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RESEARCH ARTICLE

Financial Incentives and Physician Practice Participation in Medicare's Value-Based Reforms

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Objectives. To evaluate whether greater experience and success with performance incentives among physician practices are related to increased participation in Medicare's voluntary value-based payment reforms.

Data Sources/Study Setting. Publicly available data from Medicare's Physician Compare ($n = 1,278$; January 2012 to November 2013) and nationally representative physician practice data from the National Survey of Physician Organizations 3 (NSPO3; $n = 907,538$; 2013).

Study Design. We used regression analysis to examine practice-level relationships between prior exposure to performance incentives and participation in key Medicare value-based payment reforms: accountable care organization (ACO) programs, the Physician Quality Reporting System ("Physician Compare"), and the Meaningful Use of Health Information Technology program ("Meaningful Use"). Prior experience and success with financial incentives were measured as (1) the percentage of practices' revenue from financial incentives for quality or efficiency; and (2) practices' exposure to public reporting of quality measures.

Data Collection/Extraction Methods. We linked physician participation data from Medicare's Physician Compare to the NSPO3 survey.

Principal Findings. There was wide variation in practices' exposure to performance incentives, with 64 percent exposed to financial incentives, 45 percent exposed to public reporting, and 2.2 percent of practice revenue coming from financial incentives. For each percentage-point increase in financial incentives, there was a 0.9 percentage-point increase in the probability of participating in ACOs (standard error [SE], 0.1, $p < .001$) and a 0.8 percentage-point increase in the probability of participating in Meaningful Use (SE, 0.1, $p < .001$), controlling for practice characteristics. Financial incentives were not associated with participation in Physician Compare. Among ACO participants, a 1 percentage-point increase in incentives was associated with a 0.7 percentage-point increase in the probability of being "very well" prepared to utilize cost and quality data (SE, 0.1, $p < .001$).

Conclusions. Physicians organizations' prior experience and success with performance incentives were related to participation in Medicare ACO arrangements and participation in the meaningful use criteria but not to participation in Physician

Compare. We conclude that Medicare must complement financial incentives with additional efforts to address the needs of practices with less experience with such incentives to promote value-based payment on a broader scale.

Key Words. Financial incentives, Medicare, accountable care organizations, value-based payment, physician practices

In April 2015, President Obama signed the Medicare Access and Children's Health Insurance Program Reauthorization Act (MACRA), permanently repealing Medicare's sustainable growth rate formula for physician payment and replacing it with a new value-based system, the Quality Payment Program (QPP). Beginning in 2019, all physicians who participate in Medicare will elect to join one of two value-based pathways: (1) the Alternative Payment Model (APM) program, for physicians who provide substantial care via accountable care organizations (ACOs) and other alternative models with two-sided risk arrangements; or (2) the Merit-Based Incentive Payment System (MIPS), for those who continue to be compensated primarily via fee for service. To entice physicians to join APMs, the Centers for Medicare and Medicaid Services (CMS) will award APM participants an unconditional 5 percent incentive payment between 2019 and 2024, and, from 2026 onward, a permanently higher fee schedule growth rate (0.75 percent per year) than MIPS (0.25 percent per year). Providers remaining in fee for service will default into MIPS, which consolidates three existing programs: the Physician Quality Reporting System ("Physician Compare"); the Physician Value-Based Payment Modifier; and the Electronic Health Records Incentive Program ("Meaningful Use"). The MIPS offers no unconditional bonus and instead adjusts payments according to measures of quality, resource use, meaningful use, and clinical practice improvement activities. Variation in MIPS payments promises to be large,

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with maximum payment adjustments growing each year from 4 percent (in 2019) to 9 percent (in 2022).

Medicare Access and Children's Health Insurance Program Reauthorization Act will soon confront all Medicare physicians with a stark choice: To remain behind in a previously familiar fee-for-service world and accept the uncertain, risky payment adjustments of the MIPS or to instead select the guaranteed bonuses of the otherwise uncharted APMs. The short-term benefits of APMs are intended to move physicians toward the more comprehensive payment reforms. Yet it is not clear that physicians with limited experience or success with value-based payment will be willing or able to make such a leap toward APMs, particularly by the QPP's launch. Given the ultimately voluntary nature of the programs upon which it rests, a clearer understanding of who participates and who does not—and why they do—is critical. In particular, it is not known how past experience with pay-for-performance or public reporting will influence physician participation in Medicare's current value-based reforms.

