

The differential effect of compensation structures on the likelihood that firms accept new patients by insurance type

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Abstract Adequate access to primary care is not universally achieved in many countries, including the United States, particularly for vulnerable populations. In this paper we use multiple years of the U.S.-based Community Tracking Survey to examine whether a variety of physician compensation structures chosen by practices influence the likelihood that the practice takes new patients from a variety of different types of insurance. Specifically, we examine the roles of customer satisfaction and quality measures on the one hand, and individual physician productivity measures on the other hand, in determining whether or not firms are more likely to accept patients who have private insurance, Medicare, or Medicaid. In the United States these different types of insurance mechanisms cover populations with different levels of vulnerability. Medicare (elderly and disabled individuals) and Medicaid (low income households) enrollees commonly have lower ability to pay any cost sharing associated with care, are more likely to have multiple comorbidities (and so be more costly to treat), and may be more sensitive to poor access. Further, these two insurers also generally reimburse less generously than private payors. Thus, if lower reimbursements interact with compensation mechanisms to discourage physician practices from accepting new patients, highly vulnerable populations may be at even greater risk than generally appreciated. We control for the potential endogeneity of incentive choice using a multi-level propensity score method. We find that the compensation incentives chosen by practices are statistically and economically significant predictors for the types of new patients that practices accept. These findings have important implications for both policy makers and private health care systems.

Keywords Physician compensation · Access to care · Physician behavior

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Introduction

Adequate access to primary care is not universally achieved in the United States, particularly for vulnerable populations. In this paper we use multiple years of the U.S.-based Community Tracking Survey to examine whether a variety of private physician compensation structures influence the likelihood that a practice takes new patients from a variety of different types of insurance. Specifically, we examine the roles that financial incentives based on customer satisfaction, quality measures and productivity play in determining whether or not firms are more likely to accept patients who have private insurance, Medicare, or Medicaid. Since physician reimbursement varies across these different types of payors, the incentive for accepting new patients may differ when physician compensation is productivity- and revenue-based, as opposed to being patient satisfaction- or quality-based. Thus, the presence of particular forms of compensation arrangements may interact with the incentives inherent in payor reimbursement to create differential incentives to provide access for patients. Further, there is a significant trend in the healthcare labor market towards larger numbers of physicians choosing salaried employment rather than equity partnerships. Thus, if physicians' financial arrangements affect the firms' willingness to accept Medicaid patients (for example), then implementing the Medicaid expansions envisioned under the Affordable Care Act may prove problematic.

Additionally, in the United States these different types of insurance mechanisms cover populations with different levels of vulnerability. Medicare (elderly and disabled individuals) and Medicaid (low income households) enrollees commonly have lower ability to pay any cost sharing associated with care, are more likely to have multiple comorbidities (and so be more costly to treat), and may be more sensitive to poor access. These two government programs also generally reimburse less generously than private payors. Thus, if lower reimbursements interact with firm productivity compensation mechanisms to discourage physician practices from accepting new patients, lower income/highly vulnerable populations may be at even greater risk than generally appreciated.

We use the Community Tracking Survey to examine whether the likelihood that firms will accept new private insurance, Medicare, or Medicaid enrollees varies with different bases for determining physicians' total compensation. Our analysis also directly tests how the financial incentives of employee physicians differ from physicians with ownership stakes in the practice. We find that the compensation structure of physicians is a statistically and economically significant predictor for the types of new patients that practices accept, and that this effect depends upon the equity position (employee vs. partner) of the surveyed physician. These findings have important implications for both policy makers and private health care systems.

Policy background

The market for health insurance in the U.S. is complex. For the purposes of this paper we categorize health insurance as being offered through three broad options: private market, Medicare, and Medicaid. Technically, these broad types of coverage are not mutually exclusive; an individual may have both coverage through the private market and Medicare, for example. However, for the purposes of our analysis, we are going to investigate the degree to which physician practices accept new patients who are characterized (by the responding

physician) as belonging primarily to only one of these categories. Each of these types of coverage plays a significant role in how Americans receive health care. According to the US Census Bureau, in 2010, 64 % of Americans had a private plan, 14.5 % had a Medicare plan, and 15.9 % had a Medicaid plan.¹ With the implementation of the Affordable Care Act—and the concomitant expansion in both private insurance and Medicaid—these percentages are in significant flux.

As the numbers above suggest, almost two thirds of Americans have private health insurance. Private insurance is offered through a variety of mechanisms. The most common mechanism is through one's employer. 55.3 % of Americans have a private insurance plan through their employer.² These plans come in several broad types including: Health Maintenance Organization plans (HMO), Exclusive Provider Organization plans (EPO), and Preferred Provider Organization plans (PPO). Without delving into the specifics of these types of organizations, it is important to note that all companies in insurance markets seek to spread risks—and thus the potential for claims—over a large pool of individuals. The insurance companies then use a variety of revenue tools (e.g., premiums, deductibles, and copays) to help create revenue in excess of cost of claims and administering of the claims such that the company is financially successful (whether profit maximizing or not).

The private market, however, typically excludes two vulnerable groups: the poor and the elderly. The poor may be excluded because they cannot afford to pay either the plan premiums or the plan deductibles and copays, and the elderly may be excluded because of the high likelihood that they will consume large amounts of health care and thus face higher premiums (in a pre-Affordable Care Act (ACA) world). In response to these potential market failures, the U.S. Federal Government created Medicare and Medicaid with the Social Security Amendments of 1965.

Medicare was created to provide health insurance for the elderly and disabled, while Medicaid provides insurance for the poor. Both programs have rich histories and have changed significantly over time, and are changing still more with the ACA implementation. But, for the purposes of this paper it is most useful to focus on the general fact that the rates at which Medicare plans reimburse physicians for treatment are lower than the average rates at which private insurance plans reimburse, but, on average, are higher than the reimbursement rates that Medicaid plans provide. These differential rates provide incentives for firms (physician offices) to accept patients with private insurance but potentially deny treatment to those with Medicaid and Medicare. The impact of these differential rates are compounded by the nature of the respective patient populations: not only are Medicaid and Medicare average payment lower, but those patients are more likely to require more treatment (and thus more of the physician's time) as a result of the generally lower health state. Both reasons suggest that Medicare and Medicaid patients are less profitable than private pay patients—a stylized fact borne out by ample academic and popular evidence.

Literature review

At the heart of our study lies a basic underlying question: how are physicians' and firms' decisions about providing care to different types of patients (access to care) influenced by

¹ DeNavas-Walt, Carmen, Bernadette D. Proctor, and Jessica C. Smith, U.S. Census Bureau, Current Population Reports, P60-239, *Income, Poverty, and Health Insurance Coverage in the United States: 2010*, U.S. Government Printing Office, Washington, DC, 2011.

