Three Essays on Managed Care and Dual Eligibles

by

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Dedication

For my parents, Debby and Larry, and my *beshert*, Melinda

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Abstract

Over the past several years, Medicare beneficiaries have increasingly chosen to receive their coverage through subsidized, private Medicare plans, rather than through the traditional, government-administered version of program. At the same time, some states have turned to private managed care plans to provide Medicaid benefits for the elderly and disabled. This dissertation explores the consequences of these trends for beneficiaries who receive coverage through both Medicare and Medicaid, also known as "dual eligibles."

In the first chapter, I identify factors associated with dual eligibles' enrollment in private Medicare plans and explore potential explanations for the sustained growth in enrollment over time. To do so, I estimate linear regression models relating enrollment patterns with various supply-side, demand-side, and state policy factors, as well as an event-year study relating enrollment with the introduction of dual-eligible special needs plans (D-SNPs), which are exclusively available to dual eligibles. Results highlight the important role of D-SNP availability and the maturation of county D-SNP markets over time in pulling dual eligibles into the private Medicare market. Private Medicare enrollment among dual eligibles was also associated with improvements in plan offerings, decreases in supplemental plan options, increases in their premiums, and changes in state policy.

In the second chapter, I evaluate the effect of enrollment in private Medicare Advantage (MA) plans on utilization and quality of care among dual eligibles. To do so, I exploit a discontinuous increase in government payments to plans—and subsequently in MA enrollment rates—in regions that exceeded a particular population threshold. I find that increases in MA enrollment reduced inpatient utilization among dual eligibles, while I fail to find evidence that this came at the expense of average care quality. However, I also find that MA enrollment was associated with a shift towards lower-quality hospitals and an increase in mortality rates in counties with

historically-low traditional Medicare spending. These results advise caution as policymakers debate whether to further encourage enrollment in private plans among dual eligibles.

In the third chapter, I evaluate the effect of requiring dual eligibles to enroll in Medicaid managed care on their use of inpatient and long-term nursing home care. To do so, I rely on a difference-in-differences approach to assess the introduction of an enrollment mandate in the state of New Jersey. I find that Medicaid managed care shaped dual eligibles' utilization in meaningful ways, despite the fact that these plans play a secondary role to Medicare for many services. In particular, the enrollment mandate led to lower inpatient use among full dual eligibles, and I provide suggestive evidence that this change included reductions in potentially-preventable hospitalizations and in 30-day readmission rates. The mandate was also associated with a decrease in the share of full dual eligibles residing in nursing homes. This study highlights the important role of Medicaid managed care for dual eligibles and suggests that further aligning incentives between these plans and Medicare could have a meaningful effect on dual eligibles' use of care.

Chapter 1.
Factors Associated With Private Medicare Enrollment and Enrollment Trends Among Dual Eligibles

1.1. Introduction

Over the past fifteen years, Medicare beneficiaries have increasingly chosen to receive their coverage through private health insurance plans rather than through the traditional, government-administered version of Medicare. The growing importance of private Medicare plans has been especially pronounced among dual eligibles, i.e., beneficiaries who are enrolled in both Medicare and Medicaid. Enrollment rates among this population increased from six percent in 2004 to thirty-five percent in 2017 (Figure 1.1). Prior research has identified factors associated with private Medicare enrollment and potential explanations for enrollment growth over time (see, for example, Atherly, Dowd, and Feldman 2004; Shimada et al. 2009; Jacobs and Buntin 2015; Pelech 2015; and Skopec et al. 2019). However, it is likely that the determinants of private Medicare enrollment among dual eligibles differ relative to other Medicare beneficiaries. For example, dual eligibles have a distinct set of private Medicare options to choose from depending on where they live. Indeed, over two-fifths of dual eligibles in private Medicare are enrolled specifically in dual-eligible special needs plans (D-SNPs) (Appendix Figure 1.1), which exclusively cater towards this population. Additionally, whereas most Medicare beneficiaries must actively choose to enroll in a private Medicare plan, some states have passively enrolled dual eligibles into private, integrated Medicare-Medicaid Plans (MMPs) under a large demonstration program. This could have a large effect on enrollment to the extent that beneficiaries have a bias towards their default enrollment option.

In this study, I identify factors associated with enrollment in private Medicare plans among dual eligibles and explore potential explanations for the sustained growth in enrollment over time. An important contribution of this research is that it will help policymakers predict the effect of

policy reforms and market changes on future enrollment patterns among dual eligibles. As one example, the Medicare Payment Advisory Commission (MedPAC) has proposed requiring D-SNPs to offer integrated Medicare and Medicaid coverage, which could lead some plans to exit the market (MedPAC 2013, 2019). Results from this study will help policy analysts predict whether enrollees would switch to another private Medicare plan or leave the private Medicare market altogether following a plan exit, which has important consequences for program spending and beneficiary outcomes. By identifying why dual eligibles enter private Medicare plans in the first place, this research may also provide a window into the potential impact on their well-being. For instance, proactive enrollment in a private Medicare plan may indicate that a beneficiary identified this coverage as being advantageous, while the same is not necessarily true for beneficiaries who were passively enrolled in an MMP. Understanding the reasons why dual eligibles in particular join private Medicare plans is especially important given that this population has fewer resources and more significant health problems than other beneficiaries on average (Jacobson, Neuman, and Damico 2012).

My analysis includes linear regression models relating enrollment patterns with various supply-side, demand-side, and state policy factors, as well as an event-year study relating enrollment with the introduction of D-SNPs. I find that the availability of D-SNPs and their experience in a given market had a strong association with private Medicare enrollment rates among dual eligibles and accounted for much of the growth in enrollment among this population from 2006 through 2015. Event-study analyses suggest that this relationship was causal. Private Medicare enrollment among dual eligibles was also associated with improvements in plan offerings, decreases in supplemental plan offerings and increases in their premiums, and changes in state policy.

1.2. Background

1.2.1. Traditional Medicare and private Medicare plans

One of the most important choices facing Medicare beneficiaries is whether to receive their primary benefits through the traditional, government-administered version of the program ("traditional Medicare") or through a subsidized, private Medicare plan. Under traditional Medicare, the government sets provider reimbursement rates and establishes relatively uniform

benefits, premiums, and cost-sharing requirements. Enrollees can receive care from most providers in the United States, and they face few constraints in how they make use of the program's benefits (Berenson and Harris 2002; Bagley 2013; Neuman and Jacobson 2018). Most beneficiaries in traditional Medicare also receive coverage through a supplemental plan (Cubanski et al. 2018). Survey data from 2016 indicate that about 30% of traditional Medicare beneficiaries are enrolled in a retiree plan offered by their or their spouse's former employer; 29% purchase a private, supplemental Medigap plan; and 22% are enrolled in Medicaid (Cubanski et al. 2018). Supplemental plans often help cover beneficiaries' costs in the traditional program and may insure services that are not part of Medicare's standard benefit package, such as vision and comprehensive dental care.

As an alternative to traditional Medicare, beneficiaries may also choose to receive their benefits through a private plan. I refer to this option as "private Medicare", which is distinct from other private plans that may supplement the traditional program. Most beneficiaries who opt for this route enroll in a plan through the Medicare Advantage (MA) program, though the government has also authorized additional private Medicare plan options. Under the MA program, private plans compete for enrollment within a tightly-regulated marketplace and receive risk-adjusted, capitated payments from the government to provide Medicare's benefits (Lipschutz et al. 2015; MedPAC 2018). If benchmark payment rates are insufficient to cover a plan's premium, enrollees must cover the difference (MedPAC 2018). Within the contours of MA regulations, plans have considerable flexibility when determining their benefit structure and defining their care management approach. First, cost-sharing requirements vary by plan, though each plan's benefit value for Medicare-covered services must be at least as great as that of the traditional program on average (CRS 2009). Second, MA plans may include additional benefits that are not part of the standard Medicare package. Finally, unlike the traditional program, most MA plans rely on managed care techniques to shape and integrate care delivery. For example, nearly all MA enrollees are in plans that limit full coverage to a specific network of providers and most are in plans that require prior authorization before receiving certain types of services (Jacobson, Damico, and Neuman 2018; Jacobson and Neuman 2018).

In addition to deciding whether to enroll in traditional Medicare or a private Medicare plan, beneficiaries must also choose whether to obtain prescription drug coverage through the Medicare Part D program. This benefit is provided exclusively through subsidized, private plans. Beneficiaries in traditional Medicare can choose to enroll in a Part D stand-alone prescription drug plan (PDP). MA enrollees typically receive Part D coverage as part of an integrated benefit package through their MA plan (CRS 2018). MA plans that incorporate Part D coverage are known as Medicare-Advantage prescription drug (MA-PD) plans.

1.2.2. Dual eligibles

In 2018, there were about 11 million dual eligibles, i.e., Medicare beneficiaries with limited resources who also receive Medicaid coverage (MMCO 2019). For this population, Medicare is the primary payer while Medicaid provides additional benefits, covers some or all of Medicare's cost-sharing requirements, and/or pays the program's premiums on behalf of dual eligibles (Jacobson, Neuman, and Damico 2012). Although Medicare beneficiaries can qualify for Medicaid through several different pathways, this study groups dual eligibles into three categories: full dual eligibles, Qualified Medicare Beneficiary (QMB) partial dual eligibles, and non-QMB partial dual eligibles. These groups roughly correspond to the restrictiveness of Medicaid's eligibility criteria and the generosity of its benefits (Table 1.1).

Full dual eligibles (about 71% of dual eligibles in 2015) typically have the fewest resources and are unique in that they qualify for the complete set of benefits offered under their state's Medicaid program (CMS 2011; Young et al. 2013). This includes coverage for some services that are not part of Medicare's benefit package, such as long-term care services and supports and — depending on the state — dental, vision, and/or hearing services (MACPAC 2018b). Additionally, states pay all of Medicare's cost-sharing requirements and premiums on behalf of the majority of full dual eligibles (MACPAC 2018b).

Partial dual eligibles do not qualify for full Medicaid benefits in their state, but instead receive assistance exclusively through one of four Medicare Savings Programs (MSPs), which are also administered by state Medicaid programs (Jacobson, Neuman, and Damico 2012). The Qualified Medicare Beneficiary (QMB) program is the most generous MSP. *QMB partial dual eligibles*

(about 14% of dual eligibles in 2015) receive coverage for Medicare's cost-sharing and premium requirements (MACPAC 2018b). *Non-QMB partial dual eligibles* (about 15% of dual eligibles 2015) meet less restrictive eligibility criteria and typically only receive coverage for the Medicare Part B premium (MACPAC 2018b).

All dual eligibles also automatically qualify for assistance with Part D premiums and cost-sharing requirements through Medicare's Low Income Subsidy (LIS) program (CRS 2018) (Table 1.1). The LIS program covers Part D premiums on behalf of dual eligibles up to a regional benchmark amount (CRS 2018). This benchmark is set to ensure that dual eligibles have access to least one plan at no cost (CRS 2018; KFF 2018). The LIS program also covers some or all of dual eligibles' prescription drug costs under Part D (CMS 2019c). Nearly all dual eligibles (over 99% in 2015) have Part D coverage and receive LIS assistance.

1.2.3. Determinants of enrollment

A variety of factors may affect the value of private Medicare relative to traditional Medicare enrollment, including the traits of individual enrollees and the characteristics of private Medicare plan options, traditional Medicare supplement options, and local health care markets (Appendix Table 1). While previous studies have evaluated the relationship between these factors and private Medicare enrollment rates (Appendix Table 1.1), unique aspects of dual eligibles' circumstances likely affect their enrollment decisions (Appendix Table 1.2).

First, dual eligibles receive varying levels of assistance with Medicare's cost-sharing requirements. They may therefore be less responsive to instances where private Medicare plans, for example, reduce copays or deductibles for Medicare-covered services. Rather, they may be particularly attentive to the availability of supplemental benefits in private Medicare plans that are not necessarily be covered by Medicaid. Indeed, in 2015, dual eligibles in private Medicare were disproportionately likely to enroll in plans that included dental, vision, or hearing benefits. Additionally, while prior work suggests that supplemental Medigap plans may be a substitute for private Medicare coverage among the overall Medicare population (McLaughlin, Chernew, and Taylor 2002; Atherly and Dowd 2005; Pelech 2015), these plans largely duplicate Medicaid

coverage for many dual eligibles. Hence, variation across Medigap markets may have a much smaller effect on their enrollment decisions.

Second, depending upon where they live, dual eligibles may have different private Medicare options than other beneficiaries. In many counties, this includes the availability of dual-eligible special needs plans (D-SNPs), a type of MA plan that was first offered in 2004 and exclusively enrolls dual eligibles (Schmitz et al. 2008; MedPAC 2013). D-SNPs may be particularly alluring to dual eligibles to the extent that these plans target marketing to them, cater benefits towards their specific needs, or take into account dual eligibles' Medicaid and LIS coverage when designing plan benefit packages and setting premiums. Additionally, D-SNPs may facilitate the integration of dual eligibles' Medicare and Medicaid benefits, such as by contracting with states to share data or to provide some or all of Medicaid's benefits (Bella and Palmer-Barnette 2010). In 2015, D-SNPs accounted for over two-fifths (44%) of dual eligibles' enrollment in private Medicare plans (Appendix Figure 1.1).

Third, state policies may shape the enrollment decisions of dual eligibles. For one, some states have collaborated with the federal government and insurers to offer private, fully integrated Medicare-Medicaid Plans (MMPs) under a large demonstration project (MACPAC 2018a). Whereas traditional Medicare is generally the default choice for beneficiaries, states may automatically enroll full dual eligibles into MMPs, with the option to change enrollment. This process is known as "passive enrollment". Prior research suggests that beneficiaries tend to stay in either traditional Medicare or private Medicare over time—e.g., due to status quo bias—which suggests that passive enrollment may have a sustained effect on their coverage (Sinaiko, Afendulis, and Frank 2013; Afendulis, Sinaiko, and Frank 2015). State Medicaid policies may also influence dual eligibles' enrollment decisions. For example, some states allow or require dual eligibles to receive their *Medicaid* benefits through a private Medicaid managed care plan (CMS 2019a). Medicaid managed care enrollment may complement enrollment in private Medicare plans if, for example, a single insurer is providing both plans. Additionally, organizations that have experience with dual eligibles in Medicaid managed care markets may be better positioned to serve them in Medicare markets, such as by offering a D-SNP. Finally, state Medicaid programs vary in the degree to which they include benefits beyond Medicare-covered

services (KFF 2019). In states with more generous coverage, dual eligibles may not need to seek these supplemental benefits in private Medicare plans.

While this discussion generally pertains to full dual eligibles, some of these points may not necessarily extend to partial dual eligibles. For example, partial dual eligibles are typically excluded from Medicaid managed care enrollment and are not allowed to enroll in MMPs. Some D-SNPs also limit enrollment among partial dual eligibles, particularly non-QMB partial dual eligibles (CMS 2014). Among beneficiaries enrolled in private Medicare plans in 2015, about 48% of QMB partial dual eligibles were in D-SNPs, compared to only 15% of non-QMB partial dual eligibles (Appendix Figure 1.1). Additionally, partial dual eligibles typically receive less comprehensive coverage than full dual eligibles (see Section 1.2.2). Non-QMB partial dual eligibles in particular may be much more sensitive to changes in plan copays and deductibles and in local Medigap options, given that these beneficiaries only receive government assistance with prescription drug cost-sharing requirements.

1.3. Empirical strategy and data

1.3.1. Empirical strategy

I begin by identifying factors that are associated with private Medicare enrollment rates. To do so, I estimate the following model, where the indices represent county (c) and year (t), Y_{ct} is the share of dual eligibles enrolled in private Medicare plans, M_{ct} is a vector of private Medicare market characteristics, S_{ct} is a vector of traditional Medicare supplemental plan variables, X_{ct} is a vector of dual eligible characteristics, P_{ct} is a vector of state policies, $Year_t$ represents year dummy variables, and η_c represents county fixed effects:

$$Y_{ct} = [\alpha + M_{ct}\beta + S_{ct}\theta + X_{ct}\psi + P_{ct}\omega] + Year_t\phi + \eta_c + \varepsilon_{ct} \quad (1)$$

I weight this model based on the number of dual eligibles in a given county in the first year of my sample and estimate heteroskedastic-robust standard errors clustered at the county level.

I next evaluate the extent to which various groups of my explanatory variables account for changes in private Medicare enrollment among dual eligibles. To do so, I rely on an approach

from a prior study that considered enrollment trends among the entire Medicare population (Pelech 2015). This entails first estimating unadjusted trends in county-level enrollment rates—i.e., by reestimating equation (1) without the terms in brackets—and then evaluating the extent to which adding different combinations of explanatory variables to the model reduces residual trends. I consider overall changes in enrollment from 2006 through 2015 and also examine changes from 2006 through 2009 and 2009 through 2015. As will be discussed, trends in private Medicare offerings changed in the latter period, likely reflecting reductions in government payments to plans and changes in market regulations (Afendulis, Landrum, and Chernew 2012; Jacobson et al. 2014; Pelech 2015; Pelech and Song 2018).

To gain a more nuanced understanding of enrollment patterns, I next run stratified analyses by dual eligible group. This is important given that enrollment options and the costs and benefits of private Medicare enrollment vary by the level of dual eligibility (Section 1.2.3).

Finally, because I expect that the proliferation of D-SNPs will be closely associated with increases in private Medicare enrollment, I provide additional evidence on the causality of this relationship. One concern may be that, for example, the growth in private Medicare enrollment among dual eligibles could lead D-SNPs to enter a given county, rather than the other way around. I explore this possibility by evaluating the timing of D-SNP market entry and the growth in private Medicare enrollment, such as whether the latter preceded the former. To do so, I estimate the following event-study model, where T_c indicates the year that D-SNPs first entered county c (known as the "event"), $\mathbf{1}(t - T_c = \tau)$ is a dummy variable indicating whether the difference between the year of observation and T_c equals τ (known as an "event-year dummy"), β_τ represents the treatment effect of D-SNP market entry on county enrollment rates after τ years, and C_{ct} is a vector of the explanatory variables from equation (1) (excluding D-SNP variables):

$$Y_{ct} = \alpha + \sum_{\tau \leq -5}^{-2} \mathbf{1}(t - T_c = \tau)\beta_\tau + \sum_{\tau=0}^{\geq 3} \mathbf{1}(t - T_c = \tau)\beta_\tau + C_{ct}\rho + Year_t\phi + \eta_c + \varepsilon_{it} \qquad (2)$$

To create a balanced sample that includes several pre- and post-periods, I focus on counties where D-SNPs entered in either 2011 or 2012, and I group event-year dummies where τ is less than or equal to -5 or greater than or equal to 3. My analysis also includes counties that never had D-SNPs. For these counties, I set all event-year dummies to 0. Because my model incorporates county fixed effects, these areas do not contribute additional variation to the event-year dummies. In addition to my primary analysis, I conduct a placebo test to evaluate whether the introduction of D-SNPs coincided with increases in enrollment among non-dual eligibles, who are not allowed to join these plans. I also explore the possibility that the Medicaid managed care enrollment mandate might have made dual eligibles more amenable to joining a D-SNP (Section 1.2.3). To do so, I run stratified analyses for counties that had Medicaid managed care enrollment mandates in place before D-SNPs became available, as well as counties that never had such requirements. The former includes mandates that were introduced in either 2008 or 2009.

1.3.2. Data

This study requires data on private Medicare plan enrollment by level of dual eligibility as well as several key explanatory variables. These variables include: (1) supply-side factors (such as the premiums and benefits of private Medicare plan options); (2) demand-side factors (such as beneficiary characteristics as well as supplemental plan offerings that may substitute for private Medicare enrollment); and (3) state policies (such as Medicaid managed care enrollment mandates, which may increase demand for private Medicare plans). I obtain this information for my sample period (2006-2015) based on administrative Medicare and Medicaid files and several public use datasets.

Enrollment

The Medicare Beneficiary Summary File (MBSF) and the Medicaid Analytic eXtract (MAX) Personal Summary (PS) files include detailed enrollment and basic demographic information for the universe of Medicare and Medicaid beneficiaries respectively (Barosso 2013; CMS 2018). I first rely on the 2006-2015 MBSF to identify whether an individual was enrolled in traditional Medicare or a private Medicare plan. I next use this file to categorize individuals based on their level of dual eligibility from 2009 through 2015. My version of the MBSF does not identify

detailed levels of dual eligibility in earlier years, so I instead rely on the corresponding variable from the 2006-2008 MAX PS files.

Supply

My analysis includes separate measures for three types of private Medicare plans: D-SNPs, other MA plan options, and MMPs (which are grouped under state policies). These measures disregard several plan types that are likely to be less salient for the general dual eligible population. For one, with the exception of D-SNPs, I exclude MA plans that restrict enrollment to a subgroup of Medicare beneficiaries, including employer-sponsored plans, chronic condition and institutional special needs plans (C-SNPs and I-SNPs), and Program of All-Inclusive Care for the Elderly (PACE) plans. I also drop plan types that, for various reasons, enrolled no or relatively few dual eligibles in my sample as of 2015. This includes MA plans that do not offer Part D coverage, Medical Savings Account (MSA) plans, a small number of demonstration plans that were no longer offered in 2015, and Medicare Cost plans. Additionally, I exclude plans that had fewer than 10 enrollees in a given year. My explanatory variables rely on the remaining plans—which represented 94% of private Medicare enrollment in my sample as of 2015—while my outcome variable is based on enrollment in any type of private Medicare plan.

All of these measures come from publicly-available data from the Centers for Medicare and Medicaid Services (CMS). I first identify where D-SNPs were offered by linking plan service area data with D-SNP identifiers from the Plan Benefit Package (PBP) dataset. Because D-SNPs are a relatively new type of MA plan, I also measure the number of years since they first became available in a given county. This is to account for the possibility that market entry will have larger effects on enrollment over time as these plans gain experience in a given region and as beneficiaries become more familiar with them. I generate this measure by combining the data above with 2004-2005 data from the Medicare Plan Finder dataset.

I also create several measures of the availability and features of other MA plans. I first use plan service area and contract information files to focus on relevant MA plan types and to identify where they were offered. My analyses include both the number of plans available to each dual eligible in a given county as well as the number of plans squared. I incorporate a quadratic term

based on a prior finding that increases in the number of plan options may have a decreasing marginal effect on enrollment (McWilliams et al. 2011).

Measures of average MA plan characteristics come from several sources. I first use contract information files to distinguish between health maintenance organization (HMO), preferred provider organization (PPO), and private fee-for-service (PFFS) plans. All else equal, beneficiaries may prefer PPO and PFFS plans as they provide greater flexibility than HMOs to go to a physician or hospital of one's choice (Sinaiko and Zeckhauser 2015). I next pull premium data from the PBP file and Medicare Part D Plan reports. Part C premiums come from the former and reflect the cost of benefits that are part of the traditional Medicare benefit package, while Part D premiums come from the latter and reflect the price of prescription drug coverage (taking into account the LIS premium subsidy). Data on MA plan benefits come from the Medicare Plan Finder data and the PBP. The Medicare Plan Finder provides an estimation of expected out-of-pocket (OOP) cost-sharing requirements under a given plan for the average beneficiary (CMS 2019b). This measure of benefit generosity is included in an online Medicare tool that is designed to help beneficiaries choose between plans. It mostly takes into account services that are part of the traditional Medicare and Part D benefit package (CMS 2019b). Because Medicaid covers most or all of the cost-sharing requirements for these services on behalf of many dual eligibles, I also evaluate whether plans offer certain supplemental benefits that may be more salient to this population. In particular, I use PBP data to identify whether plans include coverage for comprehensive dental services, eyewear, and hearing aids as a mandatory component of their benefit package.

Demand

I generate three measures of traditional Medicare supplement markets: stand-alone PDP plan counts and Part D premiums (from the same resources that I use for MA plans) and Medigap Plan F premiums by state (from the Medicare Plan Finder file). Plan F is the most common Medigap policy, and its premiums are highly correlated with other common Medigap plan types (Jacobson, Huang, and Neuman 2014). Because Medigap plan premiums likely relate to traditional Medicare spending patterns in a given region, I also control for standardized and risk-adjusted per capita spending in traditional Medicare as part of an alternative specification to my

primary model (Jacobs and Buntin 2015). This variable comes from the Medicare Geographic Variation file. Finally, I calculate the share of dual eligibles who are 65 or older and the share in each dual eligibility group based on MBSF data.

State policy

I collect data on three sources of variation in state policy that could affect dual eligibles' enrollment decisions. First, I identify counties where states have required full dual eligibles to enroll in a comprehensive Medicaid managed care plan. Direct information on county-level enrollment mandates are available in the Medicaid Managed Care Enrollment Reports from 2013-2015, but not in earlier years. When matching the 2013 report to MAX PS data from the same year, I find that focusing on counties with Medicaid managed care enrollment rates of at least 40% is a fairly accurate approach for pinpointing mandate regions. I apply this threshold to MAX PS data as available to identify county-level mandates from 2006 through 2013, and I clean potential inconsistencies in the data (e.g., by generally presuming that mandate counties remained so in later years). Second, I combine plan service area data with a government report to identify counties where states were passively enrolling full dual eligibles in MMPs (MACPAC 2018a). The first full year of passive enrollment occurred in 2015, which is also the last year of my sample. Finally, I rely on 2004-2012 biennial surveys of state Medicaid programs from the Kaiser Family Foundation to identify states that cover dentures, eyewear, and hearing aids, pulling data forwards to fill in years when the survey was not conducted. State coverage of these services likely reduces the appeal of MA plans that offer similar benefits, so I interact state coverage with the corresponding MA variable. While optional Medicaid benefits may be important in shaping demand for private Medicare coverage, relatively few states added or dropped these services over time. Further, many of the changes that did occur involved eliminating benefits shortly after the beginning of the Great Recession. Because the timing of this policy may correspond to other important changes in state economies and Medicaid programs, I only incorporate it as part of an alternative specification to my primary model.

Sample restrictions

My analysis includes a few sample restrictions to account for missing data and to simplify my approach. First, I drop regions where there were no MA offerings at any point during my sample

period. This affects about a quarter of all counties, but only 12% of my person-year observations. Without this sample restriction, my model would be more complicated as I would need to fully interact MA variables with a dummy for the availability of any MA plan. Second, I drop non-QMB partial dual eligibles from the state of Arizona as enrollment data appear to be incomplete for this population early in my sample period. Finally, I drop counties that were ever missing one or more variable.

1.4. Results

1.4.1. Descriptive statistics

Basic summary statistics highlight important changes over time and preview some of the main findings in this study regarding enrollment trends (Table 1.2). First, the number of dual eligibles in my sample increased from 6.6 to 9.1 million beneficiaries between 2006 and 2015. Enrollment growth was larger among partial dual eligibles, though full dual eligibles continued to account for the large majority of the dual eligible population (73%) in the last year of my sample. Second, the share of dual eligibles in private Medicare plans nearly tripled during my sample period, increasing from 11% in 2006 to 30% in 2015. This trend included large increases in enrollment rates across all three dual eligible groups (Figure 1.2). Third, MA plan offerings improved on average from 2006 through 2009 in terms of an increasing number of options, lower Part C premiums, and greater overall benefit generosity, before mostly reversing course from 2009 through 2015. It is therefore unlikely that these factors alone explain the sustained growth of private Medicare enrollment over my sample period (Pelech 2015; Sinaiko and Zeckhauser 2015; Frakt 2017; Skopec et al. 2019). Nonetheless, the share of counties with D-SNPs and their market experience continued to increase throughout this timeframe, as did the share of MA plans covering certain supplemental benefits. Both of these changes may be particularly salient for dual eligibles. Fourth, the number of stand-alone PDP options followed the same pattern over time as did the number of MA plans. Because PDPs are a substitute for Part D coverage in MA plans, this trend may have offset changes in the MA market. Nonetheless, PDP premiums increased substantially and Medigap plan premiums grew slightly during my sample period. Fifth, there were large changes in policy during my sample period. The share of dual eligibles in counties with Medicaid managed care mandates increased from 6% in 2006 to 30% in 2015, and 19% of dual eligibles resided in a county that had introduced MMP passive enrollment by 2015.

There was also a slight reduction in the share of dual eligibles residing in states covering certain optional benefits. Finally, Appendix Figures 1.2 and 1.3 confirm that there was substantial geographic variation in enrollment trends among dual eligibles, and the last column of Table 2 indicates a large degree of variation in trends across counties for most of my explanatory variables. This will be useful when estimating regression models with county fixed effects.

1.4.2. Enrollment

Results from my primary model largely confirm predicted relationships between explanatory variables and private Medicare enrollment rates among dual eligibles (Table 1.3). First, the availability of D-SNPs and an increase in the number of years since D-SNPs first entered a given county were both associated with a statistically significant increase in private Medicare enrollment rates. Second, private Medicare enrollment increased with both the number of MA plan options in a county and the share with less restrictive provider networks, and it decreased with Part D premiums. The association between enrollment and average expected OOP cost-sharing requirements under MA plans was not statistically significant. This was anticipated, given that Medicaid covers most or all of these costs for the majority of dual eligibles. At the same time, enrollment increased with the share of plans offering comprehensive dental, eyewear, or hearing aid coverage. This association was concentrated in counties where state Medicaid programs did not already provide a similar set of benefits (see the larger coefficient in Column 4 and the negative interaction term in the last row of this column). Third, private Medicare enrollment decreased with the number of PDPs available to traditional Medicare beneficiaries (though PDP premium results were not statistically significant). Fourth, enrollment increased with the share of dual eligibles who were elderly (versus nonelderly disabled) and with the share who were partial dual eligibles. Finally, Medicaid managed care enrollment mandates and MMP passive enrollment were both associated with a statistically significant increase in private Medicare enrollment.

The maturation of D-SNP markets and the introduction of MMP passive enrollment were both associated with noticeably large increases in private Medicare enrollment rates. For example, there was a 12.1 percentage point marginal effect of moving from a county where D-SNPs were never available to a county where they had been available for 10 years (i.e., approximately 3.7 +

0.8 x 10 years). MMP passive enrollment was similarly associated with an 11.2 percentage point increase in enrollment rates. Several other variables that were statistically significant had much smaller point estimates when considered on their own. For instance, an increase in average MA Part D premiums of one standard deviation was associated with a 0.5 percentage point increase in enrollment rates (0.5 x -1.0). As another example, although Medicaid managed care enrollment mandates may lead to substantial increases in the share of dual eligibles in those plans, they only corresponded to a 3.3 percentage point increase in private Medicare enrollment.

One surprising result is that Medigap premiums had a positive and statistically significant association with private Medicare enrollment rates. In particular, an increase in Medigap premiums of one standard deviation corresponded to a 1.8 percentage point increase in enrollment rates (i.e., approximately 3.2 x 0.6). I had anticipated that there would not be a strong relationship between these variables, given that Medigap plans are expensive and often include redundant coverage for dual eligibles. One possible explanation is that Medigap premiums are capturing other aspects of regional health care markets that are more relevant to dual eligibles' decision-making, such as costs and efficiency in the traditional program. Controlling for standardized and risk-adjusted per capita spending in traditional Medicare did not change my results (Table 1.3, Column 5), though other factors could also be at play.

1.4.3. Enrollment trends

My explanatory variables collectively account for much of the change in private Medicare enrollment rates. Enrollment rates among dual eligibles grew by 19.0 percent points from 2006 through 2015 (Table 1.4, Column 1). After adjusting for each of my explanatory variables, the residual, unexplained change over this time period was only 6.4 percentage points, or 33% of the actual trend (Table 1.4, Column 2). These variables absorbed a particularly large amount of enrollment trends after 2008, leaving a residual trend that was 23% of the actual change from 2009 through 2015 (Table 1.4, Column 2).

D-SNP variables by themselves accounted for a much larger portion of enrollment trends than any other group of variables. Simply controlling for the availability of a D-SNP in a given county and the number of years since a D-SNP first entered the market leaves a residual trend

that is 56% of the actual change in enrollment from 2006 through 2015 (Table 1.4, Column 3). The next most important factor—MMP passive enrollment—leaves much more of the trend unexplained (90%) (Table 1.4, Column 8). When combined, these variables account for about half (49%) of the increase in private Medicare enrollment over my sample, and more than half (59%) in the growth since 2009 (Table 1.4, Column 10).

Other variables are less useful in explaining overall trends. For one, while changes in other MA plan offerings account for over half of the growth in private Medicare enrollment from 2006 through 2009, plan trends suggest that enrollment in private Medicare would have fallen from 2009 through 2015 if only these factors were relevant (Table 1.4, Column 4). Conversely, although changes in supplemental plan markets explain some of the enrollment increase in recent years, they predict decreases in private Medicare enrollment from 2006 through 2009 (Table 1.4, Column 5). In other words, MA and supplemental plan variables offset each other's explanatory power to some degree (Table 1.4, Column 9). Finally, changes in the characteristics of dual eligibles and the growth of Medicaid managed care enrollment mandates each account for a modest share of private Medicare enrollment trends (Table 1.4, Columns 6 and 7).

1.4.4. Enrollment and enrollment trends by dual eligible group

Enrollment analyses stratified by level of dual eligibility generally yielded results that were consistent with my predictions and overall findings (Table 1.5). Nonetheless, there were a few unexpected outcomes. First, although MMP passive enrollment only directly effects full dual eligibles, it was associated with a decrease in private Medicare enrollment rates among partial dual eligibles. Point estimates for full dual eligibles were large, positive, and statistically significant, as expected. Second, while I focus on state Medicaid managed care mandates for full dual eligibles, this policy was associated with an increase in private Medicare enrollment across full and partial dual eligibles alike. Finally, among non-QMB partial dual eligibles, increases in expected cost-sharing requirements under MA plans were associated with increases in private Medicare enrollment rates. This is counterintuitive and was not true among other dual eligible populations.

D-SNP variables again accounted for much of the increase in private Medicare enrollment among full dual eligibles and QMB partial dual eligibles, but not among non-QMB partial dual eligibles (Tables 1.7 through 1.9). After controlling for these variables, the residual enrollment trend was 47% of the actual change in enrollment rates from 2006 through 2015 among full dual eligibles, 53% of the actual change among QMB partial dual eligibles, but 95% of the actual change among non-QMB partial dual eligibles. This is consistent with: (1) the fact that many D-SNPs do not enroll non-QMB partial dual eligibles, and (2) the possibility that D-SNPs may be less relevant for non-QMB partial dual eligibles given the limited scope of their Medicaid benefits.

1.4.5. Enrollment and D-SNP market entry

Event-study results provide suggestive evidence that the positive relationship between D-SNP market entry and private Medicare enrollment among dual eligibles overall may be causal. On the one hand, D-SNPs entered counties where private Medicare enrollment was already increasing relative to other parts of the country (Figure 1.3, top panel). This undercuts the argument that D-SNP market entry led to enrollment growth—rather than the other way around—to some degree. On the other hand, enrollment growth in the pre-period relative to other regions was modest, especially in the years just before D-SNP market entry and particularly in comparison to enrollment growth in the years after. For example, the event-study results suggest a 1.6 percentage point increase in enrollment rates from four years to one year before D-SNP market entry, but a 6.0 percentage point increase from one year before to two years after (Figure 1.3, top panel), representing a difference of 4.4 percentage points ($p<0.01$, result not shown). This is not substantially smaller than the 5.3 percentage point increase predicted in my primary model ($3.7 + 2 \times 0.8$) (Table 1.3, Column 3).

Evaluating trends among non-dual eligibles provides additional evidence that this growth in enrollment is the product of D-SNP market entry. Because non-dual eligibles are not allowed to enroll in D-SNPs, market entry should not have affected enrollment rates among this population unless there had been some other change occurring in counties at the same time. While D-SNP market entry was associated with a statistically significant increase in enrollment among non-dual eligibles, point estimates were much smaller in magnitude (Figure 1.3, bottom panel).

D-SNP market entry was associated with particularly large increases in enrollment rates in counties that had previously implemented mandatory Medicaid managed care (Figure 1.4). Among these counties, D-SNP market entry was associated with a 7.9 percentage point increase in enrollment rates two years afterwards. In counties that never had a mandate, it corresponded to a 5.4 percentage point increase. Additionally, there was less evidence of a pre-period enrollment trend among mandate counties and, unlike counties without a mandate, the increase in enrollment did not taper off in the final years following market entry.

1.4.6. Limitations

Although I provide evidence that the introduction of D-SNPs over time led to increases in private Medicare enrollment, it is unclear whether other associations observed in this study are causal. For instance, I find that private Medicare enrollment was positively correlated with the number of MA plan options in a given county. One interpretation of this result is that increases in the competitiveness and diversity of plan options led to greater enrollment, while another possibility is that increases in the demand for private coverage led plans to enter a given market. A useful avenue of future research would be to more carefully delineate these relationships. Doing so will be challenging given that: (1) prior research has only proposed a small number of methods for identifying exogenous sources of variation in private Medicare markets, and (2) most of these approaches relate to changes in government payments to plans, which could affect multiple dimensions of plan offerings. Surveys and focus groups might be a practical alternative for obtaining useful insights into dual eligibles' decision-making process.

Another limitation of this study is that it was unable to explore the role of two potentially important factors. For one, during my sample period, the government enhanced its process for risk-adjusting payments to MA plans. This likely increased the incentive of plans to cater to high-need beneficiary populations, including dual eligibles (Newhouse et al. 2012). Understanding the relationship between risk adjustment and enrollment among dual eligibles will be particularly important moving forward, given that the government recently modified its method for taking dual eligibility into account and is continuing to tinker with its approach (CMS 2015, 2017). Another factor that may merit attention is that states have the option of

subsidizing Part C premiums on behalf of certain dual eligibles (CMS 2007). This presumably increases MA enrollment, but the degree to which this is the case is unclear and will be of particular interest to states.

1.5. Conclusion

This study explores the relationship of private Medicare enrollment and enrollment growth among dual eligibles with several supply-side, demand-side, and state policy factors. Results highlight the important role of D-SNP availability and the maturation of county D-SNP markets over time in pulling dual eligibles into the private Medicare market. Controlling for D-SNP variables accounts for about half of the growth in private Medicare enrollment from 2006 through 2015 among full dual eligibles and QMB partial dual eligibles. The timing of these trends supports the interpretation that D-SNPs led to large increases in enrollment, rather than the other way around. Private Medicare enrollment among dual eligibles was also associated with improvements in plan offerings, decreases in supplemental plan offerings and increases in their premiums, and changes in state policy. Some of these factors are unique to dual eligibles. For instance, some states were passively enrolling full dual eligibles in MMPs in the last year of my sample, which was associated with a large expansion of private Medicare enrollment.

