Do financial incentives affect care provision in Medicaid? Evidence from Florida Medicaid's Payment Reform

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Abstract

While there is a large body of literature examining how physicians respond to financial incentives in the context of Medicare and private payers, evidence on this issue for Medicaid is scant. Since Medicaid patients typically constitute only a small fraction of a physician's patients, evidence in other settings may not apply to Medicaid. On this front, I study how care provision responds to Florida Medicaid's 2017 payment reform, which transitions from a fee-for-service to a prospective payment system for outpatient services. This transition creates procedure-specific payment shocks. Using procedure-level policy exposure measures, I find evidence that physicians reduce the use of procedures that are expected ex ante to be more likely to receive no payment under the new system. Additionally, the effects are concentrated on patients without co-morbidities and are observed only in facilities that are more dependent on Medicaid revenues. These findings imply that physicians do respond to financial incentives for Medicaid services. Thus, similar reforms hold out the promise to improve cost-efficiency in health care for Medicaid patients.

Keywords: *healthcare financing, financial incentives, prospective payment system, Medicaid payment reform, Enhanced Ambulatory Patient Group (EAPG)*

JEL Classification: *H51, H75, I11, I13, I18*

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1 Introduction

Slowing health care cost growth has long been a primary objective of US public policy. To this end, there is a growing interest in transitioning from traditional fee-for-service to alternative payment models (e.g., prospective, capitated, episode-based bundled, pay-for-performance payments). A fee-for-service (FFS) payment system (e.g., actual cost-based reimbursement, fee schedule) does not bundle services and pay physicians for each additional service provided, rewarding them to perform more unnecessary procedures. Critics blame fee-for-service payments for overprovision, inefficiency, incoordination, and fueling health expenditures without improving health outcomes (e.g., Hackbarth, Reischauer and Mutti 2008; Arrow et al. 2009; Ginsburg 2011; Ikegami 2015). Unlike fee-for-service, a prospective payment system typically bundles services and pays physicians predetermined amounts, regardless of actual costs for those services performed. As a result, the more care physicians provide under a prospective payment, the lower the profit margins they receive, thereby sharing financial risk between payers and providers. This may incent physicians to reduce the level of unnecessary services provided and has the potential to lower the costs while maintaining or improving the quality of care (Altman 2012). However, prospective payments could result in valuable treatments not being provided (Ellis and McGuire 1986). Therefore, how physicians respond to such a transition in the payment system is an important empirical question in determining whether it could be a promising path to promote cost-efficiency.

In this paper, I exploit a Florida Medicaid payment reform to investigate this issue in the context of Medicaid. Effective July 1, 2017, Florida Medicaid replaced its reimbursement methods for outpatient services. Both hospitals and ambulatory surgical centers (ASCs) are subject to this reform. This paper focuses on ASCs due to data availability.[1] Prior to the reform, Florida Medicaid reimbursed each payable ASC service on a medical claim based on a fee schedule. With the reform, Florida Medicaid adopted an outpatient prospective payment system (OPPS) based on the Enhanced Ambulatory Patient Groups (EAPGs).[2] The new payment system discourages providers from providing additional

[1] Prior to the reform, Florida Medicaid reimbursed hospitals a provider-specific, cost-based reimbursement rate for each payable outpatient service. Payments were then retrospectively adjusted and settled based on cost reports years after the services were provided. This paper focuses on ASCs as the pre-reformed rates, a key variable in my empirical model, are unavailable for hospitals but available for ASCs.

[2] As of 2017, states (including DC) that have adopted an EAPG-based OPPS for their Medicaid patients include Colorado, Florida, Illinois, Massachusetts, New York, Ohio, Virginia, Washington, and Wisconsin, as well as Washington DC.

low-intensity procedures for the same medical visit, intending to curb unnecessary low-intensity procedures. As low-intensity procedures are more adversely affected relative to high-intensity procedures, the reform induces procedure-specific payment shocks that are plausibly exogenous to other determinants of care provisions.

This paper mainly contributes to two strands of the health economics literature. First, it relates to studies on how financial incentives affect procedure choice. Second, this paper relates to the literature on how health care providers (e.g., hospitals, physicians) respond to a different type of payment system. While there is a large body of studies for Medicare and private payers, little is known about these issues for Medicaid. As Medicaid patients typically constitute only a small fraction of a physician's patients, evidence for Medicare or private payers, whose patients usually make up the majority of physicians' patients, may not apply to Medicaid. While previous works for Medicaid (e.g., Gruber, Kim and Mayzlin 1999; Grant 2009; Alexander 2017) focused on delivery procedures, the study analyzes across-the-board outpatient procedures for Medicaid patients. Moreover, to my knowledge, this study is the first to estimate the effects of payment reform on the volume of care for Medicaid services.

Using an identification strategy based on procedure-level reform exposure measures, I estimate the effects of the reform on care provision. I find evidence that physicians are responsive to the financial incentives in this Medicaid setting. Namely, they reduced the use of procedures that are expected ex ante to be more likely to receive no payment under the new payment system. Results also show that physician responsiveness was concentrated on patients without co-morbidities. Also, the effects are observed only in ASCs that were more dependent on Medicaid revenues.

These findings suggest that physicians' financial incentives may play an important role in determining the volume of care provision in Medicaid. Moreover, bundling services has the potential to reduce the provision of clinically wasteful procedures. As such, payment policies may hold out the promise to promote cost-efficiency and contain Medicaid expenditures.

The remainder of the paper is organized as follows. Section 2 reviews relevant literature. Section 3 introduces Florida's Medicaid payment reform and derives procedure-level policy exposure measures. Sections 4 and 5 describe identification strategy and data. Results are presented in Section 6. Section 7 discusses limitations. Finally, Section 8 concludes with policy implications.

2 Literature Review

This paper mainly contributes to two strands of literature. First, it relates to the literature on how financial incentives affect the health care supply.[3] Theoretically, the relationship is undetermined a priori. A neoclassical model of physicians as profit-maximizing firms under market demand constraints predicts that the level of services will decrease following a fee cut. However, this view fails to consider that physicians may not be constrained by market demand and may induce demand to their asymmetric information advantages over the patients regarding their medical conditions and treatments. As such, physicians may increase the volume of services to recoup the income loss due to a price cut or even sustain a "target income."[4] To incorporate the two polar cases of profit maximization and target income, McGuire and Pauly (1991) proposed a model in which physicians maximize their generalized utility. The utility depends positively on net income and leisure and negatively on demand inducement due to, e.g., ethics, threats of malpractice suits, patient expectations, etc. With this utility function, a lower price would exert downward pressures on physicians' income (the "income effects") and, at the same time, induces physicians to switch to more expensive alternatives (the "substitution effects"). How the health care supply responds to the lower price depends on the relative sizes of income and substitution effects. When the substitution effects dominate, demand inducement is less profitable. The physician may substitute away from services directly affected and thereby decrease the level of those services performed, resembling a profit-maximizing firm.[5] Conversely, when the income effects dominate, demand inducement becomes desirable. The physician may induce demand by expanding the patient's demand, increasing the level of services performed. In an extreme case, when the income effects are all that matter, the physician seeks a "target income," entirely undoing the price cut.[6] Empirically, the evidence is mixed. On one hand, some studies find positive financial incentive effects. Namely, physicians prescribe more procedures when the payment increases or

[3] See McGuire (2000) and Chandra, Cutler and Song (2011) for reviews on this literature.

[4] See Johnson and Rehavi (2016) for evidence on physician-induced demand due to the information gap between physicians and patients.

[5] A profit maximizer only considers the marginal profit, disregarding other factors such as income. Accordingly, their income effect is always zero (Folland, Goodman and Stano 2016).

[6] Another mechanism for the level of services to increase with an price cut is via a backward-banding supply curve. That is, at a sufficiently high income, the supply of labor bends backwardly to be downward sloping. Along the segment of the backward-banding supply curve, the physician becomes so rich that they spend more time in leisure to enjoy the high income (Folland, Goodman and Stano 2016). See Hadley et al. 2009 for suggestive support for the existence of a backward-banding supply curve for Medicare services.

when the payment of an alternative decreases (Gruber, Kim and Mayzlin 1999; Hadley et al. 2009; Grant 2009; Clemens and Gottlieb 2014; Alexander 2017; Foo, Lee and Fong 2017). On the other hand, consistent with the demand inducement, other studies find negative financial incentive effects (Rice 1983; Gruber and Owings 1996; Yip 1998; He and Mellor 2012; Jacobson et al. 2013). Most of these papers focus on the provision of specific procedures such as C-sections, coronary artery bypass grafting, diagnostic tests, and chemotherapy. Regardless of the mixed evidence, the notion that physicians would increase the volume due to price cuts is commonly assumed in policymaking. For example, The Health Care Financing Administration (HCFA) assumes half of any Medicare payment reduction would be offset by a volume increase (Physician Payment Review Commission 1991).

Second, this paper relates to the literature on how health care providers (e.g., hospitals, physicians) responds to a different payment scheme such as prospective (Cutler 1993; Ellis and McGuire 1996; Dafny 2005), capitated (Dickstein 2011; Ho and Pakes 2014), episode-based bundled (Carroll et al. 2018), and pay-for-performance payments (Darden, McCarthy and Barrette 2019; Alexander 2020). These studies provide evidence that providers may respond by changing the intensity of services, becoming more likely to admit profitable patients, reallocating patients across facilities, shifting cost burdens to patients untargeted by the payment scheme, and altering coding practices to their favor.

