) + c - B \leq 0$$

[12] The formula also adjusts per-capita drug costs by a rebate percentage that reflects negotiated agreements between Medicare and individual drug manufacturers.

[13] Logs are used in this optimization problem for expositional clarity; the qualitative results hold with a general concave function. The separability of c in the state's objective function seems plausible, implying the state's valuation of spending on, for example, education, is not directly affected by the number of dual-eligibles enrolled or the quality of their coverage. The linearity of the function in c supposes that in the relevant range of spending the state does not face declining marginal utility.

Where τ is a fixed cost per-capita of enrolling a dual-eligible in Medicaid, and $\pi(x)$ is a cost function of insurance quality that is positive and increasing, with increasing marginal costs.[14] Denote the optimal enrollment and quality as n^* and x^*, respectively.

Straightforward optimization implies that:

$$n^* = \frac{1}{\pi(x^*) + \tau}$$

And:

$$x^* = \frac{\pi(x^*) + \tau}{\pi'(x^*)}$$

Taking the comparative static of n^* with respect to τ yields:

$$\frac{\partial n^*}{\partial \tau} = -\frac{1}{\left(\pi'(x^*)\frac{\partial x^*}{\partial \tau} + \tau\right)^2} < 0$$

Under the intuitive assumptions in this simple framework, the share of dual-eligibles enrolled in Medicaid should unambiguously decline as the fixed cost of enrolling them increases. The empirical analysis will confirm that this reaction did, in fact, take place, and that states facing larger clawback payments experienced lower enrollment, all else equal.

A similar comparative static for the quality of coverage does not lead to such clear-cut predictions. Depending on the functional form of $\pi(x)$ and the objective function, states will either offset some of an increase in the fixed cost by also reducing the generosity of coverage; or, alternatively, states may substitute away from extensive coverage and towards more generous insurance for fewer people. For example, solving for the case where $\pi(x) = x^2$ implies that $x^* = \sqrt{\tau}$, which is clearly increasing in τ.

The final result from this framework is that the optimal level of other spending, c^*, does not depend on τ, $\pi(x)$, n, or x; in other words, total spending on dual-eligibles will be constant at the optimum, regardless of any changes in the cost of enrolling them. This result derives directly

[14] As a further technical requirement to prevent corner solutions, assume $\tau>1$.

from the assumed quasi-linearity of the objective function in c, which implies that the marginal value of non-Medicaid budget items is constant.[15] This result is similar to the well-known flypaper effect: changes in the cost of enrolling dual-eligibles will not spill over to other elements in the state budget. One can imagine such a scenario if the highest branches of state government make optimal decisions about agency funding levels, and agency-specific bureaucrats then optimize service delivery.

Methodology

This section describes the empirical methodology adopted in the remainder of this paper. Since the Part D clawback has been little studied to date, the first phase of the methodology develops a measure of intergovernmental subsidization to demonstrate how the clawback's legislated formula divorces a state's prescription drug costs from actual spending on drugs for dual-eligibles. The second phase then presents a dose-response regression framework to test the predictions of the theoretical model described above. The dose-response analysis focuses on elderly dual-eligibles, as opposed to younger adults with disabilities, because the elderly comprises a majority of all dual-eligibles and because the two populations are fundamentally different.

Intergovernmental Subsidization of Dual-Eligible Prescription Drug Spending

The first phase of the empirical analysis explores whether the rigid nature of the clawback formula decouples a state's fixed cost of enrolling dual-eligibles from actual spending on prescription drugs. To do this, the analysis calculates counterfactual clawback payments assuming that the formula referenced a state's actual drug spending on dual-eligibles in the prior year, as opposed to spending in 2003 indexed by national drug costs. Specifically, counterfactual payments are calculated using a new version of the clawback formula:

[15] In particular, $c^* = B - 1$. Thus, states make choices about Medicaid implementation independently of other budgetary decisions, such that total Medicaid spending is fixed.

$$Counterfactual\ Clawback_{s,t}$$
$$= [Prior\ Year\ Drug\ Cost\ for\ Dual\ Eligibles_{s,t} * Phase\ Down\ Percent_{s,t}$$
$$* State\ Medicaid\ Share_{s,t} * Medicare\ Drug\ Rebate\ Percent_t]$$
$$* Number\ of\ Enrolled\ Dual\ Eligibles_{s,t}$$

where prior year drug spending by dual-eligibles in state *s* and year *t* replaces the CMS estimate, which trends a state's 2003 spending forward by a national growth rate.

The comparison of actual and counterfactual clawback payments relies on two data sources: the National Association of State Budget Officers (NASBO) publishes data on actual state clawback payments from 2006 to 2018; while the *Medicare Medicaid Linked Enrollee Analytical Data Source* (MMLEADS) tracks the number of dual-eligibles and Medicaid spending on their prescription drugs from 2006 to 2012.[16] Phase-down percentages – a component of the formula – come directly from the clawback legislation. Similarly, rebate percentages for prescription drugs covered by Medicare are drawn from the *Medicare Trustees Report* (2006-2012) published by the Boards of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds. .

The Effect of Per-Capita Fixed Costs on Enrollment

The second phase of the analysis uses the clawback formula to estimate how states respond to the size of required capitation payments. As described in the background section, the empirical analysis relies on legislated prices for enrolling dual-eligibles that may not represent actual drug spending in each state. Of course, these prices are likely correlated with unobservable state characteristics that also affect enrollment, such as state income or public health. To purge the estimates of such biases, the main analysis will rely on an element of the price per-capita that is neither manipulable by the states nor correlated with time-varying state characteristics: the 2003 drug cost per dual-eligible.

