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Characteristics of teacher incentive pay programs: a statewide district survey

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Abstract

Purpose – The purpose of this paper is to examine the characteristics of teacher incentive pay programs used by midsize to large school districts in Missouri.

Design/methodology/approach – This study primarily used the Teacher Compensation Programs (TCP) survey data. The TCP survey was developed by the authors to understand the nature and characteristics of financial incentives that Missouri districts used to recruit, reward, and retain quality teachers.

Findings – The data showed that, during the 2009-2010 academic year, 32 percent of the districts offered at least one financial incentive to recruit or retain teachers. Districts were more likely to reward teachers for obtaining National Board certification and for assuming extra duties than for teaching in the subject areas of shortage or in hard-to-staff schools. Larger districts with higher teacher salary were more likely than small districts to offer a larger number of incentive pay programs.

Originality/value – The findings of this study advance our knowledge of local incentive pay policies. It also contributes to the global discourse of teacher compensation and incentives and can be informative to policymakers in the USA and around the world when designing and implementing incentive pay programs to teachers. Further, it sheds light on the important policy question of whether disadvantaged local educational agencies are more likely to use incentive pay programs to recruit and retain teachers and promote an equitable distribution of the teacher workforce. This informs the decision making of providing targeted support to those in need.

Keywords Educational policy, Educational research, Survey, Incentive pay, Questionnaire, Performance-related pay, Differentiated compensation

Paper type Research paper

The recruitment and retention of highly qualified teachers remains challenging for many countries in the world. It is estimated that between 2010 and 2015, 6.8 million teachers need to be recruited to ensure quality primary education for all children globally (UNESCO Institute for Statistics, 2012). In addition, research has shown that academically talented college students are less likely to become teachers and effective teachers in subject areas of shortage are more likely to leave the profession (Hoxby and Leigh, 2004; Podgursky *et al.*, 2004). Among the many promising approaches, providing adequate and targeted financial incentives is of particular interest to policymakers and about half of OECD countries have implemented some element of financial reward for teacher performance (Asia Society, 2011).

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In the USA, there is a growing national interest in using incentive pay programs (Liang, 2013a; Podgursky and Springer, 2007). Under the American Recovery and Reinvestment Act of 2009, the federal government issued the $4.35 billion *Race to the Top Fund* and one goal of the program is to reform educator compensation systems by providing additional pay to highly effective teachers and principals (US. Department of Education, nd). By the 2011-2012 academic year, states across the nation have enacted policies of providing financial incentives to recruit teachers in math (15 states), science (15 states), and special education (15 states), and to attract teachers to schools of high poverty (8 states), low performance (ten states), or geographic isolation (three states). In addition, 24 states had policies of rewarding teachers for obtaining National Board certification, 15 states for taking on differentiated roles, and 11 states for raising student achievement (Education Counts Research Center, nd).

In spite of this increasing global interest, the knowledge base on the implementation of these programs is still limited (Loeb *et al.*, 2009; Podgursky and Springer, 2007). Little empirical work exists that comprehensively examined the use of different financial incentives, and the characteristics of these programs. To fill this knowledge gap, this study used survey data collected in 2011 from 125 midsize to large districts in the state of Missouri in the USA, and examined four important elements of teacher incentive pay programs: target teachers of the program; criteria used for offering financial incentives; types of payment; and amount of awards. In addition, it examined the relationship between district characteristics and the offering of these programs. Specifically, it examined the following research questions:

RQ1. What percentage of districts in Missouri offered incentive pay programs to recruit and retain teachers during the 2009-2010 academic year?

RQ2. What were the characteristics of teacher incentive pay programs (i.e. criteria used for offering financial incentives, types of payment, and amount of awards)?

RQ3. What were the characteristics of the districts that offered incentive pay programs during the 2009-2010 academic year?

The findings of this study advance our knowledge of local incentive pay policies and provide policymakers with implementation data. It also contributes to the global discourse of teacher compensation and incentives and can be informative to policymakers in the USA and around the world when design and implement incentive pay programs to teachers. Further, it sheds light on the important policy question of whether disadvantaged local educational agencies are more likely to use incentive pay programs to recruit and retain teachers and promote an equitable distribution of the teacher workforce. This informs the decision making of providing targeted support to those in need.