However, although there is a large body of research for Medicare and private payers in these two strands of literature, works for Medicaid are scant Gruber, Kim and Mayzlin (1999); Grant (2009), and Alexander (2017) provide Medicaid studies focusing on C-sections. Moreover, while the effects of payment reforms have been widely examined in the inpatient or other settings, little is known about their effectiveness for outpatient services, except for He and Mellor (2012) who examined Medicare's transition to an outpatient prospective payment system in 2000.[7]

[7] Other Medicare settings studied in the literature include inpatient acute care (Cutler 1993), inpatient psychiatric care (Norton et al. 2002), inpatient rehabilitation care (Sood, Buntin and Escarce 2008), skilled nursing facility care (White 2003; Grabowski, Afendulis and McGuire 2011), and home care (McCall et al. 2003). See Salkever (2000) and Chalkley and Malcomson (2000) for reviews of relevant literature.

3 Background

3.1 Florida's Medicaid Payment Reform[8]

Florida Medicaid's 2017 reform changed its payment method for outpatient services provided to Medicaid FFS patients. Under the previous payment system, outpatient procedures provided by the ASCs were categorized into 14 groups, and each received a scheduled group rate according to its Current Procedural Terminology (CPT) code. However, the new payment method—a prospective payment system (PPS) based on Enhanced Ambulatory Patient Groupings (EAPGs)—categorizes outpatient procedures that are clinically similar and require similar resource costs into an EAPG group. Compared to the previous grouping, the EAPG grouping is much more granular.[9] Each EAPG group carries a "weight," referred to as an "EAPG weight," which measures the cost required to perform the procedure relative to that of an average procedure.[10] Defined by the EAPG Definitions Manual (3M 2015) through a list of CPT codes, "significant procedures" are usually the primary reason for a medical episode and require the majority of resources incurred during the episode. With an assigned EAPG group, each significant procedure performed during the episode receives a payment amount using the following formula:

$$\text{Payment} = \underbrace{\text{Base rate} \times \text{EAPG weight}}_{\text{full payment}} \times (\text{Consolidation/Discount factor}). \tag{1}$$

In the formula, "Base rate" is a common factor for all procedures.[11] "EAPG weight" is constant across procedures in the same EAPG group but varies across EAPG groups.[12]

[8] Information in this section is drawn from Florida's Agency for Health Care Administration (AHCA) website. For more details, see https://ahca.myflorida.com/medicaid/finance/finance/institutional/hoppps.shtml.

[9] There are 564 different EAPGs under version 3.12 of the 3M Enhanced APG System Definitions Manual, the same version used by Florida Medicaid through my study period.

[10] An EAPG weight is based on statewide providers' average cost of performing any procedure in the EAPG. This ensures that a service receives the same payment regardless of the provider and incentivizes providers to improve efficiency. EAPG weights are calibrated such that the volume-weighted average of all the weights is 1. For example, the EAPG group, "level 1 skin repair," has a weight of 0.5772, which indicates that the resource cost of any procedure in the group is 0.5772 times that of a weighted average procedure.

[11] During the design phase of the new payment system, base rates are calibrated using historical outpatient claim data so that the reform is conducted in a budget-neutral manner separately for hospitals and ASCs, holding physicians' behavior fixed. The base rate was $276.66 in the state fiscal year (SFY) of 2017, which spans between 2017 Q3 and 2018 Q2. It increased to $279.40 in the SFY of 2018.

[12] EAPG weights for ASC services did not change through 2018, the end of the study period.

By factoring in EAPG weight, EAPGs link payment to procedure intensity.

The product of the first two terms, Base rate × EAPG weight, is referred to as the "full payment". However, not all services are reimbursed for the full payment. Instead, EAPGs provide sophisticated ways to bundle services to curb unnecessary services and promote cost-efficiency. Specifically, the significant procedure with the highest weight during an episode is designated as the "primary procedure." During the same episode, an additional significant procedure performed is consolidated and receives zero payment if it is clinically related to or the same as the primary procedure; in this case, the "Consolidation factor" in the formula is 0. Conversely, if the additional significant procedure is clinically unrelated to the primary procedure, it receives a discounted payment of 50% of its full payment rate; in this case, the "Discount factor" in the formula is 50%. The rationale behind the consolidation and discount is that the resource cost required to perform a procedure alongside a related procedure is less than the cost required to perform the procedure by itself. Whether any two procedures are deemed clinically related is established by the EAPG developer, 3M, based on clinical judgment. Nonetheless, both the rule and the discount factor can be altered by the Medicaid agency to adjust financial incentives.[13]

The EAPG payment for the entire episode is the sum of all service items' payment amounts.[14] Adapted from the EAPG Definitions Manual, Table 1 shows an example of applying the EAPGs to a fictitious episode's services.

3.2 Expected Payment Shock

The objective of this paper is to examine how care provisions respond to financial incentives created by the reform. By switching from a fee-for-service to a prospective payment system, the reform creates procedure-specific payment shocks. In addition, the payment that a procedure receives depends on whether a related procedure with a higher intensity or the same procedure is performed for the same episode. Namely, the procedure-specific payment shock is not fixed but context-based.

To gauge the reform-induced financial incentives, I construct expected payment shocks as follows.[15] For procedure i, let P_i^0 and P_i^1 denote the pre-reform payment and post-

[13] Florida Medicaid sets the discount factor and adopts 3M's default rule of determining consolidated procedures.

[14] In contrast, an inpatient diagnosis-related group (DRG) payment method assigns a DRG to an entire claim and reimburses a flat rate based on the DRG code for all services performed during a medical episode.

[15] The purpose of constructing expected payment shocks is to measure the financial incentives using only pre-reform and pre-determined data in a later section. In doing so, the measures of financial incentives are plausibly exogenous.

reform full payment. Additionally, p_i^c denotes the likelihood of consolidation (i.e., propensity for consolidation); p_i^d, the likelihood of discount (i.e., propensity for discount); accordingly, the likelihood of receiving full payment is $1 - p_i^c - p_i^d$. Given that the discount and consolidation factors are $1/2$ and 0, the post-reform payment is thus $(1/2) \times P_i^1$ when i is discounted and 0 when i is consolidated. Accordingly, the expected post-reform payment, $\tilde{P}_i^1$, can be expressed as a weighted sum of the payments with the probabilities as weights:

$$\tilde{P}_i^1 = (1 - p_i^c - p_i^d) \times P_i^1 + p_i^d \times (\frac{1}{2} \cdot P_i^1) + p_i^c \times 0. \tag{2}$$

I quantify the reform-induced financial incentives using the "expected payment shock" (in percentage), $\Delta\tilde{P}_i$, which can be approximated as a log difference between the expected post-reform payment and the pre-reform payment:

$$\Delta\tilde{P}_i \approx \ln \tilde{P}_i^1 - \ln P_i^0 \approx [\ln P_i^1 - \ln P_i^0] + p_i^c + \frac{1}{2} \cdot p_i^d. \tag{3}$$

In Equation (3), the expected payment shock is approximately decomposed into a summation of three terms, corresponding to three procedure-level policy exposure measures: (a) the log difference between the post-reform full payment and pre-reform payment, referred to as the "full-payment shock," $\Delta \ln P_i = \ln P_i^1 - \ln P_i^0$, (b) the propensity for consolidation, p_i^c, and (c) the propensity for discount, p_i^d. Note that they relate to the three features of the EAPGs: full payment, consolidation, and discount.

4 Method

4.1 Baseline Specification

In this section, I empirically examine how the volume of care responds to reform-induced financial incentives. In a previous section, I capture the incentive in three policy exposure measures for procedure i, namely, the full payment shock ($\Delta \ln P_i$), the propensity for consolidation (p_i^c), and the propensity for discount (p_i^d). Here I relate the volume of procedure i at year-quarter t (2015 Q1–2018 Q4) to these policy measures in a baseline fixed effects model, flexibly allowing each measure to affect the volume differently, as follows:

$$\#\text{ per discharge}_{it} = \left[\alpha \cdot \ln P_i + \beta \cdot p_i^c + \gamma \cdot p_i^d\right] \times \text{reform}_t + I_i + T_t + \epsilon_{it}. \tag{4}$$

where # per discharge$_{it}$ is the number of procedures performed per 1,000 discharges; reform$_{it}$, an indicator for the timing of the reform, equaling 1 if $t \geq$ 2017 Q3 and 0 otherwise; I_i, procedure fixed effects; T_t, year-quarter fixed effects; ϵ_{it}, the error term.

In Equation (4), α, β, and γ are coefficients of interest. These fixed-effects estimates compare the pre- and post-reform differential in the outcome between procedures more affected by the reform and other procedures. Specifically, α measures how the full payment shock influences the outcome. β measures the pre- and post-reform change in the outcome for "always-consolidated" procedures ($p_i^c = 1$) relative to that for "never consolidated" procedures ($p_i^c = 0$). Similarly, γ measures the response of the outcome to the reform for an "always-discounted" procedure ($p_i^d = 1$) relative to that for a "never-discounted" procedure ($p_i^d = 0$).