To better understand this fast-approaching decision point, we investigate three of the principal initiatives that will form the foundation of MACRA: Medicare ACOs, Meaningful Use, and Physician Compare. Specifically, we seek to answer the following three questions. First, in the current environment, is prior exposure to financial incentives related to physicians' participation in ACOs, Physician Compare, or Meaningful Use? Second, is prior exposure to public reporting related to physicians' participation in ACOs, Physician Compare, or Meaningful Use? Third, among those practices that have applied to become a Medicare ACO, is exposure to performance incentives related to preparedness to succeed as an ACO?

Conceptual Framework

We conceptualize physicians as economic actors whose decisions regarding voluntary participation in Medicare reforms are shaped by a mix of motivations, including short- and long-run profit, tolerance for risk, financial capital and other organizational capabilities or limitations, and perceived benefit to care delivery and patient health (Conrad 2015; Kao 2015). In this framework, there are several mechanisms by which practices with greater exposure to and success with financial incentives will participate at higher rates in value-based reforms. Succeeding as an ACO requires bearing risk, aligning financial incentives, developing robust health information technology (IT) infrastructure, and managing patient populations across the continuum of care

—capacities that many practices lack and whose development requires time, capital investments, and structural changes (Lewis et al. 2013; Shortell et al. 2014). For those practices focused on maximizing near-term payoffs, we anticipate experience and success with financial incentives for quality or efficiency to increase their willingness to participate in Medicare reforms (Kantarevic and Kralj 2013). To the degree that physicians self-select into contracts containing greater financial incentives or public reporting and that this selection reflects idiosyncratic risk tolerance or perceived benefit to patient health, we expect a similarly positive relationship with reform participation. We anticipate such relationships to be particularly strong for practice participation in ACOs in light of the barriers to entry and financial risk that accompany population health management. And because practices cannot simply form an ACO but must find willing partners with which to contract, practices with greater risk experience may be viewed by emerging ACOs as more capable and preferentially selected for inclusion in those ACOs.

Our analysis centers on the effects of financial incentives and public reporting because these two influences—money and information—constitute the primary levers available to policy makers seeking to strengthen participation in value-based reforms (Glied 2015). We nonetheless recognize that many other practice and patient factors shape practice participation decisions. A robust health IT infrastructure is essential for measuring and reporting performance, tracking population health, and coordinating care (Burton, Anderson, and Kues 2004; Bardach et al. 2013). Because achieving spending and quality goals will likely require that practices greatly improve patient engagement and activation, practices with greater patient-centered culture may be more likely to participate in value-based reforms (Cosgrove et al. 2013; Shortell et al. 2015). Experience with managed care, like with financial incentives for quality and efficiency, can both reflect and reinforce a practice's capacity and preference to bear risk and manage populations of patients. At the same time, a physician who does not contract with an HMO may join an ACO in order to more effectively compete with HMOs (Frech et al. 2015), rendering the net relationship theoretically ambiguous. We are similarly uncertain about the effects of practice ownership by a hospital, particularly regarding ACO participation: While hospitals can offer considerable capital needed to invest in reporting systems and population management (improving participation in Physician Compare and Meaningful Use), achieving ACO spending reductions will require redirecting patient flow toward less expensive care settings and away from hospitals—a volume reduction unlikely to be fully offset by ACO bonuses. Finally, practices serving disadvantaged patients may be less

likely to participate in value-based reforms because they are (1) unprepared to join—due to fewer resources for value improvement initiatives (Reschovsky and O'Malley 2008; Varkey et al. 2009); (2) unwilling to join—due to historically worse pay-for-performance outcomes among safety-net providers (Markovitz and Ryan 2016); or (3) unable to join—because emerging ACOs preferentially contract with physicians serving more affluent patients (Yasaitis et al. 2016).