² *ibid*

compensation structures? [Newhouse \(2002\)](#) highlighted this question by suggesting that different types of payments to providers may induce them to attract healthy patients and deny access to those who have the greatest need and also may be the most expensive. In our review of the literature, we do not find studies that attempt to highlight the direct link between compensation structures and access to care, but we do find literature on: (1) how physicians' and firms' incentives may influence their behavior, and (2) how different reimbursement rates for different types of insurance may influence access to care. In this study we attempt to link these two lines of literature by examining how different types of compensation structures (incentives in the form of productivity and quality of care) may provide incentives to physicians to discriminate against patients with certain types of insurance, such as Medicare and Medicaid, as a result of the differing reimbursement rates.

A variety of studies have created theoretical frameworks under which incentives for either individual physicians or firms directly respond to a variety of incentives ([Bradford and Martin 2000](#); [Conrad and Christianson 2004](#)), often with a focus on the effects of pay for performance ([Conrad and Perry 2009](#); [Frølich et al. 2007](#)). This literature finds mixed evidence for the relationship between physician compensation incentives and behavior (we will explore this in more detail below). There is a second line of literature that is also of importance to our study, which examines the link between reimbursement rates and access to care. This literature finds that there does appear to be a relationship between lower reimbursement rates (particularly through Medicaid and Medicare) and access to care for patients. Our study examines whether this relationship is intensified by tying physicians' incentives to measures that may be influenced by a patient's type of insurance (via the reimbursement rates). Below we provide a review of the two lines of literature that we have just discussed: (1) physician incentives and behavior and (2) the relationship between reimbursement rates and access to care.

Physician Incentives and Behavior

In a review of the literature on the effect of explicit financial incentives on physician behavior, [Armour et al. \(2001\)](#) find mixed results of such incentives on both the quality of patient care and on physician resource use. The authors also examined the role of bonus payments and found mixed evidence for a significant relationship between bonus payments and physician resource use. [Conrad and Christianson \(2004\)](#) in reviewing the literature also find that the evidence for the relationship between explicit financial incentives and quality of care is mixed. Similarly, [Rosenthal and Frank \(2006\)](#) find mixed evidence in the literature for pay for performance schemes at improving the quality of health care. In a more recent study, while [Landon et al. \(2014\)](#) find a mixed relationship between compensation strategies and quality of patient care, they did find an association between compensation strategies and quality of care outcomes for Medicare patients in particular; these authors also found that employed physicians whose pay is determined through productivity-based reward formulae usually provide higher quality care compared to other types of physicians.

However, some researchers have found more consistent relationships between physician incentives and behaviors. For example, [Gaynor and Pauly \(1990\)](#) find that incentives affect productivity for physicians, in that physicians in large medical group partnerships have lower productivity compared to those in smaller practices, and that greater average experience within groups leads to greater productivity. [Conrad et al. \(2002\)](#) found that individual physician incentives that are designed to increase productivity do indeed have that effect. [Devlin and Sarma \(2008\)](#) similarly find that physician remuneration strategy influences productivity. Using a laboratory experiment, [Hennig-Schmidt et al. \(2011\)](#) provide additional evidence that that physician reimbursement matters for outcomes: specifically they found that patients are

often over served under fee-for-service strategies and underserved in capitation reimbursement regimes.

While the above studies have examined the relationship between physician incentives with respect to quality of care and volume productivity, fewer studies look more directly at the relationship between incentives and access to services. In one of the few studies that examine that issue, [Reschovsky et al. \(2006\)](#), using the Community Tracking Survey, find that physicians report their compensation structures do affect perceived incentives to either increase or decrease services to patients. That study also found that whether physicians have an ownership stake in the practice can affect perceptions of incentive strength.

Types of insurance, reimbursement rates, and access to care

When placing our paper in the literature, it is important to not only consider the work that has been done to tie physician and firm incentives to physician and firm behaviors, but also to examine what the literature tells us about the influence that different types of insurance (private, Medicare, and Medicaid) have on physician and firm incentives to supply care. [Brunt and Jensen \(2013\)](#) find that reimbursement rates for Medicare matter for patient access. These authors find, unsurprisingly, that when geographical adjustments result in overpayments for services, physicians are more likely to accept new Medicare patients, and the opposite is true in the face of underpayment. [Decker \(2012\)](#) identifies several statistically significant correlates of the decision physicians make to accept new Medicaid patients, including: size of practice, practice location, and specialty of care. [Howard \(2014\)](#) finds evidence for price competition with respect to reimbursement rates between Medicare and Medicaid that are particularly pronounced for cardiology and critical care. Furthermore, a large number of studies provide evidence for a positive relationship between physician service compensation and the access patients have to care across several types of insurance (see, for example: [Baker and Royalty 2000](#); [Cohen and Cunningham 1995](#); [Staiger et al. 2010](#); [Decker 2009](#); [Turcotte et al. 2005](#); [Zuckerman et al. 2004](#)).

With very few exceptions (see: [Reschovsky et al. 2006](#)), the existing literature tends to separately examine the relationship between physician compensation incentives and the behavior those incentives induce, and physician supply behavior and the relationship between varying insurance reimbursement rates (e.g., across Medicare and Medicaid) and access to care. In this paper, we link these two largely disparate literatures by examining how compensations structures offered to physicians influence the likelihood that a physician's firm will accept new patients that have either private insurance, Medicare, or Medicaid. Thus, our work serves as a bridge between the two established literatures discussed above.

Data

For this study we use four waves—1996–1997, 1998–1999, 2000–2001, and 2004–2005—of the Community Tracking Study (CTS). The CTS was conducted by the Center for Studying Health System Change, a nonpartisan organization that conducted research on the U.S. health care system, in order to support research that would help aid policy makers and industry specialists in making decisions about health care. The CTS was designed as a large-scale longitudinal survey aimed at better understanding the relationship between the U.S. healthcare system and the effects this system has on the people of the U.S. To ensure that the CTS is nationally representative, 60 different geographic were randomly chosen for inclusion. These 60 areas included 51 metropolitan areas and nine nonmetropolitan areas. The CTS is

particularly focused on capturing the impact of health care system changes from 1996 onward on healthcare access and outcomes. The CTS has three distinct subsamples: households, health plans, and physicians. In our analysis, we utilize the physician survey.³ The data contain a rich set of physician and practice characteristics, including physician age (45 percent were born before 1961), physician sex (23 percent female), practice organizational structure (23 percent solo practices, 66 percent traditional group practices, and 11 percent staff model HMOs), whether the physician is an employee or equity owner (36 percent were employees), practice size (31 physicians on average), physician perceptions of the competitiveness of their markets, physician specialties and physician incomes.

For this study, we are limited in the survey waves that we can use by the available survey items. The survey items pertaining to physician bonus and compensation structures were only asked in four of the waves, 1996–1997, 1998–1999, 2000–2001, and 2004–2005. Each of these waves repeated a set of questions about whether or not responding physician's compensation was influenced by several explicit factors.