What can we infer about the signs of α, β, and γ? First, the sign of α is ambiguous in principle, depending on the relative magnitudes of income effects and substitution effects. When income effects exceed substitution effects, the incentive effects on the volume are negative ($\alpha < 0$). Conversely, when substitution effects exceed income effects, incentive effects on the volume are positive ($\alpha > 0$). $\alpha = 0$ when the full payment shock has neither income nor substitution effects or when income and substitution effects offset each other. Second, since a consolidated procedure incurs costs while receiving no payment, procedures with a higher p_i^c are expected ex ante to be more adversely affected by the reform. Therefore, if the level of procedures with a higher p_i^c decreases more after the reform (i.e., $\beta < 0$), this would indicate that physicians respond to financial incentives when prescribing procedures. Finally, since discounting is equivalent to a price decrease, the argument for α applies to γ, and thus the sign of γ is ambiguous. That is, whether the level of procedures with a higher p_i^d decreases or increases more after the reform hinges on the relative sizes of income and substitution effects.

Year-quarter fixed effects, T_t, capture the effects of statewide trends (e.g., demographics of Medicaid FFS patients) on the level of care provision. Alternatively, I control for EAPG/year-quarter fixed effects, EAPG$_i \times T_t$, which account for variables at the EAPG-quarter level (e.g., demographics of Medicaid FFS patients with similar conditions).

For a given procedure, as the number of observations increases, the propensity for consolidation computed approximates the actual propensity. Therefore, for procedures that are occasionally performed, the propensity for consolidation computed may be inaccurate in measuring the actual propensity. To address this issue of measurement errors, alternatively, I construct a categorical measure of the propensity for consolidation (p_i^c)

based on their values of p_i^c. Specifically, I group procedures into the following three groups. "No propensity for consolidation" (Group 0) consists of procedures that would never be consolidated ($p_i^c = 0$). "Low propensity for consolidation" (Group 1) consists of procedures moderately likely to be consolidated. "High propensity for consolidation" (Group 2) consists of procedures most likely to be consolidated. Here the high (or low) propensity for consolidation is defined as being above (or below) the median of p_i^c, 0.33, conditional on $p_i^c > 0$. If consolidation causes the care volume to decrease, then the effects should be more pronounced for procedures with a greater propensity for consolidation. To examine whether the estimate on p_i^c increases monotonically in magnitude as the level of p_i^c increases, Equation refbaseline is modified as follows:

$$\begin{aligned} \text{\# per discharge}_{it} = &\Big[\alpha \cdot \ln P_i + \sum_{j=1}^{2} \beta_j \cdot \mathbb{1}(i \in \text{Group } j) + \gamma \cdot p_i^d\Big] \times \text{reform}_t \\ &+ I_i + T_t + \epsilon_{it}. \end{aligned} \tag{5}$$

where $\mathbb{1}(i \in \text{Group } j)$ is an indicator of whether procedure i is in Group j, $j = 0, 1, 2$.[16] I omit Group 0 in Equation (5) so that β_j gauges the reform effects on Group j relative to Group 0. If the relationship between consolidation and the care volume is causal, then we would expect that β_1 and β_2 are negative, with β_2 being greater in magnitude.

4.2 Event Study

To check for pre-existing trends that drive the baseline estimate, as well as to examine how the baseline coefficient on p_i^c (β in Equation 4) evolves in the post-reform period, I estimate the following event study model:

$$\begin{aligned} \text{\# per discharge}_{it} = &\Big[\alpha \cdot \ln P_i + \sum_{k=2015\,\text{Q1}}^{2018\,\text{Q4}} \beta_k \cdot p_i^c \cdot \mathbb{1}(t = k) + \gamma \cdot p_i^d\Big] \times \text{reform}_t \\ &+ I_i + T_t + \epsilon_{it}. \end{aligned} \tag{6}$$

In Equation (6), I omit t = 2017 Q2, the quarter immediately preceding the reform. Consequently, β_k is estimated relative to that quarter. For the baseline estimate (β in Equation 4) to be valid, estimates of β_k's in the pre-reform period should not exhibit a trend that appears to be correlated with p_i^c. Given that the baseline estimate is valid,

[16] $\mathbb{1}(\cdot)$ is the indicator function.

estimates of β_k's in the post-reform period show how the effect of the reform evolves over time.

5 Data

My analysis dataset is constructed from Florida Ambulatory Discharge Data from 2015 to 2018, obtained from the Florida Agency for Health Care Administration (AHCA). The discharge data contain information about the universe of Florida outpatient discharges. Each observation pertains to a patient's discharge and consists of information such as up to thirty procedures performed, the year-quarter of the discharge, the principal payer (e.g., Medicaid, Medicare, private payers), and the facility's identification number, county, type (e.g., hospital, ASC), as well as the attending physician's identification number. Pre-reform ASC fee schedules and EAPG weights are from Florida's Agency for Health Care Administration (AHCA) website.[17]

This study focuses on significant procedures performed for Medicaid FFS patients who were treated in ASCs. As the pricing logic for non-significant procedures is different from that for significant procedures, I provide analysis for ancillary procedures in Appendix A.

The unit of observation in the analysis dataset is a combination of a medical procedure (identified by the CPT code) and year-quarter. Table 2 reports summary statistics for the analysis dataset. A procedure is selected if it is present in pre-reform discharge data, and its pre-reform payment rate is available for calculating procedure-level policy exposure measures. By this criterion, 965 unique procedures, categorized into 101 EAPGs, are selected. With sixteen year-quarters, the total number of observations is 15,440. On average, 5.83 procedures and 1.45 procedures per 1,000 discharges were performed per the procedure and year-quarter combination. The average propensities of consolidation and discount computed using pre-reform data were 0.19 and 0.11. An average procedure was paid $880.90 in the pre-reform period and $962.80 if it received a full payment in the post-reform period. The average number of discharges per quarter was 4,009.19. EAPG weights ranged between 0.43 and 47.02, with a mean of 3.47.

Recall the full payment, base rate × EAPG weight, is the payment that the procedure receives when it is not consolidated or discounted; for procedure i, the full-payment

[17] Historical ASC fee schedules can be accessed via https://ahca.myflorida.com/medicaid/review/Historical_Reim.shtml; EAPG weights, https://ahca.myflorida.com/medicaid/finance/finance/institutional/hoppps.shtml.

shock ($\Delta \ln P_i$) is the log difference between the full payment in the first year of the post-reform period and the pre-reform payment. The distribution of the full-payment shock is shown in Figure 1. Roughly speaking, the full-payment shock is bell-shaped, centers around zero, and is fairly symmetric. For most procedures, the full payment is similar to the pre-reform payment. Procedures with a full-payment shock that falls in the left (or right) tail of the distribution are adversely (or favorably) affected when these procedures become primary procedures.

Moreover, for procedure i, I measure its propensity for consolidation (p_i^c) as the total number of consolidated procedures performed divided by the total number of procedures performed in the pre-reform period (2015 Q1–2017 Q2).[18] For example, the procedure with a CPT code of 43239, "Esophagogastroduodenoscopy, flexible, transoral; with biopsy, single or multiple," was performed 7,537 times in the pre-reform period. Out of the 7,537, 572 would be consolidated to another related significant procedure; thus, its propensity for consolidation is calculated as 572/7,537 = 0.076. The propensity for discount (p_i^d) is computed similarly. Figure 2 shows the distributions of the propensities of consolidation and discount. Both propensities vary between zero and one. Most procedures have zero or a low propensity for consolidation, indicating that they would never or are not likely to be consolidated under the EAPGs, holding physicians' behavior fixed. As such, most procedures are not expected ax ante to be greatly influenced by the consolidation provision. On the contrary, the consolidation provision could greatly affect procedures with a high propensity for consolidation. For the propensity for discount, the spike at zero indicates that a vast majority of procedures are not expected ax ante to be discounted under the EAPGs.

For each procedure performed during the study period between 2015 Q1 and 2018 Q4, I assign a payment type, indicating whether the procedure receives full payment, is consolidated, or is discounted under the EAPGs according to the EAPG Definitions Manual. As pre-reform procedures were not paid via EAPGs, I interpret this assignment for them as their payment type that would be assigned under the new system. Figure 3 shows the average number of significant procedures per discharge during the study period: total and by payment type. The total is equal to the sum of numbers by payment type. Immediately after the reform, indicated by the vertical dash line, the average number of significant procedures per discharge decreases discretely, mainly driven by consolidated procedures. Meanwhile, the reform does not appear to affect the average numbers for

[18] YYYY QX stands for quarter X of year YYYY.

full-payment procedures and discounted procedures, as the level of each series is similar before and after the reform.

To visually inspect the relationship between the pre- and post-reform change in the number of procedures performed per discharge and the propensity for consolidation (p_i^c), I first obtain residuals from regressing the number of procedures performed per discharge on all the independent variables in Equation (4) of Section 4 except $p_i^c \times \text{reform}$. Here I refer to these residuals as the "adjusted per discharge volume." Then, I calculate the pre- and post-reform change in the adjusted per discharge volume for each procedure. Figure 4 shows the median of the change at each value of p_i^c. Procedures with a low propensity for consolidation (i.e., p_i^c close to zero) do not appear responsive to the reform as their changes primarily cluster around zero. However, the reform seems to reduce procedures with a high propensity (i.e., p_i^c close to one) as their changes are mostly below zero. For procedures with the propensities in between, the changes generally center around zero. As the fitted regression line with a slope of -337.06 ($p = 0.002$) illustrates, the relationship is negative overall.

