

# Performance Management in Public Higher Education Unintended Consequences and the Implications of Organizational Diversity

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## Abstract

Governments are increasingly using performance management systems to improve organizational accountability and effectiveness. Critics argue these systems create perverse incentives and neglect important differences in organizational values, missions, and resources. These concerns are particularly salient in public higher education as state governments apply uniform performance accountability policies across diverse institutions. A growing body of literature suggests these policies do not improve performance, but few studies consider their potential unintended consequences or the implications of organizational differences for implementation. Using a difference-in-differences approach, I find that performance funding's effects vary depending on institutions' dependence on state funding: Institutions less dependent on state funding experience graduation rate gains, while more dependent institutions do not. I also find that implementing performance funding is associated with increased selectivity in admissions and a decline in minority enrollment. Broadly, the results suggest organizations will be more successful under performance management systems when they have greater flexibility in their resources and missions consistent with the performance regimes. The results also suggest, however, that institutions may realize performance gains at the expense of other important values.

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# 1 Introduction

Performance management is diffusing rapidly in the public sector, but we still lack definitive evidence about whether policies improve capacity and outcomes (Kroll, 2015; Moynihan et al., 2011). So far, the literature suggests they have minimal effects on organization performance, on average (Gerrish, 2015). This raises important questions about their efficacy, considering the preponderance of potential unintended consequences. Performance management systems may negatively affect organizations, for example, by not accounting for important organizational differences, creating perverse incentives, or by distracting attention from unmeasured, but important organizational outputs or outcomes.

Governments implement performance management systems in a number of areas despite the controversies associated with potential unintended consequences. Performance funding in higher education is one of the more controversial public sector performance management implementations. Several states have performance funding policies that allocate portions of state appropriations for higher education on the basis of performance. A formulaic link between performance information and budget allocations makes performance funding unique among public sector performance regimes. Efforts to make performance information an important aspect of budgetary decision making are common in the public sector, but budgeting schemes relying on automatic, formulaic ties between performance information and allocations are the rare exception (Bischoff and Blaeschke, 2015). If the popularity of performance funding in public higher education is any indication, however, it is quite possible policymakers will introduce similar systems in other functional areas of government. Thus, understanding the implications of implementing advanced performance management systems in higher education is critical for informing future implementations, not only in public higher education, but also in other public sector areas.

This paper explores the implications of performance management implementation, and

the mitigating effect or organizational differences, using the case of performance funding in Indiana, which implemented one of the more highly regarded policies in 2007. The paper proceeds as follows. First, I discuss the relevant literature relating to performance management, in general, followed by its application in public higher education. Second, I describe details of Indiana’s performance funding policy. Third, I specify hypotheses relating to performance, organizational differences, and unintended consequences, followed by a description of the data and methods I use to test the hypotheses. Fourth, I describe the results. Finally, I conclude with a discussion of the results and their implications for public management research and public higher education research.

## 2 Performance Management

Performance management came to prominence in the United States with the emergence of New Public Management (NPM) in the 1980s and the reinventing government movement of the early 1990s; reforms emphasizing results, rather than standardized procedures, and establishing explicit performance measures and standards (Hood, 1991; Joyce and Tompkins, 2002; Radin, 2006). Performance information theoretically provides clarity in the public sector context—where goals and objectives are typically characterized as vague and contradictory—and reduces information asymmetry between political principals and their agents (Moynihan et al., 2011). Proponents argue that focusing public managers’ attention on specific indicators will make them more strategic and efficient, minimizing the extent to which they engage in wasteful activities. They also argue performance management enables accountability, helping citizens and policymakers to judge the value of public programs and organizations (Behn, 2003).

While governments implement new performance management systems across a number of different contexts, a growing sub literature identifies important potential policy design

and implementation problems. Politics, resource constraints, and the nature of public goods and services create a number of complications that may make implementing performance management systems ineffective or harmful for public organizations (Joyce, 1993). The literature demonstrates that reaching an understanding and agreement on what to measure, how to measure it, and what performance measures actually say about performance is a problematic exercise in the public sector (Joyce, 1993; Moynihan, 2005).

Previous research suggests performance management's promise to enhance objectivity in decisionmaking processes works better in rhetoric than it does in practice. In a study of how decisionmakers use performance information in the budgeting process, Moynihan (2006) demonstrates that the same performance information can lead decisionmakers to opposite, but equally well reasoned conclusions about what to do with public programs. One may easily understand why this happens by considering a question posed by Gilmour and Lewis (2006): Does poor performance indicate a program is not working and decisionmakers should divert funds elsewhere, or does it indicate it needs more funding to be successful? The problem in answering this question is performance measures only tell part of the story about why performance does or does not occur. Success or failure in reaching certain levels of performance reflect a number of contextual factors organizations may have little or no influence over, making it difficult to understand their direct contribution to an outcome.

Perhaps more important than doubts about performance management's objectivity are concerns about its potential to create negative, unanticipated consequences (Radin, 2006). An often highlighted concern is that organizations will respond to reforms in perverse ways that ultimately work against aspects of organizational missions and values. As Bohte and Meier (2000) point out, using performance data to evaluate the work of organizations often means focusing on outputs rather than substantive contributions to social outcomes. This means they may respond to those incentives in ways that maximize outputs, but do not contribute to, and may work against, broader social goals. Some organizations may engage

in gaming, for example, by cutting corners, manipulating inputs, or using other tricks to boost performance numbers (Bohte and Meier, 2000; Courty and Marschke, 2004; Heinrich, 2004). There are similar concerns that focusing on maximizing specific outputs will lead organizations to neglect unmeasured—or unemphasized—aspects of their missions or non-mission based activities important to broader social outcomes (Gueorguieva et al., 2009; Piotrowski and Rosenbloom, 2002; Wichowsky and Moynihan, 2008).

At the root of many problems relating to unintended consequences is the difficulty of designing performance management regimes that accommodate the diverse capacities, resources, and missions of target organizations (Heinrich, 1999; Radin, 2006). Previous research suggests organizational differences have important implications for how organizations respond to reforms and whether reforms contribute to increased performance. Organizations will likely respond to performance management reforms passively, for example, if they are at odds with established routines and values (Moynihan, 2009). If organizations do not ignore performance management reforms altogether, they may take actions that improve their performance numbers but undermine their original missions and values. Many of these issues are at the heart of the debate surrounding performance management in higher education, which I discuss in the next section.