[16] The MMLEADS extracts data from the restricted *Medicaid Statistical Information System* (MSIS). NASBO aggregates data by state fiscal years, which typically run from July to June, whereas the CMS aggregates data by calendar years. For consistency, this analysis translates the NASBO data to calendar years by taking an average of the current and subsequent fiscal year. For example, if state fiscal year 2012 runs from July 1, 2011 through June 30, 2012, then calendar year 2012 corresponds to half of fiscal year 2012 and half of fiscal year 2013.

The main analysis is implemented through a dynamic dose-response regression estimated at the state level between 2000 and 2018. Ideally, this paper would use the clawback quasi-experiment to identify all of the parameters in the simple model above – both on the extensive margin of enrollment (n) and the intensive margin of quality (x). Unfortunately, reliable data on state Medicaid spending for dual-eligibles, which would be required to measure the intensive margin, are only available from 2006-2012.[17] Consequently, this study focuses on the extensive margin of enrollment, which does not require substantial spending data and can be estimated over the period 2000-2018.

The dose-response explores the association between per-capita prescription drug costs in 2003 and the Medicaid enrollment of elderly dual-eligible beneficiaries over time (particularly after the launch of Part D in 2006):

$$Fraction\ Enrolled_{s,t} = \alpha + \beta_1(Price\ in\ 2003_s) + \boldsymbol{\beta_2}(\boldsymbol{Year_t}) + \boldsymbol{\beta_3}(Price\ in\ 2003_s * \boldsymbol{Year_t}) + \varepsilon_{s,t}$$

In each state (s) and year (t), the dependent variable measures the fraction of individuals jointly eligible for Medicaid and Medicare who are actually enrolled in Medicaid. This variable is calculated from the *Current Population Survey*, which is produced by the U.S. Census Bureau. The denominator includes residents who are ages 65 or above and have household income below the size-adjusted federal poverty line or are receiving Supplemental Security Income.[18] The first independent variable, $Price\ in\ 2003_s$, reflects the natural log of 2003 per-capita spending on drugs for dual-eligibles, as documented by the Kaiser Family Foundation (2005). Values vary across states, but are constant over time. The regression includes a vector of year fixed effects, with 2005 as the omitted year, and interacts the $Price\ in\ 2003_s$ variable with these year fixed effects to see how the association between price and quantity evolves over time. If clawback payments caused state governments to reduce the enrollment of dual-eligibles, then the vector of

[17] The CMS publishes two sets of estimates of dual-eligible Medicaid spending by state and year. Although one set of estimates spans the entire time period necessary to estimate the dose-response regression, it lacks data on certain states and in certain years, and is inconsistent with the more reliable MMLEADS.

[18] This is the minimal criterion for full Medicaid eligibility at the federal level. In addition, eligibility for some reduced benefits persists for somewhat higher incomes, such as through the Specified Low-Income Medicare Beneficiaries program, which covers individuals with up to 120 percent of the federal poverty line.

coefficients measuring the association between price and quantity, $\boldsymbol{\beta_3}$, should become negative after 2006. Throughout the analysis, regressions are estimated with Ordinary Least Squares and standard errors are clustered at the state level.

The analysis assumes that the association between dual-eligible enrollment and drug spending in 2003 would have remained at its 2005 level had the MMA not taken effect in 2006. In other words, a state's drug spending in 2003 may be correlated with the fraction of dual-eligibles enrolled in Medicaid for many reasons other than the clawback, such as the local political climate, but this study assumes that such unobserved factors did not change systematically after 2006. While the assumption is fundamentally impossible to test, it gains credibility if the association between $Price\ in\ 2003_s$ and $Fraction\ Enrolled_{s,t}$ remained constant during the years leading up to 2006 (equivalent to a test of parallel pre-trends). By estimating the association in every year between 2000 and 2006, the dynamic dose-response regression includes this parallel pre-trends test.

However, the annual dose-response estimates are often statistically imprecise because of the small number of states. Consequently, the analysis also implements a two-period dose-response design, represented by the following equation:

$$Fraction\ Enrolled_{s,t} = \alpha + \beta_1(Price\ in\ 2003_s) + \beta_2(Post_t) + \beta_3(Price\ in\ 2003_s * Post_t) + \varepsilon_{s,t}$$

This regression trades the year fixed effects for a dichotomous variable, $Post_t$, that is equal to one if the state-year observation falls after 2005. As before, β_3 is the main coefficient of interest, reflecting the interaction of $Post_t$ with $Price\ in\ 2003_s$. Unlike before, β_3 is estimated off of 300 observations in the pre-clawback period and 650 observations in the post period, enhancing statistical precision.

Although the regressions focus on per-capita drug spending in 2003 as a plausibly exogenous source of cross-state variation in clawback payments, state costs in practice also depend on the matching rate from the federal government, the FMAP.[19] Controlling for the

[19] Components of the clawback formula that are constant across states, such as the phase-down percentage, might cause all states to change their enrollment patterns, but would not cause systematic differences across states. These would be controlled for by the year fixed effects.

FMAP could reduce statistical noise and help isolate the effect of $Price\ in\ 2003_s$. Yet, doing so also might introduce endogeneity bias because the FMAP is based on personal income, which also determines Medicaid eligibility (the denominator of $Fraction\ Enrolled_{s,t}$), and could itself be affected by the health care provided to dual-eligibles (reverse causation).[20] Consequently, the main results do not control for the FMAP or for state economic conditions more broadly. Fortunately, robustness checks that include these controls are nearly identical to the main results. Furthermore, specifications including controls also include year and state fixed effects.[21]

Results

This section presents results, first focusing on the cross-subsidization occurring between governments and then examining how the size of required clawback payments affects enrollment.