Taken together, the reform is associated with a decrease in consolidated procedures under the EAPGs, as well as a decrease in procedures with high propensities for consolidation. Whether this association is causal will be taken up in the next section.

6 Results

6.1 Baseline Estimates

Table 3 shows coefficients from estimating various specifications. Standard errors are clustered at the EAPG level and reported in parentheses.[19] All specifications control for procedure fixed effects and year-quarter fixed effects except column (5), which controls for EAPG/year-quarter fixed effects instead of year-quarter fixed effects.

Columns (1)–(3) separately include each policy variable, i.e., full-payment shock ($\Delta \ln P_i$), the propensity for consolidation (p_i^c), and the propensity for discount (p_i^c), as interacted with an indicator for the reform. Column (4) estimates Equation (4) of Section 4, including all three policy variables. Comparing columns (1) through (4), column (4) preserves the pattern found in columns (1)–(3), suggesting that these policy variables affect the outcome fairly independently. While the estimates on the full payment shock and the

[19] For each coefficient, the status of whether it is statistically significant at the 5% level preserves when standard errors are clustered at the pre-reform group level.

propensity for discount are not statistically significant, the estimate on the propensity for consolidation is negative and significantly significant. The negative significant effect on the propensity for consolidation indicates that the usage of procedures expected ex ante to be more likely to be consolidated is reduced more due to the reform. Based on estimates in column (4), the reform reduces "always-consolidated" procedures ($p_i^c = 1$) by 0.722 relative to "never-consolidated" procedures ($p_i^c = 0$), a 49.38% decrease compared to the pre-reform mean of the outcome, 1.462. As consolidated procedures incur costs but receive no payment, this finding is consistent with the notion that physicians consider financial incentives when prescribing procedures and points to an important role of payment schemes in physicians' treatment decisions. On the other hand, the null effects on the full-payment shock and the propensity for discount suggest that the full-payment shock and discount overall do not lead to demand inducement or procedure substitution.

Column (5) controls for EAPG/year-quarter fixed effects instead of year-quarter fixed effects. Estimates in column (5) are qualitatively similar to those in column (4), except for the coefficient on the full-payment shock, which flips the sign from negative to positive but is still statistically insignificant. This suggests that the reform effects are not driven by variables at the EAPG/year-quarter level (e.g., demographics of Medicaid FFS patients with similar conditions).

Column (6) estimates an alternative specification, Equation (5) of Section 4. Instead of including p_i^c, column (6) includes two dummy variables each for a procedure group, "low p_i^c" (Group 1) and "high p_i^c" (Group 2), using procedures with $p_i^c = 0$ (Group 0) as the base group. Table 4 shows the number of unique procedures and the value or range of p_i^c in each group. While the coefficient on "low $p_i^c \times$ reform" is -0.0197 and is significantly insignificant, the coefficient on "high $p_i^c \times$reform" is -0.433 and is significantly significant. Thus, procedures with a higher level of p_i^c are more responsive to the reform and decrease more after the reform. This supports the causal negative significant effect on p_i^c in column (4), i.e., the consolidation provision under the new EAPG system reduces the level of per-discharge procedures after the reform. I hereafter refer to column (4) estimates as the "baseline estimates."

6.2 Event Study Estimates

In this section, I conduct an event study to examine whether there exists a pre-trend that drives the baseline estimate. Figure 5 shows the event study estimates from estimating *beta*'s in Equation (6) of Section 4 at each year-quarter during the study period, with stan-

dard errors clustered on the EAPG level. None of the pre-reform period coefficients are statistically different from zero compared to the coefficient in the last quarter before the reform (2017 Q2), which is anchored at zero. There appears no pre-existing trend that is correlated with the reform timing, suggesting that the propensity for consolidation (p_i^c) is exogenous given other covariates. An F-test with the null hypothesis that all the pre-reform betas are jointly zero is not statistically significant ($p = 0.1298$). The level of per-discharge procedures responds to the reform immediately after the reform as the coefficient at the effective quarter (2017 Q3) drops below zero and is statistically significant. The effects during the post-reform period maintain at a similar level around the baseline estimate, −0.722. The event study results ensure that the baseline estimate is driven by the reform, not by unobserved factors.

6.3 Heterogeneous Effects

In this section, I examine the reform's heterogeneous effects across (a) patient groups with different health statuses, (b) ASC groups with different levels of propensities to treat Medicaid FFS patients, and (c) procedure groups with different payment types.

First, in the terminology of principal-agent literature, physicians act as the "agent" on behalf of their patients (Ellis and McGuire 1986). Physicians' care supply decisions respond less strongly to financial incentives when physicians weigh more value on patients' health benefits (Clemens and Gottlieb 2014). Since sick patients are likely to benefit more from care than healthier patients, physicians may respond less to financial incentives for sick patients than for healthier patients. To examine whether this bears out in the data, I classify patients into two groups based on their health status using the Charlson index, which gauges the level of mortality for a patient with co-morbidities (Charlson et al. 1987). Patients with co-morbidities are sicker than others. While a zero value of the Charlson index indicates no co-morbidities, a higher positive value indicates a higher chance that the co-morbidities will result in death. Figure 6 shows coefficients of the full-payment shock, the propensity for consolidation, and the propensity for discount (as interacted with the dummy for reform) separately for all patients, those with zero Charlson index, and those with a positive Charlson index. We observe that the reform effects are concentrated exclusively on patients with no co-morbidities, whereas the reform does not appear to impact patients with co-morbidities. Thus, consistent with the previous literature, physicians are more responsive to financial incentives when treating healthier patients in this case.

Second, since the reform applies to services for Medicaid FFS patients, we expect that ASCs with higher propensities for treating Medicaid FFS patients are more affected by the reform because they are more financially dependent on Medicaid. To examine this, for each ASC, I compute the propensity for treating Medicaid FFS patients as the share of discharges paid by Medicaid FFS. Then, I define the high (or low) propensities for treating Medicaid FFS patients as being above (or below) the median of the propensities among all the 317 ASCs in the analysis sample. Table 5 lists the number of ASCs with high (or low) propensities, as well as the range of propensities in each of the ASC groups. Figure 7 shows coefficients from estimating the baseline specification (Equation 4 of Section 4) for each ASC group, along with the coefficients for all ASCs. For comparison, all estimates are divided by their corresponding group's mean of the pre-reform outcome. Consistent with our expectations, the baseline estimates are exclusively driven by ASCs with higher propensities, whereas the reform had little effect on ASCs with low propensities.

Finally, I examine how the reform impacts procedures in each payment type (i.e., full-payment, consolidated, or discounted procedures). I split the total volume into the sum of volumes by payment type. Then, for each payment type, I estimate the baseline specification (Equation 4 of Section 4) using the per-discharge volume of procedures in that payment type as the outcome. Figure 8 shows coefficients by payment type. For each policy variable on the x-axis, the sum of the three point estimates equals the baseline estimate on that policy variable. None of the coefficients on full-payment shock and the propensity for discount is statistically significant. For the propensity for consolidation (p_i^c), the coefficients with full-payment procedures and consolidated procedures are -0.186 ($p = 0.099$) and -0.524 ($p = 0.032$), respectively. These two coefficients almost entirely make up the baseline estimate on the propensity for consolidation (-0.722). Accordingly, consolidated procedures account for most (72.58%), and full-payment procedures account for part (25.76%) of the baseline estimate. On one hand, since "never-consolidated" ($p_i^c = 0$) procedures are rarely consolidated, the coefficient for consolidated procedures indicates that the reform reduced the use of consolidated procedures, with the reduction more pronounced in procedures expected ex ante to be more likely to be consolidated. On the other hand, the coefficient for full-payment procedures indicates that there is limited evidence that the reform shifts full-payment procedures from low-intensive to high-intensive services (i.e., from procedures with high propensities for consolidation to those with low propensities for consolidation).

6.4 Spillover Effects

As ASCs typically receive patients with various payers, a reform targeted at one particular payer may spill over to affect patients with other payers. This "spillover effect" may stem from various avenues. For one, if the reform reduces the net revenue for providers, the providers may seek to recoup profits from other reform-untargeted payers, for example, by increasing the volume of care if these other payers pay for additional services. For another, the reform may induce physicians to change their practice pattern for one set of patients. In turn, they may carry that changed practice pattern over to patients with other payers.

To examine whether the Florida Medicaid payment reform has any spillover effect on another reform-untargeted payer, I estimate the baseline specification using the number of procedures per discharge for that another payer as the dependent variable as well as the same other covariates as the independent variables. Essentially, I relate the care provision of a reform-untargeted payer to the reform-induced financial incentives for Medicaid. Figure 9 depicts the baseline estimates on policy variables (as interacted with a dummy for the reform) for Medicaid FFS, private payers, and Medicare FFS. For comparison, procedures common to all these three payers, 927 in total, are used for the estimations. In addition, all coefficients are normalized by their corresponding mean of the dependent variable in the pre-reform period. Among all the coefficients for private and Medicare FFS payers, none is economically significant except the private payer's estimate on the propensity for consolidation, which is statistically significant. This significant coefficient indicates that, for private payers, the level of "always-consolidated" procedures ($p_i^c = 1$) decreases by 6.29% relative to "never-consolidated" procedures ($p_i^c = 0$), which is much smaller in magnitude than its Medicaid FFS counterpart (49.38%).

