Payer Steering and Patient Welfare: Evidence from Medicaid*

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Abstract

Health care payers can lower costs by steering patients to lower cost providers. We examine steering in the Medicaid context, as Medicaid has been transitioning towards a managed care organization ("MCO") model over time. We examine Florida obstetrics patients and control for selection using fixed effect specifications as well as variation from a 2014 Florida policy reform that dramatically increased MCO penetration. Patients in MCOs are steered towards lower cost facilities, but these facilities are not of lower quality or much farther from their residence. Our evidence suggests Medicaid MCOs can improve efficiency by referring patients to lower cost providers.

JEL Codes: I11, I18

Keywords: medicaid, hospitals, steering

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1 Introduction

Unlike in most industries, individuals are typically not fully exposed to the cost of their consumption using prices in health care. Therefore, governments and private payers search for ways to induce consumers to efficiently utilize care. One approach is to expose patients to more of the cost of health care, such as by increasing coinsurance or introducing high deductible health plans. However, policymakers often face situations in which it may not be possible or socially desirable to have patients bear more of the burden of the cost of health care.

A potential alternative approach is for payers and providers to "steer" patients by discouraging them from using certain types of procedures or providers, even when patients do not face a monetary cost for doing so. For example, payers might incentivize primary care providers to refer patients to efficient facilities, highlight these facilities in their materials, or exclude expensive providers from their network. While such steering could reduce health care costs, the degree of steering, the mechanisms used to steer patients, and the effects of steering on patient welfare are open questions.

These questions are particularly salient in Medicaid. First, due to regulation, it is difficult to expose patients to much of the cost of care. Second, states have been gradually transitioning patients away from traditional Fee for Service ("FFS") arrangements towards managed care. In contrast to traditional FFS networks, which are frequently managed by a state agency, private Medicaid Managed Care Organizations ("MCOs") may have greater flexibility to steer members to specific types of providers. Further, because they receive a capitated payment for each enrollee, MCOs have financial incentives to steer their members to lower cost providers. Thus, one potential benefit of managed care in Medicaid is that MCOs may be more able to induce patients to select more efficient providers.

Using 2006-2014 data from Florida labor and delivery patients, we find that MCOs steer patients away from high cost hospitals without those patients traveling farther or going to a lower quality facility. A major issue in examining choice behavior is selection – patients who are covered by MCOs may have different preferences than those on FFS. We thus focus on patient choice of facility for labor and delivery, because we can control for selection on time-invariant patient preferences through fixed effects. By evaluating a woman's choice of provider across their different births, we can evaluate how her choice of payer influences her choice of provider while holding her preferences fixed.

We use two different proxies for high cost hospital: whether a hospital is an academic medical center ("AMC") and whether it is above the 85th percentile of costs in 2013 using information on hospital charges and the Medicaid cost-to-charge ratio (high percentile cost – "HPC"). Our estimates that control for selection through fixed effects suggest that women in MCOs are 2 percentage points less likely to go to high cost hospitals than women in FFS using either proxy. At baseline, the steering effect is about a 10 percent reduction in visits to high cost hospitals.

While these results suggest that the MCOs are able to steer patients, they do not tell us how joining a MCO affects patient welfare. Therefore, we estimate a structural model of patient choices where we allow MCO steering can affect members' travel time, the quality of the hospital that they visit, as well as whether they visit high cost hospitals. We control for selection into MCOs by using a fixed effect approach based on Chamberlain (1980) and construct a quality metric based upon the choices of commercial patients. Our fixed effects estimator shows that MCO steering away from high cost hospitals is equivalent to an additional 7 to 8 minutes of travel time. However, we find only a small increase in the average travel time by patients transitioning to MCOs, by 0.6 minutes, and a slight increase in the average hospital quality. These results suggest that MCOs in Florida may be able to steer patients away from high cost hospitals without adverse consequences for patients.

We also study MCO steering by using the 2014 Florida Medicaid reform as an instrument for MCO participation. During the summer of 2014, Florida began transitioning nearly their entire Medicaid population to managed care plans. Therefore, this policy change should serve as a valid instrument for individual's participation in MCOs. The reform also required changes to MCO practices, including a mandate that all MCOs include the physicians associated with all Florida medical schools in their network.

Using the reform as an instrument for MCO participation, we find that that there was a 2 to 6% decline in the number of women going to HPCs or AMCs post-reform relative to the population on FFS plans. When we simulate the reform using the pre-reform data, we predict that the reform should lead to a 25% reduction in the share of people going to an AMC, and a 17% reduction in the share of people going to HPC hospitals, a much larger change than observed in the data. The smaller post-reform MCO steering effect could be because it takes time for the MCO to steer, the mandate to include Medical School physicians diminished their steering capabilities, or because it is difficult to fully scale up steering mechanisms. However, in both the fixed effects and IV estimates, we find that the MCOs do steer and that there is little effect on travel time or hospital quality.

We also examine women with complex conditions separately. In our fixed effects estimates, we do not find that these women are steered away from HPCs or AMCs differentially than women without complex conditions. However, we do find evidence that these women are steered toward higher quality hospitals. In our post-reform IV estimates, we find a 20% increase in the share of women with complex conditions going to an AMC, but a 4% reduction in the number going to HPCs. This difference between AMCs and HPCs may be because AMCs have the expertise to care for these more medically complex women. While for a normal labor and delivery, there may be no difference in quality between AMCs and HPCs, for a women with comorbidities, AMCs may be of higher quality.

Taken together, these results suggest that the MCOs efficiently steer Medicaid patients seeking care for labor and delivery. These women are steered towards lower cost hospitals and higher quality hospitals and do not need to travel much farther to go to them.

Ho and Pakes (2014a) examine steering by MCOs for commercially insured patients in California, and find steering away from high cost hospitals without major effects on quality. Unlike us, they also find that patients travel farther for their care in their setting. In addition, a number of papers have found that MCO enrollment affects health care utilization. Duggan et al. (2015) show that patients exiting MCO Medicare Advantage plans then sharply increase their health care utilization. Van Parys (2015) examines the 2006 pilot Florida Medicaid reform and finds that the reform reduced health care costs by 8 to 10 percent.

The paper proceeds as follows. Section 2 provides background information on Medicaid managed care and the Florida reforms. Section 3 describes our data. Section 4 examines evidence for steering by Florida MCOs, while Section 5 estimates the welfare trade-offs that Florida Medicaid patients on FFS and MCOs face. Section 6 examines the Florida reform and Section 7 concludes.

2 Background

2.1 Managed Care

Medicaid is a national program to provide health care to low-income individuals. In contrast to Medicare, which is centrally operated by the federal government, Medicaid is financed through a combination of state and federal funding and is managed at the state level. As of March 2013, Medicaid covered roughly 25% of Americans and 40% of all births. (The Kaiser Commission on Medicaid and the Uninsured, 2013) When initially created, Medicaid operated largely on a FFS model, under which the state would pay providers directly for every service provided. (Paradise, 2014) Further, a traditional FFS model has no entity responsible for coordinating members' care. Thus, policymakers have been concerned about enrollees' access to providers willing to serve them. (The Kaiser Commission on Medicaid and the Uninsured, 2013) Under managed care, an entity exists that is responsible for coordinating their members' care; for example, this entity could be a coordinating physician or a managed care organization.

Over the past two decades, states have increased enrollment in managed care approaches in their Medicaid programs. The blue dashed line in Figure 1 plots the trend in the fraction of Medicaid enrollees covered by some form of managed care. Managed care already covered a majority of Medicaid enrollees in 1999, at 55%. The fraction of Medicaid enrollees under managed care has increased over 20 percentage points since then to 77% in 2014.

While managed care approaches all have some entity coordinating their members' care, they differ in their payment model. Under some managed care plans, the coordinating entity (e.g., physician) receives a per-member per-month payment to coordinate their members' care, but services are still paid for on a FFS basis. Alternatively, under risk-based managed care programs run by a managed care organization ("MCO"), the states pay a per-member per-month rate to the MCO which then contract with networks of providers. In part based on these networks, Medicaid beneficiaries choose their preferred MCO. These types of plans

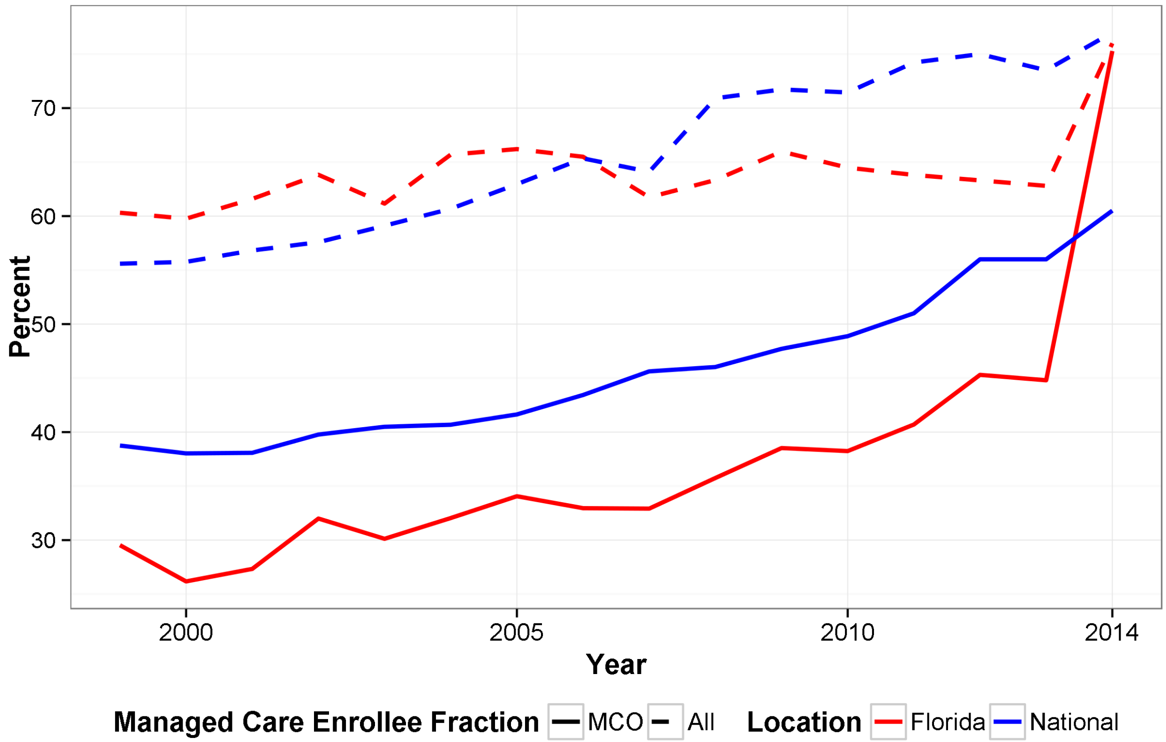


Figure 1 Trends in Medicaid Managed Care Enrollment, Nationwide and Florida

Note: Source: Medicaid Managed Care Enrollment Reports, 1999-2014 and Medicaid Managed Care Trends and Snapshots, 2000-2013.

are also called *comprehensive risk-based managed care* (Paradise, 2014). The blue solid line in Figure 1 plots the trend in the fraction of Medicaid enrollees covered by MCOs. While MCOs covered 39% of Medicaid enrollees in 1999, the fraction of Medicaid enrollees under MCOs has increased by over 20 percentage points to 61% in 2014. Thus, the increased penetration of MCOs can account for almost all of the increase in managed care over the 1999–2014 time period.