The measures of whether own productivity and quality of the physician's services influence their compensation are directly taken from survey questions from the Community Tracking Survey. In these cases, we construct the measures based on physicians' self-reported understanding of whether productivity and quality affect their compensation. Physicians who report "factors that reflect (their) own productivity" are "explicitly considered in determining (their) compensation" are considered to have elements in their compensation that are influenced by their own productivity. Our measure for quality is generated from two specific items from the survey. The first survey item that we use to define our measure of quality asks if "specific measures of quality of care, such as rates of preventive care services for (their) patients" are "explicitly considered in determining (their) compensation." The second survey item we use to define our measure of quality asks if "results of satisfaction survey completed by (their) own patients" are "explicitly considered in determining (their) compensation." If a physician responds with a "factor does affect compensation" (essentially responding with a yes) then we consider them as having a compensation structure that is influenced by quality. Thus we use these two sets of question to measure whether productivity, quality, or both influence a physician's compensation. It should be noted that we might have some measurement error with these constructs. First, these are self-reported measures, which suggests that different physicians may have different conceptualizations of what are "factors that measure own productivity" or "factors that measure quality or patient satisfaction." However, we do not believe that in this case that this potential measurement error should bias our results except to possibly attenuate them. These self-reports do, however, limit our ability to have a more nuanced view of the specific types of measures used by firms to either measure (physician) own productivity or quality of care.

We define indicator variables that equal one when the physician compensation is influenced by each factor and a zero otherwise.⁴ Note that in principle, this could be expressed as four bonus options for practices to choose from: do not tie compensation to productivity or quality; tie compensation only to quality; tie compensation only to productivity; or tie compensation to both productivity and quality. However, empirically we observe that only slightly more than 4% of physicians are in practices that choose to tie compensation to quality but not to productivity. Since it seems likely that these practices are different from the other firms

³ Information about CTS retrieved from <http://www.icpsr.umich.edu/icpsrweb/HMCA/series/00161>, on July 7, 2014.

⁴ With respect to own-productivity, the CTS says "[e]xamples include the amount of revenue you generate for the practice, the number of relative value units you produce, the number of patient visits you provide, or the size of your enrollee panel.

in our data in ways that will not be captured by our models, we chose to exclude them from the analysis. Consequently, we will examine the impact of three types of compensation structures: not tied to any physician performance (the excluded group), compensation tied to physician productivity; and compensation tied to both physician productivity and quality.

These variables, along with other firm characteristics, are used to predict whether or not the firm (which the responding physician either owns in full or in part, or serves as an employee) accepts patients with different types of insurance. We examine whether the physician's firm accepts any new patients with Medicare, Medicaid, or private insurance. Below we discuss the empirical methods which we use to examine the relationships between compensation incentives, equity status of the physician, and the willingness to accept new patients with differential types of health insurance.

Conceptual framework and empirical methods

As discussed above, we will estimate a series of models to determine how various compensation mechanisms within a physician practice reflect the willingness of the practice to accept new patients. We expect the financial incentives to admit patients will differ based on the payor. We also expect the ability of practices to fully exploit the differing patient financial returns will vary with the competitiveness of the market. These sometimes contradictory influences will lead to an association between market competitive factors and the physician incentive mechanisms that practices employ. We will outline the theoretical considerations for each of these in order.

First, we address the varying financial opportunities patients from different types of payors present to medical practices. Consider three patients, each with identical medical histories and presenting with the same acute condition but with three different insurance payers. In these circumstances, the costs of treating the patients will be essentially the same—each will be equally difficult to diagnose and (since we assume they have identical histories and conditions) each will have the same treatment cost. Thus, costs for all three will be essentially identical (if we assume the administrative costs of processing their insurance claims do not differ much in an absolute sense). The profit that the practice will earn on each of them will differ, however, based upon the generosity of payment for services by the patients' insurers. If we consider archetypical services, then the Medicaid patient should be the least profitable of the hypothetical three and the private pay patient should be the most profitable; the Medicare patient would fall between the other two.

The second set of issues to be considered is how medical practices can solve the agency problem with their constituent physicians to maximize firm profits. As summarized by [Town et al. \(2004\)](#), there is a long literature on managing the agency problem in physician practices (see for example: [Abbott 1988](#); [Gaynor and Pauly 1990](#); [Ellis and McGuire 1990](#); [Pauly et al. 1992](#); [Bradford and Martin 2000](#)). As [Milgrom and Roberts \(1988\)](#) highlight, organizations play a repeated game with their members to overcome informational asymmetries (e.g., the physician work environment is complex and physician actual effort is largely unobservable to practice managers). Further, like much of the literature we assume that physicians are risk averse, which implies that some fixed component of compensation will be preferable to reimbursement that is purely based on productivity. Thus, generally a combination of salary and productivity incentives is more efficient than purely one or the other set of incentives. ([Ellis and McGuire 1990](#)).

The degree to which two-part reimbursement is used, and the type of performance based component used, will vary by the competitiveness of the market in which the practice is operating. When markets are not very competitive, then on the margin practices that are

considering expanding their patient pool—i.e., that are considering admitting new patients—would more commonly face patient demand that exceeds the most profitable scale. That is, the practice is more likely to prefer to admit fewer patients than want service and so has an incentive to admit privately insured patients first; only when there are no remaining privately insured patients seeking entry to the practice would the firm begin to admit Medicare patients. Similarly, the firm should only wish to admit Medicaid patients once all available Medicare patients have been exhausted. Of course, in the real world patients do not arrive so neatly and practices are not able to perfectly select their patient populations. Still, we expect that there will be a general tendency to prefer privately insured, Medicare and then Medicaid patients, in that order, if there are more patients seeking admission to the practice than the practice actually wants to serve (i.e. less competitive market). If, on the other hand, markets are very competitive then there will more likely be fewer patients than the firm would prefer to admit in a profit maximizing setting (i.e. the firm is demand constrained). In that circumstance, the practice should admit any patient as long as he or she provides positive profit value to the firm and would want to incent the physicians toward volume.

Consider then how compensation mechanisms that the practice uses to pay the member physicians could be used to further these practice goals. First, assume that there are more patients seeking admission than the practice wishes to admit (i.e. less competitive market). In this case, the practice as a whole will wish the physicians to be discriminating in who they agree to service—private pay patients first, and Medicaid patients last. How might the practice achieve this? One mechanism would be to design the productivity component of compensation (if there is one) such that the individual physician's income rises as firm profits rise. The firm could hold back a portion of revenue as a compensation tool to be paid to each physician at the end of the year or quarter; alternatively, the practice may reward very highly productive physicians with greater profit sharing (which is, of course, not the same as revenue sharing). Higher excess revenue (profits) would mean higher compensation; more private-pay patients and fewer Medicaid patients mean higher excess revenue. Thus, on the margin, the physician will work to admit private pay patients and work to discourage Medicaid patients (again, assuming there are more potential patients seeking admission than the practice wishes to admit). Thus, we should see practices choosing to use revenue-tied productivity components in compensation also choosing to admit fewer Medicaid (and potentially Medicare) patients and admit more private pay patients. This implies a negative association between physician productivity—based compensation and the likelihood of admitting Medicaid patients, and a positive association between this compensation tool and the likelihood of admitting privately insured patients. As a further refinement, less competitive markets also imply less risk to revenue flows, and so one would expect a lower frequency of pure salaried compensation arrangements (or, at least salary should be a smaller component of total compensation), *ceteris paribus*.