Thus, there is suggestive evidence that the reform effect may have affected private payer patients. One explanation for the finding is that physicians carry their altered practice pattern for Medicaid patients over to private payer patients. However, a caveat of this analysis is that, due to data limitations, certain potential determinants of the care provision (e.g., procedure-level reimbursement rates) for these other payers are omitted when estimating the baseline specification. Consequently, the estimates for the reform-untargeted payers could be driven by omitted variables and thereby spurious.

7 Discussion

Ideally, my specifications should include prices of substitutes or complements for the procedure, as they may influence the provision of that procedure. Nonetheless, substitutes or complements are hard to define for a given procedure and may depend on the patient's condition. Consequently, a caveat of this analysis is that the estimates could be biased if prices of substitutes or complements are correlated with the policy variables. However, the finding that, among all payment types, only consolidated procedures are responsive and reduced more for procedures with higher propensities for consolidation provides us confidence that the only significant baseline estimate, the estimate on the propensity for consolidation, is unlikely driven by substitute or complement prices. Otherwise, other payment types (i.e., full-payment procedures and discounted procedures) could also be influenced in the same way as consolidated procedures.

Moreover, while this study finds that care provision responds to the reform, it does not identify the source of that response. Figure 10 plots the number of Florida Medicaid FFS and managed care enrollees over the study period. Since the number of FFS enrollees changes smoothly during the transition of the payment system, the effects found immediately after the transition (see Figure 5) were unlikely driven by factors on the demand side (i.e., changes in patients' demographics or preferences) but rather driven by the supply side. One scenario is that ACSs admit more low-cost patients (e.g., patients whose health conditions do not require additional, possibly consolidated procedures) while denying admissions of high-cost patients. Another scenario is that, for a given patients' case mix, physicians change their practice styles by undersupplying certain services in response to the prospective payments. Still, the reform effects could stem from a combination of both scenarios. Since different scenarios have drastically different policy implications, it is important to determine which scenario or whether both are at work.

Furthermore, an alternative explanation for my findings is that they are due to the underreporting of consolidated procedures. Since consolidated procedures receive no payment under the new EAPG system, health care providers have less incentive to report these procedures for reimbursement purposes, reducing consolidated procedures observed in the discharge data after the reform. However, an analysis in Appendix A for ancillary procedures shows that ancillary procedures receiving zero separate payments (i.e., packaging) do not respond to the reform compared to other procedures. (If anything, the per-discharge volume of ancillary procedures increases after the reform compared to other ancillary procedures.) This result ensures that the baseline estimates are not due

to underreporting because, if providers underreported separately unpaid procedures, the observed volume of packaged ancillary procedures would also decrease. Since ancillary procedures typically require substantially fewer resources than significant procedures, providers are less adversely affected by packaged ancillary procedures than by consolidated significant procedures. Therefore, these results are more in line with the role of financial incentives in care provision than underreporting.

Finally, since the discharge data do not contain and cannot be linked to quality-of-care measures, this study does not examine the reform effects on access of care, patients' health outcomes, and the quality of care. More comprehensive data are required to examine these topics, which remains an important direction for future research.

8 Conclusion

As the federal and state governments are pressing efforts to expand health insurance through the Affordable Care Act (ACA) Medicaid expansion and exchange marketplace, financing and delivering the expanded services cost-efficiently is crucial to maintain sustainable cost growth. The traditional fee-for-service financing model is generally believed to lead to the overprovision of unnecessary services without improving health outcomes. How an alternative financing model can remedy the shortcomings of the fee-for-service is thus an important empirical question.

This paper contributes to the understanding of how financial incentives affect care provision for Medicaid outpatient services. Specifically, I exploit a 2017 Florida Medicaid payment reform that shifts from a fee-for-service to an EAPG-based prospective payment system as a natural experiment. First, to quantify the reform-induced financial incentives, I construct three procedure-level policy exposure measures: full-payment shock as well as propensities for consolidation and discount. These policy variables capture three distinct aspects of the EAPG system: full payment, consolidation, and discount. Then, to examine how care provision responds to the financial incentives, I relate the level of per-discharge procedures to these policy variables in the baseline specification.

I find evidence that EAPG consolidation, which provides no payment for consolidated procedures, has effectively reduced the use of procedures expected ex ante to be consolidated more frequently. Since consolidated procedures receive no payment but incur costs, this finding implies that physicians weigh between financial costs and benefits when prescribing treatments. However, I do not find evidence that the other two EAPG aspects

have affected care provision. This suggests that either the reform induces no income nor substitution effects, or income and substitution effects offset each other. Moreover, a scatterplot depicting the relationship between the pre- and post-reform change in the per-discharge volume of procedures and the propensity for consolidation indicates that only procedures with high propensities for consolidation are responsive to the reform. Consistent with a causal interpretation of the finding, an event study shows no pre-existing trend in care provision that correlates with the timing of the reform. Furthermore, the reform effects are concentrated on healthier patients (i.e., patients with no co-morbidities), whereas physicians do not seem to change practice patterns for sick patients (i.e., patients with co-morbidities). This is consistent with the notion in the previous literature that physicians respond less to financial incentives when they value patients' health gains. Finally, the reform effects are driven exclusively by ASCs with above-median propensities for treating Medicaid FFS patients, as well as primarily by consolidated procedures.

The findings imply a substantial degree of health care providers' response to financial incentives for Medicaid. Therefore, a Medicaid payment policy has the potential to influence physicians' procedure choices and thereby contain Medicaid expenditures. In particular, providing zero payment for clinically wasteful procedures could curb the use of such procedures. Accordingly, similar Medicaid reforms (e.g., prospective, bundled payments), which have generated a growing interest among states in adopting, may prove effective in promoting cost-efficiency. At the same time, policymakers should be cautious about overshooting payment policies, leading to the underprovision of care. Due to data limitations, this paper does not investigate how the reform affects patients' access to care, care quality, and health outcomes. These topics remain a natural direction for future research.

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A Appendix

In this appendix, I analyze how the 2017 Florida Medicaid payment reform affects ancillary services with no separate payments. The EAPG payment system classifies services into one of three types: (1) significant procedures, (2) medical visits, and (3) ancillary services. Under the EAPGs, ancillary services refer to ancillary tests and ancillary procedures, which may or may not be performed along with a significant procedure or a medical visit during an outpatient episode. An ancillary service may be "packaged" to a significant procedure or medical visit, which means that the ancillary service is included in the EAPG payment for the significant procedure or medical visit instead of being separately paid. For example, anesthesia may be packaged into a total knee arthroplasty; chest X-ray, a pneumonia visit. Based on clinic grounds, the EAPG developer defines a suggested list of ancillary services that are always packaged when occurring with an associated significant procedure or medical visit (hereafter referred to as the EAPG-packaged ancillaries). However, the list can be modified by the payer. Table A.1 shows an example of applying the EAPG payment system to a fictitious episode's service items, which is adapted from the EAPG Definitions Manual. The packaging does not imply that the packaged services receive zero payment. Rather, the packaged services' expected cost is included in the payment for its associated significant procedure or medical visit. For example, if a packaged service costs \$10 and is performed on 10% of patients with one of its associated medical visits, then \$1 (10% of \$10) would be included in the payment for that medical visit. While packaging only applies to inexpensive ancillaries that are routinely performed alongside the significant procedure or medical visit, expansive and rarely-performed ancillaries receive separate payments (e.g., the procedure with a CPT code of 84233 in Table A.1). This is because the packaging of expansive, rarely-performed ancillaries would put providers at financial risk and discourage them from performing these, often valuable, services. For example, a provider would receive only \$1 from a packaged test that costs \$1,000 but occurs once every 1,000 visits.

A priori, how the packaging affects the level of the EAPG-packaged ancillaries to be packaged is ambiguous. On one hand, the EAPG-packaged ancillaries apparently receive zero payments but require resources, whereas non-EAPG-packaged ancillaries receive separate payments. This may incentivize physicians to substitute non-EAPG-packaged ancillaries for the EAPG-packaged ancillaries, increasing the former relative to the latter. On the other hand, a definite list of the EAPG-packaged ancillaries could prevent providers from performing other ancillaries, given that payments for their associated sig-

nificant procedures or medical visits sufficiently account for packaged ancillaries' costs.

To examine how the provision of EAPG-packaged ancillaries responds to the reform, I estimate a difference-in-differences (DiD) model, which relates the number of procedures per discharge for ancillary service i at year-quarter t in the following form:

$$\#\text{ per discharge}_{it} = \alpha \cdot \text{package}_i \times \text{reform}_t + I_i + T_t + \epsilon_{it}. \tag{A1}$$

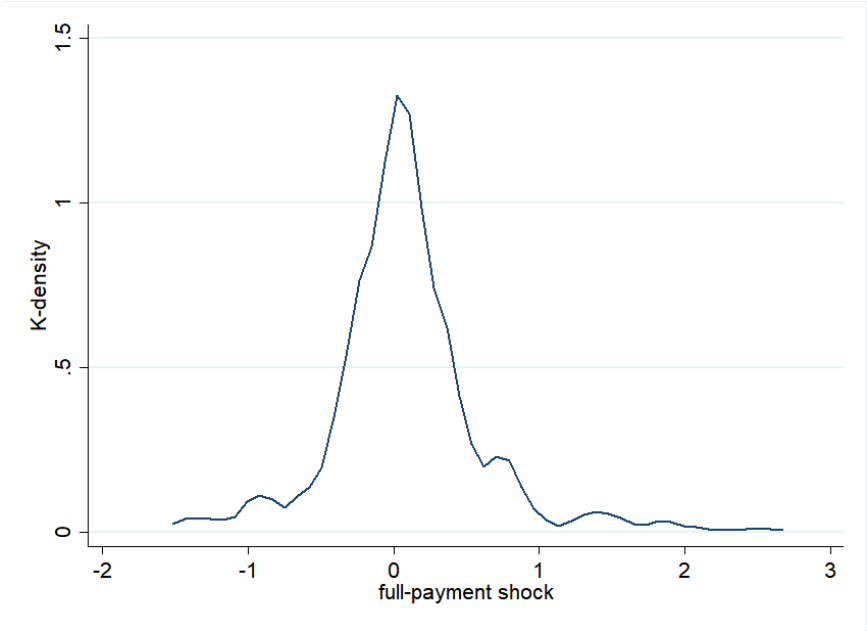
where $textpackage_i$ is an indicator of the EAPG-packaged ancillaries, i.e., 1 if i is always packaged under the EAPGs and 0 otherwise. α is the coefficient of interest and measures the effect of the packaging on the level of per-discharge volume. Other notations and variables remain the same as in the main text.