Figure 2 depicts the variation in fraction of Medicaid enrollees in MCOs across different states in the US. States vary tremendously in the degree to which they use the MCO model for Medicaid, ranging from several states with zero enrollment, such as Alabama, Connecticut, and Maine, to states such as Tennessee and Washington with 100 percent of Medicaid enrollees in MCOs. Thus, the degree to which states use MCOs to coordinate care for their Medicaid enrollees remains an active policy issue.

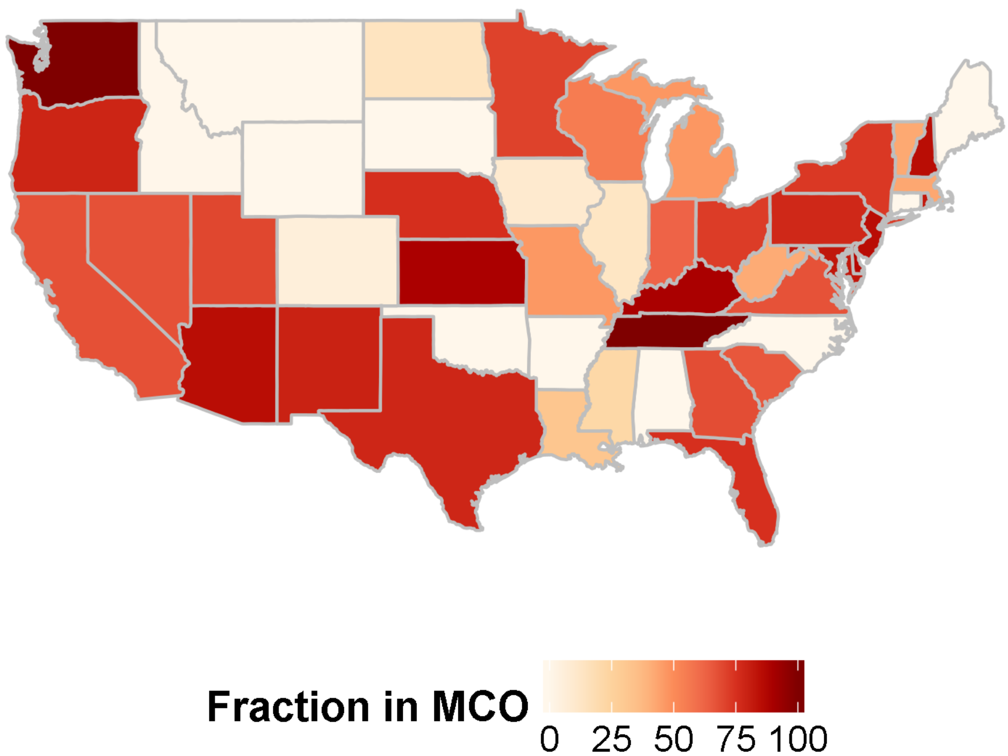


Figure 2 MCO Share of Medicaid Enrollment by State in 2014

Note: Source: Medicaid Managed Care Enrollment Report 2014. Alaska had 0.00% of enrollees on MCOs, Hawaii 98.50%, and Puerto Rico 100.00%.

2.2 Steering and Network Access

The rationale behind the MCO model is that MCOs are able to provide more efficient care: high-quality care for similar or lower costs than the traditional FFS model (Sparer, 2012). These improvements are achieved by providing incentives for the MCOs to reduce health care expenditures of their members. MCOs are paid on a capitated basis and so have incentives to reduce costs, such as through utilization management, improved care coordination, member education, or lower reimbursement rates to providers.

One way that MCOs could reduce costs is by steering their members away from high cost facilities.[1] In the Medicaid context, the MCOs are restricted in their ability to charge patients copayments or coinsurance, and so have a very limited ability to use price as a mechanism to steer. Nevertheless, they have both direct and indirect methods by which they can incentivise patients to use different providers.

Most directly, they can use network exclusions to steer patients. Since Medicaid MCOs will not generally pay for treatment by providers outside of the network, network exclusions provide a strong incentive to use in-network providers. The network is also able to steer patients indirectly. One way to do so would be by accounting for physician referral patterns. A MCO may want to exclude physicians that frequently refer to high cost hospitals to avoid some of those referrals, even if their own cost of treating patients is not particularly high, or incentivise physicians to refer to cheaper hospitals. The MCO could also try to promote cheaper hospitals to their patients. Since there are specific network access requirements for Medicaid MCOs, indirect approaches may allow MCOs to reduce costs while complying with the network access regulations.

While introducing steering mechanisms could improve efficiency, it could also reduce welfare for Medicaid members if they no longer have access to the same providers that they would have access to under a FFS model. The degree of this welfare loss will depend on whether the lower cost providers also provide lower quality.

Two papers by Kate Ho and Ariel Pakes examine patient steering within commercial

[1] Even though these prices are negotiated between hospitals and the MCOs, theory suggests that the price paid by an MCO to a hospital is increasing in the hospital's marginal cost of treatment. See Gowrisankaran et al. (2015).

health insurance. Ho and Pakes (2014b) demonstrate that members' choices of hospital for labor and delivery are more responsive to price when the physicians received a higher capitated payment from the insurer. Ho and Pakes (2014a) find that this steering drives patients to attend farther, but similar quality hospitals. To our knowledge, we are the first to study steering in a Medicaid context.

2.3 Managed Care Reforms in Florida

Over the last 10 years, Florida has introduced major reforms in its Medicaid program to increase the share of Medicaid enrollees in MCOs. Before the reforms, enrollment in a MCO was voluntary. In July of 2006, Florida introduced a "pilot" reform of its Medicaid program for enrollees living in Broward (Ft. Lauderdale) and Duval (Jacksonville) counties. Approximately 9% of the state's Medicaid population lived in these two counties. In September 2007, this pilot program was expanded into three rural counties: Baker, Clay, and Nassau. While this pilot program required Medicaid enrollees to enroll in a managed care plan, they did not have to enroll in a MCO and several categories of patients were exempted from the pilot.[2]

Between May and August 2014, Florida implemented major reforms across the state. On the supply side, these reforms eliminated non-MCO managed care plans. All health plans serving Medicaid members after the reform implementation would receive a per-member per-month capitated payment from the state and so would be fully at risk for their medical care.[3]

[2]These exempted groups included pregnant women above 27% of the federal poverty level, refugees, and medically needy women. Other groups, such as women receiving emergency Medicaid for aliens or women eligible only for family planning, were required to remain on FFS Medicaid. There were also supply side reforms such as payers being permitted to construct differentiated benefit packages for members, which had previously been uniform across plans. (See https://ahca.myflorida.com/medicaid/Policy_and_Quality/Policy/federal_authorities/federal_waivers/docs/mma/Reports/medicaid_reform_final_annual_report_year_one.pdf)

[3]MCO plans were subject to a number of consumer protection provisions, including a required medical loss ratio of 85 percent – 85 percent of premium revenues have to be spent on medical care – and penalties for withdrawal from any market before 5 years. Not all MCOs were approved to solicit enrollees post-reform; after the reform, 14 standard MCOs and 5 speciality MCOs were participating in the state Medicaid program.For more details of the reform, see Alker and Hoadley (2013) and Center For Medicare and Medicaid Services, "Managed Care in Florida", at https://www.medicaid.gov/medicaid-chip-program-information/by-topics/delivery-systems/managed-care/downloads/florida-mcp.pdf.

On the demand side, all Medicaid members, with some narrow exceptions, were required to enroll in an MCO.[4] Medicaid enrollees had 30 days to select a plan and then 90 days to change plans; enrollees who did not select a plan would be auto-enrolled in one.

In January 2014, prior to these statewide reforms, close to 60% of Florida Medicaid enrollees were enrolled in a plan that was paid on a fee-for-service basis. Some of these FFS patients were having their care managed by a physician or Physician Services Network (a "Primary Care Case Management" (PCCM) or "Physician Services Network" (PSN)) and others had no care coordination at all.[5] The other 40% of Medicaid enrollees had their care managed by an MCO that was paid on a capitated basis.[6]

Figure 1 depicts how the 2014 reforms affected Medicaid enrollees in Florida. The share of Florida Medicaid enrollees on any managed care plan (including FFS managed care plans) – the dashed red line – was fairly static from 1999 to 2013, increasing only from 60% to 63%. In 2014, the managed care share jumps to 74%. The share of Medicaid enrollees in MCOs – the solid red line – does increase slowly from 1999 to 2013, from 30% to 45%. But the MCO share increases to 75% in July 2014 and 80% by December 2015, about double the increase over the preceding 14 years. Overall, the reduction in the share of traditional FFS plans can account for about 43% of the post-reform rise in MCO, while the remainder can be accounted for by patients moving from non-MCO managed care plans to MCO plans. Therefore, following this reform, many more members' care was managed by MCOs who were "at-risk" for their medical treatment, and who have incentives to steer them to different types of providers.

