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Three Essays on Impacts of Medicaid Primary Care Fee Bump in 2013-14 on Primary Care Access and Utilization

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Abstract

Essays on Impacts of Medicaid Primary Care Fee Bump in 2013-14 on Primary Care Access and Utilization

By Zhuo Yang

Medicaid programs historically paid primary care physicians (PCPs) less than other insurance types. Lower PCP payment is believed to hamper Medicaid beneficiaries' access to and utilization of primary care. In 2013 and 2014, Medicaid PCP payments were increased to be on parity with Medicare using 100% federal funding, a provision so called the 'Medicaid primary care fee bump'. After 2014, some states extended the fee bump with state funding, while others did not. This dissertation comprises three articles investigating the effect of the fee bump and its extension on Medicaid beneficiaries' care access and utilization and PCP treatment pattern.

The first article examines changes in self-reported access to primary care and, as the fee bump size varied by states, whether the changes correlated with the bump size. Based on the Behavioral Risk Factor Surveillance System (BRFSS) data 2011-2014 from nine states, I found no significant improvement in Medicaid beneficiaries' likelihoods of having a personal doctor or having routine checkup visits; flu vaccination exhibited seasonal fluctuation but no consistent post-fee-bump improvement.

The second article assesses the fee bump's effects on per-patient and within-visit intensity of primary care services received by Medicaid beneficiaries. Based on the National Ambulatory Medical Care Survey (NAMCS) 2010-2014 data, I found that PCPs did not increase annual number of visits, minutes spent per visit, and type of services provided for Medicaid beneficiaries following the fee bump, even for PCPs with practice ownership, who are supposedly more incentivized than salaried counterparts.

The third article capitalizes the reverse experiment of state extending versus terminating the fee bump in 2015 and 2016, estimating the effect of a state's extension decision on primary care access and utilization. By using the National Health Interview Survey (NHIS) 2013-2016, I find that the extension decision was associated with increased likelihoods of having a usual source of care and chronic condition checkups, decreased likelihoods of rejection by a doctor's office and using emergency departments for non-urgent reasons, and more frequent office visits. Overall, the results suggest that the fee bump extension in 2015-16 yielded positive impacts on access and utilization of primary care.

In sum, my dissertation suggests that the 2013-14 fee bump did not yield significant impacts on Medicaid beneficiaries' access and utilization of primary care, nor did it incentivize PCPs to provide more intensive care. Nonetheless, the positive results found in the extension states may suggest that a sustained, better implemented physician payment incentive could potentially generate positive impacts on care access and utilization.

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CHAPTER 1

Introduction: Policy Background and Conceptual Framework

MAIN THEME

Medicaid programs historically paid primary care physicians (PCPs) less than Medicare and private insurers. Relatively lower physician payment generosity is believed to hamper Medicaid beneficiaries' access to primary care. Empirical evidence suggests that Medicaid payment generosity is associated with PCPs' Medicaid participation (Adams 1994, Perloff, Kletke et al. 1995, Zuckerman, McFeeters et al. 2004, Decker 2007, Decker 2009, Wilk 2013, Callison and Nguyen 2017), as well as some aspects of primary care access and utilization (Shen and Zuckerman 2005, Decker 2009, Atherly and Mortensen 2014, Callison and Nguyen 2017). However, there are also studies showing that some other aspects of primary care are inelastic to physician payment (Shen and Zuckerman 2005, Atherly and Mortensen 2014). My dissertation aims to contribute to this existing pool of evidence on association between Medicaid payment generosity and primary care, by examining how a federally funded, nationwide Medicaid PCP payment increase in 2013-14, so called the "Medicaid primary care fee bump", affected Medicaid beneficiaries' access to and utilization of primary care. In addition, the pre-determined temporality of the fee bump also presents a unique opportunity to examine how sustainment of a physician payment incentive moderates its impacts on care access and utilization.

The rest of this chapter will review the context of the 2013-14 Medicaid primary care fee bump as well as its state-funded extension, followed by a discussion of the conceptual framework based on the two-market model, which provides the theoretical guide on how

metrics pertaining to primary care supply respond to changes in Medicaid physician payment.

POLICY BACKGROUND

Section 1202 of the Accountable Care Act (ACA) mandated states to increase Medicaid reimbursement for primary care services provided by qualified providers to the Medicare rates in the calendar years of 2013 and 2014 , with 100% federal funding (Office of Information and Regulatory Affairs 2012). The fee increase applied to primary care services delivered by a physician with a specialty designation of family medicine, general internal medicine, or pediatric medicine. Procedures eligible for the payment increase included the Evaluation and Management (E&M) codes 99201 through 99499 and vaccine administration codes 90460, 90461, 90471, 90472, 90473, and their successor codes. In terms of Medicaid payment arrangement, eligible procedures provided to both fee-for-service (FFS)-based beneficiaries and those enrolled in a managed care organization (MCO) qualified for the fee increase. For MCO enrollees, the fee increase was converted to an enhanced capitation rate. However, certain provider settings, such as the federally qualified health centers (FQHCs) and the community/rural health centers (CHCs), did not qualify for the fee increase, as reimbursement to these providers was cost-based.

The fee bump size was substantial. According to a 50-state survey of Medicaid physician fees in 2012, Medicaid payment for primary care services averaged 59% of Medicare rates prior to the fee bump, which meant a 73% fee increase after the fee bump was enacted (Zuckerman 2012). In addition, the fee bump size varied widely by state, depending on a state's Medicaid-to-Medicare primary care fee ratio in the preceding years. States such as Rhode Island, which had a low Medicaid-to-Medicare fee ratio of 0.33 in 2012,

enjoyed a larger increase (for RI: the fee increase equals 67% of Medicare rate) compared to states such as Montana, which had a high 2012 Medicaid-to-Medicare ratio of 0.94 (for MT: the fee increase equals 4% of Medicare rate); whereas states in which Medicaid used to pay more than Medicare, such as Alaska with a 2012 Medicaid-to-Medicare ratio of 1.27, were not affected by the fee bump.

As the Centers for Medicare and Medicaid Services (CMS) did not release the final rule of the fee bump until November 2012, states were faced with numerous operational challenges at the first half of 2013. Two surveys of Medicaid program officials and providers (Medicaid and CHIP Payment and Access Commission 2015, Timbie, Buttorff et al. 2017) reveal that states experienced administrative burden in establishing the provider self-attestation process, coordination with MCOs, caption payment adjustment for Medicaid managed care enrollees, and so on. In many states the first increased payments were paid retrospectively in the second half of 2013 (Medicaid and CHIP Payment and Access Commission 2015), which further shortened the window in which providers actually experienced the benefit. Nonetheless, states reported that most operational challenges had been resolved by the second half of 2013. In addition to the operational challenges, state Medicaid agencies reported limited resources allocation to reach out and educate physicians about the policy (Timbie, Buttorff et al. 2017). For example, a Washington State survey identified that two thirds of PCPs in small private practices were uncertain or did not think that they or their practices ever received increased Medicaid payments; the percentage was even higher in rural areas compared to the urban areas (Center for Health Workforce Studies 2015). The short duration of the fee increase compounded by operational challenges and limited resource allocation are important contextual factors to consider when evaluating the impacts of the fee bump.

The second year of the fee bump, by design, coincided with the large-scale Medicaid eligibility expansion under the ACA. The Medicaid expansion increased the income eligibility to 138% of the federal poverty level and extended coverage to childless adults, the group that was historically excluded in many states. Though the expansion was originally designed as a nationwide change, the Supreme Court's ruling made it optional for states (Rudowitz, Artiga et al. 2015). As a result, 25 states and the DC adopted the expansion starting from January 1, 2014; another seven states adopted on later dates. The states that expanded in 2014 experienced on average an 18% increase in enrollment between 2013 and 2014 (Rudowitz, Snyder et al. 2014). Non-expansion states also experienced an enrollment increase, by 5% from 2013 to 2014, due to the 'woodwork effect' among people who were previously eligible but did not sign up until walking out the 'woodwork' after the expansion. Medicaid enrollment increase in both expansion and non-expansion states are an important confounding factor when assessing the effect of the fee bump on Medicaid beneficiaries' access to care. It is because increased demand could potentially offset increased supply induced by the fee bump; in such case, access to care might not be improved even PCPs responded to the financial incentive (further discussed in the 'conceptual framework' section).

Expanded Medicaid eligibility carried on in 2015 and onwards, while the federally funded fee increase ended on December 31, 2014 after Congress failed to reauthorize it (Snyder, Paradise et al. 2014). Nonetheless, 15 states and the DC decided to extend the fee bump, though not necessarily at Medicare levels, in 2015 and 2016 with state money plus the federal contribution through the Federal Medical Assistance Percentage. Although the original policy objective for the initial fee bump was to address the expected increase in primary care needs following the expansion, states' decision on the fee bump extension was

not tied with the expansion status: 6 of the fee bump extension states had not expanded as of 2016.

CONCEPTUAL FRAMEWORK

The over-arching theoretical framework for the entire dissertation is the two-market model originally developed by Sloan, Mitchell, and Cromwell (Sloan, Mitchell et al. 1978). The two-market model has been adopted extensively in the strand of literature examining various factors influencing care supply for the Medicaid population (Mitchell 1983, Adams 1994, Perloff, Kletke et al. 1995, Tucker Iii 2002, Adams, Bronstein et al. 2003, Wilk 2013). To facilitate the discussion of application of the two-market model in studying the Medicaid primary care fee bump, I further adopted the price and care supply chart developed by Held and Holahan (Held and Holahan 1985), as illustrated in **Figure 1**.

In the two-market model, physicians are assumed to have some price-setting power in the non-Medicaid market, facing a downward-sloping demand curve (Dp), and only be price-taking agents in the Medicaid market, facing a fixed marginal revenue for the Medicaid patient caseload. Because Medicaid patients face zero or nominal cost sharing (P=0), demand from Medicaid patients equals $0Q_M$. When PCPs are faced with a lower Medicaid reimbursement rate before the fee bump (P_{before}), the marginal revenue curve is abcd (red solid line).

It should be noted that, the c point coincides with the marginal cost curve (MC_{PCP}) only if there is excess Medicaid demand (i.e., total Medicaid demand, $0Q_M$ or the parallel equal length line be, is larger than bc). In the alternative scenario of no excess demand (be<bc), the demand becomes the constraint and therefore a reimbursement rate change does not increase primary care utilization by Medicaid patients. However, I refrain from

discussion of the no excess demand scenario, for two reasons. First, the Medicaid expansion under the Patient Protection and Affordable Care Act (PPACA) was known to create extra demand in both expansion states and non-expansion states ('spillover' effect). Second, Fossett and Peterson (Fossett and Peterson 1989) pointed out that excess Medicaid demand was created by geographic segregation of socioeconomically disadvantaged people, the group that Medicaid covers, in the area where PCP offices often do not locate.

Direct Measures of Care Supply vs. Patient-Reported Access Measures

When there is excess demand, the reimbursement rate increase will unambiguously increase the units of service provided to Medicaid (from $Q_{before} - Q_1$ to Q_{bump}-Q_2), whereas the eligibility expansion alone will not affect the units of service. Therefore, when outcome variables are direct measures of physician care supply (e.g., share of Medicaid caseload, number of Medicaid patient office visits, or treatment intensity within a visit), one influencing factor to account for is the reimbursement rate but not the eligibility expansion. Nonetheless, when outcome variables are patient-reported access to care (e.g., likelihood of having a usual source of care or a regular checkup), it is necessary to consider both reimbursement change and eligibility expansion. Mathematically, assuming that a constant proportion of Medicaid enrollment, μ, has demand for primary care, access to care – measured as $bc/(be/\mu) = \mu \cdot (bc/be)$ before the fee bump - may not improve after the fee bump, if $bc/be < hi/hk$ or the proportional increase in demand, due to expansion, exceeds the proportional increase in supply, due to a fee raise.

Change in Care Supply on the Extensive and Intensive Margins

Change in care supply could happen on both extensive and intensive margins. An increase on the extensive margin means average physician accepting more patients, while an

increase on the intensive margin means more units of service provided per patient or per visit. Supply change on the extensive margin should be commensurate with change in the patient-reported access, if change in demand (i.e. eligibility expansion) is adequately controlled for; as such, my study of patient-reported access measures during the federally-funded (chapter 2) and extension phases (chapter 4) of the fee bump could arguably capture change on the extensive margin.

In terms of intensive margin, the reason for expecting a change is the design of the fee bump that rewards more intensive procedure with a more generous fee increase. An example of the differential sizes of fee increase is eligible codes 99211 to 99215 for an office visit by established patients before and after the fee bump, the most frequently used ones among the fee-bump-eligible codes. Take Medicaid fee schedule for 99211-99215 in Illinois for example (Illinois Medicaid Program 2012)(Illinois Medicaid Program), the most intensive office visit of 99215 received a $94 or 192% increase, compared to a $7 or 57% increase for the least intensive visit of 99211 (see **Figure 2**). Although the choice of a visit code should be driven by a patient's medical needs, a PCP still has a high level of latitude in deciding the intensity and the code. Hence, a PCP could potentially increase the intensity of an office visit to gain more benefit from the fee bump. My study of physician-reported per-patient and within-visit primary care intensity in Chapter 3 intends to address this question.

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Figure 1. Physician Payment and Service Supply

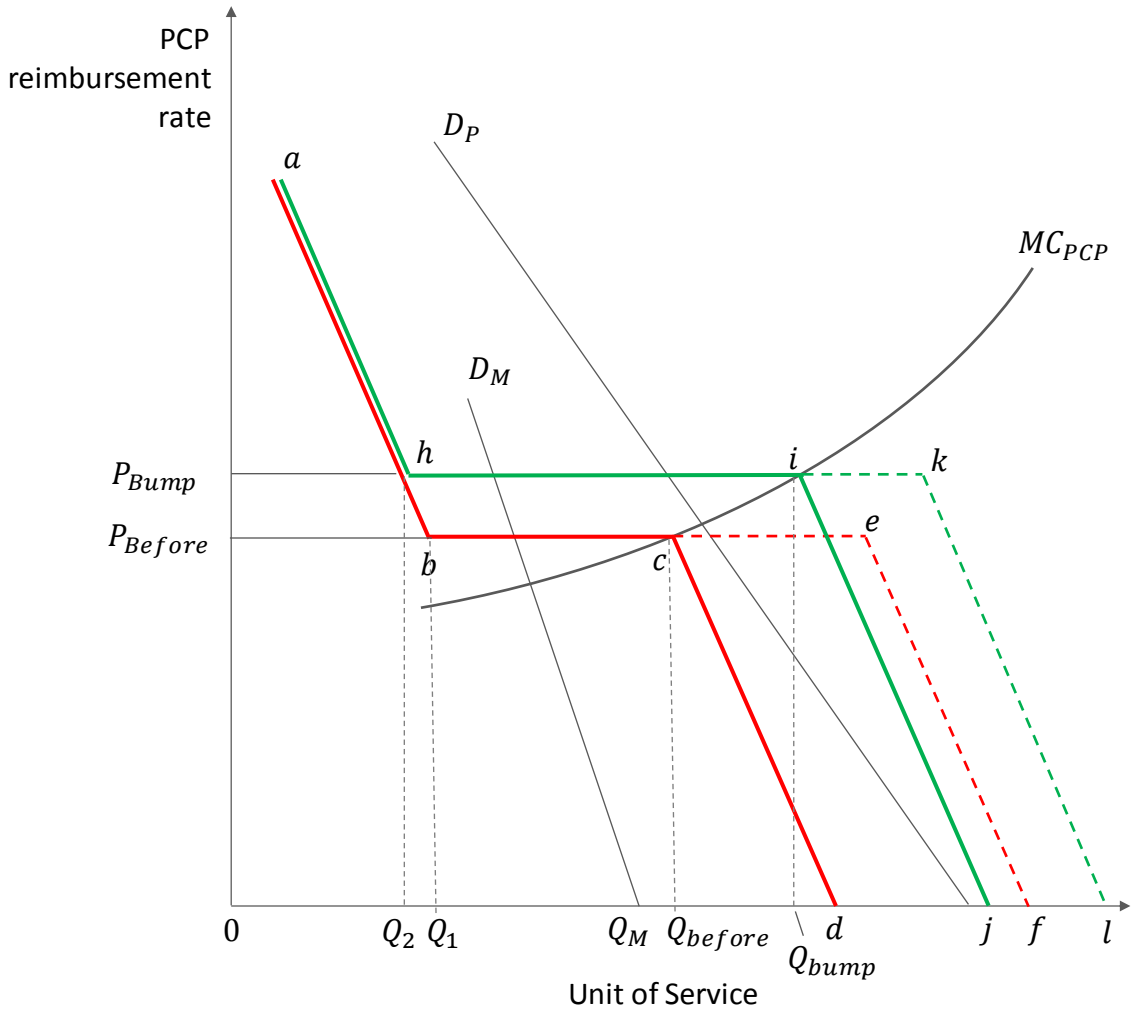
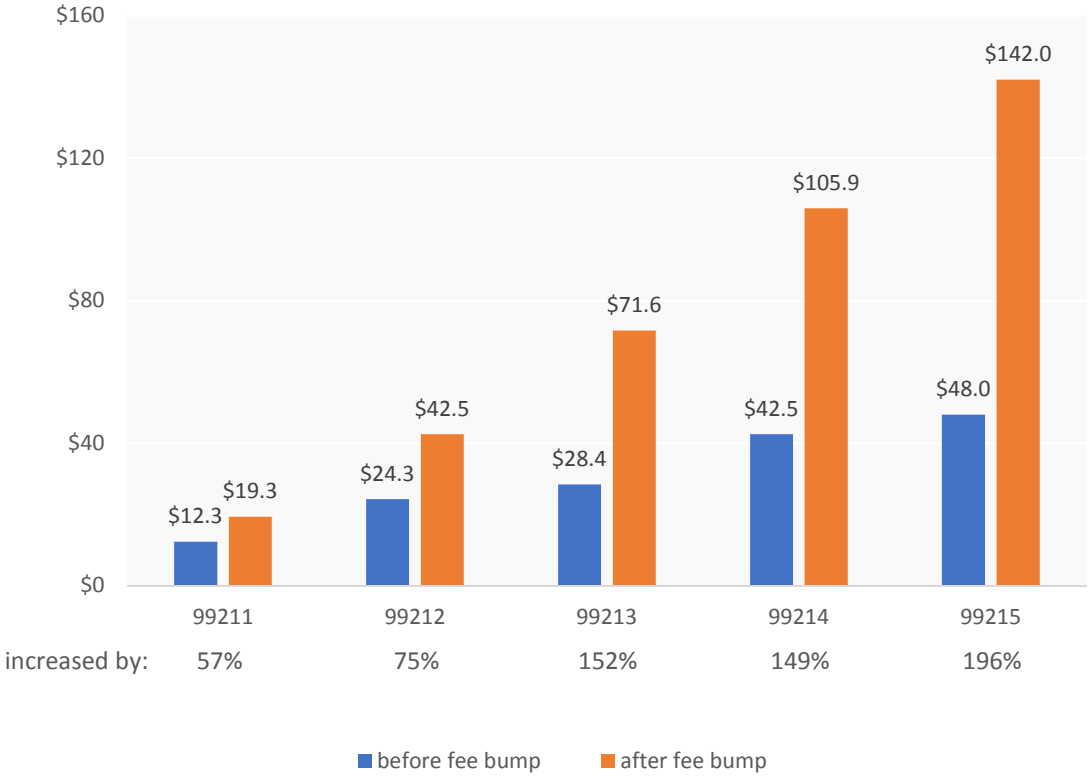


Figure 2. Medicaid Physician Payment for Office Visit 99211-99215 in Illinois, Before and After the Fee Bump



CHAPTER 2

Effects of 2013-14 Medicaid Primary Care Fee Bump on Medicaid Beneficiaries' Self-Reported Access to Primary Care

ABSTRACT

Evidence is mixed regarding the effect of the 2013-14 Medicaid primary care fee bump on primary care physicians' participation in Medicaid and beneficiaries' appointment availability, while its overall effect on Medicaid beneficiaries' self-reported access to primary care is unknown. This study uses the Behavioral Risk Factor Surveillance System 2011-2014 from nine states to examine primary care access-related measures: having personal doctors as well as routine checkup visits and flu vaccinations in the past 12 months. I found no significant improvement in having any personal doctor or routine checkup visits among Medicaid-insured following the fee bump; flu vaccination exhibited seasonal fluctuation but no consistent post-fee-bump change. Lack of improvement in primary care access might be attributed to the fee bump's temporary nature and operational challenges, as well as patient-side care access barriers that were not addressed by the policy.