Intergovernmental Subsidization of Dual-Eligible Prescription Drug Spending

Figure 1 presents the total clawback remitted to the federal government by all the states between 2007 and 2012, as well as the total counterfactual clawback that states would have remitted under the new formula. The figure reflects the fact that drug spending by dual-eligibles grew much more rapidly between 2003 and 2006 than drug spending by all populations nationally (the growth factor in the legislated clawback formula). Consequently, in 2007, the federal government received $132 less per dual-eligible than it would have received had the states based their clawback payments on prior-year spending. This counterfactual underpayment persisted throughout the decade; in 2012, the federal government received $194 less per dual-eligible (approximately $1.46 billion in total) than it would have otherwise.

This aggregate subsidy, however, may not have persisted beyond 2012. Figure 2 compares the cumulative growth in per-capita prescription drug spending by dual-eligibles to the growth rates estimated by CMS over time. Between 2003 and 2006, actual spending grew 7 percentage points more than estimated, whereas by 2011, per-capita spending was only 3

[20] For an example of the second concern, consider a hypothetical scenario where state governments react to the MMA by postponing investments in roads and bridges, slowing the growth of the state's economy. Or, states react by enrolling fewer of the elderly poor in Medicaid, which reduces labor force participation due to untreated health conditions, and slows the growth of the state's economy.

[21] When state fixed effects are included, they absorb the base $Price\ in\ 2003_s$ variable, which does not vary within state.

percentage-points higher than estimated. By 2012, the cumulative growth in actual spending dropped slightly below the CMS estimate, implying that the states began to subsidize the federal government in aggregate. This finding is consistent with Keohane et al. (2018), who show that dual-eligible spending growth slowed dramatically around 2010 relative to the general Medicare population, and with Cutler et al. (2019), who document that the growth of medical spending by the elderly declined during this period.[22] Extrapolating beyond 2012, the direction of the aggregate subsidy will depend on how the dual-eligibles utilize prescription drugs relative to the Medicare Part D population overall.

Not only does the aggregate subsidy change over time, but the states also vary dramatically in their degree of subsidization. Figure 3 reveals that Arizona, South Carolina, and Indiana were the three most subsidized states in 2012 – underpaying by around 35 percent on average relative to the counterfactual clawback – while Wyoming, Oregon, and Tennessee are the least subsidized, overpaying by around 6 percent. The median state – Missouri – paid 10 percent less than it would have had the clawback formula referenced prior-year drug spending.

Mechanically, the degree of subsidization depends on the state-specific growth of dual-eligible prescription drug spending, which is determined by an idiosyncratic combination of drug prices and utilization. As shown in Figure 4, the five most-subsidized states in 2012 experienced 92-percent growth in drug spending for dual-eligibles between 2003 and 2012, whereas the five least subsidized states only experienced 34-percent growth. The CMS estimate of drug spending fell between these two extremes, at 55 percent. Interestingly, however, the state variation in growth rates did not seem to correlate with geographic region (Figure 3).

The state variation in growth rates was also uncorrelated with traditional measures of economic performance. Figure 5 compares mean underpayment of clawback (actual versus counterfactual clawback payments) across the distribution of per-capita personal income and state GDP.[23] The figure suggests that the federal subsidy of state clawback payments may have

[22] Cutler et al. (2019) were unable to look beyond 2012 due to the same data limitations encountered in this study.
[23] The analysis relies on per-capita personal income and state GDP published by the U.S. Bureau of Economic Analysis (2006-2012). Although the comparison in Figure 5 spans the years 2007 to 2012, a state's position within the national distribution is determined annually. Re-indexing the states each year avoids conflating secular trends in clawback underpayment with concurrent growth in national income and GDP. The averages weight each state equally because the conceptual unit of interest is a state budget, rather than an individual state resident or dual-eligible.

been slightly progressive between 2007 and 2012, with the poorest and least productive states receiving a larger subsidy than richer states, but the relationship is weak.[24]

The Effect of Per-Capita Fixed Costs on Enrollment

This section reports on whether states react to the size of clawback payments by adjusting the fraction of elderly dual-eligibles enrolled in Medicaid. Table 1 displays summary statistics in 2005 (pre-reform) for the variables of interest. The fraction of elderly dual-eligibles enrolled in Medicaid (defined using the minimum federal eligibility criterion) ranged from 31 percent in New Hampshire to 170 percent in Alaska. Similarly, drug expenditures per dual-eligible in 2003 ranged from $123 per month in Arizona to $262 per month in New Jersey. Most of the variables extend from 2000 to 2018 except for GDP per capita, which is currently available through 2017.[25]

Figure 6 plots the association between $Price\ in\ 2003_s$ and $Fraction\ Enrolled_{s,t}$ in every year from 2000 to 2018 (the vector of coefficients $\boldsymbol{\beta_3}$ from the dynamic dose-response regression), relative to the association in 2005 (the omitted year). Since $Price\ in\ 2003_s$ is measured in natural logs, each coefficient represents the correlation, in percentage points, between $Fraction\ Enrolled_{s,t}$ and a 100-percent increase in $Price\ in\ 2003_s$. As expected, the association trends down starting in 2007, indicating that states with a higher fixed price per dual-eligible enrolled increasingly fewer of them after the implementation of Medicare Part D. Reassuringly, the parallel trends assumption seems to hold in the years prior to 2006. The downward trend that begins in 2007 is not statistically significant in most years due to the existence of only 50 state governments.