This reform also induced changes on the supply side. Following the reform, the faculty plans of Florida medical schools were deemed "essential providers", meaning that they needed to be in network with any MCO contracting with the state.[7] Therefore, following the reforms, MCOs were more restricted in their ability to steer patients – in particular away from AMCs.

[4] The exempted groups were women only eligible for family planning services, women only eligible for cervical and breast cancer services, and people eligible for emergency Medicaid for aliens. For a few other small groups, entry was voluntary.

[5] See http://ahca.myflorida.com/Medicaid/Finance/data_analytics/enrollment_report/docs/ENR_Jan2014.xls

[6] For simplicity, we refer to PSNs that were paid on a capitated basis as MCOs.

[7] See http://ahca.myflorida.com/Medicaid/statewide_mc/pdf/mma/SMMC_MMA_Snapshot.pdf. If the MCO and the faculty plans could not reach an agreement, the services provided would be reimbursed at the FFS Medicaid rates. See https://www.flsenate.gov/Session/Bill/2016/2508/Analyses/2016s2508.pre.ap.PDF.

To our knowledge, no academic work has yet evaluated the 2014 reforms. However, some work has evaluated the 2006 reforms, which is consistent with tradeoffs between potentially lower costs and potential welfare losses from selective contracting. On the cost side, a recent evaluation of the Florida 2006 reforms found that hospital costs were reduced by $7-12\%$ following the introduction of the reforms (Van Parys, 2015). Both Harman et al. (2011) and Harman et al. (2014) also find substantial falls in per member costs in the reform counties.

The evidence regarding welfare losses from steering is more qualitative in nature. A small survey from 2007 shows that 27% of physicians in pilot counties who previously participated in Medicaid would not participate in any of the pilot Medicaid plans (Georgetown University, 2007). Qualitative analysis from focus groups suggests that Medicaid members were having trouble finding plans that included all of the physicians that they usually saw. This is particularly worrisome from a policy perspective, since many patients "exhibited significant problems in comprehension" when asked about how they were choosing their plans.

3 Data

3.1 Patient Data

We use hospital discharge data obtained from the Florida Agency for Health Care Administration (AHCA) from 2006 to 2014. These data identify the reason for the hospital visit, the entity that paid for the care, the physician that treated the patient, and characteristics about the patient such as the zip code that she lived in, and contain patient level identifiers that allow us to match women across births.

To construct our sample, we use women covered by Medicaid visiting the hospital in order to give birth. For each delivery, we can identify whether the birth was a normal or complicated delivery and any comorbidities.[8] We then identify whether each woman was enrolled in a FFS or an MCO at the time of delivery. Figure 3 shows the share of Medicaid

[8] We use the Diagnosis Related Group (DRG) codes provided in the data to indicate pregnancy. For DRG version 24 and earlier, these are DRGs from 370 to 375. For DRG version 25 and after, these are DRGs 765 to 768 and 774 to 775. Normal deliveries are DRGs 766 and 775 for DRG version 25 and after, and DRGs 371 and 373. To measure comorbidities we compute the women's Charlson score and define her as having comorbidities if her Charlson score is above zero.

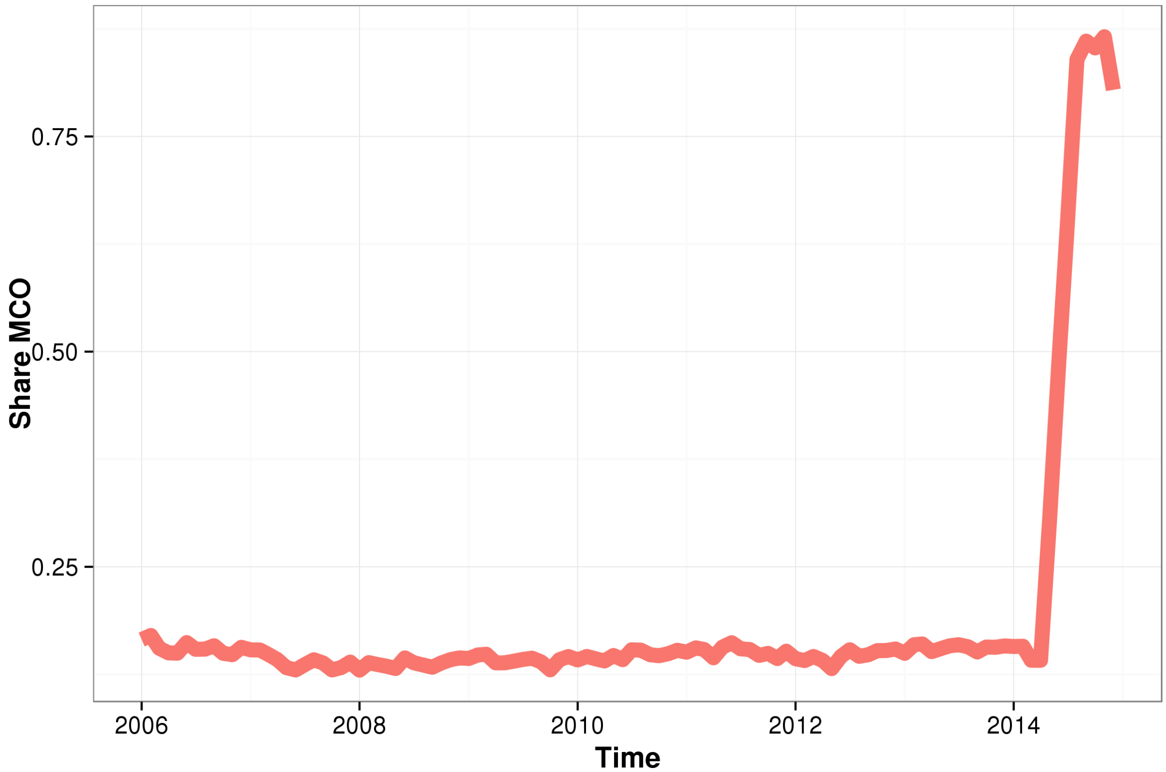


Figure 3 Share of Medicaid Obstetrics Patients in MCO over Time

Note: The red line plots the share of Medicaid patients in an MCO.

births in Florida covered by MCOs over our sample period. Before the reform, there is very little change in the share of MCOs among Medicaid patients; this share is 17.4 percent in January 2006 and 16.3 percent in January 2014. This pattern is very different than the slow increase in MCO patient enrollment in Florida seen earlier in Figure 1. The reform in 2014 induces a massive increase in the share of obstetrics patients in MCOs – the reform increases the MCO share steadily from May through July 2014, after which the MCO share stabilizes at roughly 85 percent. Thus, the reform creates a huge increase in the share of Florida Medicaid obstetrics patients enrolled in MCOs.

In Table I, we display summary statistics for all Florida births and births under Medicaid. Medicaid births make up 51 percent of overall births, while women in the Medicaid sample comprise 48 percent of the women in the full sample. The Medicaid population is slightly younger than the overall sample, at 25.4 years compared to 27.6 years for the overall population, less white, at 58 percent compared to 66 percent, and more black, at 32 percent compared to 24 percent. We match 2012 Census median zip code income to each patient as well; the average median zip code income is slightly lower for the Medicaid sample, at $42,243 compared to $47,470 for the full sample. Almost all births in Florida are in Metropolitan areas.

The last two columns of Table I examine differences between the FFS and MCO Medicaid populations. The Medicaid MCO population is slightly younger than the FFS sample, at 24.9 years compared to 25.6 years for the overall population, less white, at 47 percent compared to 61 percent, more black, at 45 percent compared to 29 percent, and has a slightly lower median zipcode income, at $41,336 compared to $43,916.

Table I Summary Statistics

	All	Medicaid	Medicaid FFS	Medicaid MCO
Age	27.6	25.4	25.6	24.9
White	0.66	0.58	0.61	0.47
Black	0.24	0.32	0.29	0.45
Hispanic	0.20	0.22	0.23	0.19
Medicaid	0.51	1.00	1.00	1.00
Metro	0.97	0.96	0.95	0.97
Median Income	47,986	43,425	43,916	41,336
Comorbidities	0.04	0.05	0.04	0.06
N Admissions	1,727,391	876,835	709,894	166,941
N Women	1,247,624	645,675	564,952	141,498

Note: All datasets are as described in the text. Zipcodes are defined as Metropolitan if the USDA assigns the zipcode a Rural Urban Commuting Area (RUCA) score of 3 or less.

Throughout the paper, we define the hospital choice set as all hospitals within 45 minutes driving time of their location. All hospitals outside of this choice set are coded as the "outside option".

3.2 Proxies for High Cost Hospital

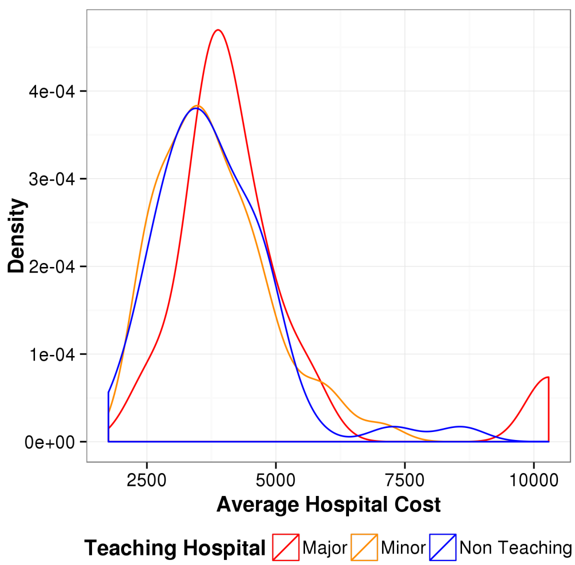
To examine steering to high cost hospitals, we have to define which hospitals are high cost. Throughout the paper, we use two proxies for whether a hospital is a high cost facility.

Our first proxy for a high cost facility is whether a hospital is a major teaching hospital. In our data, we have 6 hospital systems classified as a "Major" teaching facility in data from the American Hospital Association (AHA). These systems contain 12 hospitals with obstetrics facilities. The academic literature has found that academic medical centers tend to have higher costs than other hospitals. For example, Shepard (2016) finds that the five most expensive hospitals in Massachusetts on a per admission basis are academic medical centers, as are five out of the six most expensive hospitals after adjusting for patient composition. White et al. (2014) also find that high price hospitals are 30 percentage points more likely to be academic medical centers than low price hospitals. We refer to this proxy measure for high cost hospital as *AMC*, after Academic Medical Center.

