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Incentives for Better Public Outcomes? Evidence from Public Hospitals

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ABSTRACT

There is disagreement between the theoretical and empirical literature as to whether economic incentives can lead to better public outcomes. Work in this arena has largely consisted of formal modeling or studies within sectors that have a specific performance requirement over which citizens or bureaucrats have strong levels of influence such as welfare-to-work programs or education. Even in these studies the results have been decidedly mixed. This manuscript examines the role of incentives in public hospitals, a context where administrators are hard-pressed to ignore other standards in favor of the known payoff requirement. Using data from the Center for Medicare and Medicaid Services on hospital performance this study evaluates how the imposition of penalties on Medicare reimbursements affected the readmission ratios in public sector hospitals. Findings suggest that incentives have no effect. Additionally, the author suggests that the structure of public organizations makes it difficult to effectively implement incentives.

KEYWORDS

New public management;
health care; incentives

Introduction

This manuscript explores the role of incentives in providing positive public outcomes. Specifically, it examines the role of incentives in the outcomes produced by public hospitals. Public hospitals are a unique case in the arena of incentive and public outcomes since unlike areas such as education or welfare reform it is difficult for the recipients to game the incentive system in an effort to find a cutoff (such as the point at which it becomes more beneficial to remain on public assistance) or to specifically attempt to reach the measure without regard for broader outcomes, such as teaching to the test. Using data collected from the Center for Medicare and Medicaid Services (CMS) on hospital performance this study evaluates how the imposition of penalties on Medicare reimbursements affected the readmission ratios in public sector hospitals.

Economic incentives are a means of inducing efficiencies that have a long history in the public policy literature but less so in the public administration literature. Incentives are widely used as policy instruments. They assume that individuals will be positively motivated to maximize their utility via some policy-relevant action unless the pay-offs for the alternative course are greater, or unless they do not recognize the payoff structure. Inducements (positive incentives) reward individuals for compliant behavior while penalties punish noncompliance. Education, for example, uses

bonuses for performance, economic development uses tax credits or relaxation of a standard, and so on. Recent work by Considine, Nguyen, and O'Sullivan (2018) explored the role of economic incentives as a means of inducing positive outcomes in welfare-to-work programs. Their findings indicate that incentives can produce rent-seeking and shirking due to individuals engaging in rational self-interest which produces results contrary to the welfare-to-work program.

Despite the importance of effectiveness for positive citizen outcomes, the literature on incentives in public administration has largely been tied to examining rational expectations of organizations, e.g. the assumption of the No Child Left Behind Act (2001) that schools would respond to tying funding to state test performance and test scores would increase. Other areas explored include incentives for politicians (Besley, 2004; Rundlett & Svolik, 2016), or responses to incentives by functionaries such as teachers or social service workers (Duflo, Hanna, & Ryan, 2012; Perry, 1996; Whitford 2018). This body of literature has largely examined negative incentives such as taking away a bonus (claw-backs) (Jacobsen, 2006; Raymond & Hanushek, 2003) or inducing efficiencies via contracting out – which brings with it the implication of funding loss to private providers (Edleson & Reinhardt 1995; Rhodes 1994). The literature examining responses of administrators and organizations to perceived

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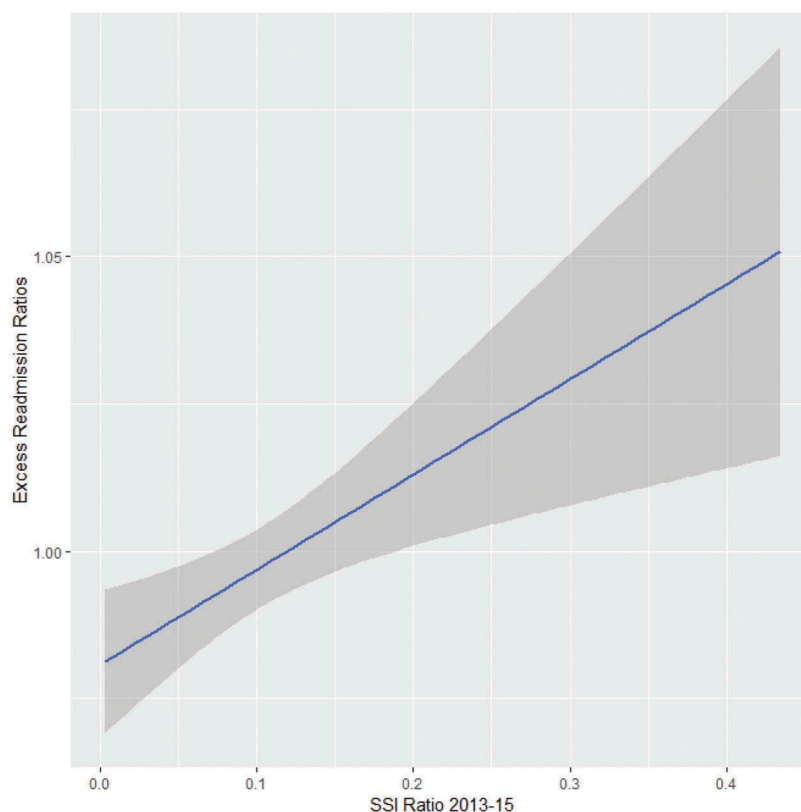


Figure 1. ERR | SSI ratio.

threats tends to find managers employing defensive strategies within their organizations (e.g. Edwards, Poister, & Pasha, 2016; Meier & O'Toole, 2011; Rauh, 2015). The evidence linking service quality to economic incentives in public organizations is largely confined to the education or welfare-to-work realms with findings indicating that positive incentives such as teacher bonuses tend to have a stronger effect when they are provided in a negative context, i.e. give the bonus as a windfall upfront with the warning that if a standard is not met then the bonus will be clawed back (e.g. Springer, Matthew et al., 2010; Van der Stede, 2009). These studies have found though that threats such as claw-backs come with unintended consequences like 'teaching to the test' (Van der Stede, 2009).