Literature review

Human resource (HR) management and financial incentives

Building a strong teacher workforce of capacity and expertise is a key function of HR management to enhance educational outcomes (Myung *et al.*, 2013). A comprehensive HR system requires three inter-connected subsystems on teacher recruitment and retention: getting the right teachers in the right positions, supporting and developing teachers with professional growth, and sustaining high-performing teachers. All these subsystems are critical to enhancing teacher capabilities and improving classroom instruction (Myung *et al.*, 2013). Research shows that a teacher's career decision can be influenced by a variety of factors such as earning opportunities outside the profession

and working conditions. Therefore, getting high-quality candidates into the system and keeping the best teachers in the classrooms are critical in teacher HR management.

Among the many approaches to attract and retain teachers, one high-leverage way is to provide targeted financial incentives (Heneman and Kimball, 2008; Milanowski, 2008; Odden, 2008). This approach gains support from the expectancy theory of motivations (e.g. Lawler, 1971; Locke and Latham, 1990; Vroom, 1964). According to the theory, three key conditions jointly determine an individual teacher's motivation: the teacher must perceive the existence of a relationship between efforts and performance (i.e. expectancy); the teacher must perceive that such performance will lead to certain outcomes (i.e. instrumentality); and the outcomes must be desirable or attractive to the teacher (i.e. valence). If any of the three conditions is not met, the motivational effect will be zero and the teacher will not be motivated.

Therefore, an HR policy of aligning expectancy, instrumentality, and valence and providing attractive financial incentives would motivate teachers for higher levels of efforts and performance such as teaching subjects in high demand in disadvantaged schools, improving their knowledge and skills, taking differentiate roles and responsibilities, and achieving outstanding performance. In the long run, it will elicit a sorting effect of attracting and retaining high-quality teachers who can produce the rewarded outcomes (e.g. improving student achievement) in the profession (Lazear, 2003; Hanushek and Rivkin, 2007; Milanowski, 2003).

Characteristics of teacher incentive pay programs

Three elements are important for the design and implementation of incentive pay programs: types of program; types of payment; and amount of awards. Some of the popular programs in the USA that global policymakers may consider target teachers who teach in the subject areas of shortage; teach in hard-to-staff schools; improved their knowledge and/or skills; assume extra duties; and performed exceptionally well based on teacher evaluation (Rice *et al.*, 2009; Springer, 2009).

The first two market-based programs are attractive because many disadvantaged schools find it difficult to recruit and retain teachers in high demand subjects (Podgursky, 2009). As compensation is an important factor associated with teachers' career decisions (e.g. Imazeki, 2005) and student achievement (e.g. Akiba *et al.*, 2012), one way is to provide targeted financial incentives to teachers in hard-to-staff subjects and schools. Such programs are flexible and easy to administer. They respond to market demands and can be effective in attracting teachers in critical shortage areas and schools. However, they do not take into account individual performance, and can lead to concerns on pay fairness.

Alternatively, policymakers may offer knowledge- and skill-based pay to reward teachers for developing their knowledge and skills (Springer, 2009). One example in the USA is to reward teachers for attaining the National Board certification. These programs are flexible to be tailored and aligned with school and district goals. They demonstrate an emphasis on teacher learning and development. However, the design and implementation of the system and the evaluation of their knowledge and skill can be cumbersome.

Another type of financial incentives as represented by career ladder programs offers extra pay to teachers for assuming additional duties and responsibilities (Springer, 2009). For example, through the career ladder program, teacher in Missouri who met statewide and district-level performance criteria were eligible to receive supplementary compensation of up to $5,000 for assuming responsibilities, which could be extra

teaching work or participation in professional learning activities (Booker and Glazerman, 2009). These programs promote teacher leadership and involvement in school activities and encourage teachers to take on responsibilities related to overall school goals. However, fairness may become an issue when determining how much pay is equitable to different roles and volunteerism may be discouraged.

The fifth program (i.e. performance-related pay, or PRP) rewards teachers for excellent teaching or improving student achievement based on performance evaluation systems. Such models focus on outcomes and accountability, and align with school goals of improving teacher practice and student learning and growth. However, it is often difficult to establish fair and measurable evaluation standards and there are often concerns on the fair distribution of bonus funds. There exists a growing body of empirical studies on its implementation (e.g. Liang and Akiba, 2011) and impact on student and teacher outcomes. Some studies found positive effects of teacher PRP programs on student achievement in the USA (Figlio and Kenny, 2007; Winters *et al.*, 2009), England (Atkinson *et al.*, 2009), Kenya (Glewwe *et al.*, 2010), Israel (Lavy, 2002, 2009), and India (Kingdon and Teal, 2007; Muralidharan and Sundararaman, 2011). Some other studies, however, found no consistent impact of such programs on student learning (Fryer, 2011; Goodman and Turner, 2010; Marsh *et al.*, 2011; Springer *et al.*, 2010).