STUDY DATA AND METHODS

Data Sources and Study Sample

We used data on physician practices from the third National Survey of Physician Organizations 3 (NSPO3). The NSPO3 is a nationally representative survey of U.S. physician practices that was administered to practice leaders between January 2012 and November 2013 (1,398 responses for a response rate of 49.7 percent; Shortell et al. 2014). We used NSPO3 data to measure organizational characteristics and ACO participation ($n = 1,278$) and ACO preparedness ($n = 259$). To measure Physician Compare and Meaningful Use participation, we linked NSPO3 practices ($n = 1,192$) to Medicare's 2013 Physician Compare National Provider-Level National File ($n = 907,538$). We excluded practices with missing information on either performance incentives or organizational characteristics (see Figure S2 in Appendix SA2 for CONSORT flow diagram). The methods used to link the practice survey data to participation in value-based reforms are described in the Appendix.

Measuring Participation in Medicare's Value-Based Reforms

Our three main study outcomes were ACO participation, Physician Compare participation, and Meaningful Use participation. We measured participation in Physician Compare or Meaningful Use as the percentage of a practice's physicians that were listed on Physician Compare as participating in calendar year 2013. We used NSPO3 survey questions to assess (1) ACO participation (whether the practice had applied to CMS to become an ACO in 2012); and (2) ACO preparedness to (a) implement Meaningful Use and (b) collect, analyze, and report cost and quality measures required by Medicare. Please see Table S1 in Appendix SA2 for survey instruments and variable operationalization.

Measuring Financial Incentives, Public Reporting, and Organizational Characteristics

We summarize key variables relating to financial incentives, public reporting, and organizational characteristics in Table S1 in Appendix SA2. We created a measure of practice exposure to financial incentives by summing together two NSPO3 measures: (1) percentage of past-year revenue from bonuses for clinical quality, patient satisfaction, and use of information technology; and (2) percentage of past-year revenue from bonuses for efficient utilization of resources. We measured exposure to public reporting using a binary NSPO3 measure of whether data on clinical quality of care are publicly reported by health plans or other external entities. We controlled for practice characteristics that we hypothesized would be related to practice participation in value-based reforms (as described in the Conceptual Framework). These included a health IT index, a patient-centered culture index, as well as practice ownership, size, and type (see Table S1 in Appendix SA2 for index details). We also included three measures of a practice's patient demographics: percentage of patients with limited English proficiency; percentage of patients who were black; and share of revenue from different payers (Medicare or uninsured and low-income, Medicaid, commercial insurance, other).

Statistical Analysis

We used multivariable regression analysis to examine practice-level relationships between prior exposure to either financial incentives or public reporting and participation in Medicare's value-based reforms. We used linear models for our two continuous outcomes (participation in Physician Compare and Meaningful Use) and probit models for our binary outcome (participation in ACOs), adjusting for the practice characteristics and patient factors described above. We express the results as average marginal effects. These represent the absolute percentage-point change in a practice's probability of participation given a one-unit increase in the variable of interest while allowing all other variables to vary as they were observed in the sample. We also estimated ordered probit models to analyze the relationship between incentives and ACO preparedness.

To assess the sensitivity of our results across model specifications, we specified two alternative models of the relationship between financial incentives and ACO participation. First, because the percent of revenue from financial incentives could reflect either experience or success with value-based

payment programs, we created an index of any exposure to financial incentives that measured whether practices received any additional revenue for quality (no = 0, yes = 1) and any additional revenue for efficiency (no = 0, yes = 1; Table S1 in Appendix SA2). Second, to evaluate the influence on our estimates of financial incentive outliers (the 4 percent of practices with at least 20 percent of revenue from financial incentives, many of whom may also participate in ACOs), we estimated probit models excluding those outlier practices and compared the estimates to those derived from the full sample of practices. Finally, we evaluated whether the effects of financial incentives varied across key organizational characteristics (described in the Appendix). Weights provided by NSPO3 were used in all analyses so that our results and inferences can be generalized to U.S. physician practices nationally. We specified Huber–White standard errors to be robust to heteroskedasticity and performed all analyses using *Stata 14.0* (StataCorp LLC, College Station, TX, USA).