The economics literature examining incentives in healthcare show that a hospital's financial characteristics largely affect the response to incentives, e.g. Turner, Kevin, and Counte (2015) and Vogel, Langland-Orban, and Gapenski (1993). Specifically, studies exploring the value-based programs within the ACA have shown that hospitals target care based on financial considerations (see Batty & Ippolito, 2017). These studies were confined largely to studying fair pricing laws though in which binding price ceilings were set on services that were tied to trade-offs for uninsured individuals.

Additionally, much of the literature is tied to how hospitals responded to the 1983 Prospective Payment System (PPS) which moved reimbursements away from fee for service and towards a flat rate based upon the diagnosis, weighted by local cost of living considerations. The studies that exist exploring financial incentives in public service delivery more generally find mixed results with incentives showing either marginal benefit or crowding-out of positive social outcomes (Belle, 2015; Milstein & Schreyoegg, 2016; Voorberg, Bekkers, & Tummers, 2015). To illustrate this, consider figures 1 and 2. As the SSI ratio increases we see a corresponding increase in readmission (Figure 1) however as Medicare spending per beneficiary increases we see a corresponding decrease (Figure 2).

This manuscript examines the correlates of incentives put in place under the Affordable Care Act (ACA) for services delivered in US public hospitals. Specifically, it examines whether hospitals responded to the system of penalties under the ACA designed to reduce readmissions. This provides an opportunity to explore how public organizations respond to incentives that can provide either a benefit or a penalty in a context where the administrator of functionary cannot ignore other standards in favor of the known payoff requirement such as teachers teaching to the test or welfare recipients recognizing the loss-of-benefit

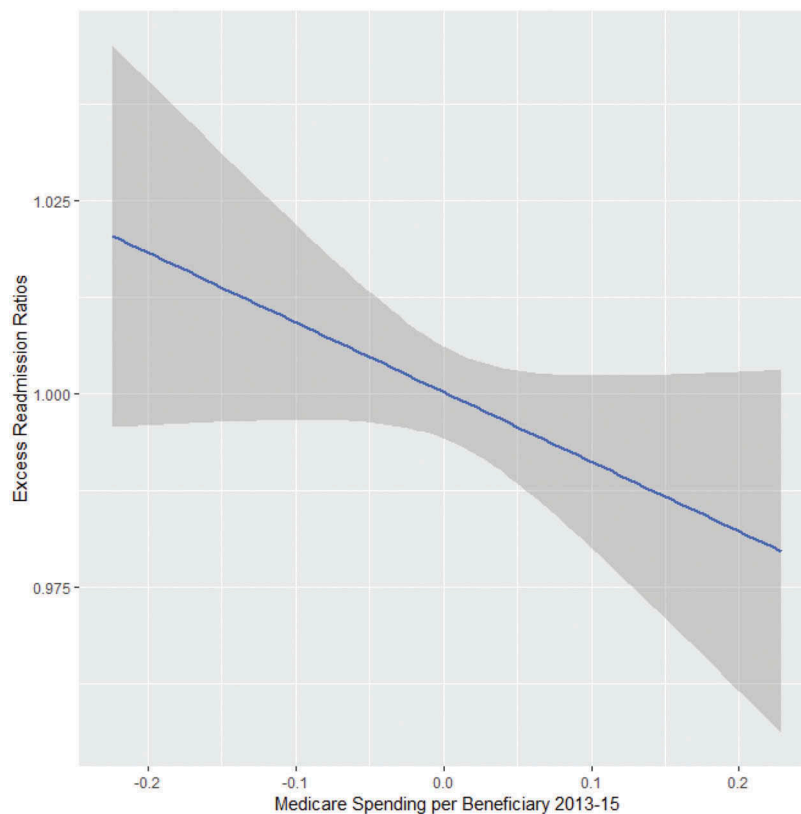


Figure 2. ERR | Medicare spending per beneficiary, 2013–15.

threshold for their income levels (Bereson, Paulus, & Kalman 2012; Considine et al., 2018; Peter et al., 2015).

This study combines unique data sources linking CMS Medicare incentives to readmission rates Medicare patients along with known service quality and economic indicators of readmissions. Hospital responses to ACA regulations provide an interesting comparison for this study since the law instructed the Centers for Medicare and Medicaid Services to provide Medicare reimbursement bonuses to hospitals that reduced readmissions for six specific conditions: acute myocardial infarction (AMI), heart failure (HF), pneumonia, chronic obstructive pulmonary disease (COPD), coronary artery bypass graft (CABG) surgeries, and elective primary total hip and/or total knee arthroplasty (THA/TKA). The excess readmission ratio (ERR) is an indicator of a hospital's performance and is used to scale a hospital's base Medicare reimbursements. This serves as the basis for reducing Medicare reimbursement to hospitals that did not meet readmission reduction targets (Davis, Abrams, & Stremikis, 2011). There are known best practices for reducing readmissions. Most of these deals with the quality of care and quality of the information provided to patients (Gillespie, Gleason, Karuza, & Shah, 2010; Kripalani et al., 2010). Given this, there are two possible avenues of

explorations: do incentives change outcomes directly, or do they moderate behavior change to affect outcomes?

The research design of this study exploits the fact that hospitals conduct similar activities but that the quality indicators and outcomes vary across hospitals. The degree to which hospitals engage in best practices may change based upon the financial incentives available to them. For example, hospitals run by local governments outside of urban areas may not be equipped to provide wide-ranging therapies in the same way that a large urban teaching hospital can. This analysis, therefore, accounts for how the delivery of the same types of outcomes varies by hospital type – acute care or critical care. Using this empirical framework this analysis examines the covariates of a hospital's readmission rates to both financial incentives and practices to determine the direct or indirect effects.