INTRODUCTION

In 2013 and 2014, the Affordable Care Act (ACA) increased Medicaid payments for primary care services to be on par with Medicare rates. This parity, which was 100% federally funded, became known as the "Medicaid primary care fee bump." Prior to the fee bump, the majority of Medicaid programs paid lower fees for primary care services than Medicare, with a national average of approximately two-thirds of Medicare rates (Zuckerman 2012). Furthermore, the Medicaid-to-Medicare fee ratios varied widely across states in 2012, from 0.33 in Rhode Island to 1.27 in Alaska (Zuckerman 2012). The variation led to heterogeneous sizes of fee bump: states with a lower Medicaid-to-Medicare ratio received a larger payment boost.

The purpose of the fee bump was to improve Medicaid beneficiaries' access to primary care by incentivizing primary care physicians (PCPs) to see more Medicaid patients. Empirical studies on past changes in Medicaid fee generosity have generally shown a positive, albeit small-to-moderate, correlation with PCPs' willingness to see Medicaid patients (Cohen 1993, Adams 1994, Decker 2007, Decker 2009, Wilk 2013). However, because of the temporariness of the recent fee bump and complications in its implementation (e.g., heavy administrative burden of a required self-attestation process and delayed payments during the first half of 2013 in many states (Medicaid and CHIP Payment and Access Commission 2015)), the policy's impact on primary care supply for Medicaid patients might be constrained. Emerging evidence suggests that the fee bump might increase PCPs' willingness to see more Medicaid patients (Polsky, Richards et al. 2015) but may have been ineffective in attracting new PCPs to sign on (Medicaid and CHIP Payment and Access Commission 2015, Decker 2016).

Though the fee bump was designed to address the supply-side drivers of access to primary care, multiple demand-side factors could also moderate the fee bump's effects. First, the second year of the fee bump coincided with state Medicaid expansions. Extra demand for primary care services among the newly covered could offset the extra supply, if any, induced by the fee bump. Second, Medicaid beneficiaries' access to care is influenced by other barriers such as health illiteracy and transportation, cultural, language barriers. Evidence on the effects of Medicaid fee generosity on self-reported access to care measures are mixed. For example, Shen and Zuckerman (Long, Settle et al. 1986) show that higher Medicaid fees are correlated with improvements in some patient-reported measures (such as having usual sources of care and doctor visits) but not others (such as receiving preventive care and having unmet needs); Atherly and Mortensen (Atherly and Mortensen 2014) found that increased Medicaid payment rates led to no increase in utilization of screening services.

Whether the fee bump improved access to primary care as reported by Medicaid beneficiaries remains an important question. The objectives of this study are to examine post-fee-bump changes in self-reported access to primary care and, as the size of fee bump varied by states, to identify how changes in access are correlated with the size of fee bump.

METHODS

Data Source and Study Sample

I used the Behavioral Risk Factor Surveillance System (BRFSS) data for 2011-2014, a national annual, cross-sectional survey of non-institutional U.S. resident adults. BRFSS captures information on health-related behavior, chronic conditions, and use of preventive services (Centers for Disease Control and Prevention (CDC) 2011-2014). Although the

mandatory core BRFSS questionnaire does not ask about Medicaid enrollment, ten states asked this question in their state-specific BRFSS modules in 2011-2012 and also obtained this information from respondents via the health care access module in 2013-2014. I obtained state BRFSS data from nine of the ten states—Colorado(Health Statistics and Evaluation Branch 2011-12), Idaho(Bureau of Vital Records and Health Statistics 2011-2012), Maine(Maine Center for Disease Control and Prevention 2011-2013), Massachusetts(The Office of Data Management and Outcomes Assessment 2011-2012), Oregon(Program Design and Evaluation Services 2011-2012), Rhode Island(Center for Health Data Analysis 2011-2012), South Dakota(Office 2011-2014), Utah(Office of Public Health Assessment 2011-2012), and Washington(Washington State Department of Health 2011-2012), but not North Carolina.

The sample consists of non-elderly adult Medicaid beneficiaries aged 18 to 64 who indicate Medicaid as the sole source of insurance (if asked about all insurance types) or the primary one (if asked about the primary type). I did not include Medicaid-Medicare dual eligibles, because fee-bump-eligible services rendered to dual eligibles would receive the same size of fee bump as non-dual eligibles if the pre-fee-bump Medicaid rates exceeded the Medicare 20% coinsurance, or otherwise a smaller size capped at 20% of Medicare rate (Kaiser Family Foundation 2012). The respective sample sizes from 2011 through 2014 were 3,623, 4,723, 5,122, and 3,588. Yearly average sample size by state varied from 187 in South Dakota to 1,660 in Massachusetts.

Outcome Measures

I considered three outcome variables for patient-reported primary care access: 1) having any personal doctor, 2) any visit to a doctor's office for a routine checkup within the

past 12 months, and 3) receipt of flu vaccination within the past 12 months. The variables were measured semiannually to support accounting for heterogeneous policy implementation over time (e.g., due to operational issues during January-June 2013).(Medicaid and CHIP Payment and Access Commission 2015)

Analysis

I conducted three analyses. The first analysis examined the 2011-2014 trends in shares of Medicaid beneficiaries reporting adequate access to primary care. Trends were reported for the expansion state group (CO, MA, OR, RI, and WA) and the non-expansion states group (ID, ME, SD, and UT). The second analysis examined state-specific post-fee-bump changes in the likelihood of reporting improved access measures. To get state-specific estimates, I ran separate logistic regressions for each state, with the dichotomized individual-level access measures being the dependent variables. Independent variables included four time dummies for each semiannual period in 2013-2014, which captured the overall post-fee-bump changes in the access measures, and control variables (including age, sex, race, level of education, marital status, having a child, self-reported general health, pregnancy status, disability status, depression, diabetes, and asthma).

The third analysis examined correlation between different fee bump sizes and magnitude of post-fee-bump changes in the access measures. I did so by using logistic regressions that pooled subjects in all nine states. The key independent variables in this analysis were the fee bump size, percentage change in Medicaid enrollment, and state fixed effects (dummies). The outcome measures and other control variables were the same as in the state-specific regressions. The bump size variable was measured as 100% minus the 2012 Medicaid-to-Medicare PCP fee ratio, ranging from in 11% in ID to 67% in RI among

the nine states (Zuckerman 2012). This variable was interacted with an indicator for "2013 or 2014," thereby only being switched on in 2013 and 2014 data records. The percentage change in Medicaid enrollment captured changes in primary care demand, and so is a more precise measure than a binary indicator for Medicaid expansion status. In addition, the binary indicator would not account for the 'woodwork' effects in non-expansion states, which describes previously-eligible individuals coming out of the "woodwork" to apply for Medicaid (Sommers and Epstein 2011). The enrollment percentage change was measured as the enrollment number reported in June and December over the average enrollment in the pre-expansion period of 2011-2013. State fixed effects accounted for time-invariant, unobserved state characteristics that could affect access to primary care, such as geographic availability of primary care providers.

I reported average marginal effects, which were the estimated change in the likelihood of a binary outcome in response to a one-unit change in the focal independent variable, holding other independent variables at observed values. In all analyses, I applied BRFSS-provided survey weights, which differed by year and state depending on the questionnaire design. Specifically, in certain states and years, the Medicaid coverage question was limited to landline survey but not cellphone survey, or certain questionnaire version(s) when multiple versions were in use. Standard Errors were corrected by clustering at the state level.

RESULTS

Trends of Primary Care Access

Among Medicaid beneficiaries in the nine sample states, I did not observe a consistent increase in the three primary care access measures following the fee bump (see **Figure 1**). In fact, the shares of Medicaid beneficiaries having a personal doctor and any routine checkup visit in past 12 months were relatively level until the second half of 2013 and then declined in 2014 in both expansion and non-expansion groups. Flu vaccination rate had a seasonal fluctuation – around 40% and 30% in the first and second halves of a year, respectively. The rate peaked at 45% in the first half of 2013 in the expansion states; however, the peak could reflect the 2012-13 flu outbreak (Centers for Disease Control and Prevention 2013).

Adjusted Post-Fee-Bump Change in Primary Care Access

After adjustment for individual characteristics, the nine states rarely had any statistically significant post-fee-bump increase in having a personal doctor and routine checkup visits (Columns 1-9 in **Figures 2 and 3**). The only exception was Massachusetts, where the share of routine checkup visits increased by 4.0 percentage points (P=0.03) in the second half of 2013. When all nine states were combined (the rightmost column in **Figures 2 and 3**), both measures declined in second half of 2013 and full year of 2014. More specifically, the measure of having a personal doctor declined by -1.6 percentage points in second half of 2013 (P=0.08), -6.4 in first half of 2014 (p<0.01), and -4.4 in second half of 2014 (p<0.01); the measure of routine checkup visits declined by -3.0 (p=0.03), -5.2 (p<0.01), and -1.8 percentage points (p=0.07), correspondingly. The combined measure for flu vaccination (the rightmost column in **Figure 4**) displayed neither improvement nor

decline in the same period, though there was an improvement by 5.7 percentage points ($p<0.01$) in the first half of 2013.

In **Figures 2 to 4**, states are ordered by the fee bump size (from 0.11 in ID to 0.67 in RI). Based on this order, I observed that, post-fee-bump declines in the measures of personal doctors and routine check visits concentrated in the states with a relatively small bump size, including ID, CO, UT, OR, and SD (columns 1 to 5 in **Figures 2 and 3**). No decline of a large size or statistical significance was observed in MA, WA, and ME (columns 6 to 8 in **Figures 2 and 3**). Despite the largest bump size, RI (column 9 in **Figures 2 and 3**) had some noticeable declines, though not statistically significant (possibly due to the limited sample size[1]). No obvious pattern can be derived for flu vaccination (columns 1 to 9 in **Figure 4**),

I also observed that the expansion states displayed diverse patterns of access changes in 2014. For instance, CO and OR, the two states with >50% increase in Medicaid beneficiaries, had a decline in all three measures (columns 2 and 4 in **Figures 2-4**), whereas WA with >30% increase in Medicaid beneficiaries had relatively unchanged measures (column 6 in **Figures 2-4**). Some non-expansion states, particularly UT and SD (columns 3 and 5 in **Figures 2 and 3**), also experienced declines in the likelihood of having a personal doctor and routine checkup visits.

[1] RI has 65, 57, 362, and 316 study subjects in 2011-14, respectively. The small sample sizes in pre-fee-bump years are due to the survey design of limiting Medicaid enrollment question to landline survey only in 2011 and 2012. The small pre-fee-bump sample size limited the statistical power of testing the post-fee-bump change.

Effect of Bump Size on Primary Care Access

As shown in **Table 1**, I did not identify any statistically significant changes in the three access measures associated with the fee bump size (measured as a 10-percentage-point increase at Medicare rates). In contrast, an increase in Medicaid enrollment was associated with relatively large and statistically significant decreases in the measures of having a personal doctor and routine checkup visits. More specifically, a 10-percentage-point increase in Medicaid enrollment was associated with a 1.3 percentage-point reduction (95% CI: -2.6, -0.0; P=0.06) in the likelihood of having a personal doctor and a 1.6 percentage-point reduction (95% CI: -2.5, -0.7; $p<0.01$) in routine checkups. Medicaid enrollment was not associated with a significant change in flu vaccination rate.

DISCUSSION

I found no statistically significant improvements in self-reported primary care access among non-elderly adult Medicaid beneficiaries following the fee bump's implementation in nine states. I found that, across these states, Medicaid beneficiaries were generally less likely to report having a personal doctor or routine checkup visits in the second half of 2013 through 2014. Although the flu vaccination rate did not experience a similar decline during the same period, this measure may be less indicative of primary care access than the other two measures.[2] These findings corroborate other studies' findings that the fee bump has had

[2] I included flu vaccination rate, because the fee bump specifically covered the CPT codes for vaccination management. However, flu vaccination rate is considered less indicative of primary care access than the other measures, for two reasons. First, the level of flu severity could affect flu vaccination rate. Second, flu vaccination is often provided at facilities that do not provide primary care (e.g. a pharmacy or work place). In fact, after examining the location of flu vaccination in the three states (Massachusetts, Rhode Island, and Maine) where such data is available, I found that less than one third of flu shots that adult Medicaid beneficiaries received were from a doctor's office or a clinic.

limited effects on PCPs' Medicaid participation (Medicaid and CHIP Payment and Access Commission 2015, Decker 2016).

After adjusting for Medicaid expansion and other factors, I identified no statistically significant association between Medicaid beneficiaries' access to primary care and the fee bump size. Absence of a strong association could be attributed to the fact that the physician payment is only one of many factors affecting Medicaid beneficiaries' access to primary care (see discussion by Wilk and Jones (Wilk and Jones 2014)). In addition, the fee bump's effects could be attenuated by its temporariness and difficulties encountered during its implementation. One of the difficulties was the late release of the fee bump final rule in November 2012, which challenged Medicaid agencies to establish a PCP self-attestation process and convert a per-unit fee raise into an capitation payment enhancement (for Medicaid Managed Care plans) in a short period. As a result, many states delayed fee bump payments until late 2013 (2014, Medicaid and CHIP Payment and Access Commission 2015). Another difficulty was inadequate provider education and outreach about the fee bump, because of the limited capacity of Medicaid programs. For instance, a study in Washington State found that nearly one-third of PCPs in small-size practices were unaware of the fee bump, and that half of rural PCPs and one third of urban PCPs did not know, or were unsure, if their practices had received the payment raise (Patterson, Andrilla et al. 2014). Limited awareness of the fee bump may have impeded potential PCP behavioral change.

I also found that the size of Medicaid enrollment increases during the study period were associated with a relatively larger negative effect on access to primary care. Colorado and Oregon, the two states with the largest enrollment increases among the study states, experienced the most noticeable declines in 2014. Given the fee bump's limited effects,

declines would be expected as a result of greater demand for primary care from a larger Medicaid population and, perhaps, little or no increase in Medicaid participating physicians. Unexpectedly, I also found similar declines in non-expansion states in the measures of personal doctors and routine checkup visits in 2014, notably Utah and South Dakota. I cannot discount the possibility that the declines are part of a downward secular trend or being influenced by other concurrent state-specific factors, but I note that many non-expanding states experienced increased enrollment due to the 'woodwork' effect. Apart from that, subsidies starting at 100% FPL rather than 138% FPL in expansion states may have led to a general increase in the insured low-income population often served by Medicaid participating physicians. It was possible that greater demand from both the 'spillover' enrollment and newly insured low-income patients could offset improvement in primary care access induced by the fee bump. Further research on PCP behavioral changes in non-expansion states is needed to bring more clarity to the underlying causes of such decline.

My study has several limitations. First, self-reported measures for access were subject to interviewees' perception and recall bias. Second, the retrospective nature of two access measures (routine checkup visit and flu vaccination in the past 12 months) could reflect some patients' access to care prior to Medicaid enrollment if they changed insurance coverage status during this period. Third, my binary access measures, which only addressed "yes or no" questions, did not capture changes in the intensity of primary care utilization. Last but not the least, I assumed a linear relationship between the fee bump size and access changes. It is possible that the fee bump had a threshold effect, which means the changes are "triggered" by a fee bump of a size larger than a certain threshold value. To examine potential threshold effects, I tested an alternative specification of the fee bump size - a

binary variable of "Medicaid fees increased at least 30% relative to Medicare" - in a sensitivity analysis. The sensitivity analysis yielded no different conclusion.

In sum, the fee bump of 2013-14 may have had limited impacts on Medicaid beneficiaries' access to primary care. In 2015, 16 states and the District of Columbia (DC) fully or partially extended the fee bump with state funds (in accordance with Federal Medical Assistance Percentage [FMAP] rates)(Snyder, Paradise et al. 2014). The states extending the fee bump may present an opportunity to study a sustained version of it with most operational issues resolved. Further research on the continued fee bump would help policymakers better understand the interplay of magnitude, longevity, and execution of financial incentives in affecting physician behaviors regarding Medicaid patients.

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Table 1. Effect of Bump Size and Medicaid Enrollment Increase on Primary Care Access

Measures of Primary Care Access	Bump size [a] (per 10 percentage-point increase in Medicare rate)		Medicaid enrollment (per 10 percentage-point increase)	
	Marginal Effect [b]	95% CI	Marginal Effect [b]	95% CI
Have a personal doctor	0.2%	(-0.6%, 0.9%)	-1.3% *	(-2.6%, 0.3%)
Routine checkup in past 12 months	0.3%	(-1.4%, 2.1%)	-1.6% ***	(-2.5%, -0.7%)
Flu shot in past 12 months	0.6%	(-0.2%, 1.5%)	0.2%	(-0.8%, 1.2%)

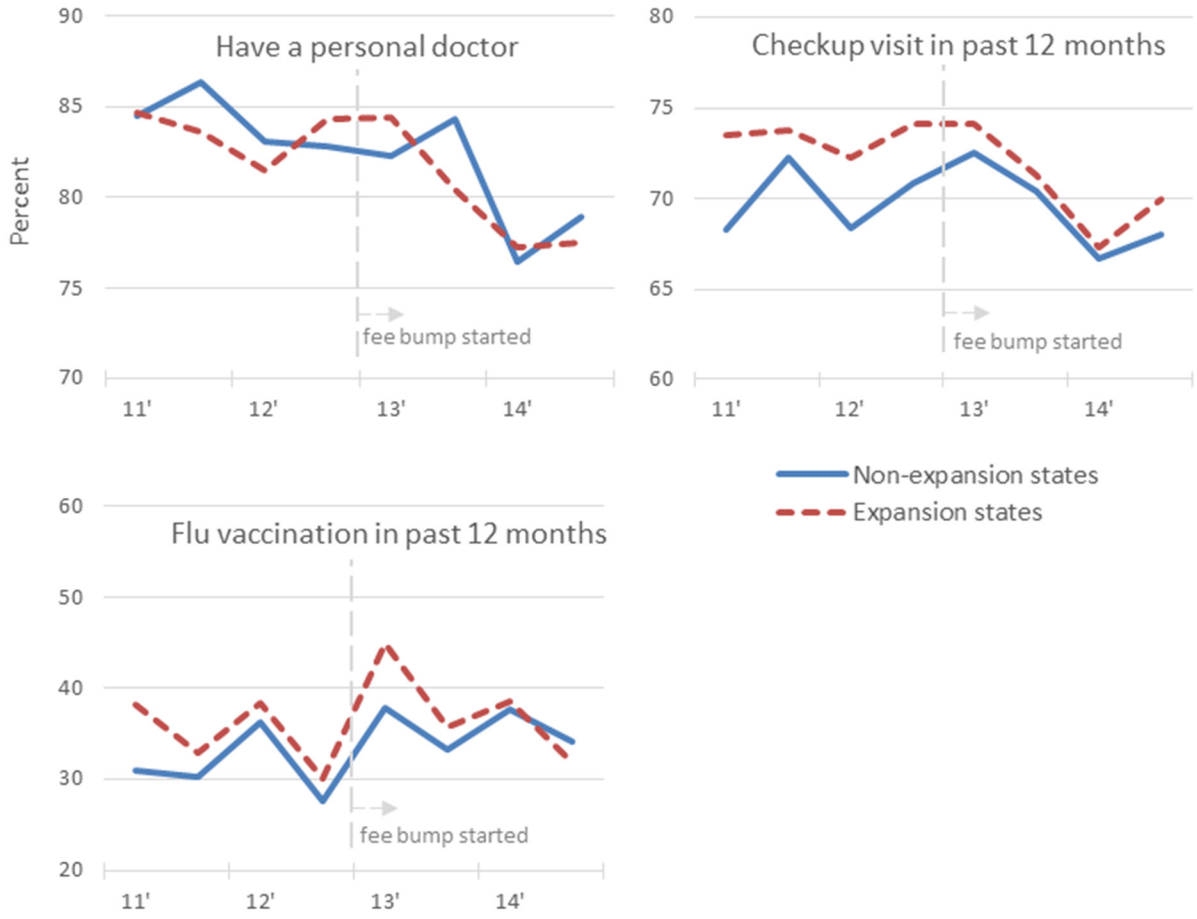
Source: Behavioral Risk Factor Surveillance System, 2011-2014. **Notes**: Average marginal effects are derived from logit models. Other independent variables in the logit models (results omitted here) include individual characteristics (age, sex, race, level of education, marital status, having child, self-reported general health, pregnancy status, disability status, depression, diabetes, and asthma), state and year dummies, Medicaid enrollment status, interaction terms between state and Medicaid enrollment status, and interaction terms between state and year.

[a] fee bump size measured as units of 10% of Medicare's fee level. For example, an increase from pre-fee bump Medicaid-to-Medicare fee ratio of 0.74 to 1.0 after fee bump equals 2.6 units of 10% of Medicare's fee level. The marginal effect of 2.6 units on percentage reporting any personal doctor is an increase by 1.04 (0.4*2.6) percentage point.