This research draws attention to the crucial role that state policy plays in determining private Medicare enrollment patterns among dual eligibles. First, states have the ability to shape local D-SNP markets. Before offering D-SNPs, insurers must enter into a contract with a given state that describes the plan's structure and responsibilities (MedPAC 2013). Second, private Medicare enrollment has increased in counties where states have rolled out MMP plans and passively enrolled full dual eligibles. Finally, states may influence private Medicare enrollment among dual eligibles in a subtler way by modifying their Medicaid programs, such as by introducing managed care mandates or altering the set of optional benefits. Although state policy may have a large effect on private Medicare enrollment among dual eligibles, most of the implications for spending are at the federal level. This ties into a broader discussion of how the incentives of states and the federal government may be misaligned in ways that lead to suboptimal policy for dual eligibles (Grabowski 2007).

Finally, this study might shape how researchers view the welfare effect of increasing private Medicare enrollment among dual eligibles. For example, this research finds that MMP passive enrollment accounted for a sizable share of the growth in private Medicare among dual eligibles in recent years. The well-being of beneficiaries who are passively enrolled in private Medicare plans may be much different than that of beneficiaries who actively choose these plans. Beneficiaries who actively choose private Medicare coverage presumably make a calculation that they would be better off under this enrollment option than in traditional Medicare (Balsa, Cao, and McGuire 2007). This is less clear among passively-enrolled beneficiaries, who may stick with a private plan because of a bias towards their default option.

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1.7. Tables and figures

Table 1.1. Dual Eligible Groups

		Typical program parameters**			
Dual eligible group	Enrollees (millions)*	Medicaid income limit	Medicaid asset limit	Medicaid coverage	Medicare Part D LIS coverage***
Full dual eligibles	7.3	≤75% FPL or ≤100% FPL	$2,000	Medicaid benefits Medicare cost sharing Part A premium Part B premium	Copay cap (med.) Premium subsidy
QMB partial dual eligibles	1.4	≤100% FPL	$7,390	Medicare cost sharing Part A premium Part B premium	Copay cap (med.) Premium subsidy
Non-QMB partial dual eligibles	1.5	101%-120% FPL	$7,390	Part B premium	Copay cap (high) Premium subsidy

SOURCES: MACPAC 2018b and 2015 Medicare Beneficiary Summary File (MBSF).
NOTES: *Enrollment estimates from January 2015. **Eligibility requirements and benefit levels applicable to the majority of beneficiaries in each dual eligible group. Other members of each group qualify through different eligibility pathways or based on different asset and income limits in particular states. Other full dual eligibles may receive less comprehensive Medicaid coverage of cost sharing and premiums based on their eligibility pathway and state of residence. A very small number of dual eligibles (<50) receive Part A premium coverage alone. ***Part D LIS benefits vary by eligibility pathway. This column represents the most common benefits among the relevant dual eligible group. In 2019, the program capped copay requirements for dual eligibles at $0 (low), $1.25/$3.80 for generic/brand name drugs (medium), and $3.60/$8.95 for generic/brand name drugs (high) (CMS 2019). The program also provides a benchmark premium subsidy, with dual eligibles paying any difference between their Part D premium and the benchmark. QMB = Qualified Medicare Beneficiary.

Table 1.2. Summary Statistics

	All years		By year			Level or percentge point change			
	Mean	SD	2006	2009	2015	2006-2009	2009-2015	2006-2015	SD
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Total population (in millions)			6.6	7.1	9.1	0.5	2.0	2.5	
Share in private Medicare	20%	15%	11%	19%	30%	8%	11%	19%	13%
D-SNPs									
Any	74%	44%	55%	75%	83%	20%	7%	28%	47%
Years since first in county	3.5	3.2	0.3	2.2	7.1	1.9	4.9	6.8	3.3
Other MA plans									
# of plans	16.2	14.5	12.3	18.9	17.2	6.5	-1.6	4.9	5.4
Avg. Part C prem.	$36.1	$25.6	$38.2	$33.6	$33.3	-$4.6	-$0.3	-$4.9	$25.8
Avg. Part D prem.	$5.9	$5.4	$5.4	$7.3	$7.4	$1.9	$0.1	$2.0	$7.5
Avg. OOP costs	$303.8	$35.2	$329.0	$245.2	$320.9	-$83.8	$75.7	-$8.1	$39.3
Share with supp. benefit	62%	27%	57%	63%	71%	6%	8%	13%	32%
Share HMO	48%	31%	46%	40%	56%	-5%	15%	10%	20%
Share PPO	29%	23%	23%	21%	37%	-3%	16%	13%	34%
Share PFFS	21%	28%	28%	37%	5%	9%	-32%	-23%	34%
Trad. Medicare supp. plans									
# of PDPs	45.0	31.8	43.2	52.9	36.8	9.8	-16.2	-6.4	6.0
Avg. PDP prem.	$17.7	$6.9	$8.6	$18.0	$21.2	$9.4	$3.2	$12.6	$5.1
Avg. Medigap prem.	$158.2	$32.5	$156.9	$161.0	$164.3	$4.1	$3.3	$7.4	$24.0
Beneficiary characteristics									
Share 65+	59%	11%	61%	60%	58%	-1%	-2%	-4%	4%
Share full dual	76%	17%	81%	78%	73%	-3%	-5%	-8%	8%
Share QMB partial dual	11%	11%	9%	10%	13%	1%	3%	4%	5%
Share non-QMB partial dual	13%	8%	10%	12%	15%	2%	2%	5%	5%
TM spending per capita	$10,493.1	$1,092.2	$9,994.3	$10,824.4	$10,587.2	$830.1	-$237.2	$592.9	$817.9
State policy									
Mandatory Medicaid MC	16%	37%	6%	13%	30%	7%	17%	24%	43%
Passive enrollment in MMP	3%	16%	0%	0%	19%	0%	19%	19%	39%
Supp. Medicaid benefits	61%	49%	65%	65%	56%	0%	-9%	-9%	28%

NOTES: Overall figures are weighted by county populaton. Figures by year and changes over time are weighted by county enrollment in 2006 to correspond to later regressions. Private Medicare includes beneficiaries in MA plans (D-SNPs and others) and other private alternatives to traditional Medicare (e.g., MMPs). D-SNP = Dual-eligible special needs plan. HMO = Health maintenance organization. MA = Medicare Advantage. MC = Managed care. MMP = Medicare-Medicaid Plan. OOP = Out-of-pocket. PDP = Stand-alone prescription drug plan. PPO = Preferred provider organization. QMB = Qualified Medicare Beneficiary.

Table 1.3. Relationship Between Private Medicare Enrollment Rates Among Dual Eligibles and Explanatory Variables

			Coefficients and standard errors		
	Mean (1)	SD (2)	Primary model (3)	Primary model + Medicaid benefits (4)	Primary model + TM spending per capita (5)
D-SNPs					
Any	73.6%	44.1%	3.7***	3.6***	4.3***
			(0.3)	(0.3)	(0.3)
Years since first in county	3.5	3.2	0.8***	0.9***	1.2***
			(0.1)	(0.1)	(0.1)
Other MA plans					
#	16.2	14.5	0.22***	0.22***	0.23***
			(0.07)	(0.07)	(0.06)
#-squared	263.5	210.3	-0.00	-0.00	-0.00
			(0.00)	(0.00)	(0.00)
Avg. Part C prem. ($10's)	$3.6	$2.6	0.1	0.1	-0.0
			(0.1)	(0.1)	(0.1)
Avg. Part D prem. ($10's)	$0.6	$0.5	-1.0***	-1.0***	-0.5**
			(0.2)	(0.2)	(0.2)
Avg. OOP costs ($10's)	$30.4	$3.5	-0.0	-0.0	-0.1***
			(0.1)	(0.1)	(0.0)
Share with supp. benefit	62%	27%	2.8***	4.5***	2.9***
			(0.8)	(1.0)	(0.7)
Share PPO	29%	23%	3.9***	3.7***	3.9***
			(1.0)	(1.0)	(1.0)
Share PFFS	21%	28%	2.9***	2.9***	1.8*
			(1.1)	(1.1)	(1.0)
Trad. Medicare supp. plans					
# of PDPs	45.0	31.8	-0.1***	-0.1***	-0.0***
			(0.0)	(0.0)	(0.0)
Avg. PDP prem. ($10's)	$1.8	$0.7	-0.5	-0.4	0.2
			(0.4)	(0.4)	(0.3)
Avg. Medigap prem. ($10's)	$15.8	$3.2	0.6***	0.6***	0.6***
			(0.1)	(0.1)	(0.1)
Beneficiary characteristics					
Share 65+			16.7*	15.5*	4.4
			(9.0)	(8.8)	(8.3)
Share QMB partial	10.9%	10.9%	28.8***	28.5***	32.1***
			(5.4)	(5.4)	(5.0)
Share non-QMB partial	13.1%	7.6%	30.6***	29.8***	32.9***
			(5.8)	(5.7)	(5.9)
TM spending per capita ($1,000s)	$10.5	$1.1			0.0
					(0.3)
State policy					
Mandatory Medicaid MC	16%	37%	3.3***	3.3***	3.7***
			(0.7)	(0.7)	(0.7)
Passive enrollment in MMP	3%	16%	11.2***	11.2***	12.4***
			(1.6)	(1.6)	(1.6)
Supp. Medicaid benefits	61%	49%		1.5*	
				(0.9)	
Interaction with share of MA plan				-3.4***	
				(1.0)	

NOTES: N = 22,750 county-year observations. Estimates come from linear regression models that relate private Medicare enrollment rates with the relevant explanatory variables, as well as year dummies and county fixed effects. Models include heteroskedastic-robust standard errors clustered at the county level. Private Medicare includes beneficiaries in MA plans (D-SNPs and others) and other private alternatives to traditional Medicare (e.g., MMPs). D-SNP = Dual-eligible special needs plan. HMO = Health maintenance organization. MA = Medicare Advantage. MC = Managed care. MMP = Medicare-Medicaid Plan. OOP = Out-of-pocket. PDP = Stand-alone prescription drug plan. PPO = Preferred provider organization. QMB = Qualified Medicare Beneficiary.

Table 1.4. Unexplained Trends in Private Medicare Enrollment Among Dual Eligibles After Controlling for Explanatory Variables

		Baseline model, plus the following variables…								
	Baseline	All	D-SNP	Other MA plans	TM supp. plans	Dual eligible chars	Mand. Medicaid MC	Passive enroll MMP	D-SNP + TM supp.	D-SNP + Passive
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Year										
2015 vs. 2006	19.0***	6.4***	10.7***	18.3***	18.7***	17.8***	18.4***	17.1***	17.7***	9.6***
	(0.9)	(1.2)	(0.5)	(1.1)	(1.3)	(1.5)	(1.0)	(0.7)	(1.5)	(0.5)
Coeff. as % of baseline		*33%*	*56%*	*96%*	*98%*	*94%*	*96%*	*90%*	*93%*	*51%*
2009 vs. 2006	7.5***	3.7***	4.8***	3.3***	9.4***	7.0***	7.3***	7.5***	6.0***	4.9***
	(0.4)	(0.8)	(0.4)	(0.9)	(0.6)	(0.4)	(0.4)	(0.4)	(0.9)	(0.3)
Coeff. as % of baseline		*49%*	*63%*	*44%*	*125%*	*93%*	*97%*	*100%*	*80%*	*66%*
2015 vs. 2009	11.5***	2.7**	6.0***	15.0***	9.3***	10.8***	11.0***	9.5***	11.7***	4.7***
	(0.9)	(1.2)	(0.6)	(1.6)	(1.1)	(1.3)	(1.0)	(0.6)	(1.7)	(0.5)
Coeff. as % of baseline		*23%*	*52%*	*131%*	*81%*	*94%*	*96%*	*83%*	*102%*	*41%*
D-SNPs										
Any		3.7***	3.7***							3.8***
		(0.3)	(0.4)							(0.3)
Years since first in county		0.8***	1.1***							1.0***
		(0.1)	(0.1)							(0.1)
Other MA plans										
#		0.22***		0.31***					0.31***	
		(0.07)		(0.08)					(0.07)	
#-squared		-0.00		-0.00					-0.00*	
		(0.00)		(0.00)					(0.00)	
Avg. Part C prem. ($10's)		0.1		-0.1**					-0.2**	
		(0.1)		(0.1)					(0.1)	
Avg. Part D prem. ($10's)		-1.0***		-1.3***					-1.3***	
		(0.2)		(0.3)					(0.3)	
Avg. OOP costs ($10's)		-0.0		-0.3***					-0.2**	
		(0.1)		(0.1)					(0.1)	
Share with supp. benefit		2.8***		3.0***					2.9***	
		(0.8)		(1.0)					(0.9)	
Share PPO		3.9***		4.1***					4.4***	
		(1.0)		(1.1)					(1.1)	
Share PFFS		2.9***		6.3***					5.3***	
		(1.1)		(1.4)					(1.4)	
Trad. Medicare supp. plans										
# of PDPs		-0.1***			-0.1***				-0.1***	
		(0.0)			(0.0)				(0.0)	
Avg. PDP prem. ($10's)		-0.5			-0.8				-0.6	
		(0.4)			(0.5)				(0.5)	
Avg. Medigap prem. ($10's)		0.6***			0.5***				0.5***	
		(0.1)			(0.1)				(0.1)	
Beneficiary characteristics										
Share 65+		16.7*				44.1***				
		(9.0)				(11.0)				
Share QMB partial		28.8***				33.3***				
		(5.4)				(6.4)				
Share non-QMB partial		30.6***				32.3***				
		(5.8)				(7.0)				
State policy										
Mandatory Medicaid MC		3.3***					2.8***			
		(0.7)					(0.8)			
Passive enrollment in MMP		11.2***						10.2***		9.7***
		(1.6)						(1.4)		(1.4)

NOTES: N = 22,750 county-year observations. Estimates come from linear regression models that relate private Medicare enrollment rates with the relevant explanatory variables, as well as year dummies and county fixed effects. Models include heteroskedastic-robust standard errors clustered at the county level. Private Medicare includes beneficiaries in MA plans (D-SNPs and others) and other private alternatives to traditional Medicare (e.g., MMPs). D-SNP = Dual-eligible special needs plan. HMO = Health maintenance organization. MA = Medicare Advantage. MC = Managed care. MMP = Medicare-Medicaid Plan. OOP = Out-of-pocket. PDP = Stand-alone prescription drug plan. PPO = Preferred provider organization. QMB = Qualified Medicare Beneficiary. TM = Traditional Medicare.

Table 1.5. Relationship Between Private Medicare Enrollment Rates and Explanatory Variables, by Dual Eligible Group

			Coefficients and standard errors		
	Mean	SD	Full dual	QMB partial dual	Non-QMB partial dual
	(1)	(2)	(3)	(4)	(5)
D-SNPs					
Any	73.6%	44.1%	3.9***	4.1***	3.2***
			(0.3)	(0.4)	(0.4)
Years since first in county	3.5	3.2	0.8***	1.5***	0.5***
			(0.1)	(0.1)	(0.1)
Other MA plans					
#	16.2	14.5	0.17*	0.37***	0.71***
			(0.08)	(0.10)	(0.13)
#-squared	263.5	210.3	-0.00	-0.00	-0.01**
			(0.00)	(0.00)	(0.00)
Avg. Part C prem. ($10's)	$3.6	$2.6	0.0	-0.1	0.0
			(0.1)	(0.1)	(0.1)
Avg. Part D prem. ($10's)	$0.6	$0.5	-0.7**	0.0	-0.9***
			(0.3)	(0.3)	(0.3)
Avg. OOP costs ($10's)	$30.4	$3.5	-0.0	0.1	0.3***
			(0.1)	(0.1)	(0.1)
Share with supp. benefit	62%	27%	3.1***	1.3**	1.2*
			(0.9)	(0.7)	(0.8)
Share PPO	29%	23%	4.2***	4.9***	0.8
			(1.1)	(1.0)	(0.9)
Share PFFS	21%	28%	3.1**	2.3**	-2.7**
			(1.3)	(1.0)	(1.1)
Trad. Medicare supp. plans					
# of PDPs	45.0	31.8	-0.1***	-0.0	0.1
			(0.0)	(0.0)	(0.0)
Avg. PDP prem. ($10's)	$1.8	$0.7	-0.8	0.5	0.4
			(0.5)	(0.5)	(0.5)
Avg. Medigap prem. ($10's)	$15.8	$3.2	0.6***	0.4**	0.5***
			(0.1)	(0.2)	(0.2)
Beneficiary characteristics					
Share 65+			34.1***	17.5***	29.1***
			(6.8)	(4.1)	(5.1)
State policy					
Mandatory Medicaid MC	16%	37%	3.8***	1.4*	2.9***
			(0.9)	(0.7)	(0.9)
Passive enrollment in MMP	3%	16%	13.1***	-5.6***	-5.9***
			(2.3)	(0.6)	(1.0)
Supp. Medicaid benefits	61%	49%			
N (county-year) =			22,750	22,372	22,518

NOTES: Estimates come from linear regression models that relate private Medicare enrollment rates with the relevant explanatory variables, as well as year dummies and county fixed effects. Models include heteroskedastic-robust standard errors clustered at the county level. Private Medicare includes beneficiaries in MA plans (D-SNPs and others) and other private alternatives to traditional Medicare (e.g., MMPs). D-SNP = Dual-eligible special needs plan. HMO = Health maintenance organization. MA = Medicare Advantage. MC = Managed care. MMP = Medicare-Medicaid Plan. OOP = Out-of-pocket. PDP = Stand-alone prescription drug plan. PPO = Preferred provider organization. QMB = Qualified Medicare Beneficiary.

Table 1.6. Unexplained Trends in Private Medicare Enrollment Among Full Dual Eligibles After Controlling for Explanatory Variables

		Baseline model, plus the following variables…							
	Baseline	All	D-SNP	Other MA plans	TM supp. plans	Share 65+	Mand. Medicaid MC	Passive enroll MMP	D-SNP + Passive
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Year									
2015 vs. 2006	16.7***	6.6***	7.8***	16.4***	17.2***	18.7***	16.1***	13.9***	6.3***
	(1.2)	(1.2)	(0.6)	(1.3)	(1.8)	(1.2)	(1.3)	(0.9)	(0.5)
Coeff. as % of baseline		*40%*	*47%*	*98%*	*103%*	*112%*	*97%*	*83%*	*38%*
2009 vs. 2006	5.7***	3.1***	2.7***	1.3	8.4***	6.4***	5.5***	5.7***	3.0***
	(0.4)	(0.9)	(0.4)	(1.1)	(0.7)	(0.4)	(0.4)	(0.4)	(0.3)
Coeff. as % of baseline		*54%*	*48%*	*23%*	*147%*	*113%*	*97%*	*100%*	*53%*
2015 vs. 2009	11.0***	3.6***	5.1***	15.1***	8.8***	12.3***	10.6***	8.2***	3.3***
	(1.1)	(1.3)	(0.7)	(2.0)	(1.4)	(1.2)	(1.2)	(0.8)	(0.6)
Coeff. as % of baseline		*32%*	*46%*	*137%*	*80%*	*112%*	*97%*	*74%*	*30%*
D-SNPs									
Any		3.9***	3.6***						3.8***
		(0.3)	(0.4)						(0.4)
Years since first in county		0.8***	1.1***						1.0***
		(0.1)	(0.1)						(0.1)
Other MA plans									
#		0.17*		0.17*					
		(0.08)		(0.09)					
#-squared		-0.00		-0.00					
		(0.00)		(0.00)					
Avg. Part C prem. ($10's)		0.0		-0.2*					
		(0.1)		(0.1)					
Avg. Part D prem. ($10's)		-0.7**		-1.3***					
		(0.3)		(0.4)					
Avg. OOP costs ($10's)		-0.0		-0.3***					
		(0.1)		(0.1)					
Share with supp. benefit		3.1***		3.5***					
		(0.9)		(1.2)					
Share PPO		4.2***		3.6***					
		(1.1)		(1.3)					
Share PFFS		3.1**		6.8***					
		(1.3)		(1.7)					
Trad. Medicare supp. plans									
# of PDPs		-0.1***			-0.2***				
		(0.0)			(0.0)				
Avg. PDP prem. ($10's)		-0.8			-1.4**				
		(0.5)			(0.6)				
Avg. Medigap prem. ($10's)		0.6***			0.3**				
		(0.1)			(0.1)				
Beneficiary characteristics									
Share 65+		34.1***				65.1***			
		(6.8)				(7.5)			
State policy									
Mandatory Medicaid MC		3.8***					2.5**		
		(0.9)					(1.1)		
Passive enrollment in MMP		13.1***						13.1***	12.6***
		(2.3)						(1.9)	(2.0)

NOTES: N = 22,750 county-year observations. Estimates come from linear regression models that relate private Medicare enrollment rates with the relevant explanatory variables, as well as year dummies and county fixed effects. Models include heteroskedastic-robust standard errors clustered at the county level. Private Medicare includes beneficiaries in MA plans (D-SNPs and others) and other private alternatives to traditional Medicare (e.g., MMPs). D-SNP = Dual-eligible special needs plan. HMO = Health maintenance organization. MA = Medicare Advantage. MC = Managed care. MMP = Medicare-Medicaid Plan. OOP = Out-of-pocket. PDP = Stand-alone prescription drug plan. PPO = Preferred provider organization. QMB = Qualified Medicare Beneficiary. TM = Traditional Medicare.

Table 1.7. Unexplained Trends in Private Medicare Enrollment Among QMB Partial Dual Eligibles After Controlling for Explanatory Variables

		Baseline model, plus the following variables…						
	Baseline	All	D-SNP	Other MA plans	TM supp. plans	Share 65+	Mand. Medicaid MC	Passive enroll MMP
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Year								
2015 vs. 2006	21.9***	9.0***	11.5***	20.7***	19.6***	22.9***	21.1***	22.4***
	(0.9)	(1.2)	(0.4)	(1.1)	(1.2)	(1.0)	(0.8)	(0.9)
Coeff. as % of baseline		*41%*	*53%*	*94%*	*90%*	*105%*	*97%*	*102%*
2009 vs. 2006	10.7***	5.9***	7.5***	6.1***	10.7***	11.3***	10.5***	10.7***
	(0.5)	(0.9)	(0.4)	(0.7)	(0.8)	(0.6)	(0.5)	(0.5)
Coeff. as % of baseline		*55%*	*70%*	*57%*	*100%*	*105%*	*98%*	*100%*
2015 vs. 2009	11.2***	3.1**	4.0***	14.6***	8.9***	11.6***	10.6***	11.7***
	(0.5)	(1.3)	(0.4)	(1.3)	(0.7)	(0.5)	(0.5)	(0.5)
Coeff. as % of baseline		*28%*	*36%*	*130%*	*80%*	*104%*	*95%*	*105%*
D-SNPs								
Any		4.1***	4.0***					
		(0.4)	(0.4)					
Years since first in county		1.5***	1.4***					
		(0.1)	(0.1)					
Other MA plans								
#		0.37***		0.48***				
		(0.10)		(0.11)				
#-squared		-0.00		-0.00*				
		(0.00)		(0.00)				
Avg. Part C prem. ($10's)		-0.1		-0.3***				
		(0.1)		(0.1)				
Avg. Part D prem. ($10's)		0.0		-0.2				
		(0.3)		(0.3)				
Avg. OOP costs ($10's)		0.1		-0.2**				
		(0.1)		(0.1)				
Share with supp. benefit		1.3**		1.5**				
		(0.7)		(0.7)				
Share PPO		4.9***		3.3***				
		(1.0)		(1.1)				
Share PFFS		2.3**		5.4***				
		(1.0)		(1.3)				
Trad. Medicare supp. plans								
# of PDPs		-0.0			-0.1***			
		(0.0)			(0.0)			
Avg. PDP prem. ($10's)		0.5			0.9			
		(0.5)			(0.6)			
Avg. Medigap prem. ($10's)		0.4**			0.4*			
		(0.2)			(0.2)			
Beneficiary characteristics								
Share 65+		17.5***				16.2***		
		(4.1)				(5.4)		
State policy								
Mandatory Medicaid MC		1.4*					1.9***	
		(0.7)					(0.7)	
Passive enrollment in MMP		-5.6***						-6.4***
		(0.6)						(0.7)

NOTES: N = 22,372 county-year observations. Estimates come from linear regression models that relate private Medicare enrollment rates with the relevant explanatory variables, as well as year dummies and county fixed effects. Models include heteroskedastic-robust standard errors clustered at the county level. Private Medicare includes beneficiaries in MA plans (D-SNPs and others) and other private alternatives to traditional Medicare (e.g., MMPs). D-SNP = Dual-eligible special needs plan. HMO = Health maintenance organization. MA = Medicare Advantage. MC = Managed care. MMP = Medicare-Medicaid Plan. OOP = Out-of-pocket. PDP = Stand-alone prescription drug plan. PPO = Preferred provider organization. QMB = Qualified Medicare Beneficiary. TM = Traditional Medicare.

Table 1.8. Unexplained Trends in Private Medicare Enrollment Among Non-QMB Partial Dual Eligibles After Controlling for Explanatory Variables

		Baseline model, plus the following variables…						
	Baseline	All	D-SNP	Other MA plans	TM supp. plans	Share 65+	Mand. Medicaid MC	Passive enroll MMP
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Year								
2015 vs. 2006	21.7***	15.9***	20.6***	18.4***	20.9***	23.8***	20.8***	22.5***
	(0.8)	(1.1)	(0.4)	(1.1)	(1.2)	(0.9)	(0.8)	(0.8)
Coeff. as % of baseline		*73%*	*95%*	*85%*	*96%*	*110%*	*96%*	*104%*
2009 vs. 2006	13.4***	11.7***	12.7***	12.7***	11.8***	14.4***	13.2***	13.4***
	(0.5)	(1.1)	(0.3)	(0.9)	(1.0)	(0.5)	(0.5)	(0.5)
Coeff. as % of baseline		*87%*	*94%*	*95%*	*88%*	*107%*	*98%*	*100%*
2015 vs. 2009	8.2***	4.2***	7.9***	5.7***	9.1***	9.4***	7.6***	9.0***
	(0.4)	(1.2)	(0.4)	(1.0)	(0.7)	(0.5)	(0.5)	(0.4)
Coeff. as % of baseline		*51%*	*96%*	*69%*	*110%*	*114%*	*93%*	*109%*
D-SNPs								
Any		3.2***	3.5***					
		(0.4)	(0.4)					
Years since first in county		0.5***	0.0					
		(0.1)	(0.1)					
Other MA plans								
#		0.71***		0.76***				
		(0.13)		(0.13)				
#-squared		-0.01**		-0.01***				
		(0.00)		(0.00)				
Avg. Part C prem. ($10's)		0.0		-0.1				
		(0.1)		(0.1)				
Avg. Part D prem. ($10's)		-0.9***		-0.9***				
		(0.3)		(0.3)				
Avg. OOP costs ($10's)		0.3***		0.2***				
		(0.1)		(0.1)				
Share with supp. benefit		1.2*		1.4*				
		(0.8)		(0.8)				
Share PPO		0.8		0.4				
		(0.9)		(1.0)				
Share PFFS		-2.7**		-2.1*				
		(1.1)		(1.3)				
Trad. Medicare supp. plans								
# of PDPs		0.1			0.1**			
		(0.0)			(0.0)			
Avg. PDP prem. ($10's)		0.4			0.8			
		(0.5)			(0.6)			
Avg. Medigap prem. ($10's)		0.5***			0.5**			
		(0.2)			(0.2)			
Beneficiary characteristics								
Share 65+		29.1***				27.0***		
		(5.1)				(5.9)		
State policy								
Mandatory Medicaid MC		2.9***					2.8***	
		(0.9)					(0.8)	
Passive enrollment in MMP		-5.9***						-7.6***
		(1.0)						(1.4)

NOTES: N = 22,518 county-year observations. Estimates come from linear regression models that relate private Medicare enrollment rates with the relevant explanatory variables, as well as year dummies and county fixed effects. Models include heteroskedastic-robust standard errors clustered at the county level. Private Medicare includes beneficiaries in MA plans (D-SNPs and others) and other private alternatives to traditional Medicare (e.g., MMPs). D-SNP = Dual-eligible special needs plan. HMO = Health maintenance organization. MA = Medicare Advantage. MC = Managed care. MMP = Medicare-Medicaid Plan. OOP = Out-of-pocket. PDP = Stand-alone prescription drug plan. PPO = Preferred provider organization. QMB = Qualified Medicare Beneficiary. TM = Traditional Medicare.

Appendix Table 1.1. Previous Literature on the Association Between Enrollment in Private Medicare and Potential Explanatory Variables *

Factor (1)	Summary of findings (2)
Supply-side	
Number plans	Increases in the number of plans available were associated with increases in MA enrollment, at least initially (McWilliams et al. 2011; Jacobs and Buntin 2015; Pelech 2015). Two of these studies found a decreasing marginal effect (McWilliams et al. 2011; Jacobs and Buntin 2015) and one found negative effects when there were already many plans in a given county (McWilliams et al. 2011).
Premiums	Increases in premiums were associated with decreases in MA enrollment (Jacobs and Buntin 2015; Pelech 2015) and enrollment in specific plans (Dowd, Feldman, and Coulam 2003; Atherly, Dowd, and Feldman 2004; Jacobs and Buntin 2015; Reid et al. 2016). They were positively associated with plan disenrollment (Ng et al. 2007; Meyers et al. 2019).
Benefits	Increases in plan generosity were associated with increases in MA enrollment (McWilliams et al. 2011; Pelech 2015) or were not associated by a statistically significant amount (Sinaiko, Afendulis, and Frank 2013). Increases in plan generosity were associated with greater enrollment in specific plans (Jacobs and Buntin 2015; Reid et al. 2016). Vision coverage was associated with an increase in enrollment in a specific plan (Dowd, Feldman, and Coulam 2003; Atherly, Dowd, and Feldman 2004) as was dental coverage in one study (Dowd, Feldman, and Coulam 2003), though neither dental nor hearing coverage results were statistically significant in another (Atherly, Dowd, and Feldman 2004). Results for copays were mixed (Dowd, Feldman, and Coulam 2003; Atherly, Dowd, and Feldman 2004).
Provider networks	Plan disenrollment rates were lower among PPO contracts than among HMO contracts (DuGoff and Chao 2019).
Quality	Increases in star ratings were associated with increases in enrollment in specific plans and decreases in disenrollment rates (Lied et al. 2003; Reid et al. 2013; DuGoff and Chao 2019; Meyers et al. 2019).
Demand-side	
Health status	Increases in health have generally been associated with increases in MA enrollment (see for example Hellinger and Wong 2000; Mello et al. 2003; and Rahman et al. 2015), though there is also evidence that this relationship has decreased over time (Newhouse et al. 2012; Newhouse et al. 2015).
Age	Among Medicare beneficiaries 65 and older, studies have found that increases in age are negatively associated with MA enrollment (Mello et al. 2003; Atherly, Dowd, and Feldman 2004; Afendulis, Sinaiko, and Frank 2015; Jacobs and Buntin 2015) with one exception (Shimada et al. 2009).
Income	Studies excluding dual eligibles have found that MA enrollment tends to be higher among lower-income beneficiaries (Atherly, Dowd, and Feldman 2004; Shimada et al. 2009; Jacobs and Buntin 2015). One study included duals and found that increases in income were associated with increases in MA enrollment but that dual eligibility was associated with a lower likelihood of enrollment (Mello et al. 2003).

Factor (1)	Summary of findings (2)
Status quo bias	Two studies suggest that beneficiaries were more likely to make optimal enrollment decisions when they first became eligible for Medicare, which the authors take as evidence of status quo bias (Sinaiko, Afendulis, and Frank 2013; Afendulis, Sinaiko, and Frank 2015). Another study found that plan enrollees were not switching to cheaper alternatives and were particularly unlikely to do so as tenure increased, implying inertia in enrollment (Jacobs and Molloy 2017).
Suppl. markets	Increases in Medigap premiums were associated with increases in MA enrollment (McLaughlin, Chernew, and Taylor 2002; Atherly, Dowd, and Feldman 2004; Pelech 2015).
	Increases in the number of PDPs were associated with decreases in MA enrollment, though the relationship between PDP premiums and MA enrollment were not statistically significant (Pelech 2015).

Notes: *All results in this table come from peer-reviewed publications, with the exception of Pelech 2015 (an unpublished chapter of a dissertation). HMO = health maintenance organization. MA = Medicare Advantage. PDP = stand-alone prescription drug plan. PPO = preferred provider organization.

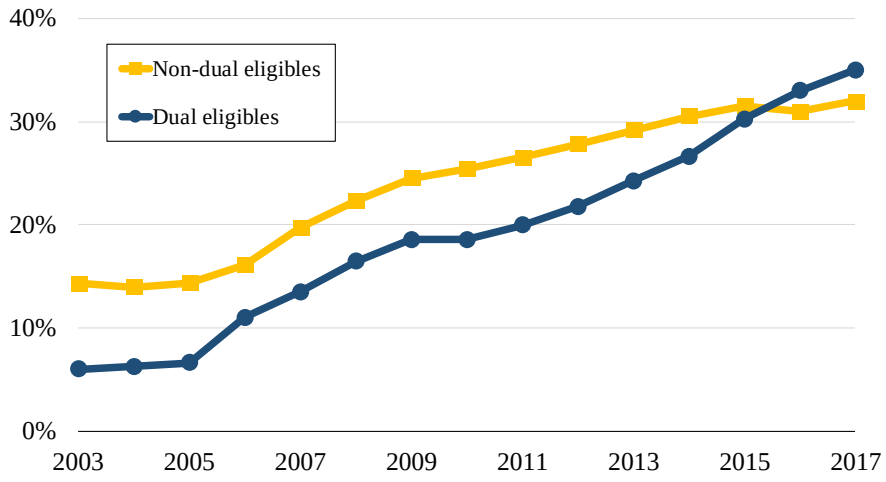
Appendix Table 1.2. Potential Determinants of Enrollment in Private Medicare Plans

Factor (1)	Predicted relationship* (2)	Nuance for dual eligibles (3)
Supply-side		
Number plans	Enrollment will initially increase with the number of plans as markets become more competitive and add a greater diversity of options (McWilliams et al. 2011). Marginal effects will decrease and may become negative due, for example, to choice overload (McWilliams et al. 2011).	Dual eligibles may be particularly sensitive to the availability of D-SNPs. D-SNPs are a relatively new plan type so may have larger effects on enrollment as they gain experience in a given county and as beneficiaries become more familiar with them.
Premiums	Enrollment will decrease with plan premiums.	All duals receive a flat premium subsidy for Part D coverage.
Benefits	Enrollment will increase with plan benefit generosity.	Many dual eligibles receive coverage for all or most of their cost-sharing obligations, though there are some gaps (e.g., most dental care in some states).
Provider networks	Enrollment will increase with the breadth of provider networks.	
Quality	Enrollment will increase with plan quality.	
Demand-side		
Health status	Enrollment will increase with health status due to cream skimming and adverse selection (e.g., as healthier beneficiaries may be less averse to managed care restrictions) (Brown et al. 2014; Newhouse and McGuire 2014).	
Age	Enrollment will generally decrease with age as health deteriorates. Beneficiaries under age 65 may be less likely to enroll; they qualify for Medicare on the basis of disability and report more significant cost and access challenges (Cubanski and Neuman 2010).	
Cohort	Enrollment will increase with birth cohort as younger cohorts may have greater experience with managed care (Sinaiko and Zeckhauser 2015).	
Income	Enrollment will decrease with income as lower-income beneficiaries are more willing to accept managed care restrictions in exchange for lower cost-sharing requirements under private plans (Newhouse and McGuire 2014).	Generosity of Medicaid and LIS benefits tends to fall with income. More generous benefits may reduce the incentive to seek similar coverage through private plans. There is less variation in income after controlling for dual eligible group.

Factor (1)	Predicted relationship* (2)	Nuance for dual eligibles (3)
Suppl. markets	Enrollment will decrease as the number of plans increase and premiums fall given that supplemental coverage for traditional Medicare may be a substitute for private Medicare (Pelech 2015).	All duals receive a flat premium subsidy for PDP coverage. Medigap coverage is largely redundant for many dual eligibles who receive similar benefits through Medicaid.
State policy		
Medicaid	Only directly applicable to dual eligibles.	Enrolling in a Medicaid managed care plan and private Medicare plan offered by the same insurer may facilitate the coordination of benefits across Medicare and Medicaid. Hence, state Medicaid managed care mandates may also lead to an increase in private Medicare enrollment. Insurers that have experience serving dual eligibles in the Medicaid managed care market may be more willing to cater towards this population in the private Medicare market.
Passive enrollment into MMPs	Only directly applicable to dual eligibles.	Prior research suggests stickiness in Medicare enrollment (Sinaiko, Afendulis, and Frank 2013; Afendulis, Sinaiko, and Frank 2015), which could indicate an important role for passive enrollment.

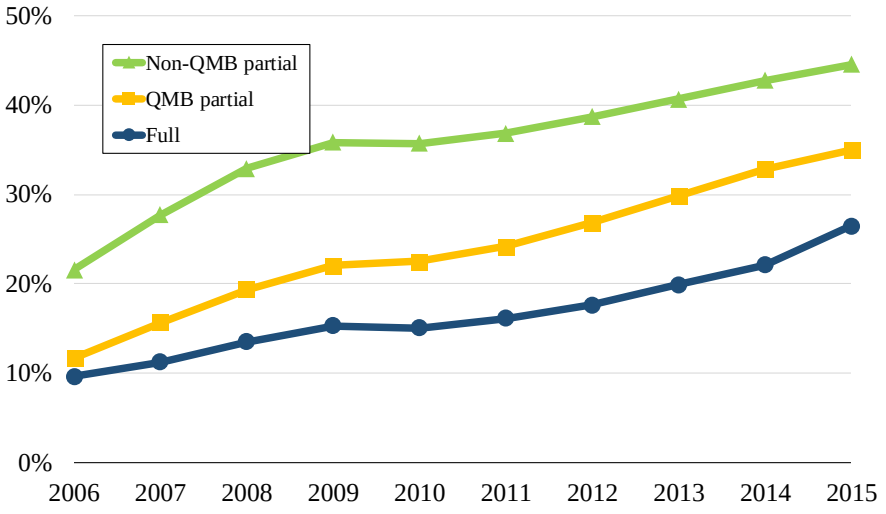
Notes: *Holding all else equal. D-SNP = Dual-eligible special needs plan. MC = Managed care. MMP = Medicare-Medicaid Plan. PDP = Stand-alone prescription drug plan.