This study contributes to the literature on how responses to financial incentives correlate with public service delivery in a category where there is little movement across types of organizations and where nationally normed standards are available. The findings suggest that financial incentives have little effect on outcomes and also do not moderate the use of known best practices in pursuing outcomes. Rather, a hospital's

disproportionate share of uninsured individuals increases readmissions whereas the quality of preventative care reduces it. Although this is not by any means conclusive, it suggests that hospitals may treat promises of punishment or reward as low priority and instead seek to control their Medicare billing rates in an effort to avoid penalties for readmissions. This is in line with previous research that finds hospitals seeking rents on privately provided insurance (see, for example, Rothstein, 2001; Sloan, 2000). While this study examines incentives in hospitals, which may be marginal per patient, it does not preclude that if larger or smaller incentives were used that there may be moderating effects. This research serves as one of the first analyses to examine the presence of differential effects of positive and negative incentives on organizational behavior. Given this, the results should caution administrators and those designing performance measurement systems to carefully consider the degree to which quality of performance is related to punishment or reward.

This manuscript is organized as follows: the first section reviews relevant aspects of the US medical system before and after the ACA. The second section details the data sources and empirical analysis. The third section addresses why organizations may choose different practices and the final section highlights the implications of this analysis in future research that may seek to assess the impacts of managerial practices on outcomes.

Background

One of the goals of the ACA was to reduce readmissions for Medicare patients. Particularly for Medicare patients, hospitalizations can be stressful and subsequent readmissions can make it even more-so (Jencks, Williams, & Coleman, 2009). A number of hospital characteristics go into the likelihood of readmissions including the structural elements of the hospital such as whether it is a surgical, heart or stroke center, as well as the type of population the hospital serves – hospitals serving more low-income individuals tend to have more readmissions (Berenson, Doty, Abrams, & Shih, 2012). To address this, CMS set specific readmission targets for hospitals and imposed penalties on providers who had failed to meet readmission requirements. The incentive, known as the payment adjustment factor is tracked to a given hospital that is assigned an expected readmission percentage for specific common ailments and procedures such as COPD, hip and knee replacements, and coronary artery bypass grafts (Center for Medicare and Medicaid Services, 2018).

Public hospitals

Public hospitals are government-owned either by a Hospital Authority, a state government or a local government. Federally owned hospitals tend to provide veterans benefits. Public hospitals tend to provide increased care, relative to private hospitals, for individuals who have limited access to healthcare in other facilities. Therefore, the changes in the ACA providing expanded insurance coverage and reducing the burden on private hospitals have direct effects on the service provision at public hospitals (Johansen, Kim, & Zhu, 2013).

According to the 2014 American Hospital Association Annual Survey, there are 2,940 public hospitals out of a total of 5,686 hospitals in the United States. Within this, there were 795,603 staffed beds in public hospitals compared to 118,910 staffed beds in private hospitals. The admission rates to public hospitals were also significantly higher, 33.6 million compared to 1.8 million for private hospitals. The outnumbering effect for public hospitals implies that public hospitals are more readily accessible. Public hospitals tend to be larger than private ones, but care tends to be more personalized in the private setting (Chassin & Galvin, 1998). Because public hospitals are generally larger and tend to have lower rejection rates than private hospitals, it also means that the quality of service and equipment tends to be rated as lower than private hospitals (Chassin & Galvin, 1998).

Incentives and outcomes

Incentives, by definition, rely on tangible payoffs as a means of inducing an actor to act in this manner or that. In the case of hospitals, the concern is over standards of performance which implies that either bonuses or relief from standards would be preferred to encourage positive behavior and sanctions (penalties) would be preferred to discourage noncompliant behavior; the overall assumption being that the collective benefit to all patients would be at equilibrium. Unlike other policy tools such as the provision of authority, incentives assume that the individuals or organization in question have the ability and authority to make decisions that would allow them to enjoy the incentive or receive the penalty. This is certainly the case with hospitals since doctors can choose to behave in ways that maximize the benefits to the patient and, if a patient's benefit is the intent of the policy, to achieve the incentive.

Previous studies examining hospital's financial incentive show that a number of characteristics affect the financial outcomes of hospitals including ownership and occupancy rates (Turner et al., 2015; Gapenski, Vogel &

Langland-Orban 1993). Additionally, previous studies of the ACA's value-based program, of which excessive readmission rates are part, have shown that hospitals target care based on financial considerations and that altering the financial incentives for the hospital can result in better patient care (see Batty & Ippolito, 2017). These studies primarily examined the use of fair pricing laws for medical care. These laws set binding price ceilings on services and are largely tied to trade-offs for "charity care" to uninsured individuals. Much of the existing literature related to hospital responses to Medicare reimbursements are based around the 1983 introduction of the Prospective Payment System (PPS). This change moved reimbursements away from fee for service and towards a flat rate based upon the diagnosis, weighted by local cost of living considerations. This research suggests that reductions in the length of stay and readmissions provide a financial boon for hospitals (Coulam & Gaumer, 1991), while not resulting in significant reductions in patient care (Chandra et al. 2011). Indeed, it is established that readmissions significantly increase patient stress (Jencks et al., 2009). Other analysis examining Medicare fee-for-service shows mixed results. For example, Clemens and Gottlieb (2014) show that location-specific price shocks resulted in hospitals and physicians leaning more heavily on more costly technology while health outcomes were still largely unchanged. This implies that one must account for the ratio of fee-for-service reimbursements relative to flat rate Medicare to assess a hospital's value proposition.

Work on incentives in the public administration literature has examined a number of outcome types. In their work on performance accountability, Courty and Marschke (2003) and Heinrich (2003) observe that marginal incentives related to managers use performance information varied significantly. Nuances within these findings were provided by Ammons and Roenigk (2015) who showed that the effectiveness of incentives varied by doctrinal and reputational concerns of organizational leaders. The role of incentive has also been shown to have mixed results in the international context or in the context where a service provider can directly influence outcomes via their adherence to best practices. For example, Rangel, Vassallo, and Herraiz (2013) showed that incentives to road contractors in Spain were associated with better adherence to better safety practices. All of this is to say that the question of incentives in the public sector is still muddled.