### **3 Performance Management in Higher Education**

Governments are aggressively implementing performance management in public higher education. Despite the inherent ambiguity of performance information, states are turning to a form of performance management where, rather than inform decisionmaking, performance information makes decisions automatically. Performance-based funding establishes a “tight, automatic and formulaic” relationship between a set of performance indicators and budget allocations (Burke et al., 2003, p.3). The indicators and amounts of funding allocated based

on performance vary among the states, but common among the policies is a desire to influence a shift in university priorities away from activities such as research, toward outcomes relating to undergraduate education, particularly on-time graduation and degree production (Rabovsky, 2014). In this discussion I discuss the rise of performance funding in higher education and findings from the developing literature assessing its effectiveness.

Tennessee adopted the first performance funding policy in 1979, but the policy did not gain popularity until the early 1990s with the emergence of the reinventing government movement and a fiscal crisis among the states (Burke, 2002). Many states looking for ways to tighten their budgets targeted public higher education institutions, citing their unique capability to replace lost revenues through other means, such as increasing tuition and seeking additional grants and private donations (Zumeta, 2001). When institutions responded by increasing tuition, however, they faced backlash from policymakers and a skeptical public who believed that institutions ought to become more efficient, rather than increase tuition (Zumeta, 2001). Performance funding, then, offered policymakers a potential way to satisfy public demands for accountability and focus higher education administrators' attention on efficiency and productivity.

According to the National Conference of State Legislatures (NCSL), thirty states allocate a portion of funding for public higher education based on performance (NCSL, 2015). The enthusiasm for performance funding among state officials, however, comes in the absence of empirical evidence supporting its effectiveness. Several studies published in recent years investigate the effectiveness of state performance funding policies, focusing on whether implementing the policy improves graduation rates or degree production. Overall, the assessment of the policy is bleak as nearly every study finds either a negligible positive assertion, no association, or a negative association, between performance funding and student outcomes.

In one of the earliest quantitative studies, Shin and Milton (2004) find that states implementing performance funding did not improve graduation rates more than states without

the policy over the period of 1997 to 2001. The authors caution, however, that their findings should not dissuade policy-makers from adopting the policy because many of the state policies included in their analysis were still in their nascent stages of implementation at the time of study (2004). A later study by Shin (2010), which included several more years of data, however, yielded essentially the same results.

Fryar (2011) investigates the impact of performance based funding policies on graduation rates and finds a small, but statistically significant, negative association. She notes, despite the small coefficient, the result indicates, at a minimum, performance funding policies are not improving performance. In another nationwide study, Volkwein and Tandberg (2007) use the presence of a state performance based funding policy as one of several predictors of state “Measuring Up” grades and do not find a relationship.

Rutherford and Rabovsky (2014) conduct a nationwide study of the effect of performance funding, accounting for both the number of years since a policy was first implemented and whether the policy is performance funding 1.0, where performance funding is allocated as a small bonus over the normal state appropriation, or 2.0, where performance funding is part of the base appropriation. They find a negative association between the length of time a 1.0 policy has been in place and graduation rates, and no association for 2.0 policies. They suggest further empirical research is required as more data become available about recently implemented policies.

The lack of empirical evidence supporting the effectiveness of performance funding raises an important question: is there any evidence institutions are responding to these policies? Rabovsky (2012) investigates whether the adoption of performance funding policies strengthens the link between student outcomes and state appropriations and whether the policy affects institutional spending priorities. He finds no relationship between an interaction of a performance funding policy and student outcomes and state appropriations, and a limited relationship between the policy and institutional spending priorities.

Recently, scholars have begun conducting single state studies due to complications associated with estimating performance funding's effects using multiple treated states. One of the most important reasons is that policies may vary considerably between states (e.g., metrics, maturity, and the relative portions of state funding allocated based on performance), and it is difficult to account for these differences in an empirical model. Beyond policy heterogeneity, the relative instability of performance funding policies over time also poses challenges for empirical research. Several states abandon then subsequently readopt performance funding policies or temporarily suspend policies due to budgeting problems (Burke and Modarresi, 2001; Dougherty et al., 2012).

Sanford and Hunter (2011) use the single state approach in a study of Tennessee's policy, the oldest in the country, and its effect on retention and graduation rates. They do not find statistically significant relationships for graduation or retention rates, and conclude that the strength of the incentive in Tennessee is not high enough to change institutional performance.

A more recent example of the single-state approach is Hillman, Tandberg, and Gross' (2014) study of performance funding in Pennsylvania. As the authors point out, Pennsylvania has one of the more stable and longer-operating policies among the states with many years of available pre- and post-implementation data, making it an excellent candidate for a single state study (Hillman et al., 2014). The authors use difference-in-differences models with several control groups to assess whether the policy has an association with changes in degree completions, but do not find an association. In another paper, Hillman, Tandberg, and Fryar (2015) investigated performance funding in Washington state community colleges and found it had no effect on retention or production of associate degrees, but had a small positive effect on short term certificates, and decreased long term certificates.

The potential unintended consequences of implementing performance funding have received considerably less attention in the literature. As previously discussed, a general concern about performance management practices is they may distract managers' attention



from other important measures and introduce perverse incentives for attaining performance goals. In the context of performance funding in higher education, one concern is that institutions will become more selective, thereby reducing access for students from disadvantaged backgrounds (Lahr et al., 2014).

Another understudied issue is the potential conditioning effect of an institution's dependence on state funding. Investigating the implications of state dependence is important in this context for two reasons. First, from a policy perspective, state dependence may be considered a measure of dosage: If an institution relies on the state for a comparatively small portion of its revenue, it may be less inclined to respond to a performance funding policy. If, on the other hand, an institution depends on the state for a comparatively large percentage of its revenue, it may be considerably more likely to take action. State dependence, however, also signals important differences in mission, resources, and capacity. More dependent institutions are more likely to be broad access, serving a high proportion of students from disadvantaged background, with less flexibility in their revenue streams, and fewer institutional research staff. These differences may have important implications for an institution's capacity to respond to performance incentives.

## 4 Indiana's Performance Funding Policy

The Indiana Commission for Higher Education, the state's higher education coordinating agency, developed the state's performance funding policy with input from previous governors and members of the General Assembly (Indiana Commission for Higher Education, 2013).<sup>1</sup> The first iteration introduced in 2007 included metrics measuring growth in overall degree production, changes in on-time graduation rates, as well as a two-year transfer

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<sup>1</sup>The governor appoints 12 members to the Commission, with nine members representing congressional districts and three at-large members. The governor also appoints a student and faculty representative to the Commission, with all members serving 2-year terms.

incentive—intended to benefit community colleges whose students move on to the state’s 4-year institutions—and a research incentive, with 2.5 percent of the state’s overall higher education appropriation allocated based on performance (Indiana Commission for Higher Education, 2013).<sup>2</sup>

Indiana’s performance funding policy has been controversial, with many of the concerns mirroring those described both in the general performance management literature and the literature on performance funding in higher education. Specifically there are concerns that the policy does not accommodate diverse institutional missions and that it will produce unintended consequences, such as higher selectivity and fewer minority enrollments. For example, the Ball State president characterized the policy as a “one-size-fits-all structure” that favors large and growing campuses (Smith, 2013). There are also concerns among some public Indiana university faculty and administrators that the policy incentivizes institutions to become more selective, moving them away from the broad access model. One Indiana faculty member told Lahr et al. (2014) their institution was designated selective for the first time due to the changes they made in response to performance funding, while several administrators told them they were accepting fewer conditional admits as a result of performance funding. Another Indiana administrator pointed to performance funding being responsible for their institution accepting fewer African-American students (Lahr et al., 2014, p.19).