Alternatively, consider what should happen if the practice wants to provide more visits than they can find patients for (i.e. very competitive market). In this case, the practice will want to incentivize physicians to attract *any* patient. Also, physician revenue would be more variable in a pure productivity based compensation scheme. So, not only will large salaried components of compensation be preferred by the physicians, the practice would be more likely to pay physicians based on patient satisfaction or the quality of the care provided. Greater reliance on quality or satisfaction measures for the productivity component of earnings would be incentive compatible with physicians expending effort to attract larger patient pools. All patients will be attracted to higher quality care (which is another way of saying care that gives high levels of satisfaction): such tools should not differentially attract privately insured, Medicare or Medicaid patients. Consequently, we should observe that practices in more

competitive markets will choose patient satisfaction or quality of care based compensation metrics (in addition to productivity compensation components) and also be more likely to admit patients irrespective of payment sources and thus type of insurance. In other words, we anticipate a positive association between satisfaction or quality based compensation and the likelihood of admitting private, Medicare, or Medicaid patients, when firms want to incentivize physicians to attract any patient.

Finally, we have been discussing these differing incentives in relation to the question of resolving the agency problems without reference to the ownership status of the physicians and practices. While presumably, the need for high-powered incentives would be somewhat attenuated in a practice where the physicians were also owners (a partnership), the need for incentives will not be absent. This is because even in a partnership firm profit represents a public good, and the partners will still have an incentive to shirk. Thus, we expect to see the same pattern of associations discussed above between incentive structures and willingness to accept patients with different types of payors, though the strength of association may well be weaker for partnerships compared to firms composed of physician employees.

In order to assess whether these expected relationships occur empirically, we will estimate a series of models that capture the likelihood of admission for different patient types as a function of compensation factors and other practice characteristics. Let $Y_{1ji} = 1$ if practice i is willing to admit some or most patients from payer type $j =$ Medicaid, Medicare, or privately-insured, and $= 0$ otherwise. We estimate the parameters of the model assuming a logit distribution, where

$$\Pr [Y_{1ij}] = F(\beta_{1j} + \beta_{2j}COMP_i + \beta_{3i}X_i + \beta_{4j}Z_j + \mu_t + \varepsilon_{1ij}) \quad (1)$$

In this model $F(\cdot)$ represents the logistic distribution, X_i are physician characteristics (birth year cohort, gender, medical specialty, income categories, and whether the physician is an employee), Z_j are practice characteristics (an indicator for solo or two-physician practice, an indicator for large group practice, the number of physicians in the practice, and an indicator for whether the physician believes the local medical market is very competitive), μ_t represents year indicator variables (to capture secular effects on patient admission), and ε_{1ij} is a random error. $COMP_i$ represents the indicator variables for the two compensation arrangements: patient satisfaction based compensation only; and, productivity and quality based compensation. We estimate (1) separately for each of the three types of patients (Medicaid, Medicare, and privately insured).

Potential endogeneity of bonus arrangements

The models in (1) above assume that the compensation arrangements for the sampled physician are randomly assigned, or at least that the systematic components of the compensation are unrelated to the practice's decisions with regard to payor mix for its patients. This is a potentially questionable assumption, since both compensation arrangements and the types of payors accepted are decisions that practices make deliberately. Indeed, since the generosity of insurer (Medicaid, Medicare and private) payments for each service will directly affect net revenue for the practice, then one may expect that the characteristics that make, say, Medicaid patients, more or less attractive for the practice are likely to be related to characteristics that make the practice more or less likely to use productivity-based compensation terms, for example. Ideally, we would model the compensation option take-up decisions independently from the payor mix choices, and include predicted bonus and compensation arrangement indicators in (1) using some instrumental variables method. However, given the tight links between patient profitability, firm profitability, and patient mix, finding multiple

instruments—variables that will predict physician compensation terms but not payor mix—is problematic.

One method that can control for the non-random assignment of subjects into treatment (compensation arrangements, in this case) without the need for an identifying restriction is Propensity Score matching (Rosenbaum and Rubin 1983, 1984). Propensity Score matching balances the data on all the observables, such that the treated and untreated samples are essentially identical along all important measurable dimensions. Once the sample is balanced, then the usual models (such as those specified in (1) above) may be run and the parameter on the treatment variable is interpretable as a causal effect. One complicating factor for us over the typical propensity score framework is that we do not have a single binary (yes/no) treatment; rather we have a three-part treatment: no bonus arrangements; some revenue productivity-based compensation treatment; and some revenue productivity plus quality productivity-based treatment. Consequently, we must implement propensity score *triplet* (rather than pair) matching using a procedure first proposed by Imbens and then further explored by Lu et al. (Lu and Rosenbaum 2004; Imbens 2000).

We implement propensity score triplet matching by first estimating a model for the probability that each physician in the sample is paid such that compensation depends on: nothing; on his or her own productivity; or on productivity plus the quality of his or her care. For this first step of the matching process, we use a multinomial logit to generate the predicted probability of each type of arrangement for each observation using all of the non-compensation observable variables in (1) above. We use multinomial logit to model the three outcomes because the compensation options are not inherently ordered. Having recovered the structural parameter estimates for each non-base outcome (no bonus payment is the base), we then generate estimated probabilities that each observation falls into each of the three groups. We estimate three probabilities—one for each of the compensation outcomes—because there is a non-zero chance that each type of compensation could have obtained, whatever the realized mechanism actually was for the respondent. Then we break the sample into three groups: those physicians who actually receive compensation with no performance basis; those who actually receive compensation using a revenue productivity basis; and those that actually receive compensation using a revenue productivity and quality basis.

To implement the Imbens (2000) and Lu and Rosenbaum (2004) triplet matching, we first match (with replacement) each observation in the “no bonus” group to the observation in the “revenue productivity only bonus” group that had the closest predicted probability of being in the first group (despite the fact that the matched observation was actually in the second group). This is a nearest-neighbor match. Next, we match with replacement the resulting pair with the observation from the “revenue and quality based bonus” group that had the closest predicted probability of being in the “no bonus” group as the pair matched in the first step. Matches were performed with replacement until all observations in the first group (no performance basis) were matched with observations in the second and third groups that had the closest available probability of actually having (counterfactually) been in the first group. This process resulted in a single matched sample, which can be used to estimate (1) for our three payor types across a (now) balanced sample, where the non-random selection into compensation type has been essentially randomized using all observable variables.