As to the question of why such a muddled picture exists, it is useful to examine the theoretical expectations around incentives and the corresponding empirical literature. Arguments from Ting (2003), Heinrich and Marschke (2010) and Whitford (2018) relying upon principal-agent theory suggests that managers' ability to

coerce behavior should produce compliance, and hence better outcomes. The argument is straightforward in that managers can observe the actions of employees that do or do not result in payoffs for the organization. In response, they increase their levels of monitoring to increase the likelihood of reward.

In her 2015 article, Belle shows that financial incentives can crowd out public employee motivations towards better social outcomes. Additionally, in a study of healthcare provision in OECD countries, Milstein and Schreyoegg (2016) showed that financial incentives to employees were often short-lived and produced only marginal results. One issue may lie in the complexity of the organization. Voorberg et al. (2016) showed that financial incentive had no effect on the likelihood of individuals to cooperate in co-producing better public outcomes. This may be indicative of the distinct nature of the public sector, specifically that there are few a priori rules for how the excesses of production will be distributed and all parties have a known payoff, which is, of course, the very thing that incentives seek to manipulate. One must allow that because public organizations have no means of distributing the excesses of production to employees (they do not get to enjoy the spoils of greater efficiency) and because they work in complex organizations with little recourse to coerce their colleagues into behavior that would garner an incentive (shirking), the ability of financial incentives to motivate better outcomes may be limited.

Empirical studies from Rasul and Rogers (2018) find that increased autonomy leads to better public outcomes while increased monitoring and incentives leads to worse. Their study was at a national scale though and examined the completion of public works projects in exchange for loan forgiveness. At the organizational level, specifically in studying hospitals and primarily in an international context, studies have consistently shown that hospitals respond more to competition from other hospitals (Goddard, 2015; Gravelle, Santos, & Siciliani, 2014; Longo, Siciliani, Gravelle, & Santos, 2017; Papanicolas & Alistair, 2017).

There is another possibility outside of incentive planning or managerial actions that have been noted in the literature on health-care regulation which is rent seeking on health care. Deacon and Rode (2015), within in the vein of Caselli and Michaels (2009), have argued that increased spending on issues such as health care produces no quantifiable differences in outcomes. Additionally, Deacon and Rode (2015) argued that when individuals are insulated from bearing the costs of treatment then there is little incentive to provide positive outcomes since providers can seek rents from the seemingly unlimited supply of funds – hence the bonus/penalty scheme put in place in an effort to rein

in Medicare spending. Given that incentives under the Medicare program are not offered as one-offs, but are instead based on annual performance, they may induce team production problems. These problems arise when there are no *a priori* rules for how excesses of production will be distributed and when the players involved have a known value for their provision of services (Blair Margaret & Stout, 2003; Rauh, 2018). Given that medical professionals do not provide their own inputs the idea of seeking excesses of production may be moot (Castianas & Helfat, 1991). However, since physicians are reimbursed on insurance billing, individual providers may have an incentive to readmit those billed through Medicare at a higher rate than they would those who have Medicare fee-for-service plans.

We are left with an open question both in terms of US hospitals specifically, and US public organizations generally, as to whether financial incentives produce better patient outcomes? While this study does not claim to answer this question to any degree of certainty, it does aim to provide an additional point of consideration to address the issue. Expectations of this relationship given the previous literature are uncertain. Taking the view of Belle (2015), Milstein and Schreyoegg (2016), and Voorberg et al. (2016) one would expect that incentives would either have no relationship with outcomes or would have relationships that are marginal at best. If, on the other hand, one takes the view of Heinrich and Marschke (2010) and Whitford (2018) then one may expect that incentives would moderate the pursuit of best practices in order to avoid excess readmissions and in turn see penalized Medicare reimbursements. Of course, both arguments assume that hospitals have the capacity to meet the demand specified by the incentive. It is known though that hospitals with limited resources, particularly public hospitals and hospitals with a high number of low-income patients, have higher readmission rates overall due in large part to lower nurse staffing levels and fewer specialized facilities (Joynt-Maddox and Jha 2012). It is therefore questionable as to whether penalty and reward structures would provide a prosocial benefit for which the policy mechanism argues.

A broader point is that it is questionable as to whether incentives could have a strong effect in the public sector given issues of team production. In their work on team production problems in the corporate setting Blair Margaret and Stout (2003) and Pollman (2015) showed that significant mediation requirements were necessary between the board and management to avoid rent seeking or shirking. Specifically, when there are not means of ensuring how excesses of production will be distributed and when individuals do not have

means of coercing colleagues to pursue a benefit, then the incentive to seek rents or shirk takes over. This is seen in the case of hospitals if one examines states' abuse of disproportionate share payments to reduce their Medicaid fiscal responsibilities at the cost of the federal government (Coughlin & Liska 1997) – an extension of Oates (1972) race to the bottom. Since there is not separation from elected officials and bureaucrats in the same manner as separation of boards and management, it is questionable as to why incentives should work unless managers maintained vigilant oversight of employees. Given the literature on managers responses to incentive structures in the public sector (e.g. Ammons & Roenigk, 2015; Courty & Marschke, 2003; Heinrich, 2003) it may be unlikely that such vigilant oversight would be pursued and maintained.

Theoretical perspective

When considering the role of incentives, and particularly negative incentives (punishment), in delivering public outcomes it is important to distinguish between incentives for individuals and incentives placed upon organizations that are assumed to translate to individual performance. The literature on competitive incentives around issues of individual compensation in performance show mixed findings depending upon an individual's ability to recognize their own payoffs. For example, Springer, Matthew et al. (2010) show that providing teachers with the beginning of the year bonuses with the threat of claw-backs if test scores do not improve are correlated with students achieving better results than if the benefit is offered as a bonus only if test scores improve. This is based both in the endowment affect, loss aversion, and status quo bias (Khaneman, Knetsch, & Thaler, 1991), i.e. people ascribe more to a resource than would otherwise be the case simply by owning that resource. Therefore, individuals are more risk averse if the potential losses from any decision are greater than the potential gains (see also George, Smith, Larimer, & Licari, 2012). Although such behavior is an anomaly in traditional economic (utilitarian) theory it has proven a useful means of developing frameworks around explaining individual behavior. Specifically, it is well documented that incentives – both positive and negative – influence individual behavior in specific ways. The caveat here is that individuals must understand both the incentive structure and how their individual actions make it more or less likely that they will gain some benefit or incur some penalty. It is the ability to understand the reward structure that is at question at the organizational level.