Figure 1.1. Share of Beneficiaries in Private Medicare, by Dual Eligible Status



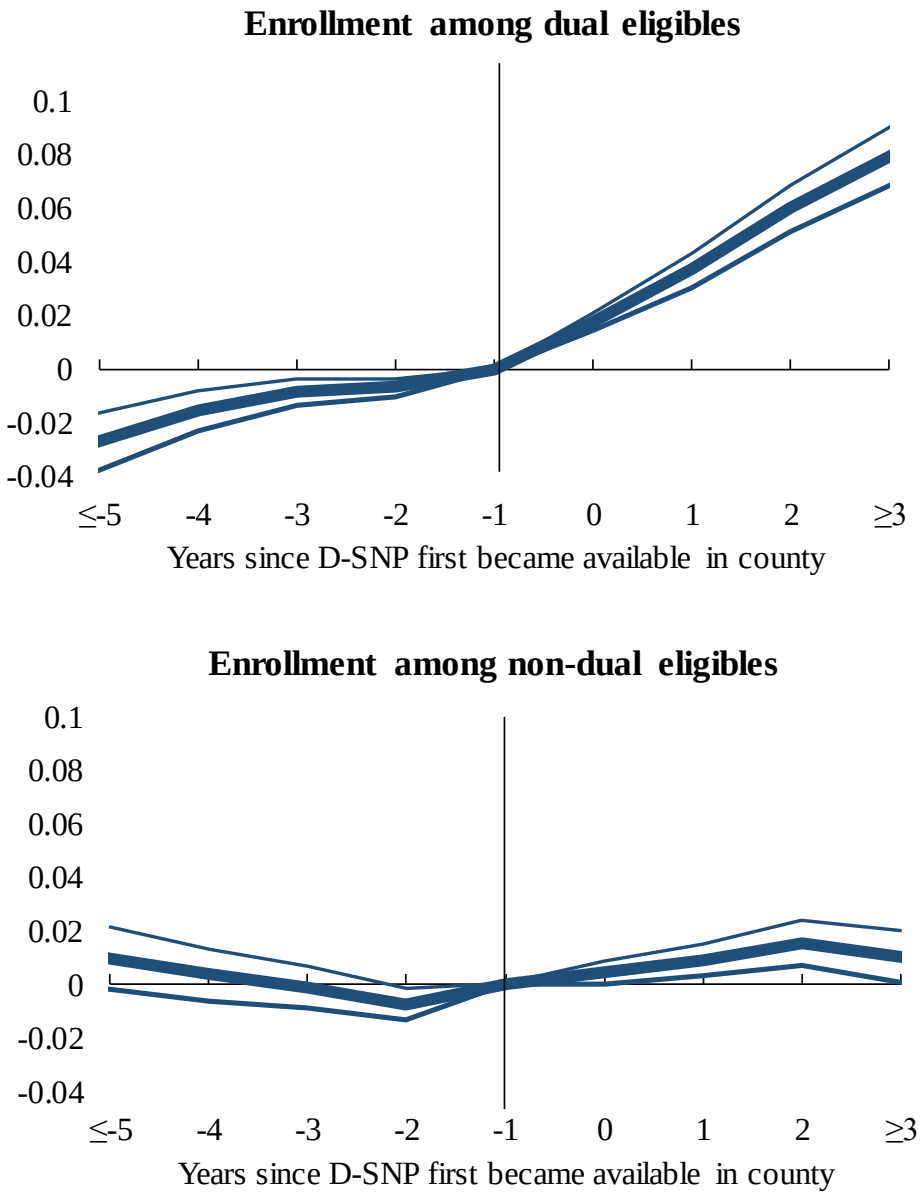
NOTE: Private Medicare includes beneficiaries in MA plans (D-SNPs and others) and other private alternatives to traditional Medicare (e.g., MMPs). D-SNP = Dual-eligible special needs plan. MA = Medicare Advantage. MMP = Medicare-Medicaid Plan.
SOURCE: 2006-2007 Denominator Files, 2008-2015 Medicare Beneficiary Summary, Files, and MMCO (2018)

Figure 1.2. Share of Dual Eligibles in Private Medicare, by Eligibility Group



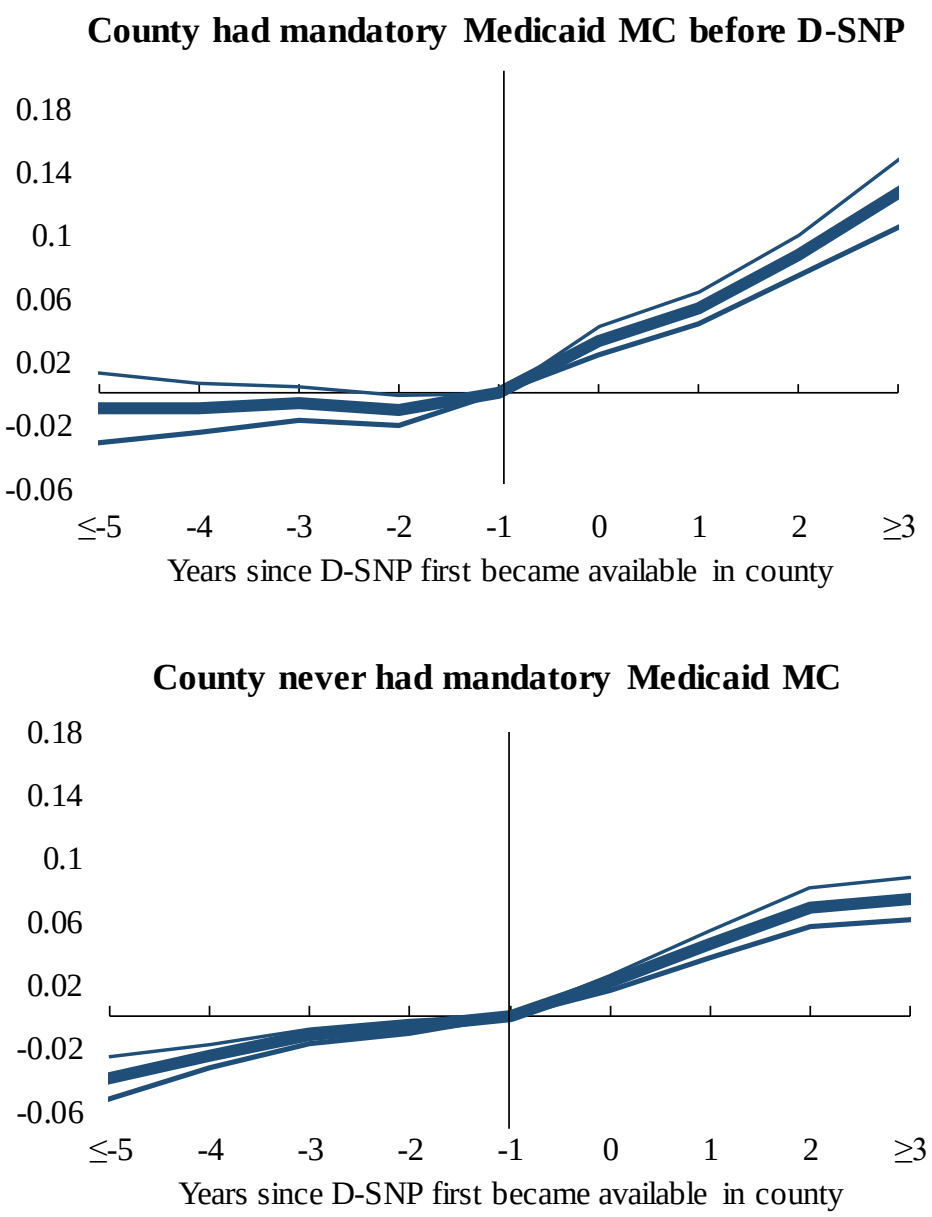
NOTE: Private Medicare includes beneficiaries in MA plans (D-SNPs and others) and other private alternatives to traditional Medicare (e.g., MMPs). D-SNP = Dual-eligible special needs plan. MA = Medicare Advantage. MMP = Medicare-Medicaid Plan. QMB = Qualified Medicare Beneficiary.
SOURCE: 2005-2007 Medicaid Analytic eXtract Personal Summary files and 2005-2015 Medicare Beneficiary Summary Files.

Figure 1.3. Relationship Between D-SNP Availability and the Share of Beneficiaries in Private Medicare



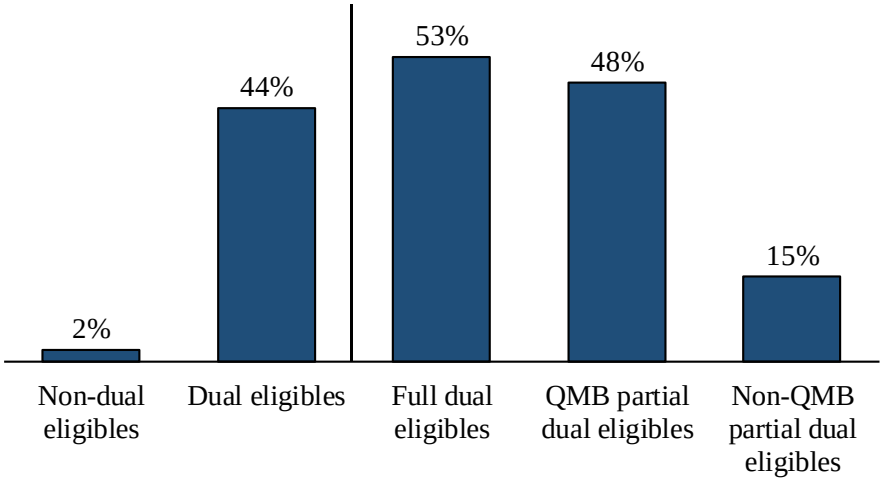
NOTE: Estimates come from event-study models that relate private Medicare enrollment rates with event-year dummies, explanatory variables from other models that are unrelated to D-SNPs, and county and year fixed effects. The thick blue line plots coefficients for event-year dummies, with -1 as the reference year. The thin blue lines represent 95% confidendence intervals. Private Medicare includes beneficiaries in MA plans (D-SNPs and others) and other private alternatives to traditional Medicare (e.g., MMPs). D-SNP = Dual-eligible special needs plan. MA = Medicare Advantage. MMP = Medicare-Medicaid Plan.

Figure 1.4. Relationship Between D-SNP Availability and the Share of Beneficiaries in Private Medicare



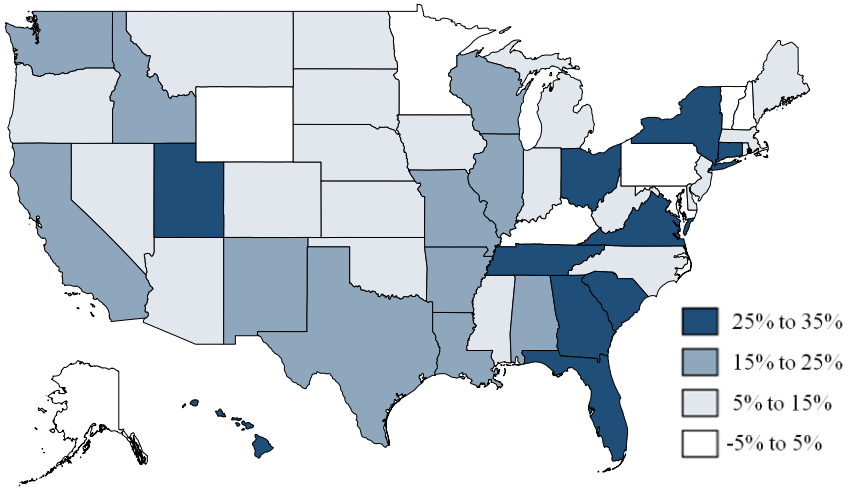
NOTE: Estimates come from event-study models that relate private Medicare enrollment rates with event-year dummies, explanatory variables from other models that are unrelated to D-SNPs, and county and year fixed effects. The thick blue line plots coefficients for event-year dummies, with -1 as the reference year. The thin blue lines represent 95% confidendence intervals. Private Medicare includes beneficiaries in MA plans (D-SNPs and others) and other private alternatives to traditional Medicare (e.g., MMPs). D-SNP = Dual-eligible special needs plan. MA = Medicare Advantage. MC = Managed care. MMP = Medicare-Medicaid Plan.

Appendix Figure 1.1. Share of Private Medicare Enrollees in D-SNPs, by Dual Eligible Group



NOTE: Private Medicare includes beneficiaries in MA plans (D-SNPs and others) and other private alternatives to traditional Medicare (e.g., MMPs). D-SNP = Dual-eligible special needs plan. MA = Medicare Advantage. MMP = Medicare-Medicaid Plan. QMB = Qualified Medicare Beneficiary.
SOURCE: 2015 Medicare Beneficiary Summary Files and 2015 Plan Benefit Package data.

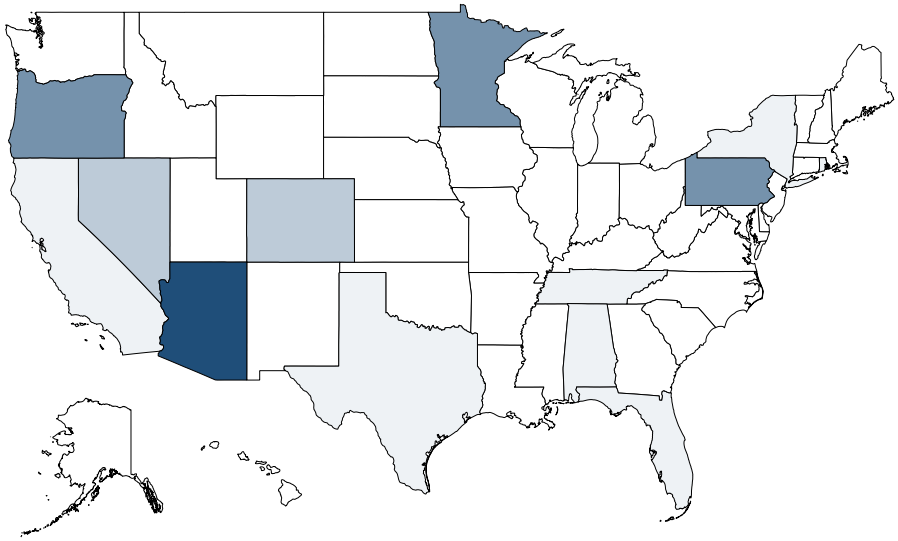
Appendix Figure 1.2. Percentage Point Increase in Private Medicare Enrollment Rates, 2006-2015



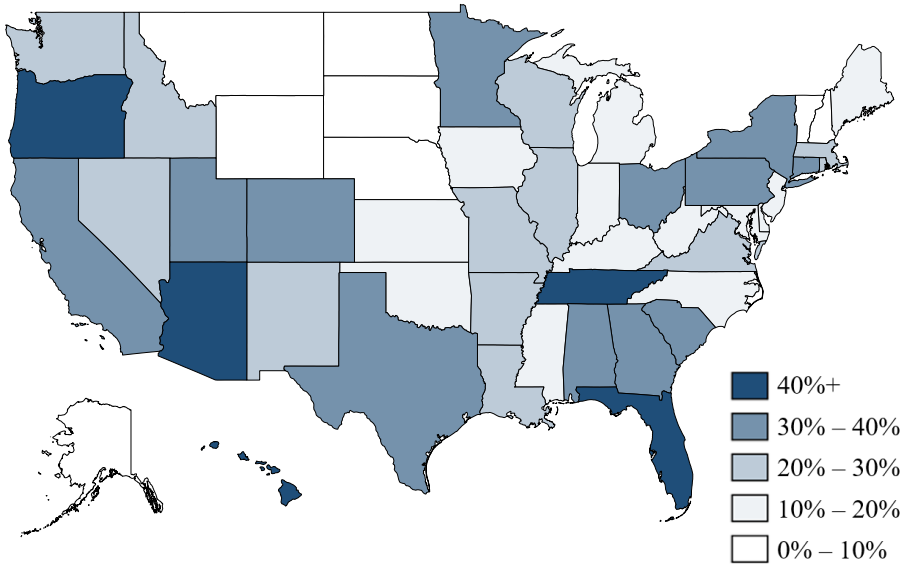
NOTE: Private Medicare includes beneficiaries in MA plans (D-SNPs and others) and other private alternatives to traditional Medicare (e.g., MMPs). D-SNP = Dual-eligible special needs plan. MA = Medicare Advantage. MMP = Medicare-Medicaid Plan.
SOURCE: 2006-2007 Denominator Files, 2008-2015 Medicare Beneficiary Summary, Files.

Appendix Figure 1.3. Private Medicare Enrollment Rates, by State and Year

2006



2015



NOTES: Private Medicare includes beneficiaries in MA plans (D-SNPs and others) and other private alternatives to traditional Medicare (e.g., MMPs). D-SNP = Dual-eligible special needs plan. MA = Medicare Advantage. MMP = Medicare-Medicaid Plan.
SOURCE: 2006-2007 Denominator Files, 2008-2015 Medicare Beneficiary Summary, Files.

Chapter 2.
Dual Advantage or Double the Burden?:
The effect on dual eligibles of providing Medicare benefits through private plans

2.1. Introduction

Over the past several years, there has been a dramatic change in the structure of Medicare, the federal health insurance program that currently covers about 60 million elderly and disabled Americans (CMS 2018b). Historically, beneficiaries obtained coverage almost exclusively through a government-administered version of the program known as "traditional Medicare." Today, however, over 20 million beneficiaries choose to receive their coverage through subsidized, private plans under Medicare Advantage (MA) (CMS 2018b). The government introduced, and at times encouraged, this enrollment option as a mechanism for capitalizing on the perceived efficiencies of market competition and managed care. Indeed, prior research suggests that MA plans have been able to reduce the intensity of beneficiaries' resource use without necessarily harming the quality of care, albeit with the caveat that the government's subsidies to MA plans have often been generous relative to its average expenditures under traditional Medicare. Despite these potentially promising results, most studies have estimated the *average* effect of MA enrollment on beneficiary outcomes. Few have considered whether some groups of beneficiaries have more to gain or lose from the expanding role of private plans in Medicare.

This study evaluates the effect of MA enrollment on the resource use and quality of care among dual eligibles — i.e., the approximately 11 million Medicare beneficiaries who also receive full or partial benefits through state Medicaid programs — and whether this effect varies within the dual eligible population based on health status, level of Medicaid benefits, and regional spending levels (MMCO 2019b). Dual eligibles merit special attention for several reasons. First, they are a uniquely vulnerable population, possessing limited resources as a requirement of Medicaid

eligibility and often having the significant health needs associated with the intersection of poverty, old age, and/or disability (Figure 2.1). Second, given the high needs of this population, they incur more than twice as much Medicare spending on average than other beneficiaries (Figure 2.1) and are therefore of interest from a fiscal perspective. Third, because of their unique characteristics — such as having poor health, low levels of health literacy and patient activation, and low incomes on average and receiving supplemental coverage through Medicaid — the effects of MA likely differ for dual eligibles relative to other Medicare beneficiaries. Fourth, studying dual eligibles is tractable, given the availability of administrative enrollment data, whereas evaluating other vulnerable groups may not be.

Finally, focusing on the effect of MA among dual eligibles is especially salient given that policy changes over time have encouraged this population to enroll in private plans. These changes include the authorization of specialized MA plans that exclusively enroll dual eligibles and the creation of a large demonstration program that permits states to passively enroll dual eligibles in private, integrated Medicare-Medicaid plans (MedPAC 2013; MACPAC 2018a). For these and other reasons, the share of dual eligibles enrolled in MA and other private plans has grown substantially, increasing from 6% in 2004 to 35% in 2017 (Figure 2.2).

To identify the effect of MA enrollment on outcomes among dual eligibles, I rely on a regression discontinuity design that has been validated by prior studies (Duggan, Starc, and Vabson 2016; Afendulis, Chernew, and Kessler 2017). This approach exploits a discrete increase in average government benchmark payments to MA plans in metropolitan statistical areas that exceeded a population threshold of 250,000. This increase subsequently led to a discontinuous jump in MA enrollment rates, including among dual eligibles. I use this exogenous source of variation in enrollment to explore the relationship of MA with inpatient utilization patterns and the quality of care among dual eligibles.

My primary results suggest that the generally positive findings from much of the prior literature extend to dual eligibles. In particular, I find that increases in plan payments and MA enrollment reduced inpatient utilization — including potentially unnecessary admissions — among dual eligibles. At the same time, I fail to find evidence that these changes came at the expense of care

quality in terms of either hospital quality ratings or patient mortality. Despite these promising results, there is a much different story when focusing on counties with historically-low traditional Medicare spending. In these regions, MA enrollment was associated with a smaller reduction — if any — in inpatient utilization, as well as a shift towards lower-quality hospitals and an increase in one-year mortality rates. These results highlight the importance of identifying how the effects of MA enrollment may vary across subpopulations of beneficiaries. They also suggest caution as policymakers debate whether to further encourage MA enrollment among dual eligibles.

2.2. Background and literature

2.2.1. Traditional Medicare and Medicare Advantage

One of the most important choices facing Medicare beneficiaries is whether to receive their benefits through the traditional, government-administered version of the program ("traditional Medicare") or through one of the private, subsidized plans offered in Medicare Advantage (MA). Traditional Medicare has been available since the program's implementation in 1966 and initially resembled a single-payer system for the elderly and disabled (Oberlander 2003). Under traditional Medicare, the government sets provider reimbursement rates and establishes relatively uniform benefits, premiums, and cost-sharing requirements. Enrollees can receive care from most providers in the United States, and they face few constraints in how they make use of the program's benefits (Berenson and Harris 2002; Bagley 2013; Neuman and Jacobson 2018).

MA has been available since 1985 and represents a managed competition system (Zarabozo 2000; Frank and McGuire 2017). Under this arrangement, private plans compete for enrollment within a tightly-regulated marketplace and receive risk-adjusted, capitated payments from the government to provide Medicare's benefits (Lipschutz et al. 2015; MedPAC 2018b). If benchmark payment rates are insufficient to cover a plan's premium, enrollees must cover the difference (MedPAC 2018b). Within the contours of MA regulations, plans still have considerable flexibility when determining their benefit structure and defining other aspects of their care management approach. Unlike traditional Medicare, nearly all MA plans rely on managed care techniques to shape and integrate care delivery (Jacobson, Damico, and Neuman 2018). For example, plans may limit full coverage to a specific network of providers, require

beneficiaries to obtain referrals from their primary care provider before receiving specialist services, necessitate prior authorization before using expensive tests and procedures, and/or offer case management programs to coordinate care for high-need patients.

While most beneficiaries receive their primary coverage through traditional Medicare or an MA plan, they can also choose to enroll in supplemental plans that assist with each program's cost-sharing requirements and/or provide additional benefits. A large majority of beneficiaries (73% in 2017) receive prescription drug coverage through Medicare Part D (CMS 2018b). Beneficiaries may also receive supplemental coverage through private Medigap policies, retiree health plans, and state Medicaid programs.

2.2.2. Dual eligibles

In 2018, there were about 11 million dual eligibles, i.e., Medicare beneficiaries with limited resources who also receive Medicaid coverage (MMCO 2019b). For this population, Medicare is the primary payer while Medicaid provides additional benefits, covers some or all of Medicare's cost-sharing requirements, and/or pays the program's premiums on behalf of dual eligibles (Jacobson, Neuman, and Damico 2012). Although Medicare beneficiaries can qualify for Medicaid through several different pathways, this study groups dual eligibles into three categories: (1) full dual eligibles, (2) Qualified Medicare Beneficiary (QMB) partial dual eligibles, and (3) non-QMB partial dual eligibles. These three categories roughly correspond to the restrictiveness of Medicaid's eligibility criteria and the generosity of its benefits (Table 2.1).

Full dual eligibles (about 71% of dual eligibles in 2015) typically have the fewest resources and are unique in that they qualify for the complete set of benefits offered under their state's Medicaid program (CMS 2011; Young et al. 2013). This includes coverage for some services that are not part of Medicare's benefit package, such as long-term care services and supports and — depending on the state — dental, vision, and/or hearing services (MACPAC 2018). Additionally, states pay all of Medicare's cost-sharing requirements and premiums on behalf of the majority of full dual eligibles (though provide less complete coverage for others) (MACPAC 2018).

Partial dual eligibles, by contrast, do not qualify for full Medicaid benefits in their state, but instead receive assistance exclusively through one of four Medicare Savings Programs (MSPs), which are also administered by state Medicaid programs (Jacobson, Neuman, and Damico 2012). The QMB program is the most generous MSP. *QMB partial dual eligibles* (about 14% of dual eligibles in 2015) receive coverage for Medicare's cost-sharing and premium requirements (MACPAC 2018b). *Non-QMB partial dual eligibles* (about 15% of dual eligibles 2015) meet less restrictive eligibility criteria and typically only receive coverage for the Medicare Part B premium (MACPAC 2018b). Finally, nearly all dual eligibles (over 99% in 2015) are enrolled in a Medicare Part D prescription drug plan and receive assistance with their plans' premiums and cost sharing through the Low Income Subsidy (LIS) program.

2.2.3. The effect of MA on utilization and quality of care

Theory

General comparisons of traditional Medicare and MA mirror debates about the relative efficiency of single-payer and managed competition systems (Einav and Levin 2015). On the one hand, traditional Medicare has relatively few administrative costs and is able to set low provider reimbursement rates while still affording beneficiaries access to the majority of providers (i.e., by leveraging its substantial market power) (Einav and Levin 2015; Gruber 2017). Expanding the role of private plans in Medicare could also lead to inefficiencies — e.g., as a result of choice complexity, adverse selection, insurer market power, and to the extent that plans overly stint on care — that might offset any potential gains in part or in whole (Newhouse and McGuire 2014; Einav and Levin 2015; Gruber 2017). On the other hand, managed competition models, such as MA, can mitigate these inefficiencies through regulation (e.g., by simplifying plan choices for ease of comparison and by adjusting capitation rates based on enrollee health to reduce risk selection) (Enthoven 1993). Further, capitated payments and competitive pressures in MA may force plans to deliver care more efficiently than traditional Medicare (Gruber 2017; Henke et al. 2018). Perhaps most importantly, nearly all MA plans employ managed care techniques, which can improve efficiency by reducing moral hazard (e.g., through utilization review or risk sharing with providers), informing patients about their care options (e.g., by distributing provider quality information), and integrating care (e.g., through case or disease management programs) (Glied 2000; Landon et al. 2012; Ayanian et al. 2013; Gruber 2017). Finally, MA may improve the

match between coverage features and beneficiary preferences by offering several different plan options (Newhouse and McGuire 2014; Gruber 2017).

An important feature of the Medicare program is that beneficiaries can choose between these two models of public health insurance. The fact that many beneficiaries opt into MA may be evidence in itself that the program improves the welfare of its enrollees to the extent that beneficiaries are making fully-informed, rational decisions (Balsa, Cao, and McGuire 2007). However, beneficiaries may make mistakes when choosing between traditional Medicare and MA given the complexity of this decision. For example, setting aside decisions about supplemental coverage, beneficiaries had the option of enrolling in traditional Medicare or one of 21 MA plan options on average in 2018 (Jacobson, Damico, and Neuman 2018). Plan options vary along several dimensions — such as cost-sharing requirements, supplemental benefits, premiums, provider networks, care management, and quality — some of which are not always immediately transparent. Not surprisingly, research suggests that many MA enrollees may not be making optimal enrollment decisions (Sinaiko, Afendulis, and Frank 2013; Afendulis, Sinaiko, and Frank 2015; Abaluck and Gruber 2016; Jacobs and Molloy 2017).

Even if MA enrollment did produce welfare gains, it is unclear whether this would lead to reductions in utilization, improvements in care quality, or both. For example, some insurers may be able to offer premium rebates and/or relatively low cost sharing by establishing networks of cheaper — and potentially lower-quality — providers. Beneficiaries who especially value the financial aspects of coverage might prefer such a plan to traditional Medicare (Newhouse and McGuire 2014). Hence, enrolling in MA would increase their welfare, even though the quality of care they receive may be worse.

Previous literature

Despite this theoretical ambiguity, prior research has generally suggested that MA plans have been able to reduce the intensity of beneficiaries' resource use, without necessarily harming the quality of their care. In particular, studies have found that MA enrollment is associated with greater use of preventive care (Landon et al. 2004; Keenan et al. 2009; Ayanian et al. 2013; Timbie et al. 2017), less inpatient utilization (Mello, Stearns, and Norton 2002; Baicker,

Chernew, and Robbins 2013; Afendulis, Chernew, and Kessler 2017; Feyman and Frakt 2017; Duggan, Gruber, and Vabson 2018), and less post-acute care following a hospitalization (Huckfeldt et al. 2017). Studies evaluating quality of care have either produced mixed results or favored MA. For example, researchers have reported conflicting results when evaluating patient-reported measures of quality (Keenan et al. 2009; Elliott et al. 2011; Ayanian et al. 2013; Timbie et al. 2017), hospital readmissions (Friedman et al. 2012; Lemieux et al. 2012; Afendulis, Chernew, and Kessler 2017; Duggan, Gruber, and Vabson 2018), and the quality of hospitals where beneficiaries received their care (Erickson 2000; Friedman and Jiang 2010; Duggan, Gruber, and Vabson 2018). Nonetheless, studies have found that MA is associated with better performance on clinical quality measures (Ayanian et al. 2013; Timbie et al. 2017) and fewer preventable hospitalizations (Basu and Mobley 2007; Nicholas 2013; Duggan, Gruber, and Vabson 2018). Finally, researchers have found that the effect of MA on mortality is either not statistically significant or negative (Bian, Dow, and Matchar 2006; Afendulis, Chernew, and Kessler 2017; Duggan, Gruber, and Vabson 2018). Many studies have attempted to address selection by controlling for beneficiary characteristics, but others have obtained similar results when employing more rigorous approaches that rely on natural experiments to identify exogenous sources of variation in MA enrollment (Mello, Stearns, and Norton 2002; Baicker, Chernew, and Robbins 2013; Baicker and Robbins 2015; Feyman and Frakt 2017; Afendulis, Chernew, and Kessler 2017; Duggan, Gruber, and Vabson 2018).

One strand of the literature has considered the possibility that increases in MA enrollment rates have spillover effects, i.e., that they affect traditional Medicare beneficiaries in the same health care market. For example, as MA enrollment expands, plans could begin to fundamentally change the way that local physicians practice medicine by promoting clinical guidelines or providing capitated and/or value-based reimbursements (Baker 2011). This could have a spillover effect on traditional Medicare beneficiaries to the extent that they receive care from some of the same providers (Baker 2011). Indeed, prior studies suggest that the spillover effects of MA on traditional Medicare beneficiaries parallel the direct effects on MA enrollees in terms of increasing outpatient care and decreasing inpatient care without having a statistically significant effect on mortality (Baker 1999; Chernew, DeCicca, and Town 2008; Baicker, Chernew, and Robbins 2013; Baicker and Robbins 2015; Callison 2016; Johnson et al. 2016).

2.2.4. The effect of MA on the utilization and quality of care of dual eligibles

While the results above inform general expectations about the relationship of MA enrollment with resource use and quality of care, the premise of this study is that the effects may differ for dual eligibles relative to other populations. In particular, dual eligibility is associated with several unique characteristics, each of which may mediate the effects of MA on beneficiary outcomes.

Mediating factor: Health needs

Dual eligibles have much more significant and complex health needs on average than other beneficiaries. For example, they are more than twice as likely as other Medicare beneficiaries to report being in fair or poor health (50% versus 20%) (Figure 2.1). They are also much more likely to describe having three or more chronic conditions (18% versus 10%) and one or more limitations in activities of daily living (54% versus 31%) (Figure 2.1).

Beneficiaries with significant health needs could disproportionately benefit from the coordinated care initiatives and disease management programs offered through managed care plans (Keenan et al. 2009; Glazer and McGuire 2013; Newhouse and McGuire 2014). Alternatively, managed care restrictions could create unique barriers for the sick, such as by making it more difficult to see specialists or access expensive tests and procedures (Sutton and DeJong 1998; Keenan et al. 2009; Elliott et al. 2011). It seems unlikely, however, that these constraints will have a significant effect in the long run, given that dual eligibles have multiple opportunities during the course of a year to leave MA for traditional Medicare should they find their plans' requirements to be overly burdensome (CMS 2018c).

Mediating factor: Patient activation and health literacy

Dual eligibles have lower levels of patient activation than other beneficiaries and are more likely to have traits associated with low levels of health literacy, including lower education levels, lower incomes, and much higher rates of cognitive impairments (Paasche-Orlow et al. 2005; Parker, Regan, and Petroski 2014; Serper et al. 2014; MMCO 2019a; MACPAC 2018b). Care management could be particularly beneficial for such populations by helping them navigate the

complexities of the health system (Elliott et al. 2011). At the same time, these beneficiaries may face unique challenges when negotiating with managed care plans to access needed care (Elliott et al. 2011). Once again, this drawback of managed care may not be a significant factor, given that dual eligibles who have difficulty engaging with their MA plan can easily switch to traditional Medicare.

Mediating factor: Supplemental coverage

Although states and the federal government separately administer Medicaid and Medicare, MA can serve as a mechanism for integrating these programs' benefits. For example, states have the option of contracting with dual-eligible special needs plans (D-SNPs) or, under a large demonstration program, Medicare-Medicaid Plans (MMPs) to provide fully-integrated Medicare and Medicaid benefits (Bella and Palmer-Barnette 2010; MACPAC 2018a). These initiatives could reduce the complexity and potential inefficiencies of providing coverage through two separate programs (Cassidy 2011; Grabowski 2012), a potential benefit of MA enrollment that is restricted to dual eligibles.

Mediating factor: Socioeconomic status

Finally, Medicare beneficiaries must have limited resources (gross or net of health expenses) in order to qualify for Medicaid. Presuming that the demand for health care and care quality decreases with income, lower-income beneficiaries in MA may tend to enroll in cheaper — and potentially lower-quality — plans than wealthier beneficiaries, all else equal. Additionally, they could be more willing to enter MA even when the marginal benefits to health relative to traditional Medicare are small, given that the program often includes options that are cheaper than traditional Medicare (i.e., that offer more generous coverage at no additional premium) (Glazer and McGuire 2009, 2013; Newhouse and McGuire 2014). Altogether, one might expect to observe that the effect of MA relative to traditional Medicare is less beneficial among beneficiaries with limited means.

Medicaid complicates this story to some degree. For example, Medicaid coverage of cost-sharing requirements and supplemental benefits reduces or eliminates the financial incentive of full dual eligibles to enroll in MA (Newhouse and McGuire 2014). Indeed, while non-QMB

partial dual eligibles are much more likely to enroll in MA than non-dual eligibles, full dual eligibles are less likely to enroll than either group (Appendix Figure 1.1). Nonetheless, full Medicaid benefits may further reduce the incentive of MA enrollees to join high-cost plans to the extent that plan premiums include the cost of a redundant set of benefits. As expected, both plan premiums and quality ratings are strictly decreasing with income (Appendix Figure 1.1).

Prior literature

Previous studies have assessed the relationship of enrollment in specific types of Medicare managed care plans with utilization and quality of care outcomes among dual eligibles. One group of studies has evaluated a long-standing waiver program in Minnesota which has given dual eligibles the option of receiving their Medicare and Medicaid benefits through a single, integrated managed care plan (Kane and Homyak 2004). Altogether, these studies have found that plan enrollment is associated with less inpatient care and fewer potentially-preventable hospitalizations and ER visits, but did not find a statistically significant effect on mortality (Kane et al. 2004, 2005; Zhang et al. 2008; Anderson, Feng, and Long 2016). Other studies have evaluated Program of All-Inclusive Care for the Elderly (PACE) organizations, which provide integrated benefits to a mostly dual-eligible population and are intended to help beneficiaries who are eligible for nursing home care remain in the community (MedPAC 2012). Research has found that enrollment in PACE is associated with less inpatient care, a lower likelihood of having a long-term nursing home stay, and lower mortality rates, though it also suggests that the program has incurred more government spending (Ghosh, Orfield, and Schmitz 2014; Ghosh, Schmitz, and Brown 2015). A small number of studies have focused on D-SNPs. Two industry-sponsored reports found that enrollment in specific D-SNPs was associated with less inpatient utilization, fewer potentially-preventable hospitalizations, and/or lower readmission rates (Murugan, Drozd, and Dietz 2012; Purva and Munevar 2012), and one peer-reviewed article found that increases in D-SNP enrollment across the country corresponded to lower Medicare spending (Zhang and Diana 2017). Most recently, a series of government-sponsored studies have evaluated MMPs. This research has found mixed results for both utilization and quality of care outcomes across states and population subgroups (RTI International 2018a, 2018b, 2019a, 2019b).

While the research on dual eligibles is generally consistent with the broader literature on MA (see Section 2.2.3), this research has two significant limitations. First, each of these studies focuses on a specific type of managed care plan and nearly all of them consider potentially high-performing plans that integrate Medicare and Medicaid benefits. It is unclear whether lessons gleaned from these particular plans will extend to the broader MA program. Second, while many of these studies employ strong research designs, most do not rely on advanced methods of causal inference to identify the effect of enrollment on beneficiary outcomes. By contrast, this paper uses a rigorous econometric method to estimate the broader effect of MA enrollment on outcomes among dual eligibles.

2.2.5. Heterogeneous treatment effects across subpopulations of dual eligibles

The premise of this study is that the effects of MA may differ among dual eligibles relative to other Medicare beneficiaries, given the unique characteristics of this population. However, dual eligibles themselves represent a diverse group of beneficiaries (Brown and Mann 2012). For instance, about two-fifths of dual eligibles (44%) report that they have no difficulty performing activities of daily living while about one-fifth (21%) reside in an institution (MACPAC 2018). Hence, it is also plausible that the effects of MA enrollment may vary across subpopulations of dual eligibles. This study considers whether there is heterogeneity based on level of Medicaid benefits, health needs, and regional spending levels.

By level of dual eligibility

Comparisons of full and partial dual eligibles mirror those of dual eligibles with other beneficiaries (see Section 2.2.4). For example, full dual eligibles have more significant health needs than partial dual eligibles on average (Appendix Figure 2.2) and may therefore benefit more from the care coordination and management offered through most MA plans. Full dual eligibles are also more likely to benefit from efforts in MA to integrate Medicare and Medicaid benefits. This is both because full dual eligibles typically have the most comprehensive Medicaid coverage — including long-term care services and supports — and because some integrated plans restrict enrollment to this population (i.e., all plans in the financial alignment demonstration and a subset of D-SNPs) (CMS 2014; MedPAC 2016a). While these factors suggest that the effect of MA may be more beneficial among full relative to partial dual eligibles,

the reverse could also be true, given that full dual eligibles typically have fewer resources and may therefore be more likely to enroll in cheaper and potentially lower-quality MA plans (Section 2.4.4).