Types of payment and amount of awards are also important elements. Compared with one-time bonuses, awards in the forms of salary raises, extra steps or channels on the salary schedule, and annual stipends are more attractive to teachers because they become permanent increases in teachers' base pay. The cumulative amount of the awards can be substantial and desirable. In addition, financial incentives need to be substantial so as to effectively in affecting teachers' career decision and performance (Lawler, 1990; Liang, 2013b; Hanushek *et al.*, 2004).

District characteristics and the offering of teacher incentive pay programs

Empirical studies have shown that teachers are more likely to leave disadvantaged schools such as those with high proportion of poor and minority students in rural areas (Hanushek *et al.*, 2004; Monk, 2007). Therefore, those schools and districts may be more interested in using financial incentives to combat the uneven distribution of high-quality teachers. In addition, policymakers often need to factor in the local contexts such as the position of teachers unions. In the USA, for example, the National Education Association supports providing extra compensation to teachers for teaching in hard-to-staff schools, earning National Board certification, and assuming extra duties, and opposes to tying teacher pay to student test scores, and rewarding teachers in hard-to-staff subjects (Koppich, 2010). Opposition from teacher unions has historically led to the failure of many PRP programs (e.g. Murnane and Cohen, 1986) and empirical studies consistently found an inverse relationship between union opposition and districts' use of PRP (e.g. Liang and Akiba, 2011).

To our knowledge, only two empirical studies have examined the use of various incentive pay programs at the local level and they were both conducted in the USA. Using survey data from 494 superintendents, Balter and Duncombe (2008) found that larger districts were more likely than high need rural districts to offer financial incentives, particularly to National Board-certified teachers. In addition, they found that districts using only a limited set of recruitment practices hired less qualified teachers. Using California data, Strunk and Zeehandelaar (2011) found that districts with a larger population of Hispanic students in rural areas were less likely to reward teachers for obtaining National Board certification. Due to the legal requirement in

California that districts negotiate with teachers unions on teacher compensation policies, Strunk, and Zeehandelaar did not control for the influence of teachers unions. In addition, districts in California have much larger enrollment of Hispanic students than the national average (Snyder and Dillow, 2011). Therefore, there is a need to examine the use of teacher financial incentives with different policy contexts and characteristics.

The Missouri context

Missouri is similar to many others in the USA regarding state-level teacher incentive pay policies. During the 2011-2012 academic year when the survey data for this study were collected, Missouri did not have a state policy for rewarding teachers for: teaching in hard-to-staff teaching assignment areas; teaching in challenging schools; obtaining National Board certification; taking on differentiated roles; and increasing student achievement. The corresponding total numbers of states across the nation were 36, 31, 27, 36, and 40, respectively (Education Counts Research Center, nd). Missouri is also similar to the majority of states in decentralizing curriculum decision making (Pipho, 1991), and does not have a state right-to-work law (US Department of Labor, nd). The state excludes teachers from the collective bargaining law (Education Commission of the States, 2008), and allows districts to bargain with union representatives (Lindy, 2011). Therefore, districts in Missouri have much local decision-making power and flexibility to develop and implement different types of teacher incentive pay programs.

Method

Data

This study relied on the Teacher Compensation Programs (TCP) survey data, developed by the authors to understand the nature and characteristics of financial incentives that Missouri districts used to recruit, reward, and retain teachers. It focussed on midsize to large districts which met the following criteria: being a standard school district as classified and accredited by the State Board of Education; having at least two school buildings in the district; and enrolling at least 1,000 students. Using administrative data from the state department, we identified 172 eligible districts and mailed the TCP survey in fall 2010. Although these 172 districts constituted only one third of all districts, they employed 84.8 percent of teachers and enrolled 84.2 percent of K-12 students, and therefore the incentive pay programs they offered influence the majority of teachers and students in the state.