A recent paper by Umbricht, Fernandez, and Ortagus (2015) also examines the effect of performance funding in Indiana. They find evidence that implementing performance funding led to declining admission rates and increased selectivity in public Indiana institutions. This project builds on and departs from Umbricht, Fernandez, and Ortagus’ (2015) study by investigating how organizational differences condition the effect of performance management. As previously discussed, recent work in the public management literature finds that or-

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<sup>2</sup>Beginning in 2003 Indiana offered a research based incentive to public institutions whose enrollment was stable, leaving them unable to benefit from funding increases based on enrollment growth.

ganizational differences have important conditional effects on organizational responses and performance under rule- and procedure-based reforms. I find organizational differences, measured as dependence on state funding for operating revenue, to be a statistically and substantively significant conditioning variable for several outcomes.

In the next section I describe the hypotheses, which draw on the literature described in the previous two sections.

## 5 Hypotheses

### 5.1 Performance

Performance funding advocates argue public higher education institutions receiving funding based on performance will direct more effort toward those measures and improve performance. Indiana's policy includes metrics for both overall degree completions and on time graduation rates. I expect performance funding will be associated with increases in both graduation rates and degree production if the policy is successful.

$H_{1,1}$ : Implementing performance funding increases average graduation rates for public institutions in Indiana.

$H_{1,2}$ : Implementing performance funding increases degree production for public institutions in Indiana.

### 5.2 Access

Critics argue performance management policies may create perverse incentives that detract from other unmeasured, or less emphasized performance goals (Moynihan, 2010). Previous research has found that performance regimes emphasizing outputs and efficiency measures may lead organizations to neglect values such as responsiveness, equity, and participation

(Boyne, 2002; Wichowsky and Moynihan, 2008). One concern cited in the literature on performance funding, for example, is it may lead some institutions to become more selective in their admissions processes to boost their graduation rates and degree production (Dougherty and Reddy, 2011; Rutherford and Rabovsky, 2014). While some may argue that increased selectivity is a positive result, showing public institutions doing a better job at finding and recruiting the best and brightest, it is important to note that broad access is an important mission component for many public institutions in the United States (Fryar, 2014). Indeed, federal policies such as the GI Bill and Federal Pell Grant Program aim to increase accessibility to higher education for veterans, minorities, women, and lower-income students (Feeney and Welch, 2012). Thus, I test whether institutions are becoming more selective and potentially undermining an important, but less emphasized goal of public higher education:

*H<sub>2.1</sub>*: Performance funding is associated with a decrease in acceptance rates.

A concern relating to increased selectivity is that performance funding will result in decreasing minority enrollments. Indeed, in an interview, an Indiana administrator suggested that changes to admission policies made in response to performance funding dramatically reduced the number of African American students in their institution (Lahr et al., 2014). Thus,

*H<sub>2.2</sub>*: Performance funding is associated with a decrease in minority student enrollment.

### **5.3 Organizational Differences**

Critics argue that performance management policies are often one-size-fits all solutions that do not account for important differences in organizational capacity, resources, and mission. One of American public higher education's defining characteristics is the diversity of its institutions, ranging from selective, research-intensive universities that attract students from

around the country to broad-access regional campuses dedicated to serving specific populations and communities (Quintero, 2012). Many performance funding policies are applied at the state level and ask institutions with varying missions to improve performance across a common set of metrics.

Previous studies have found that organization-level differences in culture and strategic orientation have significant conditioning effects on responses to formal rule- and procedure-based reforms, such as performance management (Kroll, 2014; Pandey et al., 2007). These organizational differences may have important implications for how and whether institutions respond to performance funding policies. More selective, research institutions tend to be wealthier, have institutional research staff, and more control over their inputs (students) than broad access regional institutions. In other words, they have the resources and capacity necessary to engineer performance oriented change and missions consistent with the notion of improving performance in areas typically rewarded by performance funding policies, such as graduation rates and retention. Thus,

*H<sub>3</sub>*: Organizational differences condition the effect of performance funding.

## 6 Data and Methods

### 6.1 Data

To test these hypotheses I construct a longitudinal dataset using institution level data from the Integrated Postsecondary Education Data System (IPEDS), the Delta Cost Project, and state-level data from a variety of sources. The full sample includes all public 4-year institutions in Indiana, and public 4-year institutions in states that did not implement performance funding for the years 2001 through 2012.<sup>3</sup> The remainder of this section describes the data

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<sup>3</sup>The acceptance rates model includes data for the years 2003 through 2012 because the measure is not available prior to 2003.

I use to construct the final dataset, the specific variables and measures, and descriptive statistics. Table 1 shows descriptive statistics for variables I use in the analysis.

### 6.1.1 Dependent Variables

*Graduation Rates.* Indiana’s performance funding policy awards institutions based on increases in degree production and on-time graduation rates, among other measures. I first test the effect of performance funding on six-year graduation rates. Six-year graduation rates measure the percentage of undergraduate, bachelor-degree seeking students, entering as first-time, full-time freshman completing a bachelors degree within six years.

*Degree Production* Six-year graduation rates are frequently used to measure performance both in research and practice, but some argue it offers an incomplete view of institution performance (Hillman et al., 2014; Rutherford and Rabovsky, 2014; Tandberg and Hillman, 2014). The measure’s main limitation is it does not include part-time students, transfer students, or students that leave school and return later. As Hillman, Tandberg, and Gross (2014) point out, an institution could easily manipulate this measure by shrinking the size of the incoming freshman class, effectively increasing “performance” without actually increasing completions. Thus, I also test the effect of performance funding using a measure of degree production that measures the total number of degrees awarded per 100 FTE students.

*Acceptance Rates.* The acceptance rate variable measures admitted students as a percentage of total applicants.

*Minority Enrollment.* Minority enrollment measures the percentage of students in an institution that are Asian, Hispanic, African-American, or American Indian.