By health needs

Dual eligibles with more significant health needs may have more to gain from MA than healthier dual eligibles (see Section 2.4.1). Because of data limitations, I consider a rough proxy for health by comparing dual eligibles between the ages of 55 and 64 who qualified for Medicare on the basis of a disability with dual eligibles between 65 and 74 who qualified on the basis of age. Utilization and reported health needs tend to be greater among the younger, disabled population. For example, they report being in worse health and having greater difficulty with activities of daily living on average (Appendix Figure 2.3). Additionally, while the prevalence of many common chronic conditions is similar across disabled and aged dual eligibles when focusing on this narrow age range, rates of mental illness are much higher among the former.

By regional spending levels

Increases in MA enrollment rates may be more beneficial in regions where traditional Medicare spending per capita is high. A well-known result in the health services literature is that: (1) there is substantial variation in traditional Medicare spending per person, even after controlling for several characteristics of local beneficiary populations and (2) higher spending does not clearly correspond to higher quality (Skinner 2011; Newhouse et al. 2012). One explanation for this trend is that beneficiaries in high-spending areas receive much more care to the point where the marginal benefit is close to zero (Fuchs 2004). If that were the case, then MA plans would be able to restrain utilization in expensive regions without necessarily harming beneficiary health. Another explanation is that high-spending regions produce care less efficiently — e.g., due to differences in provider quality or clinical practice norms — which also suggests greater potential gains from MA enrollment (Baicker and Chandra 2009; Bernstein, Reschovsky, and White 2011; Gold and Hudson 2013). Finally, government benchmark payment rates to MA plans tend to increase with traditional Medicare spending per capita, and plans may pass higher payments on to enrollees by providing better coverage.

2.2.6. Expected findings

This section has yielded four major conclusions. First, whether or not the generally positive results from previous MA studies extend to dual eligibles remains an empirical question. Dual eligibles could benefit more than other beneficiaries from coordinated care and care management in MA and might receive additional value from the program if they enroll in plans that integrate Medicare and Medicaid benefits. However, it is also conceivable that they could have less positive experiences in MA to the extent that these beneficiaries gravitate towards less expensive and potentially lower-quality plans. Second, whether or not full dual eligibles have more to gain from MA than partial dual eligibles also remains an empirical question for reasons similar to the theoretical ambiguity of comparisons between dual eligibles and other beneficiaries. Third, increases in MA enrollment will have more beneficial effects among dual eligibles with significant health needs relative to healthier dual eligibles. Finally, increases in MA enrollment rates will lead to better outcomes in regions with high relative to low traditional Medicare spending per capita.

2.3. Empirical strategy and data

2.3.1. Empirical strategy

There are two key empirical challenges when attempting to identify the causal effect of MA enrollment on beneficiary outcomes. One major challenge is the likelihood that the expansion of MA in a given health care market not only has a direct effect on plan enrollees, but also has an indirect spillover effect on traditional Medicare beneficiaries in the same region (Section 2.2.3). Given that increases in MA enrollment may affect both populations, it would not be appropriate to simply compare individual-level outcomes across the two groups. Instead, I evaluate the relationship between the share of beneficiaries enrolled in MA at the county level and average outcomes among the entire dual eligible population in that region. By looking at outcomes across all dual eligibles in a given county, this approach captures both the direct effect of MA enrollment rates on plan enrollees as well as the county-level spillover effect on traditional Medicare beneficiaries. Because spillover effects relate to MA enrollment rates among *all* Medicare beneficiaries in a region rather than among dual eligibles alone, I rely on the former as my primary explanatory variable. Nonetheless, there is a strong correlation between these two enrollment rates ($\rho = 0.77$).

The second major challenge for this study is to address selective enrollment, i.e., the likelihood that beneficiaries in traditional Medicare and MA differ in predetermined ways that could also affect their outcomes. For example, several studies suggest that healthier beneficiaries may be more likely to enroll in MA than sicker beneficiaries (perhaps because they are less averse to managed care restrictions or because insurers design plans to attract this generally less-expensive population) (Mello et al. 2003; Newhouse et al. 2015; Jacobs and Kronick 2018). This trend would bias estimates in favor of MA. For instance, if MA enrollment were negatively associated with hospitalizations, it would be difficult to parse out whether this was because MA plans were able to constrain inpatient utilization or because MA enrollees tend to be healthier and therefore need less care than traditional Medicare beneficiaries. Controlling for all relevant beneficiary characteristics is almost certainly impossible due to data limitations (e.g., the limited availability of accurate income data and the inherent difficulty in collecting relevant measures, such as beneficiaries' aversion to risk and preferences for expensive services). Further, controlling for beneficiary health would introduce its own complications, given that beneficiary health is also an outcome of interest.

My empirical strategy relies on arbitrary differences in benchmark payment rates to MA plans across regions to identify exogenous variation in enrollment. Historically, the government determined payments to plans based on (1) average traditional Medicare spending at the county level and (2) an adjustment based on beneficiary characteristics (Pope et al. 2006). In 1998, the government introduced a payment floor (the "rural floor") to encourage plans to enter counties where they previously would have received low payment rates (Gold et al. 2004; Pope et al. 2006). This was followed by the introduction of a second, higher payment floor for urban counties (the "urban floor") in March 2001 in an effort to stem the flow of plan exits from populous regions of the country (GPO 2000; Gold et al. 2004; McGuire, Newhouse, and Sinaiko 2011). This urban floor specifically applied to counties in metropolitan statistical areas (MSAs) with populations of 250,000 or more (Afendulis, Chernew, and Kessler 2017). As a result of the urban floor, there was a large, discrete jump in average payments to plans at this population threshold.

This discontinuous increase in plan payments at the 250,000 population threshold persisted during my sample period (2009-2015). By that time, the government had initiated a bidding process to determine plan reimbursements (McGuire, Newhouse, and Sinaiko 2011). Under this approach, plans submit bids to provide Medicare coverage for a standard beneficiary and the government compares these bids with county-level benchmark payment rates (MedPAC 2016b). If bids are above the benchmark rate, then plans receive the benchmark as their base rate (i.e., prior to risk-adjustment) and enrollees cover the difference through a plan premium (MedPAC 2016b). If bids are below the benchmark, then plans receive their bid as the base rate plus a portion of the difference between their bid and the benchmark — which they must use to reduce cost-sharing requirements, offer a premium rebate, or provide supplemental benefits — while the government retains the remainder (Frank and McGuire 2017). Importantly, benchmark payment rates were, in many cases, based on minimum updates over historical payment rates. Hence, the urban floor discontinuity continued to play an important role in benchmarks in later years (Figure 2.3). Beginning in 2012, changes under the Affordable Care Act began to phase out the link between benchmark payments and the urban floor, but this was not complete until 2017, after the end of my sample period (MedPAC 2016b).

Increases in average benchmark payment rates at the population threshold led to a jump in MA enrollment rates, both among the overall Medicare population and among different groups of dual eligibles (Figure 2.4). There are multiple reasons why higher plan payments may be associated with greater MA enrollment. Depending on the extent to which MA markets are competitive, plans may pass on some or all of a payment increase from the government to beneficiaries by reducing premiums (or increasing premium rebates), offering more generous benefits (e.g., by lowering deductibles or by covering new, optional services), or investing in plan quality. Research suggests that there may indeed be a moderate amount of pass-through in the form of reduced premiums and/or improved benefit generosity, but studies have not found an effect of payment rates on plan quality (Song, Landrum, and Chernew 2012; Stockley et al. 2014; Layton and Ryan 2015; Duggan, Starc, and Vabson 2016; Geruso, Cabral, and Mahoney 2018). Increases in payment rates may also lead to greater MA enrollment by inducing new plans to enter the market or by encouraging plans to more aggressively market to beneficiaries. Duggan et al. (2016) found both to be the case.

I generally assume that the urban floor is only associated with beneficiary outcomes through its effect on MA enrollment. In reality, the urban floor could also have a direct effect on the outcomes of existing plan enrollees by, for example, leading plans to offer more generous benefits. In the terminology of instrumental variable analyses, this would violate the exclusion restriction. In Section 2.4.9, I consider whether this is likely to be the case and explore a method for isolating the effect of the urban floor on MA enrollment. In the meantime, it is important to note that a violation of this assumption would require reinterpreting estimates as the aggregate effect of MA payment increases on beneficiary outcomes, both in terms of leading to better plan options and nudging beneficiaries into the MA program (Duggan, Starc, and Vabson 2016; Baicker and Robbins 2015; Afendulis, Chernew, and Kessler 2017). This framing is still salient, given that policymakers have made dramatic changes to payment rates over time and have used them as a tool for increasing MA enrollment (Zarabozo and Harrison 2009; McGuire, Newhouse, and Sinaiko 2011). My study is one of several that have used exogenous changes in plan payments to identify the effects of MA enrollment on beneficiary outcomes (Chernew, DeCicca, and Town 2008; Baicker, Chernew, and Robbins 2013; Baicker and Robbins 2015; Afendulis, Chernew, and Kessler 2017; Feyman and Frakt 2017).

Moving forward with this assumption, I rely on a regression discontinuity (RD) design that uses the discrete jump in MA enrollment at the urban floor threshold to identify the causal effect of MA on beneficiary outcomes. In RD parlance, my running variable is the MSA population where a county is located and the cutoff is at a population of 250,000. Presuming that dual eligibles do not choose where to live in order to take advantage of the urban floor, the discrete increase in the probability of enrollment at the threshold is "as good as random" (Lee and Lemieux 2010). One previous study successfully used this RD design to examine the effect of MA on a similar set of outcomes among the overall Medicare population (Afendulis, Chernew, and Kessler 2017).

I begin by testing the internal validity of this RD design. First, I consider the key assumption of this approach: that individuals do not precisely manipulate the running variable (Lee and Lemieux 2010). In theory, this assumption could be violated if, for example, dual eligibles

moved to urban floor counties in order to take advantage of more generous plan offerings in those regions. In practice, this is unlikely to be the case, given the magnitude of decisions about where to live and the difficulty comparing plan options in general, let alone across counties. Nonetheless, I formally assess whether dual eligibles gravitated towards or away from urban floor counties by evaluating whether there was a discrete change in the population density at the RD threshold (i.e., a "manipulation test") (McCrary 2008). Second, I test whether individuals just above and below the cutoff are similar to each other outside of differences attributable to the discrete policy change (i.e., a "balance test" near the threshold). One would expect this to be the case if changes in enrollment at the threshold were indeed as good as random (Imbens and Lemieux 2008; Lee and Lemieux 2010).

After exploring the validity of my RD design, I evaluate the direct effect of the urban floor on plan payment rates, the share of Medicare beneficiaries in MA, the share of dual eligibles in MA, and various utilization and quality of care measures. To do so, I estimate the following RD model, where the indices represent county (c) and year (t), Y_{ct} represents county-level outcomes, $MSAPOP_c$ represents the population of a county's MSA in 2000, $I(MSAPOP_c \geq 250{,}000)$ is a dummy for being an urban floor county, X_{ct} represents county-level control variables, and $\eta_{s(c)}$ and τ_t represent state and year fixed effects respectively.

$$Y_{ct} = \alpha + I(MSAPOP_c \geq 250{,}000)\beta + MSAPOP_c\psi + MSAPOP_c^2\zeta + X_{ct}\phi + \eta_{s(c)} + \tau_t + \varepsilon_{ct} \quad (1)$$

The RD estimator β identifies the discrete change in outcomes at the population threshold, which is interpreted as the effect of the urban floor payment policy. This approach is akin to a fuzzy RD model, given that the urban floor may have increased the share of beneficiaries in MA in a given county but was not deterministic of enrollment.

I focus on counties within the 100,000 to 400,000 MSA population bandwidth. A sizable minority of dual eligibles (15%) lived in these counties in 2009. Among this group, the distribution was slightly skewed towards the lower end of the population range (Figure 2.5). Nonetheless, a large share (20%) resided in MSAs that were very close to the urban floor threshold (within 50,000), which facilitates the estimation of discontinuities. I weight county-

year observations based on the corresponding dual eligible population and estimate heteroskedastic-robust standard errors with clusters at the county level. As is standard practice when implementing an RD design, I confirm that my findings are robust to different model specifications and population bandwidths. I anticipate that the urban floor will be associated with an increase in plan payments, MA enrollment rates among all beneficiaries, and MA enrollment rates among dual eligibles. However, the effect on beneficiary outcomes is theoretically ambiguous (Section 1.2.6).

After identifying the effect of the urban floor on MA enrollment and on beneficiary outcomes, I combine these results in a two-stage least squares (2SLS) framework, as is common practice for fuzzy RD designs. In particular, I use the urban floor discontinuity to instrument for MA enrollment rates among all beneficiaries in a given county and year. In other words, the first-stage equation (2) is equivalent to the RD equation (1) where the outcome is the county-level MA enrollment rate. MA_{ct} represents MA enrollment rates, $\widehat{MA}_{ct}$ represents predicted values from equation (2), and all other variables have the same interpretation as in equation (1):

$$MA_{ct} = \alpha + I(MSAPOP_c \geq 250{,}000)\beta + MSAPOP_c\psi + MSAPOP_c^2\zeta + X_{ct}\phi + \eta_{s(c)} + \tau_t + \varepsilon_{ct} \quad (2)$$

$$Y_{ct} = \delta + \widehat{MA}_{ct}\gamma + MSAPOP_c\theta + MSAPOP_c^2\xi + X_{ct}\mu + \eta_{s(c)} + \tau_t + \nu_{ct} \quad (3)$$

It is important to note that the standard interpretation of the 2SLS estimator (γ) — i.e., as the effect of treatment (MA enrollment) on compliers (dual eligibles who enroll in MA as a result of the urban floor) — may not apply here. This is because of the likelihood that MA enrollment has spillover effects on other beneficiaries (Section 2.2.3) (Afendulis, Chernew, and Kessler 2017). Instead, I scale γ to identify how MA enrollment increases associated with the urban floor affected outcomes among all dual eligibles in the relevant counties. Because I find that the urban floor led to an approximately 9 percentage point increase in MA enrollment rates (Section 2.4.4), I multiply γ by 0.09. The results are approximately equal to the RD estimates from equation (1) by construction. However, they are useful for identifying whether the effect of MA enrollment on beneficiary outcomes is statistically significant.

I estimate linear models, despite the fact that many of my outcomes are county-level shares and are therefore constrained to values from 0 to 1. Many researchers rely on two-stage residual inclusion (2SRI) models when considering inherently nonlinear relationships (Chapman and Brooks 2016). However, two recent studies provide evidence that 2SLS produces consistent estimates of local average treatment effects in the presence of "essential heterogeneity" — i.e., when there are heterogeneous treatment effects and the magnitude affects individual enrollment decisions, as is likely the case here — while 2SRI does not (Chapman and Brooks 2016; Basu, Coe, and Chapman 2018). First-stage and reduced form results are very similar under linear and nonlinear models (Appendix Table 2.1, Columns 2 and 6), which further supports the use of 2SLS.

My final analysis considers whether the effect the urban floor varies within the dual eligible population. To do so, I estimate the following, which is an RD model that allows the effect of the urban floor to differ across groups of beneficiaries. This includes the same set of variables from equation (1), a dummy variable G_{ct} representing the group (i.e., based on health status, level of Medicaid benefits, or regional spending levels), and interactions between each variable and this dummy:

$$Y_{ct} = \alpha_0 + \alpha_1 G_{ct} + I(MSAPOP_c \geq 250{,}000)(\beta_0 + G_{ct}\beta_1) + MSAPOP_c \times (\psi_0 + G_{ct}\psi_1) + \cdots + \varepsilon_{ct} \quad (4)$$

In this case, estimates of β_1 indicate whether the effect of the urban floor varies by group. This could occur because of differences in the effect of the urban floor on MA enrollment by group as well as differences in the relationship between enrollment and outcomes. Because I am primarily interested in the latter, I carefully note where the former is the case and incorporate it into my interpretation.

2.3.2. Data

This study requires information at the county level about: (1) traditional Medicare and MA enrollment for each relevant beneficiary group (e.g., among all beneficiaries and among dual eligibles), (2) utilization and quality of care patterns by enrollment group, (3) MSA population and MA payment rates (to identify the urban floor and its effect on payment rates), and (4)

relevant geographic and socioeconomic characteristics (to test the validity of the RD design and to include as controls). Additionally, data on enrollment and outcomes need to capture a large number of dual eligibles to ensure an adequate level of statistical power. I make use of several datasets to meet these requirements. I describe each file and measure below and provide additional details in the Appendix.

Enrollment data

One of my two primary resources is the 2009-2015 Medicare Beneficiary Summary File (MBSF), an administrative dataset that includes detailed enrollment and basic demographic information for the universe of beneficiaries (CMS 2018a). I rely on this file to identify whether an individual was in traditional Medicare or MA and whether they were dually-enrolled in Medicaid in a particular month. I then roll this information up to the county-year level to obtain my key explanatory variable: the share of months a given beneficiary group spent in MA. A small share of beneficiaries are enrolled in managed care plans that are offered outside of the MA program (e.g., PACE plans, cost plans, and MMPs). These options are closer in spirit to MA than traditional Medicare, so I include their enrollees under the former. For subgroup comparisons, I rely on the MBSF to sort dual eligibles on the basis of health status, level of dual eligibility, and county-level traditional Medicare spending per capita. To obtain traditional Medicare spending, I merge the MBSF with CMS Fee-For-Service (FFS) Data.

Outcomes data

My other primary resource is the 2009-2015 Medicare Provider and Analysis Review (MedPAR) file. MedPAR summarizes claims data for every traditional Medicare hospital discharge (NCHS 2012; ResDAC 2016). Beginning in early 2008, the government required hospitals receiving disproportionate share (DSH) payments or indirect or direct medical education adjustments to also report information for MA enrollees (ResDAC 2011; Huckfeldt et al. 2017). I restrict my analysis to only include this subset of hospitals (see Appendix A.1 for details). My sample includes the large majority of Medicare discharges from acute care hospitals (about 91% from 2009-2015 based on CMS Cost Report data). Because DSH hospitals treat a disproportionate share of low-income patients by definition, these data may be even more complete for the dual

eligible population (CMS 2017b). Appendix A.1 provides additional information about MedPAR data and its usefulness relative to other large datasets.

I first use MedPAR to create variables related to the intensity of inpatient utilization. My primary outcomes are the share of beneficiaries with a hospital admission, the average number of inpatient days among those with an admission (which I refer to as "length of stay"), and the average number of inpatient days among all beneficiaries. To gain a more nuanced understanding of differences in inpatient use, I also evaluate the share of beneficiaries with an emergency inpatient admission and a non-emergency admission. Emergency admissions are defined as those where the patient "required immediate medical intervention as a result of severe, life threatening, or potentially disabling conditions" (ResDAC 2018).

I next use MedPAR data to create several inpatient-based measures of care quality and MBSF data to identify one-year mortality rates. First, I consider the share of beneficiaries with a potentially-preventable hospitalization (also known as hospitalizations for "ambulatory care sensitive conditions"). Potentially-preventable hospitalizations reflect admissions that could possibly have been avoided with proper primary care (e.g., hospitalizations for pneumonia) and are therefore viewed as an indicator of poor outpatient care quality (Gao et al. 2014; Fingar et al. 2015). Second, I look at 30-day readmission rates, which have become a common measure of inpatient care quality (e.g., as they may reflect whether patients' conditions were resolved or whether they received proper discharge instructions) (Benbassat and Taragin 2000). Third, I evaluate the quality of hospitals where beneficiaries receive their care. In particular, I rely on CMS Hospital Compare data to generate pooled measures of hospital cost and quality across three dimensions: 30-day mortality rates, 30-day readmission rates, and patient experience. One recent study provided causal evidence that beneficiaries who were admitted to hospitals with high Hospital Compare ratings had better outcomes than those admitted to hospitals with low ratings (Doyle, Graves, and Gruber 2017). Finally, I rely on the MBSF to identify one-year mortality rates.

RD variables

I use public Census data to group counties into MSAs and to identify MSA population, i.e., the basis of the urban floor threshold. I base these definitions on data from 1999 through 2003 to reflect the fact that urban floor designations during my sample period were effectively carried over from prior years (see Appendix A.2 for more details). I combine these RD data with the 2009-2015 MA Ratebook files to identify the effect of the urban floor on plan payment rates.

Control variables

I rely on three datasets to generate a wide array of control variables. I first calculate the county-level share of dual eligibles by age, gender, and race based on the MBSF. I next pull several county-level variables from the 2009-2015 Area Health Resources File (AHRF), a government repository of statistics on health care markets. This includes population; land area; median income; poverty rates (overall and among those 65 and older); the share of the population in Medicare; and physicians, specialists, general hospitals, and general hospital beds per capita. Finally, I use 2000 CMS FFS Data to obtain average risk scores among traditional Medicare beneficiaries. I focus on risk score data from the year prior to the implementation of the urban floor because of the possibility that this policy may have affected outcomes, in part, through its effect on the health of traditional Medicare beneficiaries. Risk score data are not publicly available for MA enrollees in this year.

Sample restrictions

In addition to focusing on dual eligibles, I impose a few sample restrictions to account for policy context and missing data. First, I restrain the sample to include beneficiaries who were enrolled in both Medicare Parts A and B, which is a requirement for joining MA. Second, I drop all territories given the unique way in which Medicare operates in those regions. Third, I exclude dual eligibles from the state of Maryland, where MedPAR data are incomplete due to the state's all-payer hospital payment system. Fourth, I omit full dual eligibles who were not enrolled in an MSP. These beneficiaries typically qualify for Medicaid through medically needy programs or other eligibility pathways with less restrictive income criteria than MSPs (CMS 2011). Finally, I require that each of these sample restrictions be met throughout the year or until the month of death.

I impose two additional sample restrictions that focus the analysis on regions and beneficiaries that were most likely to be affected by the urban floor. I first drop the top decile of counties in terms of historical payment rates (i.e., that exceeded $475 per month in 2000). These counties were much more likely than others to have payment rates that exceeded the urban floor during my sample period (Appendix Figure 2.4). I also exclude dual eligibles who had been enrolled in Medicare for at least five years when the urban floor was first introduced. The urban floor had a much smaller effect on this population, which aligns with evidence of substantial inertia in Medicare enrollment (Sinaiko, Afendulis, and Frank 2013; Jacobs and Molloy 2017).

2.4. Results

2.4.1. Descriptive statistics

There are several ways in which the group of dual eligibles who are in sample differ from those who are not (Tables 2.2 and 2.3, Columns 1 and 2). First, the sample includes a relatively young group of dual eligibles, largely reflecting the sample restriction that excludes beneficiaries who first enrolled in Medicare at least five years before the urban floor payment took effect. Second, a smaller proportion of the dual eligibles in sample are racial or ethnic minorities. Third, dual eligibles in sample reside in smaller MSAs on average and are more likely to live in the south or Midwest. Fourth, MA enrollment rates are lower among the dual eligibles in sample, which may relate to the fact that a large proportion of this population lives in regions below the urban floor payment threshold. Fifth, the dual eligibles in sample reside in counties that, on average, have lower median incomes and fewer physicians and specialists per capita. Finally, the beneficiaries in sample ultimately use slightly less inpatient care and have lower mortality rates than other dual eligibles. In Section 2.4.10, I discuss the implications of focusing on a subset of dual eligibles with these distinct characteristics.

2.4.2. Internal validity

Manipulation and balance tests generally support the internal validity of my research design. For one, I do not find a discrete change in the population density at the RD threshold. This may come as a surprise, given that the share of dual eligibles residing in MSAs just above the threshold is much larger than the share residing in MSAs just below the threshold (Figure 2.5).

However, the difference largely reflects my choice of sample inclusion criteria rather than beneficiary behavior. Specifically, I exclude most dual eligibles in counties that received the urban floor designation but fell below the population threshold (Appendix A.2). Because these beneficiaries typically lived in areas just under the threshold, excluding them creates the artificial impression of a discontinuity (Figure 2.5, orange versus blue bars). Regardless of whether I include or exclude these beneficiaries, I fail to reject the hypothesis that the population density is smooth at the threshold when running manipulation tests that allow for a discrete running variable and small degrees of nonlinearity ($p = 1.00$ and $k = 0.001$ in each case) (Frandsen 2017).

In most instances, I also fail to reject the hypothesis that the covariates are balanced near the RD threshold when conditioning on geographic variables. It should first be noted that differences in the mean value of covariates across populations above and below the threshold are usually small and not statistically significant, even without focusing attention on the population threshold (Table 2.2, Column 5). Estimates of discontinuities at the threshold are also typically not statistically significant after controlling for county geographic characteristics (Column 7). One noticeable exception is that there is a large and statistically significant decrease in county-level median income around the cutoff (similar to a finding in Afendulis, Chernew, and Kessler 2017). However, RD estimates are not statistically significant for county-level poverty rates, risk scores, and provider capacity. Nor are they statistically significant when evaluating the age, race, and gender distribution of dual eligibles (with the exception of a statistically significant, but small, point estimate for the share who are not white, African-American, or Hispanic). I control for all of these variables, including median income, in subsequent analyses.

2.4.3. Benchmark payment rates

As expected, RD analyses confirm that there was a large and statistically significant effect of the urban floor on monthly benchmark payment rates (Table 2.4). This table lists baseline benchmark payment rates (i.e., the predicted value presuming that counties were at the population threshold but did not receive the urban floor designation), RD estimates of the change in payment rates at the threshold, and the percent change relative to baseline in Columns 1 through 3 respectively. Pooling all years in sample, the urban floor led to a $59 increase in

benchmark payment rates, which represents an 8% increase over the baseline rate of $749. The effect of the urban floor was larger during earlier years of the sample. For example, in 2009, the urban floor was associated with an $80 increase in benchmark payment rates (an 11% increase over baseline). By contrast, the urban floor only led to a $19 increase in 2015 (a 3% increase over baseline). This is likely the result of changes under the Affordable Care Act (ACA), which phased in an entirely new payment system between 2012 and 2017 and therefore eliminated much of the relationship between plan payment rates and MSA population (MedPAC 2016b). The one exception is that the ACA also established a demonstration program that provided bonuses to MA contracts with high quality ratings and offered double bonuses in a small subset of urban floor counties (Layton and Ryan 2015). The decline in benchmark payment rates is smaller among high-quality plans when taking these bonus payments into account.

2.4.4. Enrollment

The urban floor was also associated with a large and statistically significant increase in MA enrollment (Table 2.5). The first row displays results for the entire population of Medicare beneficiaries. This row roughly corresponds to the first-stage results for subsequent 2SLS analyses (which vary slightly due to sample and weighting differences). The urban floor led to a 9 percentage point increase in the share of months that Medicare beneficiaries spent in MA (Column 2), which represents a 49% increase in MA enrollment over the baseline enrollment rate of 18%. This increase is quite large when considering that the urban floor rate was only associated with an 8% increase in benchmark payment rates during the sample period. Nonetheless, the two previous studies that have evaluated the urban floor also found large increases in enrollment rates of 7 or 8 percentage points when excluding private fee-for-service plans (Duggan, Starc, and Vabson 2016; Afendulis, Chernew, and Kessler 2017).

The urban floor also had a large and statistically significant effect on enrollment rates among dual eligibles (the remaining rows of Table 2.5). In particular, it led to a 9 percentage point increase in the share of months that dual eligibles spent in MA, which represents a 61% increase over the baseline enrollment rate of 15%. Further, the urban floor increased enrollment rates among each of the three major categories of dual eligibles considered in this study: full dual eligibles, QMB partial dual eligibles, and non-QMB partial dual eligibles. The largest

percentage point increase occurred among non-QMB partial dual eligibles, i.e., the group with the least generous support from Medicaid. Nonetheless, the largest *percent* increase over baseline occurred among full dual eligibles, i.e., the group with the *most* comprehensive Medicaid coverage. It is possible that increases in plan payment rates may have fostered enrollment growth among these groups through different pathways. For example, non-QMB partial dual eligibles do not receive assistance with Medicare's cost-sharing requirements, so may have been drawn to MA to the extent that the urban floor led plans to reduce cost sharing or offer supplemental benefits. Full dual eligibles, who are already protected from cost-sharing requirements and receive some degree of supplemental benefits through Medicaid, may have instead been attracted to MA if the urban floor led new plans to enter the market, such as D-SNPs, that were more geared towards these beneficiaries' needs.

Large enrollment effects persisted throughout the sample period (Table 2.6). This may come as a surprise, given that the government phased out much of the urban floor by the end of my sample period (Section 2.3.1). Prior research suggests that there may be substantial inertia in Medicare enrollment decisions (Sinaiko, Afendulis, and Frank 2013; Jacobs and Molloy 2017), which could explain why there was not a large and immediate response of enrollment to changes in payment rates and any corresponding changes in plan premiums and benefits. Regardless of the reason, this empirical result supports the use of the urban floor RD design for all years in sample.

2.4.5. Main findings

The urban floor was ultimately associated with less inpatient utilization among dual eligibles (Table 2.7, Column 2). For one, the urban floor led to a two percentage point decrease at the population threshold in the share of dual eligibles who were hospitalized in a given year, representing an 11% reduction relative to baseline. This effect was concentrated among non-emergency admissions. While the urban floor did not have a statistically significant effect on emergency admissions, it led to a reduction in the share of dual eligibles with a non-emergency admission of about two percentage points (a 23% reduction relative to the baseline).

Although the urban floor led to fewer admissions, it was also associated with an increase in the average number of inpatient days among those who were hospitalized in a given year (Table 2.7). This result was unexpected, given that capitated payments to plans create a strong incentive to restrain inpatient care and that prior research has found that managed care reduces length of stay (Miller and Luft 2002). One potential explanation is that increases in MA enrollment may have prevented relatively uncomplicated admissions that would have resulted in short lengths of stay. If true, this would increase the average observed length of stay when focusing on the remaining pool of admissions (i.e., sample selection bias). To explore this possibility, I ran admission-level analyses to evaluate whether controlling for diagnosis-related group (DRG) and admission type (emergency versus non-emergency) would eliminate the positive relationship between the urban floor and average length of stay. This was not the case. However, my analysis does not rule out the possibility that there was sample selection bias *conditional* on DRG and admission type (e.g., which would have been the case if MA enrollment prevented relatively uncomplicated admissions within a given DRG).

While the urban floor was associated with an increase in the average length of stay, it ultimately led to a decrease in the average number of inpatient days when considering the entire dual eligible population (Table 2.7). This finding implies that either (1) the urban floor reduced the number of hospitalizations more than it increased the average length of stay or (2) the urban floor also reduced the average length of stay, but estimates suggest otherwise due to sample selection bias.

At least some of the decrease in hospital utilization appears to represent an improvement in the quality of care. For one, the urban floor led to a 0.8 percentage point decrease in the share of beneficiaries with a potentially-preventable hospitalization — i.e., an admission that might have been avoided with proper outpatient care — which represents a 16% decrease relative to baseline (Table 2.8). It was also associated with a 1.3 percentage point reduction in 30-day readmission rates or a 6% decrease relative to baseline (Table 2.8). It is conceivable that the latter result may reflect a change in the pool of hospitalizations used to calculate readmission rates (i.e., sample selection bias), rather than a decrease in the likelihood of being readmitted after a given hospital discharge. Nonetheless, the urban floor was also associated with a shift of admissions towards

hospitals with lower readmission rates (Table 2.8), which suggests a potential mechanism for this change.

Results for other measures of hospital quality and for all-cause mortality rates were not statistically significant (Table 2.8). However, it is important to note that these estimates do not have the precision to reject the possibility that the urban floor may have had a sizable positive or negative effect. For instance, the 95% confidence interval for all-cause mortality ranges from a decrease of 0.6 percentage points (13% relative to baseline) to an increase of 0.3 percentage points (5% relative to baseline).

Whereas prior analyses separately identify the effect of the urban floor on enrollment and the effect of the urban floor on beneficiary outcomes, 2SLS results combine these findings and confirm that the relationship between changes in enrollment and beneficiary outcomes is statistically significant (Table 2.9). Table 2.9 shows that first-stage F-statistics exceed 10. This is commonly viewed as an indicator that a single instrumental variable (i.e., the urban floor) is not weak and therefore can be reliably used to identify the effect of the endogenous variable (i.e., MA enrollment rates) on outcomes (Stock, Wright, and Yogo 2002). Additionally, results are statistically significant for the same set of outcomes under 2SLS as under prior RD models that were evaluating the effect of the urban floor. I present 2SLS point estimates that have been scaled down to convey the effect of a 9 percentage point increase in county-level MA enrollment rates (i.e., the first-stage result) (see Section 2.3.1 for an explanation). Hence, these results mechanically have the same sign and magnitudes of prior RD estimates, but are nonetheless useful for confirming that the effects of MA enrollment on outcomes are statistically significant.

It would not be appropriate to interpret unscaled 2SLS results as the effect of switching compliers from traditional Medicare to MA given the likely presence of spillover effects on other beneficiaries (Section 2.3.1). Indeed, if one disregarded spillover effects and assumed that the effects of MA were constant across dual eligibles, then my 2SLS estimates would imply that shifting every dual eligible from traditional Medicare to MA would lead to 2.1 fewer inpatient days on average, an implausibly large decline of 96% relative to the sample baseline.

2.4.6. Heterogeneous treatment effects

The next set of results consider whether the effects of the urban floor vary based on the level of dual eligibility, health status, or regional health spending. Differences in the effect of the urban floor across subgroups of dual eligibles could reflect (1) differences in its effect on MA enrollment rates, (2) differences in the relationship between MA enrollment rates and beneficiary outcomes, or (3) both. I consider each possibility when reviewing these results.

By level of dual eligibility

Although full and non-QMB partial dual eligibles represent two very distinct populations, I did not generally find evidence that the effect of the urban floor on outcomes varied across these groups (Table 2.10). In most cases, point estimates and standard errors were similar among full and non-QMB partial dual eligibles. The one exception is that the urban floor was associated with a large and statistically significant reduction in readmission rates among non-QMB partial dual eligibles but not among full dual eligibles, a difference which was statistically significant. Nonetheless, I did not find evidence that the urban floor had a varying effect on where these groups received their care in terms of hospital readmission rates or other measures of hospital quality. An important caveat is that the urban floor had a smaller effect on MA enrollment among full dual eligibles. Hence, these results may understate the magnitude of the effect of MA enrollment increases on outcomes among full dual eligibles relative to partial dual eligibles.

By health needs

Among dual eligibles ages 55-74, the effects of the urban floor were largely concentrated among those under 65 who qualified for Medicare on the basis of disability (Table 2.11). In particular, the urban floor led to a decrease in the share who were hospitalized, the average number of inpatient days, the share with a potentially-preventable admission, and hospital readmission rates among the under-65 group, but not among those 65-74 who aged onto Medicare. Differences in the effect of the urban floor on MA enrollment rates across groups were small and not statistically significant. Because the under-65 group is a potentially sicker group of dual eligibles, these results confirm the expected finding that MA enrollment increases would have more favorable effects among those with more significant health needs.

By regional spending levels

Finally, the effects of the urban floor varied significantly depending on regional health care spending patterns (Table 2.12). Results generally mirror the main findings of this study when evaluating counties where historical spending per capita in traditional Medicare was high. However, the urban floor had less favorable effects — and in some cases led to adverse outcomes — among dual eligibles in counties where historical spending per capita in traditional Medicare was low. First, the effect of the urban floor on the average number of inpatient days among this population was small and not statistically significant. Reductions in the probability of being hospitalized were offset by increases in the average length of stay. Second, the effect of the urban floor on readmission rates was positive and not statistically significant. Third, the urban floor led to a shift in admissions towards lower-quality hospitals in terms of 30-day mortality rates and patient experience. Finally, the urban floor was associated with an increase in one-year mortality rates among this population.

There are a few possible explanations for this important distinction between counties. First, there may be more waste in regions with historically high Medicare spending (Section 2.2.5). This would provide plans with an opportunity to constrain utilization and costs without necessarily harming quality, e.g., by implementing outpatient interventions to prevent potentially-avoidable hospitalizations. Conversely, if there were less waste in counties with historically low spending, then plans may be more likely to constrain utilization in ways that harm beneficiary health. Second, government payments to MA plans were lower on average in counties with historically low Medicare spending. Hence, the urban floor would have nudged beneficiaries into less-subsidized — and potentially lower-quality — plans. Finally, the urban floor exclusively affected enrollment among dual eligibles and not enrollment among the broader beneficiary population in counties with historically low Medicare spending (Table 2.12). It is conceivable that dual eligibles benefit from the spillover effects of MA (e.g., to the extent that MA plans increase adherence to medical guidelines) while facing challenges when enrolling in an MA plan themselves (e.g., as a result of low-quality provider networks). Regardless of which explanation is correct, each suggests that there may be negative effects of MA enrollment on dual eligibles in certain contexts.

2.4.7. Robustness check: Model specification

The primary findings in this study are largely robust to a number of different model specifications. In particular, I considered models with different population windows (0-500,000; 150,000-350,000; and 200,000-300,000), a model that allows coefficients for MSA population and population-squared to vary before and after the threshold, a fractional probit model for outcomes that represent shares, a local linear regression model with the standard population window, and a local linear regression with a data-driven population window (approximately 150,000-350,000) (Appendix Table 2.1). In most instances, the urban floor was associated with an increase in MA enrollment rates, as well as a reduction in the share of dual eligibles with a hospitalization, the average number of inpatient days, the share with a potentially-preventable hospitalization, readmission rates, and readmission rates at the hospitals where beneficiaries received their care. Findings related to hospitalization type (emergency or non-emergency), hospital mortality and patient experience measures, and all-cause mortality were not as robust. For example, under both local linear models, the urban floor was associated with a shift of admissions towards hospitals with higher mortality rates, but also a reduction in all-cause mortality. Neither of these results were statistically significant under my primary specification. Further, some of the results from the model with the narrowest bandwidth (200,000-300,000) were at odds with the rest of this study. For instance, the urban floor was actually associated with a large and statistically significant *decrease* in the share of Medicare beneficiaries enrolled in MA. While the regions included in that analysis are important because of their proximity to the threshold, these regions account for only 31 MSAs, 78 counties, and about 69,000 dual eligibles (i.e., less than two percent of my main sample).

2.4.8. Placebo tests

Results from placebo tests also generally support the main findings of this study, though there were a few exceptions (Appendix Table 2.2). I first estimated the effect of the urban floor in regions with historically high MA plan payment rates, i.e., where rates were much less likely to be bound by the floor (Column 2). As expected, the urban floor did not have a statistically significant effect on enrollment in these regions. While there was a negative association with length of stay, hospital patient experience scores, and hospital readmission rates, only the last is consistent with my primary findings. I next considered the effect of a placebo threshold of

400,000 among MSAs with populations between 250,000 and 550,000 (Column 3). The placebo urban floor corresponded to an increase in average length of stay, but all other results were not statistically significant. Finally, I estimated the same model, but restricted to counties with historically low payment rates (Column 4). In this case, the enrollment and length of stay estimates were large and statistically significant, but the remaining results were not.