[b] Marginal effects are change in percentage points.

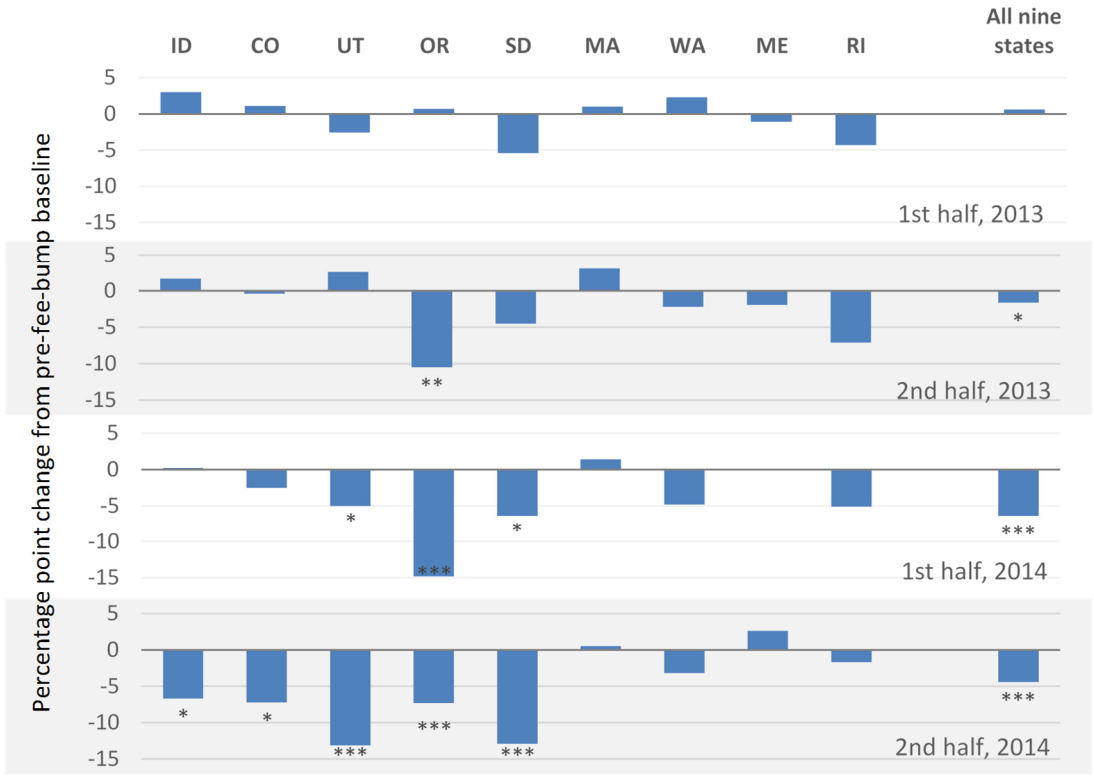
*p < 0.10 **p < 0.05 ***p < 0.01

Figure 1. Semiannual Measures of Access to Primary Care among Medicaid Enrollees in Nine States, 2011-14



Source: Author's calculations using the Behavioral Risk Factor Surveillance System 2011-2014. **Notes:** N=17,056. Expansion and non-expansion refer to the latest round of Medicaid expansion starting January 1, 2014. Expansion states included are Colorado, Massachusetts, Oregon, Rhode Island, and Washington; non-expansion states included are Idaho, Maine, South Dakota, and Utah. Outcomes were measured semiannually (January to June and July to December). Survey weights were applied in accordance with survey design.

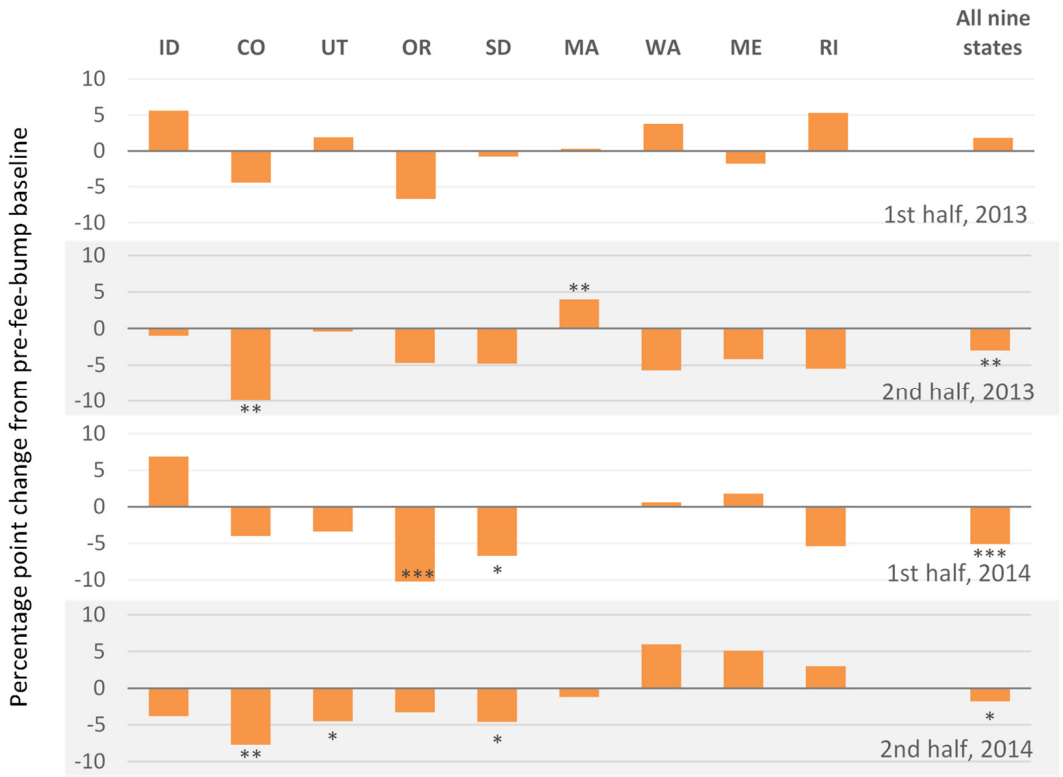
Figure 2. Change in Likelihood of Medicaid Beneficiaries Having a Personal Doctor, 2013 and 2014



Pre-fee-bump baseline	83.9	82.6	75.5	81.9	74.2	90.0	84.9	83.3	89.0	83.4
Bump size	0.11	0.26	0.26	0.28	0.31	0.32	0.34	0.37	0.67	N/A
Expansion	No	Yes	No	Yes	No	Yes	Yes	No	Yes	N/A

Source: Authors' calculation using the Behavioral Risk Factor Surveillance System 2011-2014. **Notes:** Percentage-point changes are estimated average marginal effects over the pre-fee-bump baseline in 2011-2012. Survey weights are applied. Adjustment includes individual characteristics such as age, sex, race, level of education, marital status, having child, self-reported general health, pregnancy status, disability status, depression, diabetes, and asthma. *p < 0.10 **p < 0.05 ***p < 0.01

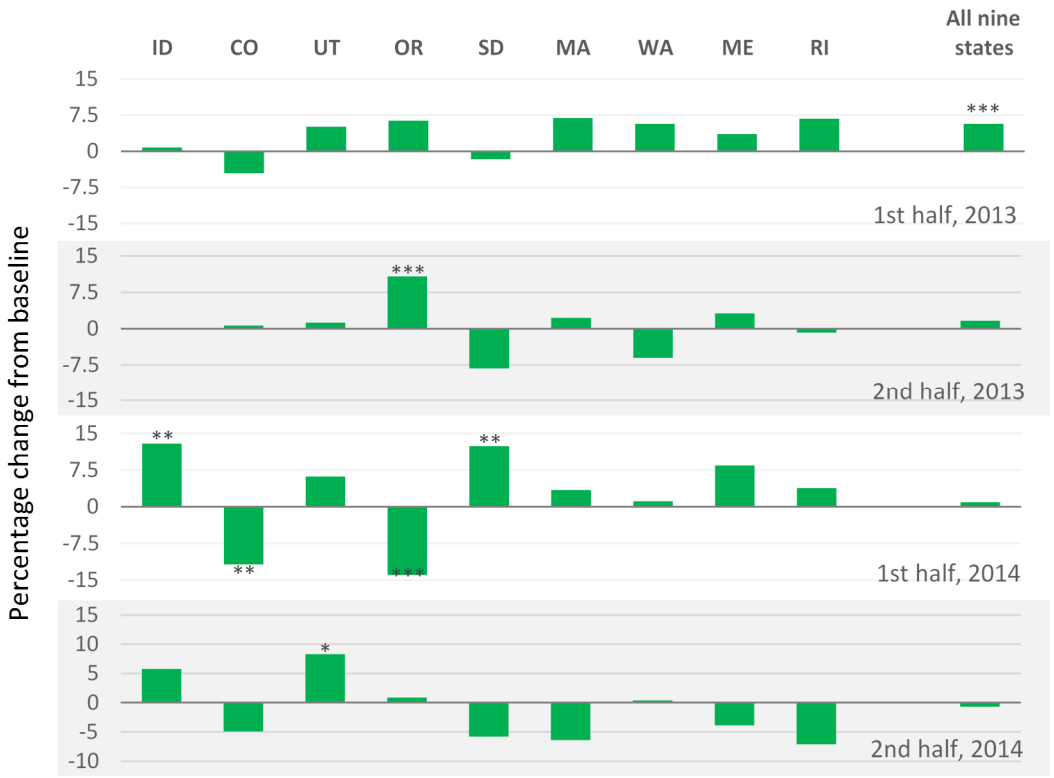
Figure 3. Change in Likelihood of Medicaid Beneficiaries Having any Routine Checkup Visit within the Past Twelve Months, 2013 and 2014



	ID	CO	UT	OR	SD	MA	WA	ME	RI	All nine states
Pre-fee-bump baseline	69.4	71.0	67.0	65.0	74.4	68.5	59.3	78.7	80.6	71.5
Bump size	0.11	0.26	0.26	0.28	0.31	0.32	0.34	0.37	0.67	N/A
Expansion	No	Yes	No	Yes	No	Yes	Yes	No	Yes	N/A

Source: Authors' calculation using the Behavioral Risk Factor Surveillance System 2011-2014. **Notes:** Percentage-point changes are estimated average marginal effects over the pre-fee-bump baseline in 2011-2012. Survey weights are applied. Adjustment includes individual characteristics such as age, sex, race, level of education, marital status, having child, self-reported general health, pregnancy status, disability status, depression, diabetes, and asthma. *p < 0.10 **p < 0.05 ***p < 0.01

Figure 4. Change in Likelihood of Medicaid Beneficiaries Having a Flu Vaccination within the Past Twelve Months, 2013 and 2014



	ID	CO	UT	OR	SD	MA	WA	ME	RI	All nine states
1st half year baseline	41.4	30.1	36.6	34.8	40.7	49.9	40.1	30.4	36.6	37.2
2nd half year baseline	31.9	26.6	30.1	28.5	24.8	57.1	46.4	26.4	37.4	30.7
Bump size	0.11	0.26	0.26	0.28	0.31	0.32	0.34	0.37	0.67	N/A
Expansion	No	Yes	No	Yes	No	Yes	Yes	No	Yes	N/A

Source: Authors' calculation using the Behavioral Risk Factor Surveillance System 2011-2014. **Notes:** Percentage-point changes are estimated average marginal effects over the pre-fee-bump baseline in 2011-2012. Because of seasonal fluctuation of flu vaccination rate, the first- and second-half-year estimates are compared with the baseline in the corresponding half of year. Survey weights are applied. Adjustment includes individual characteristics such as age, sex, race, level of education, marital status, having child, self-reported general health, pregnancy status, disability status, depression, diabetes, and asthma. *p < 0.10 **p < 0.05 ***p < 0.01

CHAPTER 3

Effects of 2013-14 Medicaid Primary Care Fee Bump on Quantity and Intensity of Primary Care – Evidence from a National Physician Survey

ABSTRACT

Objective. To assess the effects of the 2013-2014 Medicaid primary care physician (PCP) fee increase on PCP's care quantity and intensity rendered to Medicaid beneficiaries; and whether the effects differ by practice ownership, as owner PCPs might have been more responsive to fee changes than salary-based PCPs. **Data**. National Ambulatory Medical Care Survey 2010-2014. **Sample**. 46,637 visits made by Medicaid or privately-insured patients to PCPs who were either practice owners (owner PCPs) or employees or contractors in a private practice, community health center, health management organization, or hospital (non-owner PCPs). **Design**. A quasi-experimental triple-difference design comparing care quantity and intensity metrics among Medicaid patients versus among privately insured patients, and, within the Medicaid sample, further comparing the metrics for visits provided by owner versus non-owner PCPs. **Findings**. Despite a large fee increase, I did not observe any increase in the annual number of visits, average visit duration, or service types (e.g. likelihood of new prescriptions, exams, counseling, and specialty referral) offered to Medicaid patients, even among owner PCPs. **Conclusions**. The fee increase did not incentivize PCPs, even those with practice ownership, to provide more intensive primary care to Medicaid beneficiaries.

INTRODUCTION

The Affordable Care Act (ACA) mandated that Medicaid programs increase reimbursement payments to primary care physicians (PCPs) up to Medicare rates in 2013-2014, with the increase 100% federally funded. This policy sought to boost the supply of primary care services and addressing the anticipated increase in demand following the 2014 Medicaid expansion. The fee bump was large in size – an estimated 73% increase nationwide on average – but short-lived, phasing out on December 31, 2014.

The primary policy objective of the fee bump was to increase PCPs' Medicaid participation rate as well as participating PCPs' willingness to accept new Medicaid patients. Existing studies on the policy's intended effects offer mixed messages: although one study found a post-fee-bump increase in Medicaid patients' acceptance and better appointment availability (Polsky, Richards et al. 2015), several others suggested little to no improvement in the participation rate (Medicaid and CHIP Payment and Access Commission 2015, Brown 2016, Decker 2016). Inconclusive evidence and possibly limited effects on care access could be attributable to the policy's temporary nature as well as operational challenges during its implementation (such as a mandatory physician self-attestation requirement, delayed release of increased payments, and limited PCP outreach and education on the policy) (Timbie, Buttorff et al. 2017)(Wilk and Jones 2014). It could also be because the extra payments were still overshadowed by PCPs' concerns about extra administrative burden and the perception that Medicaid patients are more difficult to take care of and find specialty care to refer to (Timbie, Buttorff et al. 2017).

Apart from effects on primary care access, the fee bump might have also influenced quantity and intensity of primary care services that Medicaid patients received. The policy

increased per-unit price paid by Medicaid relative to other payers and likely induced a predominant substitution effect that caused PCPs to shift time and resources toward Medicaid patients. Furthermore, because the fee bump was implemented in such way that the fee increase for different procedures are unequal, percentagewise or in dollar term, and generally favored more intensive procedures, the policy could incentivize more intensive care provided per visit. For the above two and other reasons, it is not unreasonable to anticipate an increase in care quantity and intensity following the fee bump. Such increase could be beneficial, if Medicaid patients had received a suboptimal level of intensity previously; conversely, if Medicaid patients had already received non-inferior treatment compared to counterparts with other types of insurance, a physician-induced intensity increase could potentially be wasteful. Therefore, it is important to evaluate the intensity of care provided post-fee-bump whether the change, if any, meant narrowing the gap between Medicaid patient treatment intensity and that for other types of insured patients.

To address these questions, I employed a quasi-experimental triple-difference method. The triple difference design identified the fee bump's effects on per-patient quantity and per-visit intensity of primary care by first contrasting the pre-versus-post-fee bump changes in care use outcomes for Medicaid patients against those for privately insured patients, and by further contrasting the pre-post changes for Medicaid patients treated by practice owner PCPs against those for Medicaid patients treated by non-owner PCPs. Because Medicaid payments are normally made to providers instead of individual PCPs, practice ownership status determines the form of a PCP's financial tie with a provider and consequently moderates how strong a PCP perceives the financial incentive from the fee bump. Therefore, I hypothesized that care intensity metrics for Medicaid patients treated by owner PCPs was the most responsive to the fee bump. The care intensity metrics that I

assessed included annual number of visit, visit duration, and outcomes indicating a more intensive primary care visit (such as prescribing new medications or specialist referral).

BACKGROUND

Rules and Design of Medicaid Fee Bump

The ACA mandated that qualified PCPs participating in the Medicaid program would receive an enhanced payment for certain primary care services during 2013-2014. Eligible services included all evaluation and management (E&M) and certain vaccine administration codes provided by qualified family physicians, internists, and pediatricians. Services provided on a fee-for-service (FFS) basis as well as those provided to patients enrolled in a Medicaid managed care organization (MCO) qualified for the increased payment. For MCO-enrolled patients, the fee increase was often converted to an enhanced capitation rate. Community/rural health centers (CHCs), including Federally qualified health centers (FQHCs), did not qualify, as reimbursement to these providers is cost-based.

The size of the fee increase varied substantially by eligible service, depending on the pre-fee-bump reimbursement gap between Medicaid and Medicare. The most frequently claimed codes among all fee-bump-eligible codes (>60% based on authors' estimation using a Medicaid claims dataset) were 99211-99215 for office visits by an established patient. The 2012 Illinois Medicaid fees for 99211 through 99215 were $12.30, $24.30, $28.40, $42.50, and $48.00 (Illinois Medicaid Program 2012); the fee bump boosted the respective rates to $19.30, $42.50, $71.60, $105.90, and $142.00 (Illinois Medicaid Program 2013). Thus the least intensive visit type, 99211, received a $7 or 57% increase, whereas the most intensive visit type, 99215, received a $94 or 196% increase. A similar pattern of unequal increases favoring more intensive visits existed in most other states.

Although a patient's medical necessity is the overarching criterion to guide which code to choose among 99211-99215, PCPs still have a high degree of latitude in making the choice. For example, 99212 entails a 10-minute counseling and a brief examination, whereas 99214 requires a 25-minute counseling and a detailed examination. A profit-maximizing PCP could adjust duration of consultation and range of examinations to improve the profit. A study of Medicare Part B fee rates for 99212-99215 found that shift in fee differentials led to shift in frequency of code use (Brunt 2011). Given the design of the fee bump, I hypothesize that PCPs would increase within-visit intensity for Medicaid patients, as reflected by visit duration, as well as likelihood of ordering diagnostic laboratory tests, ordering imaging, and providing health education; consequently, more intensive visits could lead to more new medication prescriptions and specialty referral.

Medicaid Financial Incentive, Facility Ownership, and Physician Behavior

In McGuire and Pauly's physician behavior model (McGuire and Pauly 1991), an exogenous financial incentive has both a substitution effect and an income effect on physician care supply. While a Medicare fee change would exert a strong income effect as Medicare patients make up a significant portion of patient caseload for most physicians, a Medicaid fee change would have predominantly a substitution effect, as Medicaid patients usually constitute a limited portion of caseload. The predominant substitution effect predicts that a Medicaid fee increase (cut) would increase (decrease) care supply to Medicaid patients. The prediction is generally supported by empirical studies on how Medicaid payment change affects access to primary care: Medicaid fee increases generally led to improved PCPs' acceptance of Medicaid patients (Adams 1994, Decker 2007, Callison and Nguyen 2017); conversely, fee cuts led to Medicaid patients shifting away from physician offices and towards outpatient and emergency departments (Decker 2009). However, findings on how

fee changes affect quantity and intensity of care is less consistent. Studies suggest that some aspects of care intensity respond to a financial incentive elastically, while others are inelastic. For example, Shen and Zuckerman (Shen and Zuckerman 2005) found Medicaid fee generosity was associated with no difference in likelihood of receiving preventive care; also, Atherly and Mortensen (Atherly and Mortensen 2014) found that an increase in Medicaid payment rates led to no increase in meeting five screening recommendations.

The effects of a financial incentive on care supply could be moderated by the form of an individual physician's financial tie with a provider organization, as physicians with provider ownership would perceive stronger incentive than physicians paid on a salary basis. Research on physician ownership and care supply has been concentrated in the area of ambulatory surgery centers, where privately-owned centers are found to deliver a larger surgery volume than those not privately owned (Strope, Daignault et al. 2009, Hollingsworth, Ye et al. 2010, Mitchell 2010). Few studies have examined how Medicaid financial incentives changed care supply in the context of physician practice ownership. Among them, Baker and Royalty (Baker and Royalty 1997) found that a Medicaid fee increase was associated with only a small improvement in Medicaid acceptance among private physicians, and the effect was confined to young private physicians. Wilk (Wilk 2013) examined how Medicaid fee levels interacted with physician characteristics in determining the level of Medicaid participation; he found that salaried physicians and those in HMO or hospital-affiliated facilities were relatively less responsive to a Medicaid payment change in terms of accepting new Medicaid patients. However, both studies focused on the extensive margin of primary care (i.e., patient acceptance). This study focuses on how physician ownership moderates the intensive margin of primary care: I hypothesize that owner PCPs

would be more responsive to the fee bump, in terms of amount of care provided per patient and per visit, compared with non-owner PCPs.