For this analysis, I construct a balanced panel dataset with the service and year-quarter combination as the unit of observation. Table A.2 presents summary statistics for this analysis dataset. An ancillary service is selected if it is performed for Medicaid FFS patients during the study period (2015 Q1–2018 Q4). By the criterion, 74 unique ancillary services, categorized into 26 EAPGs, are selected. Among these ancillaries, 39 are EAPG-packaged, and the rest are non-EAPG-packaged. With sixteen year-quarters, the total number of observations is 1,186. On average, 1.63 procedures and 1.45 procedures per 1,000 discharges were performed per the procedure and year-quarter combination.

Table A.3 reports the estimate of Equation (A1), which is not statistically significant with standard errors clustered at the EAPG level. If anything, the packaging increases the level for the EAPG-packaged ancillaries per discharge by 0.0249 (or 4.2%, relative to the pre-reform mean of the number of the EAPG-packaged ancillaries, 0.5922), which is also economically insignificant. In conclusion, the reform does not significantly impact the provision of the EAPG-packaged ancillaries.

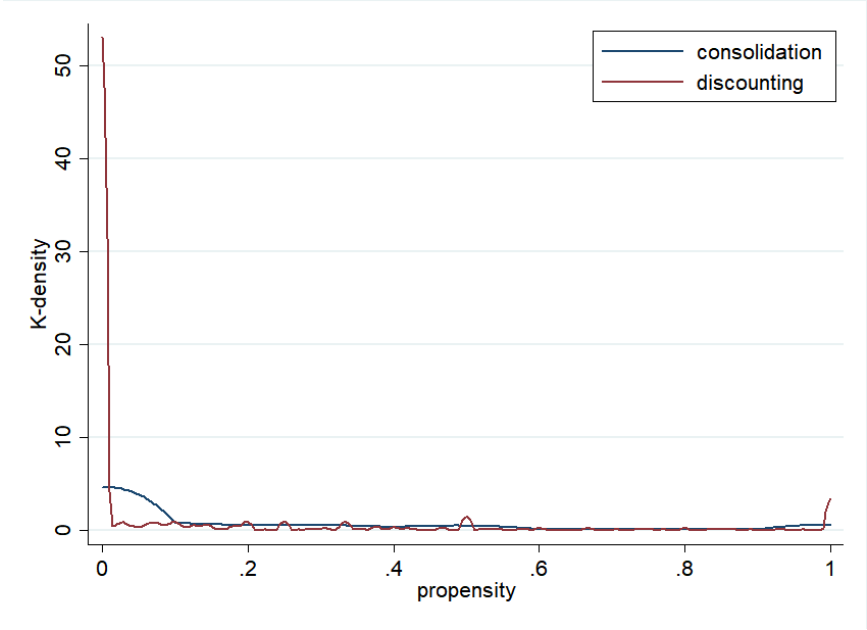
Figures and Tables

Figure 1: Distribution of the full-payment shock



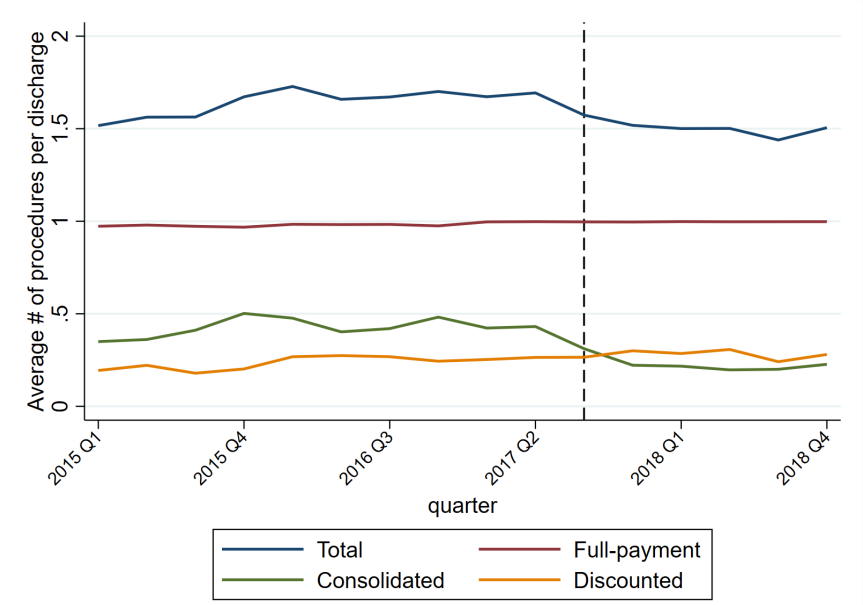
Notes: This figure shows the distribution, estimated by the kernel density (K-density), of the full-payment shock ($\Delta \ln P_i$), which is calculated as the log difference between the full payment in the first year of the post-reform period and the pre-reform payment.

Figure 2: Distributions of the propensities of consolidation and discount



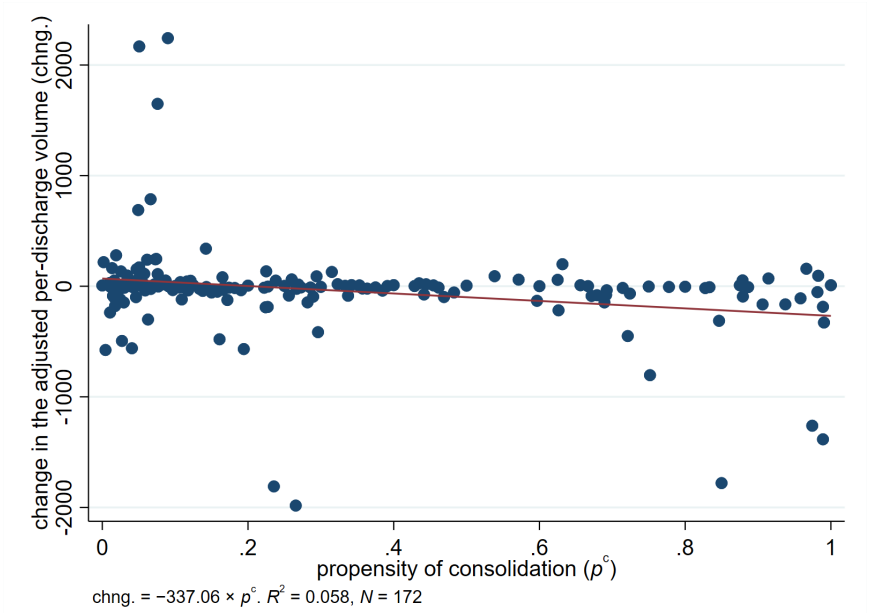
Notes: This figure shows the distributions, estimated by the kernel density (K-density), of the propensities of consolidation and discount. With pre-reform data, the propensity for consolidation of a procedure is computed as the total number of procedures performed that would be consolidated under EAPGs divided by the total number of procedures performed. The propensity for discount is computed analogously.

Figure 3: Average number of significant procedures per discharge during the study period (2015 Q1–2018 Q4): total and by payment type



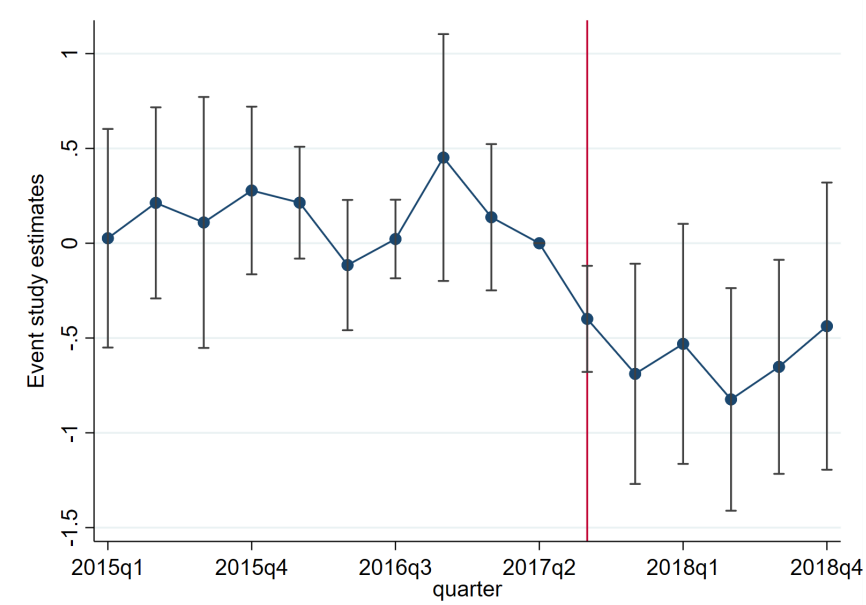
Notes: The vertical dash line indicates the effective quarter of 2017 Florida's Medicaid payment reform, 2017 Q3. Under the new system based on EAPGs, a full-payment procedure receives the full payment, base rate × EAPG weight; a consolidated procedure receives no payment; a discounted procedure receives 50% of the full payment.