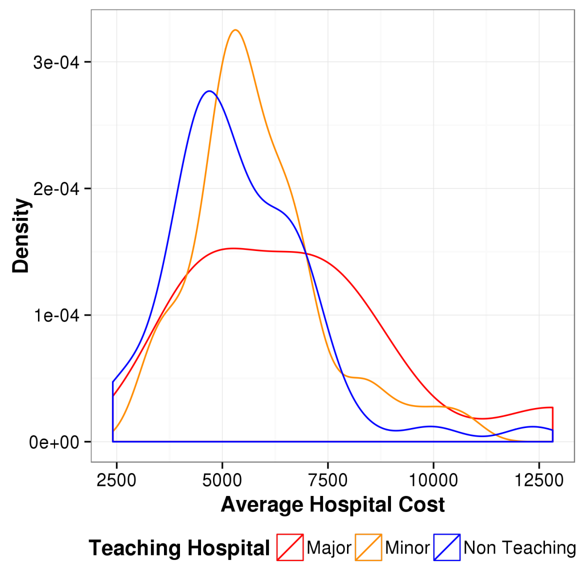
To verify that AMCs are typically costlier than other hospitals, we construct a measure of hospital cost by combining hospitals' cost to charge ratios used by the Florida Medicaid agency to bill hospitals with information on delivery charges in our data. The cost to charge ratio has been used by several papers as a proxy for hospital marginal cost in combination with hospitals' charges (Riley (2009)). We estimate the average delivery cost as the 2013 cost to charge ratio multiplied by the hospitals' average charges for FFS Medicaid in 2013.[9] While MCOs will have their own contracted prices with each hospital, models of hospital-insurance bargaining (Gowrisankaran et al., 2015) imply that hospital prices should, in general, be higher for higher cost hospitals.

However, we can see in Figure 4 that there are minor and non-teaching hospitals that have higher costs than major teaching hospitals. Thus, we develop an additional proxy for a high cost facility: whether a hospital has an average cost greater than the 85th percentile for all deliveries among hospitals with at least 50 deliveries. This procedure selects 18 hospitals; these high cost hospitals include four, or one third, of the major teaching hospitals, all of which constitute the flagship hospitals for a teaching hospital system. The average cost for these high cost hospitals for normal deliveries is \$5,671, compared to \$3,518 for all other hospitals; for complicated deliveries, the average cost is \$8,723 for the high cost hospitals, compared to \$5,334 for all other hospitals. We refer to this proxy measure for high cost hospital as *HPC*, for high percentile cost hospital.

[9]The Florida AHPCA provides data on the cost to charge ratio for 2013 and 2014 at `http://aHPCa.myflorida.com/medicaid/cost_reim/archive/hospital_rates_archive.shtml`. Since the major reform in the market occured in 2014, we only use the cost to charge ratio in 2013.



(a) Normal Deliveries



(b) Complicated Deliveries

Figure 4 Distribution of Costs by Teaching Hospital Category for Normal and Complicated Deliveries

Note: Each figure displays the distribution of hospital costs by type of hospital as defined by the AHA: Major Teaching, Minor Teaching, or Non-Teaching hospitals. The left figure is for normal deliveries and right figure for complicated deliveries. Hospital costs are as defined in the text.

4 Pre-Reform Evidence of Steering

In this section, we show that, consistent with the discussion in Section 2.2, MCO patients are more likely to be steered away from the use of higher cost medical centers than Medicaid FFS patients. Using data from the pre-reform period, we examine whether MCO patients are less likely to go to a high cost hospital after controlling for locality and time effects by estimating:

$$Y_{it} = \beta MCO_{it} + \gamma_{z(i)} + \eta_{c(i)t} + \epsilon_{it} \tag{1}$$

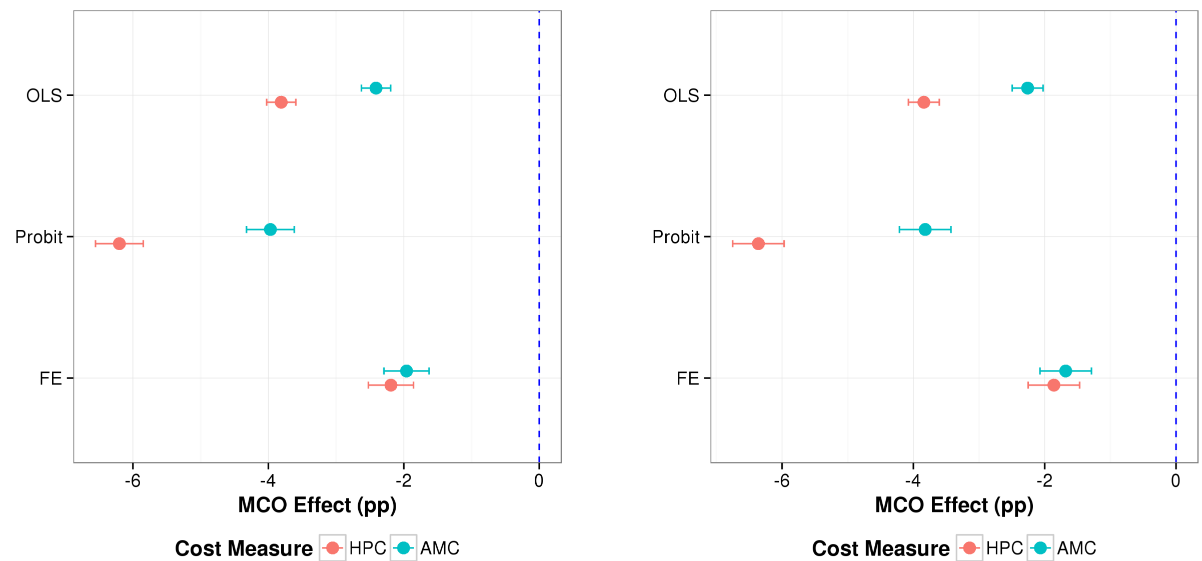
where:

- Y_{it} equals one if individual i goes to a high cost hospital in period t (high cost hospital defined based on either AMC or HPC status),
- MCO_{it} equals one if individual i is enrolled in a MCO in period t,
- $\gamma_{z(i)}$ are zip code of residence indicators, and
- $\eta_{c(i)t}$ are month/year indicators interacted with patient county.

In this specification, β, the effect of being enrolled in a MCO, is the object of interest. We examine both proxies for a high cost hospital, and estimate equation (1) using both linear probability and probit models. For the probit models, we show the average marginal effect of MCO membership in the observed population of women. For these regressions, we drop patients who went to an "outside option" hospital for their delivery.

We examine steering effects using data from 2006 to 2013, so we do not use data from the reform period. In this time period, 15.1% of FFS Medicaid patients and 14.8% of MCO Medicaid patients who went to a hospital within 45 minutes of their house went to an AMC. 22% of FFS Medicaid patients and 19% of MCO Medicaid patients who went to a hospital within 45 minutes of their house went to a HPC hospital.

In Figure 5, we display our estimates of the MCO steering effect for both the linear probability and probit models. The left figure examines all deliveries while the right figure



(a) All Deliveries

(b) Normal Deliveries

Figure 5 MCO Steering Effects

Note: Each figure displays the effect of being enrolled in an MCO on the probability of visiting a high cost hospital. We examine both of our proxies for high cost hospital. For each specification, the dot is the point estimate and the lines are the 95% confidence interval. Standard errors are clustered at the individual level. The left figure is for all deliveries and right figure for normal deliveries only. Results are in Table X and Table XI.

examines only normal deliveries; the HPC estimates are in red and the AMC estimates are in blue. The OLS specifications suggest that women in an MCO are about 2.4 (AMC) to 3.8 (HPC) percentage points less likely to go to a high cost hospital than those in FFS Medicaid. At baseline, this is about a 15 percent effect. These estimates are similar using both of our proxies for high cost hospital, and using either all deliveries or only normal deliveries. The Probit specifications are even larger, suggesting a 4 (AMC) to 6 (HPC) percentage point effect, or about a 25 percent effect at baseline.

Before the 2014 reforms, however, women were allowed to select into MCOs. Thus, women with particularly strong preferences for high cost hospitals might have been more likely to opt away from MCOs than other women, which would overstate the impact of the MCO steering away from high cost hospitals. We address this selection problem by exploiting the patient identifiers in the dataset and including patient fixed effects that control for time invariant patient hospital preferences in equation (1).[10]

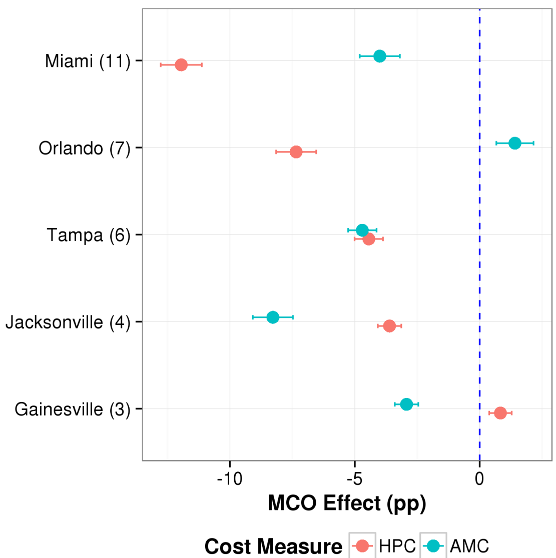
Figure 5 displays the fixed effect estimates. Our estimate of the impact of the steering falls after including these fixed effects; on average, women are about 2 percentage points less likely to go to a high cost hospital after switching to a MCO, holding preferences fixed, or about a 10 percent difference at baseline. The reduced effects of steering are consistent with women selecting into MCOs having weaker preferences for higher cost hospitals, but the effects of steering remain substantial.