METHODS

Data and Study Sample

This study relied on data from the National Ambulatory Medical Care Survey (NAMCS) 2010-2014. NAMCS is an annual nationally representative sample survey of visits to office-based physicians, administered by the National Center for Health Statistics. Participating physicians report detailed visit information – such as patients' symptoms, physicians' diagnoses, and medications – in a randomly assigned one-week period. NAMCS uses a two-stage probability design that randomly samples physicians within targeted states or census divisions as well as patient visits within practices.

In my primary analyses, eligible observations are limited to primary care visits offered by PCPs who are either full or partial owners of a practice or employees/contractors affiliated with a private practice, hospital, a community health center (CHC), or a health management organization (HMO). The sample selection process is illustrated in **Figure 1**. Briefly, I excluded: 1) non-primary care visits, defined as visits offered by doctors in specialties other than general/family practice, internal medicine, and pediatrics (i.e., the three specialties qualified for the fee bump), or visits by elderly patients (age≥65) due to common Medicare eligibility; 2) visits by patients not covered by Medicaid or private insurance; 3) visits for which the billing provider was a non-physician (e.g., nurse practitioner or physician assistant, whose services did not qualify for the fee bump) or a physician who is not the patient's PCP (because visits to physicians who are not the regular primary care provider

could be systematically different in cause and nature from regular primary care visits); and 4) visits offered by PCPs who claim ownership of a hospital, CHC, or HMO.

The final study sample for the primary analyses consist of 46,727 primary care visits. The sample is clustered into 4 subgroups by patient insurance type and physician ownership status: 5,439 visits by Medicaid patients and 7,460 visits by privately insured patients to owner PCPs, and 17,106 visits by Medicaid patients and 16,722 visits by privately insured patients to non-owner PCPs. The 5,439 visits by Medicaid patients to owner PCPs are the focal group, and are further divided by a practice's share of Medicaid caseload and FFS arrangement.

Study Variables

Dependent Variables

I used the following seven metrics to measure quantity and within-visit intensity of primary care: 1) number of primary care visits in the past 12 months, 2) minutes that a patient spent with his PCP during the visit, 3) any new (as opposed to continued) medication prescribed, 4) any diagnostic exam provided, 5) any imaging test provided or ordered, 6) any referral to specialist, and 7) any health education provided. For the metric of health education, because the scope of health education questions in NAMCS was broadened since 2012, I limited it to the ones that are consistently asked throughout the study period. The types of health education included education on asthma, diet/nutrition, exercise, family planning/contraception, growth development, injury prevention, stress management, tobacco cessation, and weight reduction. Metrics 1 and 2 measure quantity of primary care, and are treated as continuous variables. Whereas metrics 3 through 7 measure within-visit

intensity, and are treated as binary variables. Descriptive statistics of these metrics are provided in Table 1.

Independent Variable of Interest

I constructed dummy variables for the post-fee-bump period (2013 and 2014), Medicaid enrollment, and practice ownership. Though level of ownership – full versus partial – further differentiated how strong the financial incentive was perceived, a change in NAMCS questionnaire design that merged the options of full and partial ownership since 2012 precluded distinguishing between levels of ownership.

In a secondary analysis, I limited the sample to owner PCPs only and examined whether owner PCPs in a practice with a larger share of Medicaid patients or a larger share of FFS arrangement are more responsive to the fee bump. NAMCS asks about shares of Medicaid patients and FFS arrangement in quartile increments. I constructed two binary variables of "≥50% caseload are covered by Medicaid" and "≥75% patients are paid FFS." 56% of visits by Medicaid patients to owner PCPs in the study sample happened in a practice with <50% Medicaid caseload, and 36% reported <75% patients were FFS.

Control Variables

In all analyses, I controlled for patient and physician-level variables. Patient-level control variables include age, gender, race/ethnicity, number of total chronic conditions (0, 1, 2, and ≥3), the major reason for visit (care for new problem, routine care of chronic problem, care of flared-up chronic problem, pre/post-surgery visit, and preventive care), and category of principal diagnosis (including 20 major diagnostic categories). Physician-level control variables include provider type (solo practice, group practice, hospital, HMO, and

CHC), practice location in a metropolitan statistical area, and region (northeast, midwest, south, and west).

Empirical Approach

I designed two regression analyses to examine two hypotheses:

Hypothesis 1. Owner PCPs increased quantity and within-visit intensity of primary care rendered to Medicaid patients following the fee bump, relative to privately insured patients treated by owner PCPs and Medicaid patients treated by non-owner PCPs.

Hypothesis 2. Among owner PCPs, those with a larger share of Medicaid patients and/or FFS patients perceived a stronger financial incentive and therefore increased quantity and within-visit intensity of primary care by a relatively larger margin.

To test *Hypothesis 1*, I constructed a triple difference model, with a model specification as follows:

$$Y_{ijt} = \beta_0 + \beta_1 Post_t + \beta_2 Medicaid_i + \beta_3 Owner_j + \beta_4 Post_t * Medicaid_i + \beta_5 Post_t * Owner_j + \beta_6 Owner_j * Medicaid_i + \beta_7\ Post_t * Owner_j * Medicaid_i + \delta_1 X_i + \delta_2 Z_j + \varepsilon_{ijt}$$

Where Y_{ijt} is one of the seven metrics for patient *i* treated by physician *j* in year *t*, X_i is a vector of patient-level control variables, and Z_j is a vector of physician-level control variables. Other independent variables are described in Table 1. The parameter of interest, β_7, illustrates the differential effect of the fee bump on care intensity provided by owner versus non-owner PCPs. β_7 would be positive if the effect of the fee bump on the intensive margin was moderated by ownership status as hypothesized.

The triple difference models control for two confounding trends: any post-fee-bump change in quantity or intensity provided by owner PCPs that is common across insurance types (captured by β_5), any the post-fee-bump change in care intensity provided to Medicaid patients regardless of PCP ownership status (captured by β_4). A positive β_4 would imply a spill-over effect of the fee bump on non-owner PCPs; in an extreme case that owner PCPs and non-owner PCPs were equally incentivized, β_4 would be positive while β_4 would be zero.

I was further concerned that the spill-over effect could be strong for non-owner PCPs in private practices, but not as strong in hospital or HMO settings. In private practices, it is of owner PCPs' interest to incentivize non-owner PCPs by sharing the fee bump profits, whereas hospitals or HMOs might lack sensitivity to the fee bump, as primary care contributes to a small fraction of revenue, and also lack administrative flexibility or agility to incentivize employee/contractor PCPs. To address the issue of unequal spill-over effects for non-owner PCPs in different provider settings, I constructed three alternative models as follows: 1) limiting non-owner PCPs to those in private practices; 2) limiting non-owner PCPs to those in hospitals or HMOs; and 3) excluding services provided by non-owner PCPs altogether (i.e., reducing the triple difference model to a difference-in-difference model only comparing pre-post change for Medicaid versus privately insured patients seen by owner PCPs). I found that the alternative models yielded no different conclusion (data not provided) from the primary model.

To test *Hypothesis 2*, I focused only on visits provided by owner PCPs to Medicaid patients. I constructed standard difference-in-difference models with three specifications:

Specification 1: Share of Medicaid patients

$$Y_{ijt} = \beta_0 + \beta_1 Post_t + \beta_2 Medicaid > 50\%_j + \beta_3 Post_t * Medicaid > 50\%_j + \delta_1 X_i + \delta_2 Z_j + \varepsilon_{ijt}$$

Specification 2: Share of FFS patients

$$Y_{ijt} = \beta_0 + \beta_1 Post_t + \beta_2 FFS > 75\%_j + \beta_3 Post_t * FFS > 75\%_j + \delta_1 X_i + \delta_2 Z_j + \varepsilon_{ijt}$$

Specification 3: Composite incentive level

$$Y_{ijt} = \beta_0 + \beta_1 Post_t + \beta_2 Incentive\_lvl_j + \beta_3 Post_t * Incentive\_lvl_j + \delta_1 X_i + \delta_2 Z_j + \varepsilon_{ijt}$$

In Specification 3, $Incentive\_lvl_j$ is a composite measure of physician j's incentive level that combines share of Medicaid patients with share of FFS patients (i.e. "Medicaid≤50% & FFS>75%", "Medicaid>50% & FFS≤75%", "Medicaid≤50% & FFS>75%", and "Medicaid>50% & FFS>75%"). Owner PCPs in a practice with "Medicaid>50% & FFS>75%" are expected to be perceive the strongest incentive among all. The parameter of interest is β_3 in all specifications: a positive β_3 suggests a stronger financial incentive for PCPs in practices with a larger share of Medicaid patients and FFS arrangement. For all above mentioned models, I applied survey weights and clustered standard errors at the physician level. In addition, I used linear probability models for binary outcomes of the five within-visit intensity metrics.

Validation of Study Design: Test Parallel Pre-Trend

Estimating the impacts of the fee bump by comparisons between the 'treatment' group, Medicaid patients treated by owner PCPs, and the two 'control' groups, Medicaid patients treated by non-owner PCPs and privately insured patients treated by owner and non-owner PCP, requires a strong assumption that, had the fee bump not occurred, the trends of the outcomes for the 'treatment' and 'control' groups should be relatively parallel.

One way to test the parallel trends assumption would be to examine the trends prior to the fee bump. If the care intensity increased for the 'treatment' group relative to the 'control' groups even before the fee increase, it would suggest that the estimated effect could be due to difference in existing trends between the groups rather than the fee bump.

I first present the visual evidence of parallel trends for the seven outcome variables, as plotted in **Figure 2**. To account for shifts in patient and physician composition over time that would affect the outcomes, trends are adjusted for patient- and physician-level control variables. The left panel of **Figure 2** shows primary care visits provided by owner PCPs to Medicaid (red lines) and privately insured patients (blue lines), while the right panel displays the same information for non-owner PCPs. It should be mentioned that **Figure 2** also serves the purpose of illustrating post-policy trends; but for the parallel pre-trend discussion, I focused on the period of 2010-2012. Visual inspection of the 2010-2012 trends revealed that, first, all outcomes follow very similar trends for Medicaid and privately insured patients within respective PCP ownership types (i.e., separately comparing within left and right panels); the only noticeable exception is annual number of visits in the non-owner PCP groups where the numbers for Medicaid patients versus the privately insured diverged in 2012. Secondly, when comparing the outcomes between owner and non-owner PCPs (i.e., left versus right panels), the trends are generally comparable except for two outcomes – percentages of receiving any exams and health education during a visit. In sum, the trend plots showed no strong divergence in pre-policy trends.

I also formally tested parallel pre-policy trends by estimating marginal differences in linearized 2010-2012 trends of outcome variables between different study groups. Two sets of comparisons were conducted: a) marginal differences between Medicaid visits treated by owner and non-owner PCPs, and b) marginal differences between visits by Medicaid patients

and privately insured patients. The dependent variables and control variables in the comparisons are the same as in the triple difference model. The only difference is that the independent variable of interest is an interaction between the linear semiannual trend and the 'treatment' group (for comparison a, the 'treatment' group is owner PCPs; for comparison b, visits by Medicaid patients). The linear semiannual trend began with 0 for the first half of 2010, then 1 for the second half of 2010, 2 for the first half of 2011, and so on. Semiannual intervals were chosen over yearly intervals to allow for more observational units for the 3-year pre-policy period. Statistical significance for a coefficient estimate of the interaction term would indicate violation of parallel trend assumption. The coefficient estimates are presented in the **Appendix Table A1**. For comparison a, the only outcome measure that showed statistical significance at the 5-percent level is annual number of visits. For comparison b, none of the seven outcomes displayed statistically significant coefficient estimates. In sum, the regression results suggest that potential post-policy differences could not be explained by divergence of pre-policy trends.

RESULTS

I first examined the 2010-2014 trends of the seven metrics by patient insurance status (Medicaid vs. privately insured) and PCP ownership status (owner vs. non-owner), as shown in **Figure 2**. The trends are adjusted for survey weights and patient- and physician-level control variables. Several observations can be made. First, the expected post-fee-bump intensity change is absent: neither owner PCPs nor non-owner PCPs increased any of the seven metrics rendered to Medicaid patients in 2013-14, relative to 2010-12 or relative to privately insured patients. In fact, minutes per visit for Medicaid patients seen by owner

PCPs declined from a range of 19.9 to 21.6 minutes in 2010-12, a level above privately insured patients, to around 19.1 minutes in 2013-14, a level below privately insured patients.

A second observation is that, the levels of almost all metrics rendered to Medicaid and privately insured patients are comparable, in both groups of owner and non-owner PCPs. The only exception was number of visits in the past 12 months: Medicaid patients consistently had more visits than privately insured counterparts in both PCP ownership groups. A third observation is that some metrics did not vary much over time. More specifically, three within-visit intensity metrics - percentages of visits involving image tests/new medications/referral to other specialties - are generally stable, whereas the other two within-visit intensity metrics - diagnostic exams and health education - vary in a wider range. The two quantity metrics, number of visits in past 12 months and minutes per visit, generally have larger variations than the within-visit intensity metrics.

Results from the triple difference models, as shown in Table 2, further confirmed the absence of post-fee-bump change in quantity or within-visit intensity for Medicaid patients. More specifically, none of coefficients for the triple interaction terms (Post * Medicaid * Owner PCP) was statistically significantly positive, which indicates that owner PCPs were not more incentivized than non-owner PCPs. Furthermore, coefficients for the double interaction terms (Post * Medicaid) did not identify any positive, statistically significant effect either, suggesting muted effects on quantity or within-visit intensity regardless of PCP ownership status.

Although the triple difference models pick up no positive effect, it is possible that effects still existed among owner PCPs in practices with a significant share of Medicaid and FFS patients, who could be more strongly incentivized than other PCPs. I first tested the

effects of share of Medicaid patients and share of FFS arrangement in respective Specifications 1 and 2, and then a 'composite incentive level' in Specification 3. As shown in Table 3, all specifications yielded negative results. Insignificant coefficient estimates for interaction terms in Specifications 1 and 2 indicate that neither share of Medicaid patients nor share of FFS arrangement differentiated owner PCPs' response to the fee bump. Similarly, Specification 3 shows that even owner PCPs in practices with >50% Medicaid patients and >75% patients paid FFS were not incentivized to change quantity or intensity of primary care, relative to those in practice with <50% Medicaid and <75% FFS patients.

DISCUSSION

The ACA mandated an increase in physician reimbursement for primary care services rendered to Medicaid patients during 2013-2014. Emerging evidence suggests that the fee increase might have failed to induce an improvement on the extensive margin of primary care delivery – in terms of PCPs' participation in Medicaid and Medicaid enrollees' access to primary care. However, its effect on the intensive margin – in terms of per-patient quantity and within-visit intensity of primary care - remains less studied. In this study, I identified no significant post-fee-bump increases in quantity or intensity of primary care rendered to Medicaid patients. This finding held even for PCPs who owned a practice with a large share of Medicaid caseload, the subgroup supposedly perceiving the strongest financial incentive.

Underlying causes for the negative findings could be multifold. First, expected effects could be attenuated by limited effort to inform and educate PCPs about the policy. A survey in Washington State found that two thirds of PCPs in small private practices were unsure or did not think they or their practices ever received increased Medicaid payments

{Center for Health Workforce Studies, 2015 #8}; the percentage was even higher in rural areas. Second, it could be due to inelasticity of the metrics. Inelasticity is evidenced, to a certain extent, by **Figure 1**, which shows that some patient-and-physician-characteristics-adjusted primary care metrics do not differ by patient insurance type, such as percentage of new medications prescribed or health education provided. Third, it could be because there was no ex ante difference in care intensity between Medicaid and privately insured groups. **Figure 1** shows that there was no intensity difference between Medicaid and privately insured groups prior to the fee bump, except that Medicaid patients had more visits annually than privately insured counterparts. The finding corroborates another study (Bruen, Ku et al. 2013), which shows that Medicaid patients obtain primary care services at levels comparable with those of patients in other insurance groups. If payment gaps between insurance types do not cause less favorable care intensity for less paid insurance groups in the first place, then payment increase would not affect care intensity.

It is noteworthy that, my finding of no change on actual (in the sense of being recorded by PCPs) intensity margin should not be interpreted as evidence for no change in intensity claimed to Medicaid programs. It is possible that PCPs are more inclined to claim a higher primary care intensity than what is actually delivered after the fee bump. There are several enabling factors. First, some E&M codes eligible for the fee bump do not have a clearly defined boundary and can substitute each other at PCPs' discretion. Second, the same group of E&M codes received unequal payment increase during the fee bump, with high intensity ones receiving much larger increases in dollar amount than low intensity ones. In fact, authors' unpublished analysis of Medicaid claims data found that, more intensive office visit codes (CPT: 99214 and 99215) were claimed 20-25% more after the fee bump by PCPs on Medicaid FFS patients; less intensive office visit codes (CPT: 99212 and 99213) with

smaller fee increases became less used alternatives. However, this study suggests that the claimed more frequent use of more intensive office visits is not supported by a corresponding actual increase in primary care intensity. Taken both evidence together, the fee bump might spur unintended consequences of upcoding. By rendering the notion of 'providing more and better services for higher payment' seemingly unnecessary, there is some room to 'game the system,' which may also contribute to no change in actual intensity.

Lastly, despite the negative findings on the intensive margin, it is still possible that, the fee bump could positively impact the extensive margin, by increasing the absolute number or fraction of Medicaid beneficiaries in a PCP's patient pool. Such possibility cannot be ruled out by emerging evidence showing no or limited impacts on PCP participation rates and patient-reported access to care. To examine the possibility, I further used the NAMCS data to calculate aggregated and per-PCP indicators for non-elderly adult Medicaid beneficiaries' primary care utilization. See details in Appendix. I found that, in both owner and non-owner PCP groups, there was no post-fee-bump increase in all four indicators including: 1) national aggregate number of Medicaid beneficiaries' office visits; 2) estimated annual number of Medicaid beneficiaries' office visits per PCP; 3) estimated national number of Medicaid beneficiaries ever having an office visit in the past year; and 4) fraction of office visits made by Medicaid beneficiaries. Hence, it suggests that the fee bump might not drive average PCPs to allocate more time and effort to Medicaid patients. Nonetheless, because the aggregate estimates heavily rely the NAMCS survey weights and therefore are subject to high levels of error, additional research using other data sources would bring extra clarity on the question about changes on the extensive margin.

My study has several limitations. First, due to the cross-sectional nature of the NAMCS data, I could not avoid change of PCP composition in the treatment group over the

study period, which could potentially threaten the validity of my study design. Prior to the fee bump, the 'treatment' group consisted of PCPs who had already seen Medicaid patients (referred to as 'existing PCPs'); after the fee bump, the treatment group consisted of existing PCPs plus new ones who just signed on Medicaid ('new PCPs'). If new PCPs systematically offered a lower primary care intensity than existing PCPs, it could mask the actual post-fee-bump intensity increase commenced by existing PCPs. However, I argue that this threat to validity should be minimal, for two reasons. The first reason is that, given that studies have shown that the fee bump was ineffective in incentivizing PCPs' Medicaid participation, the composition shift towards new PCPs could be small. The second reason is that there is no evidence indicating that new PCPs would provide less care than existing PCPs. As indirect supporting evidence to this second reason, I examined the care intensity offered to privately insured patients by PCPs who did vs. did not accept Medicaid in the pre-fee-bump period. Because 'new PCPs' were among those who did not accept Medicaid pre-fee-bump, this comparison served as evidence on difference in care intensity between 'existing' and 'new PCPs'. I found no noticeable difference, after adjustments, between the two groups (data not provided). Therefore, unless 'new PCPs' intentionally lowered care intensity offered to Medicaid patients than to the privately insured, I expect that care intensity for Medicaid patients during the post-fee-bump period to be comparable between existing and new PCPs.

A second limitation is that, despite a negative finding using the national sample, I cannot rule out the possibility that PCPs in some states might alter care intensity after the fee bump. Temporality of the fee bump has been identified as a potentially significant contributing factor for PCPs' non-response. In the states that extended the fee bump beyond 2014, PCPs might respond to a more sustained financial incentive in terms of care intensity. A third limitation is that, one of my independent variables – share of FFS patients

– is merely a proxy for the true variable of interest: share of FFS within the subgroup of Medicaid patients. The two measures could differ by a sizeable gap in some extreme cases, causing potentially biased estimates.