The argument provided herein is distinct from the crowding out literature (Belle, 2015) which contends that issues related to reputation (Ariely, Bracha, & Meier, 2009), known value propositions (Miller & Whitford, 2007), and relativity of price effects (Weibel, Rost, & Osterloh, 2010) increase extrinsic motivations at the expense of intrinsic motivation. While research has demonstrated that penalties placed upon organizations can impact employee motivation and mood (Brief & Weiss, 2002), this research has largely focused on employee empowerment (Demircioglu, 2018; Fernandez & Moldogaziev, 2015). To the author's knowledge, there is little research linking incentives, particularly negative incentives, for public organizations to organizational performance. The literature that does exist tying organizational incentives to organizational performance is largely confined to the private-sector management literature and tends to focus on affect within the organization, particularly at the managerial level (see Eggers & Kaplan, 2013).

There is a good reason to question why punishment and reward structures for organizations would impact organizational outcomes. For incentives to be effective policy tools organizations must have both the willingness and the ability to apply incentives in a way that will affect individual behaviors (Kankaanpää, 2010). Although governments can provide benefits to organizations for in exchange for 'better' services and penalties for 'worse' coverage, these incentives can only be effective if both the internal behavior of the organization and the demand for those services responds to the punishment/reward system and only if the demand for those services keeps pace. Also, as stated above, the employees responsible for moving the indicator, must recognize how their actions affect the outcomes. Although both hospitals and CMS can approximate targets for readmissions based on past experience, they cannot control the cause or severity of initial admissions. Those individuals must also be willing to act in a way that would provide the organization with the benefit.

Focusing this in organizational performance literature, the presence of multiple stakeholders within organizations and multiple internal regulatory and reward schemes is likely to incentivize individuals within organizations to focus their attention away from the net organizational reward or punishment structure (Blomquist & Busby, 2013). This recognizes Barnard's (1938, p. 73) original conception of organization as an "economy of incentives." Placing this within the discussions provided by Rainey (2009), if the organization has an incentive for performance standards that is not well-matched to multiple incentive structures within the organization then there is little reason to assume the individual activities will approximate to the incentivized

organizational activities. Although Rainey (2009, p. 36) discusses the ability of executive officers to ensure "smooth operation of this economy" of incentives, if the incentives placed upon the organization to interact with the incentives of individuals then this must be factored into the smooth operation. It is unclear that this is possible, even in the private sector, as discussed by Kaplan and Henderson (2005) who note that the economics literature cannot explain why organizations find it difficult to adjust internal incentives to changes in the organizational environment. What we are left with is the proposition that, despite their normative attractiveness, incentives placed upon organizations may not have an impact on organizational outcomes. Following the above argument, this is because the individuals who make up the organization either do not recognize how the organization's incentive affects them, or their individual incentives do not align with the incentive placed upon the organization.

Data and empirical method

The ACA represented a sweeping reform to the US health-care system. At the state level, the funding of additional Medicare reimbursements was channeled into hospitals that agreed to meet specific service levels. The quality measures for CMS were fixed in 2012 and hospitals began collecting data on quality measures at standards set by the ACA in 2013. This analysis examines the period from 2013 to 2016 after which the Trump administration began rolling back several ACA provisions. The data used in this analysis were collected from the Medicare Spending per Patient files, Readmission Reduction files, and the Healthcare Common Procedures Coding system files, all are publicly available at the Center for Medicare and Medicaid Services data library.

The analysis relies on the four-year average (2017–2013) for the dependent variable (excessive readmission rates per hospital) and the three-year average for all explanatory variables. The three-year average was used since there must be a one-year lag in order to determine if hospitals are responding to changes as opposed to simply looking at responses within the same timeframe. The use of the aggregate measure controls for shocks that may have occurred as hospitals were initially learning how to respond.

Service quality and performance outcomes

Dependent variable

The dependent variable for this analysis is a hospital's excess readmission ratio for all covered conditions. These

are conditions that disproportionately affect Medicare patients. For example, Chronic Obstructive Pulmonary Disease (COPD) affects 10% of all Americans and 14.2% of all those aged 65 or above, i.e. the Medicare eligible population (Menzin et al., 2008). The excessive readmission rate is a measure of a hospital's readmission performance compared to the national average of hospitals with patients of similar conditions. The calculation of this ratio has been approved by the National Quality Forum (2017) and includes risk adjustments for elements that have been shown clinically relevant to each condition including patient demographics, known comorbidities, and patient frailty. Values from zero to one indicate that the hospital has not exceeded the target set by CMS. Values in excess of one indicate the ratio by which the hospital has exceeded the target. To collect this data, the aforementioned files were cross-walked by the hospital's Provider ID, a unique identifier for each hospital in the US.

Bonus and penalty

To capture incentives, this analysis utilizes the bonus or penalty imposed by CMS. It addresses both whether the hospital received a bonus or penalty as well as the size of the bonus or penalty. The bonus/penalty captures notions that are more familiar to economists for providing incentives; positively in terms of providing better quality service and negatively for not meeting a standard or providing poor service. This analysis uses the three-year penalty imposed or bonus provide and the three-year average reimbursement to calculate the average-realized gain or loss over three years.

The formula used to determine the Medicare adjustment is a function of the ERR. Per CMS the formula is as follows:

$$1 - \min \left\{ .03, \sum_{dx} \frac{\text{Payment}(dx) * \max \{ (ERR)dx - 1.0, 0 \}}{\text{All payments}} \right\}$$

Where dx is the any of the six covered conditions.

If hospitals are responding to penalties from prior years in an effort to avoid being penalized for excess readmissions then increases in the penalty for 2013–2015 should have a negative effect on ERR from 2014–2016.