2.4.9. Robustness check: Plan payments

An important question when interpreting the results of this study is whether the effect of the urban floor on beneficiary outcomes is the result of higher MA enrollment rates alone or also reflects improvements in plan offerings. Prior research does not provide strong evidence for the latter. First, previous studies have failed to find evidence that increases in MA payment rates lead to improvements in plan quality (Layton and Ryan 2015; Duggan, Starc, and Vabson 2016). Second, prior work suggests that plans use only a fraction of payment rate increases to improve their benefit packages (Song, Landrum, and Chernew 2013; Duggan, Starc, and Vabson 2016; Geruso, Cabral, and Mahoney 2018). Finally, any increases in benefit generosity will have a muted effect on full dual eligibles and QMB partial dual eligibles, as these beneficiaries are already shielded from Medicare's cost-sharing requirements and/or receive supplemental benefits through Medicaid.

To further explore this issue, I reran my analyses after excluding the most competitive MA markets, i.e., regions where plans were most likely to pass higher payments through to beneficiaries. Duggan et al. (2016) found that the effect of the urban floor on plan cost-sharing requirements was only statistically significant in the top quintile of counties. As might be expected, the urban floor had a smaller effect on MA enrollment rates when excluding the most competitive regions (Appendix Table 2.3). Perhaps as a result of this, several other results were smaller and less likely to be statistically significant, though they generally pointed in the same direction as my primary findings.

2.4.10. Limitations

This study relies on MedPAR data for information on hospital care, which may raise concerns about missing data. For example, if inpatient data were more likely to be missing for MA than

traditional Medicare patients, then estimates relating MA enrollment and total hospital use would be biased downwards. This could be the case if MA enrollment increased the likelihood of receiving care at hospitals that were out-of-sample or if hospitals in sample did not submit claims for all MA patients to the government (e.g., given that MA plans typically reimburse hospitals through a separate process) (ResDAC 2011; Afendulis, Chernew, and Kessler 2017). Nonetheless, my data account for the vast majority of Medicare discharges from acute care hospitals (see Section 2.3.2) and the hospitals in my sample were required to submit claims for all MA enrollees (ResDAC 2011; Afendulis, Chernew, and Kessler 2017; CMS 2019). Appendix A.1 describes the usefulness of MedPAR data relative to other large datasets.

Another limitation of this study is that it identifies local average treatment effects (LATEs), which may or may not extend to other populations of dual eligibles. One sense in which these estimates are local is that they evaluate the effect of MA at the urban floor population threshold. It is conceivable that MA may have different implications for dual eligibles in smaller or larger regions. For instance, this study provided evidence that plans were shifting beneficiaries into hospitals with lower readmission rates. This would not be an option for beneficiaries residing in remote areas with only one hospital in close proximity. Despite this potential heterogeneity, the results in this paper still have policy relevance, given that about one-seventh of dual eligibles (15%) reside in the sample counties (i.e., in MSAs with populations between 100,000 and 400,000).

Another sense in which these estimates are local is that they capture the effect on specific populations within urban floor counties, i.e., the direct effect of MA enrollment on those who were nudged into MA due to the urban floor (compliers) and the indirect spillover effects on all other beneficiaries. This estimate is important from a policy perspective, given that policymakers have made substantial changes to plan payments over time and have at times used plan payments as a mechanism for expanding the role of MA in Medicare (Zarabozo and Harrison 2009). Nonetheless, it is possible that the effects of MA enrollment increases will differ as the program continues to reach new segments of the Medicare population. For example, plans might have adverse effects on dual eligibles who have enrolled in traditional Medicare because they anticipate having difficulties under managed care (e.g., in terms of retaining access

to providers who specialize in unique diseases). It is also unlikely that increases in MA enrollment will have the same spillover effects as the program begins to saturate the market.

Another limitation of this particular RD design is that it does not apply to counties that are unbound by the urban floor. During much of the sample period, MA payment rates were based on the greater of either average traditional Medicare spending or the rural or urban floor as applicable. In other words, counties that were unaffected by the urban floor were regions where traditional Medicare spending was high. These areas accounted for about 15% of dual eligibles residing in MSAs with populations between 100,000 and 400,000. Section 2.4.6 suggests that MA may have more beneficial effects on dual eligibles in regions with historically-high traditional Medicare spending.

My results may also not apply to beneficiaries who had been enrolled in Medicare long before the urban floor payment policy went into effect. I found that older cohorts of beneficiaries were less responsive to the urban floor than were younger cohorts, possibly due to inertia in plan choice. As a result, I removed them from my analysis. Older Medicare beneficiaries tend to have more significant health needs than younger, nondisabled beneficiaries. Section 2.4.6 suggests that MA may have more favorable effects among sicker populations of dual eligibles.

My analyses also exclude full eligibles who were not enrolled in an MSP. This group accounted for about one-sixth (18%) of dual eligibles in 2013 and typically qualifies for Medicaid through medically needy programs or other eligibility pathways with less restrictive income criteria than MSPs (CMS 2011; MACPAC 2018b). MA enrollment may have unique implications for this population to the extent that, for example, beneficiaries qualifying through a medically needy program have significant health needs.

2.5. Conclusion

This study found that the average experiences of dual eligibles in MA parallel those of the general Medicare population. In short, increases in MA enrollment — driven by exogenous increases in plan payments — were associated with significant reductions in inpatient utilization among dual eligibles and, if anything, improvements in the quality of care. Effects were similar

across non-QMB partial dual eligibles relative to full dual eligibles but were much larger among disabled beneficiaries ages 55-64 relative to non-disabled beneficiaries ages 65-74. Despite these promising outcomes, results among counties where traditional Medicare spending was historically low are a cause for concern. In these regions, increases in MA enrollment were not associated with an overall reduction in inpatient care and resulted in both an increase in the share of admissions occurring in lower-quality hospitals and an increase in one-year mortality rates.

This study highlights several important avenues for future research. First, this is the only study to my knowledge that evaluates whether the effects of MA vary geographically, let alone that finds negative implications of enrollment in certain regions of the country. Given the importance of geography for MA payment policy, further research should be conducted to validate this result, explore whether it extends to other groups of beneficiaries, and identify the mechanisms that drive this finding. Second, future research should assess the experiences of dual eligibles in plans that integrate Medicaid and Medicare benefits, which are becoming increasingly common. Ongoing evaluations of the financial alignment demonstration will be informative in this regard. Researchers may also want to explore how the roll-out of integrated D-SNP plans across counties over time has affected outcomes among dual eligibles (e.g., in line with Zhang and Diana 2017). Third, my study found positive effects of MA enrollment rates on average among dual eligibles, but was unable to distinguish whether this was due to the direct effect of plan enrollment or to general spillover effects. Policymakers may be especially interested in the former, given targeted legislative efforts to specifically enroll dual eligibles in MA. Finally, this study and many others have evaluated the effect of MA enrollment during a period when the government reimbursed plans at rates that exceeded average spending in traditional Medicare. It will be useful to examine whether these effects persist in instances where traditional Medicare spending and MA payments are closer to a level playing field.

Dual eligibles are in the midst of an ongoing transformation in how they receive their Medicare benefits. The share of dual eligibles enrolled in private Medicare plans increased from 6% in 2004 to 35% in 2017, exceeding enrollment rates among non-dual eligibles for the first time in 2016. Recent policy initiatives have continued to nudge dual eligibles into private plans. For example, the financial alignment demonstration has allowed some states to passively enroll dual

eligibles in MMPs with the option to opt-out, whereas other beneficiaries must actively choose to enroll in a private plan. This study may reassure policymakers, as it confirms that the generally positive findings in the MA literature to-date appear to extend to dual eligibles on average. Nonetheless, as is generally the case with programs and populations of this magnitude, the devil is in the details. This study found that MA enrollment had negative consequences for dual eligibles residing in counties with historically low Medicare spending and that the effects of MA on dual eligibles may vary based on the diverse needs of this population. The finding that MA plans were shifting beneficiaries towards low-quality hospitals in certain counties suggests that the government should carefully monitor the provider networks of plans that disproportionately enroll dual eligibles. Finally, these results highlight the crucial need for additional research evaluating the heterogeneity of beneficiary experiences in MA in order to further inform plan regulations and ensure that plans are meeting the unique and diverse needs of beneficiaries.

2.6. Appendix

A.1. MedPAR data

This study relies on MedPAR claims data for information about inpatient utilization among traditional Medicare and MA beneficiaries. Hospitals receiving disproportionate share (DSH), indirect medical education (IME), or direct graduate medical education (GME) payments were required to submit information-only claims for MA enrollees during my sample period, in addition to submitting claims for traditional Medicare beneficiaries (ResDAC 2011; Huckfeldt et al. 2017). I restrict my analysis to this subset of hospitals. To do so, I rely on MedPAR data to identify hospitals with DSH or IME payments in a given calendar year. I am unable to isolate hospitals receiving GME payments based on MedPAR data alone. However, the vast majority of hospitals receiving GME payments also received IME or DSH payments during my sample period (about 99% based on Cost Report data). I also evaluated an alternative approach where I used Cost Report data to identify hospitals receiving DSH, IME, or GME payments during a given year. This method captured a very similar set of hospitals and yielded comparable results when rerunning my primary analyses.

There are at least two other potentially-relevant data resources, though each comes with important limitations. One alternative is the Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID), which include the universe of hospital discharges for the majority of states. However, only a subset of these states (36 in 2011) identify dual eligibles and even fewer (18 in 2011) also distinguish between traditional Medicare and MA (Barrett and Jiang 2014). Further, dual eligibles are identified in the HCUP SID based on whether the expected payer for a hospitalization was both Medicare and Medicaid (Barrett and Jiang 2014). This presumably does not include non-QMB partial dual eligibles and it does not distinguish between full and QMB partial dual eligibles. Prior research has also found large error rates when evaluating the accuracy of the expected payer field (Buchmueller, Allen, and Wright 2003; Chattopadhyay and Bindman 2005; Afendulis, Chernew, and Kessler 2017). Another alternative would be to combine traditional Medicare claims data with MA encounter data, which have only recently become available to researchers (CMS 2018d). However, preliminary work suggests

that there are significant gaps in the encounter data (e.g., as it captured only 78% of MedPAR admissions in 2015) (Johnson and Podulka 2018).

A.2. MSA population

I inferred how government administrators defined MSA population by experimenting with different MSA boundary definitions and population counts and identifying the combination that minimized discrepancies with plan payment rates. Observable discrepancies include instances where: (1) a county was in an MSA with a population below 250,000 but plan payments were set at the urban floor amount and (2) a county was in an MSA with a population above 250,000 but plan payments were set below the urban floor amount.

The following were generally consistent with plan payment rates:

- 2001-2003: June 1999 MSA definitions applied to 1999 population estimates
- January-February 2004: June 1999 MSA definitions applied to the population in 2000
- March-December 2004: December 2003 MSA definitions applied to the population in 2000
- MSA population definitions were, in effect, locked into place in later years.

Payment rate patterns also imply that counties could not lose the urban floor designation over time. This means that the urban floor during my sample period was actually based on whether a region exceeded the threshold based on any of the three MSA population definitions listed above. When implementing my RD design, I relied on the most recent definition of MSA population and dropped the relatively small number of urban floor counties that were below the population threshold (i.e., that exceeded the population threshold based on an earlier definition).

A.3. Potentially-preventable admissions

I define potentially-preventable admissions using the Agency for Healthcare Research and Quality (AHRQ) Prevention Quality Indicators (PQIs) Technical Specification files (AHRQ 2017). The PQIs include admissions for one of the following conditions (AHRQ 2017):

- Diabetes, short-term complications
- Perforated appendix
- Diabetes long-term complications

- Chronic obstructive pulmonary disease (COPD) or asthma in older adults
- Hypertension
- Heart Failure
- Low birth weight
- Dehydration
- Community acquired pneumonia
- Urinary tract infection
- Uncontrolled diabetes
- Asthma in younger adults

A.4. Rehospitalization rates

I generate 30-day rehospitalization rates based on a widely-cited study (Jencks, Williams, and Coleman 2009). In particular, I define the numerator as all discharges from acute care hospitals, excluding instances where the patient was listed as deceased on the same day, the patient was transferred on the same day to another acute care hospital, or the patient was eventually readmitted for rehabilitation within the 30-day window. I then calculate the share of these discharges where the patient was admitted to an acute care hospital within 30 days of being discharged.

A.5. Hospital quality indicators

I rely on definitions from Doyle et al. (2017) to generate three summary measures of hospital quality based on raw averages of Hospital Compare data:

30-day mortality rates

- 30-day mortality rate: AMI
- 30-day mortality rate: Pneumonia
- 30-day mortality rate: Heart failure

30-day readmission rates

- 30-day readmission rate: AMI
- 30-day readmission rate: Pneumonia
- 30-day readmission rate: Heart failure

Patient experience of care

- Doctors always communicated well
- Nurses always communicated well
- Pain was always well controlled
- Patients always received help as soon as they wanted
- Room was always clean
- Room was always quiet at night
- Staff always explained medicines before providing them
- Patient received information about what to do during recovery at home
- Patients would definitely recommend the hospital

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2.8. Tables and figures

Table 2.1. Dual Eligible Groups

Dual eligible group	Enrollees (millions)*	Typical** income limit	Typical** individual asset limit	Typical** benefits
Full dual eligibles	7.3	≤75% FPL or ≤100% FPL	$2,000	Medicaid benefits Medicare cost sharing Part A premium Part B premium
QMB partial dual eligibles	1.4	≤100% FPL	$7,390	Medicare cost sharing Part A premium Part B premium
Non-QMB partial dual eligibles	1.5	101%-120% FPL	$7,390	Part B premium

Sources: MACPAC 2018, 2015 Medicare Beneficairy Summary File (MBSF), and 2009 Mediciad Analytic Extract.

Notes: *As of January 2015. **Most common eligibility pathway(s) for each enrollment group along with the most common income and asset requirement for that pathway. Many of these limits vary by state. ***Most common benefits for each enrollment group. Full dual eligibles who do not receive QMB benefits may have less comprehensive coverage of Medicare's cost sharing and premiums depending on their state of residence. A very small number of non-QMB partial dual eligibles (<50) receive coverage for the Part A premium alone.

Table 2.2. Summary Statistics of Control Variables

		Analytic Sample					
	All	100-400k	<250k	≥250k	Difference[a]	RD[b] (basic)	RD[c] (geo controls)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
MA enrollment rate	0.239	0.190	0.158	0.241	0.083***	0.149***	0.097***
Age group							
<45	0.123	0.196	0.195	0.197	0.003	0.006	-0.012
45-54	0.130	0.158	0.157	0.161	0.004	0.018	-0.002
55-64	0.151	0.178	0.178	0.179	0.001	0.008	0.004
65-74	0.276	0.307	0.308	0.306	-0.002	-0.011	0.013
75-84	0.212	0.158	0.161	0.154	-0.006	-0.018	-0.003
≥85	0.108	0.003	0.003	0.003	0.001	-0.003**	-0.001
Race/ethnicity							
NH White	0.532	0.649	0.659	0.634	-0.024	0.191***	0.015
NH African-American	0.206	0.183	0.178	0.191	0.013	-0.030	-0.060
Hispanic	0.174	0.128	0.120	0.141	0.022	-0.178**	0.019
Other	0.088	0.040	0.044	0.034	-0.010	0.016	0.026*
Female	0.619	0.613	0.612	0.614	0.002	0.011	-0.008
Census region							
Northeast	0.207	0.126	0.123	0.132	0.009	0.145	
Midwest	0.153	0.190	0.183	0.201	0.018	-0.100	
South	0.404	0.485	0.468	0.512	0.044	0.251	
West	0.236	0.199	0.226	0.156	-0.070	-0.297**	
MSA population (1,000s)	3470	219	151	328	177***		
County characteristics							
Area (1,000 sq. miles)	144.4	139.8	148.4	126.0	-22.4	-58.0	
Population (1,000s)	1271.8	181.3	136.9	252.0	115.1***	-36.5	
% in Medicare	0.170	0.184	0.186	0.180	-0.006	0.049***	0.028
Median income	$50,429	$44,925	$44,493	$45,612	$1,119	-$5,208**	-$4,682**
% in poverty	0.172	0.182	0.182	0.181	-0.001	-0.004	0.010
% of 65+ in poverty	0.110	0.097	0.098	0.097	-0.001	0.005	0.018
2000 risk score	1.006	0.972	0.975	0.967	-0.009	-0.001	0.018
Physicians/1,000	2.784	2.301	2.305	2.295	-0.010	-1.015	-1.194
Specialists/1,000	0.984	0.729	0.727	0.731	0.004	-0.330	-0.348
Hospitals/100,000	0.016	0.016	0.018	0.013	-0.005***	-0.001	-0.002
Beds/1,000	2.703	3.031	3.125	2.881	-0.243	-0.336	-0.681
N (1,000,000s)=	53.5	8.0	4.8	3.2			

NOTES: a. Estimates from a linear regression of outcomes against the urban floor dummy. b. Linear RD estimates with controls for MSA population, MSA population-squared. c. Linear RD estimates with controls for MSA population, MSA population-squared, county population, county population-squared, county land area, urban continuum dummies, state fixed effects. All models include heteroskedastic-robust standard errors with clusters at the county level.

* p<0.10 ** p<0.05 *** p<0.01

Table 2.3. Summary Statistics of Outcomes

		Analytic Sample			
	All	100-400k	<250k	≥250k	Difference[a]
	(1)	(2)	(3)	(4)	(5)
Utilization outcomes					
Any hospitalization	0.191	0.186	0.186	0.184	-0.002
Emergency	0.139	0.123	0.121	0.126	0.005
Non-emergency	0.041	0.090	0.092	0.085	-0.007**
Length of stay	1.844	1.685	1.690	1.678	-0.012
Total inpatient days	0.334	0.322	0.323	0.319	-0.004
Quality outcomes					
Potentially-prev. hosp.	0.046	0.043	0.043	0.042	-0.001
Rehospitalization rate	0.228	0.212	0.212	0.211	-0.001
Hospital Compare					
Mortality	0.126	0.131	0.131	0.131	0.000
Patient exp.	0.684	0.700	0.699	0.702	0.003
Readmissions	0.205	0.197	0.198	0.194	-0.004***
One-year mortality	0.058	0.041	0.041	0.042	0.001
N (person-years) =	53,548,685	8,043,882	4,805,040	3,238,842	
N (hospitalization-years) =	15,957,944	2,417,658	1,447,473	970,185	

NOTES: a. Estimates from a linear regression of outcomes against the urban floor dummy. Includes heteroskedasticrobust standard errors with clusters at the county level.

* p<0.10 ** p<0.05 *** p<0.01

Table 2.4. Effect of Urban Floor on Benchmark Payment Rates

	Baseline (1)	RD estimate (2)	Pct. change over baseline (3)	County-year Observations (4)
Full sample	$749	$59.1***	7.9%	2,681
		($7.5)	(1.0%)	
2009	$757	$79.8***	10.5%	383
		($9.5)	(1.3%)	
2010	$753	$81.6***	10.8%	383
		($10.2)	(1.4%)	
2011	$752	$77.7***	10.3%	383
		($7.1)	(1.0%)	
2012	$732	$68.0***	9.3%	383
		($9.8)	(1.3%)	
2013	$743	$58.9***	7.9%	383
		($10.0)	(1.3%)	
2014	$767	$49.5***	6.5%	383
		($9.4)	(1.2%)	
2015	$743	$19.3**	2.6%	383
		($8.8)	(1.2%)	
2015 (5-star plans)	$755	$41.5***	5.5%	383
		($9.1)	(1.2%)	

NOTES: Results are from RD models that control for MSA population, MSA population-squared, dual eligible population characteristics (age, race, gender distribution), county characteristics (land area, population, population-squared, median income, poverty rate, 65+ poverty rate, share of population in Medicare, physicians per capita, specialists per capita, hospitals per capita, and beds per capita), state fixed effects, and year fixed effects. All models are weighted by county dual eligible population and include heteroskedastic-robust standard errors with clusters at the county level.
* p<0.10 ** p<0.05 *** p<0.01

Table 2.5. Effect of Urban Floor on MA Enrollment Rates

	Baseline (1)	RD estimate (2)	Pct. change over baseline (3)	County-year Observations (4)
All beneficiaries	0.182	0.088***	48.5%	2,681
		(0.024)	(13.0%)	
Dual eligibles	0.150	0.092***	61.0%	2,681
		(0.025)	(16.8%)	
Full	0.113	0.069**	61.1%	2,675
		(0.030)	(26.3%)	
Partial	0.221	0.108***	48.8%	2,680
		(0.026)	(11.8%)	
QMB	0.167	0.085***	51.3%	2,651
		(0.027)	(16.0%)	
Non-QMB	0.264	0.128***	48.6%	2,675
		(0.031)	(11.8%)	

NOTES: Results are from RD models that control for MSA population, MSA population-squared, dual eligible population characteristics (age, race, gender distribution), county characteristics (land area, population, population-squared, median income, poverty rate, 65+ poverty rate, share of population in Medicare, physicians per capita, specialists per capita, hospitals per capita, and beds per capita), state fixed effects, and year fixed effects. All models are weighted by county dual eligible population and include heteroskedastic-robust standard errors with clusters at the county level.
* p<0.10 ** p<0.05 *** p<0.01

Table 2.6. Effect of Urban Floor on Enrollment Rates Among All Beneficiaries, by Year

	Baseline (1)	RD estimate (2)	Pct. change over baseline (3)	County-year Observations (4)
Full sample	0.182	0.088***	48.5%	2,681
		(0.024)	(13.0%)	
2009	0.147	0.074***	50.1%	383
		(0.027)	(18.6%)	
2010	0.151	0.077***	50.8%	383
		(0.027)	(17.9%)	
2011	0.153	0.090***	58.8%	383
		(0.028)	(18.1%)	
2012	0.160	0.109***	68.4%	383
		(0.028)	(17.2%)	
2013	0.179	0.103***	57.3%	383
		(0.025)	(13.8%)	
2014	0.215	0.093***	43.5%	383
		(0.027)	(12.3%)	
2015	0.225	0.089***	39.4%	383
		(0.027)	(12.1%)	

NOTES: Results are from RD models that control for MSA population, MSA population-squared, dual eligible population characteristics (age, race, gender distribution), county characteristics (land area, population, population-squared, median income, poverty rate, 65+ poverty rate, share of population in Medicare, physicians per capita, specialists per capita, hospitals per capita, and beds per capita), state fixed effects, and year fixed effects. All models are weighted by county dual eligible population and include heteroskedastic-robust standard errors with clusters at the county level.

* p<0.10 ** p<0.05 *** p<0.01

Table 2.7. Effect of Urban Floor on Utilization

	Baseline (1)	RD est. (2)	Pct. change over baseline (4)	County-year Observations (6)
MA enrollment rate				
All beneficiaries	0.182	0.088***	48.5%	2,681
		(0.024)	(13.0%)	
Dual eligibles	0.150	0.092***	61.0%	2,681
		(0.025)	(16.8%)	
Any hospitalization	0.198	-0.021***	-10.5%	2,681
		(0.007)	(3.7%)	
Emergency	0.125	0.003	2.2%	2,681
		(0.009)	(7.5%)	
Non-emergency	0.099	-0.023***	-23.4%	2,681
		(0.008)	(8.0%)	
Length of stay	5.049	0.304***	6.0%	2,675
		(0.114)	(2.3%)	
Total inpatient days	1.780	-0.184*	-10.3%	2,681
		(0.111)	(6.2%)	

NOTES: Results are from RD models that control for MSA population, MSA population-squared, dual eligible population characteristics (age, race, gender distribution), county characteristics (land area, population, population-squared, median income, poverty rate, 65+ poverty rate, share of population in Medicare, physicians per capita, specialists per capita, hospitals per capita, and beds per capita), state fixed effects, and year fixed effects. All models are weighted by county dual eligible population and include heteroskedastic-robust standard errors with clusters at the county level.

* p<0.10 ** p<0.05 *** p<0.01

Table 2.8. Effect of Urban Floor on Quality

	Baseline (1)	RD est. (2)	Pct. change over baseline (3)	County-year observations (4)
MA enrollment rate				
All beneficiaries	0.182	0.088***	48.5%	2,681
		(0.024)	(13.0%)	
Dual eligibles	0.150	0.092***	61.0%	2,681
		(0.025)	(16.8%)	
Potentially-prev. hosp.	0.047	-0.008***	-16.3%	2,681
		(0.003)	(5.6%)	
Readmission rate	0.225	-0.013*	-5.6%	2,675
		(0.008)	(3.3%)	
Hospital Compare				
Mortality	0.128	0.003	2.4%	2,674
		(0.003)	(2.1%)	
Patient exp.	0.701	-0.005	-0.7%	2,675
		(0.006)	(0.9%)	
Readmissions	0.203	-0.007**	-3.3%	2,674
		(0.003)	(1.5%)	
One-year mortality	0.042	-0.002	-4.5%	2,681
		(0.002)	(4.5%)	

NOTES: Results are from RD models that control for MSA population, MSA population-squared, dual eligible population characteristics (age, race, gender distribution), county characteristics (land area, population, population-squared, median income, poverty rate, 65+ poverty rate, share of population in Medicare, physicians per capita, specialists per capita, hospitals per capita, and beds per capita), state fixed effects, and year fixed effects. All models are weighted by county dual eligible population and include heteroskedastic-robust standard errors with clusters at the county level.

* p<0.10 ** p<0.05 *** p<0.01

Table 2.9. Effect of an Increase in MA Enrollment Rates From 18% to 27% on Inpatient Utilization and Quality

	Baseline (1)	RD est. (2)	Pct. increase over baseline (3)	F-stat (4)	County-year observations (5)
Any hospitalization	0.198	-0.021***	-10.7%	15.0	2,681
		(0.007)	(3.6%)		
Emergency	0.125	0.003	2.3%	15.0	2,681
		(0.010)	(7.8%)		
Non-emergency	0.100	-0.024**	-23.7%	15.0	2,681
		(0.010)	(9.7%)		
Length of stay	5.064	0.326**	6.4%	16.0	2,675
		(0.164)	(3.2%)		
Total inpatient days	1.784	-0.187*	-10.5%	15.0	2,681
		(0.100)	(5.6%)		
Potentially-prev. hosp.	0.047	-0.008***	-16.4%	15.0	2,681
		(0.003)	(6.2%)		
Rehospitalization	0.225	-0.014*	-6.0%	16.0	2,675
		(0.007)	(3.2%)		
Hospital Compare					
Mortality	0.128	0.003	2.6%	14.5	2,674
		(0.003)	(2.5%)		
Patient experience	0.701	-0.005	-0.7%	15.8	2,675
		(0.007)	(1.0%)		
Readmissions	0.203	-0.007***	-3.5%	15.8	2,674
		(0.003)	(1.3%)		
One-year mortality	0.042	-0.002	-4.7%	15.0	2,681
		(0.002)	(4.5%)		

NOTES: Results are from 2SLS models where the endogenous variable is the county-level MA enrollment rate and the instrument is an urban floor dummy variable. All results are multiplied by 0.09 to capture a change in MA enrollment rates to 18% to 27%. All models control for MSA population, MSA population-squared, dual eligible population characteristics (age, race, gender distribution), county characteristics (land area, population, population-squared, median income, poverty rate, 65+ poverty rate, share of population in Medicare, physicians per capita, specialists per capita, hospitals per capita, and beds per capita), state fixed effects, and year fixed effects. All models are weighted by county dual eligible population and include heteroskedastic-robust standard errors with clusters at the county level.

* p<0.10 ** p<0.05 *** p<0.01

Table 2.10. Effect of Urban Floor
Among Full and Non-QMB Partial Dual Eligibles

	Baseline (1)	RD est. (2)	Pct. increase over baseline (3)	Group difference (4)	County-year observations (5)
MA enrollment rate (all)					
Full	0.174	0.081***	46.4%		5,369
		(0.026)	(14.7%)	-0.001	
Non-QMB partial	0.194	0.080***	41.1%	(0.020)	5,369
		(0.022)	(11.4%)		
MA enrollment rate (group)					
Full	0.113	0.057**	50.8%		5,369
		(0.028)	(24.8%)	0.049*	
Non-QMB partial	0.221	0.107***	48.2%	(0.029)	5,369
		(0.026)	(11.8%)		
Any hospitalization					
Full	0.200	-0.018**	-9.1%		5,369
		(0.007)	(3.7%)	0.001	
Non-QMB partial	0.180	-0.017**	-9.5%	(0.007)	5,369
		(0.007)	(4.0%)		
Length of stay					
Full	5.137	0.272**	5.3%		5,304
		(0.127)	(2.5%)	0.043	
Non-QMB partial	4.763	0.315***	6.6%	(0.118)	5,304
		(0.115)	(2.4%)		
Total inpatient days					
Full	1.850	-0.154	-8.3%		5,369
		(0.121)	(6.5%)	-0.010	
Non-QMB partial	1.458	-0.164*	-11.3%	(0.094)	5,369
		(0.090)	(6.2%)		
Potentially-prev. hosp.					
Full	0.046	-0.006**	-12.4%		5,369
		(0.003)	(5.9%)	-0.003	
Non-QMB partial	0.044	-0.008***	-18.5%	(0.003)	5,369
		(0.003)	(6.2%)		
Rehospitalization					
Full	0.228	-0.007	-3.0%		5,300
		(0.008)	(3.4%)	-0.021**	
Non-QMB partial	0.214	-0.028***	-13.2%	(0.009)	5,300
		(0.008)	(3.8%)		
Hospital Compare					
Mortality					
Full	0.128	0.003	2.0%		5,300
		(0.003)	(2.1%)	0.002	
Non-QMB partial	0.128	0.005*	3.7%	(0.002)	5,300
		(0.003)	(2.2%)		
Patient experience					
Full	0.699	-0.005	-0.7%		5,304
		(0.007)	(0.9%)	0.002	
Non-QMB partial	0.705	-0.002	-0.3%	(0.006)	5,304
		(0.006)	(0.9%)		
Readmissions					
Full	0.204	-0.008**	-3.9%		5,291
		(0.003)	(1.5%)	0.002	
Non-QMB partial	0.203	-0.006**	-3.2%	(0.002)	5,291
		(0.003)	(1.3%)		
One-year mortality					
Full	0.042	0.000	-1.0%		5,369
		(0.002)	(4.3%)	-0.002	
Non-QMB partial	0.039	-0.002	-4.9%	(0.002)	5,369
		(0.002)	(6.2%)		

NOTES: Results are from RD models that control for MSA population, MSA population-squared, dual eligible population characteristics (age, race, gender distribution), county characteristics (land area, population, population-squared, median income, poverty rate, 65+ poverty rate, share of population in Medicare, physicians per capita, specialists per capita, hospitals per capita, and beds per capita), state fixed effects, and year fixed effects. All models also include a group dummy variable and its interaction with each control variable. All models are weighted by county dual eligible population and include heteroskedastic-robust standard errors with clusters at the county level.
* p<0.10 ** p<0.05 *** p<0.01

Table 2.11. Effect of Urban Floor
Among Disabled (55-64) and Aged (65-74) Dual Eligibles

	Baseline (1)	RD est. (2)	Pct. increase over baseline (3)	Group difference (4)	County-year observations (5)
MA enrollment rate (all)					
Disabled	0.184	0.073***	39.6%		5,371
		(0.024)	(12.8%)	0.008	
Aged	0.180	0.081***	44.7%	(0.006)	5,371
		(0.022)	(12.4%)		
MA enrollment rate (group)					
Disabled	0.146	0.100***	68.7%		5,371
		(0.028)	(18.8%)	-0.014	
Aged	0.205	0.086***	41.9%	(0.011)	5,371
		(0.026)	(12.6%)		
Any hospitalization					
Disabled	0.217	-0.023***	-10.8%		5,371
		(0.007)	(3.1%)	0.015***	
Aged	0.180	-0.009	-4.8%	(0.005)	5,371
		(0.006)	(3.5%)		
Length of stay					
Disabled	4.598	0.228*	5.0%		5,293
		(0.134)	(2.9%)	-0.007	
Aged	4.819	0.221*	4.6%	(0.102)	5,293
		(0.133)	(2.7%)		
Total inpatient days					
Disabled	1.971	-0.263**	-13.3%		5,371
		(0.118)	(6.0%)	0.248***	
Aged	1.544	-0.015	-1.0%	(0.075)	5,371
		(0.087)	(5.6%)		
Potentially-prev. hosp.					
Disabled	0.054	-0.010***	-18.9%		5,371
		(0.003)	(5.9%)	0.008***	
Aged	0.044	-0.003	-5.7%	(0.003)	5,371
		(0.003)	(6.2%)		
Rehospitalization					
Disabled	0.110	-0.018***	-15.9%		5,284
		(0.005)	(4.5%)	0.013**	
Aged	0.099	-0.004	-4.0%	(0.006)	5,284
		(0.006)	(5.5%)		
Hospital Compare					
Mortality					
Disabled	0.128	0.003	2.4%		5,284
		(0.003)	(2.0%)	-0.002**	
Aged	0.129	0.001	1.1%	(0.001)	5,284
		(0.003)	(2.1%)		
Patient experience					
Disabled	0.702	-0.003	-0.5%		5,290
		(0.006)	(0.9%)	0.003	
Aged	0.697	-0.001	-0.1%	(0.002)	5,290
		(0.006)	(0.9%)		
Readmissions					
Disabled	0.203	-0.007**	-3.6%		5,273
		(0.003)	(1.5%)	0.000	
Aged	0.204	-0.007**	-3.5%	(0.001)	5,273
		(0.003)	(1.4%)		
One-year mortality					
Disabled	0.027	-0.001	-2.6%		5,371
		(0.001)	(4.9%)	0.001	
Aged	0.029	0.000	0.7%	(0.002)	5,371
		(0.002)	(5.9%)		

NOTES: Results are from RD models that control for MSA population, MSA population-squared, dual eligible population characteristics (age, race, gender distribution), county characteristics (land area, population, population-squared, median income, poverty rate, 65+ poverty rate, share of population in Medicare, physicians per capita, specialists per capita, hospitals per capita, and beds per capita), state fixed effects, and year fixed effects. All models also include a group dummy variable and its interaction with each control variable. All models are weighted by county dual eligible population and include heteroskedastic-robust standard errors with clusters at the county level.

* p<0.10 ** p<0.05 *** p<0.01

Table 2.12. Effect of Urban Floor
Among Dual Eligibles in Low and High Cost Regions

	Baseline (1)	RD est. (2)	Pct. increase over baseline (3)	Group difference (4)	County-year observations (5)
MA enrollment rate (all)					
Low cost	0.247	0.031	12.4%		2,681
		(0.027)	(10.9%)	0.123***	
High cost	0.133	0.154***	115.4%	(0.037)	2,681
		(0.026)	(19.4%)		
MA enrollment rate (group)					
Low cost	0.174	0.081***	46.6%		2,681
		(0.030)	(17.1%)	0.044	
High cost	0.126	0.125***	98.7%	(0.039)	2,681
		(0.025)	(19.5%)		
Any hospitalization					
Low cost	0.186	-0.017***	-8.9%		2,681
		(0.005)	(2.8%)	0.002	
High cost	0.202	-0.015*	-7.4%	(0.010)	2,681
		(0.009)	(4.4%)		
Length of stay					
Low cost	4.936	0.605***	12.3%		2,675
		(0.150)	(3.0%)	-0.587***	
High cost	5.219	0.018	0.3%	(0.206)	2,675
		(0.140)	(2.7%)		
Total inpatient days					
Low cost	1.564	0.060	3.8%		2,681
		(0.089)	(5.7%)	-0.315**	
High cost	1.899	-0.255**	-13.4%	(0.147)	2,681
		(0.117)	(6.2%)		
Potentially-prev. hosp.					
Low cost	0.040	-0.004	-10.3%		2,681
		(0.003)	(7.8%)	-0.001	
High cost	0.049	-0.005	-9.8%	(0.005)	2,681
		(0.004)	(8.1%)		
Rehospitalization					
Low cost	0.211	0.008	3.9%		2,675
		(0.009)	(4.3%)	-0.023*	
High cost	0.230	-0.015*	-6.5%	(0.013)	2,675
		(0.009)	(3.8%)		
Hospital Compare					
Mortality					
Low cost	0.129	0.006*	4.5%		2,674
		(0.003)	(2.6%)	0.000	
High cost	0.123	0.006	4.5%	(0.005)	2,674
		(0.004)	(2.9%)		
Patient experience					
Low cost	0.709	-0.018*	-2.5%		2,675
		(0.010)	(1.4%)	0.010	
High cost	0.701	-0.008	-1.1%	(0.013)	2,675
		(0.008)	(1.1%)		
Readmissions					
Low cost	0.199	-0.004	-2.1%		2,674
		(0.004)	(1.9%)	0.002	
High cost	0.204	-0.003	-1.3%	(0.006)	2,674
		(0.004)	(2.1%)		
One-year mortality					
Low cost	0.040	0.004*	9.1%		2,681
		(0.002)	(5.3%)	-0.005	
High cost	0.041	-0.002	-3.9%	(0.005)	2,681
		(0.004)	(10.0%)		

NOTES: Results are from RD models that control for MSA population, MSA population-squared, dual eligible population characteristics (age, race, gender distribution), county characteristics (land area, population, population-squared, median income, poverty rate, 65+ poverty rate, share of population in Medicare, physicians per capita, specialists per capita, hospitals per capita, and beds per capita), state fixed effects, and year fixed effects. All models also include a group dummy variable and its interaction with each control variable. All models are weighted by county dual eligible population and include heteroskedastic-robust standard errors with clusters at the county level.