RESULTS

Performance Incentives and Participation in Medicare’s Value-Based Reforms

Table 1 shows descriptive statistics of the practice-level variables used in the analysis: 46 percent and 22 percent of practices reported some exposure to financial incentives for quality and efficiency, respectively, while 45 percent of practices had experienced public reporting. There was relatively wide variation in practices’ exposure to financial incentives, with 2.2 percent (standard deviation of 7.0 percent) of practice revenue linked to financial incentives for quality or efficiency (Table 1, Figure S2 in Appendix SA2). For our outcomes, 15 percent of practices had applied to participate in Medicare ACOs, while 48 percent of practices’ physicians participated in Medicare’s Physician Compare and Meaningful Use programs. Practices that applied to Medicare ACOs reported varying levels of preparedness, with the modal practice “somewhat” prepared to collect, analyze, and report on required cost and quality performance measures and “very well” prepared to implement Meaningful Use. Participation in ACOs was weakly correlated with participation in either Physician Compare (Table 2; Pearson’s $r = 0.17$) or Meaningful Use ($r = 0.14$; Table 2). Participation in Physician Compare and Meaningful Use, meanwhile, demonstrated slightly greater correlation (Table 2; $r = 0.37$).

Table 1: Descriptive Characteristics of 1,278 Physician Practices in the Study Sample, 2013

<i>Characteristic</i>	<i>Percent or Mean (SD)</i>
<i>Performance incentives</i>	
Financial incentives for quality (some)	0.46 (0.49)
Financial incentives for efficiency (some)	0.22 (0.41)
Financial incentives for quality or efficiency (some)	0.64 (0.74)
Financial incentives for quality (% revenue)	1.20 (4.30)
Financial incentives for efficiency (% revenue)	1.01 (4.04)
Financial incentives for quality or efficiency (% revenue)	2.20 (7.01)
Public reporting (yes = 1, no = 0)	0.45 (0.50)
<i>Medicare value-based outcomes</i>	
Physician Compare participation (% of practices' physicians) [†]	0.48 (0.45)
Meaningful Use participation (% of practices' physicians) [†]	0.48 (0.45)
ACO participation (yes = 1, no = 0)	0.15 (0.36)
ACO preparedness to implement Meaningful Use [‡]	3.32 (0.91)
ACO preparedness to collect, analyze, report cost and quality data [‡]	3.12 (0.83)
<i>Practice capabilities</i>	
IPA/PHO, significant share of patients (yes = 1, no = 0)	0.18 (0.38)
<i>Ownership</i>	
Physician	0.83 (0.38)
Hospital or health system	0.13 (0.34)
Community health center	0.04 (0.20)
Practice size (number of physicians)	24.97 (173.17)
HMO (% revenue)	28.89 (26.81)
Health information technology index [§]	52.14 (27.85)
Patient-centered culture index [¶]	4.07 (0.65)
<i>Patient factors</i>	
Black (% share of patients)	15.91 (15.24)
Limited English proficiency (% share of patients)	10.54 (19.93)
<i>Payer mix (% annual revenue)</i>	
Medicare	36.26 (17.31)
Medicaid or no insurance (low-income)	13.08 (12.42)
Other ^{††}	10.24 (16.60)
Commercial	40.48 (20.32)

[†]Physician Compare and Meaningful Use participation rates were based on the 1,192 practices linked between NSPO 3 and Physician Compare Provider-Level National File.

[‡]ACO preparedness was based on the 259 ACO practices and measured on a 4-point Likert-type scale with 1 = Not at all prepared, 2 = Very little prepared, 3 = Somewhat prepared, 4 = Very well prepared.

[§]The health information technology index is described elsewhere (McMenamin et al. 2010).

[¶]The patient-centered culture index ranged from 1 to 5 based on average responses for items measured on a 5-point Likert-type scale that captured the extent to which practices: assess patient needs and expectations; promptly resolved patient complaints; study patients' complaints to identify patterns and prevent recurrence; use patient data to improve care; use data on patient expectations and/or experiences when developing services.