Results

As we have discussed throughout this paper, we are particularly interested in the relationship between compensation structures (including bonuses) and the relationship those structures

have with the likelihood that a firm accepts patients with a variety of types of health insurance. Also, as discussed above, in order to deal with endogeneity, we have additionally estimated our models using a propensity score matching sample. Empirically, propensity score matching does, indeed, support findings that differ somewhat from the standard sample (Table 1).

The first sets of results are presented in Table 2. In these results we examine the relationship between the two samples and if the firm is accepting any new patients with Medicaid, Medicare, or private insurance. The results are presented as marginal effects. The first three columns are the models estimated on the unmatched (“No Matching”) sample, and the last

Table 1 Variable means and standard deviations

	Mean	SD
Practice accepting some new Medicaid patients	0.788	0.409
Practice accepting some new Medicare patients	0.887	0.317
Practice accepting some new private patients	0.973	0.162
Practice has productivity based compensation	0.521	0.500
Practice has productivity and quality based compensation	0.246	0.431
Physician born on or before 1940	0.0410	0.198
Physician born between 1941 and 1945	0.0440	0.205
Physician born between 1946 and 1950	0.0752	0.264
Physician born between 1951 and 1955	0.118	0.323
Physician born between 1956 and 1960	0.173	0.378
Physician born between 1961 and 1965	0.207	0.405
Physician born between 1966 and 1970	0.201	0.401
Physician born between 1971 and later	0.140	0.347
Physician is female	0.228	0.419
Physician specialty is internal medicine	0.193	0.395
Physician specialty is general practice	0.225	0.418
Physician specialty is pediatrics	0.155	0.362
Physician specialty is medical specialty	0.224	0.417
Physician specialty is surgical specialty	0.158	0.364
Physician specialty is Ob/Gyn	0.0454	0.208
Solo or two-physician practice	0.234	0.423
Group practice	0.657	0.475

Table 1 continued

	Mean	SD
Staff model HMO	0.109	0.312
Physician is employee	0.361	0.480
Income under \$50,000	0.0386	0.193
Income between \$50,000 and \$99,999	0.126	0.332
Income between \$100,000 and \$149,999	0.294	0.456
Income between \$150,000 and \$199,999	0.208	0.406
Income between \$200,000 and \$249,999	0.126	0.332
Income between \$250,000 and \$299,999	0.0774	0.267
Income between \$300,000 or more	0.129	0.336
Number of physicians in practice	30.62	56.00
Medical market is very competitive	0.0911	0.288
Year is 1996	0.287	0.453
Year is 1998	0.270	0.444
Year is 2000	0.289	0.453
Year is 2004	0.154	0.361
Observations	17,891	

three columns are the results estimated on the propensity score sample (“Propensity Score Matched”). Our primary results conform well to the theoretical expectations we outlined above. In both the matched and non-matched samples, we find that the firm having only a productivity-based compensation mechanism (compared to no performance basis) reduces the likelihood of accepting some new Medicaid patients by between 3.2% ($p < 0.01$) for the non-matched sample and 3.4% ($p < 0.01$) for the matched sample. In addition, when firms add measures of quality of care for compensation purposes along with productivity measures for compensation, the probability of accepting some Medicaid patients rises by 2.6% ($p < 0.01$) for the non-matched sample and 2.5% ($p < 0.01$) for the matched sample. In addition, the probability of accepting Medicare patients also rises when both productivity and quality based measures for compensation are included by the firm. The probability that a firm accepts any new Medicare patients rises by 3.2% ($p < 0.01$) for the non-matched sample and 3.1% ($p < 0.01$) for the matched sample. The compensation structures (whether the firm has productivity measures or productivity measures and quality measure) do not have a significant influence on whether or not the firm accepts new privately insured patients.

Interestingly, the type of practice (solo or two-physicians, group, or HMO) and the equity status (employer or ownership) both play a role in the propensity for accepting new patients. Solo or two-physician practices and group practices are much less likely to accept any new Medicare or Medicaid patients and much more likely to accept private insurance than their staff model HMO counterparts. Solo or two-physician practices are 6.1% (in the non-matched sample) and 5.9% (in the matched sample) less likely to accept new Medicaid patients compared to their HMO counterparts. Additionally, solo or two-physician practices are 4.4% (in the non-matched sample) and 5.2% (in the matched sample) less likely to accept new Medicare patients compared to their HMO counterparts. It is also worth noting that solo or two-physician firms are also more likely to accept privately insured patients than their HMO counterparts. Solo or two-physician firms are 1.5% (non-matched and matched samples) more likely to accept privately insured patients than their HMO counterparts. The results are similar to the findings for group practice firms. Group practice firms are also less likely to

Table 2 Marginal effects from models for likelihood of admitting new patients

	No matching		Propensity score matched	
	Medicaid	Private insured	Medicaid	Private insured
Practice has productivity based compensation	-0.032*** (-4.16)	0.0081 (1.59)	-0.034*** (-4.06)	0.011* (1.79)
Practice has productivity and quality based compensation	0.026*** (2.78)	0.032*** (5.14)	0.025*** (2.84)	0.031*** (4.80)
Physician born on or before 1940	-0.0040 (-0.24)	0.036*** (2.88)	-0.032* (-1.83)	0.036*** (2.51)
Physician born between 1941 and 1945	-0.0085 (-0.51)	0.016 (1.38)	0.00069 (0.04)	0.026* (1.84)
Physician born between 1946 and 1950	-0.0084 (-0.60)	-0.00046 (-0.05)	-0.030* (-1.86)	0.0069 (0.57)
Physician born between 1951 and 1955	-0.0089 (-0.72)	-0.0038 (-0.46)	-0.013 (-0.88)	0.0027 (0.26)
Physician born between 1956 and 1960	-0.013 (-1.19)	0.00089 (0.12)	-0.031** (-2.33)	-0.018* (-1.96)
Physician born between 1961 and 1965	-0.012 (-1.10)	-0.00065 (-0.09)	-0.031** (-2.51)	0.0028 (0.32)
Physician born between 1966 and 1970	-0.0097 (-0.92)	0.016** (2.20)	-0.0073 (-0.58)	0.036*** (3.90)
Physician is female	-0.023*** (-3.00)	-0.0061 (-1.20)	-0.019** (-2.08)	-0.0078 (-1.24)
Physician specialty is internal medicine	-0.071*** (-4.68)	-0.011 (-0.88)	-0.0076 (-0.44)	0.0027 (0.16)
				0.00014 (0.39)
				-0.00040 (-0.12)
				-0.021*** (-2.89)
				-0.020*** (-2.76)
				-0.021*** (-3.11)
				-0.014** (-2.23)
				-0.019*** (-3.50)
				-0.015*** (-2.86)
				0.00075 (0.13)
				-0.00015 (-0.04)
				-0.025** (-2.50)