* p<0.10 ** p<0.05 *** p<0.01

Appendix Table 2.1. Robustness to Model Specification

	0k-500k (1)	*100k-400k (2)*	150k-350k (3)	200k-300k (4)	Varying slopes 100k-400k (5)	Nonlinear 100k-400k (6)	Local linear, 100k-400k (7)	Local linear, 147k-353k (8)
MA enrollment rate (all)	0.063***	0.088***	0.079***	-0.077**	0.085**	0.079***	0.070***	0.045***
	(0.020)	(0.024)	(0.029)	(0.032)	(0.038)	(0.023)	(0.024)	(0.017)
MA enrollment rate (group)	0.064***	0.092***	0.121***	0.025	0.055	0.086***	0.095***	0.063***
	(0.020)	(0.025)	(0.036)	(0.045)	(0.038)	(0.021)	(0.026)	(0.018)
Any hospitalization	-0.016***	-0.021***	-0.028***	-0.012	-0.031**	-0.020***	-0.026***	-0.031***
	(0.006)	(0.007)	(0.008)	(0.015)	(0.012)	(0.007)	(0.008)	(0.006)
Emergency	-0.008	0.003	-0.024**	-0.073***	-0.009	0.004	-0.016**	-0.028***
	(0.007)	(0.009)	(0.011)	(0.013)	(0.014)	(0.009)	(0.008)	(0.006)
Non-Emergency	-0.008	-0.023***	-0.005	0.060***	-0.025**	-0.023***	-0.011	-0.003
	(0.006)	(0.008)	(0.010)	(0.013)	(0.012)	(0.008)	(0.007)	(0.006)
Length of stay	0.135	0.304***	0.172	0.533**	0.098	0.304***	0.176**	0.129**
	(0.113)	(0.114)	(0.170)	(0.235)	(0.162)	(0.114)	(0.082)	(0.066)
Total inpatient days	-0.169**	-0.184*	-0.334**	-0.181	-0.412**	-0.184*	-0.318***	-0.420***
	(0.086)	(0.111)	(0.132)	(0.161)	(0.164)	(0.111)	(0.099)	(0.071)
Potentially-prev. hosp.	-0.007***	-0.008***	-0.011***	-0.016**	-0.009**	-0.007***	-0.008***	-0.009***
	(0.002)	(0.003)	(0.003)	(0.006)	(0.004)	(0.002)	(0.002)	(0.002)
Rehospitalization	-0.012**	-0.013*	-0.017**	-0.037**	-0.022*	-0.012*	-0.017**	-0.029***
	(0.006)	(0.008)	(0.008)	(0.015)	(0.012)	(0.007)	(0.007)	(0.005)
Hospital Compare								
Mortality	-0.001	0.003	0.011***	0.015***	0.011***	0.003	0.010***	0.013***
	(0.002)	(0.003)	(0.003)	(0.004)	(0.004)	(0.003)	(0.002)	(0.002)
Patient experience	-0.002	-0.005	0.003	-0.050***	0.006	-0.005	0.000	0.001
	(0.005)	(0.006)	(0.008)	(0.012)	(0.011)	(0.006)	(0.006)	(0.005)
Readmissions	-0.009***	-0.007**	-0.013***	-0.012***	-0.012***	-0.007**	-0.010***	-0.015***
	(0.002)	(0.003)	(0.003)	(0.003)	(0.005)	(0.003)	(0.003)	(0.002)
One-year mortality	-0.002	-0.002	-0.002	-0.008	-0.003	-0.001	-0.003	-0.004***
	(0.001)	(0.002)	(0.003)	(0.006)	(0.003)	(0.002)	(0.002)	(0.001)
N (county-years)=	*16,310*	*2,681*	*1,505*	*532*	*2,681*	*2,681*	*2,681*	*1,554*

NOTES: Columns (1) - (6) present results from linear or fractional probit models that control for MSA population, MSA population-squared, dual eligible population characteristics (age, race, gender distribution), county characteristics (land area, population, population-squared, median income, poverty rate, 65+ poverty rate, share of population in Medicare, physicians per capita, specialists per capita, hospitals per capita, and beds per capita), state fixed effects, and year fixed effects. The model in Column (5) also includes interaction terms between the urban floor dummy and MSA population and MSA population-squared. Columns (7) and (8) present results from local polynomial regression models with same set of controls as models from Columns (1) - (4). The model in Column (8) relies on data-driven population bandwidths based on an evaluation of enrollment that excludes control variables. All models are weighted by county dual eligible population and include heteroskedastic-robust standard errors with clusters at the county level.

* p<0.10 ** p<0.05 *** p<0.01

Appendix Table 2.2. Placebo Test

	100k-400k (<$475)	100k-400k (>$475)	250k-550k (all counties)	250k-550k (<$475)
	(1)	(2)	(4)	(4)
MA enrollment rate (all)	0.088***	0.064	0.043	0.110**
	(0.024)	(0.054)	(0.044)	(0.044)
MA enrollment rate (group)	0.092***	0.056	-0.005	0.090***
	(0.025)	(0.057)	(0.042)	(0.029)
Any hospitalization	-0.021***	0.016	0.003	0.002
	(0.007)	(0.026)	(0.006)	(0.006)
Length of stay	0.304***	-0.317*	0.210**	0.422***
	(0.114)	(0.187)	(0.097)	(0.138)
Total inpatient days	-0.184*	0.004	0.091	0.146
	(0.111)	(0.312)	(0.075)	(0.105)
Potentially-prev. hosp.	-0.008***	0.006	-0.001	-0.001
	(0.003)	(0.009)	(0.002)	(0.003)
Rehospitalization	-0.013*	0.003	-0.004	-0.003
	(0.008)	(0.016)	(0.006)	(0.009)
Hospital Compare				
Mortality	0.003	0.002	0.001	0.003
	(0.003)	(0.003)	(0.002)	(0.003)
Patient experience	-0.005	0.018*	-0.004	-0.006
	(0.006)	(0.009)	(0.006)	(0.008)
Readmissions	-0.007**	-0.010**	-0.001	0.000
	(0.003)	(0.004)	(0.003)	(0.005)
One-year mortality	-0.002	-0.001	0.002	0.002
	(0.002)	(0.010)	(0.001)	(0.002)
N (county-years)=	*2,688*	*308*	*1,498*	*1,281*

NOTES: Results are from RD models that control for MSA population, MSA population-squared, dual eligible population characteristics (age, race, gender distribution), county characteristics (land area, population, population-squared, median income, poverty rate, 65+ poverty rate, share of population in Medicare, physicians per capita, specialists per capita, hospitals per capita, and beds per capita), state fixed effects, and year fixed effects. All models are weighted by county dual eligible population and include heteroskedastic-robust standard errors with clusters at the county level.

* p<0.10 ** p<0.05 *** p<0.01

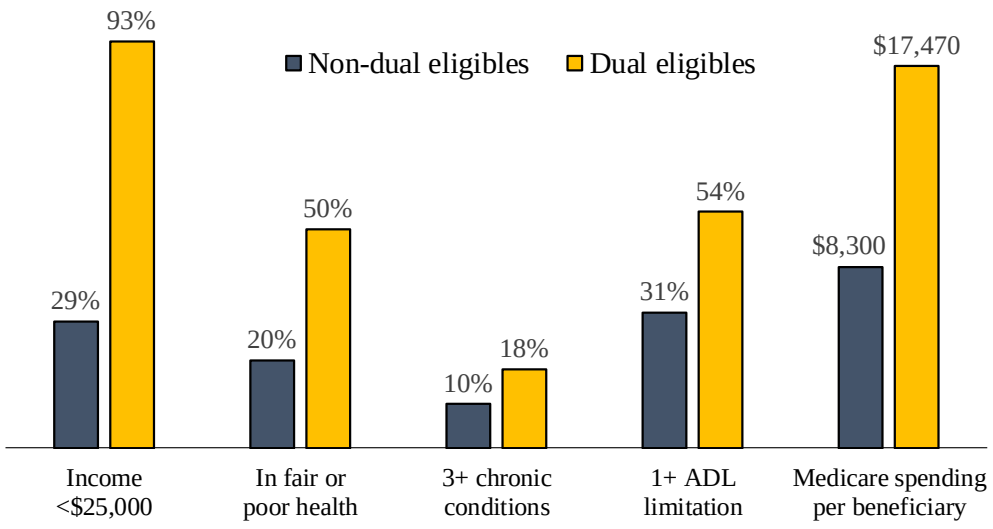
Appendix Table 2.3. Effect of Urban Floor Excluding the Top HHI Quantile

	Baseline (1)	RD est. (2)	Pct. increase over baseline (3)	County-year observations (4)
MA enrollment rate (all Medicare)				
Main	0.182	0.088***	48.5%	2,681
		(0.024)	(13.0%)	
Less competitive	0.180	0.056**	31.1%	2,227
sample		(0.024)	(13.5%)	
MA enrollment rate (group-specific)				
Main	0.150	0.092***	61.0%	2,681
		(0.025)	(16.8%)	
Less competitive	0.133	0.083***	62.4%	2,227
		(0.024)	(17.7%)	
Any hospitalization				
Main	0.198	-0.021***	-10.5%	2,681
		(0.007)	(3.7%)	
Less competitive	0.197	-0.015**	-7.8%	2,227
		(0.007)	(3.4%)	
Length of stay				
Main	5.049	0.304***	6.0%	2,675
		(0.114)	(2.3%)	
Less competitive	5.038	0.305**	6.0%	2,223
		(0.134)	(2.7%)	
Total inpatient days				
Main	1.780	-0.184*	-10.3%	2,681
		(0.111)	(6.2%)	
Less competitive	1.767	-0.116	-6.6%	2,227
		(0.106)	(6.0%)	
Potentially-prev. hosp.				
Main	0.047	-0.008***	-16.3%	2,681
		(0.003)	(5.6%)	
Less competitive	0.047	-0.007***	-15.6%	2,227
		(0.003)	(5.9%)	
Rehospitalization				
Main	0.225	-0.013*	-5.6%	2,675
		(0.008)	(3.3%)	
Less competitive	0.223	-0.010	-4.4%	2,223
		(0.008)	(3.5%)	
Hospital Compare				
Mortality				
Main	0.128	0.003	2.4%	2,674
		(0.003)	(2.1%)	
Less competitive	0.127	0.004	3.3%	2,222
		(0.003)	(2.3%)	
Patient experience				
Main	0.701	-0.005	-0.7%	2,675
		(0.006)	(0.9%)	
Less competitive	0.706	-0.012*	-1.7%	2,223
		(0.007)	(1.0%)	
Readmissions				
Main	0.203	-0.007**	-3.3%	2,674
		(0.003)	(1.5%)	
Less competitive	0.202	-0.004	-2.0%	2,222
		(0.003)	(1.4%)	
One-year mortality				
Main	0.042	-0.002	-4.5%	2,681
		(0.002)	(4.5%)	
Less competitive	0.042	-0.002	-5.7%	2,227
		(0.002)	(4.5%)	

NOTES: Results are from RD models that control for MSA population, MSA population-squared, dual eligible population characteristics (age, race, gender distribution), county characteristics (land area, population, population-squared, median income, poverty rate, 65+ poverty rate, share of population in Medicare, physicians per capita, specialists per capita, hospitals per capita, and beds per capita), state fixed effects, and year fixed effects All models are weighted by county dual eligible popualtion and include heteroskedastic-robust standard errors with clusters at the county level.

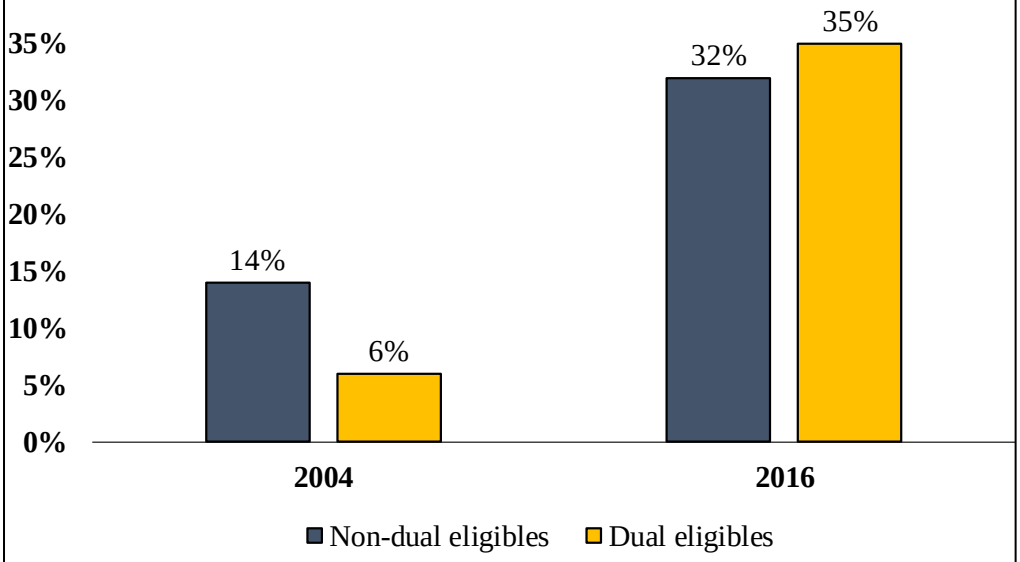
* p<0.10 ** p<0.05 *** p<0.01

Figure 2.1. Beneficiary Characteristics, by Dual Eligible Status



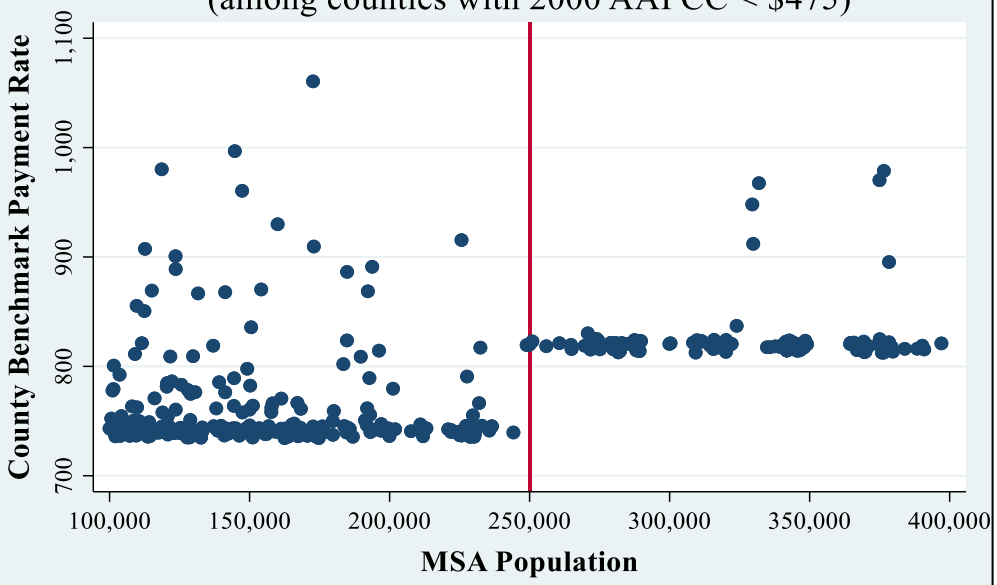
NOTES: Chronic conditions and Medicare spending figures are from CBO analysis of 2011 data. All other figures are weighted results from the 2015 MCBS PUF.
SOURCES: CBO 2013 and author's analysis of the 2015 Medicare Current Beneficiary Survey (MCBS) Public Use File (PUF)

Figure 2.2. Share of Beneficiaries in MA and Other Private Medicare Plans



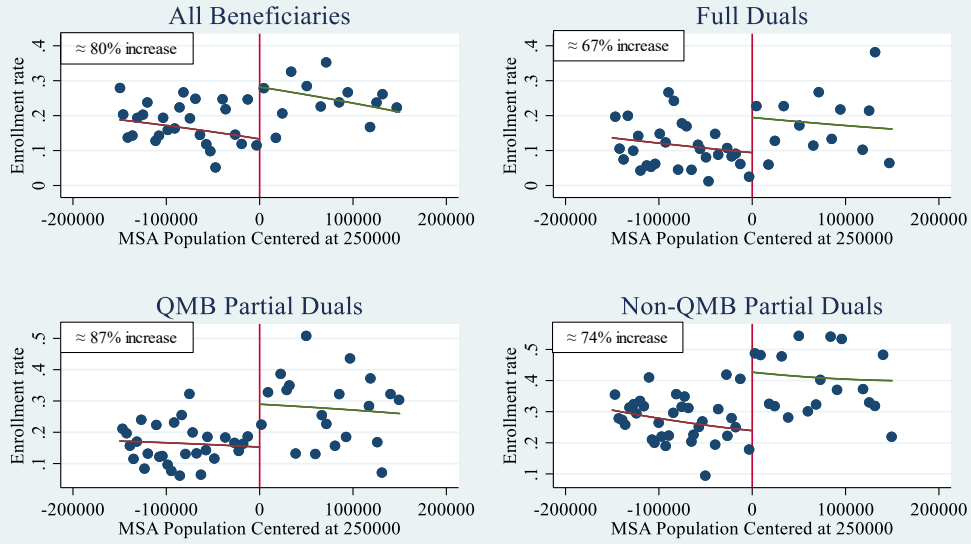
NOTE: Private Medicare includes beneficiaries in MA plans (D-SNPs and others) and other private alternatives to traditional Medicare (e.g., MMPs). D-SNP = Dual-eligible special needs plan. MA = Medicare Advantage. MMP = Medicare-Medicaid Plan.
SOURCE: MMCO 2018 and author's analysis of 2004 Medicare Denominator File.

Figure 2.3. MA Rates by MSA Pop, 2009
(among counties with 2000 AAPCC < $475)



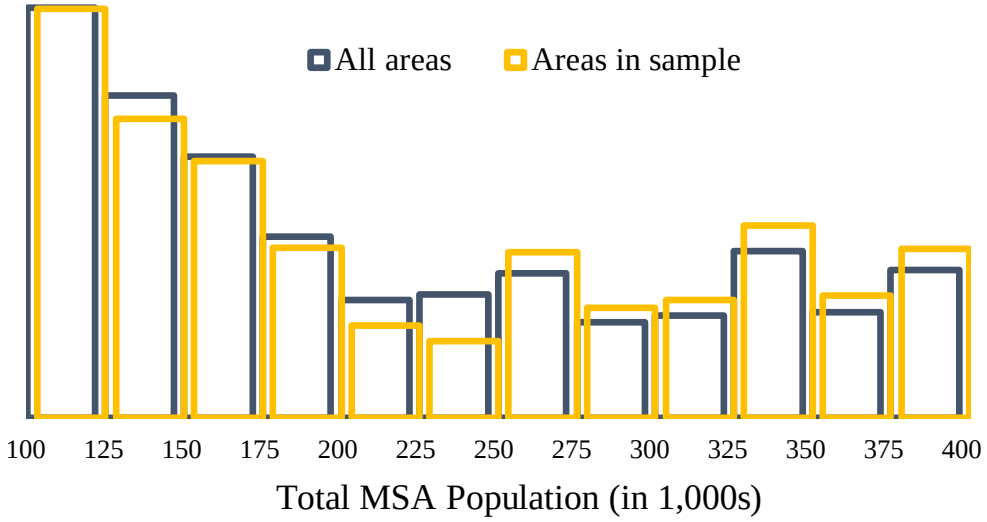
NOTES: AAPCC = adjusted average per capita costs in traditional Medicare. Slight jitter to convey mass at urban and rural floors.
SOURCE: 1999 and 2000 Census and 2009 CMS Ratebook data.

Figure 2.4. Effect of the Urban Floor on MA Enrollment, 2009-2015



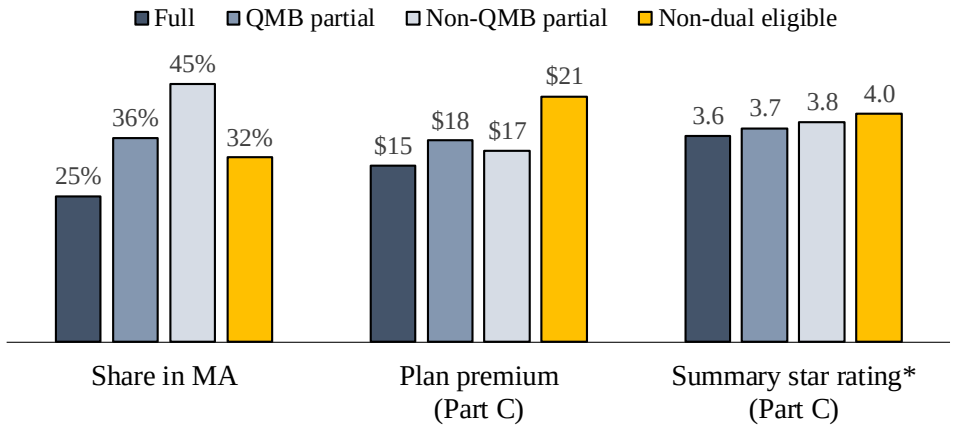
NOTES: Data represent means of county-year observations that are grouped together based on data-driven MSA population bins.
SOURCE: 1999 and 2000 Census, 2009-2015 CMS Ratebook, and 2009-2015 Medicare Beneficiary Summary File (MBSF) data.

Figure 2.5. Dual Eligible Population Density (within RD bandwidth)



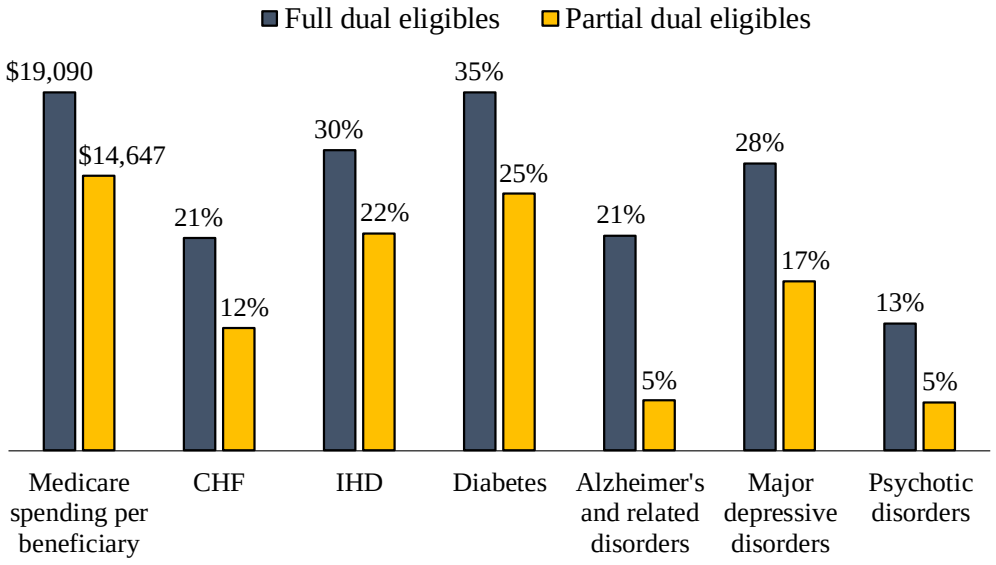
NOTES: Total MSA population is based on 2000 Census data and December 2003 MSA definition file. Analytic sample excludes (1) urban floor counties in MSAs with populations under 250,000 and (2) counties where the adjusted average per capita costs in traditional Medicare exceeded $475 in 2000.
SOURCE: 2009-2015 Medicare Beneficiary Summary File (MBSF)

Appendix Figure 2.1. MA Enrollment, Premiums, and Quality By Level of Dual Eligibility (Adjusted for County of Residence)



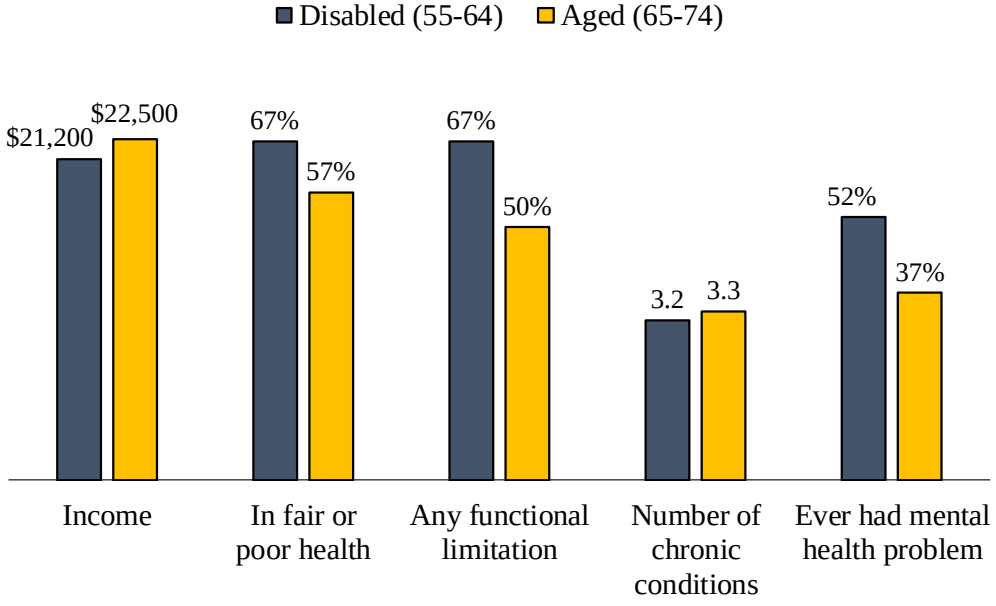
NOTE: The summary star rating represents a weighted average of several quality measures. Calculations vary slightly by contract depending on the completeness of their quality measure data and whether the contract offers special needs plans (SNPs) (as there were a small number of additional quality measures for SNPs in the sample year).
SOURCE: 2015 Medicare Beneficiary Summary File (MBSF), 2015 CMS Part C and Part D Performance Data, and 2015 Medicare Plan Finder data.

Appendix Figure 2.2. Medicare Spending and Chronic Conditions, by Level of Dual Eligibility

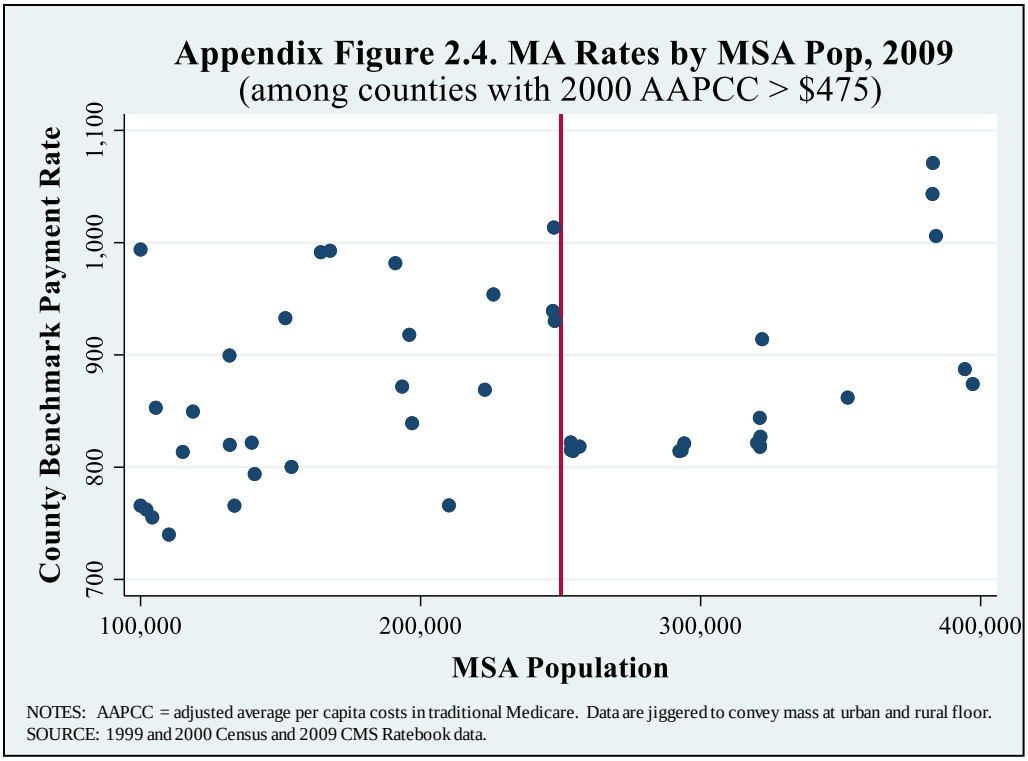


NOTES: CHF = Congestive heart failure. IHD = Ischemic heart disease. Chronic condition figures for traditional Medicare only.
SOURCE: 2012 Medicare-Medicaid Linked Enrollee Analytic Data Source (MMLEADS) Public Use File (PUF)

Appendix Figure 2.3. Beneficiary Characteristics, Among Those Ages 55-64 and 65-75



SOURCE: 2014 Health and Retirement Study



NOTES: AAPCC = adjusted average per capita costs in traditional Medicare. Data are jiggered to convey mass at urban and rural floor.
SOURCE: 1999 and 2000 Census and 2009 CMS Ratebook data.

Chapter 3.
Transforming Secondary Coverage for a Critical Population:
The effect of Medicaid managed care on hospital use among full dual eligibles

3.1. Introduction

While many states have a long history of contracting with private managed care plans to provide Medicaid coverage for adults and children, only recently has it become common to extend these initiatives to dual eligibles, i.e., Medicaid beneficiaries who also qualify for Medicare coverage. An extensive literature suggests that Medicaid managed care plans may be able to reduce the intensity of beneficiaries' care, with ambiguous implications for quality. However, because Medicare is the primary payer for most medical benefits for dual eligibles, Medicaid managed care plans may have less ability or incentive to shape their care.

This study evaluates the effect of requiring dual eligibles to enroll in Medicaid managed care on the use of inpatient and nursing home care among dual eligibles. This topic is important for several reasons. For one, dual eligibles are a uniquely vulnerable group of Medicaid beneficiaries, often having the significant health needs associated with the intersection of poverty, old age, and disability (Figure 3.1). Second, given the high needs of this population, dual eligibles are much more expensive than other beneficiaries in Medicare and Medicaid (Figure 3.1) and are therefore of interest from a fiscal perspective. Third, because Medicaid provides secondary coverage for dual eligibles, studying enrollment mandates will provide insight into the effect of a relatively constrained application of managed care techniques for this population and will create a baseline for more extensive reforms. Finally, Medicaid enrollment mandates may affect many more dual eligibles than do managed care initiatives in the Medicare program, given that enrollment in the latter is voluntary by federal law.

To explore the effect of Medicaid managed care, I evaluate the introduction of an enrollment mandate for full dual eligibles—i.e., those who qualify for the full set of Medicaid benefits—in the state of New Jersey in October 2011. As a result of New Jersey's enrollment mandate, over 100,000 full dual eligibles shifted from FFS Medicaid to one of four Medicaid managed care plans overnight. Relying on large administrative datasets, I identify the effect of this policy on inpatient and nursing home care by comparing full dual eligibles in New Jersey to full dual eligibles in the neighboring state of Pennsylvania.

This study finds that Medicaid managed care can have important effects on dual eligibles' health care use, even though these plans play a secondary role to Medicare for many services. First, the managed care enrollment mandate was associated with a decrease in the share of dual eligibles with a hospitalization as well as in the average number of hospital days. This occurred despite the fact that plans were not typically allowed to constrain use through prior authorization requirements or provider network restrictions. Second, I provide suggestive evidence that the mandate reduced the share of dual eligibles with potentially-preventable admissions—an indicator of low-quality outpatient care—and the share of those with 30-day hospital readmissions, an indicator of low-quality hospital care. Third, I find that the mandate was associated with a small reduction in the share of the population admitted to a nursing home. This may indicate that plans reduced the need for nursing home care—i.e., by slowing the decline of enrollees' functional status—given that plans did not cover current residents. Finally, despite these decreases in utilization, the mandate was not associated with a statistically significant change in total Medicaid spending. Any Medicare savings may therefore represent a net reduction in government spending.

3.2. Background and literature

3.2.1. Dual eligibles

In 2018, there were about 11 million dual eligibles, i.e., individuals who receive coverage through both the Medicare and Medicaid programs (MMCO 2019b). Medicare serves as the primary payer of medical services for this population, while Medicaid pays Medicare's premiums, covers some or all of Medicare's cost-sharing requirements, and/or provides supplemental benefits depending on beneficiaries' level of eligibility (Jacobson, Neuman, and

Damico 2012). Additionally, nearly all dual eligibles (over 99% in 2015) are enrolled in a Medicare Part D prescription drug plan and receive assistance with their plans' premiums and cost sharing through the Medicare Low Income Subsidy (LIS) program.

This study focuses on full dual eligibles, i.e., those who qualify for the complete set of benefits offered under their state's Medicaid program and who receive some level of assistance with Medicare's cost-sharing requirements and premiums (Table 3.1) (CMS 2011; Young et al. 2013). Medicaid coverage for this population includes services that are not part of Medicare's benefit package (MACPAC 2018). Indeed, the majority of Medicaid spending among the full dual eligible population is for long-term care services and supports, including care provided through institutions (such as in nursing homes) and in home- and community-based settings (such as in assisted living facilities or by home health aides or personal care assistants) (Peebles and Bohl 2013; MACPAC 2018). State Medicaid programs may also cover dental, vision, and hearing services, among other supplemental benefits (Appendix Table 3.1).

3.2.2. Medicaid managed care

States have the option of providing Medicaid coverage through direct fee-for-service (FFS) payments to providers, managed care plans, or both (MACPAC 2011; CMS 2019b). Under the most common managed care arrangement, states contract with plans to provide a comprehensive set of Medicaid-covered services (referred to hitherto as "comprehensive managed care plans") (MACPAC 2018). Many states that contract with these plans carve out coverage for certain services, such as behavioral health care and long-term care services and supports (Gifford et al. 2017; MACPAC 2018; CMS 2019b). In those cases, states cover the service on a FFS basis or by contracting with separate managed care plans (known as "limited-benefit plans"). Conversely, some states cover benefits primarily on a FFS basis while delegating any remaining services to limited-benefit plans. As of 2017, over four-fifths (82%) of Medicaid beneficiaries received coverage through some form of managed care arrangement, including over two-thirds (69%) who were enrolled in a comprehensive managed care plan (CMS 2019b).

In recent years, states have increasingly turned to managed care plans to provide coverage for dual eligibles. For one, while many states initially excluded full dual eligibles from enrollment

mandates, over one-third (18 in 2017) now require this population to enroll in comprehensive managed care plans (CBO 2018; CMS 2019b). Additionally, an increasing number of states have moved long-term care benefits from the FFS system to managed long-term services and supports (MLTSS) programs (Lewis et al. 2018). Indeed, 13 of the 18 states that required full dual eligibles to enroll in comprehensive managed care plans also mandated enrollment in an MLTSS program, typically offered through the same plan (CMS 2019b). This trend has particular relevance for full dual eligibles, who are more than twice as likely to require long-term care as other elderly and disabled Medicaid enrollees (CBO 2013).

State decisions regarding the provision of Medicaid benefits interact with the Medicare program in complex ways. Under Medicare, beneficiaries have the choice of receiving their benefits through the government-administered version of the program (known as "traditional Medicare," which is akin to FFS Medicaid) or through private plans under the Medicare Advantage (MA) program (which are akin to comprehensive Medicaid managed care plans). In other words, it is possible that dual eligibles may enroll in private plans for both their Medicare and Medicaid coverage, for one or the other, or for neither (Table 3.2). Depending on where they reside, dual eligibles may also have the choice of receiving both their Medicare and Medicaid benefits through a single, integrated managed care plan (MedPAC 2019).

3.2.3. The effect of Medicaid managed care on utilization and care quality

A major impetus behind Medicaid managed care is the belief that capitated payments and competitive pressures will force plans to deliver care more efficiently than is possible under FFS arrangements (Duggan 2004; Duggan and Hayford 2013; CBO 2018). This includes a strong incentive for plans to reduce the intensity of care. Prior studies suggest that Medicaid managed care enrollment is associated with less inpatient use (Lurie et al. 1994; Basu, Friedman, and Burstin 2004; Baker and Afendulis 2005; Herring and Adams 2011; Marton, Yelowitz, and Talbert 2014), with one exception (LoSasso and Freund 2000).

At the same time, the effect of Medicaid managed care enrollment on the quality of beneficiaries' care is theoretically ambiguous (Buchmueller, Ham, and Shore-Sheppard 2016). On the one hand, plans may seek to better manage and integrate members' care and to improve their health in an effort to prevent unnecessary utilization and attract enrollment (Duggan and

Hayford 2013). Indeed, in a 2017 survey, Medicaid managed care plans reported several initiatives to improve enrollees' well-being, such as identifying high-risk or high-need enrollees (100% of plans), implementing chronic disease or complex case management programs (100% of plans), and addressing the social determinants of health (91% of plans) (Garfield et al. 2018). On the other hand, plan initiatives to drive down costs may also lead them to overly stint on care through utilization management and other managed care restrictions (Buchmueller, Ham, and Shore-Sheppard 2016). In line with this ambiguity, researchers have generated conflicting findings when evaluating quality of care measures, such as potentially-preventable hospitalization rates (LoSasso and Freund 2000; Basu, Friedman, and Burstin 2004; Bindman et al. 2005; Hu and Mortensen 2018) and emergency room (ER) visits (Garrett, Davidoff, and Yemane 2003; Baker and Afendulis 2005; Herring and Adams 2011; Caswell and Long 2015).

3.2.4. The effect of Medicaid managed care on utilization and care quality of dual eligibles

As a secondary payer, Medicaid managed care plans may be less consequential for dual eligibles when considering the provision of Medicare-covered services, including inpatient care. For one, in many instances, the government prohibits plans from implementing key managed care restrictions—such as requirements that enrollees see providers in their plan's network or obtain prior authorization before receiving certain types of care—when covering Medicare cost sharing on behalf of full dual eligibles (CMS 2018c; Burke, 2019) . To the extent that Medicaid managed care plans are still capable of shaping beneficiaries' use of care, they may have less incentive to do so. For example, Medicare covers the lion's share of dual eligibles' hospital expenses (91% among those in both traditional Medicare and FFS Medicaid in 2013) (MACPAC 2018). Hence, plan interventions that reduce inpatient use among dual eligibles may yield substantial savings for the Medicare program while providing little or no financial benefit to plans themselves. Plans may still actively manage care for dual eligibles to the extent that: (1) managed care initiatives reduce spending for non-dual eligible enrollees, (2) plans cannot exclude dual eligibles from these initiatives, and (3) plan savings among non-dual eligibles exceed the costs of managing care for dual eligibles. This is less likely to be true in cases where dual eligibles make up a large share of a plan's enrollee population. It is also unlikely that interventions targeting the elderly, such as fall-prevention programs, will be cost-effective from the plan's perspective, as they would mostly apply to the dual eligible population.

3.2.5. Prior literature

Three sets of studies have evaluated the effect of Medicaid managed care on dual eligibles, though each considered a different context than my research. First, only one study to my knowledge has focused on the effect of mandatory enrollment on the noninstitutionalized dual eligible population. That article found that elderly Medicaid beneficiaries who were randomized into a managed care plan had less utilization and reported modest improvements in their health (Lurie et al. 1994). Nonetheless, these findings may have limited applicability to the current policy environment, given that the study was conducted twenty-five years ago and included only a subset of beneficiaries from a single county in Minnesota.