Because the set of MCOs operating within Medicaid varied by Florida medical region, MCO steering effects could also vary by region. We thus interact the MCO steering effect with patient medical region. Figure 6 displays the region MCO effects for the five medical regions (out of 11 total) with academic medical centers, which are the regions around Gainesville (3), Jacksonville (4), Tampa (6), Orlando (7), and Miami (11). We estimate specifications with and without patient fixed effects, and find negative point estimates for MCO steering for all regions in both cases except for HPC hospitals for Gainesville and AMCs in Orlando. While adding fixed effects reduces the magnitude of the effects, all of the negative estimates are significantly different from zero with and without patient fixed effects. Thus, the MCO steering effects are not restricted to one region of Florida, but appear to be present in all of the regions containing AMCs.

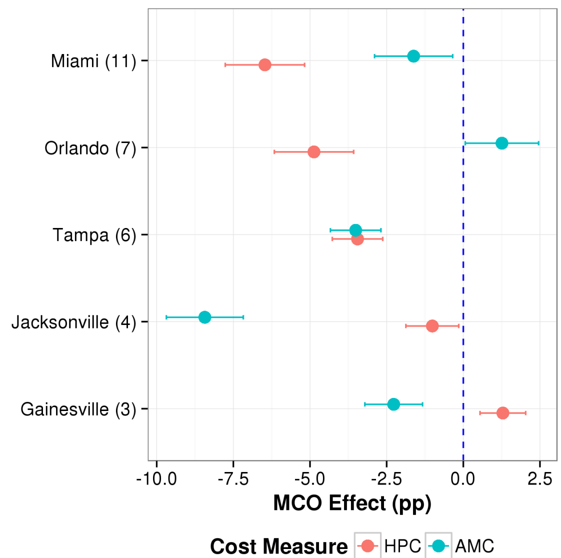
5 Welfare Trade-offs

The results in the previous section suggest that MCOs steer patients away from the highest cost facilities. The welfare impact of this steering, however, is ambiguous. To the extent that people value high cost hospitals due to potential higher quality care or better amenities, steering could be socially detrimental. However, if this steering simply moves procedures away from the highest cost hospitals with little or no welfare harm, it could be socially beneficial. In this section, we examine how this steering affects the trade-offs that patients face.

[10] For the specifications involving individual fixed effects, we use a linear probability approach, due to the computational burden and incidental parameters problems with a non-linear approach (Greene, 2004). We still identify zip code indicators through women that move over time.



(a) OLS



(b) Patient FE

Figure 6 MCO Steering Effects by Florida Medical Region

Note: Each figure displays the effect of being enrolled in an MCO on the probability of visiting a high cost hospital by different Florida hospital regions for all deliveries. We examine both of our proxies for high cost hospital. For each specification, the dot is the point estimate and the lines are the 95% confidence interval. Standard errors are clustered at the individual level. The right figure also controls for patient fixed effects.

In order to estimate the trade-offs associated with the steering described above, we estimate a multinomial choice model that allows us to assess how MCOs and FFS Medicaid differentially direct patients to providers. In particular, we measure how patients in MCOs and FFS weight travel, hospital quality, and hospital costs in choosing a hospital for childbirth. As Ho and Pakes (2014a) point out, a patient's referral to a specific hospital is the result of the preferences of the woman, her physician, and her insurer. In this section we remain agnostic about how these three entities interact in making a decision and write down a reduced form of this complex decision problem.

5.1 Model

We begin by reviewing a workhorse model of a patient's hospital choice which has been used as the cornerstone of a broader empirical model of provider bargaining (Capps et al. (2003), Ho (2006), Gowrisankaran et al. (2015)).

A patient i goes into labor at time t and has access to a set of hospitals H $(j = 1, ..., N)$ and an outside option $(j = 0)$. She chooses the specific hospital j based on the level of utility that she anticipates from receiving care there.

We assume that the hospital referral function takes the form:

$$u_{ijmt} = \beta_m^d d_{ijt} + \beta_m^{AMC} AMC_j + \beta_m^{HPC} HPC_j + \beta_m^{\xi} \xi_{jt} + \eta_{ij} + \epsilon_{ijt} \tag{2}$$

where i indexes the patient, j indexes the hospital, m indexes the type of Medicaid plan (FFS or MCO), and t indexes the birth. Also,

- AMC_j is an indicator for whether hospital j is an Academic Medical Center,
- HPC_j is an indicator for whether hospital j is a High Percentile Cost Hospital,
- d_{ijt} is the distance from patient i's residence to hospital j at time t,
- ξ_{jt} is the (potentially time varying) hospital quality,
- η_{ij} are unobserved hospital-patient effects, and
- ϵ_{ijt} is the iid logit error.

To estimate hospital quality (ξ_{jt}), we used the observed choice patterns of commercially insured women. In particular, we estimate ξ_{jt} through a multinomial logit regression with hospital dummy variables, after offsetting the disutility of distance for these consumers from a first stage Chamberlain (1980) estimation on commercial patients.[11] These hospital dummies, estimated separately for the pre-2010 period and post-2010 period, are our measures of ξ_{jt}.

We allow the effects of our main variables of interest – travel time, both proxies for high cost hospital, and hospital quality – to vary by the type of Medicaid plan m. While we allow the coefficients to freely differ by coverage type, we are concerned about the selection of patients into MCO plans, so $\eta_{ij} \not\perp MCO_{it}$. If patients select into MCOs because of their weaker preferences for high cost hospitals, then the estimates on high cost hospitals will differ between FFS and MCO patients because of differential preferences between the populations as well as the steering mechanism.

In order to control for selection effects, we include time-invariant patient specific preferences for different facilities in our estimation. These time-invariant hospital-patient effects also control for correlation between travel time and unobserved patient preferences that can bias estimates of the disutility of travel time. In Raval and Rosenbaum (2017), we find that the disutility of distance falls by about 45% after controlling for such unobserved patient preferences.

To estimate equation (2), we difference out the fixed hospital-patient effects (η_{ij}) using the fixed effect logit framework of Chamberlain (1980); details are included in Appendix A.[12] It is easiest to understand this procedure by rewriting the referral function as follows:

$$u_{ijmt} = \beta^d_{FFS} d_{ijt} + MCO_{it}[(\beta^d_{MCO} - \beta^d_{FFS}) d_{ijt}] + \delta_{j,FFS} + \delta_{j,MCO} MCO_{it} + \eta_{ij} + \epsilon_{ijt} \quad (3)$$

where:

- $\delta_{j,FFS} = \beta^{AMC}_{FFS} AMC_j + \beta^{HPC}_{FFS} HPC_j + \beta_{FFS} \xi_{jt}$

[11] These estimates are available upon request from the authors.

[12] The Chamberlain (1980) framework requires us to use each woman's first two births. We restrict the sample to women 21 or younger in 2006, the first year of our data, in order to make it more likely that the first birth in our data is the woman's first birth.

- $\delta_{j,MCO} = (\beta^{AMC}_{MCO} - \beta^{AMC}_{FFS})AMC_j + (\beta^{HPC}_{MCO} - \beta^{HPC}_{FFS})HPC_j + (\beta^{\xi}_{MCO} - \beta^{\xi}_{FFS})\xi_{jt}$

and MCO_{it} is an indicator for whether patient i is in a MCO in period t.

We can only identify parameters for variables that vary over time for at least some women. These are the distance parameters for FFS and MCO, β^d_{FFS} and β^d_{MCO}, based upon women who move over time, the quality parameters for FFS and MCO, β^{ξ}_{FFS} and β^{ξ}_{MCO}, based upon hospitals where the quality changes over time, and the difference in AMC and HPC parameters between MCO and FFS patients, $(\beta^{AMC}_{MCO} - \beta^{AMC}_{FFS})$ and $(\beta^{HPC}_{MCO} - \beta^{HPC}_{FFS})$, based upon women that switch between FFS and MCO over time. Since a hospital's status as an HPC or AMC is not time varying, we can not recover the levels of β^{AMC}_{MCO}, β^{AMC}_{FFS}, β^{HPC}_{MCO}, or β^{HPC}_{FFS}.

5.2 Results

Table II contains parameter estimates from our baseline specifications. The first three specifications examine all births, while the latter three examine only normal births. For each dataset, we include the AMC and HPC proxies for high cost, as well as both together in the same regression. In all of the specifications, patients in MCOs have a 15 percent lower cost of travelling than patients on FFS; the "disutility" of travel time falls from 0.073 for patients on FFS to 0.063 for patients on MCOs in the specifications including both proxies for high cost hospitals. This effect may reflect the MCO steering patients towards farther, lower cost hospitals.

Consistent with that, the estimates show that patients in MCOs are more likely to be steered away from high cost hospitals than patients in FFS. We consider the magnitude of this difference by comparing the implied marginal rate of substitution ("MRS") between cost and travel time, as well as quality and travel time, for MCO and FFS patients. For the measures of high cost hospitals, the MRS is the number of minutes of travel that would make patients equally likely to choose a farther low cost hospital and a closer high cost hospital. For the quality measures, the MRS is the number of minutes of travel that would make patients equally likely to choose a closer lower quality hospital and a farther higher quality hospital. Since a hospital's status as an AMC or HPC is time invariant in our data, we cannot recover the mean preferences of FFS patients for those hospitals and so cannot compute the exact difference in MRS between AMC or HPC and distance between MCO and FFS women. However, we can bound the difference between them. Appendix B contains the details of this procedure.

In Table III, we show the MRS computed from the estimates in Table II. Using the all birth sample and the AMC only specification, the difference in the MRS between AMCs and distance for FFS and MCO patients is between 7.0 and 8.0 minutes. For the HPC only specification, the difference in the MRS between HPCs and distance for FFS and MCO patients is between 7.4 and 8.3 minutes. If we include both AMC and HPC proxies in the specification, the MRS from going to either an AMC or HPC hospital under a MCO shrink, but remain significantly different from zero. We find very similar estimates if we only include normal births. Overall, these estimates show that patients in MCOs are more likely to be steered away from high cost hospitals than patients in HPCs, and that they would travel up to 8 minutes farther than FFS patients to go to a lower cost facility. Since the mean travel time to these women's hospital of choice is approximately 17 minutes, this is a large effect.