Table 2 presents results from the two-period dose-response regression that combines multiple years. The first column does not include any control variables, while the second and third columns control for state fixed effects, year fixed effects, and a host of state-level variables

[24] A linear regression of percent underpayment on income or GDP quintile, with year fixed effects and state-level clustering, does not find statistically significant differences. Results are available from the authors upon request. An alternate measure of progressivity recalculates each state's FMAP to incorporate total spending on prescription drugs for the state's dual-eligible population (see Appendix Table A1). In 2012, all of the states see their FMAP increase by 1.8 percentage points, on average, because the clawback formula contains a phase-down percentage that explicitly reduces the state share. However, between 2007 and 2012, no consistent correlation emerged between the legislated FMAP and the change in the FMAP after incorporating prescription drug spending.

[25] For this reason, this section of the analysis relies on per capita personal income estimates from the *American Community Survey*.

that measure economic conditions. Before the clawback came into effect, column (1) indicates that a 10-percent increase in $Price\ in\ 2003_s$ was associated with a 1.6-percentage point increase in the fraction of dual-eligibles enrolled in Medicaid (not statistically significant). Perhaps unsurprisingly, states that provided generous prescription drug insurance to dual-eligibles also had more generous enrollment policies before the MMA went into effect. The clawback caused a 2.3-percentage-point reduction in the fraction enrolled for every 10-percent increase in $Price\ in\ 2003_s$, such that the overall association became significantly negative ($p<0.05$).

Column (2) confirms that state economic trends are not confounding the results. Control variables include year and state fixed effects, the state's FMAP (which varies over time), the age structure of the population, the fraction of residents with incomes below 138 percent of the federal poverty line (who, in Medicaid expansion states, would have been eligible for Medicaid below age 65 after 2014 under the Affordable Care Act), the state's unemployment rate, and the log of per-capita state GDP. The coefficient on the interaction between $Price\ in\ 2003_s$ and the post-period indicator remains stable, although it loses some statistical significance in column (2) because the state GDP data only extend to 2017. Exchanging the GDP control for the log of per-capita personal income in column (3) restores the statistical significance and maintains the effect size.

While Table 2 displays results from a reduced-form estimation of the effect of 2003 prices on enrollment, ideally the analysis would reveal how increasing actual state clawback payments affects the fraction of dual-eligibles enrolled in Medicaid (rather than increasing $Price\ in\ 2003_s$). This preferred interpretation is easy to obtain through an instrumental variables (IV) regression, where $Price\ in\ 2003_s$ instruments for a new independent variable, $Clawback\ Payment\ Per\ Capita_{s,t}$.

This IV regression is implemented in Table 3 using two-stage-least-squares.[26] Note that the first-stage regression in column (1), which is mechanically determined by the clawback formula, measures the average relationship between $Price\ in\ 2003_s$ and $Clawback\ Payment\ Per\ Capita_{s,t}$ across the states in all the years considered in the analysis. Column (2) replicates the reduced-form regression in column (1) of Table (2) for the years 2000

[26] As before, the per-capita clawback variable combines data on total clawback payments from NASBO with MMLEADS data over the period 2000-2012. It is measured in levels, rather than logs, because it equals zero in years prior to 2006.

through 2012 (in which per-capita clawback data are available). The result of this new reduced-form is nearly identical to the main finding presented earlier. Lastly, column (3) displays the IV specification and reveals that a $100 increase in $Clawback\ Payment\ Per\ Capita_{s,t}$ leads to a 2-percentage point decrease in the share of dual-eligibles enrolled in Medicaid. [27]

Conclusion

Increasing healthcare costs have put pressure on both state and federal Medicaid budgets. A number of recent proposals would alter the structure of Medicaid financing so that the federal government subsidizes state spending with fixed dollar transfers per beneficiary, replacing the current system whereby the federal government matches each dollar of state spending at a legislated rate. This paper shows that states respond to the generosity of capitated federal transfers by adjusting the share of their low-income population actually enrolled in Medicaid.

The analysis relies on a natural quasi-experiment created by a provision of the MMA. This provision stipulates that states refund the federal government part of the cost of providing prescription drugs to beneficiaries enrolled in both Medicare and Medicaid. These state clawback payments are determined by a formula that contains a fixed cost per-beneficiary, effectively adding a capitation element to current Medicaid financing.

This paper begins by discussing the implications of the legislated formula for state spending on prescription drugs for dual-eligibles. The analysis demonstrates that the clawback creates unintended transfers between the federal government and the states, as well as substantial cross-state subsidization of prescription drugs for dual-eligibles. The magnitude and direction of these transfers depend on differences in trends of prescription drug spending across income levels nationally and across states. Between 2007 and 2012, the federal government subsidized the states by more than one billion dollars annually, but the pattern may have changed in recent years.

The analysis then turns to the quasi-experiment, showing that a $100 increase in required state capitation payments decreases the fraction of eligible elderly dual-eligibles enrolled in

[27] Regression results in Appendix Table A2 extend the IV analysis beyond 2012 by replacing the denominator of the per-capita clawback variable (which comes from the MMLEADS) with the number of elderly dual-eligibles enrolled in Medicaid reported by the ACS (2000-2017). The new variable displays the same aggregate trend as is reported in Figure 1, but is much noisier. Unsurprisingly, given the amount of statistical noise, the IV estimate in Appendix Table A2 is considerably smaller than that obtained using administrative data.

Medicaid by 2 percentage points. Assuming that a tax on enrollment is simply the inverse of a subsidy, this result implies that more generous federal subsidies would expand the Medicaid rolls. However, since the clawback formula retains a matching component in addition to the fixed cost – consistent with current Medicaid financing generally – the experiment does not reveal how states would respond to the transition from a pure matching structure to a pure capitation structure.