CONCLUSION

My study found that PCPs did not change number of visits, duration of a visit, and within-visit intensity of primary care rendered to Medicaid beneficiaries in response to the large-size Medicaid primary care fee bump in 2013-2014. A lack of response is observed even in the group of PCPs with private practice ownership and whose practice has a large share of Medicaid patients. However, it is unclear as to whether no response is attributable to temporality of the fee bump or the inelastic nature of primary care services. Future studies that examine primary care intensity rendered to Medicaid beneficiaries in the states extending vs. not extending the fee bump in 2015 and later years will shed light on the question regarding the association between longevity of a financial incentive and physician behavior change.

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Table 1. Variable List and Descriptive Statistics

Variable	Description	Mean
Dependent Variables		
TimePCP	Time spent with physician in minutes	20.92
AnyNewMed	Any new medications	52.14%
AnyExam	Any diagnostic exam ordered or provided	22.84%
AnyImage	Any imaging test ordered or provided	8.67%
PastVis	How many past visits in the last 12 months	3.54
Referral	Refer to other physician	9.60%
AnyEduc	Any health education provided	27.30%
Independent Variables of Interest		
Post	Visit in 2013 or 2014	28.81%
Medicaid	Insured by Medicaid	26.44%
Owner	PCP has full or partial ownership of the practice	60.34%
Medicaid>50%	>50% patients seen in a practice are Medicaid insured	15.42%
FFS>75%	>75% patients seen in a practice are FFS payment	54.91%
Patient-Level Control Variables		
Age_under_15	Age 14 or younger	41.08%
Age_15_24	Age between 15 and 24	9.05%
Age_25_44	Age between 25 and 44	19.24%
Age_45_64	Age between 45 and 64	30.90%
Male	Male gender	48.17%
White	Non-Hispanic White	69.38%
Black	Non-Hispanic Black	11.50%
Hispanic	Hispanic	16.11%
Other_Ethn	Non-Hispanic other ethnicities	5.41%
Chron_0	0 total chronic condition	58.82%
Chron_1	1 total chronic condition	20.94%
Chron_2	2 total chronic conditions	10.89%
Chron_3	3 or more total chronic conditions	9.69%

Major_1	Major reason for visit: new problem	44.10%
Major_2	Major reason for visit: chronic problem, routine	18.69%
Major_3	Major reason for visit: chronic problem, flare-up	5.67%
Major_4	Major reason for visit: pre/post-surgery	26.90%
Major_5	Major reason for visit: preventive care	4.78%
Diag_1-Diag_20	Principal ICD-9 diagnosis category 1 to 20	-
Physician-Level Control Variables		
Solo	Solo Practice	31.29%
Group	Group Practice	35.66%
Hospital	Practice owned by a hospital	18.87%
HMO	Practice owned by a HMO	11.73%
CHC	Community health clinics including FQHC	2.45%
MSA	Located in a metropolitan statistical area	87.46%
Northeast	Region northeast	22.42%
Midwest	Region midwest	19.73%
South	Region south	35.48%
West	Region west	21.18%

Source. National Ambulatory Medical Care Survey 2010-2014.

Table 2. Effects of Medicaid Fee Bump on Quantity and Intensity of Primary Care Services, by PCP Practice Ownership

VARIABLES	(1) Minutes with PCP	(2) Any New Medication	(3) Any Lab Test	(4) Any Imaging Test	(5) # Visits in Past 12mo	(6) Specialty Referral	(7) Any Health Education
Post	0.671	0.0404	0.0895**	0.00888	-1.032***	0.00902	-0.0156
	(0.587)	(0.0252)	(0.0351)	(0.0141)	(0.247)	(0.0182)	(0.0284)
Medicaid	0.674	0.0225	-0.00149	0.000278	0.827***	0.0234**	0.0135
	(0.598)	(0.0198)	(0.0312)	(0.0103)	(0.219)	(0.0114)	(0.0265)
Owner PCP	0.469	-0.000468	0.0392	0.00494	0.315*	-0.0118	0.00712
	(0.525)	(0.0173)	(0.0257)	(0.0109)	(0.167)	(0.00932)	(0.0231)
Post * Medicaid	0.404	-0.0117	-0.0561	-0.00535	0.151	0.0278	-0.0255
	(1.151)	(0.0364)	(0.0465)	(0.0192)	(0.358)	(0.0402)	(0.0446)
Post * Owner PCP	-1.026	-0.0579**	-0.0674	-0.0310*	0.715**	-0.0112	-0.0626*
	(0.779)	(0.0289)	(0.0422)	(0.0181)	(0.305)	(0.0204)	(0.0350)
Medicaid * Owner PCP	-0.524	0.0112	0.0126	-0.00304	0.0504	-0.0223	-0.00644
	(0.919)	(0.0283)	(0.0442)	(0.0139)	(0.399)	(0.0159)	(0.0373)
Post * Medicaid * Owner PCP	-1.938	-0.0287	0.0365	0.0200	-0.139	-0.0210	0.0430
	(1.398)	(0.0474)	(0.0719)	(0.0254)	(0.548)	(0.0435)	(0.0588)
Observations (unweighted)	43,399	43,399	43,399	43,399	43,399	43,399	43,399
R^2	0.050	0.079	0.048	0.091	0.107	0.050	0.136

Source. National Ambulatory Medical Care Survey 2010-2014. **Notes**. The sample consists of 46,727 primary care visits (unweighted; weighted n: 1,122,462,328) made by Medicaid and privately insured patients to PCPs who fully/partially owned a practice or was an employee/contractor. Estimates are marginal effects generated by triple difference models

on primary care visits by non-elderly Medicaid or privately insured patients in 2010-2015. 'Post', 'Medicaid', and 'Owner PCP' are dummy variables: 'Post' indicates a visit in 2013 and 2014 (as opposed to 2010-12); 'Medicaid' indicates Medicaid enrollment (as opposed to privately insured); 'Owner PCP' indicates full/partial practice ownership (as opposed to non-owner employee/contractor). Estimates for control variables are omitted and can be found in the online appendix. Standard errors (in parentheses) are clustered at the physician level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 3. Effects of Medicaid Fee Bump on Quantity and Intensity of Primary Care Services among Owner PCPs, by Share of Medicaid Patients and FFS Payment

VARIABLES	(1) Minutes with PCP	(2) Any New Medication	(3) Any Lab Test	(4) Any Imaging Test	(5) # Visits in Past 12mo	(6) Specialty Referral	(7) Any Health Education
Specification 1. By share of Medicaid patients							
Post	-2.069**	-0.0400	-0.0604	0.00603	-0.582	0.00293	-0.0564
	(0.872)	(0.0289)	(0.0520)	(0.0177)	(0.611)	(0.0177)	(0.0383)
Medicaid>50%	-0.203	-0.0174	-0.0391	0.00759	-0.0494	0.00895	0.0995**
	(1.116)	(0.0375)	(0.0573)	(0.0168)	(0.545)	(0.0206)	(0.0499)
Post * Medicaid>50%	1.324	-0.00214	0.120	-0.0256	0.919	0.00284	-0.0510
	(1.407)	(0.0510)	(0.0973)	(0.0239)	(0.725)	(0.0260)	(0.0684)
R^2	0.057	0.115	0.059	0.088	0.107	0.068	0.162
Specification 2. By percentage of FFS payment							
Post	-0.0985	-1.793	-0.102**	-0.0587	-0.00320	-0.0855	0.0292
	(0.0651)	(1.197)	(0.0400)	(0.0543)	(0.0245)	(0.559)	(0.0270)
FFS>75%	-0.0606	-0.193	-0.0518	-0.0230	-0.000813	0.444	-0.0150
	(0.0473)	(1.111)	(0.0323)	(0.0620)	(0.0160)	(0.644)	(0.0200)
Post * FFS>75%	0.0595	0.157	0.0744	0.0946	-0.00564	-0.327	-0.0380
	(0.0761)	(1.397)	(0.0494)	(0.0892)	(0.0277)	(0.784)	(0.0304)
R^2	0.161	0.067	0.107	0.062	0.091	0.120	0.077
Specification 3. By composite incentive level							
Post	-1.562	-0.0367	-0.0557	0.0185	-0.0430	0.0159	-0.137**
	(1.191)	(0.0494)	(0.0693)	(0.0319)	(0.768)	(0.0296)	(0.0678)
Medicaid≤50% & FFS>75%	2.770	0.0686	0.0185	0.00782	0.342	0.0110	0.0715
	(1.784)	(0.0454)	(0.0812)	(0.0256)	(0.666)	(0.0330)	(0.0771)
Medicaid>50% & FFS≤75%	2.065	0.0216	0.0347	-0.00246	0.975	-0.0143	-0.0910
	(1.616)	(0.0361)	(0.0839)	(0.0235)	(1.063)	(0.0264)	(0.0576)
Medicaid>50% & FFS>75%	-0.162	-0.0667	-0.0651	0.00769	0.210	-0.00677	0.0241
	(1.295)	(0.0567)	(0.0765)	(0.0229)	(0.602)	(0.0225)	(0.0673)
Post *	0.0894	-0.157**	-0.00410	-0.0605*	-0.0110	0.0402	0.109

Medicaid≤50% & FFS>75%	(2.769)	(0.0778)	(0.105)	(0.0365)	(1.110)	(0.0469)	(0.146)
Post * Medicaid>50% & FFS≤75%	-1.719 (1.799)	-0.0318 (0.0567)	-0.0333 (0.104)	-0.0282 (0.0361)	-1.148 (1.252)	-0.0205 (0.0381)	0.148* (0.0842)
Post * Medicaid>50% & FFS>75%	1.872 (1.632)	0.0491 (0.0772)	0.233 (0.143)	-0.0245 (0.0407)	0.509 (0.956)	-0.0264 (0.0366)	0.0669 (0.0919)
R^2	0.078	0.112	0.075	0.094	0.124	0.078	0.171
Observations (unweighted)	5,439	5,439	5,439	5,439	5,439	5,439	5,439

Source. National Ambulatory Medical Care Survey 2010-2014. **Notes**. The sample consists of 5,439 primary care visits (unweighted; weighted n: 157,450,979) made by Medicaid patients to PCPs who fully/partially owned a practice. Estimates are marginal effects generated by difference-in-difference models. '*Post*', '*Medicaid>50%*', and '*FFS>75%*' are dummy variables: '*Post*' indicates a visit in 2013 and 2014 (as opposed to 2010-12); '*Medicaid>50%*' indicates a share of Medicaid patients more than 50%; '*FFS>75%*' indicates a share of FFS patients more than 75%. The composite incentive level is a combination of the dummies of '*Medicaid>50%*' and '*FFS>75%*'. Estimates for control variables are omitted and can be found in the online appendix. Standard errors (in parentheses) are clustered at the physician level. Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Figure 1. Sample Selection Process

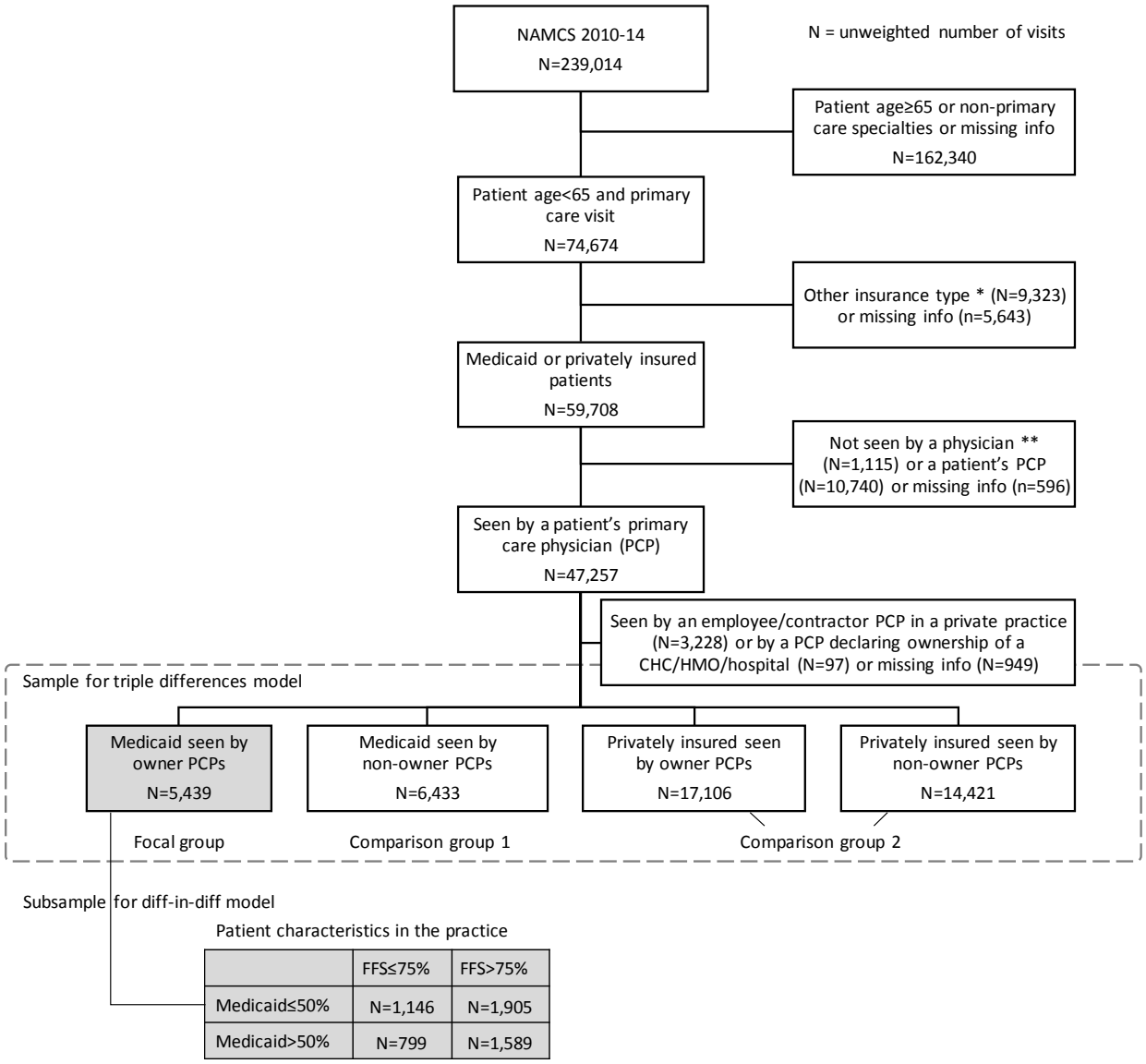

Figure 2. Adjusted Trend of Primary Care Amount and Quality Measures 2010-14, by Insurance Status and Physician Ownership

Source. National Ambulatory Medical Care Survey 2010-2014. **Notes**. Estimates are weighted and controlled for patient- and physician-level variables.

APPENDICES

Table A1. Test for Parallel Pre-Policy Trends

VARIABLES	(1) Minutes with PCP	(2) Any New Medication	(3) Any Lab Test	(4) Any Image	(5) # Visits in Past 12mo	(6) Specialty Referral	(7) Any Health Education
Comparison a. Owner vs. Non-Owner PCPs for Medicaid visits							
Interaction of linear semiannual time trend and dummy for owner PCPs	-0.227	-0.0138	-0.0217*	0.00653	-0.372**	0.000722	-0.0152
	(0.638)	(0.0423)	(0.0154)	(0.0328)	(0.195)	(0.0167)	(0.0184)
Comparison b. Medicaid vs. Privately Insured Visits							
Interaction of linear semiannual time trend and dummy for owner PCPs	-0.162	0.0093	-0.0167	0.00258	-0.144	0.00325	0.0162
	(1.033)	(0.0218)	(0.0844)	(0.00952)	(0.293)	(0.0262)	(0.0847)

Notes. The sample for comparison a) consists of 12,899 primary care visits made by Medicaid patients; the sample for comparison b) consists of 46,727 primary care visits made by Medicaid or privately insured patients. Interaction terms are between linear semiannual time trend and a dummy for treatment group. Linear semiannual time trend begins with the first half of 2010 being 0, the second half of 2010 being 1, the first half of 2012 being 2, and so on so forth. Estimates for control variables are omitted. Standard errors (in parentheses) are clustered at the physician level. Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Appendix A2. Number of Primary Care Office Visits

I examined some national and per-PCP indictors related to office visits. The purpose was to identify any change on the extensive margin of primary care supply. I calculated the indicators for owner and non-owner PCPs separately (**Tables A2 and A3**, respectively).

First, I relied on NAMCS patient visit weights to estimate national aggregate numbers of office visits (item A). Secondly, I relied on physician weights to estimate number of owner/non-owner PCPs that saw the privately insured and Medicaid patients (item B). Note that number of PCPs seeing the privately insured was always higher than the number of PCPs seeing Medicaid patients. Thirdly, I estimated on average how many office visits a PCP offered to each type of patients, by dividing item A by item B (item C). Then, I cited the average number of office visits to a patient's PCP in the past 12 months from **Figure 2** (item D). Lastly, I divided item A by item D, to get an estimate of total number of patients who ever had an office visit (item E).

I found that, overall, owner and non-owner PCPs offered less office visits to non-elderly adult Medicaid beneficiaries nationwide in 2013-2014, compared to 2010-2012. A similar decline is witnessed for the privately insured. The concurrent decline in both insurance types is unexpected; nonetheless, the finding is consistent with the official NAMCS yearly summary 2010-2013 showing downward trends in office visits for both Medicaid and privately insured groups[3]. In terms of national total number of PCPs seeing a specific type of patients, I found no increase in owner PCPs who were willing to see Medicaid patients in 2013-14, and a decline in non-owner PCPs who did the same. Further, both owner and non-owner PCPs offered, on average, less office visits to Medicaid patients in 2013 and 2014. Lastly, I found that there were less Medicaid patients who had office visits in the past 12 months in 2013-2014 than previously.

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[3] See Table 5s in the "National Ambulatory Medical Care Survey: Summary Tables" for 2010 (https://www.cdc.gov/nchs/data/ahcd/namcs_summary/2010_namcs_web_tables.pdf), 2011 (https://www.cdc.gov/nchs/data/ahcd/namcs_summary/2011_namcs_web_tables.pdf), 2012 (https://www.cdc.gov/nchs/data/ahcd/namcs_summary/2012_namcs_web_tables.pdf), 2013 (https://www.cdc.gov/nchs/data/ahcd/namcs_summary/2013_namcs_web_tables.pdf). 2014 summary is not available as of June, 2017.

It should be noted that, all above estimates were built on national aggregate estimates. Aggregate estimates, which are heavily dependent on survey weights, might not be as reliable as weighted average estimates, which are used in my main analysis. It is because the primary objective of survey weights was to address sample imbalance and no response, not to produce reliable aggregate estimates. At least part of variation in aggregate estimates over time could be attributed to potential inaccuracy of survey weights for the purpose of producing aggregate estimates.

Table A2. Office Visits to Owner PCPs by Non-Elderly Adult Medicaid Beneficiaries or the Privately Insured

	2010	2011	2012	2013	2014
A. National aggregate number of office visits					
Privately insured	116,843,198	128,085,514	117,733,678	96,096,877	90,883,791
Medicaid	40,358,110	37,319,875	33,414,919	28,652,577	27,705,499
B. Number of owner PCPs seeing					
Privately insured	45,040	49,471	47,070	46,218	51,341
Medicaid	27,754	29,597	27,593	24,965	28,700
C. estimated annual number of office visits per PCP (=A/B)					
Privately insured	2,594	2,589	2,501	2,079	1,770
Medicaid	1,454	1,261	1,211	1,148	965
D. Average annual number of office visits to PCPs by (Number Based on Figure 2)					
Privately insured	3.7	3.7	3.7	3.3	3.2
Medicaid	5.4	4.9	4.9	4.2	4.2
E. Estimated national number of patients having an office visit (=A/D)					
Privately insured	31,524,884	34,224,769	32,142,028	28,946,848	28,004,570
Medicaid	7,494,375	7,598,576	6,835,805	6,793,123	6,647,320

Note: Author's calculation using NAMCS 2010-2014 data.

Table A3. Office Visits to Non-Owner PCPs by Non-Elderly Adult Medicaid Beneficiaries or the Privately Insured

	2010	2011	2012	2013	2014
A. National aggregate number of office visits					
Privately insured	49,129,647	42,765,181	43,625,498	38,048,662	38,405,978
Medicaid	17,487,769	19,677,597	13,300,347	10,847,702	7,296,741

B. Number of non-owner PCPs seeing					
Privately insured	22,824	23,661	18,945	17,856	17,076
Medicaid	16,843	21,400	15,189	11,521	10,481
C. estimated annual number of office visits per PCP (=A/B)					
Privately insured	2,153	1,807	2,303	2,131	2,249
Medicaid	1,038	920	876	942	696
D. Average annual number of office visits to PCPs by (Number Based on Figure 2)					
Privately insured	3.6	3.6	3.2	2.3	2.4
Medicaid	4.0	3.9	4.9	3.2	3.5
E. Estimated national number of Medicaid beneficiaries having an office visit (=A/D)					
Privately insured	13,730,384	11,873,214	13,520,914	16,217,420	16,258,770
Medicaid	4,416,728	5,073,533	2,727,281	3,338,936	2,090,056

Note: Author's calculation using NAMCS 2010-2014 data.