Using our measure of hospital quality, which uses the choices of commercial patients, we find that Medicaid patients tend to utilize the lower quality hospitals in their area. This could reflect network composition or informational issues for these women or the fact that hospitals that cater relatively more to Medicaid patients are not as high quality as hospitals that cater relatively more to commercial ones.[13] However, MCO and FFS patients behave similarly on this dimension, especially relative to steering based upon cost. For example, in the "Both" specification for all deliveries, the difference in MRS between a one standard deviation increase in quality and travel time for FFS and MCO patients is only 1.4 minutes.[14] For normal deliveries including both proxies, we see a similar picture.

One benefit of MCOs may be that they focus attention on those women who are likely to have more costly care, and may potentially steer them differently than the general population of women. Therefore, in Table XII we include interaction terms for whether or not the patient had any comorbidities as measured by their Charlson score; we designate these hospital

[13]There is some descriptive evidence on this last point in Goldman et al. (2007).

[14]It is -4.5 minutes for FFS patients and -5.9 minutes for MCO patients.

admissions as "complex".

We display the MRS for these patients in Table IV.[15] For these women, the MRS between AMC status and time is between 2 and 4 minutes, while the MRS between HPC and time is between 9 and 16 minutes. The AMC estimate is smaller than that obtained from normal labor and delivery, while the HPC estimate is larger, although neither of these differences are statistically significantly different from zero. Thus, we cannot conclude that MCOs steer patients with complex conditions away from high cost hospitals differently from those without such conditions; however, to the extent that AMCs have services that are of particular value to women with complex conditions, then the greater differential between HPCs and AMCs may make sense from an efficiency perspective.

Further, we find evidence that MCOs steer women with more complex conditions to *higher* quality hospitals and that they travel farther to do so. Similar to the broad population of Medicaid patients, FFS patients with complex conditions are more likely to go to a lower quality hospital. In contrast, MCO patients with complex conditions are more likely to go to higher quality hospitals. For MCO patients with complex conditions, the MRS between a standard deviation of quality and distance is 4 minutes, suggesting that these women would trade-off 4 additional minutes of travel time to go to a hospital that is one standard deviation better in quality.

5.3 Simulation

To help understand the aggregate impact of these estimates, we compare two scenarios: the choice patterns if every women had the FFS referral function, and the choice patterns if every woman had the MCO referral function. We examine the likelihood of going to an academic medical center or high percentile cost hospital, average travel time to the hospital that the woman goes to, and the share of hospitals in the top quartile of quality. To facilitate a comparison with the Florida Medicaid reforms, we focus on women having their first birth in 2013 or pre-reform 2014.[16]

[15]The parameter estimates are in Table XII.

[16]We use women's first births in the simulation, so that we do not need to account for potential switching costs from switching between facilities for the different births.

Table II Structural Estimates of Steering and Distance

	All Deliveries			Normal Deliveries		
	Academic	High Cost	Both	Academic	High Cost	Both
Time	-0.073	-0.072	-0.073	-0.072	-0.071	-0.072
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
MCO X Time	0.009	0.007	0.010	0.008	0.006	0.009
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
MCO X AMC	-0.510		-0.396	-0.519		-0.426
	(0.051)		(0.053)	(0.066)		(0.068)
MCO X HPC		-0.539	-0.434		-0.525	-0.431
		(0.052)	(0.054)		(0.067)	(0.069)
Quality	-0.317	-0.337	-0.332	-0.330	-0.346	-0.342
	(0.036)	(0.036)	(0.036)	(0.043)	(0.043)	(0.043)
MCO X Quality	-0.115	0.051	-0.040	-0.048	0.105	0.020
	(0.026)	(0.024)	(0.027)	(0.032)	(0.031)	(0.034)
N	19,001	19,001	19,001	12,391	12,391	12,391

Note: All specifications include hospital-patient interactions. N gives the number of women, which is the unit of observation used to compute the asymptotics. The quality effects reflect a one standard deviation increase in quality.

Table III Marginal Rates of Substitution

		All Deliveries			Normal Deliveries	
	Academic	High Cost	Both	Academic	High Cost	Both
AMC, Time	[7.012, 8.045]		[5.423, 6.289]	[7.210, 8.134]		[5.898, 6.720]
HPC, Time		[7.440, 8.265]	[5.946, 6.895]		[7.344, 7.993]	[5.971, 6.803]
Quality, Time	2.460	-0.259	1.356	1.346	-1.173	0.337

Note: These marginal rates of substitution (MRS) are computed using the point estimates in Table II. The bounds for the MRS between AMC and distance and HPC and distance are computed using the methodology in Appendix B.

Table IV Marginal Rates of Substitution: Complex and Non-Complex

	Non-Complex	Complex
AMC, Time	[5.638, 6.355]	[2.331, 4.020]
HPC, Time	[6.045, 6.813]	[9.295, 16.029]
Quality, Time	1.383	-4.622

Note: These marginal rates of substitution (MRS) are computed using the point estimates in Table XII. The bounds for the MRS between AMC and distance and HPC and distance are computed using the methodology in Appendix B.

In order to predict patient choices, we parametrize the hospital-patient effects η_{ij} that were differenced out in the estimation. We allow η_{ij} to vary by patient zip code and by patient "type" for each hospital. In particular, we define four types of women based upon their pre and post-reform MCO enrollment: women who were in a MCO before the reform and after, women who were on FFS before the reform and after, women who were on FFS before the reform and in a MCO after, and women who were on a MCO pre-reform and in FFS after. Since the reform induced women to join MCOs, the largest group is composed of women who were in FFS before the reform and in a MCO post-reform. Our assumption is that women's unobserved hospital preferences are similar to those of other women in her zip code who had the the same MCO enrollment pattern as her both before and after the reform. This differentiation of women allows us to account for differential patient preferences for facilities for women that make different selections of MCOs.[17]

The simulation results are in Table V. When moving from a FFS regime to a MCO regime, the share of these women going to an academic medical centers falls by 25 percent, or 3.9 percentage points, from 15.9% to 12.0%. The market share of HPC hospitals also falls by 17 percent or 4 percentage points. We find little change in the travel time that patients

[17] In particular, we recover patient zip code/hospital/type specific ηs using a similar method to the approach in Raval and Rosenbaum (2017). However, since there were not sufficient observations to identify the η for many hospital/zip code/type triads, we parameterize $\eta_{jzy} = \eta_{jz} + \eta_{jy}$, where y indexes the type, and z indexes the zip code. Taking the recovered η_{jzy}s as data, we use OLS to predict η_{jz} and η_{jy}. For any η_{jz} or η_{jy} parameter that is not identified in the regression, we assign it a value of 0 (i.e., which would give η_{izy} the mean within the zip code/hospital or type/hospital grouping). Using the recovered η_{jz} and η_{jy}, we then predict η_{jzy} for every hospital/zip code/type triad.

face or the quality of the hospitals that they visit. The average travel time increases by 0.4 minutes, or 3 percent, while the share of patients going to top quartile quality hospitals increases by 2.3 percentage points or by about 7.5 percent. Thus, while we find large steering effects away from high cost hospitals following the switch to MCOs, the changes in travel time are small and the changes to the quality of hospitals is positive but small.

Table V Simulation Results: Impact of MCO

	FFS	MCO
AMC Share	0.159	0.120
HPC Share	0.234	0.194
Avg. Travel Time	17.27	17.73
Top ξ_j Quality Share	0.30	0.33

Note: All of these results are based on the estimates in the sixth column of Table II, which includes both the Academic Medical Center and High Percentile Cost steering effects and examines only normal deliveries.

Overall, the picture that emerges from these results is a largely positive one for Medicaid MCOs. They seem to steer the general population of women away from higher cost hospitals and steer women with more complex needs to higher quality hospitals. However, these women do travel farther. We explore these results further in the next section, in the context of Florida's 2014 Medicaid reforms.

6 Florida Reform

In this section, we examine the effects of the 2014 comprehensive reform described in Section 2.3 by using the reform as an instrument for MCO enrollment. Since the 2014 policy reform required eligible members to enroll in MCOs, they should provide valid instruments unless women move as a result of the MCO rollout, which is unlikely. The IV estimates the local average treatment effect, or LATE, and so reflects the impact of being in an MCO on going to a high cost hospital for the women who are induced to switch into an MCO by the state's policy change. We also compare our results in this section to the results of the simulation in Section 5.3.

As Figure 3 shows, the share of MCOs increases by about 70 percentage points after the

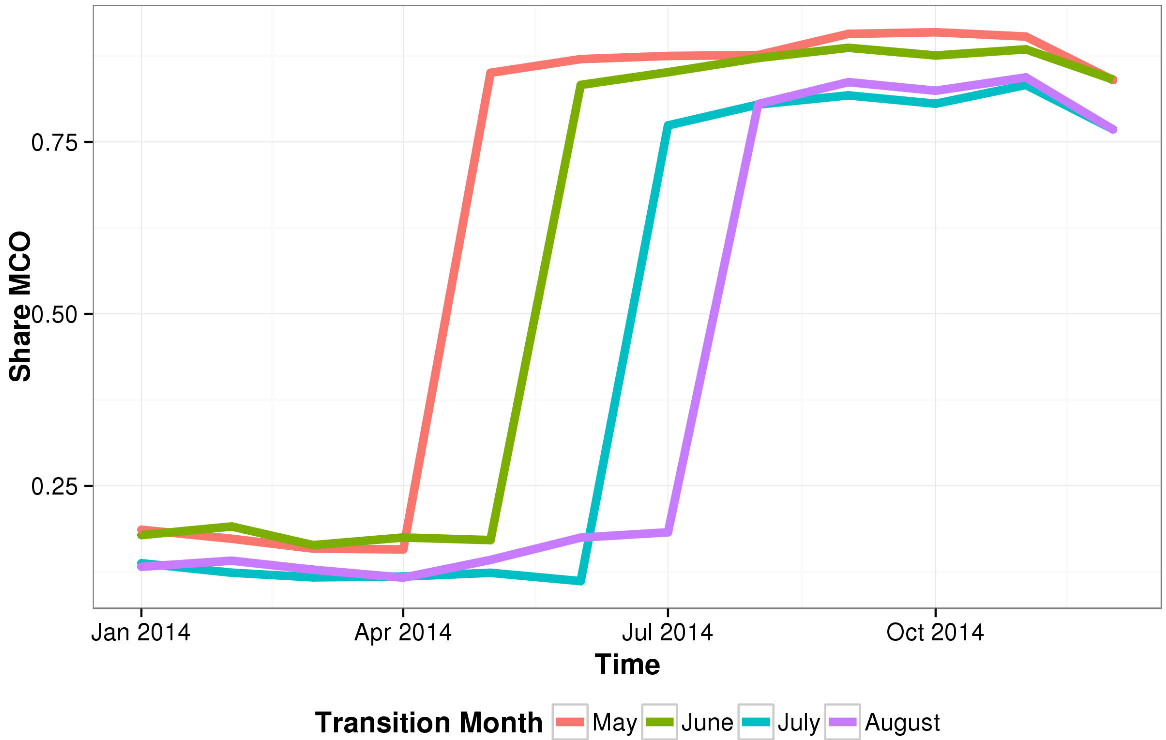


Figure 7 Share of Medicaid Obstetrics Patients in MCO over Time by Reform Onset Period

Note: Florida Medical Regions 2, 3, and 4 had the 2014 policy reform begin on May 1st, Medical Regions 5, 6, and 8 on June 1st, Medical Regions 10 and 11 on July 1st, and Medical Regions 1, 7, and 9 on August 1st.