^{††}Other insurance includes no insurance (if middle- or high-income) and other insurance. All analyses used weighted data.

ACO, accountable care organization; HMO, health maintenance organization; IPA, Independent Practice Association; PHO, Physician Hospital Organization; SD, standard deviation.

Table 2: Correlation Matrix of Participation in Medicare's Value-Based Reforms

<i>Program</i>	<i>ACO</i>	<i>Physician Compare</i>	<i>Meaningful Use</i>
ACO	–	–	–
Physician compare	0.1722	–	–
Meaningful use	0.1358	0.3736	–

Note. Participate rates were based on the 1,295 practices linked between the NSPO3 and the 2013 Physician Compare Provider-Level National File. This is a matrix of the Pearson correlation coefficients, where +1 represents a perfect positive correlation, 0 represents no correlation, and –1 represents a perfect negative correlation.

Relationship between Financial Incentives and Participation in Value-Based Reforms

Table 3 shows the relationship between exposure to either financial incentives (row 1) or public reporting (row 2) and participation in Medicare value-based programs. The average marginal effects are derived from either probit or linear regression analyses of the relationship between financial incentives and participation (see Table S2 in Appendix SA2). This shows that a 1 percentage-point increase in the percent of revenue linked to financial incentives for quality or efficiency was associated with approximately a 1 percentage-point increase in the probability of ACO participation (Marginal Effect [ME], 0.009, standard error [SE], 0.001, $p < .001$) and a 1 percentage-point increase in Meaningful Use participation (ME, 0.008, SE, 0.001, $p < .001$). This corresponds to a 6 percent increase in ACO participation and a 2 percent increase in Meaningful Use participation (Table S3 in Appendix SA2). Financial incentives were not significantly related to Physician Compare participation (Table 3; ME, 0.000, SE, 0.001, $p = .918$).

In sensitivity analyses, any past exposure to financial incentives was significantly related to increased participation in ACOs (Table S4 in Appendix SA2; ME, 0.095, SE, 0.008, $p < .001$) but not Physician Compare (ME, 0.021, SE, 0.013, $p = .123$) or Meaningful Use (ME, 0.006, SE, 0.013, $p = .650$). In our outlier analysis, we found that, among practices with less than 20 percent of revenue from financial incentives, a 1 percentage-point increase in financial incentives was related to a 1.5 percentage-point increase in the probability of ACO participation (Table S5 in Appendix SA2; ME, 0.015, SE, 0.002, $p < .001$), a significantly greater relationship than among the full sample of practices (change in regression coefficient, -0.030 , SE, 0.008, $p < .001$).

Table 3: Average Marginal Effects on Participation in Medicare's ACOs, Physician Compare, and Meaningful Use

	ACO Participation [†]	Physician Compare Participation [†]	Meaningful Use Participation [†]
<i>Performance incentives</i>	Average marginal effect of incentives on participation (SE)		
Financial incentives	0.009 (0.001)***	0.000 (0.001)	0.008 (0.001)***
Public reporting	0.036 (0.014)**	0.120 (0.026)***	0.136 (0.046)***
<i>Practice capabilities</i>			
IPA/PHO, significant share of patients	0.106 (0.027)***	0.062 (0.046)	-0.143 (0.062)**
Size (number of physicians)	0.000 (0.000)	0.001 (0.000)*	0.000 (0.000)
HMO (% revenue)	0.001 (0.000)**	0.003 (0.000)***	0.001 (0.001)
Health information technology	0.002 (0.000)**	0.004 (0.000)***	— [§]
Patient-centered culture	0.046 (0.006)***	0.058 (0.033)*	-0.026 (0.014)*
<i>Ownership[†]</i>			
Hospital or health system	0.001 (0.028)	0.002 (0.036)	0.173 (0.025)***
Community health center	0.010 (0.039)	0.164 (0.11)	0.166 (0.069)**
<i>Patient factors</i>			
Black (% patients)	-0.001 (0.001)	-0.001 (0.000)*	0.002 (0.001)***
Limited English proficiency (% patients)	0.001 (0.000)**	0.005 (0.001)**	0.001 (0.000)**
Payer mix (% revenue) ^{††}			
Medicare	-0.003 (0.001)**	0.001 (0.001)	0.001 (0.001)
Medicaid or uninsured and low-income	0.000 (0.001)	-0.007 (0.002)***	-0.008 (0.001)***
Other insurance	-0.001 (0.000)*	-0.001 (0.001)*	-0.001 (0.001)*
Sample size, <i>n</i>	1,278	1,192	1,192

* $p < .1$; ** $p < .05$; *** $p < .001$.