Two waves of surveys were mailed to eligible districts in October and November, 2010. The collection of data concluded in January, 2011, and 125 out of the 172 districts returned complete surveys with a response rate of 72.7 percent. Each participant received a $15 gift card for a major online retailer as a financial incentive. The respondents consisted of primarily superintendents (20.8 percent), assistant superintendents (23.2 percent), and payroll/human resource officers (26.4 percent). *t*-tests and χ^2-tests did not show statistically significant differences between participant and nonparticipant districts in observable characteristics (e.g. enrollment).

Measures

Teacher incentive pay programs. The TCP survey asked whether districts used financial incentives to recruit and retain teachers during the 2009-2010 academic year. Two dummy variables were created for the recruitment of teachers new to the districts, and the retention of existing teachers, respectively. For those who reported having

provided such incentives, they were asked the criteria, types of payment, and amount of awards.

Criteria used for offering financial incentives. The survey asked whether districts offered financial incentives to recruit teachers new to the districts for: teaching in the subject areas of shortage; teaching in hard-to-staff schools; attaining National Board certification; and other factors. For existing teachers, it asked whether the district rewarded teachers for: assuming extra duties (e.g. lead teacher); obtaining National Board certification; achieving excellence in teaching individually; achieving excellence in teaching collectively; and other factors. Their responses were coded as 1 = yes, 0 = no for each item.

Types of payment and amount of awards. For those who indicated that their districts offered financial incentives, they were asked to report the types of payment from the following list: salary raise, defined as a percentage increase in teachers' salary; extra steps/channels, defined as advancement of one or more extra steps/channels on the salary schedule; a one-time cash bonus; and annual stipend, defined as a recursive annual bonus. A series of dummy variables were created for each item. The respondents were also asked to report the average amount of awards either in percentage or dollar amount.

District-level variables. The following district-level variables were obtained from the state department: average teacher salary; enrollment; ethnic diversity level, as measured by the percentage of ethnic minority students; student performance level, as measured by the mean score for mathematics and communication arts in the state mandated Missouri Assessment Program (MAP); location, coded as 1 = rural district, and 0 = otherwise; and AYP status, coded as 1 = district met AYP requirement in mathematics and/or communication arts, and 0 = otherwise. It is important to note that out of the 521 districts in Missouri, 379 are rural districts (72.7 percent). Therefore, although this study focussed on midsize to large districts, there were still a large percentage of rural districts in the sample. The measure of the influence of teachers union came from the TCP survey in which respondents were asked, "Does this district have an agreement with a teachers' association or union for the purpose of collective bargaining or meet-and-confer discussion?" with the answer choices of "yes, collective bargaining", "yes, meet-and-confer", and "no". Two dummy variables were created for districts with collective bargaining agreements and districts with meet-and-confer discussions. The Appendix provides descriptive statistics of the district-level variables.

Analysis

To answer the first and second questions, we computed and reported descriptive statistics. To address the third question, we used a series of binary logistic regressions to estimate the relationship between district characteristics and districts' probability for offering each type of incentive pay programs. In addition, because districts may provide teachers with multiple financial incentives, we used OLS regression to explore the association between district characteristics and the number of financial incentives.

Results

Percentage of districts offering incentive pay programs

Table I shows that in 2009-2010, all the 125 districts primarily used salary schedules to pay teachers, a finding consistent with the previous studies (e.g. Podgursky, 2009). In addition, 85 districts (68.0 percent) did not offer any incentive pay program, 21 districts (16.8 percent) offered one program, 14 districts (11.2 percent) used two programs,

Table I.
Teacher compensation approaches used by districts in Missouri in 2009-2010

	n	(%)
Districts primarily used formal salary schedules to pay teachers	125	100.0
The number of districts that offered		
No incentive pay program	85	68.0
One incentive pay program	21	16.8
Two incentive pay programs	14	11.2
Three incentive pay programs	2	1.6
Four incentive pay programs	3	2.4
The number of districts that offered incentive pay programs to		
Recruit new teachers only	2	1.6
Retain existing teachers only	30	24.0
Both recruit new teachers and retain existing teachers	8	6.4

Note: $n = 125$

and five districts (4.0 percent) offered three or more programs. Thus, only 40 districts (32 percent) implemented a teacher incentive program. These percentages are smaller than those in California where 72.8 percent of the districts used at least one and 38.8 percent offered two or more programs in 2008-2009 (Strunk and Zeehandelaar, 2011).