Of course, enrollment is not the only policy margin that states may adjust in response to changes in capitation rates. Future work may explore how states substitute between the extensive margin of coverage (enrollment) and the intensive margin (service quality). To this end, obtaining updated Medicaid spending data by beneficiary type seems like a first-order research priority.

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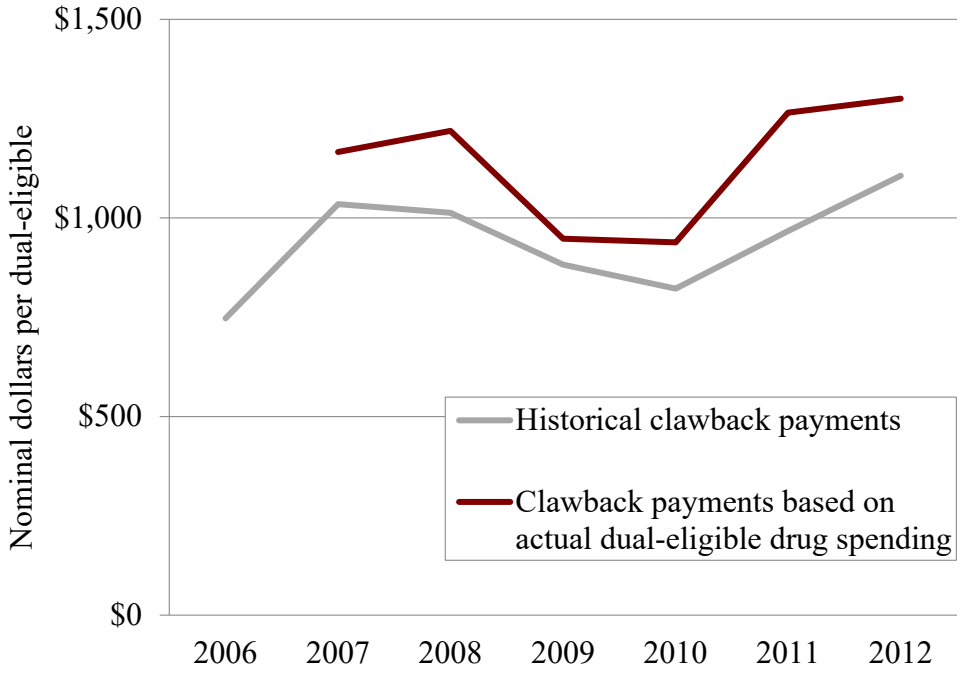
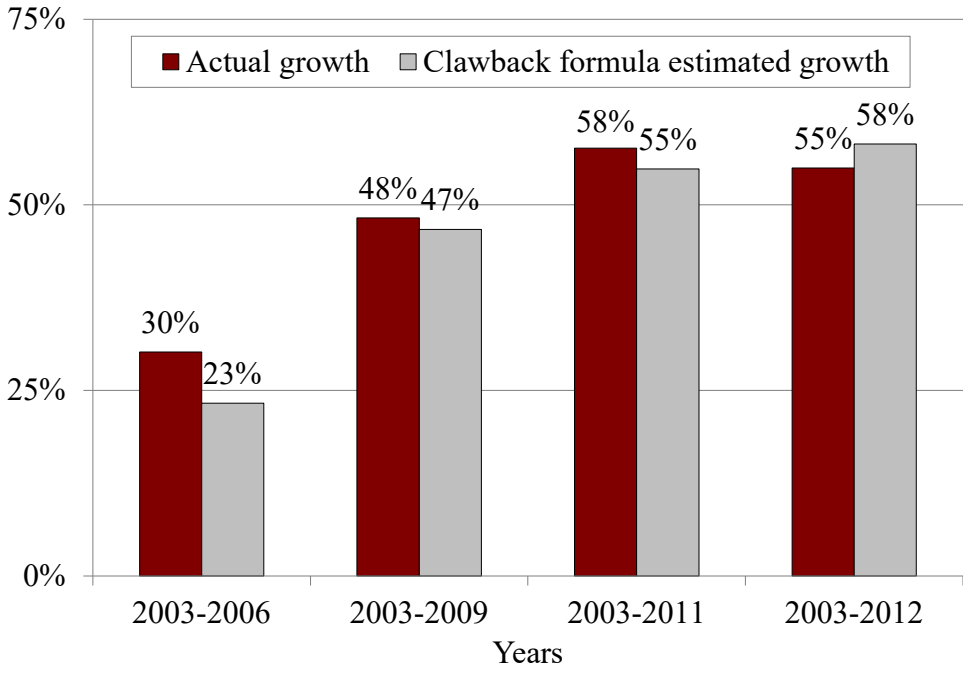
Figure 1. *National Aggregate Clawback Payments per Dual-Eligible, 2006(07)-2012*