[†]Probit regression analysis was used for the ACO participation model. Average marginal effects derived from the probit regression were largely consistent with regression coefficients from the same model.

[‡]Linear regression analysis was used for the Physician Compare and Meaningful Use analyses.

[§]The health information technology composite variable was excluded from the Meaningful Use model to avoid over-adjustment.

[¶]Reference group is physician owned.

^{††}Reference group is commercial insurance. All analyses used weighted data.

ACO, accountable care organization; HMO, health maintenance organization; IPA, Independent Practice Association; PHO, Physician Hospital Organization; SE, standard error.

Relationship between Public Reporting and Participation in Value-Based Reforms

Practices with prior exposure to public reporting were approximately 4 percentage points more likely to participate in ACOs (Table 3; ME, 0.036, SE, 0.014, $p < .05$), 12 percentage points more likely to participate in Physician Compare (ME, 0.120, SE, 0.026, $p < .001$), and 14 percentage points more likely to participate in Meaningful Use (ME, 0.136, SE, 0.046, $p < .001$). These average marginal effects correspond to increases of 24 percent, 25 percent, and 28 percent in the probability of participating in ACOs, Physician Compare, and Meaningful use, respectively (Table S3 in Appendix SA2).

Relationship between Performance Incentives and ACO Preparedness

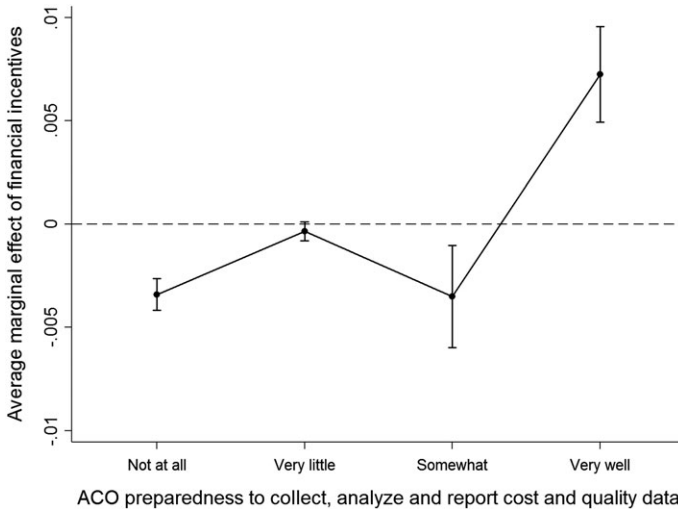
Among ACO participants, experience with both financial incentives (regression coefficient, 0.032, SE, 0.011, $p < .001$) or public reporting (regression coefficient, 0.967, SE, 0.162, $p < .001$) was positively and significantly related to practices' preparedness to collect, analyze, and report those cost and quality measures required by Medicare ACO contracts (Figure 1, Table S6 in Appendix SA2). These effects appeared nonlinear in both models, with financial incentives and public reporting incentives most strongly related to an increased probability of being "very well" prepared to utilize cost and quality data (Figure 1, Figure S4, and Table S7 in Appendix SA2). Experience with public reporting was also positively related to improved ACO preparedness to implement Meaningful Use, while financial incentives were not (Tables S6 and S7 in Appendix SA2).

Although participation in value-based reforms was independently related to organizational characteristics such as the health IT index, the patient-centered culture index, and revenue from HMOs (Table 2), heterogeneity analyses uncovered only limited evidence that organizational characteristics modified the relationship between performance incentives and participation (Table S8 in Appendix SA2).