To avoid potential inaccuracy induced by using aggregate estimates, I also looked at the average fraction of office visits made by Medicaid beneficiaries (this analysis does not limit to non-elderly; it includes those aged 18 and below). I first calculated the fraction of Medicaid patients' visits within each physician, by using patient visit weights. I then calculated the average fraction across all physicians that saw any Medicaid patient, by using physician weights. The resulting measure is a weighted average, instead of an aggregate estimate.

As shown in **Table A4**, in the owner PCP group, the fraction of visits made by Medicaid beneficiaries was higher in 2013-2014 than 2010-2011. However, the 2013 and 2014 numbers were not significantly higher than the pre-fee-bump year of 2012. As for non-owner PCPs, the fraction steadily declined from 23.8% in 2010 to 16.5% in 2014.

Table A4. Fraction of Office Visits Made by Medicaid Beneficiaries

	2010	2011	2012	2013	2014
Owner PCPs	21.3%	19.1%	24.5%	25.8%	24.6%
Non-owner PCPs	23.8%	27.9%	21.8%	20.6%	16.5%

Note: Author's calculation using NAMCS 2010-2014 data.

CHAPTER 4

Effects of 2013-14 Medicaid Fee Increase on Quantity and Intensity of Primary Care – Evidence from a National Physician Survey

ABSTRACT

After the federally funded Medicaid primary care fee bump phased out at the end of 2014, 15 states and the DC elected to extend the fee bump, at either full Medicare rates (i.e., full extension) or somewhere between full Medicare rates and states' pre-ACA Medicaid rates (partial extension), while other states reversed to pre-ACA rates (no extension). This study estimates the effects of full and partial extension decisions on Medicaid beneficiaries' primary care access and utilization. Effects were estimated by contrasting differential pre- and post-extension changes in patient self-reported metrics in full, partial, and no extension states, while controlling for confounding state attributes and common time trends. The data for this study was the adult sample in the National Health Interview Survey 2013-2016 who were insured by Medicaid or privately. The results show that the fee extension was associated with increased likelihood of having a usual source of care and chronic condition checkups, decreased likelihood of rejection by a doctor's office and using emergency departments for non-urgent reasons, and more frequent office visits.

INTRODUCTION

The federally funded Medicaid primary care fee bump mandated by the Affordable Care Act (ACA) phased out on December 31st, 2014. As a result, the physician payment rates reversed to the pre-fee-bump level in most states, except for the 15 states and the District of Columbia (DC) that elected to carry on the provision using state funds (with a proportion of federal fund through the federal matching percentage [FMAP] program) in 2015 (Snyder, Paradise et al. 2014). The provision further continued in all extension states in 2016 (American Congress of Obstetricians and Gynecologists 2016).

Emerging studies, including chapter 2 in this assay, suggest that the federally funded fee bump might have had limited impacts on Medicaid beneficiaries' access to and utilization of primary care. For instance, state and Medicaid managed care officials from 8 states report that the fee bump had little to no effect on provider participation rates (Medicaid and CHIP Payment and Access Commission 2015, Brown 2016, Decker 2016); in addition, the proportion of office-based PCPs who were not accepting new Medicaid patients was higher in 2013 (35% (Hing, Decker et al. 2015)) than in 2011 (31% (Decker 2012)) or 2011-2012 (33% (Decker 2013)).

Temporality of the federally funded fee bump, as identified through interviews with Medicaid programs and primary care providers (Medicaid and CHIP Payment and Access Commission 2015, Timbie, Buttorff et al. 2017), could have attenuated PCP's willingness to participate in Medicaid and to invest in staffing and infrastructure needed to boost service capacity, as providers could be forward-looking and make business decisions on a time scale longer than 2 years. However, the limited impacts could also be attributable to the possibility that, as suggested by previous studies (Long, Settle et al. 1986, Cohen 1993, Shen and

Zuckerman 2005, Atherly and Mortensen 2014), some primary care metrics such as likelihood of receiving preventive care and screening services do not respond to physician financial incentive elastically. The reverse experiment of states extending versus not extending the fee bump beyond 2014 presents a unique opportunity to examine the extent to which temporality of a physician payment incentive could moderate effects of such policy. Furthermore, extending the fee bump puts pressure on state budgets, and so there is a need for evidence on whether the investment could be justified. Therefore, it is of interest to investigate whether access to and utilization of primary care improved during the fee bump extension period.

DATA

Medicaid Fee Bump Extension and Eligibility Expansion

After the federally funded fee bump phased out at the end of 2014, 15 states (AL, CO, CT, DE, GA, HI, IA, ME, MD, MI, MS, NE, NV, NM, and SC) and the DC elected to continue the fee bump[4] (Zuckerman, Skopec et al. 2014, Wilk, Evans et al. 2018). Among them, 9 states (CO, CT, DE, HI, IA, MD, MI, NV, and NM) and the DC also expanded

[4] Number of states vary in different reports. For example, the Centers for Medicare & Medicaid Services (CMS) reported that a total of 15 states and the DC extended, including: Alabama, Colorado, Connecticut, Delaware, the District of Columbia, Hawaii, Iowa, Kentucky, Maine, Mississippi, Montana, Nebraska, New Mexico, South Carolina, Vermont, and Wisconsin. Wilk, Evans, and Jones reported 17 states (AL, AK, CO, CT, DE, GA, HI, IA, ME, MD, MI, MT, MS, NE, NV, NM, and SC) and the DC. Because AK and MT had a pre-fee-bump Medicaid-to-Medicare ratio above 1.0, they did not pay a rate higher than what they had paid in 2012 and prior. On the other hand, GA did not explicitly state fee bump extension, but elected to maintain 90% of Medicare fee schedule for selected E&M codes in 2015 and 100% of Medicare fee schedule for all E&M codes eligible under the federally funded fee bump in 2016 (https://dch.georgia.gov/sites/dch.georgia.gov/files/Physician%20Rate%20Increase%20for%20Primary%20Care%20PN.pdf). Hence, I did not include AK and MT in the fee bump extension state list, but added GA.

Medicaid program eligibility, while 6 others (AL, GA, ME, MS, NE, and SC) did not. 6 states (AL, CO, IA, MD, MS, and NM) and the DC elected to continue paying at the Medicare level (full extension states), whereas the other 9 states (CT, DE, GA, HI, ME, MI, NE, NV, and SC) paid at higher rates, but are not as high as Medicare (partial extension states).

My analysis suggests that cost to extend the fee bump might be a driving factor in a state's extension decision. On a per-patient basis, cost of extending fee bump is determined by the pre-ACA Medicaid-to-Medicare fee ratio. An analysis of 2012 and 2016 Medicaid-to-Medicare fee ratios revealed that few extension states had a 2012 fee ratio below 0.6 (**Figure 1**). Conversely, states with low 2012 ratios were unlikely to extend the fee bump. Therefore, had all states allowed fees to fall back to the 2012 rates, PCPs in actual non-extension states would take a harder hit in fee cuts than those in actual extension states.

Change in patient care access and utilization was collectively determined by supply and demand side contextual factors. While the bump extension decision mainly exerted supply-side effects, the demand side was greatly influenced by state decision on Medicaid expansion. Although the motivation of the fee bump was to match the extra demand from newly enrolled beneficiaries, the proportion of expansion states [5] extending the fee bump (10 out of 29, 32%, excluding MT, AK, and ND, which was not affected by the fee bump) was comparable with that of 2014 non-expansion states (6 out of 16, 35%, excluding TN, which were not affected by the fee bump).

The comparable proportions of states extending the fee bump in both expansion and non-expansion groups presented a unique opportunity to examine the interplay of the

[5] Include the expansion states that started after 2014: Pennsylvania (1/1/2015), Indiana (2/1/2015), Alaska (9/1/2015), Montana (1/1/2016), and Louisiana (7/1/2016),

supply- and demand-side policies. I examined the change of access and use of primary care over the period of 2013-16 in each of the four state groups (shown in **Figure 2**):

State Group 1: no expansion but bump extension (6 states: AL, GA, ME, MS, NE, and SC).

State Group 2: no expansion and no bump extension (12 states: FL, ID, KS, LA, MO, NC, OK, SD, TX, UT, VA, and WY);

State Group 3: expansion and bump extension (10 states: CO, CT, DC, DE, HI, IA, MD, MI, NV, and NM);

State Group 4: expansion but no bump extension (19 states: AR, AZ, CA, IL, IN, KY, MA, MN, NH, NJ, NY, OH, OR, PA, RI, VT, WA, WI, and WV).

Dichotomizing states into expansion and non-expansion states overlooks the unequal effects on primary care demand across expansion states. The size of enrollment increase varied broadly across expansion states, depending on restrictiveness of pre-expansion eligibility criteria, adoption of early expansion (CA, CT, DC, MN, NJ, and WA), and pre-ACA Medicaid coverage change (e.g. 2006 MA Medicaid coverage expansion). On the other hand, some non-expansion states also experienced enrollment increase, because of the so-called "woodwork effect" among newly enrolled people who were previously eligible for Medicaid but did not sign up. To account for unequal increase in care demand in expansion states as well as presence of demand increase in non-expansion states, I parameterized the factor of Medicaid expansion as an enrollment percentage change in each year of 2014 to 2016 relative to the 2013 baseline.

National Health Interview Survey

Data was drawn from the National Health Interview Survey (NHIS) 2013-16. NHIS collects health-related data from non-institutionalized U.S. population on a broad range of topics through cross-sectional household interviews. The NHIS questionnaire consists of four components, namely household, family, sample adult, and sample child. The household and family components collect demographic and health information on all individuals living in a particular house. However, the scope of health information in these two components are limited. Sample adult and sample child components collect more detailed health information on a particular adult and child that is randomly selected from the household. I limited the study sample to those in the sample adult questionnaire. By doing so, I was able to analyze more care access and utilization variables. I further restricted the sample to those covered by Medicaid or, as a comparison group, private insurance. I excluded Medicare-Medicaid dual eligible.

Individual demographic characteristics and health conditions influence how strongly and how frequently primary care is sought. Therefore, I controlled for a list of individual variables in all analyses. Table 2 summarizes individual characteristics by insurance type (private vs. Medicaid) and, further, for Medicaid subsample, by aforementioned state groups. Compared to the privately insured, the Medicaid subsample was more likely to be older, residing in Northeast and West, non-Hispanic white, less educated, current smoker, having at least one child, and having health conditions examined. Among the Medicaid subsample, as expected, there is a noticeable between-group difference in terms of regions. Also, as expected, samples in expansion states (groups 3 and 4) were generally younger and healthier than non-expansion states (groups 1 and 2).

To measure primary care access, I included the following three variables: a) a usual source of care other than emergency department (ED); b) ever being rejected by a doctor's office as a new patient in the past 12 months; and c) using ED because there was no other place to go (among those who ever used ED in the past 12 months). I expect the measure of being rejected by a doctor's office to be the most responsive measure to the fee bump extension, as it is directly tied to physician Medicaid participation rate and appointment availability. Whereas the usual source of care measure is less responsive, because a low physician participation rate often means a longer and laborious search before getting a care source, which will not be captured by the binary variable. Similarly, because the measure of ED visit for no alternative care sources is tied to having a usual source of care, it will also suffer a low policy responsiveness. Nonetheless, the two less responsive access measures are arguably more important than the doctor's office rejection measure.

To measure primary care utilization, I included three retrospective measures for the past 12-month care use: a) number of doctor's office visits; b) flu shot (including nasal spray); c) checkup of chronic conditions including blood pressure, cholesterol level, or blood sugar level. Number of office visits is associated with appointment availability; flu shot procedure is among the codes eligible for the fee increase; and chronic condition checkups are basic exams often offered during an office visit. Among the three metrics, I expect the number of office visits to be the most responsive to the fee bump extension, because of the quantitative nature (as opposed to a binary variable). Chronic condition checkups would be less responsive because the baseline rate is high (>80% of patients) and therefore policy impacts would be marginal. Flu shot would also be less responsive because an analysis in Chapter 2 showed that less than 40% of flu shots were received in office settings.

EMPIRICAL STRATEGY

The main identification assumption is that variations in outcomes are driven by collective effects of the fee bump extension on the demand side and the Medicaid coverage expansion on the supply side, after controlling for individual characteristics, time-invariant state contextual factors, and common cross-state secular trends. I treated the fee bump extension as a reverse experiment, with the federally funded fee bump in 2013-14 being pre-period and 2015-2016 being post-period. The regression equation is specified as below:

$$Y_{ist} = \beta_0 + \beta_1 Rate\_Drop_{st} + \beta_2 Enrl\_Change_{st} + \gamma X_i + State_s + Year_t + \varepsilon_{ist} \quad (1)$$

Where Y_{ist} represents the measures of primary care access or utilization for NHIS interviewee i in state s and year t; $Rate\_Drop_{st}$ is the size of fee drop relative to the 2013-14 level in state s and year t; $Enrl\_Change_{st}$ is the percentage change in number of Medicaid enrollment in state s and year t, relative to the enrollment number in 2013; X_i is a vector of individual control variables; $State_s$ and $Year_t$ are state and year fixed effects, respectively. By including the state and year fixed effects, I controlled for time-invariant baseline level within a state as well as common time trend shared across states. The primary coefficients of interest, β_1 for $Rate\_Drop_{st}$, is identified by widely varying sizes of fee drop across states. For full extension states, the size of fee drop was zero; for partial or no extension states, the size of fee drop was 100% Medicare rate minus 2015-16 Medicaid-to-Medicare fee ratio[6]. For this analysis and lately mentioned ones, I calculated robust standard errors, which

[6] The same method has been used by other studies to approximate the size of Medicaid payment increase Berman, S., et al. (2002). "Factors that influence the willingness of private primary care pediatricians to accept more Medicaid patients." Pediatrics **110**(2): 239-248. , Zuckerman, S., et al. (2009). "Trends in Medicaid physician fees, 2003–2008." Health Affairs **28**(3): w510-w519., Decker, S. L. (2012). "In 2011 nearly one-third of physicians said they would not accept new Medicaid patients, but rising fees may help." Ibid. **31**(8): 1673-1679.

accounted for state-level clustering and the NHIS multi-stage sampling design. I also employed the adult sample survey weights.

As discussed in the 'Data' section, there are alternative ways to specify the two policy variables of bump extension and eligibility expansion. The bump extension can be written as, instead of a continuous variable in equation (1), dummy variables for states' decision to fully or partially extend the fee bump. The continuous variable specification addresses one of the endogeneity issues potentially caused by the fact that non-extension states tended to have lower pre-ACA Medicaid-to-Medicare fee ratios than extension states. Endogeneity of the bump-size-influenced extension decision could biasedly inflate the estimated policy effect. However, a drawback of the size of fee drop is that such specification cannot distinguish partial extension states from non-extension states, as both groups suffered a certain level of fee drop. Similarly, the Medicaid expansion variable can, instead of a continuous enrollment percentage change, be specified as a binary variable. A benefit of the binary specification is to account for concurrent, all-around reforms to support the coverage expansion; the drawback is that it neglects the 'woodwork effect' in non-expansion states that also affected primary care demand. In sum, neither specification for the two policy variables was without limitations. I gave preference to specifications in equation (1), because being able to avoid endogeneity of extension decision and to account for the 'woodwork effect' outweighs the discussed drawbacks. Nonetheless, I also modified equation (1) to alternative specifications as below:

Specification 2: Full or partial bump extension status (binary) and percentage change of enrollment number (continuous)

$$Y_{ist} = \beta_0 + \beta_1 Full\_Ext_{st} + \beta_2 Partial\_Ext_{st} + \beta_3 Enrl\_Change_{st} + \gamma X_i + State_s + Year_t + \varepsilon_{ist} \quad (2)$$

Specification 3: Size of fee drop (continuous) and expansion status (binary)

$$Y_{ist} = \beta_0 + \beta_1 Rate\_Drop_{st} + \beta_2 Expansion_{st} + \gamma X_i + State_s + Year_t + \varepsilon_{ist} \quad (3)$$

Specification 4: Full or partial bump extension status (binary) and expansion status (binary)

$$Y_{ist} = \beta_0 + \beta_1 Full\_Ext_{st} + \beta_2 Partial\_Ext_{st} + \beta_3 Expansion_{st} + \gamma X_i + State_s + Year_t + \varepsilon_{ist} \quad (4)$$

Where all variables carry the same meaning as in equation (1), except that $Full\_Ext_{st}$ and $Partial\_Ext_{st}$ are dummies for full and partial extension in state s and year t, and $Expansion_{st}$ is Medicaid expansion status in state s and year t. Results from alternative specifications are provided in Tables 3 and 4.

All outcomes except for 'usual source of care except ED' retrospectively collect patient experience in the past 12 months. Given the retrospective nature, interviewees in the first half of 2015 recalled what happened in the second half of 2014, thereby not reflecting full policy effect. However, a counter argument is that the extension decision had been made and publicly released in the second half of 2014 in most states, and physicians might have started reacting to it by then. Hence, I considered the first half of 2015 as a part of the post-policy period in my primary analysis. Nonetheless, I conducted a sensitivity analysis, in which the first half of 2015 was switched to the pre-policy period; the sensitivity analysis yielded no difference in main conclusions.

RESULTS

Figure 3 presents adjusted semiannual trends of the primary care access measures during 2013 and 2016. The trends are provided for each state group stratified by fee bump extension and coverage expansion status. Adjustment was done by estimating outcomes for each semiannual period using the mean sample composition in each state group across the study period; the adjusted composition factors included age, gender, ethnicity, marital status, education level, any children, smoking status and health conditions. The purpose for the adjustment was to rule out outcome changes due to shifts in Medicaid beneficiary composition over time, especially in the expansion states where relatively younger and healthier adults joined after 2014.

The percentages of adult beneficiaries without any usual source of care other than ED (panel a of **Figure 3**) fluctuated without a clear trend in three of the four state groups in 2013 through 2016. The only exception is the group that did not expand coverage nor extend the fee bump (referred to as 'non-expansion and non-extension' group hereafter; similar terminology is employed for other state groups to save words) – the percentage increased from around 10 to 12 percent from 2013 till the first half of 2015 to around 15 to 20 percent afterwards. Absence of any post-policy percentage decline in the two state groups extending the fee bump could be due to the fact that the percentage in 2013-14 was already low and perhaps consisted of beneficiaries who did not actively seek to establish primary care access. Conversely, the post-policy percentage increase in the 'non-expansion and non-extension' group implies that, without influx of new beneficiaries in 2015-16 ('woodwork' effect mainly occurred in 2014, as Table 1 suggests), beneficiaries eligible under preexisting criteria had harder time identifying a usual source of care after the federally funded fee bump phased out.

As expected, the percentages of being ever rejected by a doctor's office in the past 12 months (panel b of **Figure 3**) displays a high level of responsiveness to the policy change. First, the percentage in all four state groups noticeably declined in 2014 relative to 2013, which could be partially due to the delayed rollout of the federally funded fee bump or due to the retrospective nature of the measure that caused 1-year lag. This finding corroborates the improved appointment availability in 2013-14 for new Medicaid patients across states shown by Polsky et al (citation). Subsequently, in 2015-16, trends in the four groups displayed distinctive movements: the 'non-expansion but extension' group had a further drop from around 8 percent in 2014 to 4 to 6 percent in 2015-16; the 'expansion and extension' group flatted out; the two groups not extending the fee bump climbed to 12 to 16 percent in 2016, a level even higher than 2013. In sum, the result hints a negative correlation between the fee bump extension and the likelihood of patient rejection.

The percentage of using ED because of no other place to go (panel c of **Figure 3**) shows that, among Medicaid patients who ever visited ED in the past 12 months, in general, more than half of them used ED as a primary care provider. In the 'non-expansion but fee extension' group, the percentage dropped from around 60% to around 40% in 2014, and then slightly increased in 2015-16. A change in the opposite direction was seen in the 'non-expansion and non-extension' group, where the percentage increased from around 50% in 2013-14 to around 60% in 2015-16. The percentage leveled throughout 2013-16 in the 'expansion and fee extension' group. Lastly, in the 'expansion but non-extension' group, the percentage jumped from 50% in 2013 to 60% in 2014 and then slightly increased in 2015-16.