In addition, districts were more likely to reward existing teacher than teachers new to the districts. Among the 40 districts that implemented at least one program, 30 districts had a program only for retaining existing teachers compared to only two districts that had an incentive pay program for recruiting new teachers. Ten districts rewarded both new and existing teachers.

Characteristics of incentive pay programs

Tables II and III present the characteristics of the programs. Because districts may offer multiple financial incentives simultaneously, the right column of Table II shows the frequency of combinations of multiple programs. These percentages sum up to 100 percent.

Criteria use for offering financial incentives. The first panel of Table II shows that seven districts (70.0 percent) rewarded National Board-certified teachers. This is the most common criteria used for offering pay incentives to new teachers. Other criteria were less common; only two districts (20 percent) incentivized teachers for teaching in the subject areas of shortage, two districts (20 percent) for teaching in hard-to-staff schools, and three districts (30 percent) for other qualifications. Of the seven districts that rewarded National Board certification, five used this as the only criteria for a pay incentive to new teachers, and two other districts used multiple criteria.

The second panel shows that, of the 38 districts that reward existing teachers, 25 (65.8 percent) offered a financial incentive to teachers who performed extra duties such as mentoring colleagues, 25 districts (65.8 percent) to National Board-certified teachers, and two districts (5.3 percent) for some other characteristics such as holding a doctorate degree. No districts reported having offered individual or school performance-related pay. In addition, 14 districts rewarded teachers for assuming extra duties and obtaining National Board certification, 11 districts for assuming extra duties only, and ten districts for obtaining National Board certification only. Three districts offered some other combinations of incentive pay programs.

Types of payment and amount of awards. The first panel in Table III shows that to recruit new teachers in hard-to-staff subject areas, one district offered an extra 1.8

Targets and criteria		Criteria in combination	
Teachers new to the districts (n = 10)			
Subject areas of shortage	2 (20.0%)	National Board certification only	5 (50.0%)
Hard-to-staff schools	2 (20.0%)	Subject areas of shortage and hard-to-staff schools	1 (10.0%)
National Board certification	7 (70.0%)	Other combinations	4 (40.0%)
Other (e.g. doctorate holders)	3 (30.0%)		
Existing teachers in the districts (n = 38)			
Assuming extra duties	25 (65.8%)	Assuming extra duties and National Board certification	14 (36.8%)
National Board certification	25 (65.8%)	Assuming extra duties only	11 (28.9%)
Individual performance pay	0 (0.0%)	National Board certification only	10 (26.3%)
School performance pay	0 (0.0%)	Other combinations	3 (7.9%)
Other (e.g. doctorate holder)	2 (5.3%)		

Note: $n = 125$

Table II. Targets and criteria used in incentive pay programs offered by districts in Missouri: 2009-2010

	Salary raise[a]	Extra step/ channel	One-time bonus	Annual stipend
Programs to new teachers (ten districts)				
Subject areas of shortage (two districts)	One district (1.8%)[b]	Two districts (one extra step)	None	NA
Hard-to-staff schools (two districts)	1 district (1.8%)	2 districts (one extra step)	None	NA
National Board certification (seven districts)	1 district (10.0%)	None	6 districts (mean: $2,217) (range: $1,500-$3,500)	NA
Programs to existing teachers (38 districts)				
Assuming extra duties (25 districts)	4 districts (mean: 2.5%) (range: 0.1%-5.0%) 3 districts[c] (amount varies)	2 districts (one extra step)	None	7 districts (mean: $2,014) (range: $300-$5,000) 11 districts[c] (amount varies)
National Board certification (25 districts)	2 districts (mean: 10.0%)	1 district (one extra step) 1 district (one extra channel)	None	22 districts (mean: $2,445) (range: $1,000-$5,000)

Notes: [a]A salary raise was defined as a percentage increase in the teacher's salary. An extra step/channel was defined as advancement of one or more extra steps/channels on the salary schedule. A one-time bonus was defined as a one-time cash bonus. An annual stipend was defined as a recursive annual cash bonus; [b]The total numbers of districts in some rows are different from those in Table II because some districts offered teachers with multiple financial incentives; [c]Districts indicated that the amount of awards varies based on such factors as duties, salary levels, and school levels, and districts did not report the average amount of awards

Table III. Types of payment and amount of awards of incentive pay programs offered by districts in Missouri in 2009-2010

percent increase in base pay, two districts provided an extra step on the salary schedule, but none gave one-time cash bonuses. These two districts used the same methods for recruiting teachers in hard-to-staff schools. For teachers certified by the National Board, one district provided an extra 10 percent increase in base salary, and six districts offered one-time cash bonuses with an average amount of $2,217.