DISCUSSION

Using a nationally representative survey of U.S. physician practices, we found that greater prior exposure to performance incentives, including both financial incentives and public reporting, was strongly and significantly related to participation in Medicare ACOs and Meaningful Use. This pattern holds true even

Figure 1: Average Marginal Effect of Financial Incentives on ACO Preparedness to Utilize Cost and Quality Data



Notes. Ordered probit analysis was conducted on the 259 NSPO3 practices that had applied to become a Medicare ACO. Each dot represents the average marginal effect of financial incentives on the likelihood of a practice reporting a specific level of preparedness. For example, for each additional 1 percentage-point increase in financial incentives for cost or quality, there is about a 0.7 percentage-point increased probability of a practice reporting that their ACO is “very well” to collect, analyze, and report cost and quality data. Average marginal effects derived from the ordered probit regression were largely consistent with regression coefficients from the same models (Table S6 in Appendix). The vertical lines represent 95% confidence intervals. ACO, accountable care organization.

among those practices that have applied to contract with ACOs, where experience with either financial incentives or public reporting was related to significantly improved preparedness to collect, analyze, and report on required cost and quality measures. Exposure to public reporting but not financial incentives was positively associated with participation in Medicare Physician Compare.

These findings suggest that physicians with prior experience and success responding to payer incentives are disproportionately participating in and learning from Medicare’s new value-based payment initiatives. On the other side are those physician practices with little to no prior exposure to value-based payments or public reporting who are not engaging in reforms at the same rate. To encourage practice participation in MACRA’s APMs, Medicare will not only need to facilitate participation among incentive-savvy practices but also encourage and address the needs of those practices currently left behind by value-based payment reforms.

Our findings are consistent with several different hypotheses about why practices join or abstain from value-based reforms, each suggesting a different set of potential policies. If our findings stem from practices seeking to minimize risk or maximize profit in the short run, Medicare could motivate these practices to join ACOs by continuing to offer one-sided risk ACOs (i.e., shared savings but not shared losses) or by rewarding improvements over time, in addition to achievement. Given previous findings that capital constitutes a major barrier to physician leaders initiating an ACO (Colla et al. 2014), it is also possible that our results reflect capital constraints or other infrastructural barriers. If this were the case, Medicare's Transforming Clinical Practice Initiative, which will provide \$685 million in technical assistance to 39 collaborative health care networks representing 140,000 physicians, represents an important step forward in encouraging greater participation (Center for Medicare and Medicaid Services 2015).

On the other hand, if our results reflect physicians' idiosyncratic preferences regarding care delivery or perceived benefit to patient health, Medicare will need to address and alleviate those concerns held by physicians that have historically opted out of these reforms. In this scenario, improving participation in value-based reforms will likely require simultaneous efforts to promote physician support among late adopters for Physician Compare and other historically unpopular programs (Berenson and Kaye 2013; Berenson and Rice 2015). Medicare could use some of the \$15 million per year set aside by MACRA for measure development through 2018 to more effectively involve physicians and specialty societies in developing, implementing, and evaluating both the measures and the payment design itself (McClellan et al. 2015; Roland and Dudley 2015). Nonetheless, Medicare must ensure that those measures that are selected ultimately reflect societal priorities, not physicians', focusing particular attention on cost-effectiveness and socioeconomic disparities (Ryan 2013; Morden et al. 2014; Selby, Forsythe, and Sox 2015).

At the same time, physicians joining MACRA's APMs and other two-sided risk models will likely require very different types of assistance than those joining the MIPS. This possibility is underscored by our finding that participation in Medicare ACOs, the basis for the APM track, is only weakly correlated with participation in either Physician Compare or Meaningful Use, which form the foundation for the MIPS track. Similarly, experience with value-based payment may also reflect or confer capacities that are distinct from those required by public reporting. Experience with financial incentives was significantly related to participation in ACOs, which primarily utilize financial risk to motivate physician behavior, but not Physician Compare,

historically a pay-for-reporting program. Conversely, public reporting was more strongly related to Physician Compare than ACO participation.