Figure 4 presents the adjusted semiannual trends of the primary care access measures. As for number of office visits and chronic condition checkup (panels a and c, respectively), both measures dropped in the two non-fee-extension groups in 2015-16

relative to 2013-14, whereas both increased in 2015-16 in the 'non-expansion but fee extension' group; there was an absence of noticeable change in the 'expansion and fee extension' group. As for flu shot (panel b of **Figure 4**), the percentage fluctuated higher in the second half of every year, during which period flu seasons started, and lower in the first half. However, none of the state groups displayed any noticeable pre- and post-policy change, indicating that the flu vaccination rate was not associated with changes of payment to primary care providers. Taken the findings from **Figures 3 and 4** together, the fee bump extension seemed to be associated with further improvements in some aspects of primary care access and utilization measures.

Figure 5 presents regression results for Medicaid beneficiaries. Dots are point estimates, and whiskers are 95% confidence intervals. In general, fee drop in 2015-16 was associated with negative changes in primary care access and utilization. More specifically, every fee drop by 10% of Medicare rate was associated with 0.9 percent increase ($P<0.05$) in not having a usual source of care except ED, 1.5 percent increase ($P<0.05$) in rejection by a doctor's office, 0.8 percent decrease ($P<0.05$) in checkups for blood pressure, cholesterol level, or blood sugar level, and 0.32 less office visits annually ($P<0.05$). Fee drop was also associated with 1.7 percent decrease in flu shot, despite lack of statistical significance. Base on my calculation using 2016 Medicaid-to-Medicare fee ratios in Table 1, I estimated an average 30% drop of Medicare rate in the 39 states and the DC that did not or only partially extended the fee bump [7]. Multiplying the above point estimates by three, Medicaid beneficiaries in a typical state not fully extending the fee bump were 2.7 percent less likely to

[7] Excluded the seven full extension states (AL, IA, ME, MS, NE, NM, and SC) and three states having over 100% pre-ACA Medicaid-to-Medicare ratios (AK, MT, and ND) and TN where there is 100% managed care enrollment and fee-for-service fee ratio is unknown.

get a usual source of care, 4.5 percent more likely to be rejected by a doctor's office, 2.4 percent less liekly and had 1.11 fewer office visits in the past 12 months.

Figure 5 also shows that, for every 10% increase in Medicaid enrollment, there were a higher likelihood of rejection by a doctor's office (1.1 percent; $p<0.05$) and fewer annual office visits (-0.44; $p<0.1$). As a placebo test, I ran the same analyses for the privately insured population (**Figure 6**). Overall, I did not observe spillover effects of the Medicaid policy change in the privately insured population, except that per 10% increase in Medicaid enrollment was associated with a statistically significant 1.0% increase in likelihood of rejection by a doctor's office.

As discussed previously, a continuous variable of fee drop in **Figures 5 and 6** cannot distinguish between partial extension states and non-extension states. I addressed this issue in alternative model specifications where the fee bump extension was specified as dummies for full and partial extension. As shown in column 2 in Tables 3 and 4, for Medicaid beneficiaries, full extension was associated with 3.7 percent increase in the probability of having a usual source of care ($P<0.05$), 5.9 percent drop in the probability of being rejected by a doctor's office ($P<0.05$), 4.0 percent increase in the probability of chronic condition checkups ($p<0.01$), and 0.71 more office visits ($p<0.05$); partial extension was associated with improvements in likelihood of rejection by a doctor's office (-1.5 percent; $p<0.1$), chronic condition checkups (1.1 percent; $p<0.01$), and annual number of office visits (0.04; $p<0.01$), but not others.

DISCUSSION

Findings in this study consistently suggest that states electing to extend the fee bump in 2015 and 2016 benefited from this decision in terms of improved primary care access and

utilization for Medicaid beneficiaries. Although funding the fee bump extension added burden to the state budget by various degrees, more primary and preventive care use could improve health of underserved Medicaid populations and prevent use of more costly care types[8], thereby potentially offsetting the budgetary burden in a longer term.

The federally funded fee bump in 2013-14 was the largest financial incentive targeting primary care supply for Medicaid beneficiaries in the past two decades, in terms of magnitude and a nationwide coverage. The estimated spending on this provision amounted to $12 billion (Tollen, Finder et al. 2015). However, emerging evidence, including my studies, suggest that the policy might have had limited effects on PCPs' level of Medicaid participation. The limited effects have been attributed to numerous causes, including coincidence with Medicaid expansion and a host of other ACA reforms, temporality of the provision, physician self-attestation requirement, retrospectively paid fee increase, inadequate provider education and outreach, and others. On top of these potential causes, it is also possible that Medicaid populations' primary care access and use have been constrained by patient-side barriers. Socio-economically disadvantaged Medicaid beneficiaries are disproportionally faced with financial, cultural, transportation issues, as well as health illiteracy that negatively affect primary care demand. If excessive demand is absent, a supply-side financial incentive would be ineffective in stimulating better access and more utilization. Nonetheless, positive effects associated with the extended fee bump identified in this study seem to dismiss the suspected lack of excessive demand.

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[8] One strain of empirical studies show that primary care does not substitute inpatient and ED care but rather complements it. More primary care use could lead to more overall health care use. Nonetheless, my study showed that, at least, the fee bump extension was associated with less non-urgent ED use. Non-urgent ED use is prevalent among Medicaid beneficiaries and costly to the programs. Reduced non-urgent ED use would offset part of the fee bump extension cost.

What differentiated the size of the impact from the initial fee bump versus the subsequent extension could also be attributed to the design and implementation of the policy in these two stages. A survey of the fee bump stakeholders revealed some potential differentiating factors. First, the initial fee bump was scheduled to phase out after 2 years, whereas the fee bump extension has no pre-determined termination date, though subject to annual policy renewal. In fact, all states that extended the fee increase in 2015 continued to do so in 2016, demonstrating willingness for a long-term commitment to certain extent. The gesture of a long-term commitment helps care providers make strategic decisions to invest on staff and infrastructure that enable more primary care supply. Second, at the extension stage, states had flexibility in designing the scope of the provision to better fit their health delivery system context and to align with ongoing state-level reforms. Some states expanded the eligibility criteria to include non-physician practitioners and non-PCP specialists who spend a sizeable share of time providing primary care but are not qualified for the initial fee bump. Lastly, some states exerted more efforts to communicate with stakeholders and streamline the process of getting the payment increase. For instance, Colorado removed the attestation requirement and extended the eligibility to all primary care providers in 2015. In general, these changes that happened during the extension phase might help the provision become more effective. Future studies could use the variation in design and implementation of the fee bump extension in the 15 states and the DC to further identify the influential factors that moderates the impact of provider financial incentives on Medicaid beneficiaries' access and utilization of primary care.

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Table 1. Fee Bump Extension Decision, Bump Size, Expansion Decision, and Enrollment Number Change

State	Fee Bump Continuation [a]	Partial or Full Fee Bump	Medicaid-to-Medicare Primary Care Fee Ratio, 2016 [b]	Medicaid Expansion from 2014 [c]	Enrollment Number Change Relative to 2013 Baseline [d]		
					2014	2015	2016
AK	N/A		1.27	Yes from 2016	2.6%	3.8%	31.2%
AL	Yes	Full	1.00	No	4.7%	10.0%	12.2%
AR	No		0.73	Yes	38.7%	47.4%	54.0%
AZ	No		0.65	Yes	18.7%	32.3%	40.3%
CA	No		0.41	Yes	19.0%	37.9%	59.0%
CO	Yes	Partial	0.84	Yes	38.9%	61.3%	74.0%
CT	Yes	Partial	0.76	Yes	19.9%	24.0%	25.7%
DC	Yes	Partial	0.80	Yes	4.5%	8.3%	12.1%
DE	Yes	Partial	0.99	Yes	4.5%	7.6%	5.7%
FL	No		0.48	No	7.2%	13.5%	16.1%
GA	Yes	Partial	0.89	No	15.1%	16.3%	16.1%
HI	Yes	Partial	0.54	Yes	11.4%	14.8%	18.3%
IA	Yes	Full	0.98	Yes from 2015	21.3%	21.0%	25.3%
ID	No		1.00	No	15.6%	16.5%	21.5%
IL	No		0.48	Yes	14.3%	20.4%	18.9%
IN	No		0.75	Yes	7.2%	19.7%	31.8%
KS	No		0.73	No	6.9%	7.3%	11.2%
KY	No		0.67	Yes	73.7%	84.1%	102.0%
LA	No		0.67	No	1.3%	5.2%	3.2%
MA	No		0.70	Yes	13.4%	26.7%	28.5%
MD	Yes	Partial	0.92	Yes	35.1%	38.9%	43.6%
ME	Yes	Full	1.00	No	15.5%	29.1%	30.9%
MI	Yes	Partial	0.71	Yes	15.0%	22.1%	21.0%
MN	No		0.78	Yes	20.9%	17.9%	20.3%
MO	No		0.55	No	-4.4%	9.5%	14.0%
MS	Yes	Full	1.00	No	8.0%	11.9%	9.7%
MT	N/A		1.06	Yes from 2016	13.1%	19.3%	61.1%
NC	No		0.79	No	13.4%	25.3%	28.3%
ND	N/A		1.00	Yes	22.4%	26.9%	28.5%
NE	Yes	Full	1.00	No	-2.5%	-2.9%	-1.6%
NH	No		0.56	Yes	7.9%	42.6%	49.5%
NJ	No		0.53	Yes	19.5%	39.5%	38.7%
NM	Yes	Full	1.00	Yes	51.1%	55.5%	65.5%

NV	Yes	Partial	0.95	Yes	52.6%	69.4%	83.1%
NY	No		0.44	Yes	7.3%	14.1%	12.9%
OH	No		0.59	Yes	12.5%	27.6%	27.2%
OK	No		0.87	No	0.9%	3.3%	-1.2%
OR	No		0.71	Yes	57.2%	69.9%	67.5%
PA	No		0.51	Yes from 2015	0.7%	10.8%	19.7%
RI	No		0.33	Yes	33.9%	43.9%	49.5%
SC	Yes	Full	1.00	No	-4.1%	13.4%	10.3%
SD	No		0.71	No	0.4%	2.5%	3.3%
TN	N/A		N/A	No	7.7%	20.4%	30.4%
TX	No		0.58	No	2.1%	5.2%	6.7%
UT	No		0.86	No	13.1%	5.0%	6.7%
VA	No		0.84	No	15.5%	4.6%	5.1%
VT	No		0.84	Yes	17.0%	14.6%	15.1%
WA	No		0.65	Yes	36.8%	53.7%	59.5%
WI	No		0.48	Yes	21.1%	6.3%	6.3%
WV	No		0.74	Yes	45.0%	51.9%	61.7%
WY	No		0.93	No	-0.6%	-3.1%	-5.1%

[d] https://www.kff.org/health-reform/state-indicator/total-monthly-medicaid-and-chip-enrollment/?activeTab=graph&currentTimeframe=0&startTimeframe=44&selectedDistributions=percent-change&selectedRows=%7B%22states%22:%7B%22all%22:%7B%7D%7D%7D&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D

Table 2. Descriptive Statistics by Insurance Status and State Medicaid Program Policy Change

			Within Medicaid sample			
	Private	**Medicaid**	**State Group 1: No Exp. + Fee Ext.**	**State Group 2: No Exp. + No Fee Ext.**	**State Group 3: Exp. + Fee Ext.**	**State Group 4: Exp. + No Fee Ext.**
N (unweighted)	64,348	13,178	978	2,536	3,243	5,961
Male	47.4%	32.8%	35.1%	32.4%	39.2%	39.8%
Age						
18-29	23.6%	34.6%	29.6%	36.7%	34.3%	34.7%
30-39	20.7%	21.9%	22.6%	21.8%	22.8%	21.4%
40-49	22.2%	17.7%	16.4%	15.5%	18.5%	18.4%
50-59	23.5%	18.4%	24.4%	17.7%	17.6%	17.9%
60-64	10.0%	7.4%	7.0%	8.3%	6.9%	7.6%
Region						
Northeast	17.9%	21.6%	44.8%	0.9%	45.2%	13.8%
Midwest	24.3%	21.7%	16.6%	30.5%	22.3%	20.5%
South	34.9%	27.9%	37.4%	66.3%	19.0%	12.2%
West	22.9%	28.9%	1.2%	2.4%	13.5%	53.4%
Ethnicity						
Non-Hispanic white	71.6%	42.5%	35.5%	39.8%	38.1%	47.3%
Non-Hispanic black	9.4%	24.4%	33.4%	31.7%	29.8%	16.8%
Hispanic	10.3%	28.8%	29.6%	25.9%	27.9%	30.3%
Others	8.7%	4.3%	1.5%	2.6%	4.2%	5.6%
Married	60.2%	28.7%	32.6%	29.2%	28.7%	28.9%
Current Smoker	13.2%	29.5%	32.6%	29.2%	28.7%	28.9%
Former Smoker	18.9%	15.1%	16.6%	13.6%	16.3%	15.0%
Health Conditions						
Cancer	5.2%	5.6%	7.1%	6.6%	4.8%	5.4%
Diabetes	5.4%	11.4%	13.1%	12.2%	10.8%	11.1%
Arthritis	15.5%	22.7%	26.4%	22.0%	21.9%	22.4%
Blind	2.6%	4.7%	7.5%	5.8%	3.4%	4.2%
Hypertension	21.9%	30.2%	33.7%	34.1%	28.7%	28.5%
Heart condition	4.8%	8.4%	9.1%	9.0%	7.8%	8.3%
Ulcer	4.6%	8.6%	8.0%	9.4%	7.6%	8.8%

Source. National Health Interview Survey 2013-2016.

Table 3. Effects of Fee Bump Extension and Medicaid Expansion on Primary Care Access Measures

	Medicaid				Privately Insured			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Usual source of care except ED								
Full fee bump continuation		0.0369**		0.0424***		-0.000119		0.000475
		-0.0243		(0.00519)		(0.00775)		(0.00795)
Partial fee bump continuation		0.00336		0.0037		0.00604		0.00774
		(0.0039)		(0.00271)		(0.0248)		(0.00771)
10% Medicaid fee drop	0.00919**		0.00812**		-0.000511		-0.000563	
	(0.00401)		(0.00491)		(0.00728)		(0.0019)	
Medicaid Expansion		-0.0323**	-0.0369**			-0.0109	-0.0149	
		(0.0142)	(0.0146)			(0.00798)	(0.0225)	
10% Medicaid enrollment increase	0.00689			0.00557	-0.00721			-0.00893
	(0.00537)			(0.00542)	(0.0171)			(0.0214)
N	11,959	11,959	11,959	11,959	59,409	59,409	59,409	59,409
R2	0.059	0.058	0.059	0.058	0.045	0.045	0.046	0.045
Rejected by PCP								
Full fee bump continuation		-0.0579***		-0.0406***		0.0073		0.00959**
		(0.0129)		(0.00504)		(0.0041)		(0.00409)
Partial fee bump continuation		-0.0147*		-0.0192***				
		(0.00783)		(0.00333)				
10% Medicaid fee drop	0.0152***		0.00062		0.00266		0.00353	
	(0.00592)		(0.00332)		(0.01466)		(0.00245)	
Medicaid Expansion		0.0498**	0.0294			-0.00378	0.00336	
		(0.02)	(0.0228)			(0.00407)	(0.0129)	
10% Medicaid enrollment increase	0.0112**			0.0246**	0.00124			0.0123
	(0.00471)			(0.0118)	(0.015)			(0.0123)
N	11,942	11,942	11,942	11,942	59,340	59,340	59,340	59,340
R2	0.032	0.032	0.032	0.032	0.01	0.009	0.01	0.01
ED visit because of no place else to go								
Full fee bump continuation		-0.0462		-0.0522		-0.00444		-0.00414
		(0.0323)		(0.0474)		(0.00302)		(0.00304)
Partial fee bump continuation		-0.0254		0.0352		0.000625		0.000508
		(0.0184)		(0.0214)		(0.0276)		(0.0497)
10% Medicaid fee drop	-0.0173		0.0168*		0.00226		-0.00331	
	(0.0217)		(0.00998)		(0.00647)		(0.01716)	
Medicaid Expansion		0.119**	0.105*			0.0326	-0.0649	
		(0.0519)	(0.059)			(0.0294)	(0.0883)	
10% Medicaid enrollment increase	0.0189			0.0273	0.00422			-0.00822
	(0.0244)			(0.0316)	(0.0103)			(0.0085)
N	4,670	4,670	4,670	4,670	13,016	13,016	13,016	13,016
R2	0.035	0.038	0.036	0.036	0.026	0.025	0.024	0.025

Source. National Health Interview Survey 2013-2016. **Notes**. Specifications 1 to 4 correspond to the ones laid out in the 'Empirical Strategy Section'. Marginal effects reported are derived from two-way fixed effect models, further controlling for individual characters. Standard errors in parentheses *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 4. Effects of Fee Bump Extension and Medicaid Expansion on Primary Care Access Measures

	Medicaid				Privately Insured			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Usual source of care except ED								
Full fee bump continuation		-0.0142		-0.0149		0.00712		0.0056
		(0.0231)		(0.0231)		(0.012)		(0.0121)
Partial fee bump continuation		0.0292		0.0157		-0.000999		-0.000985
		(0.0675)		(0.0194)		(0.0472)		(0.0344)
10% Medicaid fee drop	-0.00597		-0.0049		-0.00269		0.00161	
	(0.0188)		(0.00533)		(0.00505)		(0.00272)	
Medicaid Expansion		-0.00567	0.0231			0.00648	0.0395	
		(0.0296)	(0.0729)			(0.0137)	(0.0315)	
10% Medicaid enrollment increase	0.0082			-0.0106	0.00438			-0.0019
	(0.0096)			(0.0731)	(0.0133)			(0.0159)
N	12,026	12,026	12,026	12,026	59,719	59,719	59,719	59,719
R2	0.063	0.063	0.063	0.063	0.06	0.06	0.06	0.06
Rejected by PCP								
Full fee bump continuation		0.0399***		0.0436***		0.0036		0.00379
		(0.009)		(0.00936)		(0.00878)		(0.00892)
Partial fee bump continuation		0.0107***		0.0119***		0.00453		0.00293
		(0.00095)		(0.00302)		(0.0305)		(0.0315)
10% Medicaid fee drop	-0.00798***		-0.00898***		-0.00736		-0.000204	
	(0.00289)		(0.00338)		(0.01546)		(0.021)	
Medicaid Expansion		-0.0672***	0.0647 ***			-0.00105	-0.00396	
		(0.0143)	(0.0173)			(0.00986)	(0.0255)	
10% Medicaid enrollment increase	0.0178			0.0537	-0.0095			-0.0000525
	(0.0194)			(0.0615)	(0.0149)			(0.011)
N	13,727	13,727	13,727	13,727	60,448	60,448	60,448	60,448
R2	0.063	0.063	0.063	0.063	0.06	0.06	0.06	0.06
ED visit because of no place else to go								
Full fee bump continuation		0.707 **		0.932 ***		-0.00484		0.0421
		(0.226)		(0.4522)		(0.0106)		(0.316)
Partial fee bump continuation		0.0391*		1.122 ***		-0.000269		-0.238
		(0.0229)		(0.367)		(0.033)		(0.225)
10% Medicaid fee drop	-0.316 **		-0.378 ***		-0.0522		0.000883	
	(0.102)		(0.052)		(0.184)		(0.00257)	
Medicaid Expansion		0.628 **	0.796 **			0.00301	-0.00785	
		(0.283)	(0.3349)			(0.0117)	(0.0312)	
10% Medicaid enrollment increase	-0.437 *			-0.587	-0.207			-0.248
	(0.213)			(0.326)	(0.523)			(0.213)

N	11,762	11,762	11,762	11,762	58,724	58,724	58,724	58,724
R2	0.114	0.114	0.114	0.114	0.073	0.073	0.073	0.073

Source. National Health Interview Survey 2013-2016. **Notes**. Specifications 1 to 4 correspond to the ones laid out in the 'Empirical Strategy Section'. Marginal effects reported are derived from two-way fixed effect models, further controlling for individual characters. Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Figure 1. 2012 and 2016 Medicaid-to-Medicare Primary Care Fee Ratios