Table 2 continued

	No matching			Propensity score matched		
	Medicaid	Medicare	Private insured	Medicaid	Medicare	Private insured
Physician specialty is general practice	-0.081*** (-5.39)	-0.075*** (-6.02)	-0.058*** (-4.84)	-0.035** (-2.09)	-0.055*** (-3.57)	-0.033*** (-3.43)
Physician specialty is pediatrics	0.031* (1.94)	-0.24*** (-19.63)	-0.034*** (-2.77)	0.080*** (4.73)	-0.24*** (-16.50)	-0.012 (-1.20)
Physician specialty is medical specialty	0.12*** (8.22)	0.023* (1.76)	-0.025** (-2.07)	0.14*** (8.67)	0.028* (1.81)	-0.011 (-1.08)
Physician specialty is surgical specialty	0.13*** (7.96)	0.053*** (3.71)	-0.016 (-1.29)	0.13*** (7.15)	0.055*** (2.99)	0.0067 (0.59)
Solo or two-physician practice	-0.061*** (-4.33)	-0.044*** (-4.49)	0.018*** (3.50)	-0.059*** (-3.95)	-0.052*** (-4.56)	0.018*** (3.37)
Group practice	-0.012 (-0.97)	-0.032*** (-3.59)	0.023*** (4.99)	-0.0053 (-0.39)	-0.032*** (-3.04)	0.022*** (4.58)
Physician is employee	0.035*** (4.90)	0.024*** (4.80)	0.0074** (2.57)	0.013 (1.57)	0.019*** (3.13)	0.0048 (1.47)
Income under \$50,000	-0.0041 (-0.22)	-0.0088 (-0.65)	-0.019** (-2.29)	-0.054*** (-2.72)	-0.026 (-1.60)	-0.036*** (-3.88)
Income between \$50,000 and \$99,999	-0.00051 (-0.04)	-0.022** (-2.13)	-0.019*** (-2.85)	-0.059*** (-3.63)	-0.034** (-2.49)	-0.035*** (-4.25)
Income between \$100,000 and \$149,999	-0.0040 (-0.33)	-0.010 (-1.09)	-0.012* (-1.92)	-0.022 (-1.56)	-0.025** (-2.01)	-0.019** (-2.43)
Income between \$150,000 and \$199,999	-0.028** (-2.35)	-0.013 (-1.35)	-0.014** (-2.23)	-0.042*** (-2.94)	-0.030** (-2.43)	-0.016** (-2.05)

Table 2 continued

	No matching			Propensity score matched		
	Medicaid	Medicare	Private insured	Medicaid	Medicare	Private insured
Income between \$200,000 and \$249,999	-0.014 (-1.09)	-0.00013 (-0.01)	-0.0086 (-1.31)	-0.0013 (-0.09)	-0.010 (-0.78)	-0.018** (-2.22)
Income between \$250,000 and \$299,999	0.0033 (0.23)	-0.0014 (-0.12)	-0.010 (-1.37)	-0.016 (-0.94)	0.00012 (0.01)	-0.016* (-1.76)
Number of physicians in practice	0.00033*** (4.63)	0.00018*** (3.55)	-0.0000039 (-0.15)	0.00012 (1.49)	0.00022*** (3.37)	-0.000017 (-0.60)
Medical market is very competitive	-0.012 (-1.13)	0.020** (2.43)	0.012** (2.49)	-0.0017 (-0.13)	0.051*** (4.53)	0.0086 (1.42)
Year is 1996	0.045*** (4.63)	-0.026*** (-3.61)	0.0024 (0.59)	0.066*** (5.92)	-0.023** (-2.52)	-0.0060 (-1.20)
Year is 1998	0.034*** (3.48)	-0.021*** (-2.96)	0.0040 (0.96)	0.054*** (4.71)	-0.028*** (-3.12)	-0.0034 (-0.66)
Year is 2000	0.015 (1.63)	-0.032*** (-4.67)	-0.0084** (-2.18)	0.017 (1.61)	-0.032*** (-3.68)	-0.013*** (-2.61)
Number of observations	17635	17635	17635	12419	12419	12419

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

accept Medicare patients (3.2% for both the non-matched and matched samples) and more likely to accept privately insured patients (2.3% for the non-matched sample and 2.2% for the matched sample) than their HMO counterparts. This suggests that smaller firms (solo-two physicians and groups) may be more sensitive to the relationship between physician compensation structures and the acceptance of new patients from different type of insurance.

Furthermore, practices where the responding physician is an employee are much more likely to respond that the firm accepts any new patients from all types of insurance, but generally only in the non-matched sample. The finding for the differences between when a physician is an employee compared to when they are an equity owner only hold for the matched sample with respect to whether or not they accept any Medicare patients. If the physician is an employee, they respond that the firm is 2.4% (in the non-matched sample) and 1.9% (in the matched sample) more likely to accept Medicare patients than do equity owners. This may highlight that employees have a different understanding of the firm's policies than do the equity owners. To examine this further, we split the sample by physicians who have identified themselves as employees versus those who have identified themselves as equity owner.

The final sets of results are presented in Tables 3 and 4. These results outline the impact of the two compensation mechanisms (and other factors) on the likelihood of admitting some of each type of patient but now estimated separately for practices where the respondent is an employee compared to practices where the responding physician is an equity owner. Focusing our attention on the propensity-score matched sample (Table 4), we find, again, that when a firm considers productivity measures (but not quality measures) as part of physicians' compensation, this decreases the likelihood the practice admits Medicaid patients. However, the strength of the effect is different for practices with equity owner respondents compared to those with employee respondents. If the respondent is an equity owner then the firm is 2.5% (for equity owners) and 4.8% (for employees) less likely to accept new Medicaid patients. In addition, when quality based measures are considered along with productivity measures for compensation, the likelihood that the firm accepts Medicaid or Medicare patients increases by 4.1% (for Medicaid patients) and 3.6% (for Medicare patients), but only for firms with equity owner respondents. Across almost every specification, Medicaid patients are less likely to be accepted when productivity measures are considered for physicians' compensation, but when quality measures are considered along with productivity measures, then both Medicaid and Medicare patients are more likely to be accepted by a practice.