### 6.1.2 Covariates

I rely on previous research on institution-level postsecondary student outcomes and previous research on performance funding for selecting control variables for the graduation rate and

degree production models. Specifically, I include controls for institution size, student demographics, the extent of part-time student enrollment, institution financial capacity, tuition, and student aid. I also control for state-level factors that may affect student achievement and enrollment including educational attainment, unemployment, and state appropriations for public higher education. In the model predicting changes in minority enrollment, I include variables measuring the percentage of state population that is black or Hispanic, as well as a variable indicating whether the institution is in a state with an affirmative action ban or limit in place.

In the model predicting performance funding's effect on acceptance rates I include an *enrollment growth* variable that measures the three-year average percent change in total enrollment, as enrollment growth or declines may affect acceptance rates.

### **6.1.3 Measuring Organizational Differences**

I use the extent to which an institution depends on state funding for its operating revenue as a proxy for organizational differences that may condition performance funding's effects. Dependence on state funding trends with important organizational differences, such as mission and values (Feeney and Welch, 2012), as well as capacity and resources. This measure is also important from a policy standpoint, as the extent to which an institution depends on the state is also a measure of dosage, or exposure to performance funding. If an institution is highly dependent on the state for its operating revenue, performance funding will affect a larger percentage of its overall revenue. Thus, one may expect this measure to have important implications for whether and how an institution responds to performance funding.

[Table 1 about here.]

## 6.2 Methods

I use ordinary least squares (OLS) and a difference-in-differences design to estimate the effect of performance funding on outcomes for public higher education institutions in Indiana. Specifically, I estimate the following reduced form model:

$$y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 PF + \beta_3 PF \cdot \%stateapprops + \theta_i + \gamma_t + \epsilon_{it} \quad (1)$$

where  $y_{it}$  is the given outcome for institution  $i$  in year  $t$ . The vector  $\beta_1 X_{it}$  represents time-varying institution and state characteristics described in the previous section. The variable  $\beta_2 PF$  is a binary indicator that equals 1 for Indiana institutions when performance funding is in effect (academic years 2007 to 2012). The interaction  $\beta_3 PF \cdot \%stateapprops$  controls for potential treatment heterogeneity between institutions that differ in the extent to which they depend on state funding for revenue. Institution fixed effects ( $\theta_i$ ) control for time-invariant, unobserved heterogeneity between institutions. Year fixed effects ( $\gamma_t$ ) control for potential year-specific shocks that may affect the outcome variable for all institutions, such as national-level policy changes or economic shocks.

## 7 Results

### 7.1 Graduation Rates and Degree Production

Table 2 displays results for the models estimating the effect of performance funding on six-year graduation rates and degree production. First, the results in model 1 suggest performance funding had a positive effect on graduation rates. Specifically, implementing performance funding is associated with a 1.04 percentage point average increase in graduation rates. The results in model 2, however, show the extent of dependence on state funding for operating revenue moderates performance funding's effect.



[Table 2 about here.]

Figure 1 shows how institution dependence on state funding conditions performance funding's effect on total graduation rates. The x-axis shows the range of values for the percentage of revenue from state appropriations observed for Indiana institutions in the post treatment period. The figure shows performance funding has a small, positive effect for institutions receiving a relatively smaller percentage of their operating revenue from state appropriations. Institutions receiving more than 39 percent of their operating revenue from state appropriations, however, see no, or a potentially negative, effect on graduation rates.

[Figure 1 about here.]

The results also show that performance funding had a negative effect on degree production. Specifically, model 3 shows that implementing performance funding is associated with a 0.54 average decrease in completions per 100 FTE students. Similar to the models predicting changes in six year graduation rates, the results in model 4 show that dependence on state funding moderates performance funding's effect. Figure 2 provides a graphical interpretation of the interaction effect. A notable difference between this result and the result for graduation rates, however, is that the effect remains statistically significant for a broader range of institutions. In this model, the negative effect is statistically significant for institutions with up to 44 percent of their operating revenue coming from state appropriations.

[Figure 2 about here.]

## 7.2 Access

Table 3 displays results for models estimating the effect of performance funding on acceptance rates and minority enrollment. First, the results in model 1 show a negative, statistically

significant association between performance funding and acceptance rates. Specifically, implementing performance funding is associated with a 5.53 percentage point average decrease in acceptance rates. Again, the interaction model shows that dependence on state funding conditions performance funding's effect.

[Table 3 about here.]

Figure 3 suggests that most institutions in Indiana became more selective under performance funding relative to the control group. Similar to the degree production result, the effect remains statistically significant for institutions receiving up to 44 percent of their operating revenue from state funding.

[Figure 3 about here.]

The results also suggest that performance funding may be associated with declines in minority enrollment. Specifically, performance funding is associated with 0.58 average percentage point decrease in minority enrollment. Contrary to the other models, however, dependence on state funding does not condition performance funding's effect.

### 7.3 Robustness Tests

Difference-in-differences models require that the trend in outcome for the control units provide a plausible counterfactual path for the treated units in the absence of treatment. This is commonly referred to as the parallel trends assumption, which is not directly testable. There are a number of ways, however, to increase confidence in the results through different robustness tests. I test the results' robustness using event-study specifications and an alternative control group.

### 7.3.1 Event Studies

The panel data approach allows for testing whether the treatment and control institutions were trending similarly in the years leading up to the intervention. I estimate event study specifications for each outcome (graduation rates, degree production, acceptance rates, minority enrollment) to test whether treatment and control institutions were trending differently leading up to the implementation of performance funding:

$$Outcome_{it} = \sum_{k=-x}^{k=x^+} \beta^k PF_{it+k} + \beta_1 X_{it} + \theta_i + \gamma_t + \epsilon_{it} \quad (2)$$

where *Outcome* represents the value of one of the four outcomes for institution *i* in year *t*.  $\beta^k PF_{it+k}$  indicates that institution *i* was a public four-year institution in Indiana when it adopted performance funding *k* years before year *t*. The parameter  $\beta^k$  is the change in a given outcome *k* years after Indiana implements performance funding relative to the omitted category (*k*= -x). In other words,  $\beta^{-5}$  is the change in net price five years before implementation,  $\beta^0$  is the change in the year of implementation, and  $\beta^6$  is the change six years after implementation, all relative to five years before implementation. The event-study specification provides evidence supporting the parallel trends assumption if the pretreatment coefficients are approximately zero. Table 4 and figure 4 show event study estimates for the four outcomes tested in the analyses.

[Table 4 about here.]

Figure 4 plots point estimates and 95 percent confidence intervals for the  $\beta^k$  coefficient in equation 7.3.1. The results show that any differences in pretreatment outcomes between public institutions in Indiana and institutions in the control group are not statistically significant, save for a marginally significant difference in 2006 for degree production in the pre-implementation period.