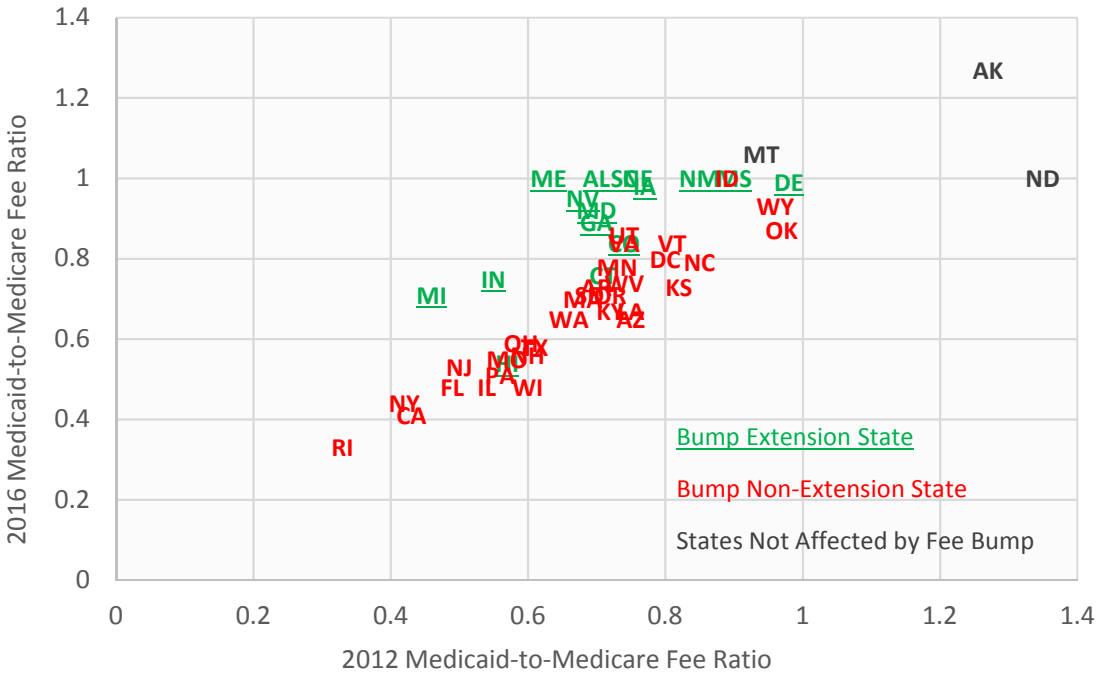


Figure 2. Medicaid Fee Bump Extension and Medicaid Expansion Status, 2015-2016

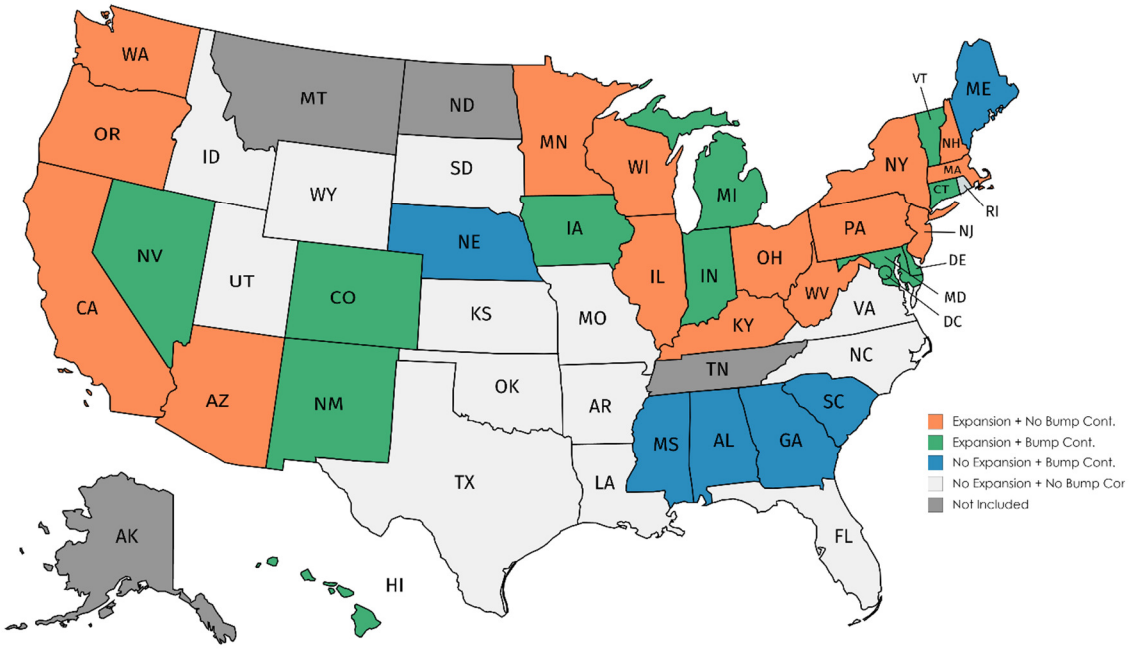
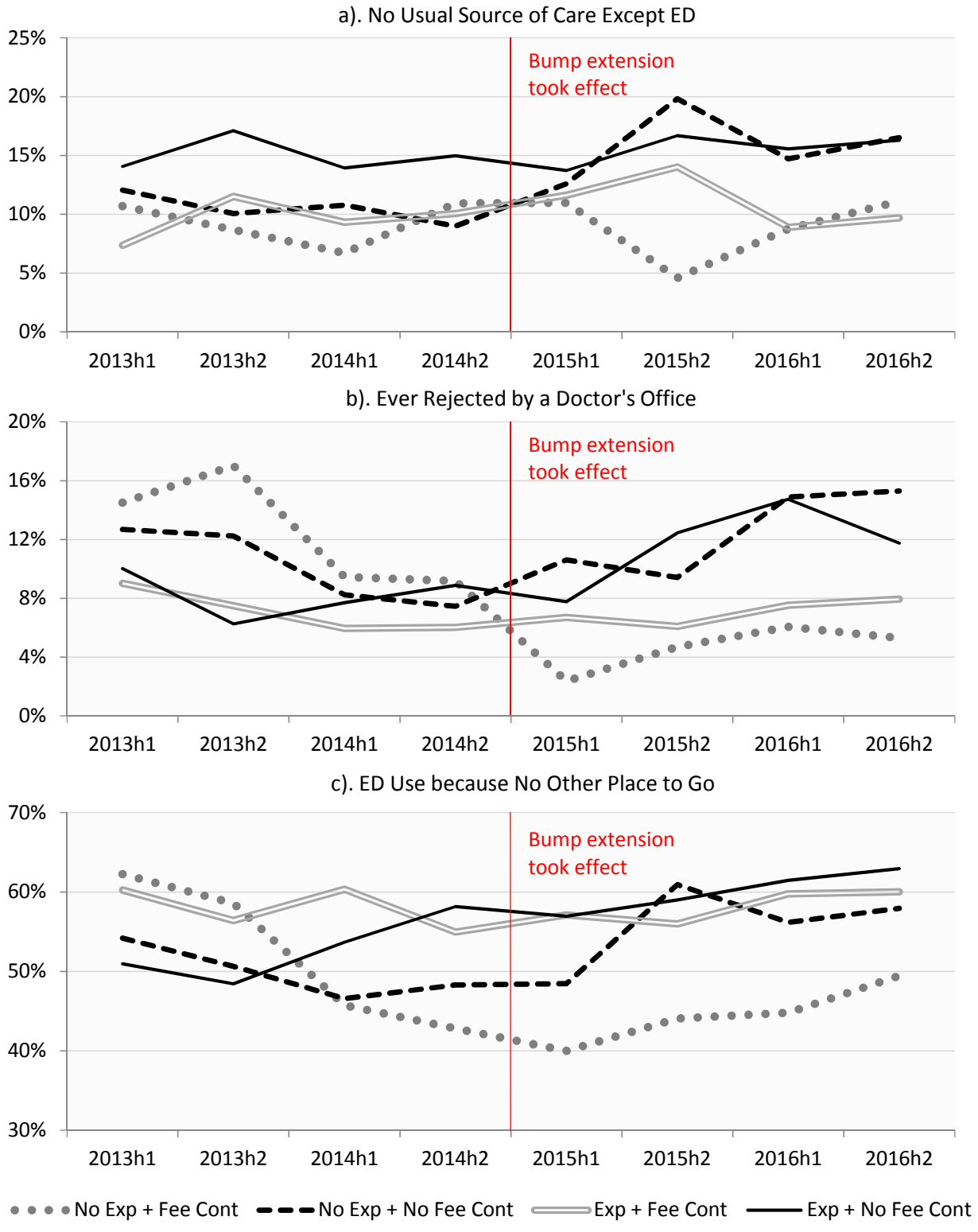
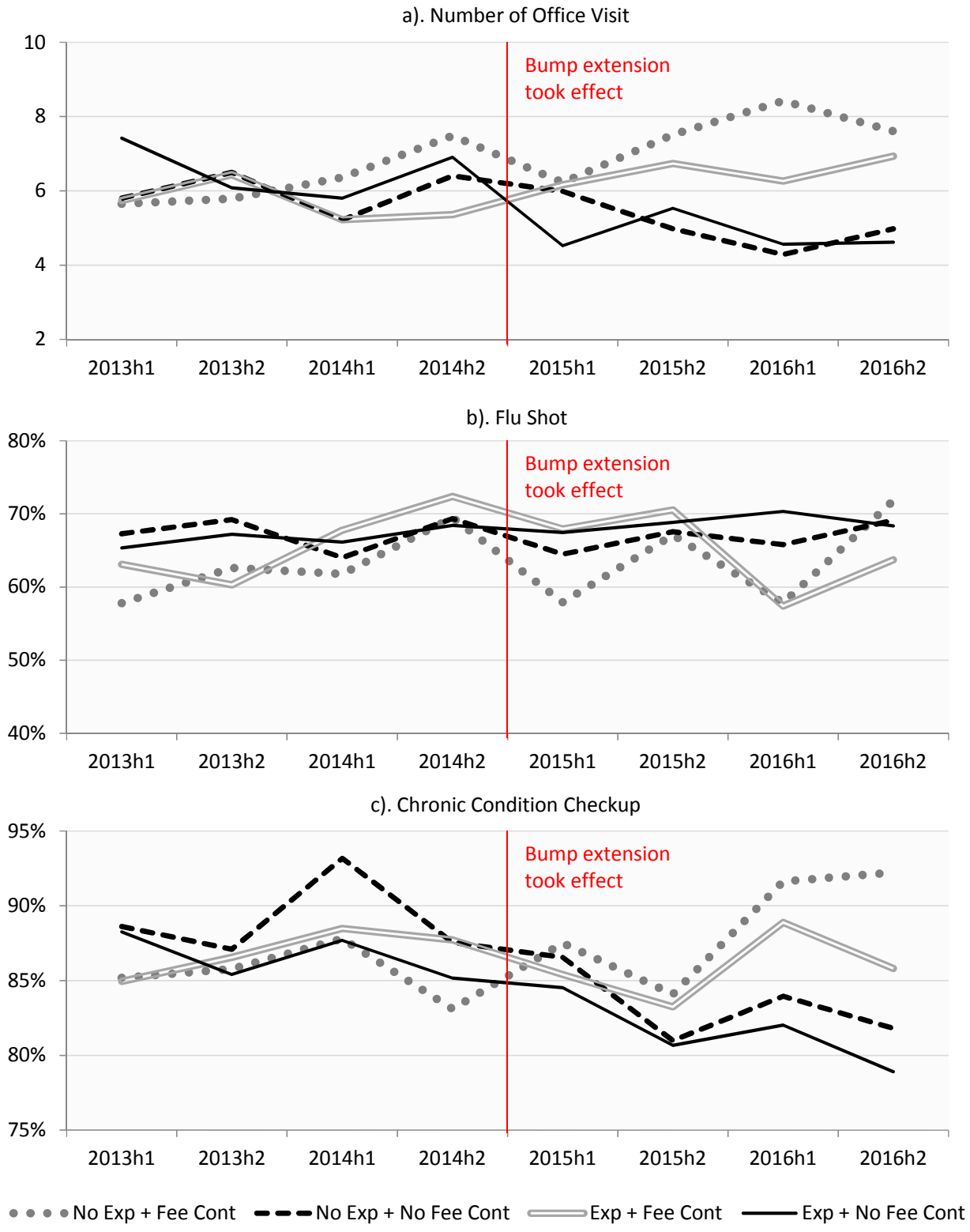


Figure 3. Adjusted Semiannual Trend of Primary Care Access Measures



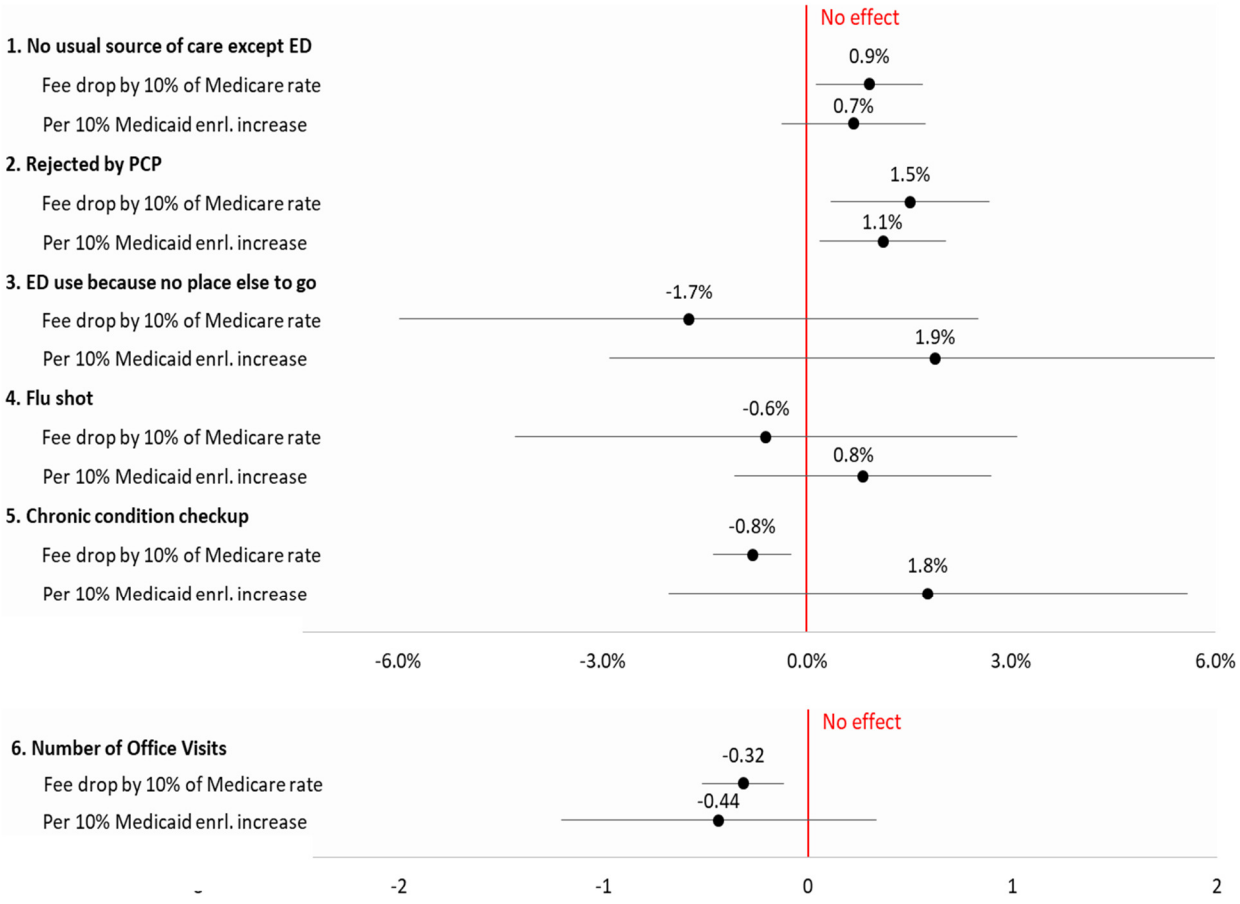
Source. National Health Interview Survey 2013-2016.

Figure 4. Adjusted Semiannual Trend of Primary Care Utilization Measures



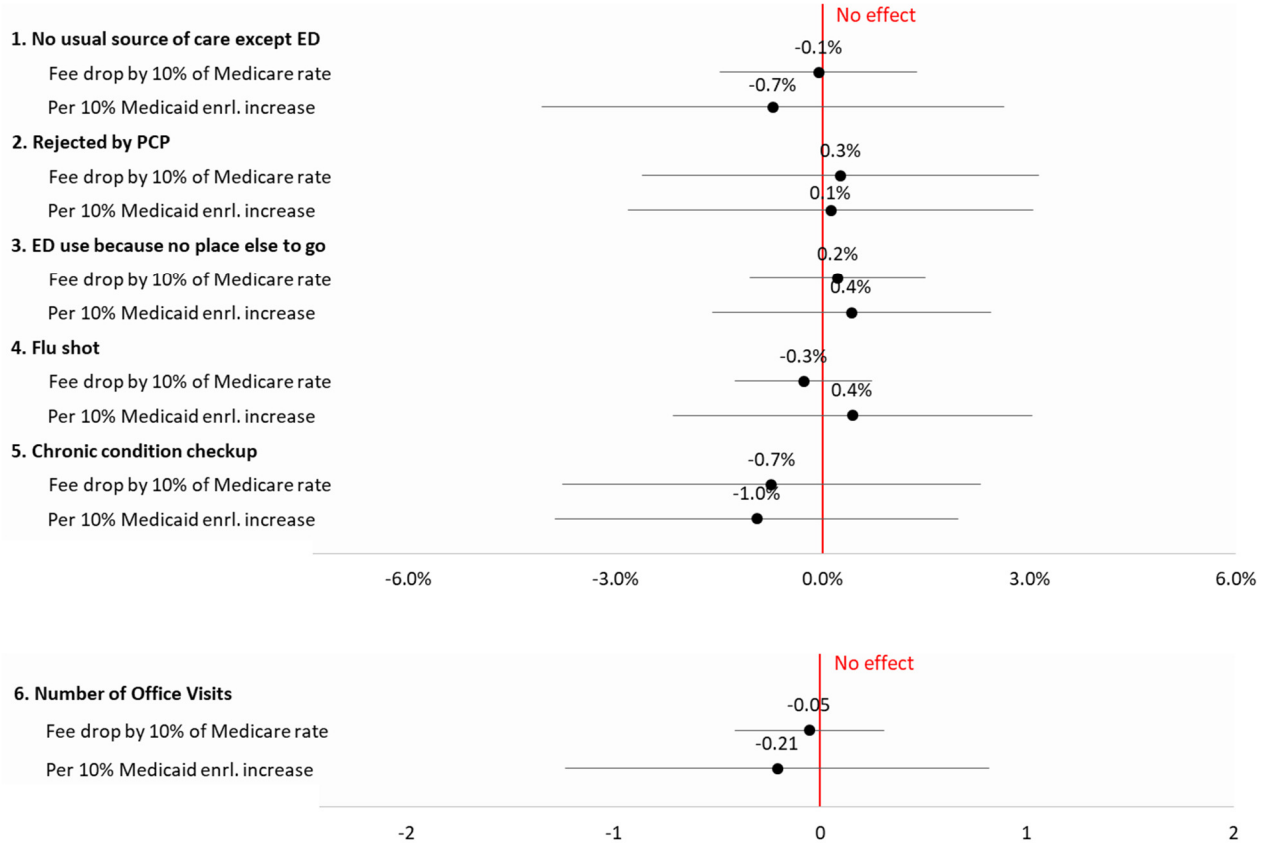
Source. National Health Interview Survey 2013-2016.

Figure 5. Effects of Fee Bump Extension and Medicaid Expansion on Primary Care Access and Utilization: Medicaid Subsample



Source. National Health Interview Survey 2013-2016. **Notes**: Based on 2013-2016 NHIS *Medicaid* non-elderly adult subsample; analysis is at the individual level (n=13,178). Regressions control for state and time fixed effects, and individual characteristics including age, gender, ethnicity, marital status, education level, any children, smoking status and health conditions such as cancer, diabetes, arthritis, blind, hypertension, heart condition, and ulcer. 'Per 10% Medicaid enrollment increase' is measured for year 2014 through 2016 relative to the 2013 baseline in a state. Survey weights are applied, and standard errors are clustered at state level.

Figure 6. Effects of Fee Bump Extension and Medicaid Expansion on Primary Care Access and Utilization: Privately Insured Subsample



Source. National Health Interview Survey 2013-2016. **Notes**: Based on 2013-2016 NHIS *privately insured* non-elderly adult subsample; analysis is at the individual level (n=64,348). Regressions control for state and time fixed effects, and individual characteristics including age, gender, ethnicity, marital status, education level, any children, smoking status and health conditions such as cancer, diabetes, arthritis, blind, hypertension, heart condition, and ulcer. 'Per 10% Medicaid enrollment increase' is measured for year 2014 through 2016 relative to the 2013 baseline in a state. Survey weights are applied, and standard errors are clustered at state level.