Figure 4: The relationship between the pre- and post-reform change in the adjusted per discharge volume and the propensity for consolidation



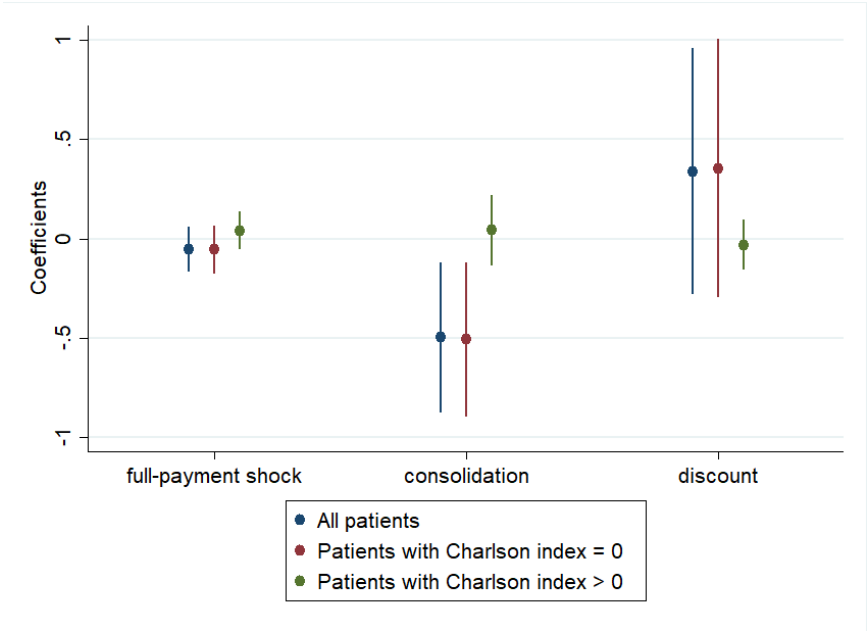
Notes: The above figure plots the median of the pre- and post-reform change in the adjusted per discharge volume at each value of the propensity for consolidation. Here the adjusted per discharge volume refers to residuals from regressing the number of procedures per discharge on independent variables. These independent variables include full-payment shock and the propensity for discount, as interacted with an indicator for Florida Medicaid's payment reform, as well as procedure and quarter fixed effects.

Figure 5: Event study estimates



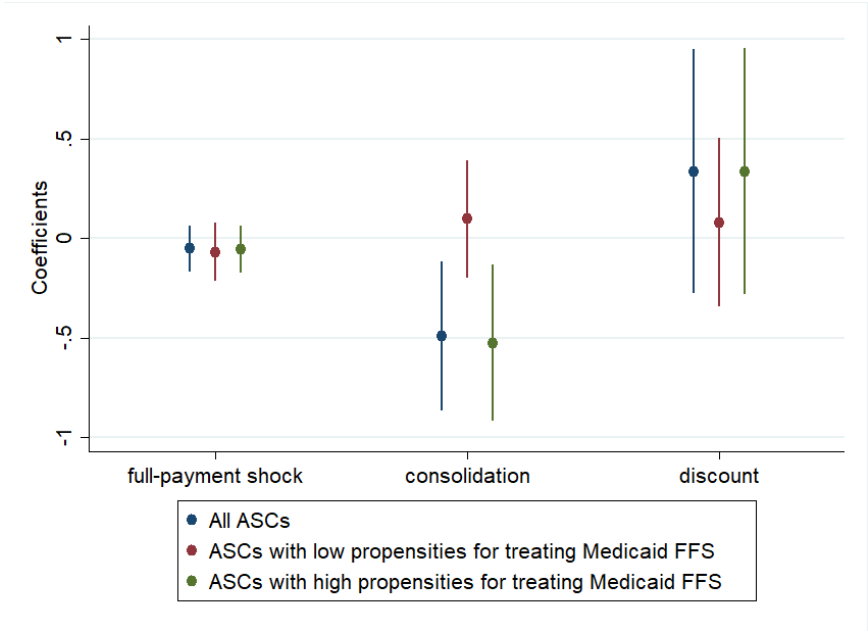
Notes:This figure shows estimates from a lead and lag regression, which regresses the number of procedures per discharge on the propensity for consolidation, as interacted with indicators for each quarter. Dots show point estimates and vertical bars, 95% confidence intervals using standard errors clustered on the EAPG level. The controls include full-payment shock and the propensity for discount, as interacted with an indicator for Florida's Medicaid payment reform, as well as procedure and quarter fixed effects. The solid vertical line indicates the effective quarter of the reform.

Figure 6: The impact of the reform on care provision by patients' health status



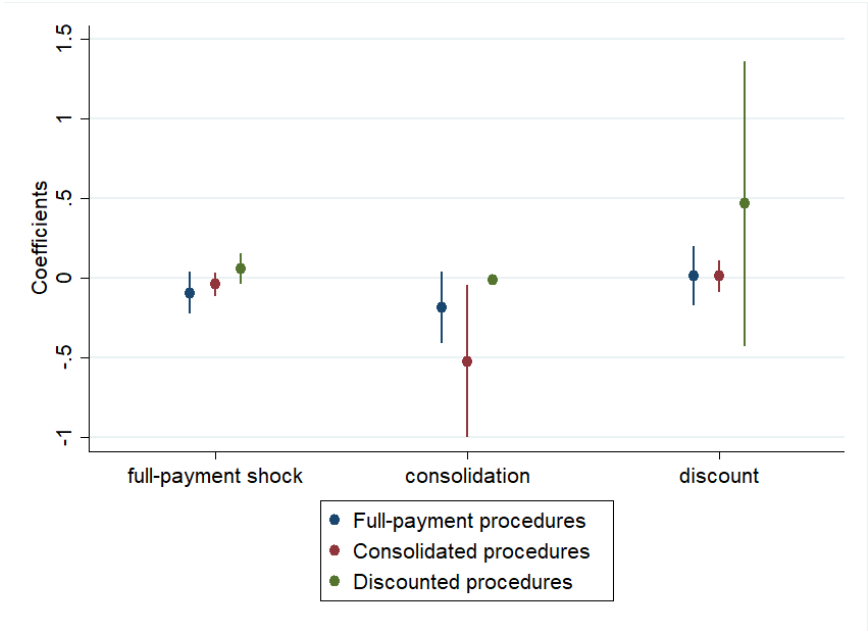
Notes: For each patient group indicated in the legend, this figure shows estimates from regressing the number of procedures per discharge for the patient group on three policy variables. As indicated on the x-axis, the three policy variables consist of full payment and the propensities of consolidation and discount, as interacted with an indicator for Florida Medicaid's payment reform. All models include procedure and quarter fixed effects. Dots show point estimates and vertical bars, 95% confidence intervals with standard errors clustered on the EAPG level.

Figure 7: The impact of the reform on care provision by facility group based on the propensity for treating Medicaid FFS patients



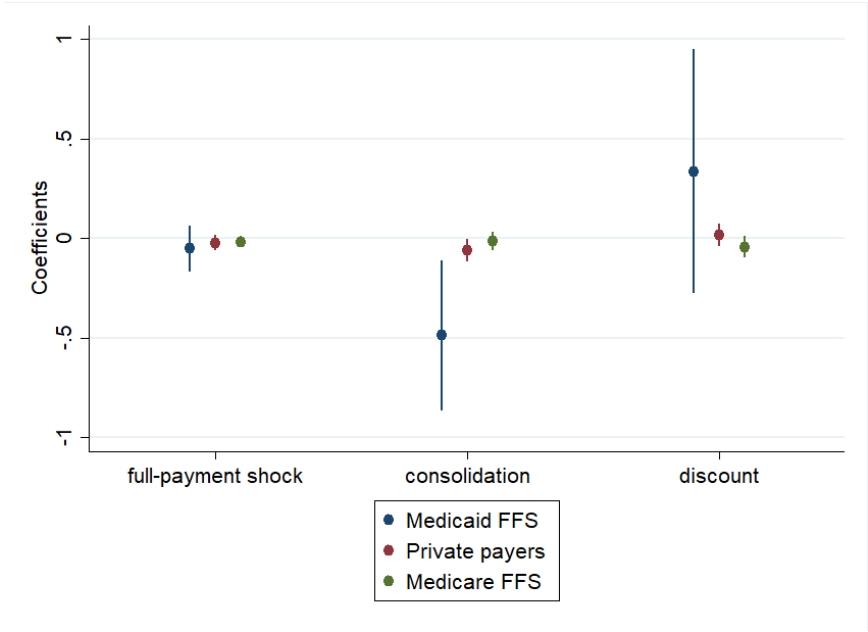
Notes: In the legend, "ASCs with low propensities for treating Medicaid FFS" refers to ASCs with below-median baseline propensity for treating Medicaid FFS patients, and "ASCs with low propensities for treating Medicaid FFS" refers to other ASCs. For each ACS group indicated in the legend, this figure shows estimates from regressing the number of procedures per discharge for the ASC group on three policy variables. As indicated on the x-axis, the three policy variables consist of full-payment shock and the propensities of consolidation and discount, as interacted with an indicator for Florida Medicaid's payment reform. All models include procedure and quarter fixed effects. Dots show point estimates and vertical bars, 95% confidence intervals with standard errors clustered on the EAPG level.