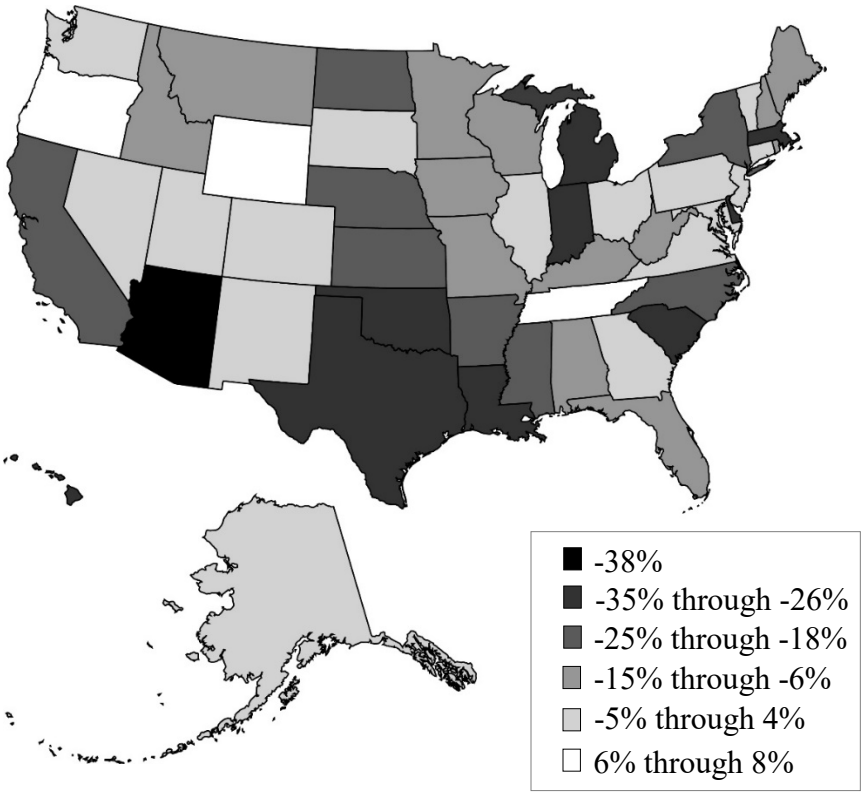
Sources: Authors' calculations from the Medicare-Medicaid Linked Enrollee Analytic Data Source (2006-2012); and the National Association of State Budget Officers (2006-2012).

Figure 2. *Cumulative Growth in Prescription Drug Spending per Dual-Eligible, 2003-2012*



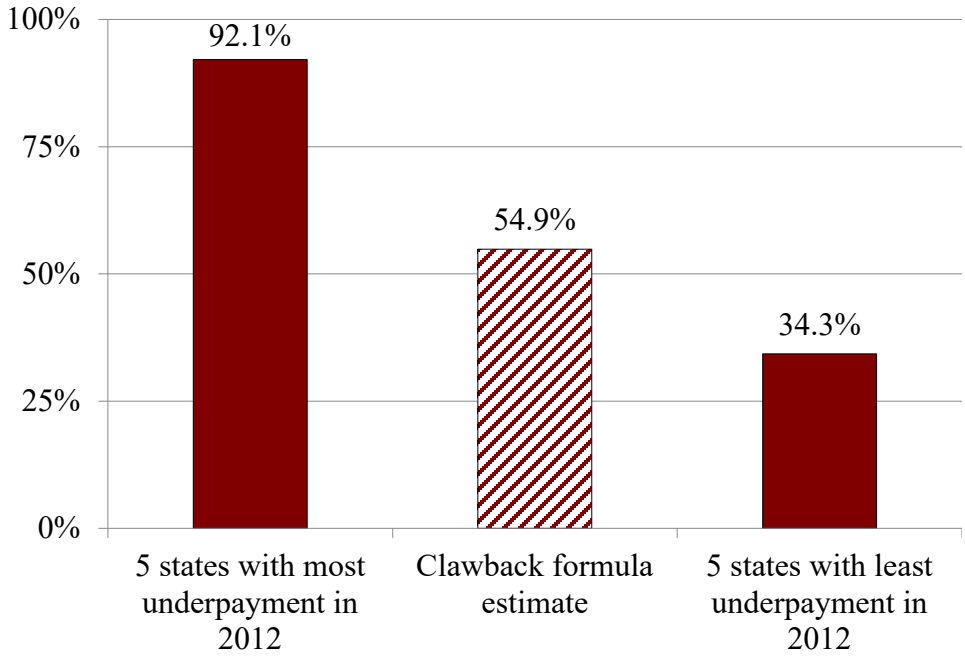
Sources: Authors' calculations from Centers for Medicare and Medicaid Services (2016); Kaiser (2005); the *Medicare-Medicaid Linked Enrollee Analytic Data Source* (2006-2012); and the *National Health Expenditure Accounts* (2006-2012).

Figure 3. *Underpayment of Clawback Due to Price Rigidities in the Legislated Formula, by State, 2012*



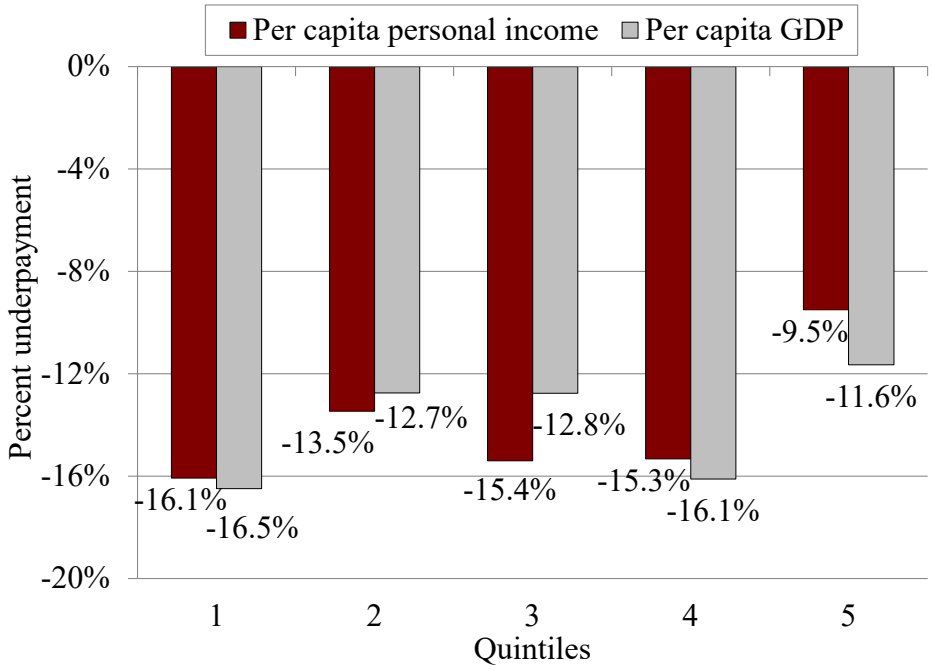
Note: Negative numbers denote underpayment, and positive numbers denote overpayment. All percentages are relative to a counterfactual clawback payment that is calculated by the authors based on the state's actual prescription drug spending per dual-eligible in the year prior.
Sources: Authors' calculations from the *Medicare-Medicaid Linked Enrollee Analytic Data Source* (2006-2012); and the National Association of State Budget Officers (2006-2012).