A handful of studies have evaluated the effect of enrollment in MLTSS plans—either stand-alone or comprehensive managed care plans—on outcomes among dual eligibles with long-term care needs. This research has generally found that MLTSS enrollment is associated with a shift from institutional care to home- and community-based services and a reduction in inpatient utilization (McCall and Korb 1997; APS Healthcare 2003; Libersky et al. 2018), though it was associated with an increase in hospital use and had ambiguous implications for long-term care in one state (Libersky et al. 2018). While a major impetus behind MLTSS coverage is to move long-term care away from institutional settings, my study focuses on the effects of a Medicaid managed care initiative that excluded institutional care and focused on beneficiaries who reside in the community.

Finally, another line research has assessed the effects of enrollment in integrated managed care plans that cover both Medicare and Medicaid benefits. One group of studies has evaluated a long-standing integrated plan option available under a waiver program in Minnesota (Kane and Homyak 2004). Altogether, these studies have found that plan enrollment corresponded to less inpatient care and fewer potentially-preventable hospitalizations and ER visits, but did not have a statistically significant association with mortality (Kane et al. 2004, 2005; Zhang et al. 2008; Anderson, Feng, and Long 2016). More recently, a series of government-sponsored studies have evaluated the effect of integrated, Medicare-Medicaid plans under a large demonstration program across several participating states. This research has found mixed results for both utilization and quality of care outcomes across states and population subgroups (RTI International 2018a, 2018b, 2019a, 2019b). In contrast with this work, my study focuses on a policy scenario where many dual eligibles are

enrolled in a managed care plan for their Medicaid benefits alone. This setting will continue to have relevance as long as some dual eligibles receive Medicare coverage through the traditional version of the program.

3.3. Intervention, empirical strategy, and data

3.3.1. Intervention

Since 1995, New Jersey has operated a managed care system for Medicaid beneficiaries through the NJ FamilyCare program (CMS 2014). Prior to 2011, enrollment in comprehensive managed care plans was voluntary for full dual eligibles and take-up was modest. In an effort to reduce state spending on health care, then-Governor Chris Christie proposed in February 2011 to (1) require enrollment among the dual eligible population and (2) extend plan coverage to include personal care, home health care, and adult daycare services, which had previously been provided on a FFS basis (Fletcher 2011; NJ OLS 2011; NJ OMB 2011). The state integrated the new benefits into its voluntary managed care program in July 2011, informed dual eligibles of the enrollment mandate in an August 2011 letter, and rolled out mandatory managed care in October 2011 (ANJ 2011; DMAHS 2011b). The share of full dual eligibles who received their Medicaid benefits through comprehensive managed care plans subsequently surged from 14% in September 2011 to 82% in October 2011. Nonetheless, the state continued to exclude the institutionalized long-term care population from managed care entirely (DMAHS 2013). Plans were required to disenroll any member admitted for long-term nursing home care after 30 days (DMAHS 2013). Additionally, while plans were responsible for many Medicaid benefits, New Jersey continued to provide coverage for behavioral health care and a subset of home- and community-based services on a FFS basis (DMAHS 2011a, 2011b, 2013). Finally, stand-alone NJ FamilyCare plans were not allowed to impose managed care restrictions when paying Medicare cost-sharing requirements on behalf of full dual eligibles (though plans offering integrated Medicare coverage could do so, see Section 3.4.4) (DMAHS 2011c; Wood 2019).

I focus on New Jersey—rather than other states that also introduced enrollment mandates over time—for several reasons. First, New Jersey had a comprehensive Medicaid managed care system in place for several years before mandating enrollment among full dual eligibles. As a result, it is unlikely that there would have been significant implementation challenges that could

otherwise have made it difficult to evaluate the full impact of this policy change. Second, New Jersey introduced and implemented mandatory managed care for full dual eligibles quickly. Consequently, while it appears that some beneficiaries voluntarily enrolled in managed care plans in anticipation of the mandate, this response was modest and constrained to the period just before implementation (Figure 3.2a). Third, I was able to access Medicaid and Medicare data from several months before and after this policy change.

3.3.2. Empirical strategy

The objective of this paper is identify the effect of New Jersey's enrollment mandate on health care use among full dual eligibles. To do so, I rely on a difference-in-differences (DID) approach comparing changes over time among full dual eligibles in the state of New Jersey (the treatment group) with changes over time among full dual eligibles in the neighboring state of Pennsylvania (the control group). If trends among the treatment and control groups would have been identical had the mandate not been implemented (i.e., the common trends assumption), then any differences in actual trends represent the effect of the policy change (Wing, Simon, and Bello-Gomez 2018). I use full dual eligibles from Pennsylvania as the control group to account for local trends that are common to both New Jersey and Pennsylvania, such as regional economic changes. While Delaware and New York also border New Jersey, I do not include full dual eligibles from these states as both initiated MLTSS reforms around the same time that New Jersey began to mandate Medicaid managed care enrollment (DHSS 2012; NYSDH 2012).

I implement this DID approach by estimating the model below with data from 2010-2013. Indices represent the individual (i) and time-period (t) (either a quarter or a year depending on the granularity of my data). Y_{it} represents a given inpatient or long-term care outcome, $POST_t$ is a dummy for being in the post-period (i.e., October 2011 or later), T_i is a dummy for being in the treatment group, X_{it} represents individual-level control variables, and $\delta_{c(i)}$ represents county fixed effects.

$$Y_{it} = f\left(\alpha + \gamma POST_t + \beta(POST_t \times T_i) + \rho X_{it} + \delta_{c(i)} + \varepsilon_{it}\right) \quad (1)$$

I drop observations that straddle the pre- and post-period (July 2011 through September 2011 for data at the quarterly level and 2011 for data at the annual level). For most outcomes, I estimate linear regression models, in which case f is the identity function and the DID estimator is simply β. The

one exception is that I estimate a two-part model when evaluating the effect of the mandate on overall inpatient utilization, given the large mass of beneficiaries with zero hospital days (Belotti et al. 2015; Deb and Norton 2018). In particular, I first estimate a logit model for the probability of having a hospital stay (the extensive margin) (in which case f is the logit function), then estimate a linear regression model for the number of days conditional on a stay (the intensive margin), and finally combine the results to evaluate the unconditional number of days. When estimating nonlinear models, I derive the DID estimate as the average marginal effect of the interaction term $POST_t \times T_i$ (Karaca-Mandic, Norton, and Dowd 2012; Puhani 2012; Setodji et al. 2017). Although it is also common to use two-part models to evaluate spending outcomes, I do not do so here as Medicaid payments were almost always greater than $0 and did not form a substantial mass at any other lower bound. This reflects the inclusion of limited-benefit plan premiums that varied by beneficiary. All analyses include heteroskedastic-robust standard errors clustered at the county level.

I next conduct a more detailed analysis of trends before and after treatment. The primary motivation of this approach is to explore the validity of my research design. If trends differ between the treatment and control groups in the pre-period, then one might question whether trends would have been similar in the post-period in the absence of the enrollment mandate. Another benefit of this approach is that it allows for the possibility that treatment effects may vary over time. For example, if plans encouraged greater use of preventive care, one would expect any reductions in hospitalizations to grow over time following the enrollment mandate. In the following model, $\underline{T}$ and $\overline{T}$ represent the first and last time period, the baseline is the last full period before implementation (either 2010 or the first half of 2011 depending on the unit of observation), γ_t represents time fixed effects, and the parameter β_τ represents the DID estimator at time τ relative to the baseline.

$$Y_{it} = f\left(\alpha + \sum_{\tau=\underline{T}}^{-1} \mathbf{1}(t=\tau)\beta_\tau T_i + \sum_{\tau=1}^{\overline{T}} \mathbf{1}(t=\tau)\beta_\tau T_i + \rho X_{it} + \delta_{c(i)} + \gamma_t + \varepsilon_{it}\right) \quad (2)$$

I also explore whether other policies that took effect in New Jersey around the time of the enrollment mandate may be driving my results. First, New Jersey eliminated coverage of the Part D LIS copay in July 2011 (DMAHS 2011a). Although it is difficult to disentangle this policy from the timing of the enrollment mandate, I evaluate whether the copay had an appreciable effect on prescription drug use and discuss the potential implications, if any, for the interpretation of my main results. Second,

in January 2012, New Jersey began to contract with D-SNPs to cover most Medicaid benefits in addition to Medicare benefits (DMAHS 2011c, 2012). D-SNPs are a type of MA plan that exclusively enroll dual eligibles. I discuss the scope of this change and explore whether this reform may explain some of the main results by stratifying analyses based on whether a beneficiary had ever enrolled in one of these plans.

3.3.3. Data

This study requires data on dual eligibles from New Jersey and Pennsylvania that identifies: (1) the level of their dual eligibility (full versus partial); (2) whether dual eligibles received most of their Medicaid benefits on a FFS basis or through a comprehensive Medicaid managed care plan; (3) whether they received their Medicare coverage through traditional Medicare, a D-SNP, or another MA plan; (4) if they resided in a nursing home (and were thereby excluded from the enrollment mandate); (5) their utilization outcomes; and (6) their socioeconomic characteristics (for the purpose of comparing treatment and control groups and to include as covariates). I rely on multiple datasets to obtain this information.

Enrollment

I obtain complete Medicare and Medicaid enrollment data from the 2010-2013 versions of the Medicare Beneficiary Summary File (MBSF) and the Medicaid Analytic eXtract (MAX) Personal Summary (PS) file. The MBSF is an administrative dataset that includes detailed enrollment and basic demographic information for the universe of Medicare beneficiaries, while the MAX PS file provides comparable information—as well as summary claims and payment data—for the universe of Medicaid beneficiaries (Barosso 2013; CMS 2018a). I first rely on the MBSF to identify whether an individual was a full or partial dual eligible and whether they were enrolled in traditional Medicare or MA in a given month. I distinguish between enrollment in D-SNPs and other MA plans by linking plan identifiers in the MBSF to data from the SNP Comprehensive Report, which is published monthly by the Centers for Medicare & Medicaid Services (CMS). I then merge the MBSF with the MAX PS file to determine whether a dual eligible obtained their coverage through FFS Medicaid or a comprehensive managed care plan in a given month.

Outcomes

I rely on claims data from Medicare—rather than Medicaid—to identify inpatient utilization among dual eligibles given that Medicare is the primary payer for hospital care. In particular, I use the 2009-2013 versions of the Medicare Provider and Analysis Review (MedPAR) file. MedPAR summarizes Part A claims data for every traditional Medicare hospital discharge (NCHS 2012; ResDAC 2016). Beginning in early 2008, the government required hospitals receiving disproportionate share payments or indirect or direct medical education adjustments to also report information for MA enrollees (ResDAC 2011; Huckfeldt et al. 2017). I restrict my analysis to only include this subset of hospitals (see Appendix A.1 for details). My sample includes the large majority of Medicare discharges from acute care hospitals in New Jersey and Pennsylvania (about 86% from 2009-2015 based on CMS Cost Report data). Because DSH hospitals treat a disproportionate share of low-income patients by definition, these data may be even more complete for the dual eligible population (CMS 2017). Appendix A.1 provides additional information about MedPAR data and its usefulness relative to other large datasets.

I first use MedPAR to create variables related to the intensity of inpatient utilization. My primary outcomes are whether a beneficiary was admitted to a hospital, the number of inpatient days among those with an admission (which I refer to as "length of stay"), and the number of inpatient days among all beneficiaries. To gain a more nuanced understanding of differences in inpatient use, I also evaluate the share of beneficiaries with an emergency inpatient admission and a non-emergency admission. Emergency admissions are defined as those that "require…immediate medical intervention as a result of severe, life threatening, or potentially disabling conditions" (ResDAC 2018). Medicaid managed care plans may have a smaller effect on planned, elective admissions given federal limitations on prior authorization requirements.

I next use MedPAR data to create two inpatient-based measures of care quality. I first consider whether a beneficiary had a potentially-preventable hospitalization. Potentially-preventable hospitalizations reflect admissions that could possibly have been avoided with proper primary care—such as hospitalizations for pneumonia—and are therefore viewed as an indicator of poor outpatient care quality (Gao et al. 2014; Fingar et al. 2015). I also look at 30-day readmission rates, which have become a common measure of inpatient care quality (e.g., as they may reflect

whether patients' conditions were resolved or whether they received proper discharge instructions) (Benbassat and Taragin 2000).

I next rely on the MAX PS file to identify long-term nursing home use. While the MAX PS file identifies the number of covered days in a nursing facility, it does not distinguish between post-acute and long-term care. Hence, I create a proxy for residence by focusing on beneficiaries who spent most of the year in a nursing facility. I use a threshold of 220 covered days, as it is rare for dual eligibles to have post-acute skilled nursing facility (SNF) stays this long (5% in 2013 based on MedPAR data).

Given that plans did not manage long-term nursing home care, a decrease in use could indicate that plans slowed beneficiaries' functional decline. However, an increase in use would be more difficult to interpret. Because New Jersey excluded nursing home residents from Medicaid managed care, plans may have had an incentive to nudge expensive, high-need enrollees into institutional care. Hence, observing an increase in nursing home utilization could indicate that: (1) Medicaid managed care had an adverse effect on enrollees' health and hastened their need for a nursing home level of care or (2) plans were encouraging nursing home entry.

Finally, I use the MAX PS file to evaluate total state Medicaid spending on each dual eligible. This measure includes both capitated payments to plans and the costs of services provided on a FFS basis. New Jersey set capitation rates to achieve budget savings (NJ OLS 2011; NJ OMB 2011). In other words, a finding that the mandate increased spending would suggest that the state misestimated trends in health care costs.

Controls

I obtain each of my control variables from the MBSF. These include age group (younger than 45, 45-54, 55-64, 65-74, 75-84, and 85 and older), race/ethnicity (non-Hispanic white, non-Hispanic African-American, Hispanic, and other), gender, original reason for Medicare eligibility (age versus disability or end-stage renal disease), and county. I also provide descriptive statistics among the treatment and control groups, relying on my control variables, as well as county-level characteristics from the 2010-2013 versions of Area Health Resources File

(i.e., population; the share of the population in Medicare and Medicaid; poverty rates; and physicians, specialists, hospitals, and beds per capita).

Sample restrictions

I apply a small number of sample restrictions based on data limitations. First, I drop observations in the MAX PS that could not be linked to the MBSF and vice-versa. This affects about 10% of dual eligible observations across the two files. Second, because I use Medicare hospital claims data to develop measures of inpatient use, I drop beneficiaries who were not enrolled in Medicare Part A, representing about 3% of dual eligibles in sample. Finally, for each analysis, I drop instances where treatment status was inconsistent during the relevant unit of observation (e.g., cases where a beneficiary moved from New Jersey during a given quarter).

I also narrow my sample to focus on beneficiaries who were most likely to be affected by the mandate. This includes dropping dual eligibles in either state who had voluntary enrolled in a comprehensive managed care plan at the beginning of my sample period (i.e., in January 2010). I also exclude nursing home residents from all analyses, except when considering nursing home care as an outcome. While these sample restrictions draw attention to the targeted population of dual eligibles, they may be problematic if, for example, enrollment in comprehensive managed care plans does indeed affect whether or when a beneficiary enters a nursing home. For this reason, I also conduct a robustness check without these sample restrictions.

3.4. Results

3.4.1. Descriptive statistics

Full dual eligibles in New Jersey differed from those in Pennsylvania in several key ways. First, they tended to be older and were more likely to be Hispanic than full dual eligibles in Pennsylvania. Second, they lived in counties with higher median incomes and less hospital capacity on average (Table 3.3). Third, pre-period enrollment in comprehensive managed care plans was modest among full dual eligibles in New Jersey but negligible among those in Pennsylvania (15.5% versus 1.4% of person-month observations) (Table 3.4). This reflects the fact that, while New Jersey offered full dual eligibles the option of enrolling in these plans, Pennsylvania did not (with temporary exceptions when Medicaid beneficiaries first became eligible for Medicare) (PHLP 2013). Fourth, when looking at Medicare coverage, the reverse

was true: pre-period enrollment in an MA plan was not common among full dual eligibles in New Jersey but was relatively widespread among those in Pennsylvania (5.4% versus 37.7% of person-month observations). Finally, average spending on full dual eligibles was much higher in New Jersey than in Pennsylvania ($18,604 versus $11,956 in 2010) (Table 3.4), perhaps reflecting differences in demographics and the Medicaid benefit package across the two states. These distinctions do not necessarily violate the common trends assumption, but they do highlight the importance of conducting additional analyses to explore the internal validity of this research design, as described in Section 3.3.2.

At the same time, it is reassuring that there were smaller differences in average use of inpatient care across the two groups in the pre-period. For example, while full dual eligibles in New Jersey were more likely than those in Pennsylvania to have a hospitalization in a given quarter (9.0% versus 8.6%) and tended to have more hospital days conditional on a stay (9.0 versus 8.2), these differences were modest and only the latter was statistically significant (Table 3.4). Full dual eligibles in New Jersey were also more likely to have resided in a nursing home (15.8% versus 14.3%), a difference that was small in magnitude and not statistically significant. Finally, the two populations likely came from a similar economic stratum given that New Jersey and Pennsylvania rely on similar income requirements (albeit different asset limits) under the standard eligibility pathways for full dual eligibles (see Appendix Table 3.2).

3.4.2. Main findings

Simple line graphs are useful for conveying the design of this study and previewing its key results. As anticipated, after excluding those who had voluntarily joined comprehensive managed care plans at the beginning of the sample period, enrollment among full dual eligibles was similar across states in the pre-period, but diverged dramatically once New Jersey's enrollment mandate took effect (Figure 3.2a). Enrollment in MA plans also increased among full dual eligibles in New Jersey relative to those in Pennsylvania, though take-up was gradual and much smaller in magnitude (Figure 3.2b). In addition, while a slightly larger share of full dual eligibles had a hospitalization in the pre-period in New Jersey relative to Pennsylvania, the rates quickly converged in the post-period (Figure 3.2c).

A formal DID analysis confirms these results and yields others that are not as immediately transparent. With regards to enrollment, the mandate was associated with an 87.0 percentage point increase in the share of full dual eligibles who received Medicaid benefits through a comprehensive managed care plan (Table 3.5, Top Panel, Column 1). The timing of the enrollment mandate also coincided with a 10.8 percentage point increase in MA enrollment rates (Table 3.5, Column 2). This increase largely reflects increases in D-SNP enrollment, as the point estimate for enrollment in other MA plans was small and not statistically significant (result not shown).

The enrollment mandate was also associated with a modest decrease in overall inpatient utilization and long-term nursing home use among full dual eligibles. In particular, it corresponded to a 0.3 percentage point reduction in the share who were hospitalized in a given quarter, which represents a 3.6% decrease relative to baseline hospitalization rates (Table 3.5, Column 3). While results for length of stay were not statistically significant, the mandate was associated with a reduction in the total number of hospital days per quarter of 0.03 days, which represents a 4.9% decrease relative to the baseline (Table 3.5, Columns 4 and 5). When evaluating the effect of the mandate by the urgency of hospitalizations, I found a statistically significant decrease in emergency admissions alone (of 0.4 percentage points or 7.0% relative to baseline) (Table 3.5, Columns 6 and 7). Decreases in inpatient care also included statistically significant reductions in the share of dual eligibles with potentially-preventable admissions (of 0.1 percentage points or 5.5% relative to baseline) and in hospital readmission rates (of 0.8 percentage points or 3.1% relative to baseline) (Table 3.5, Columns 8 and 9). Further, the enrollment mandate was associated with a modest reduction in the share of full dual eligibles who were residing in a nursing home (of 0.3 percentage points or 2.4% relative to baseline) (Table 3.6, Bottom Panel, Column 1). Finally, the point estimate for total Medicaid spending was negative, but not statistically significant (Table 3.6, Column 2).

Changes in outcomes were generally well-aligned with the timing of the enrollment mandate. For instance, although DID results in the pre-period suggest that enrollment in comprehensive Medicaid managed care and MA plans was increasing slightly in New Jersey relative to Pennsylvania before the mandate took effect, these point estimates are small and dwarfed by the

differential change in enrollment following the implementation of the mandate (Table 3.5, Bottom Panel and Figures 3.3a and 3.3b). Additionally, while my analyses do not provide evidence of differential pre-period trends in the share of beneficiaries with a hospital stay, they do indicate that there was a decrease in this outcome in New Jersey relative to Pennsylvania following the enrollment mandate (Table 3.5 and Figure 3.3c). Estimated treatment effects were generally larger following the first post-period (which straddled the mandate period), but this difference was not statistically significant ($p=0.44$ when comparing the first and last post-periods, result not shown). Changes in the total number of hospital days and the share of beneficiaries with an emergency admission were also consistent with the timing of the mandate (Table 3.5 and Figures 3.3e and 3.3f).

Despite these relatively straightforward outcomes, other results are more difficult to interpret. For one, pre-period DID estimates suggest that there was a relative decrease in New Jersey in potentially-preventable hospitalizations and in readmission rates in the period just prior to the enrollment mandate (Table 3.5 and Figures 3.3h and 3.3i). This result hints at the possibility that the common trends assumption— i.e., that changes in outcomes from the pre-period to the post-period among treatment and control groups would have been identical in the absence of the mandate—may fail for these measures. Because I only have access to annual data for nursing home use and Medicaid spending, I was unable to generate pre-period DID estimates for these outcomes. Nonetheless, more detailed trend analyses did yield the surprising finding that the mandate was associated with a spike in Medicaid spending in 2011—a year that straddled the pre- and post-periods—before declining back towards earlier differences in spending between the states in 2012 and 2013 (Table 3.6 and Figure 3.3k). This temporary increase in spending does not seem to be grounded in any obvious policy change. For example, because New Jersey paid plans actuarially-sound capitation rates, it is unlikely that this was a direct result of the state's movement towards managed care. One possibility is that it reflects a temporary accounting or administrative change during the policy transition.

3.4.3. Alternative explanation: Drug copays

It is conceivable that changes in prescription drug copays in New Jersey may have affected my DID estimates. In July 2011, three months prior to the enrollment mandate, New Jersey

eliminated a state program that had previously paid Part D LIS copays on behalf of full dual eligibles (DMAHS 2011a). Both theory and several empirical studies imply that dual eligibles would have used fewer prescription drugs once required to cover the copay on their own (Goldman, Joyce, and Zheng 2007; Swartz 2010; Artiga, Ubri, and Zur 2017; Einav, Finkelstein, and Polyakova 2018). It is unclear how large this effect would have been. On the one hand, the Part D LIS copay is relatively modest for the large majority of full dual eligibles. Most full dual eligibles (90% in 2011) would have faced a $1.10 copay for generics and a $3.30 copay for brand-name drugs (CMS 2010). On the other hand, even modest copays may have been onerous for this low-income population.

Although it is difficult to disentangle the change in copay from the timing of the enrollment mandate, it is worth noting that there did not seem to be a large effect on aggregate Part D program expenditures. Spending on full dual eligibles in New Jersey grew in tandem with spending in Pennsylvania from 2010 to 2011, before decreasing only slightly relative to that state from 2011 to 2012 (Figure 3.4). Nonetheless, it is possible that the enrollment mandate may have increased prescription drug use— e.g., if disease management programs helped improve medication adherence—which could mask any negative effects of the prescription drug copay.

Despite this caveat, to the extent that the new copay reduced prescription drug use, my DID estimates would *understate* the extent to which the enrollment mandate reduced inpatient utilization. Indeed, prior research has found that increases in cost sharing for prescription drugs lead to more hospitalizations (Goldman, Joyce, and Zheng 2007; Chandra, Gruber, and McKnight 2010).

3.4.4. Alternative explanation: D-SNP reforms

Another possibility is that my DID estimates may, in part, reflect the effect of state MA reforms that were implemented around the same time as the enrollment mandate. In January 2012, New Jersey began to contract with D-SNPs to cover most Medicaid benefits in addition to Medicare benefits (DMAHS 2011c, 2012). While this was an important policy development in itself, D-SNP enrollment was voluntary, meaning that the change affected fewer beneficiaries than did the Medicaid managed care enrollment mandate (Figure 3.2a and 3.2b).

To evaluate whether these reforms are driving my results, I conducted stratified DID analyses based on whether full dual eligibles in New Jersey had ever enrolled in a D-SNP during the sample period.

My main findings relating to inpatient care persisted and point estimates increased slightly when excluding beneficiaries from New Jersey who had ever enrolled in one of these plans (Table 3.7, Columns 1-4). Conversely, when focusing instead on D-SNP enrollees from New Jersey, point estimates for inpatient care were positive and in most instances statistically significant (Table 3.7, Columns 5-8). This is consistent with the possibility that there may have been short-term implementation challenges when rolling out an innovative, integrated coverage option (Gutman 2015). Point estimates for nursing home care were small and not statistically significant across both populations.

These results suggest that, if anything, my DID estimates may understate the extent to which the enrollment mandate reduced inpatient care. This analysis could be biased to the extent that health trends among beneficiaries who chose to enroll in a D-SNPs were different from those who did not. However, prior research suggests that healthier beneficiaries tend to select into MA plans (perhaps because these beneficiaries are less averse to provider network restrictions and other managed care barriers) (Hellinger and Wong 2000; Mello et al. 2003; Newhouse and McGuire 2014). Indeed full dual eligibles in New Jersey who switched into D-SNPs in 2012 were much less likely to have had a hospitalization in a given quarter of the pre-period than beneficiaries who were always in traditional Medicare (6.3% versus 9.1%). One would similarly expect that beneficiaries with an increasing need for inpatient care would have been more likely to enter D-SNPs over time. In other words, the potential bias of this analysis is in the opposite direction of my results.

3.4.5. Robustness check: Sample restrictions

My analysis excludes beneficiaries who had voluntarily enrolled in managed care at the beginning of the sample period, as well as beneficiaries who were residing in nursing homes. A potential issue with the first sample restriction is that it almost exclusively affects full dual eligibles from New Jersey. This could make the two comparison groups less comparable to each other at baseline. A potential concern with the second sample restriction is that I found that the enrollment mandate affected whether beneficiaries entered a nursing home, which could lead to sample bias. Removing these sample restrictions does not generally alter my primary findings (Table 3.8). As expected, reincorporating populations who were largely unaffected by the mandate leads to smaller point estimates when evaluating the effect of the policy on comprehensive managed care plan enrollment rates. Nonetheless, I find statistically significant

decreases among the same set of inpatient care outcomes. At the same time, reductions in nursing home residence were no longer statistically significant.

3.4.6. Robustness check: Data completeness

This study includes acute care hospitals that account for most, but not all, Medicare discharges in New Jersey and Pennsylvania. Hence, my results would be biased if the enrollment mandate affected the likelihood of beneficiaries receiving care at unobserved hospitals. To explore this possibility, I consider whether my results persist in a subset of counties where the data appear to the most complete. In particular, I drop the bottom quartile of my sample based on the share of traditional Medicare discharges that appear in the data for a given county (the completeness of MA data could not be determined). My sample accounts for 97% of all traditional Medicare discharges in the remaining counties of each state. The primary findings of my study are robust to this change (Table 3.9). Aside from this analysis, it is also unlikely that Medicaid managed care itself had a large effect on where beneficiaries received their hospital care, given that plans were not allowed to restrict dual eligibles' choice of provider.

3.4.7. Limitations

Because of data limitations, this study was unable to evaluate some potentially important outcomes of New Jersey's managed care mandate. For one, it did not directly consider the effect of the mandate on outpatient services. Hence, while I found a reduction in hospitalizations for medical emergencies, it is unclear whether plans prevented these emergencies altogether or simply reduced the number of inpatient admissions among enrollees with emergency department visits. Additionally, this study was unable to directly evaluate the intensity and quality of Medicaid-only services that were carved-into managed care, such as personal care, long-term home health care, and adult day care services. Comprehensive managed care plans had greater latitude to shape the use of this care—such as through provider network restrictions—relative to services that are also Medicare benefits. Hence, it will be important for future research to evaluate the effect of enrollment mandates on the quality of and access to these services.

Given that the structure of the Medicaid program varies by state, the results of this study may not carry over to other contexts. For one, the effect of managed care mandates on dual eligibles may

be larger when plans provide a more complete set of Medicaid benefits, including behavioral health services, long-term institutional care, and all types of home- and community-based care. While it is not uncommon for states to cover some or all of these services separately on a FFS basis—as New Jersey did during my sample period—or through limited-benefit plans, several states require comprehensive managed care plans to include them in their benefit package (Gifford et al. 2017; CMS 2019b). Indeed, New Jersey began to add these benefits to the FamilyCare program after the end of my sample period (DMAHS 2015). Plans that cover these services have a greater incentive to manage utilization among enrollees with mental illness, such as by investing in behavioral health case management programs. They also stand to gain more from helping enrollees maintain their functional status, such as by creating targeted interventions for those at high risk of having a fall. As a result, mandates in such situations could lead to larger reductions in inpatient and long-term care than observed in this study.

A related limitation of this study is that the New Jersey mandate excluded beneficiaries receiving long-term institutional care, a population with high needs that could very well have a much different experience in managed care from other beneficiaries. On the one hand, plans may have more opportunities to reduce inpatient utilization among nursing home residents and other beneficiaries living in long-term care facilities. For instance, nursing home residents have high hospitalization rates, and prior research suggests that many of their admissions may be avoidable (Walsh and Wiener 2011). Plans also have additional tools for reducing inpatient care among this population, such as by employing nurse practitioners to provide care on-site (Konetzka, Spector, and Limcangco 2008; Ouslander and Berenson 2011; Goldfeld et al. 2013). On the other hand, plans may also have less incentive to do so (Grabowski 2007). In fact, it is conceivable that plans could spend *less* on nursing home residents while they are in the hospital, given that Medicare is the primary payer for this care and that plans may be allowed to reduce or eliminate payments to nursing facilities during an inpatient stay (Grabowski et al. 2010).

Finally, this study relies on MedPAR data for information on hospital care, which may raise concerns about missing data. For example, if inpatient data were more likely to be missing for MA than traditional Medicare patients, then estimates relating MA enrollment and total hospital use would be biased downwards. This could be the case if MA enrollment increased the

likelihood of receiving care at hospitals that were out-of-sample or if hospitals in sample did not submit claims for all MA patients to the government (e.g., given that MA plans typically reimburse hospitals through a separate process) (ResDAC 2011; Afendulis, Chernew, and Kessler 2017). Nonetheless, Section 3.4.6 suggests that the former issue does not significantly affect my results. Further, hospitals in my sample were required to submit claims for all MA enrollees (ResDAC 2011; Afendulis, Chernew, and Kessler 2017; CMS 2019b). Appendix A.1 describes the usefulness of MedPAR data relative to other large datasets.

3.5. Conclusion

This study indicates that Medicaid managed care can shape dual eligibles' use of care in meaningful ways, despite the fact that these plans play a secondary role to Medicare for many services. In particular, I found that the introduction of mandatory managed care in the state of New Jersey led to lower inpatient utilization among full dual eligibles, including reductions in the share with a hospitalization and in total inpatient days. It is unlikely that these changes represent barriers to care, given that dual eligibles were exempt from prior authorization and provider network restrictions in Medicaid managed care plans. I also found suggestive evidence that changes in inpatient care included reductions in potentially-preventable hospitalizations and in 30-day readmission rates, both indicators of unnecessary care. Further, the mandate was associated with a decrease in the share of full dual eligibles residing in nursing homes, even though this benefit was not the financial responsibility of managed care plans. Finally, total Medicaid spending results were not statistically significant when comparing pre- and post-periods, though there was an unexplained jump in spending during the transition year.

Although these results are promising, additional policy changes could lead to greater efficiency gains from Medicaid managed care. Many of the potential savings from Medicaid managed care enrollment are realized by the Medicare program, rather than by states or plans. For example, back-of-the-envelope calculations suggest that the enrollment mandate reduced Medicare spending on inpatient care by about $139 million, while only lowering total Medicaid spending on these services by about $14 million (see Appendix A.2). This arrangement mutes the incentive of states to implement managed care initiatives and of plans to invest in the care of their dual eligible members (Grabowski 2007). One solution to this problem would be to share

savings across the Medicare and Medicaid programs, conditional on meeting care quality standards. The federal government has been testing a similar approach in the context of integrated Medicare-Medicaid plans and coordinated care initiatives in FFS Medicaid (MedPAC 2018). This study suggests that extending such a program to cover Medicaid managed care arrangements more generally could yield meaningful reductions in government spending.

3.6. Appendix

A.1. MedPAR data

This study relies on MedPAR claims data for information about inpatient utilization among traditional Medicare and MA beneficiaries. Hospitals receiving disproportionate share (DSH), indirect medical education (IME), or direct graduate medical education (GME) payments were required to submit information-only claims for MA enrollees during my sample period, in addition to submitting claims for traditional Medicare beneficiaries (ResDAC 2011; Huckfeldt et al. 2017). I restrict my analysis to this subset of hospitals. To do so, I rely on MedPAR data to identify hospitals with DSH or IME payments in a given calendar year. I am unable to isolate hospitals receiving GME payments based on MedPAR data alone. However, the vast majority of hospitals receiving GME payments also received IME or DSH payments during my sample period (about 99% based on Cost Report data). I also evaluated an alternative approach where I used Cost Report data to identify hospitals receiving DSH, IME, or GME payments during a given year. This method captured a very similar set of hospitals and yielded comparable results when rerunning my primary analyses.

There are at least two other potentially-relevant data resources, though each comes with important limitations. One alternative is the Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID), which include the universe of hospital discharges for the majority of states. However, only a subset of these states (36 in 2011) identify dual eligibles and even fewer (18 in 2011) also distinguish between traditional Medicare and MA (Barrett and Jiang 2014). Further, dual eligibles are identified in the HCUP SID based on whether the expected payer for a hospitalization was both Medicare and Medicaid (Barrett and Jiang 2014). This presumably does not include non-QMB partial dual eligibles and it does not distinguish between full and QMB partial dual eligibles. Prior research has also found large error rates when evaluating the accuracy of the expected payer field (Buchmueller, Allen, and Wright 2003; Chattopadhyay and Bindman 2005; Afendulis, Chernew, and Kessler 2017). Another alternative would be to combine traditional Medicare claims data with MA encounter data, which have only recently become available to researchers (CMS 2018b). However, preliminary work suggests

that there are significant gaps in the encounter data (e.g., as it captured only 78% of MedPAR admissions in 2015) (Johnson and Podulka 2018).

A.2. Back-of-the-envelope calculations

I estimate changes in total Medicare and Medicaid spending by multiplying the following:

- The total number of full dual eligibles in New Jersey in 2012. 193,345, based on the public use version of the Medicare-Medicaid Linked Enrollee Analytic Data Source (MMCO 2019a).

- The estimated share of full dual eligibles who switched from FFS Medicaid to Medicaid managed care as a result of the mandate. 65.4%, based on my DID estimates for the complete sample of full dual eligibles (Table 3.8).

- Average Medicare and Medicaid spending on inpatient care for full dual eligibles in 2012. $21,613, based on a government report that evaluated data among full dual eligibles in traditional Medicare and FFS Medicaid (MACPAC 2018). The report provides average spending separately for Medicare ($19,580) and Medicaid ($2,033), which I use to estimate aggregate spending effects for each.

- The estimated percent reduction in inpatient costs as a result of the mandate among full dual eligibles who switched from FFS Medicaid to Medicaid managed care. 5.6%, based on my primary DID estimates for percent change in total hospital days, which I use as a proxy for percent change in costs. Because I conduct intent-to-treat analyses, I scale my estimate for the percent change in total hospital days by the percentage point change in the share in Medicaid managed care: 5.6% = 4.9% / 0.87 (Table 3.5). The latter figure differs from the second bullet because my primary analyses exclude beneficiaries who were already enrolled in Medicaid managed care prior to the mandate as well as nursing home residents.

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3.8. Figures and tables

Table 3.1. Dual Eligible Groups

Dual eligible group	Enrollees (millions)*	Typical** income limit	Typical** individual asset limit	Typical** benefits
Full dual eligibles	7.3	≤75% FPL or ≤100% FPL	$2,000	Medicaid benefits Medicare cost sharing Part A premium Part B premium
QMB partial dual eligibles	1.4	≤100% FPL	$7,390	Medicare cost sharing Part A premium Part B premium
Non-QMB partial dual eligibles	1.5	101%-120% FPL	$7,390	Part B premium

SOURCES: MACPAC 2018 and 2015 Medicare Beneficairy Summary File (MBSF).
NOTES: *Enrollment estimates from January 2015. **Eligibility requirements and benefit levels applicable to the majority of beneficiaries in each dual eligible group. Other members of each group qualify through different eligibility pathways or based on different asset and income limits in particular states. Other full dual eligibles may receive less comprehensive coverage of cost sharing and premiums based on their eligibility pathway and state of residence. A very small number of dual eligibles (<50) receive Part A premium coverage alone.

Table 3.2. Share of Full Dual Eligibles Enrolled in Medicare and/or Medicaid Managed Care in 2012

	Medicare coverage		
Medicaid coverage	Traditional Medicare	Managed care plan*	Total
FFS Medicaid	72%	13%	85%
Comprehensive managed care plan	10%	5%**	15%
Total	83%	17%	100%

SOURCE: 2012 Medicare Beneficiary Summary File (MBSF) and Medicaid Analytic eXtract (MAX) Personal Summary (PS) file.
NOTES: N = 5,720,068. Includes beneficiaries who could be matched between files. Data were unavailable for beneficiaries from Colorado, Idaho, Kansas, and Rhode Island. *Mostly Medicare Advantage enrollees. **Some dual eligibles in this category are enrolled in integrated Medicare-Medicaid plans.