Quality of care

To assess the quality of care, this analysis examines patient response to conditions of care including being fully informed about their medications, quality of communication with the attending physician about the procedure, and quality of communication of what to expect following discharge. These answers were highly correlated. Additionally, the questions do not ask the respondent to distinguish the quality of information

they received about Medicines from the quality of information they received about what to expect upon discharge although the two are seemingly related. The correlation between the two responses was 97%. Additionally, correlation between the quality of information provided upon discharge and quality of the information provided by the attending physician was 93%. To address this, the analysis relied on a factor of the three responses which is labeled, "Quality of Information."

Other issues of quality include the preventative care. Medicare covers preventative care at no cost to patients. Therefore, a measure of service quality is the ratio of covered individuals receiving preventative care services to which they are entitled. Hospitals report this ratio to CMS as the ratio of total services provided that were preventative care. There are also emergency issues that could very well increase readmission rates though. Hospitals also report this to CMS as the ratio of total services provided that were emergency services.

Quality of care has a known impact on ERR (McIlvennan, Eapen, & Allen, 2018). Given this, the quality of care indicators are expected to be significant in predicting a decrease in ERR. If the above factor or incentives moderate the effects of quality of care (meaning the strength of the relationship between quality of care and ERR changes in response to incentives) then both should be significant independently and should then be significant as interactions. However, effects in the presence of interaction terms should be significantly smaller than the effects independently (Cohen, Cohen, West, & Aiken, 2003).

Economic drivers (disproportionate share)

Hospitals that see a disproportionate share of low-income individuals tend to have higher readmission rates than other hospitals; specifically, hospitals below the top quartile in terms of serving low-income individuals have significantly higher readmission rates (Berenson, et al 2012). One potential reason for this is that lower-income individuals tend to forego care more often than median or high-income individuals and therefore wind up with more serious conditions when they finally go for care (Kullgren, 2010). When Congress adopted a per diem cost limit on Medicare payments (1982) the intent was to limit Medicare over-spending. However, there was also a concern that this could harm hospitals that saw a large number of low-income patients. In an effort to protect these hospitals, Congress included a provision in the Tax Equity and Fiscal Responsibility Act (1982) that required CMS to take into account the additional costs of seeing large numbers of low-income patients. Specifically, this

required that CMS waives the per diem requirements in hospitals that saw a disproportionate share of low-income individuals. The SSI ratio captures the ratio of these individuals seen by a hospital. By the late 1990s states and hospitals had figured out ways to game the SSI reimbursements. After several incremental changes to SSI reimbursements throughout the 1990s, the ACA instituted major changes to SSI. Under the ACA Congress reduced the SSI reimbursement by 75% and increased payments based on the percent of the uninsured population served by a hospital and the amount of uncompensated care.

The SSI measure is included to account for hospitals that serve a disproportionate share of high poverty individuals. Because there is a history of public hospitals gaming the SSI in the past it may be the case that hospitals once again figured out how to game the SSI in an effort to avoid additional losses from ERR. $DSH\ Patient\ Percent = (Medicare\ SSI\ Days / Total\ Medicare\ Days) + (Medicaid,\ Non - Medicare\ Days / Total\ Patient\ Days)$. This determines the amount of payment add-on for hospitals, e.g. if a hospital desired to increase the add-on they could seek means of increasing the numerator or decreasing the denominator. Hospitals have a history of employing such strategies (Coughlin & Liska 1997). Because states and hospitals have employed several strategies to count disproportionate shares payments as general medical expenses (Coughlin & Liska 1997), the SSI ratio is necessarily imprecise. Additionally, because states that expanded Medicaid saw a reduction in charity care but also while states that did not saw an increase in charity care, changes to SSI may be specific to states that chose not to expand Medicaid.

Seeking rents

It is also possible that hospitals seek more Medicare dollars overall and that they are concerned with total Medicare billing rather than a bonus or penalty. However, average Medicare reimbursements vary greatly by state, $m = \$6,824.63$, $s = \$2,719.58$. As such the log reimbursement each hospital is used to measure Medicare reimbursements. As mentioned in the introduction, simply looking at Medicare reimbursements as a standalone are not sufficient since it does not control for a fee for service issues. To address this, the model includes the adjusted fee for service ratio (the ratio of fee for service to non-fee for service) In this fashion the log of the Medicare reimbursement variable can be assessed independent of fee for service considerations. There is also the possibility, that as in the 1990s, the hospitals have figured out how to game the SSI reimbursements and may seek rents on flat fee reimbursements.

Grouping

There are a number of factors that may affect readmission including groupings by the state where readmissions may vary by individual characteristics such as history of smoking, prior health issues, or a history of pulmonary complications. For example, the prevalence of COPD and admissions due to COPD comorbidities is higher in the Ohio River Valley than the rest of the US (CDC 2015). Because the data used here are aggregated to each hospital these individual characteristics are included in the average for each hospital. Still, this also implies that factors affecting rates of readmission may be affected by the clustering of these individual characteristics. Other characteristics such as differences in hospital governance, Local, State, or Hospital Authority was coded binomially.

Not all hospitals can provide the same level of care. There are structural considerations including whether the hospital is a licensed stroke center, licensed heart attack center and so on. Hospitals report their structural capacity to CMS on seven criteria – if the hospital is: able to receive lab results electronically; able to track patients' lab results, tests, and referrals electronically between visits; a Safe Surgery Checklist is Used, is part of the Cardiac surgery registry; is part of the General Surgery Registry; is part of the Nursing care registry, and; is part of the Stroke care registry. To account for this, the analysis uses the count of items that a hospital stated were part of its structure, e.g. if a hospital used a Safe Surgery Checklist and was on the General Surgery Registry then it would receive a 2.