Discussion

Our goal for this paper has been to develop an understanding of the role that physician compensation structures play in a firm's decision to accept patients with different types of insurance. As we highlighted in the literature review, while there have been a multitude of studies on the relationship between physician incentives and physician behaviors, and there have been many studies that examine the role of reimbursement rates and access to care for patients (Brunt and Jensen 2013; Howard 2014) we are not aware of any studies that directly examine this relationship. In particular, evidence for the relationship between physician incentives and health outcomes has been mixed (Landon et al. 2014), but evidence for the direct relationship between incentives and behaviors has been more clear: incentives provided by a firm to physicians appear to often change physicians behaviors (Hennig-Schmidt et al. 2011; Devlin and Sarma 2008; Conrad et al. 2002). Our study provides additional evidence of this relationship and how the behaviors flowing from these incentives may work to exacerbate

Table 3 Marginal effects from models for likelihood of admitting new patients, no propensity score matching

	Equity owner		Employees	
	Medicaid	Medicare	Medicaid	Medicare
Practice has productivity based compensation	-0.034*** (-3.54)	0.0091 (1.48)	-0.023* (-1.80)	0.010 (1.13)
Practice has productivity and quality based compensation	0.022* (1.81)	0.044*** (5.27)	0.031** (2.27)	0.017* (1.82)
Physician born on or before 1940	0.024 (1.03)	0.050*** (3.08)	-0.040 (-1.63)	0.018 (0.92)
Physician born between 1941 and 1945	0.0018 (0.08)	0.028* (1.92)	-0.030 (-1.05)	-0.0061 (-0.29)
Physician born between 1946 and 1950	-0.00070 (-0.04)	0.0032 (0.27)	-0.023 (-0.99)	-0.0023 (-0.13)
Physician born between 1951 and 1955	-0.016 (-0.95)	-0.0021 (-0.19)	0.011 (0.55)	-0.0070 (-0.50)
Physician born between 1956 and 1960	-0.021 (-1.40)	0.0081 (0.81)	0.014 (0.80)	-0.012 (-1.05)
Physician born between 1961 and 1965	-0.010 (-0.67)	-0.0049 (-0.51)	-0.0098 (-0.63)	0.014 (1.25)
Physician born between 1966 and 1970	-0.00037 (-0.02)	0.016 (1.63)	-0.019 (-1.28)	0.018* (1.69)
Physician is female	-0.018* (-1.70)	-0.0081 (-1.23)	-0.036*** (-3.14)	-0.0099 (-1.23)
Physician specialty is internal medicine	-0.092*** (-5.16)	-0.019 (-1.30)	-0.047 (-1.60)	0.0092 (0.35)
				Private insured
				0.0030 (0.53)
				0.0061 (1.12)
				-0.029*** (-2.76)
				-0.019 (-1.49)
				-0.039*** (-4.29)
				-0.021** (-2.37)
				-0.018** (-2.40)
				-0.018** (-2.48)
				-0.0093 (-1.32)
				-0.0079* (-1.65)
				-0.050*** (-2.12)

Table 3 continued

	Equity owner		Employees	
	Medicaid	Medicare	Medicaid	Medicare
Physician specialty is general practice	-0.085*** (-4.81)	-0.083*** (-5.89)	-0.084*** (-2.88)	-0.053** (-2.06)
Physician specialty is pediatrics	0.032* (1.73)	-0.25*** (-18.46)	0.020 (0.65)	-0.21*** (-8.15)
Physician specialty is medical specialty	0.15*** (8.39)	0.034** (2.30)	0.072** (2.39)	0.0041 (0.16)
Physician specialty is surgical specialty	0.15*** (8.03)	0.063*** (3.89)	0.059* (1.78)	0.017 (0.59)
Solo or two-physician practice	-0.038 (-1.43)	-0.047** (-2.41)	-0.053*** (-3.02)	-0.041*** (-3.32)
Group practice	0.016 (0.63)	-0.031* (-1.69)	-0.016 (-1.09)	-0.032*** (-3.06)
Income under \$50,000	0.019 (0.73)	-0.0013 (-0.07)	0.0054 (0.15)	0.010 (0.36)
Income between \$50,000 and \$99,999	0.012 (0.68)	-0.020* (-1.68)	0.016 (0.48)	0.0011 (0.04)
Income between \$100,000 and \$149,999	-0.0014 (-0.10)	-0.00086 (-0.08)	0.020 (0.63)	0.010 (0.40)
Income between \$150,000 and \$199,999	-0.019 (-1.40)	-0.0085 (-0.83)	-0.0091 (-0.28)	0.024 (0.92)
Income between \$200,000 and \$249,999	-0.0040 (-0.28)	0.0073 (0.66)	-0.0043 (-0.12)	0.017 (0.57)
				Private insured (-0.056** (-2.34) -0.033 (-1.39) -0.032 (-1.34) -0.021 (-0.82) 0.018** (2.57) 0.024*** (4.02) -0.0086 (-0.48) -0.0045 (-0.27) -0.0025 (-0.16) 0.0038 (0.23) -0.00034 (-0.02)

Table 3 continued

	Equity owner			Employees		
	Medicaid	Medicare	Private insured	Medicaid	Medicare	Private insured
Income between \$250,000 and \$299,999	0.0077 (0.49)	0.0062 (0.49)	-0.0067 (-0.86)	0.011 (0.27)	0.0024 (0.07)	-0.013 (-0.69)
Number of physicians in practice	0.00035*** (2.92)	0.00022*** (2.60)	-0.000040 (-0.95)	0.00034*** (3.77)	0.00017** (2.57)	0.000026 (0.77)
Medical market is very competitive	-0.011 (-0.76)	0.018* (1.76)	0.018*** (2.78)	-0.017 (-0.97)	0.022 (1.59)	0.0046 (0.58)
Year is 1996	0.048*** (3.95)	-0.022** (-2.51)	0.0065 (1.32)	0.036** (2.19)	-0.034*** (-2.75)	-0.0060 (-0.82)
Year is 1998	0.038*** (3.07)	-0.017* (-1.94)	0.0070 (1.38)	0.024 (1.48)	-0.030** (-2.43)	-0.0020 (-0.27)
Year is 2000	0.018 (1.50)	-0.027*** (-3.20)	-0.0070 (-1.51)	0.0087 (0.57)	-0.041*** (-3.48)	-0.012* (-1.77)
Number of observations	11377	11377	11377	6258	6258	6258

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

Table 4 Marginal effects from models for likelihood of admitting new patients, with propensity score matching