Table 3.3. Summary Statistics, by State

	Pennsylvania (1)	New Jersey (2)	Difference (3)
Age group			
<45	0.222	0.137	-0.084***
45-54	0.190	0.147	-0.043***
55-64	0.161	0.138	-0.023***
65-74	0.235	0.272	0.038
75-84	0.139	0.212	0.074***
≥85	0.054	0.093	0.038***
Eligible for Medicare based on age	0.337	0.468	0.131***
Race/ethnicity			
NH White	0.671	0.424	-0.247**
NH African-American	0.203	0.215	0.012
Hispanic	0.083	0.262	0.179***
Other	0.043	0.099	0.056**
Female	0.608	0.622	0.015**
County characteristics			
Population (1,000s)	646.9	574.9	-72.0
% in Medicare	0.191	0.156	-0.035***
% in Medicaid	0.229	0.177	-0.052
Median income	$47,261	$65,516	$18,255***
% in poverty	0.158	0.120	-0.038
% of 65+ in poverty	0.097	0.093	-0.004
Physicians/1,000	3.234	3.047	-0.186
Specialists/1,000	1.137	1.298	0.160
Hospitals/100,000	1.368	0.749	-0.619***
Beds/1,000	3.163	2.309	-0.854***
N (person-years) =	892,206	387,426	

NOTES: Excludes beneficiaries who were enrolled in a comprehensive Medicaid managed care plan in January 2010 and nursing home residents (except when looking at residence as an outcome) Statistical significance of state differences evaluated by estimating a linear regression model of outcomes against a dummy variable for state with heteroskedastic-robust standard errors clustered at the county level. *p<0.10 **p<0.05 ***p<0.01

Table 3.4. Summary Statistics of Outcomes in Pre-Period,[a] by State

	Pennsylvania (1)	New Jersey (2)	Difference (3)
Enrollment			
Medicaid managed care	0.014	0.155	0.141***
Medicare Advantage	0.377	0.054	-0.323***
D-SNP			
Inpatient utilization			
Any hospitalization	0.086	0.090	0.004
Length of stay	8.244	9.031	0.787***
Total inpatient days	0.709	0.813	0.104*
Emergency	0.063	0.073	0.010
Non-emergency	0.030	0.023	-0.007
Potentially-prevantable	0.020	0.021	0.002
Rehospitalization rate	0.155	0.169	0.014
N (person-quarters) =	1,462,309	616,736	2,079,045
Share in nursing home	0.143	0.158	0.014
Total Medicaid payments	$11,956	$18,604	$6,648
N (person-years) =	253,988	111,363	365,351

NOTES: Excludes beneficiaries who were enrolled in a comprehensive managed care plan in January 2010 and nursing home residents. Statistical significance of state differences evaluated by estimating a linear regression model of outcomes against a dummy variable for state with heteroskedastic-robust standard errors clustered at the county level. a. Pre-period defined as January 2010-September 2011 for outcomes observed at the person-quarter level and as 2010 for outcomes observed at the annual level.
*p<0.10 **p<0.05 ***p<0.01

Table 3.5. DID Estimates:
Full Dual Eligibles in New Jersey Versus Pennsylvania

	Enrollment		Inpatient utilization						
	Medicaid managed care (1)	Medicare Advantage (2)	Any hospitalization (3)	Length of stay (4)	Total inpatient days (5)	Any emerg. Hosp. (6)	Any non-emerg. hosp. (7)	Potentially-prev. hosp. (8)	Rehosp. rate (9)
				Pre-post DID model					
Baseline[a]	0.013	0.287	0.080	8.183	0.655	0.062	0.024	0.018	0.249
DID estimate	0.870***	0.108***	-0.003**	-0.110	-0.032**	-0.004**	0.001	-0.001*	-0.008*
	(0.009)	(0.013)	(0.001)	(0.124)	(0.015)	(0.002)	(0.001)	(0.001)	(0.004)
Pct. increase over baseline[c]	6843.1%	37.5%	-3.6%	-1.3%	-4.9%	-7.0%	4.7%	-5.5%	-3.1%
	(73.2%)	(4.4%)	(1.7%)	(1.5%)	(2.2%)	(3.4%)	(5.2%)	(3.3%)	(1.8%)
N=	2,425,618	2,425,618	2,425,616	316,128	2,425,616	2,423,983	2,423,594	2,425,570	310,422
				Multi-period DID model					
2010, Jan-June	-0.010***	-0.002	-0.001	0.198	0.014	-0.003	0.002	0.003**	0.013*
	(0.002)	(0.003)	(0.003)	(0.175)	(0.033)	(0.003)	(0.002)	(0.001)	(0.007)
2010, July-Dec	-0.006***	-0.006***	-0.001	-0.047	-0.014	-0.001	0.001	0.002***	0.009
	(0.002)	(0.002)	(0.002)	(0.138)	(0.027)	(0.002)	(0.001)	(0.001)	(0.006)
2011, Jan-June *(reference)*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2011, July-Dec	0.456***	0.015***	-0.004**	-0.233	-0.066**	-0.005**	0.003	0.000	-0.004
	(0.004)	(0.004)	(0.002)	(0.172)	(0.026)	(0.002)	(0.002)	(0.001)	(0.005)
2012, Jan-June	0.878***	0.068***	-0.005**	0.169	-0.023	-0.007**	0.003	0.000	-0.001
	(0.010)	(0.009)	(0.002)	(0.240)	(0.037)	(0.003)	(0.003)	(0.001)	(0.006)
2012, July-Dec	0.887***	0.108***	-0.008***	-0.126	-0.090***	-0.011***	0.002	0.000	0.002
	(0.009)	(0.013)	(0.002)	(0.176)	(0.031)	(0.003)	(0.003)	(0.001)	(0.006)
2013, Jan-June	0.881***	0.139***	-0.004*	0.245	-0.010	-0.007**	0.003*	0.001	0.006
	(0.010)	(0.015)	(0.003)	(0.195)	(0.035)	(0.003)	(0.002)	(0.001)	(0.006)
2013, July-Dec	0.894***	0.151***	-0.006**	-0.460**	-0.113***	-0.009***	0.003	0.000	-0.008
	(0.009)	(0.017)	(0.003)	(0.182)	(0.034)	(0.003)	(0.002)	(0.001)	(0.006)
N=	2,768,114	2,768,114	2,768,112	359,670	2,768,112	2,766,056	2,765,548	2,768,060	353,255

NOTES: Estimates come from linear, logit, and two-part difference-in-differences models that control for age, race, sex, initial reason for Medicare eligibility, and county fixed effects and include heteroskedastic-robust standard errors clustered at the county level. All analyses exclude beneficiaries who were enrolled in a comprehensive managed care plan in January 2010 and nursing home residents (except when looking at residence as an outcome) Estimates for shares represent percentage point changes. Pre-post DID analyses are at the person-quarter year level and exclude data from July through September 2011. Multi-period DID analyses are at the person-half-year level. a. The baseline represents predicted values among the entire sample after setting the DID interaction term to 0. b. Estimates for shares represent percentage point changes. *p<0.10 **p<0.05 ***p<0.01

Table 3.6. DID Estimates:
Full Dual Eligibles in New Jersey Versus Pennsylvania (cont'd)

	Nursing home residence (2)	Total Medicaid payments (3)
	Pre-post DID model	
Baseline[a]	0.144	13864.876
DID estimate	-0.003*	-330.323
	(0.002)	(535.768)
Pct. increase	-2.4%	-2.4%
over baseline[c]	(1.2%)	(3.9%)
N	1,125,670	964,638
	Multi-period DID model	
Baseline	0.145	$13,783
2010 (*reference*)	0.000	$0
2011	-0.002*	$1,487*
	(0.001)	($883)
2012	-0.003*	-$294
	(0.002)	($502)
2013	-0.004*	-$399
	(0.002)	($580)
N=	1,490,097	1,275,236

NOTES: Estimates come from linear difference-in-differences models that control for age, race, sex, initial reason for Medicare eligibility, and county fixed effects and include heteroskedastic-robust standard errors clustered at the county level. All analyses exclude beneficiaries who were enrolled in a comprehensive managed care plan in January 2010 and nursing home residents (except when looking at residence as an outcome) Estimates for shares represent percentage point changes. Pre-post DID analyses exclude data from 2011. All analyses are at the person-year level. a. The baseline represents predicted values among the entire sample after setting the DID interaction term to 0. b. Estimates for shares represent percentage point changes. *p<0.10 **p<0.05 ***p<0.01

Table 3.7. Main DID Estimates by D-SNP Enrollment

	Never enrolled in D-SNP				Ever enrolled in D-SNP			
	Baseline[a]	DID est.[b]	Pct. increase over baseline	Observations[c]	Baseline[a]	DID est.[b]	Pct. increase over baseline	Observations[c]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Enrollment								
Medicaid managed care	0.012	0.839***	7053.6%	5,224,447	0.012	0.906***	7858.6%	4,292,755
		(0.011)	(90.2%)			(0.002)	(19.2%)	
Medicare Advantage	0.293	0.005	1.7%	5,224,447	0.361	0.420***	116.1%	4,292,755
		(0.004)	(1.2%)			(0.007)	(1.9%)	
Inpatient utilization								
Any hospitalization	0.084	-0.003**	-3.9%	5,224,443	0.080	0.004**	5.1%	4,292,751
		(0.001)	(1.7%)			(0.002)	(2.2%)	
Length of stay	8.256	-0.176	-2.1%	438,111	7.823	0.863***	11.0%	345,704
		(0.134)	(1.6%)			(0.152)	(1.9%)	
Total inpatient days	0.697	-0.041***	-5.9%	5,224,443	0.629	0.105***	16.6%	4,292,751
		(0.016)	(2.3%)			(0.020)	(3.2%)	
Emergency	0.066	-0.006**	-9.2%	5,222,047	0.061	0.005**	7.5%	4,290,828
		(0.002)	(3.7%)			(0.002)	(3.0%)	
Non-emergency	0.025	0.001	5.8%	5,221,662	0.025	0.002	6.1%	4,290,534
		(0.001)	(5.7%)			(0.001)	(3.9%)	
Potentially-prev. hosp.	0.019	-0.002**	-8.7%	5,224,379	0.018	0.002***	11.3%	4,292,697
		(0.001)	(3.9%)			(0.001)	(3.9%)	
Rehospitalization rate	0.255	-0.011**	-4.3%	416,939	0.241	0.034***	14.1%	330,909
		(0.005)	(1.8%)			(0.005)	(2.2%)	
Share in nursing home	0.142	0.001	0.8%	1,222,092	0.121	0.000	0.4%	978,227
		(0.002)	(1.5%)			(0.002)	(1.5%)	
Total Medicaid payments	$13,254	$109	0.8%	1,047,989	$11,313	-$875*	-7.7%	859,785
		($527)	(4.0%)			($468)	(4.1%)	

NOTES: Estimates come from linear, logit, and two-part difference-in-differences models that control for age, race, sex, initial reason for Medicare eligibility, and county fixed effects and include heteroskedastic-robust standard errors clustered at the county level. All analyses exclude beneficiaries who were enrolled in a comprehensive managed care plan in January 2010 and nursing home residents (except when looking at residence as an outcome) a. The baseline represents predicted values among the entire sample after setting the DID interaction term to 0. b. Estimates for shares represent percentage point changes. c. Enrollment and inpatent utilization analyses are at the person-quarter level, while long-term care and total Medicaid payment analyses are at the person-year level. *p<0.10 **p<0.05 ***p<0.01

Table 3.8. Main DID Estimates Without Sample Restrictions

	Original analysis				Without Subsetting Based on Nursing Home Residence or Pre-Period Managed Care Enrollment			
	Baseline[a]	DID est.[b]	Pct. increase over baseline	Observations[c]	Baseline[a]	DID est.[b]	Pct. increase over baseline	Observations[c]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Enrollment								
Medicaid managed care	0.013	0.870***	6843.1%	5,432,553	0.051	0.654***	1284.6%	6,727,576
		(0.009)	(73.2%)			(0.017)	(34.1%)	
Medicare Advantage	0.287	0.108***	37.5%	5,432,553	0.271	0.083***	30.7%	6,727,576
		(0.013)	(4.4%)			(0.010)	(3.7%)	
Inpatient utilization								
Any hospitalization	0.080	-0.003**	-3.6%	5,432,549	0.080	-0.003**	-4.2%	6,727,576
		(0.001)	(1.7%)			(0.001)	(1.7%)	
Length of stay	8.183	-0.110	-1.3%	432,152	7.992	0.024	0.3%	532,960
		(0.124)	(1.5%)			(0.110)	(1.4%)	
Total inpatient days	0.655	-0.032**	-4.9%	5,432,549	0.638	-0.025*	-3.9%	6,727,576
		(0.015)	(2.2%)			(0.014)	(2.1%)	
Emergency	0.062	-0.004**	-7.0%	5,430,253	0.063	-0.005**	-7.6%	6,724,638
		(0.002)	(3.4%)			(0.002)	(3.4%)	
Non-emergency	0.024	0.001	4.7%	5,429,883	0.022	0.001	6.2%	6,724,181
		(0.001)	(5.2%)			(0.001)	(5.6%)	
Potentially-prev. hosp.	0.018	-0.001*	-5.5%	5,432,487	0.018	-0.001*	-6.0%	6,727,484
		(0.001)	(3.3%)			(0.001)	(3.6%)	
Rehospitalization rate	0.249	-0.008*	-3.1%	420,454	0.240	-0.005	-1.9%	518,075
		(0.004)	(1.8%)			(0.004)	(1.8%)	
Share in nursing home	0.144	-0.003*	-2.4%	1,125,670	0.135	-0.001	-0.7%	1,196,576
		(0.002)	(1.2%)			(0.002)	(1.2%)	
Total Medicaid payments	$13,865	-$330	-2.4%	964,638	$19,740	-$274	-1.4%	1,196,576
		($536)	(3.9%)			($433)	(2.2%)	

NOTES: Estimates come from linear, logit, and two-part difference-in-differences models that control for age, race, sex, initial reason for Medicare eligibility, and county fixed effects and include heteroskedastic-robust standard errors clustered at the county level. Original analyses exclude beneficiaries who were enrolled in a comprehensive managed care plan in January 2010 and nursing home residents (except when looking at residence as an outcome) a. The baseline represents predicted values among the entire sample after setting the DID interaction term to 0. b. Estimates for shares represent percentage point changes. c. Enrollment and inpatent utilization analyses are at the person-quarter level, while long-term care and total Medicaid payment analyses are at the person-year level. *p<0.10 **p<0.05 ***p<0.01

Table 3.9. Main DID Estimates in Counties With More Complete Hospital Data

	Original analysis				Counties With More Complete Hospital Data[d]			
	Baseline[a] (1)	DID est.[b] (2)	Pct. increase over baseline (3)	Observations[c] (4)	Baseline[a] (5)	DID est.[b] (6)	Pct. increase over baseline (7)	Observations[c] (8)
Enrollment								
Medicaid managed care	0.013	0.870***	6843.1%	5,432,553	0.012	0.868***	7353.8%	4,082,836
		(0.009)	(73.2%)			(0.016)	(136.4%)	
Medicare Advantage	0.287	0.108***	37.5%	5,432,553	0.336	0.120***	35.7%	4,082,836
		(0.013)	(4.4%)			(0.017)	(5.1%)	
Inpatient utilization								
Any hospitalization	0.080	-0.003**	-3.6%	5,432,549	0.083	-0.003**	-4.0%	4,082,832
		(0.001)	(1.7%)			(0.002)	(1.9%)	
Length of stay	8.183	-0.110	-1.3%	432,152	8.089	-0.203	-2.5%	338,286
		(0.124)	(1.5%)			(0.143)	(1.8%)	
Total inpatient days	0.655	-0.032**	-4.9%	5,432,549	0.674	-0.043**	-6.4%	4,082,832
		(0.015)	(2.2%)			(0.017)	(2.6%)	
Emergency	0.062	-0.004**	-7.0%	5,430,253	0.064	-0.005**	-7.1%	4,080,947
		(0.002)	(3.4%)			(0.002)	(3.5%)	
Non-emergency	0.024	0.001	4.7%	5,429,883	0.026	0.000	-1.3%	4,080,650
		(0.001)	(5.2%)			(0.001)	(5.0%)	
Potentially-prev. hosp.	0.018	-0.001*	-5.5%	5,432,487	0.020	-0.002*	-8.6%	4,082,781
		(0.001)	(3.3%)			(0.001)	(4.3%)	
Rehospitalization rate	0.249	-0.008*	-3.1%	420,454	0.251	-0.014**	-5.5%	329,594
		(0.004)	(1.8%)			(0.005)	(2.1%)	
Share in nursing home	0.144	-0.003*	-2.4%	1,125,670	0.130	-0.003*	-2.5%	832,736
		(0.002)	(1.2%)			(0.002)	(1.4%)	
Total Medicaid payments	$13,865	-$330	-2.4%	964,638	$13,102	-$568	-4.3%	725,113
		($536)	(3.9%)			($732)	(5.6%)	

NOTES: Estimates come from linear, logit, and two-part difference-in-differences models that control for age, race, sex, initial reason for Medicare eligibility, and county fixed effects and include heteroskedastic-robust standard errors clustered at the county level. Original analyses exclude beneficiaries who were enrolled in a comprehensive managed care plan in January 2010 and nursing home residents (except when looking at residence as an outcome) a.The baseline represents predicted values among the entire sample after setting the DID interaction term to 0. b.Estimates for shares represent percentage point changes. c. Enrollment and inpatent utilization analyses are at the person-quarter level, while long-term care and total Medicaid payment analyses are at the person-year level. d. This analysis excludes the bottom quartile of the sample based on the share of total traditional Medicare discharges that are available in a given county. Data account for 97% of traitional Medicare discharges in the remaining counties. *p<0.10 **p<0.05 ***p<0.01

Appendix Table 3.1. Medicare and Medicaid benefits

	Medicare	Medicaid
Prescription drugs	X	State option
Oupatient		
Physician services	X	X
Outpatient hospital care	X	X
Ambulatory surgical services	X	X
Durable medical equipment	X	State option
Outpatient mental health services	X	X
Dental		State option
Vision and hearing		State option
Lab and x-ray services	X	X
Diagnostic, screening, and preventive services	X	State option
Clinic services	X	State option
Physical, occupational, and speech therapy	X	X
Home health care	X	X
Hospice	X	State option
Inpatient		
Inpatient hospital	X[a]	X
Inpatient psychiatric hospital	X[a]	State option[b]
Post-acute care		
Skilled nursing facility	X[c]	X
Home health care	X	X
Long-term care		
Nursing facility		X
ICF/ID		State option
IMD		State option[d]
Assisted living facility		State option
Round-the-clock services		
Home health care		X
Personal care		State option
Case management		State option

SOURCES: MACPAC 2018 and CMS 2019.

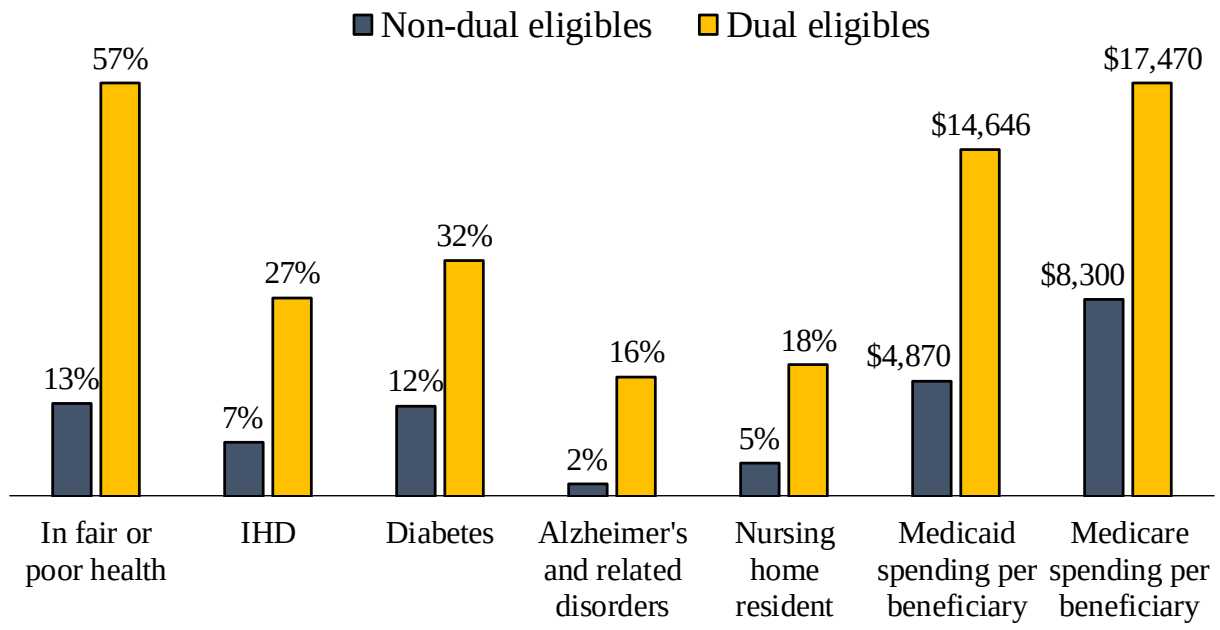
NOTES: ICF/ID = Intermediate Care Facilities for individuals with Intellectual disability. IMD = Institution for Mental Diseases. a. Medicare covers the first 90 days in a hospital for a given benefit period (or more if an individual has remaining lifetime reserve days). b. This optional benefit is only available for beneficiaries under age 21. c. Medicare covers the first 100 days in a skilled nursing facility for a given benefit period. d. This optional benefit is only available for beneficiaries ages 65 and older.

Appendix Table 3.2. State Medicaid Program Features

	New Jersey	Pennsylvania
Full dual eligibility		
ABD Pathway		
Income limit (% FPL)	100%	100%
Income disregard	$20	$20
Asset limit	$4,000	$2,000
Medically needy pathway		
Income limit (% FPL)	37%	43%
Income disregard	$4,000	$2,400
Budget period	6 months	6 months
Partial dual eligibility		
QMB program		
Income limit (% FPL)	100%	100%
Asset limit	$4,000	$7,280
SLMB program		
Income limit (% FPL)	120%	120%
Asset limit	$7,280	$7,280
QI program		
Income limit (% FPL)	135%	135%
Asset limit	$7,280	$7,280
Optional Medicaid benefits		
ICF/ID	X	X
IMD	X	X
Assisted living	X	
Personal care	X	X
Case management	X	X
Hospice care	X	X
Dental services	X	X
Vision services	X	X
Hearing services	X	X
Mandatory managed care		
Full dual eligibles		
Jan.2010 - Sept. 2011	Voluntary	Not an option[a]
Oct.2011 - Dec. 2013	Mandatory	Not an option[a]
Partial dual eligibles	Not an option	Not an option
ACA Medicaid expansion		
Partial	4/14/2011[b]	N/A
Full	1/1/2014	1/1/2015

SOURCES: KFF 2012, KFF 2013, KFF 2015, and KFF 2019.
NOTES: ABD = Aged, blind, and disabled. QMB = Qualified Medicare Beneficiary. SLMB = Specified Low-Income Medicare Beneficiary. QI = Qualified Individual. ICF/ID = Intermediate Care Facilities for individuals with Intellectual disability. IMD = Institution for Mental Diseases. ACA = Affordable Care Act. a. Some Medicare beneficiares in Pennsylvania are required to enroll in a managed care plan when first enrolling in Medicaid but are quickly switched to fee-for-service Medicaid. b. The early expansion in New Jersey covered adults with incomes under 23% of the federal poverty level, who had previously been covered under a state program.

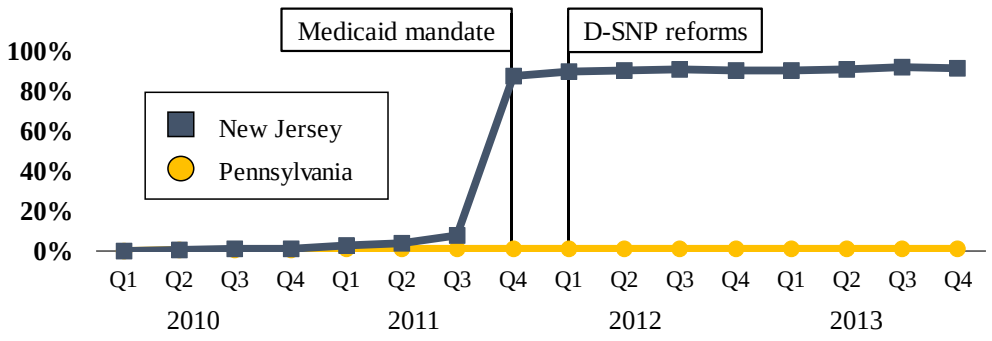
Figure 3.1. Beneficiary Characteristics, by Dual Eligible Status



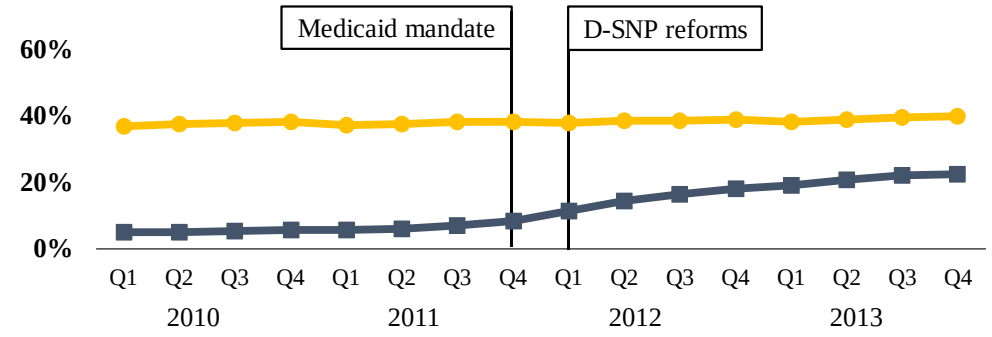
SOURCES: CBO 2013, Mathematica 2014 and author's analysis of the 2015 National Health Interview Survey and the 2019 the Medicare-Medicaid Linked Enrollee Analytic Data Source (MMLEADS) Public Use File (PUF) data.
NOTES: Non-dual eligibles represent other Medicaid beneficiaries (except when looking at Medicare spending, where they represent other Medicare beneficiaries). Non dual eligibles data only include the disabled for health conditions. Nursing home and Medicaid spending data are only for beneficiaries in fee-for-service Medicaid. IHD = Ischemic Heart Disease.

Figure 3.2. Enrollment and Hospitalization Trends Among Full Dual Eligibles, by State

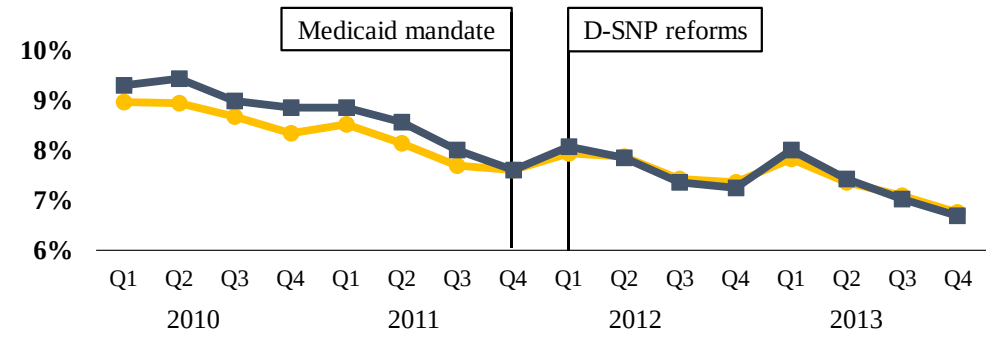
a. Share in Comprehensive Medicaid Managed Care Plans



b. Share in Medicare Advantage Plans

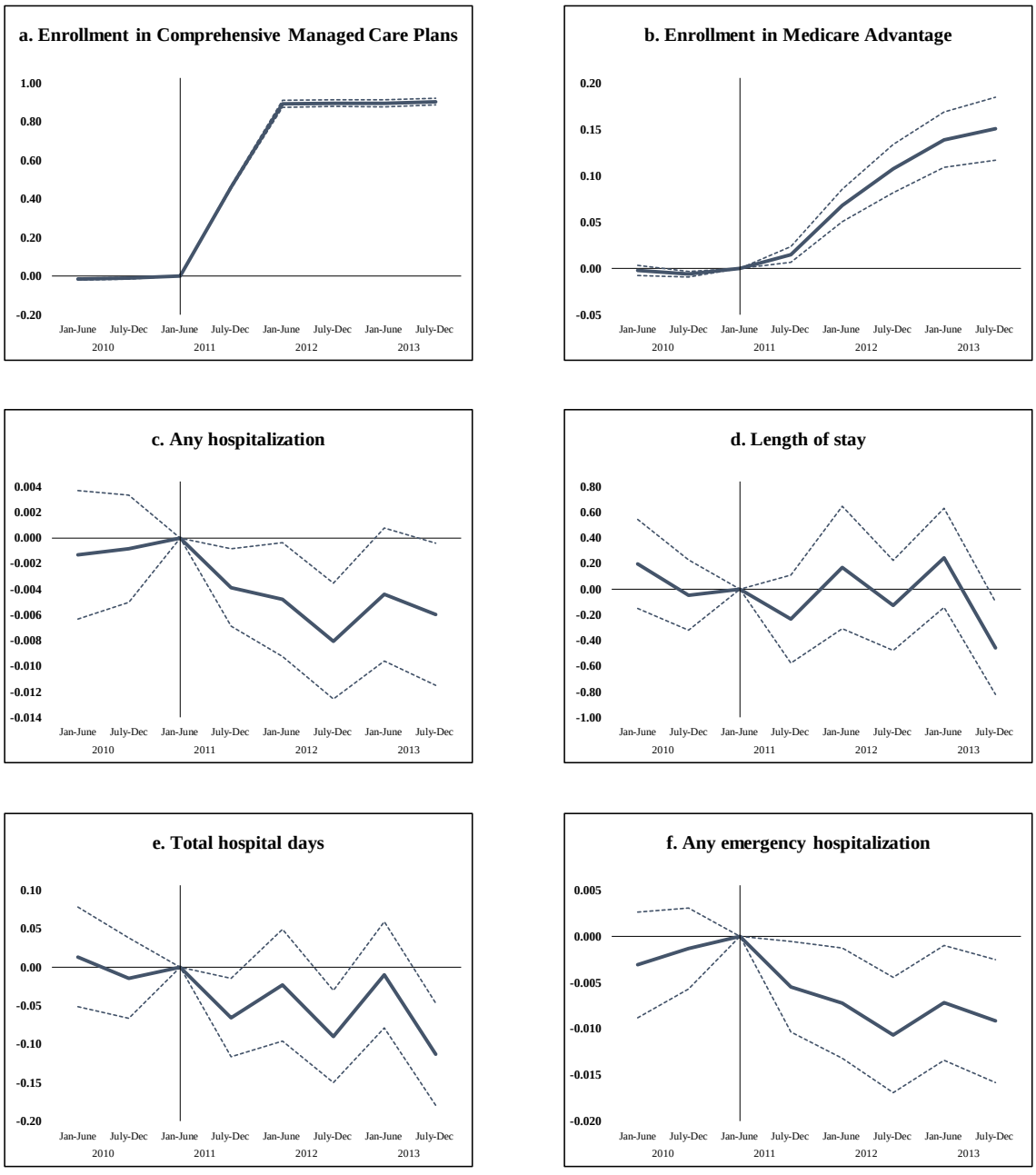


c. Share With An Inpatient Stay



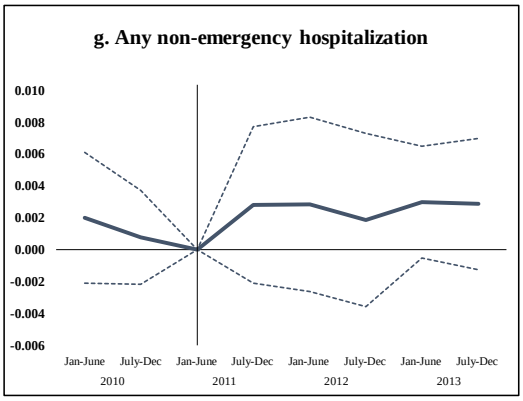
SOURCE: 2010-2013 Medicaid Analytic eXtract (MAX) Personal Summary (PS) file, Medicare Beneficiary Summary File (MSBF), and MedPAR data.
NOTES: All analyses exclude beneficiaries who were enrolled in a comprehensive managed care plan in January 2010 and nursing home residents. D-SNP = Dual-eligible special need plan.

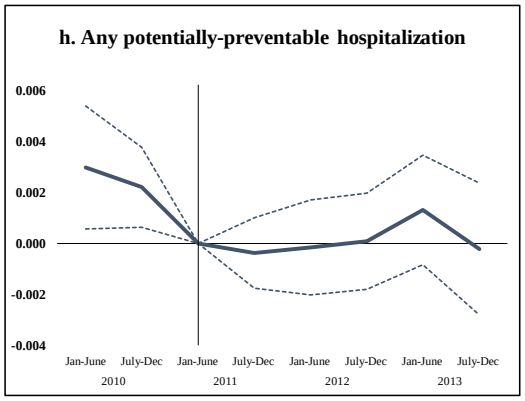
Figure 3.3. DID Estimates

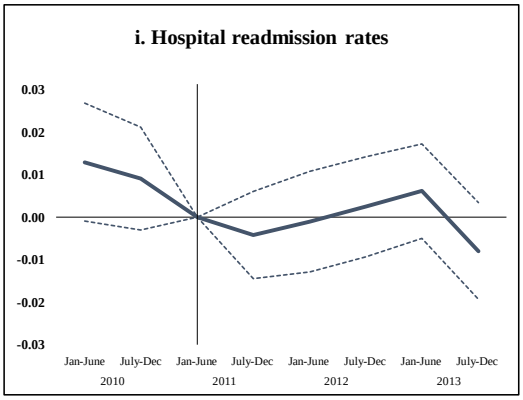


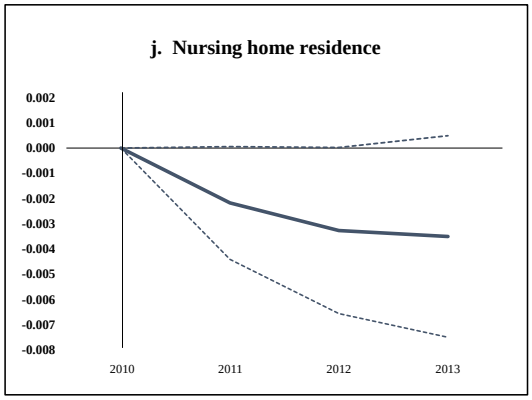
SOURCE: 2010-2013 Medicaid Analytic eXtract (MAX) Personal Summary (PS) file, Medicare Beneficiary Summary File (MSBF), and MedPAR data.
NOTES: Solid lines represent estimates from difference-in-differences models that control for age, race, sex, initial reason for Medicare eligibility, and county fixed effects and include heteroskedastic-robust standard errors clustered at the county level. All analyses exclude beneficiaries who were enrolled in a comprehensive managed care plan in January 2010 and nursing home residents (except when looking at residence as an outcome). Estimates for shares represent percentage point changes. Dotted lines represent 95% confidence intervals.

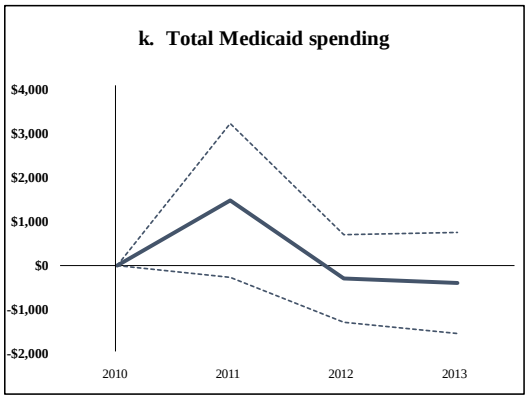
Figure 3.3. DID Estimates (cont'd)





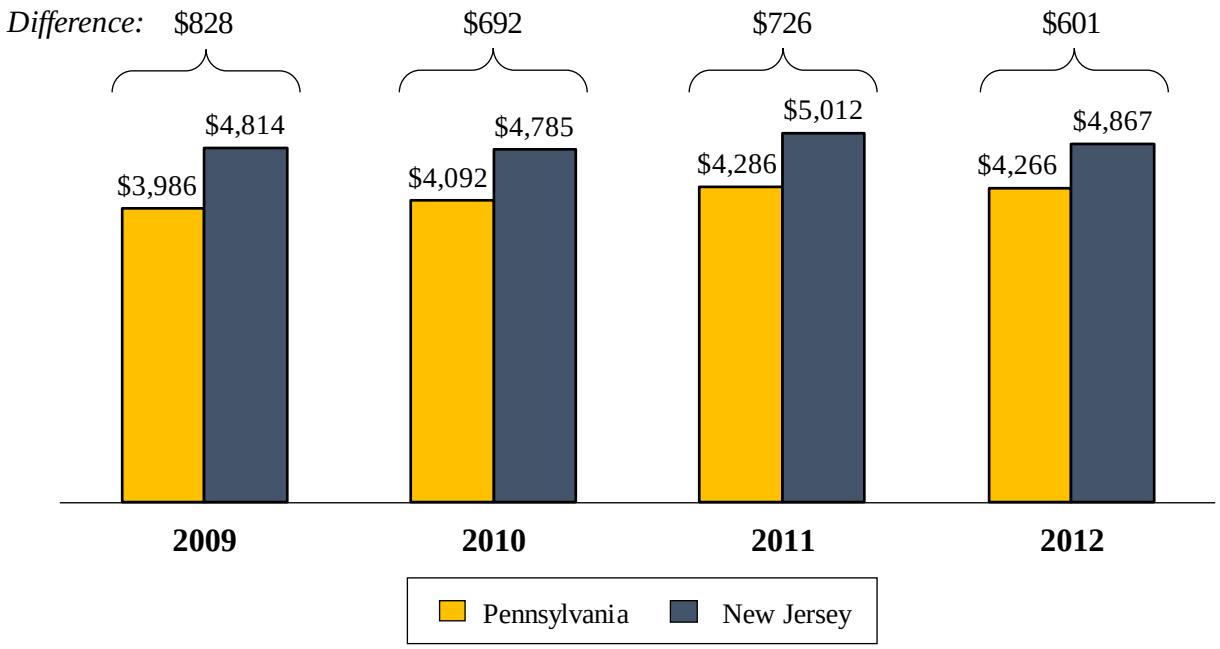






SOURCE: 2010-2013 Medicaid Analytic eXtract (MAX) Personal Summary (PS) file, Medicare Beneficiary Summary File (MSBF), and MedPAR data.
NOTES: Solid lines represent estimates from difference-in-differences models that control for age, race, sex, initial reason for Medicare eligibility, and county fixed effects and include heteroskedastic-robust standard errors clustered at the county level. All analyses exclude beneficiaries who were enrolled in a comprehensive managed care plan in January 2010 and nursing home residents (except when looking at residence as an outcome). Estimates for shares represent percentage point changes. Dotted lines represent 95% confidence intervals.

Figure 3.4. Average Medicare Part D Plan Expenditures Per Full Dual Eligible, by State



SOURCE: 2019 Medicare-Medicaid Linked Enrollee Analytic Data Source (MMLEADS) Public Use File (PUF) data.