Our study has a number of limitations. First, the cross-sectional study design limits causal inference. A practice's decision to enter public reporting or pay-for-performance programs may be a signal of practices' unmeasured interests or capabilities that could also be correlated with participation in value-based reforms. While reverse-causality could also bias our results (i.e., increased program participation increases practices' exposure to financial incentives), we consider this is unlikely for several reasons: (1) respondents were asked about past-year experience and preceded the start of the ACO "payment year" (i.e., when ACO incentives would affect practice revenue); (2) respondents were specifically instructed to disregard Meaningful Use payments; and (3) Physician Compare did not constitute a pay-for-performance program at the time of the survey. However, given the relatively early introduction of Physician Compare (2006), reverse-causality constitutes a greater threat in the context of our public reporting variable.

Second, our main financial exposure variable is a function of two inputs—share of revenue tied to financial incentives and performance within those incentive structures—and thus our results reflect both practice experience and success with such schemes. Nonetheless, our alternative specification of any financial incentive (rather than percentage of revenue from incentives) remained strongly related to ACO participation and positively, albeit non-significantly, related to Meaningful Use. Third, we uncovered evidence that the presence of financial incentive outliers (i.e., those with at least 20 percent of revenue from financial incentives) was slightly biasing our results downward, and their exclusion shifted the marginal effect from approximately 1 to 1.5 percentage points.

Finally, caution must be taken in generalizing our results. The influence of performance incentives on value-based reforms is likely context-dependent and depends on the exact nature of the incentives (e.g., bonus size, likelihood), programs (e.g., incentivized measures, beneficiary population), and timing (e.g., early versus late adoption; Kronick, Casalino, and Bindman 2015; Wu et al. 2016). Although we seek to evaluate whether past exposure to incentives can encourage and facilitate participation in Medicare's value-based reforms, these relationships will likely change as the scale and scope of ACOs, Physician Compare, and Meaningful Use evolve and are consolidated into the MIPS and APM payment pathways. These relationships are likely yet more complex in the context of commercial insurance, given the enormous diversity of ACOs, ACO-like programs, and other value-based initiatives offered by commercial payers.

Medicare Access and Children's Health Insurance Program Reauthorization Act embodies the belief that financial incentives can motivate providers to participate in value-based reforms to improve quality and efficiency. Incentives are not a panacea, nor are all incentives financial (Phipps-Taylor and Shortell 2016). Nonetheless, policy makers have at their disposal a very limited number of tools—most prominently, money and information (Glied 2015). We find that experience responding to financial incentives and public reporting may powerfully enhance practices' ability to join Medicare's value-based payment reforms. These incentives have clear limits, however. The increased dependence on such external incentives as the sole instrument for systematic change necessitates careful consideration by all. There is likely need to consider a broad range of incentives and support to ensure systematic changes on a broad scale.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the supporting information tab for this article:

Appendix SA1: Author Matrix.

Appendix SA2: Supplement to “Financial Incentives and Physician Practice Participation in Medicare’s Value-Based Reforms” (Markovitz et al., HSR)

Figure S1. Value-Based Programs Targeting Medicare Physicians.

Figure S2. CONSORT Diagram.

Figure S3. Histogram of Previous Exposure Financial Incentives and Public Reporting.

Figure S4. Average Marginal Effect of Public Reporting on ACO Preparedness to Utilize Cost and Quality Data.

Table S1. Key NSP03 Instruments and Variables.

Table S2. Regression Analysis of the Association between Performance Incentives and Participation in ACOs, Physician Compare, and Meaningful Use.

Table S3. Semi-Elasticity Estimates of Effects of Financial Incentives on Participation in Medicare’s ACOs, Physician Compare, and Meaningful Use.

Table S4. Incremental Effect of Any Exposure to Financial Incentives for Either Quality or Efficiency on Participation in Medicare’s ACOs, Physician Compare, and Meaningful Use.

Table S5. Outlier Analysis of Effect of Financial Incentives and Participation in ACOs.

Table S6. Ordered Probit Analysis of the Association between Performance Incentives and ACO Preparedness.

Table S7. Ordered Probit Analysis of the Marginal Effect of Performance Incentives on ACO Preparedness.

Table S8. Heterogeneity Analysis of Marginal Effect of Performance Incentives and Participation in ACOs, Physician Compare, and Meaningful Use.