	Equity owner			Employee		
	Medicaid	Medicare	Private insured	Medicaid	Medicare	Private insured
Practice has productivity based compensation	-0.025** (-2.53)	0.018** (2.50)	0.000039 (0.01)	-0.048*** (-3.22)	-0.0040 (-0.34)	0.0050 (0.70)
Practice has productivity and quality based compensation	0.041*** (3.57)	0.036*** (4.40)	-0.000045 (-0.01)	0.0027 (0.20)	0.020* (1.85)	0.0032 (0.55)
Physician born on or before 1940	-0.020 (-0.81)	0.056*** (2.85)	-0.010 (-1.17)	-0.046* (-1.77)	0.0097 (0.44)	-0.032** (-2.53)
Physician born between 1941 and 1945	-0.0077 (-0.32)	0.011 (0.69)	-0.011 (-1.42)	0.0095 (0.27)	0.066** (2.15)	-0.015 (-0.86)
Physician born between 1946 and 1950	-0.0026 (-0.12)	0.0034 (0.22)	-0.000094 (-0.11)	-0.10*** (-3.89)	0.010 (0.47)	-0.049*** (-4.30)
Physician born between 1951 and 1955	-0.043** (-2.17)	-0.0049 (-0.36)	0.0052 (0.67)	0.055** (2.24)	0.012 (0.68)	-0.039*** (-3.75)
Physician born between 1956 and 1960	-0.040** (-2.17)	-0.017 (-1.35)	-0.0091 (-1.34)	-0.014 (-0.67)	-0.031** (-2.06)	-0.027*** (-2.72)
Physician born between 1961 and 1965	-0.031* (-1.69)	-0.012 (-1.00)	-0.0030 (-0.45)	-0.040** (-2.20)	0.025* (1.79)	-0.028*** (-2.98)
Physician born between 1966 and 1970	-0.0068 (-0.37)	0.033** (2.57)	0.019** (2.37)	-0.0099 (-0.56)	0.036*** (2.67)	-0.019** (-2.07)
Physician is female	-0.031*** (-2.58)	0.0017 (0.21)	0.0040 (0.84)	-0.013 (-0.97)	-0.029*** (-2.82)	-0.0052 (-0.87)
Physician specialty is internal medicine	-0.041* (-1.94)	-0.0084 (-0.43)	-0.020* (-1.90)	0.030 (0.96)	0.033 (1.09)	-0.047* (-1.82)

Table 4 continued

	Equity owner		Employee		
	Medicaid	Medicare	Medicaid	Medicare	
				Private insured	
Physician specialty is general practice	-0.045** (-2.23)	-0.068*** (-3.76)	-0.027*** (-2.68)	-0.024 (-0.83)	-0.055** (-2.18)
Physician specialty is pediatrics	0.061*** (3.01)	-0.26*** (-15.45)	0.00080 (0.08)	-0.19*** (-6.96)	-0.041 (-1.62)
Physician specialty is medical specialty	0.15*** (7.64)	0.027 (1.51)	-0.0042 (-0.42)	0.027 (0.91)	-0.032 (-1.26)
Physician specialty is surgical specialty	0.13*** (5.93)	0.055*** (2.62)	0.018 (1.46)	0.029 (0.78)	-0.029 (-1.07)
Solo or two-physician practice	-0.036 (-1.31)	-0.059*** (-2.65)	0.015* (1.67)	-0.036** (-2.38)	0.023*** (2.80)
Group practice	0.016 (0.64)	-0.030 (-1.41)	0.019** (2.29)	-0.031** (-2.40)	0.024*** (3.40)
Income under \$50,000	-0.016 (-0.57)	-0.025 (-1.23)	-0.026** (-2.44)	-0.078 (-1.41)	-0.045 (-1.63)
Income between \$50,000 and \$99,999	-0.037* (-1.86)	-0.018 (-1.21)	-0.031*** (-3.67)	-0.10* (-1.91)	-0.035 (-1.31)
Income between \$100,000 and \$149,999	-0.020 (-1.25)	-0.0027 (-0.21)	-0.016** (-2.17)	-0.093* (-1.73)	-0.018 (-0.68)
Income between \$150,000 and \$199,999	-0.050*** (-3.23)	-0.015 (-1.19)	-0.016** (-2.09)	-0.077 (-1.42)	-0.0096 (-0.35)
Income between \$200,000 and \$249,999	-0.0042 (-0.26)	0.0032 (0.23)	-0.015* (-1.85)	0.082*** (1.96)	-0.025 (-0.89)
Income between \$250,000 and \$299,999	-0.023 (-1.27)	0.018 (1.16)	-0.0080 (-0.90)	0.083 (1.62)	-0.044 (-1.49)

Table 4 continued

	Equity owner			Employee		
	Medicaid	Medicare	Private insured	Medicaid	Medicare	Private insured
Number of physicians in practice	0.00019 (1.37)	0.00029** (2.49)	-0.000039 (-0.82)	0.000075 (0.71)	0.00018** (2.15)	-0.0000010 (-0.03)
Medical market is very competitive	0.00087 (0.53)	0.049*** (3.72)	0.016** (2.00)	-0.020 (-0.92)	0.057*** (2.74)	-0.00023 (-0.22)
Year is 1996	0.060*** (4.30)	-0.011 (-1.04)	-0.0059 (-1.03)	0.073*** (3.89)	-0.041** (-2.56)	-0.00079 (-0.83)
Year is 1998	0.049*** (3.45)	-0.022** (-2.03)	0.0054 (0.86)	0.059*** (3.14)	-0.047*** (-2.95)	-0.018* (-1.93)
Year is 2000	0.00097 (0.72)	-0.027*** (-2.60)	-0.012** (-2.04)	0.026 (1.49)	-0.040** (-2.56)	-0.016* (-1.75)
Number of Observations	7882	7882	7882	4537	4537	4537

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

or mitigate the relationship between differing reimbursement rates by insurance type and access to care.

As has been noted, Medicaid, Medicare, and private insurance payors reimburse firms at different average rates, thus leading to differences in the attractiveness of patients to practices. In a market in which a practice perceives there to be an excess in the supply of patients, the firms may offer incentive structures for the physicians to be selective about the types of patients they accept. Thus when a practice is making the decision of whether or not to accept new patients, it may choose compensation structures for the member physicians to encourage them to only accept certain types of clients. Thus we hypothesized that in a less competitive environment (where the firm faces an excess supply of patients) firms may set up physician compensation structures that focus on physician own productivity measures; those would be expected to more strongly enhance the firm's profitability in order to encourage physicians to accept the most profitable patients (e.g., those with private insurance) and discourage them from accepting less profitable patients (e.g., those with Medicaid insurance). Our analysis supports these hypotheses. We find a negative relationship between productivity-based compensation and firm willingness to accept new patients with Medicaid. However, when a physician's compensation is based on both productivity and quality/satisfaction there is a higher probability of admitting both Medicaid and Medicare patients.

Furthermore, we find that physicians' equity status in the firm is also related to the influence of the compensation structures on the acceptance of patients with different types of insurance. If the responding physician is an equity partner in the firm, then they are more likely to be influenced by the compensation structures that have been put into place within the firm. This suggests that these physicians are more attuned to the incentives embedded in the compensation structures. We also find some initial evidence that different types of firms (solo to two-physician, group practices, and HMOs) may be more effective in using physician compensation tools to encourage physicians to accept more profitable patients.

This analysis provides initial evidence that firm compensation structures can be utilized to either encourage or discourage physicians from accepting patients with differing levels of vulnerability, conditional on the competitive nature in which the firm operates. In particular, if policy makers are concerned with underserving Medicaid patients, they may consider encouraging firms to take consider quality measures along with productivity measures for physicians' compensation. At a minimum, however, policy makers should be aware of these incentives and the influence they may have on the policies that are developed with respect to attempts at increasing access to care for disadvantaged patients.

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