Figure 4. *Growth in Drug Spending per Dual-Eligible, by Underpayment Due to Price Rigidities in the Formula, 2003-2012*



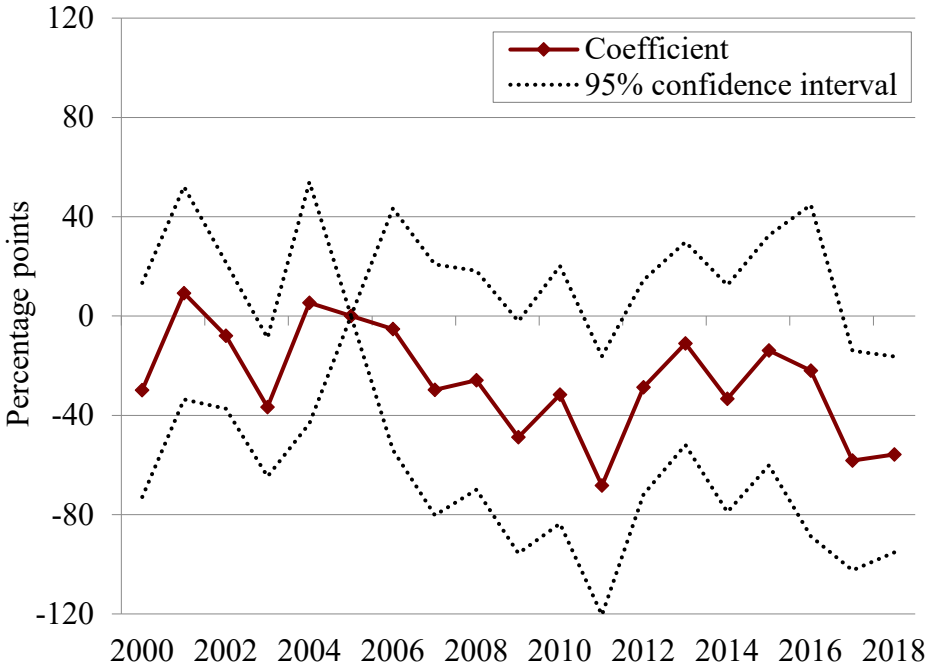
Sources: Authors' calculations from Centers for Medicare and Medicaid Services (2016); the *Medicare-Medicaid Linked Enrollee Analytic Data Source* (2006-2012); and the *National Health Expenditure Accounts* (2006-2012).

Figure 5. *Mean Percent Underpayment, by Position in the Distribution of Per Capita Personal Income and GDP, 2007-2012*



Note: A state's position in the distribution is determined each year, while percent underpayment by quintile is averaged across all years.
Sources: Authors' calculations from the Bureau of Economic Analysis (2007-2012); the *Medicare-Medicaid Linked Enrollee Analytic Data Source* (2006-2012); and the National Association of State Budget Officers (2006-2012).

Figure 6. *Effect of Doubling 2003 Drug Expenditures per Dual-Eligible on the Percent of Dual-Eligibles Enrolled in Medicaid, 2000-2018*



Note: Figure depicts the coefficients from a state-level regression of percent dual-eligibles enrolled in Medicaid on the log of 2003 prescription drug spending per dual-eligible. Standard errors are clustered by state.
Sources: Authors' estimates from Kaiser Commission on Medicaid and the Uninsured (2005); and the *Current Population Survey* (2000-2018).

Table 1. *State Characteristics in 2005*

Variables	N	Mean	Standard deviation	Min	Max
Fraction duals enrolled	50	0.731	0.297	0.309	1.698
Unemployment rate	50	0.054	0.010	0.034	0.075
Share below 138% poverty	50	0.188	0.041	0.093	0.286
Drug spending per dual in 2003	50	$202.982	$33.477	$122.720	$261.690
FMAP	50	0.607	0.084	0.500	0.771
Share 18 and under	50	0.263	0.019	0.229	0.339
Share 19 to 64	50	0.614	0.013	0.586	0.641
Share 65 and older	50	0.122	0.019	0.059	0.163
GDP per capita	50	42	8	28	63
Personal income per capita	50	$23,587.551	$2,853.780	$18,617.350	$30,591.197

Notes: Prescription drug spending per dual-eligible in 2003 represents monthly expenditures. GDP per capita is in thousands of dollars.
Source: Authors' estimates from the *American Community Survey* (2000-2018); the Bureau of Economic Analysis (2000-2017); and the Kaiser Commission on Medicaid and the Uninsured (2005).