One advantage of the event study specification is it provides year-by-year estimates of the treatment in the post intervention years. Model 3, for example, shows that performance funding’s negative association with acceptance rates does not become statistically significant until the third treatment year. This may indicate that increasing selectivity does not happen immediately after implementing performance funding, but perhaps emerges as a strategic response after institutions attempt other means of increasing performance.

[Figure 4 about here.]

### 7.3.2 Local Sample

I also test the results’ robustness using institutions in non-performance funding states belonging to the Midwestern Higher Education Compact (MHEC)<sup>4</sup>. MHEC states provide an interesting control group because they constitute a tighter geographical area and may be more similar to Indiana across both observable and unobservable factors relating to higher education than the larger control group. Table 5 shows the results for graduation rates and degree production. Performance funding is no longer statistically significant in the baseline graduation rate model, but is marginally significant in the model including the interaction with state dependence. Performance funding is not statistically significant in either completion rate model.

[Table 5 about here.]

Table 6 shows the results for acceptance rates and minority enrollment using the MHEC sample. The results hold up much better here compared to the graduation rate and degree production models. Performance funding is not statistically significant, however, in the baseline minority enrollment model.

[Table 6 about here.]

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<sup>4</sup>States belonging to MHEC include Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin

## 8 Discussion

Overall this analysis provides limited evidence that performance funding is associated with increases in graduation rates for a select group of institutions in Indiana. There is also evidence, however, that overall degree production decreased in these institutions. There is stronger evidence, on the other hand, that performance funding is associated with declines in acceptance rates and a small decrease in minority enrollment. In this section I discuss these results in more detail.

The small effects for graduation rates and degree completions are in line with previous research suggesting that—while sometimes finding either negative or positive effects—performance funding’s overall effect is substantively insignificant. What this study adds to the discussion of performance funding, and performance management generally, is that institutional differences matter for how and whether we see effects at all.

From a policy perspective, the results for graduation rates are somewhat counterintuitive. If one considers dependence on the state for operating revenue to be a measure of dosage, performance funding seems to be working in precisely opposite the expected direction. The larger the portion of revenue performance funding affects, the smaller the effect on an institution’s graduation rates. From an organizational standpoint, however, the results are not counterintuitive, and may actually make a lot of sense. The group of institutions managing to increase their graduation rates under performance funding have more resources, capacity, and missions more consistent with the notion of becoming more selective. They likely have greater diversity in their revenue streams and institutional research staff that make it easier for innovating and making changes that may increase graduation rates.

The importance of institutional differences in these findings reflect some things we already know at the managerial level from the literature on performance management. Organizations perform better under performance management regimes when they have discretion and flex-

ibility in their resources to engineer performance oriented change (Moynihan and Pandey, 2005; Nielsen, 2013). The findings also align with the literature suggesting the importance of organizational-level differences in conditioning the effects of rule- and procedural-based reforms. Resource constrained, highly state dependent institutions may simply lack the capacity to respond to performance funding policies in ways that will help them improve performance. Implementing performance funding necessitates the assumption that institutions are not already doing everything they can, given their resources and capacity, to help their students succeed.

The unintended consequences point to precisely why performance funding may have helped Indiana's more selective research institutions improve performance. While many institutions became more selective under performance funding, the less state-dependent institutions became considerably more selective. Becoming more selective may be consistent with the cultures and missions of these institutions, but for the broader access, state-dependent institutions it may constitute a major change. These differences may reflect something deeper relating to mission differences. Not only might there be resistance to becoming more selective among faculty and administrators, it may also be harmful from a revenue standpoint. The bulk of revenue for these institutions will still come from enrollment-based state funding and tuition and fees. Becoming more selective could potentially reduce revenue from enrollments.

Broadly, the analyses suggest that policymakers need to pay careful attention to the differences between the organizations they are subjecting to performance management regimes. Specifically, policymakers should consider the following questions: Do all the target organizations have the resources and capacity to respond to the incentives and they reasonably be expected to improve performance? Do the policy's incentives encourage behavioral changes consistent with organizations' missions? If they are not, and policymakers do not intend to disrupt their missions, what are some of the ways they can build in flexibilities so the policy does not work against the target organizations' missions?

## 9 Conclusion

Performance funding for public higher education is one of the more controversial public sector performance management applications. Where performance measures may be used as an *aid* for making budgeting or other management decisions in other contexts, performance funding in higher education represents a more stringent use of performance information, as it is the performance information that makes the budgeting decision. While fully-specified, numerically-based performance budgeting schemes are rare in the public sector, it is not unreasonable to expect that, given performance funding's popularity, policy makers will implement this variation of performance management in other areas of the public sector. Thus, understanding how and whether these policies affect institution behavior and performance is important for both public higher education as well as for our general understanding of performance management's efficacy.

One limitation of this study is that it examines a single performance funding case and the findings cannot necessarily be generalized. However, performance funding policies are similar across states along a number of dimensions, especially when it comes to emphasizing on-time graduation and degree production. At a more granular level, however, there are important differences in terms of how much funding is allocated based on performance, the specific details of how policies measure changes in performance, and differences between the institutions themselves. Thus, we cannot rule out that performance funding's effects will look different in other states with policies. This is not the first study on performance funding, however, and it is adding to a growing literature producing relatively consistent findings.

An important finding of this paper is that institutional differences have important implications for how and whether institutions perform under performance management regimes. This finding contributes more broadly to a growing literature that suggests organizational culture has important conditioning effects on institutional responses to formal rule- and

procedure-based interventions (Pandey et al., 2007). While performance management regimes are often criticized for being one-size fits all policies applied to diverse organizations, few studies have empirically tested the implications of this potential problem generally, and I know of no performance funding studies investigating the issue of treatment heterogeneity.

Another limitation of this paper is there may be other, potentially more meaningful ways to investigate how organizational differences matter in performance management. The value of the measure I use in this study, however, is that it has implications both in terms of understanding how the dosage of the policy matters in addition to how organizational differences may matter.

Future research in both performance funding for higher education as well as performance management generally would do well to continue exploring the implications of organizational differences for the effects of performance management regimes. A growing body of literature examines how differences in managerial capacity matters under performance management, but too few studies explore this dynamic at the organizational level.