The second panel shows that, of 25 districts that offered incentives to teachers for assuming extra duties, seven districts increased the base salary for extra work. Four districts reported the amount of awards which ranged from 0.1 to 5.0 percent with an average of 2.5 percent of the base salary. Two districts offered one extra step on the salary schedule. Among the 18 districts that provided teachers with annual stipend, seven districts reported the amount of awards which varied from $300 to $5,000 with an average of $2,014. Among the 25 districts that rewarded teachers for obtaining National Board certification, two districts increased the base pay by 10 percent, one district offered an extra step and one district an extra channel on the salary schedule, and 22 districts gave annual stipends ranging from $1,000 to $5,000 with an average of $2,445. No district offered one-time cash bonuses.

Characteristics of districts offering incentive pay programs

Table IV presents the results of four binary logistic regression models. The fifth column reports the association between district characteristics and the number of programs. Because the initial analyses showed that urban and suburban districts are not significantly different in their program offering, they are combined in the final analysis and reported as the reference group compared with rural districts.

The first model examines districts' use of financial incentives to new and/or existing teachers who have obtained National Board certification. We see that the average teacher salary and the size of the district are significantly and positively associated districts' use of the program. Holding other factors constant, the probability of rewarding National Board-certified teachers increases 23.1 percentage points with every $10,000 increase in average teacher salary, and increases 2.5 percentage points with every 1,000 student increase in enrollment.

The second model shows that rural districts are less likely than urban and suburban districts to reward existing teachers who performed extra duties. After controlling for the other factors, the probability of providing teachers with a financial incentive for assuming extra duties in rural districts is 32.2 percentage points lower than that in other districts. The coefficients for teacher salary and district enrollment are positive, but not statistically significant.

The third model examines districts' offering of any incentive pay program to existing teachers. Again, average teacher salary is significantly and positively associated with the use of financial incentives. Holding other factors constant, every $10,000 increase in teacher salary is associated with an increase of 18.6 percentage points in the probability of districts offering financial incentives to existing teachers. Similarly, average teacher salary is significantly related to districts' offering of incentive pay to new and/or existing teachers, and rural districts are less likely to use the program than urban and suburban districts do.

When districts provide teachers with multiple incentive pay programs, the combined effect of the financial incentives can be substantial. The fifth column shows that on average, larger districts in urban and suburban areas that offer higher average

Table IV.
Relationship between district characteristics and districts' offering of incentive pay programs

	Incentive pay for National Board certification to new and existing teachers		Incentive pay for extra duty to existing teachers		Any incentive pay to existing teachers		Any incentive pay to new and existing teachers		Multiple incentive pay to new and existing teachers[a]	
	B(SE)	Prob.[b]	*B*(SE)	Prob.	*B*(SE)	Prob.	*B*(SE)	Prob.	*B*(SE)	*β*
Average teacher salary (in $10,000s)	1.000** (0.471)	0.231	0.392 (0.432)	0.097	0.783* (0.414)	0.186	0.671* (0.405)	0.162	0.286** (0.134)	0.230
Enrollment (in 1,000s)	0.100* (0.052)	0.025	0.045 (0.048)	0.011	0.034 (0.047)	0.009	0.052 (0.048)	0.013	0.030* (0.016)	0.185
% Ethnic minority	−0.024 (0.015)	−0.006	0.010 (0.012)	0.002	0.001 (0.011)	0.000	0.000 (.011)	0.000	−0.002 (0.004)	−0.055
Mean MAP score	0.003 (0.009)	0.001	0.003 (0.008)	0.001	0.007 (0.008)	0.002	0.004 (0.007)	0.001	0.001 (0.002)	0.028
Rural district	−1.085 (0.711)	−0.247	−1.526* (0.802)	−0.322	−0.764 (0.545)	−0.182	−0.896* (0.538)	−0.210	−0.313** (0.155)	−0.186
AYP status	−0.176 (0.775)	−0.044	0.596 (0.702)	0.145	−0.261 (0.674)	−0.065	0.064 (0.635)	0.016	0.004 (0.208)	0.002
Collective bargaining	0.450 (1.007)	0.111	−0.956 (1.049)	−0.222	−0.536 (0.918)	−0.131	−0.660 (0.925)	−0.159	−0.158 (0.304)	−0.049
Meet-and -confer	0.358 (0.570)	0.088	−0.317 (0.548)	−0.079	0.032 (0.473)	0.008	0.019 (0.463)	0.005	0.054 (0.148)	0.033
Constant	−7.707 (4.823)	−0.500	−4.749 (4.453)	−0.491	−8.119* (4.248)	−0.500	−6.265 (4.135)	−0.498	−1.262 (1.361)	
R^2	0.259		0.187		0.178		0.173		0.179	