Figure 8: The impact of the reform on care provision by payment type (full-payment, consolidated, and discounted procedures)



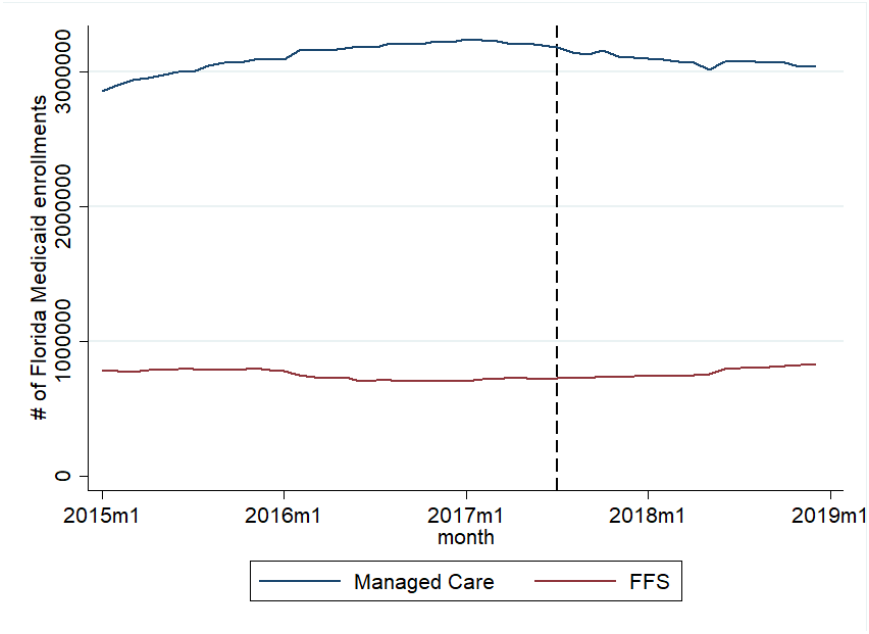
Notes: For each payment type of procedure indicated in the legend, this figure shows estimates from regressing the number of procedures per discharge for that payment type on three policy variables. As indicated on the x-axis, the three policy variables consist of full-payment shock and the propensities of consolidation and discount, as interacted with an indicator for Florida Medicaid's payment reform. All models include procedure and quarter fixed effects. Dots show point estimates and vertical bars, 95% confidence intervals with standard errors clustered on the EAPG level.

Figure 9: The impact of the reform on care provision by payer (Medicaid FFS, private payers, and Medicare FFS)



Notes: For each payer indicated in the legend, this figure shows estimates from regressing the number of procedures per discharge for that payer on three policy variables. As indicated on the x-axis, the three policy variables consist of full-payment shock and the propensities of consolidation and discount, as interacted with an indicator for Florida Medicaid's payment reform. All models include procedure and quarter fixed effects. Dots show point estimates and vertical bars, 95% confidence intervals with standard errors clustered on the EAPG level.

Figure 10: The number of Florida Medicaid FFS and managed care enrollees



Notes: YYYYmX stands for month X of year YYYY. The vertical dash line indicates the effective month of Florida's Medicaid payment reform, July 2017.

Table 1: An application of the EAPG payment system to an episode's service items

CPT code	EAPG assigned	Payment element	Payment type	Payment discount
31545	063 Level II Endoscopy of Upper Air Way	Significant Procedure	Full Payment	100%
31515	062 Level I Endoscopy of Upper Air Way	Related Procedure	Consolidated	0%
42405	252 Level I Facial and ENT Procedures	Unrelated Procedure	Discounted	50%

Table 2: Summary Statistics

	mean	min	max
# of procedures	5.83	0	944
# of procedures per 1,000 discharges	1.45	0	218.11
Propensity for consolidation	0.19	0	1
Propensity for discount	0.11	0	1
Pre-reform payment	880.90	100	3,000
Post-reform full payment	962.80	119.77	13,137.02
# of discharges	4,009.19	3,091	5,079
EAPG weight	3.47	0.43	47.02
# of unique procedures	965		
# of EAPGs	101		
# of year-quarters	16		
Observations	15,440		

Notes: This table shows summary statistics of the analysis sample for the study period (2015 Q1–2018 Q4) in terms of mean, maximum, and minimum. The unit of observation is at the procedure and year-quarter level. Propensities for consolidation and discount are described in the text.

Table 3: Effect of the Florida's Medicaid payment reform on the number of procedures per discharge

	# of procedures per discharge					
	(1)	(2)	(3)	(4)	(5)	(6)
Full-payment shock × reform	-0.115			-0.0781	0.0519	-0.0817
	(0.0732)			(0.0690)	(0.118)	(0.0842)
Propensity for consolidation × reform		-0.791***		-0.722***	-0.823**	
		(0.233)		(0.227)	(0.298)	
Propensity for discount × reform			0.630	0.491	0.602	0.529
			(0.366)	(0.372)	(0.458)	(0.376)
Low propensity for consolidation × reform						-0.0197
						(0.251)
High propensity for consolidation × reform						-0.433**
						(0.171)
Baseline mean	1.462	1.462	1.462	1.462	1.462	1.462
EAPG-quarter fixed effects	No	No	No	No	Yes	No
Observations	15,440	15,440	15,440	15,440	15,440	15,440

Notes: This table reports estimates from various specifications in which the number of procedures per discharge is the dependent variable. Data are balanced panel with the unit of observation at the procedure/quarter level from 2015 to 2018. "Reform" is an indicator of the timing of Florida Medicaid's payment reform. "Full-payment shock," "propensity for consolidation," and "propensity for discount" are defined in the text, capturing three aspects of the new EAPG payment system. With procedures unlikely to be consolidated as the base group, "low propensity for consolidation" refers to procedures more modestly likely to be consolidated. "High propensity for consolidation" are procedures most likely to be consolidated. "Baseline mean" presents the pre-reform average of the dependent variable. All columns include procedure and quarter fixed effects, except column (5), which includes procedure and EAPG/year-quarter fixed effects instead. Standard errors are clustered at the EAPG level and reported in parentheses. *$p < 0.1$ ** $p < 0.05$ *** $p < 0.01$.

Table 4: Groups of procedures based on the propensity for consolidation

	# of unique procedures	value/range of propensity for consolidation
No propensity for consolidation	542	0
Low propensity for consolidation	225	(0, 0.33]
High propensity for consolidation	198	(0.33, 1]

Table 5: ASC groups based on the propensity for treating Medicaid FFS patients

	# of facilities	range of the propensity
ASCs with low propensities	159	(0, 0.0025]
ASCs with high propensities	158	(0.0025, 1]

Table A.1: An application of the EAPG payment system to an episode's service items

CPT Code	EAPG assigned	Payment element	Payment type	Payment discount
31545	063 Level II Endoscopy of Upper Air Way	Significant Procedure	Full Payment	100%
31515	062 Level I Endoscopy of Upper Air Way	Related Procedure	Consolidated	0%
42405	252 Level I Facial and ENT Procedures	Unrelated Procedure	Discounted	50%
88331	390 Level I Pathology	Routine Ancillary	Packaged	0%
82435	402 Basic Chemistry Tests	Routine Ancillary	Packaged	0%
93000	413 Cardiogram	Routine Ancillary	Packaged	0%
322	380 Anesthesia	Routine Ancillary	Packaged	0%
84233	399 Level II Endocrinology Tests	Non Routine Ancillary	Full Payment	100%

Table A.2: Summary statistics

	mean	min	max
# of services	1.63	0	101
# of services per 1,000 discharges	0.41	0	24.71
# of unique ancillaries	74		
# of unique EAPG-packaged ancillaries	39		
# of unique non-EAPG-packaged ancillaries	35		
# of EAPGs	26		
# of year-quarters	16		
Observations	1,186		

Notes: This table shows summary statistics of the analysis dataset for the study period (2015 Q1–2018 Q4) in terms of mean, maximum, and minimum. The unit of observation is at the ancillary service and year-quarter level.

Table A.3: Effect of Florida's Medicaid payment reform on the number of the EAPG-packaged ancillaries per discharge

	# of services per 1,000 discharges
Package × reform	0.0249
	(0.280)
Baseline mean	0.5922

Notes: This table reports estimates from a difference-in-differences regression in which the number of ancillary services per discharge is the dependent variable. Standard errors are clustered at the EAPG level and are shown in parentheses. Data are balanced panel with the unit of observation at the service and year-quarter level from 2015 Q1 to 2018 Q4. "Package" is an indicator of the EAPG-packaged ancillaries. "Reform" is an indicator of the timing of the 2017 Florida Medicaid payment reform. The model includes service and year-quarter fixed effects. "Baseline mean" presents the pre-reform average of the dependent variable.