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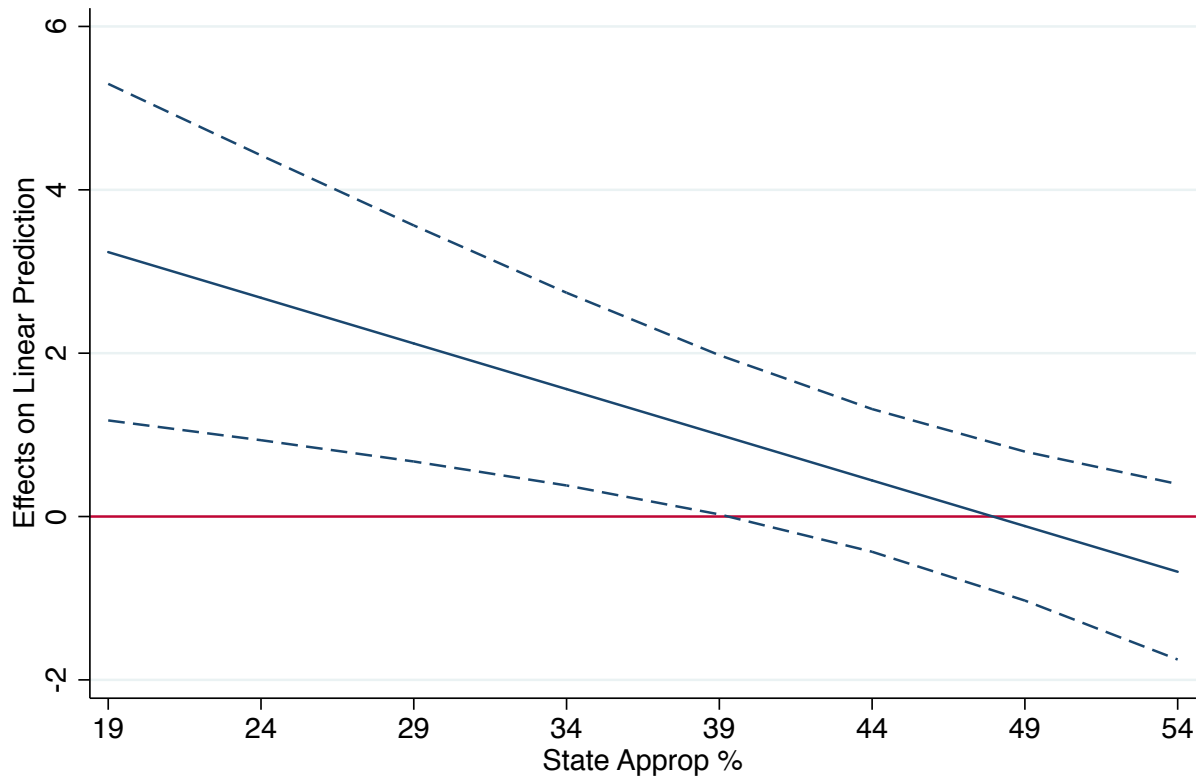