Notes: $n = 124$. [a]Multiple regression was conducted to examine the relationship between the number of incentive pay program (ranging from 0 to 4) and district characteristics. Multiple logistic regression was conducted for all the other models; [b]The probability change in districts' use of incentive pay programs with a one-unit increase in each independent variable controlling for the other independent variables was computed based on the equation $\exp(B)/[1+\exp(B)]-0.50$. *$p < 0.10$; **$p < 0.05$

teacher salary are more likely to offer a greater number of incentive pay programs to recruit new teachers into the districts and reward existing teachers than do smaller districts in rural areas with lower average teacher salary.

Discussion

To build a strong teacher HR system, it is important to recruit and retain high-quality teachers into the profession and deploy them where they are most needed. This sets a foundation for enhancing the teaching workforce and improving the performance of the organization (Myung *et al.*, 2013). However, teacher shortage remains a major global policy challenge and much effort is still needed through the development of country-specific strategies (UNESCO Institute for Statistics, 2012). One approach policymakers around the world are interested in is the use of financial incentives (Asia Society, 2011). However, we have very little empirical knowledge on the use of such programs. This study attempts to fill this gap and contribute to the global discourse on the implementation of different types of teacher incentive pay programs.

This study found that few school districts in Missouri used financial incentives to attract teachers in hard-to-staff subjects, or in challenging schools. Given that these teachers have more earning opportunities outside the profession and disadvantaged schools are often in greatest need of quality teachers in subject areas of shortage, this finding may be a concern. When the financial reward is substantial and attractive, according to the expectancy theory of motivations, teachers in high demand perceive the links between their career decision, the reward, and the value of the reward, and should be more likely to choose to enter the profession and stay in the challenging schools. Therefore, these market-based incentive pay programs can be effective policy tools to recruit and retain teachers in high-need subjects and schools.

Offering an incentive pay to National Board-certified teachers is popular for both the recruitment of new teachers and the retention of existing teachers in Missouri. This finding is consistent with the studies in New York (Balter and Duncombe, 2008), and in California (Strunk and Zeehandelaar, 2011). An emerging body of research suggested that National Board-certified teachers are more effective in improving student achievement (e.g. Goldhaber and Anthony, 2007; Vandervoort *et al.*, 2004), and teachers unions supported providing teachers with extra pay for getting certified by the National Board (Koppich, 2010). Thus, offering such programs focussing on improving teachers' knowledge and skills could be a promising as well effective approach to motivating teachers to improve their instruction and enhance student achievement.

The types of payment and the amount of awards are important factors policymakers need to consider when designing incentive pay programs. This study found that districts in Missouri are more likely to reward teachers with salary raises, extra steps/channels, and annual stipends than one-time bonuses. Although the award levels are generally lower than the recommended 10 to 20 percent (Hanushek *et al.*, 2004; Lawler, 1990), the districts were more likely to reward teachers by increasing their base salary, advancing them on the salary schedule, and providing them with recursive annual stipends rather than one-time bonuses. These types of awards are built into base salary and become permanent increases. The cumulative amount in the long run can be attractive and this helps strengthen the efficacy of the incentives.

Furthermore, this study found that small and poor districts are less likely to reward teachers certified by the National Board, or to offer a larger number of programs. This is consistent with previous studies (Balter and Duncombe, 2008; Liang and Akiba, 2011).

Due to higher teacher attrition in small rural districts and that financial incentives can be an important vehicle for teacher recruitment and retention, these findings may be a concern.