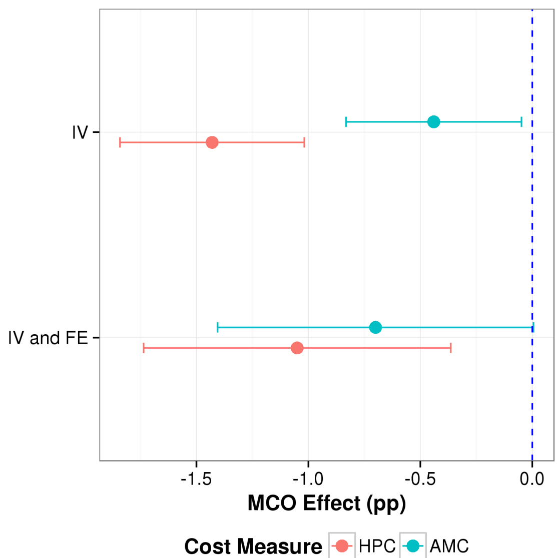
2014 reforms. The rollout of the reform was staggered across four months, with the timing varying by Florida hospital region. Thus, different localities in Florida were first exposed to the 2014 reform at different times. Figure 7 depicts this variation through the change in MCO share by the month in which the reform was implemented. The share of Florida obstetrics patients in MCOs jumps dramatically in the month of reform implementation. For example, in July the MCO share was over 85 percent for the May and June adopting regions and below 20 percent in the August adopting region. We cannot include county-month dummies in the regression, as in our earlier estimates, as these dummies would eliminate all of the variation due to the reform. Instead, we examine one specification without any time controls and a second specification with county specific time trends.

In Figure 8, we display the results from the linear probability IV both with and without fixed effects and with and without county trends. We estimate this using data from 2010-2014. The point estimates suggest that these women are steered away from AMCs with a steering effect between 0.4 and 0.7 percentage points. For HPC hospitals, the point estimates suggest steering that ranges from 0.5 to 1.4 percentage points. Using 2013 shares as a baseline, these estimates imply a 3 to 5 percent fall in demand for AMC hospitals and a 2 to 6 percent fall in demand for HPC hospitals. In Table VI, we show the impact of the reform on patient travel time and hospital quality. While some of the estimates are noisy, we find no evidence that patients are traveling much farther to go to the hospital or that they are going to lower quality facilitates.

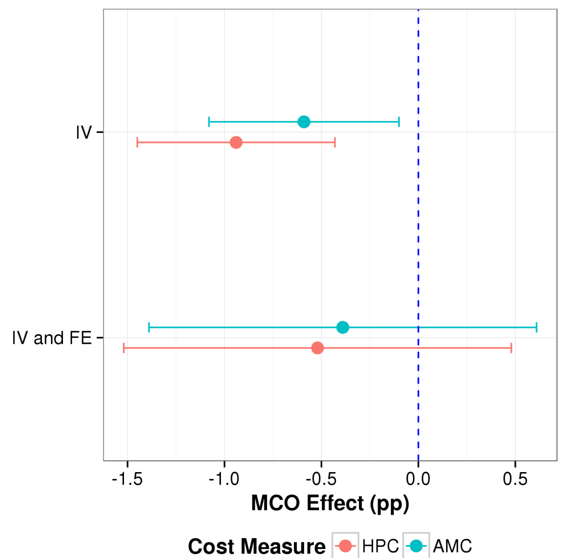
The results on travel time and quality are consistent with our simulations; we find no evidence of an increase in travel time or that patients are going to lower quality facilities. However, regarding high cost hospitals, we find considerably smaller steering effects from the 2014 reform than either our pre-reform reduced form effects or from the estimates of the structural model. One explanation for this smaller effect is that it takes time for MCOs to implement steering mechanisms, and our analysis only examines the first few months of the reform. Another explanation is that it is difficult to "scale up" steering; for example, if steering largely occurs through physicians, physicians willing to steer may have capacity constraints.

In Table VIII and Table IX, we show the results of linear probability models where we include interactions for patients with complications. The point estimates from these regressions show that these higher acuity patients are differentially steered towards AMCs, but still are steered away from HPCs. This may be due to the higher level of expertise for complex conditions in these higher acuity facilities. This is in contrast to the structural estimation, where we found that higher acuity patients in MCOs were still steered away from AMCs. Regarding distance and quality, we find that higher acuity MCO patients needed to travel a bit farther (less than a minute) than non-MCO patients. Estimates regarding hospital quality are very noisy.

Overall, consistent with our earlier analyses, our analysis of the reform suggests that MCO steering had efficiency benefits. While the magnitudes are smaller than what would be predicted by the pre-merger period, our estimates suggest that MCOs steer patients away



(a) Without County Trends



(b) With County Trends

Figure 8 MCO Steering Effects Induced by the 2014 Reform

Note: Each figure displays the effect of being enrolled in an MCO on the probability of visiting a high cost hospital using the 2014 policy reform as an instrument. For each specification, the dot is the point estimate and the lines are the 95% confidence interval. Standard errors are clustered at the zip code level. The left figure does not include county time trends while the right figure does. Resuls are in Table XIII and Table XIV.

from high cost hospitals. For more complex patients, we find evidence of steering towards AMCs but away from HPCs, which could reflect the efficient steering of those patients to higher quality facilities after the reform. However, we find no evidence that the reform induces patients to travel much farther or go to lower quality facilities.

Table VI MCO Steering Effect Induced by 2014 Reform: Distance and Quality

	IV Distance (Minutes)	IV Top Qual Quant	IV and FE Distance (Minutes)	IV and FE Top Qual Quant
Estimate	0.168	0.470	0.220	0.450
	(0.045)	(0.230)	(0.086)	(0.400)
N	369,855	369,855	87,410	87,410

Note: This first title row lists the estimation specification: IV or IV and FE. The second title row lists whether the dependent variable is an individual's distance traveled to hospital or whether they went to a hospital in the top quality quantile. All specifications include (patient) zip code dummy variables and use whether an individual is in a reform county as an instrument for whether an individual is in an MCO. The IV and FE (fixed effect) specification includes person specific fixed effects. All standard errors are clustered at the individual level. This uses data from 2010-2014.

Table VII MCO Steering Effect Induced by 2014 Reform: Distance and Quality With Time Trends

	IV Distance (Minutes)	IV Top Qual Quant	IV and FE Distance (Minutes)	IV and FE Top Qual Quant
Estimate	0.060	-0.570	0.042	-0.260
	(0.056)	(0.280)	(0.122)	(0.570)
N	369,855	369,855	87,410	87,410

Note: This first title row lists the estimation specification: IV or IV and FE. The second title row lists whether the dependent variable is an individual's distance traveled to hospital or whether they went to a hospital in the top quality quantile. These specifications include (patient) zip code dummy variables and county specific time trends and use whether an individual is in a reform county as an instrument for whether an individual is in an MCO. The IV and FE (fixed effect) specification includes person specific fixed effects. All standard errors are clustered at the individual level. This uses data from 2010-2014.

Table VIII Impact of Reform on AMC and HPC Steering for Patients With Complications

	AMC		HPC	
	IV	IV/FE	IV	IV/FE
MCO	-0.610	-0.930	-1.420	-1.020
	(0.210)	(0.360)	(0.210)	(0.360)
Complex	0.650	-0.380	9.000	6.160
	(0.440)	(1.080)	(0.420)	(1.030)
MCO X Complex	3.550	4.400	-1.500	-1.240
	(1.080)	(2.040)	(1.020)	(2.030)
N	369,855	87,410	369,855	87,410

Note: This first title row lists the dependent variable. All specifications include (patient) zip code dummy variables. The FE (fixed effect) specification includes person specific fixed effects. All standard errors are clustered at the individual level.

Table IX Impact of Reform on Quality and Travel Time for Patients with Complications

	Distance (Minutes)		Top Qual Quant	
	IV	IV/FE	IV	IV/FE
MCO	0.153	0.230	0.430	0.470
	(0.046)	(0.088)	(0.230)	(0.410)
Complex	0.584	0.299	1.010	1.640
	(0.085)	(0.226)	(0.460)	(1.140)
MCO X Complex	0.224	-0.217	0.570	-0.610
	(0.222)	(0.443)	(1.130)	(2.240)
N	369,855	87,410	369,855	87,410

Note: This first title row lists the dependent variable. All specifications include (patient) zip code dummy variables. The FE (fixed effect) specification includes person specific fixed effects. All standard errors are clustered at the individual level.

7 Conclusion

Given the increasing adoption of Medicaid MCOs, it is very important to understand how MCOs affect both health care costs and member welfare. There are two primary margins by which these MCOs can reduce health care costs relative to FFS plans – by reducing the number of treatments or encouraging patients to choose more efficient providers. In this paper, we study the steering margin and leave the health care utilization margin for future work.