Figure 1: Graduation Rate - Interactive effect



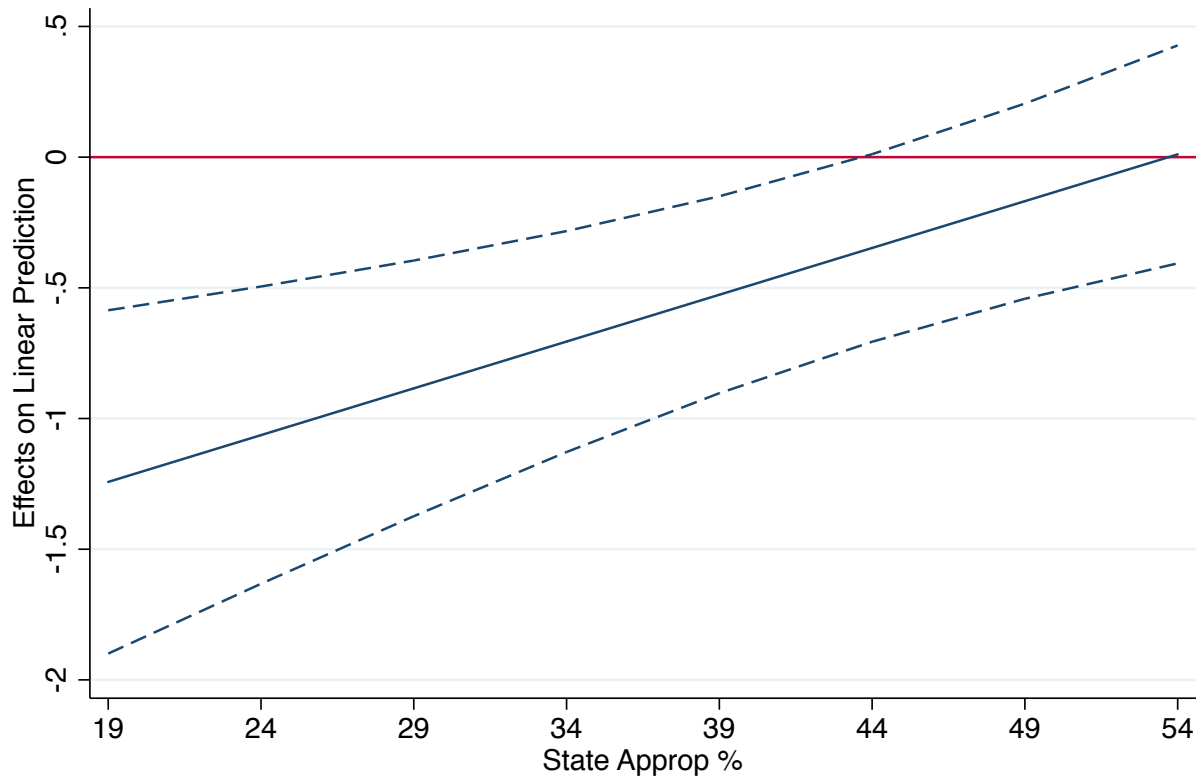


Figure 2: Degree Production - Interactive effect

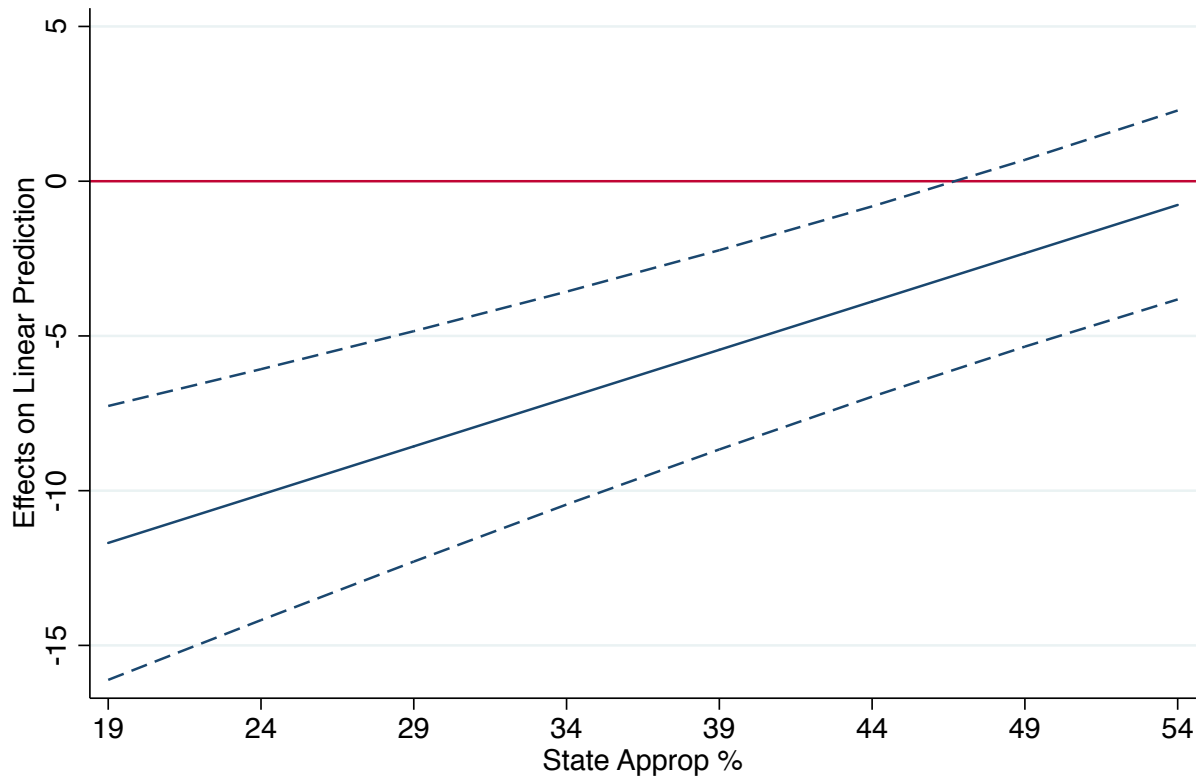


Figure 3: Acceptance Rate - Interactive effect

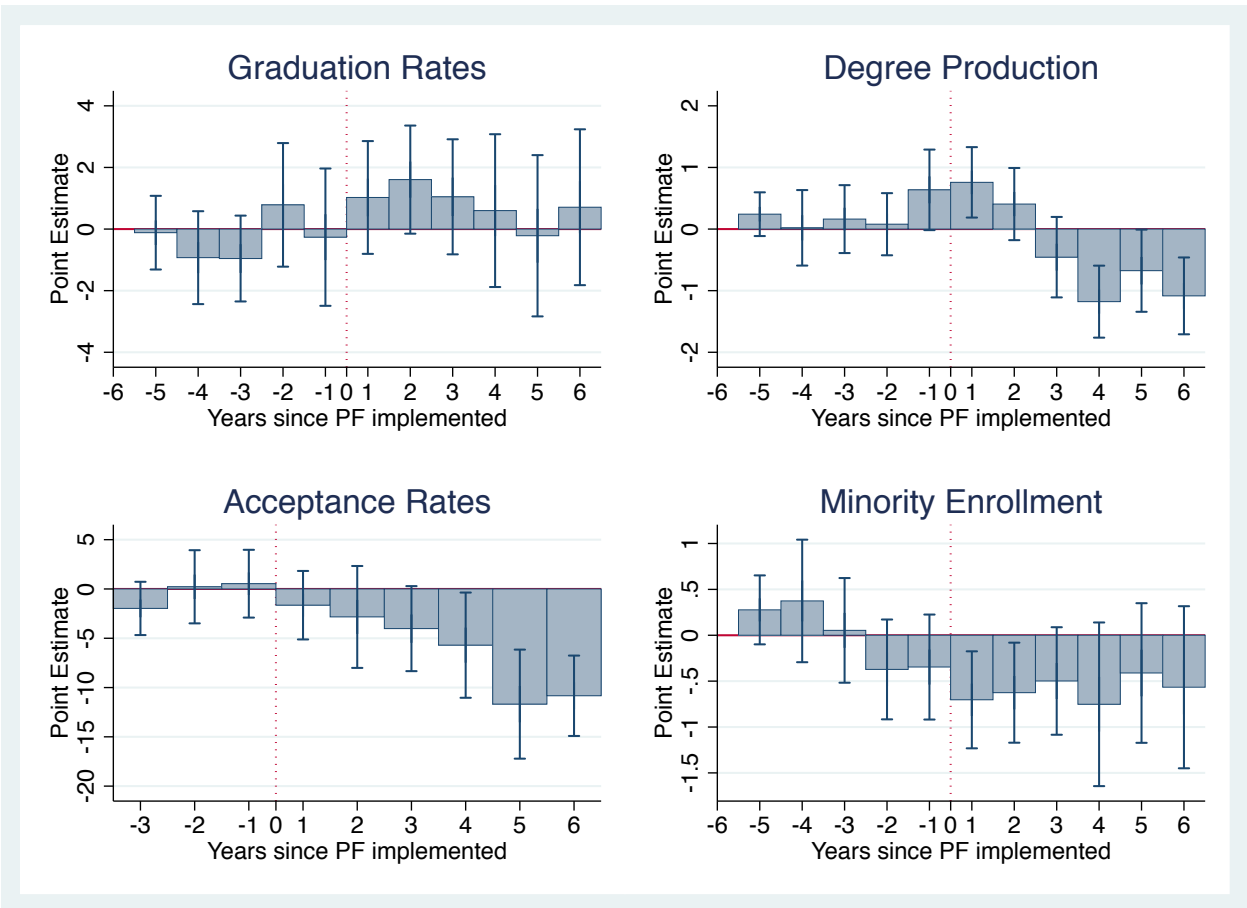


Figure 4: Event Studies

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Table 1: Descriptive Statistics

	All	Control States	Indiana
<i>Outcomes</i>			
Graduation Rate	47.69 (15.96)	48.57 (15.49)	35.04 (17.36)
Acceptance Rate	67.98 (17.21)	67.09 (17.30)	80.18 (9.747)
Minority Enrl %	26.96 (24.81)	27.90 (25.28)	13.43 (9.037)
<i>Institution Controls</i>			
Part Time Student %	25.89 (12.76)	25.21 (12.34)	35.64 (14.60)
Black Enrl %	15.07 (23.81)	15.59 (24.50)	7.634 (5.626)
Hispanic Enrl %	5.742 (8.355)	5.885 (8.560)	3.686 (3.902)
E & G Exp per FTE (1000s)	18.59 (10.79)	18.85 (10.92)	14.95 (7.762)
Pell grant per FTE	1061.7 (780.1)	1065.3 (792.9)	1009.5 (563.0)
FT Faculty per 100 FTE	5.194 (2.012)	5.220 (2.042)	4.813 (1.469)
State Approp %	44.58 (13.13)	44.71 (13.31)	42.82 (9.992)
In-State Tuition	5011.3 (2179.2)	4983.5 (2215.7)	5412.4 (1509.5)
Total enrollment	15341.6 (12910.0)	15407.3 (12929.4)	14393.5 (12626.9)
Enrol. Growth %	0.0597 (0.0972)	0.0605 (0.0978)	0.0482 (0.0884)
<i>State Controls</i>			
Observations	2592	2424	168
mean coefficients; sd in parentheses			