Before discussing the implications, it is important to identify the limitations of the study. First, this study focussed on 125 midsize to large districts in one state in one country. It is therefore unclear as to whether the findings can be extended to other states or countries which vary in their political, financial, and cultural capitals in supporting incentive pay programs. In addition, this study used average teacher salary as a measure of teacher salary levels. A specific point on the salary schedule for teachers in the district (e.g. teachers with an MA degree and 15 years experience) would provide a better measure, but unfortunately, such data were not available to the researchers. Furthermore, the landscape of teacher evaluation and compensation has been changing in the past several years in the USA due to the federal initiatives such as Race to the Top and Elementary and Secondary Education Act (ESEA) Flexibility. As one of the 43 states that have been approved for ESEA flexibility and to comply with the waiver, Missouri is incorporating student achievement into teacher evaluation and changing the practice of teacher compensation. According to the National Council on Teacher Quality report (Doherty and Jacobs, 2013), Missouri requires full implementation in 2014-2015 of locally developed systems that make significant use of student achievement data in teacher evaluation. Although the state does not require evaluation results be factored into teacher salaries, it does have policies that individual teachers can receive performance pay bonuses based on student achievement results. Therefore, future studies are needed to examine how the terrain may have changed.

The previous research in California (Steele *et al.*, 2010), Massachusetts (Fowler, 2003), North Carolina (Clotfelter *et al.*, 2008), and Missouri (Liang, 2013b; Liang and Akiba, 2015) have reached mixed conclusions on the impacts of incentive pay programs on student and teacher outcomes. Although it is beyond the capability of this study due to data constraint to examine the effectiveness of these programs or their elements (e.g. the amount of the awards), the expectancy theories do suggest that financial incentive pay is promising in motivating teachers when the rewards are substantial and desirable in relation to the perceived effort required. This study examined one such process – how districts offered incentive pay programs – and the findings have important implications.

Policy and leadership implications

Compensation is a decisive factor for teachers' career decisions. Although few districts in this study offered financial incentives to teachers in subject areas of shortage or in hard-to-staff schools, it is important for policymakers around the world to reexamine their local policy context and priorities and consider offering targeted financial incentives to attract teachers in high demand and ensure the equitable distribution of high-quality teachers across regions.

In addition, although poor schools in rural areas are often in greatest need of teachers, they are less likely to offer a larger number of financial incentives. Incentive pay programs require substantial and sustained investment of financial resources. Within the current global contexts of budget cuts and financial constraints, high-need schools, and local educational agencies may not have the capacity to implement and sustain these programs. It is therefore important for policymakers at the higher levels to consider providing targeted, continuous, and adequate financial assistance to high-need schools and regions, and encourage them to experiment and implement a broad set of sustainable incentive pay programs.

Furthermore, it is important to make the financial incentives substantial so as to be desirable. When there are budget constraints and the amount of awards cannot be as high as recommended (Hanushek *et al.*, 2004; Lawler, 1990), it would be advisable to build the awards into teachers' base salary and make them permanent increases. The cumulative amount of the awards can then be attractive and motivating, and promising in improving the quality and performance of the teacher workforce.

Our study leaves many important research questions unanswered and more studies are needed. First of all, to our knowledge, all the several studies available on teacher incentive pay programs have used data in the USA. Therefore, it is important to examine such practices in other countries with different policy contexts. Meanwhile, in addition to financial incentives, local educational agencies may use other policies such as student loan forgiveness or improving teaching conditions. It is promising for future studies to examine the use and the effectiveness of those policy levers as well. Furthermore and perhaps most importantly, findings are still mixed on the effectiveness of incentive pay programs. An important next step in terms of research will be to examine the causes or the outcomes of these practices in improving teachers' instruction and student achievement, and recruiting and retaining high-quality teachers.

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Appendix

	n	Min	Max	Mean	SD
Average teacher salary ($)	125	36,064	68,129	45,706	6,323
Enrollment	125	1,016	25,046	4,214	4,986
% Ethnic minority students	125	1.06	98.97	17.18	22.48
Mean MAP score	125	509.75	625.90	551.45	29.72
Rural district	125	0.00	1.00	0.32	0.47
AYP status	125	0.00	1.00	0.13	0.34
Collective bargaining district	124	0.00	1.00	0.06	0.25
Meet-and-confer district	124	0.00	1.00	0.39	0.49

Table AI. Descriptive statistics of districts in Missouri that offered incentive pay programs in 2009-2010

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