Using a multiple estimation approaches, we provide evidence that MCOs are steering women to lower cost facilities for labor and delivery for Florida Medicaid enrollees. While these women are steered away from high cost hospitals, we find no evidence that they go to lower quality facilities using our patient-based quality metric or that they travel much farther for their care. These results thus suggest that MCOs may reduce health care costs through steering without deleterious effects on enrollee welfare. Therefore, this MCO steering may help to yield more efficient patient care.

Future research should aim to study the scope and mechanisms of this steering. For example, we have examined labor and delivery, but the degree of steering could vary across conditions. Insurers could use many different mechanisms for steering, including through physician referrals, persuasion of members, or network status.

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A Estimation Details: Fixed Effects Approach

In our fixed effects approach, we allow for individual specific preferences for hospitals (Raval and Rosenbaum, 2017). In the fixed effects approach, we assume that the hospital referral function takes the form:

$$u_{ijmt} = \underbrace{\beta^d_{FFS} d_{ijt} + MCO_{it}[(\beta^d_{MCO} - \beta^d_{FFS}) d_{ijt}] + \delta_{j,FFS} + \delta_{j,MCO} MCO_{it} + \eta_{ij}}_{\gamma_{ijt}} + \epsilon_{ijt} \quad (4)$$

In this section, we impose that the β coefficients are constant for all women, so the effects of steering are homogeneous across all women. In addition, women's time varying preferences for hospitals (ϵ_{ijt}) are assumed independent of whether or not she joins an MCO (MCO_{it}).

To estimate equation (4), we use the Chamberlain (1980) approach for estimating logit fixed effects to identify the β coefficients. Chamberlain shows that these parameters can be recovered by conditioning on the women attending both hospitals, and using variation in the sequence of the choices. Formally, the likelihood contribution for a given woman i can be written as:

$$Pr(H_{i1} = k, H_{i2} = k' | H_{i1} + H_{i2} = 1) = \frac{\exp(\Delta\gamma_{i1} - \Delta\gamma_{i2})}{1 + \exp(\Delta\gamma_{i1} - \Delta\gamma_{i2})}$$

where

$$\Delta\gamma_{it} = \gamma_{ik1} - \gamma_{ik'1}.$$

Since the η_{ij}'s enter linearly in γ_{ikt}, they therefore cancel out in this specification.

In this approach, the only women with a positive likelihood contribution are those who switched hospitals between their first and second child. We identify the coefficient on distance from observing the difference in travel times between their chosen and not chosen hospital for each birth. We identify the impact of MCO steering by looking at whether women were more likely to chose an academic medical center/higher cost facility/higher quality facility in the birth in which they were in an MCO or the birth in which they were not.

B Bounding Difference in MRS

As noted in Section 5, we cannot recover the exact difference in MRS between AMCs/HPCs and distance for FFS and MCO women, because the time invariant preferences of FFS members are differenced out of the fixed effects estimation. Nevertheless, as we describe below, we can bound this difference.

The MRSs for FFS and MCO patients between AMCs and distance is given by:

$$MRS^{FFS}_{AMC,dist} = \frac{\beta^{AMC}_{FFS}}{\beta^{d}_{FFS}}$$
$$MRS^{MCO}_{AMC,dist} = \frac{\beta^{AMC}_{MCO}}{\beta^{d}_{MCO}}.$$

$MRS^{MCO}_{AMC,dist}$ can be rewritten as

$$MRS^{MCO}_{AMC,dist} = \frac{\beta^{AMC}_{FFS} + (\beta^{AMC}_{MCO} - \beta^{AMC}_{FFS})}{\beta^{d}_{FFS} + (\beta^{d}_{MCO} - \beta^{d}_{FFS})}.$$

The difference between the two is then given by:

$$MRS^{FFS}_{AMC,dist} - MRS^{MCO}_{AMC,dist} = \frac{\beta^{AMC}_{FFS}}{\beta^{d}_{FFS}} - \frac{\beta^{AMC}_{FFS} + (\beta^{AMC}_{MCO} - \beta^{AMC}_{FFS})}{\beta^{d}_{FFS} + (\beta^{d}_{MCO} - \beta^{d}_{FFS})} \quad (5)$$

From our fixed effects estimates, we can recover

- β^{d}_{FFS}
- $(\beta^{AMC}_{MCO} - \beta^{AMC}_{FFS})$
- $(\beta^{d}_{MCO} - \beta^{d}_{FFS})$,

but cannot recover β^{AMC}_{FFS} for the reasons noted above.

In our estimates, $(\beta^{d}_{MCO} - \beta^{d}_{FFS}) > 0$ (e.g., MCO patients display more willingness to travel than FFS patients). Therefore, equation (5) is bounded by

$$\frac{\beta^{AMC}_{FFS}}{\beta^{d}_{FFS}} - \frac{\beta^{AMC}_{FFS} + (\beta^{AMC}_{MCO} - \beta^{AMC}_{FFS})}{\beta^{d}_{FFS}}$$
$$= \frac{(\beta^{AMC}_{MCO} - \beta^{AMC}_{FFS})}{\beta^{d}_{FFS}}$$

and

$$\frac{\beta^{AMC}_{FFS}}{\beta^d_{FFS} + (\beta^d_{MCO} - \beta^d_{FFS})} - \frac{\beta^{AMC}_{FFS} + (\beta^{AMC}_{MCO} - \beta^{AMC}_{FFS})}{\beta^d_{FFS} + (\beta^d_{MCO} - \beta^d_{FFS})}$$
$$= \frac{(\beta^d_{MCO} - \beta^d_{FFS})}{\beta^d_{FFS} + (\beta^d_{MCO} - \beta^d_{FFS})}$$

which can both be computed from the estimated parameters.

An identical approach to this can be used to identify bounds for the difference in MRS between HPCs and distance for FFS and MCO women.

C Additional Graphs and Tables

Table X MCO Steering Effect (Average Marginal Effect) All Births

	OLS HPC	OLS AMC	FE HPC	FE AMC	Probit HPC	Probit AMC
Estimate	-3.810	-2.410	-2.190	-1.960	-6.200	-3.970
	(0.110)	(0.110)	(0.170)	(0.170)	(0.180)	(0.180)
N	724,788	724,788	307,661	307,661	421,710	392,910

Note: This first title row lists the estimation specification: OLS (linear probability), FE (linear probability), or probit. The second title row lists whether the dependent variable is the HPC measure or the AMC measure. All specifications include (patient) zip code dummy variables. The OLS and FE specifications include county month dummy variables, while the Probit specification includes month dummy variables. The FE (fixed effect) specification includes person specific fixed effects. All standard errors are clustered at the individual level.

Table XI MCO Steering Effect (Average Marginal Effect) Normal Births

	OLS HPC	OLS AMC	FE HPC	FE AMC	Probit HPC	Probit AMC
Estimate	-3.840	-2.260	-1.860	-1.680	-6.360	-3.820
	(0.120)	(0.120)	(0.200)	(0.200)	(0.200)	(0.200)
N	562,439	562,439	208,102	208,102	324,024	301,733

Note: This first title row lists the estimation specification: OLS (linear probability), FE (linear probability), or probit. The second title row lists whether the dependent variable is the HPC measure or the AMC measure. All specifications include (patient) zip code dummy variables. The OLS and FE specifications include county month dummy variables, while the Probit specification includes month dummy variables. The FE (fixed effect) specification includes person specific fixed effects. All standard errors are clustered at the individual level.

Table XII Structural Estimates of Steering and Distance: With Complications

	Academic	High Cost	Both
Time	-0.073	-0.072	-0.073
	(0.002)	(0.002)	(0.002)
MCO X Time	0.008	0.006	0.008
	(0.002)	(0.002)	(0.002)
Complex X Time	0.000	-0.001	-0.006
	(0.007)	(0.007)	(0.007)
MCO X Complex X Time	0.034	0.035	0.036
	(0.012)	(0.011)	(0.012)
MCO X AMC	-0.520		-0.411
	(0.053)		(0.055)
Complex X AMC	0.673		0.527
	(0.133)		(0.142)
MCO X Complex X AMC	0.213		0.228
	(0.230)		(0.263)
MCO X HPC		-0.546	-0.441
		(0.054)	(0.056)
Complex X HPC		1.081	1.005
		(0.141)	(0.144)
MCO X Complex X HPC		-0.155	-0.288
		(0.208)	(0.232)
Quality	-0.328	-0.337	-0.336
	(0.036)	(0.036)	(0.037)
MCO X Quality	-0.126	0.041	-0.050
	(0.026)	(0.025)	(0.028)
Complex X Quality	0.392	0.095	0.215
	(0.066)	(0.060)	(0.070)
MCO X Complex X Quality	0.277	0.238	0.312
	(0.130)	(0.108)	(0.140)
N	19,001	19,001	19,001

Note: All specifications include hospital-patient interactions. N gives the number of women, which is the unit of observation used to compute the asymptotics. The quality effects reflect a one standard deviation increase in quality.

Table XIII MCO Steering Effect (Average Marginal Effect) From Reform

	IV HPC	IV AMC	IV and FE HPC	IV and FE AMC
Estimate	-1.430	-0.440	-1.050	-0.700
	(0.210)	(0.200)	(0.350)	(0.360)
N	369,855	369,855	87,410	87,410

Note: This first title row lists the estimation specification: IV or IV and FE. The second title row lists whether the dependent variable is the HPC measure or the AMC measure. All specifications include (patient) zip code dummy variables and use whether an individual is in a reform county as an instrument for whether an individual is in an MCO. The IV and FE (fixed effect) specification includes person specific fixed effects. All standard errors are clustered at the individual level.

Table XIV MCO Steering Effect (Average Marginal Effect) From Reform With Trends

	IV HPC	IV AMC	IV and FE HPC	IV and FE AMC
Estimate	-0.940	-0.590	-0.520	-0.390
	(0.260)	(0.250)	(0.510)	(0.510)
N	369,855	369,855	87,410	87,410

Note: This first title row lists the estimation specification: IV or IV and FE. The second title row lists whether the dependent variable is the HPC measure or the AMC measure. These specifications include (patient) zip code dummy variables and county specific time trends and use whether an individual is in a reform county as an instrument for whether an individual is in an MCO. The IV and FE (fixed effect) specification includes person specific fixed effects. All standard errors are clustered at the individual level.