*Continued on next page*

Table 1 – *Continued from previous page*

	<b>All</b>	<b>Control States</b>	<b>Indiana</b>
Unemployment %	6.103 (2.402)	6.103 (2.410)	6.100 (2.296)
HE Approps % GDP	7.966 (2.300)	7.990 (2.375)	7.619 (0.344)
Educational Attainment %	27.30 (5.399)	27.65 (5.387)	22.24 (1.868)
State Black Pop %	13.20 (12.18)	13.08 (12.58)	15.00 (0.152)
State Hispanic Pop %	13.69 (11.46)	13.62 (11.84)	14.72 (1.180)
Affirm. Action Ban/Limits	0.228 (0.419)	0.243 (0.429)	0 (0)
Observations	2592	2424	168

mean coefficients; sd in parentheses

Table 2: Graduation Rates &amp; Degree Production

	Graduation Rate		Degree Production	
	(1)	(2)	(3)	(4)
	$\beta$ / SE	$\beta$ / SE	$\beta$ / SE	$\beta$ / SE
PF	1.040** (0.50)	5.361*** (1.70)	-0.539*** (0.19)	-1.923*** (0.52)
PF X State Approp %		-0.112*** (0.04)		0.036*** (0.01)
State Approp %	-0.014 (0.02)	-0.014 (0.02)	-0.001 (0.01)	-0.001 (0.01)
Constant	49.812 (43.22)	51.134 (43.22)	32.948*** (11.21)	32.525*** (11.22)
Observations	2592	2592	2592	2592
Institutions	216	216	216	216
$R^2$	0.199	0.200	0.174	0.175
Institution/Year FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Robust standard errors clustered by state in parentheses.

Table 3: Access: Acceptance Rates & Minority Enrollment

	Acceptance Rate		Minority Enrollment	
	(1)	(2)	(3)	(4)
	$\beta$ / SE	$\beta$ / SE	$\beta$ / SE	$\beta$ / SE
PF	-5.530*** (1.67)	-17.618*** (3.09)	-0.583** (0.22)	-1.399** (0.60)
PF X State Approp %		0.312*** (0.05)		0.021 (0.01)
State Approp %	-0.031** (0.01)	-0.032** (0.01)	-0.012 (0.01)	-0.012 (0.01)
Constant	84.898 (80.00)	81.464 (80.49)	9.429 (21.67)	9.168 (21.75)
Observations	2060	2060	2592	2592
Institutions	206	206	216	216
$R^2$	0.0750	0.0769	0.427	0.427
Institution/Year FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Robust standard errors clustered by state in parentheses.



Table 4: Event Study Estimates

	(1) Grad Rate $\beta$ / SE	(2) Degree Production $\beta$ / SE	(3) Admit Rate $\beta$ / SE	(4) Minority Enrl $\beta$ / SE
2002 X Indiana	-0.118 (0.58)	0.241 (0.17)		0.277 (0.18)
2003 X Indiana	-0.928 (0.74)	0.020 (0.30)		0.374 (0.33)
2004 X Indiana	-0.957 (0.68)	0.162 (0.27)	-1.972 (1.32)	0.053 (0.28)
2005 X Indiana	0.785 (0.98)	0.079 (0.25)	0.223 (1.81)	-0.372 (0.27)
2006 X Indiana	-0.263 (1.09)	0.636* (0.32)	0.533 (1.68)	-0.346 (0.28)
2007 X Indiana	1.025 (0.89)	0.758** (0.28)	-1.646 (1.69)	-0.704** (0.26)
2008 X Indiana	1.605* (0.86)	0.406 (0.29)	-2.838 (2.52)	-0.626** (0.27)
2009 X Indiana	1.047 (0.91)	-0.456 (0.32)	-4.023* (2.10)	-0.498* (0.29)
2010 X Indiana	0.599 (1.21)	-1.178*** (0.29)	-5.699** (2.60)	-0.752* (0.44)
2011 X Indiana	-0.217 (1.28)	-0.676** (0.33)	-11.684*** (2.70)	-0.411 (0.37)
2012 X Indiana	0.709 (1.24)	-1.085*** (0.30)	-10.835*** (1.99)	-0.567 (0.43)
Observations	2592	2592	2060	2592
Institutions	216	216	206	216
$R^2$	0.200	0.180	0.0838	0.427
Institution/Year FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Robust standard errors clustered by state in parentheses.

Table 5: Graduation Rates & Degree Production - Local Sample

	Graduation Rate		Degree Production	
	(1)	(2)	(3)	(4)
	$\beta$ / SE	$\beta$ / SE	$\beta$ / SE	$\beta$ / SE
PF	0.338 (0.55)	2.170* (1.01)	-0.158 (0.30)	-1.189 (0.62)
PF X State Approp %		-0.047 (0.03)		0.026* (0.01)
State Approp %	-0.001 (0.01)	-0.001 (0.01)	-0.000 (0.00)	-0.000 (0.00)
Constant	25.577 (80.88)	29.385 (82.12)	42.568** (12.52)	40.425*** (10.83)
Observations	756	756	756	756
Institutions	63	63	63	63
$R^2$	0.262	0.263	0.238	0.240
Institution/Year FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Robust standard errors clustered by state in parentheses.

Table 6: Access: Acceptance Rates & Degree Production - Local Sample

	Acceptance Rate		Minority Enrollment	
	(1)	(2)	(3)	(4)
	$\beta$ / SE	$\beta$ / SE	$\beta$ / SE	$\beta$ / SE
PF	-3.138*	-8.776*	-0.583**	-0.928
	(1.28)	(4.46)	(0.22)	(0.63)
PF X State Approp %		0.145		0.017**
		(0.10)		(0.01)
State Approp %	-0.037**	-0.038**	-0.012	-0.031
	(0.01)	(0.01)	(0.01)	(0.02)
Constant	-83.458	-97.523	9.429	26.626***
	(114.43)	(122.26)	(21.67)	(1.07)
Observations	590	590	2592	2592
Institutions	59	59	216	216
$R^2$	0.207	0.209	0.427	0.386
Institution/Year FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	No

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Robust standard errors clustered by state in parentheses.