Modeling strategies

A series of multilevel models are used to predict changes to the ERR. These include modeling with random effects for inter-state differences, whether states chose to expand Medicaid, and a state's disproportionate share of low-income individuals. The linear mixed effects model was employed to account for variation that may occur due to grouping based on the aforementioned criteria. Because the sample size of hospitals for which all data were available ended up being small ($N = 156$), model fit is determined both through AICc and through likelihood ratio tests. The AICc indicates less penalization for a linear model that includes disproportionate share and Medicaid expansion than for the linear mixed effects model. However, the likelihood ratio test indicates that the mixed effects model explains more variation than the linear model and is therefore preferred.

To assess whether there is a moderating effect of reward/penalty on quality of care it must first be established that both variables are independently significant. Second, the interaction of the two variables

must be significant and be shown to have more effect than the two variables independently. As the findings below indicate, incentives did not influence ERR and can therefore not be a moderating factor for the quality of care.

Results & findings

This manuscript sought to address two questions: (1) to what extent do organizations respond to incentives when they can be either positive or negative? and; (2) to what extent to generally accepted best practices interact with that monetary incentive? To address these questions, this manuscript made use of data from the Center for Medicare and Medicaid Services on quality ratings of hospitals, Medicare reimbursements and public (patient) sentiment on the quality of communications practices that the medical literature identifies as best practices for reducing readmission and mortality. Because Medicare incentives have both a punishment and a reward structure tied to service delivery, this study was able to make use of the average penalty or bonus a hospital received per Medicare patient as means of measuring financial incentives.

On the first question of whether public hospitals respond to incentives, the answer appears to be no. Hospitals are not seeking to limit their readmission ratios based on the possibility of receiving lower Medicare reimbursements. This also implies that these incentives could not moderate any of the quality measures. On this issue of quality, quality of information received did not predict changes in readmission ratios. The ratio of preventative services did though. Looking at [Table 1](#), there is a 0.001 unit decrease for each one unit increase in the ratio of preventative services to all other services. This suggests that following best practices of providing the care to which Medicare beneficiaries are entitled provides better outcomes.

Discussion

The consistency of the coefficients across the linear and multilevel models suggests that the lack of effect from incentives is not context specific. In other words, incentives tailored for hospitals serving different income levels are not likely to see improvements in outcomes based on incentives targeted to their specific income class. A word of caution is necessary though given that the SSI and disproportionate share figures are not robust to all hospital practices given the myriad of strategies hospitals have employed to have disproportionate share payments count as general income. The inverse relationship between Medicare Spending per Beneficiary and the SSI payments even in the context

of disproportionate share suggests that these strategies are having a significant effect on readmission rates. This is even allowing for the fact that hospitals that serve lower-income individuals tend to have higher readmission rates. Although context explained a significant amount of variation in outcomes the practical implication is only a 0.003 points difference in the outcome, e.g. less than 1%. Even when contexts differ dramatically there is still no significant difference in response, suggesting that when it comes to incentives in public hospitals and public organizations more generally, context does not affect the power of incentives to influence outcomes.

More generally, governments that seek to use economic incentives in an effort to deliver better outcomes should not be surprised that administrators and functionaries do not act as rational individuals. There are few if any means of distributing the excesses of production in the public sector and there is little recourse for colleagues to police each other in pursuit of reward or penalty avoidance. In their works on team production problems in the private sector, Blair Margaret and Stout (2003) and Pollman (2015) find that significant mediating structures are needed to avoid shirking and rent-seeking behaviors. It is questionable then as to whether economic incentive structures could produce positive outcomes in the public sector with such mediation structures in place. Further, it is questionable whether such structures would be legal in the public sector given that there is not separation from ownership and management in the same way that a corporate board is separate from management (Blair Margaret & Stout, 2003; Rauh, 2018). This relies on managers then to pursue oversight of activities that would prevent penalties or provide bonuses. As has been seen in the previous literature on managerial responses to incentives, e.g. Courty and Marschke (2003), Heinrich (2003) and Ammons and Roenigk (2015) these are not likely to exist for any long period of time. This is reinforced by the lack of moderating effects between incentives and best practices. Further, given the lack of separation between elected officials and bureaucracy, there is little to keep states from hoarding or redistributing incentives except for explicit direction via law or regulation. Given previous findings from Coughlin and Liska (1997) it is known that states do not fully distribute payments to hospitals or seek strategies to have payments count in different categories to increase state revenues. Findings such as this are consistent, even in the international context, given the results from Rasul and Rogers (2018) who find state shirking in cases loan forgiveness.

The fact that there is no effect from negative incentives lends support to the argument that incentives for

Table 1. Explaining changes in excessive readmission ratios, 2014–2016.