Table 2. *Dose-Response Estimate of How Doubling 2003 Prescription Drug Spending per Dual-Eligible Affects the Fraction of Dual-Eligibles Enrolled in Medicaid, 2000-2018*

Variables	(1)	(2)	(3)
Log drug spending per dual in 2003	0.156		
	(0.142)		
Post	1.198**	1.016*	0.984*
	(0.551)	(0.567)	(0.526)
Log drug spending per dual in 2003 * post	-0.233**	-0.205*	-0.220**
	(0.104)	(0.104)	(0.102)
FMAP		0.827	1.096*
		(0.649)	(0.597)
Share 18 and under		-0.491	-0.230
		(1.545)	(1.585)
Share 19 to 64		1.271	1.347
		(1.148)	(1.013)
Share below 138% poverty		-2.418***	-2.150***
		(0.761)	(0.626)
Unemployment rate		-0.501	-0.214
		(1.191)	(1.058)
Log GDP per capita		-0.116	
		(0.246)	
Log personal income per capita			0.187
			(0.269)
Constant	-0.101	-0.309	-2.169
	(0.742)	(1.266)	(3.334)
State fixed effects	No	Yes	Yes
Year fixed effects	No	Yes	Yes
Observations	950	900	950
R-squared	0.007	0.461	0.463

Note: Table depicts the coefficients from a state-level regression with standard errors clustered by state. *** p<0.01, ** p<0.05, * p<0.1
Sources: Authors' estimates from the *American Community Survey* (2000-2018); the Bureau of Economic Analysis (2000-2017); and the Kaiser Commission on Medicaid and the Uninsured (2005).

Table 3. *Instrumental Variables Estimate of the Effect of Capitation Payments on the Fraction of Dual-Eligibles Enrolled in Medicaid, 2000-2012*

	(1)	(2)	(3)
Variables	First stage	Reduced form	IV
Log drug spending per dual in 2003	-0.000	0.156	0.1557
	(0.000)	(0.143)	(0.1408)
Post	-5,405.113***	1.305**	0.2098**
	(689.608)	(0.601)	(0.0849)
Log drug spending per dual in 2003 * post	1,189.443***	-0.241**	
	(132.075)	(0.114)	
Clawback per capita			-0.0002**
			(0.0001)
Constant	0.000	-0.101	-0.1006
	(0.001)	(0.742)	(0.7332)
Observations	650	650	650
R-squared	0.877	0.007	N/A

Note: Table depicts the coefficients from a state-level regression with standard errors clustered by state. *** p<0.01, ** p<0.05, * p<0.1

Sources: Authors' estimates from the *American Community Survey* (2000-2018); the Kaiser Commission on Medicaid and the Uninsured (2005); the *Medicare-Medicaid Linked Enrollee Analytic Data Source* (2006-2012); and the National Association of State Budget Officers (2006-2012).

Appendix

Table A1. *Modified FMAP Accounting for State and Federal Spending on Prescription Drugs for Dual-Eligibles, 2012*

State	Legislated FMAP	Counterfactual FMAP
Maryland	50.00%	51.14%
Colorado	50.00	51.13
Illinois	50.00	52.43
New Jersey	50.00	52.24
Wyoming	50.00	51.29
California	50.00	53.03
New Hampshire	50.00	52.26
Minnesota	50.00	51.68
New York	50.00	52.61
Connecticut	50.00	51.70
Virginia	50.00	51.78
Massachusetts	50.00	52.67
Washington	50.00	52.77
Alaska	50.00	51.14
Hawaii	50.48	52.61
Rhode Island	52.12	54.03
Delaware	54.17	55.32
Pennsylvania	55.07	56.78
North Dakota	55.40	57.38
Florida	56.04	58.21
Nevada	56.20	57.33
Nebraska	56.64	59.54
Kansas	56.91	59.10
Vermont	57.58	59.10
Texas	58.22	59.75
South Dakota	59.13	60.79
Wisconsin	60.53	62.82
Iowa	60.71	62.76
Louisiana	61.09	62.83
Oregon	62.91	63.99
Maine	63.27	65.25
Missouri	63.45	65.74
Oklahoma	63.88	65.90
Ohio	64.15	65.76

State	Legislated FMAP	Counterfactual FMAP
North Carolina	65.28	67.40
Montana	66.11	67.54
Michigan	66.14	68.11
Georgia	66.16	67.56
Tennessee	66.36	67.78
Indiana	66.96	68.70
Arizona	67.30	68.45
Alabama	68.62	69.92
New Mexico	69.36	69.97
Idaho	70.23	71.49
South Carolina	70.24	72.63
Arkansas	70.71	71.94
Utah	70.99	72.24
Kentucky	71.18	72.71
West Virginia	72.62	73.98
Mississippi	74.18	75.42

Sources: Authors' calculations from the Medicare-Medicaid Linked Enrollee Analytic Data Source (2006-2012); and the National Association of State Budget Officers (2006-2012).

Table A2. *Instrumental Variables Estimate of the Effect of Capitation Payments on the Fraction of Dual-Eligibles Enrolled in Medicaid, 2000-2017*

	(1)	(2)
Variables	First stage	IV
Log drug spending per dual in 2003	-0.000	0.15571
	(0.002)	(0.14075)
Post	-20,244.589***	0.10853
	(3,310.310)	(0.07228)
Log drug spending per dual in 2003 * post	4,348.096***	
	(634.021)	
Clawback per capita		-0.00005*
		(0.00003)
Constant	0.000	-0.10059
	(0.009)	(0.73317)
Observations	900	900
R-squared	0.411	N/A

Note: Table depicts the coefficients from a state-level regression with standard errors clustered by state. *** p<0.01, ** p<0.05, * p<0.1
Sources: Authors' estimates from the *American Community Survey* (2000-2017); the Kaiser Commission on Medicaid and the Uninsured (2005); and the National Association of State Budget Officers (2006-2017).

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