	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5	MODEL 6	MODEL 7
	b(se)	b(se)	b(se)	b(se)	b(se)	b(se)	b(se)
Fixed Effects:							
D Incentives 2013–15	0.165 (0.248)	0.175 (0.247)	0.168 (0.249)	0.226 (0.225)	0.236 (0.228)	0.265 (0.237)	0.286 (0.243)
SSI Ratio, 2013–15	0.247* (0.109)	0.237* (0.111)	0.25* (0.109)	0.175* (0.089)	0.198* (0.100)	0.212 (0.145)	0.321* (0.154)
Medicaid Expansion State						0.018 (0.019)	0.026 (0.020)
Emergency Services, 2013–15	0.0001 (0.000)	0.000 (0.000)	0.0001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.0002 (0.000)	0.0002 (0.000)
Prevention Services, 2013–15	-0.002* (0.001)	-0.002* (0.001)	-0.002* (0.001)	-0.001* (0.001)	-0.001* (0.001)	-0.001* (0.001)	-0.001* (0.001)
Medicare Spending per Beneficiary, 2013–15	-0.222* (0.108)	-0.222* (0.108)	-0.222* (0.108)	-0.226* (0.086)	-0.198** (0.099)	-0.206* (0.102)	-0.219* (0.105)
log Medicare Claim	-0.077 (0.095)	-0.06 (0.096)	-0.057 (0.101)	0.027 (0.016)	-0.083 (0.093)	0.033 (0.018)	0.037* (0.019)
log Discharges	0.029 (0.018)	0.024 (0.019)	0.03 (0.018)	-0.075 (0.092)	0.025 (0.017)	-0.088 (0.095)	-0.042 (0.098)
Adjusted Fee for Service	0.007 (0.008)	0.008 (0.008)	0.008 (0.008)	0.007 (0.008)	0.008 (0.008)	0.006 (0.008)	0.005 (0.009)
Quality of Information	-0.041 (0.090)	-0.013 (0.091)	-0.038 (0.091)	-0.059 (0.082)	-0.057 (0.083)	-0.071 (0.087)	-0.027 (0.092)
State-run hospital	0.008 (0.023)	0.004 (0.023)	0.010 (0.023)	0.010 (0.021)	0.010 (0.022)	0.006 (0.022)	-0.0001 (0.023)
Locally-run hospital	0.018 (0.010)	0.015 (0.010)	0.019 (0.011)	0.016 (0.010)	0.017 (0.010)	0.013 (0.010)	0.019 (0.011)
N Structural Quality Elements			-0.002 (0.004)	-0.001 (0.003)	-0.001 (0.003)	-0.001 (0.003)	-0.003 (0.003)
Medicare Spending X log Discharges							
SSI Ratio, 2013–15 X Medicaid Expansion						-0.016 (0.183)	-0.124 (0.196)
Constant	1.317** (0.381)	1.251** (0.383)	1.232** (0.409)	1.282** (0.370)	1.302** (0.375)	1.326** (0.383)	1.117** (0.396)
Random Effects							
Groups	var	var	var				var
State (Intercept)	0.000	0.003	0.000				0.000
N Structural Quality Elements	0.000	0.000					
log Discharges							
Disproportionate Share, 75th Percentile							
Disproportionate Share, Charity Care							
Disproportionate Share, 25th Percentile							
Residual	0.003	0.003	0.003				0.003
ICC	0.00%	57.57%	0.00%				69.56%
N.Obs	156	156	156			156	156,000
log Likelihood	188.803	189.13	184.258	156	156	228.613	184.461
LR Test v Model 5							87.682***
AICc	-341.692	-334.671	-335.087	-422.61	-425.1	-421.31	-306.037
AIC	-345.606	-340.259	-338.516	-426.034	-428.03	-425.23	-316.921
DF	16	19	15	15	14	16	26
RSE				0.044	0.047		
DW Test				1.869	1.868		
BP Test				21.961	22.213		
N VIF > 5	0	0	0	1	0		1

Although Model 5 has a lower AICc, Model 7 is preferred given the likelihood ratio test indicating that the more complex model explains more variation than Model 5. Only the SSI Ratio, quality of prevention services, and Medicare spending per beneficiary explain variation in readmission ratios. However, grouping by a hospital's disproportionate share status within a given state explains almost 70% of the variation in the fixed effects. Additionally, one can expect that the intercept for the fixed effects would move by between 0.002 and 0.003 based on the DSH status.

organizations qua organizations do not affect organizational outcomes. Relating this back to the broader literature there appears to be a disconnect in how hospital employees recognize the organization's incentives. The use of best practices did affect readmission rates, but the use of best practices is not moderated by organizational incentives. This suggests that internal motivations by employees operate separately from organizational incentives. This is in keeping with the findings from Blomquist and Busby (2013) and further suggests that executive level staff are not, or cannot, adequately smooth the relationship between individual incentives for performance and the incentives placed upon the organization via policy. Additionally, the fact that economic incentives in the form of Medicare Spending per Beneficiary predicted reductions in readmissions without moderating effects from potential rewards or penalties reinforces the claims of Kaplan and Henderson (2005). Specifically, it reinforces the claim that economics arguments do not suffice for explaining why organizations find it difficult to adjust internal incentives to changes in the organizational environment. Rather, it argues that understanding of best practices may be separate from the external incentives placed upon the organization and thus incentivized goals may not align with best practices.

If incentivized goals are not aligned with best practices, it still allows that organizations may use their own internal incentive structures to promote best practices towards prosocial ends – penalties for noncompliance, bonuses for engaging in specific practices, etc. This notion is consistent with the findings on the use extrinsic motivation to incent best practices even outside of intrinsic motivations (e.g. arguments from Belle, 2015; George et al., 2012; & Ariely et al., 2009). Since the evidence herein suggests that policy-driven organizational goals may not be aligned with the dogmatic pursuit of best practices, the next question, and one the author would encourage researchers to address, is why? One reason the author would posit given arguments from broader literature on incentives, Medicare, and healthcare more generally is that dogmatic pursuit of best practices could very well have adverse effects for the organization's policy-incentivized outcome (e.g. Belle, 2015; Joynt-Maddox and Jha 2012; Milstein & Schreyoegg, 2016). After all, one can well imagine that if every patient who came for pneumonia-like symptoms received a spirometry assessment (lung function) that there would be an increase in admissions for pneumonia and COPD followed by a subsequent increase in readmissions.

Overall this analysis should raise questions as to the efficacy of using reward and punishment of organizations as a policy instrument if one does not also specify a means (or at least ensure the capacity) to translate organizational

incentives into incentive structures that are readily recognizable by employees. It also calls for additional research into how such incentive structures may be designed.

Conclusion

This study has argued that economic incentives have little effect on outcomes in public organizations by examining performance levels in public hospitals. Empirically such findings suggest that contextual issues will likely not come into play given that context, although statistically significant, practically explained only a max of a 0.003 points difference. The broader question is why incentives have no meaningful effect? As a point of discussion, this study has proffered that the structural arrangements within public organizations do not provide fertile ground for economic incentives to affect individual behaviors on a scale that can effectively change organizational outcomes. Such suggestions seem poignant given the limited empirical results for incentives in public organizations, e.g. Belle (2015). Although some effectiveness has been seen in the education arena, it has come with strong rules to drive individuals towards the desired goal such as the threat of claw-backs if teachers do not meet test scores. Since most public organizations do not rely on such structural accountability processes, and when they do they tend to become simply layers of internal managerial controls (Radin, 2000), the ability of incentives to positively affect public outcomes is ever more dubious.

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