Article

Analyzing the Effectiveness of State Regulatory Review

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Abstract

This article provides a systematic empirical study of how differences in regulatory review processes across the fifty US states affect the level of regulation. We examine whether rules for regulatory review matter in terms of lowering the overall level of regulation in states. Our findings suggest that sunset provisions are the most effective means of reducing state regulatory levels. Requirements for reviewing the fiscal impacts of new regulations on state government budgets and to present lower-cost alternatives for achieving the same policy goals also appear to be somewhat effective. There is limited evidence that a regulatory review process within the state legislative branch or an independent agency reduces new regulations.

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Efficient government regulations, including those that correct market failures or better define property rights and legal liabilities, create benefits exceeding costs and thereby improve economic performance. Inefficient regulations are those that create costs exceeding benefits and thereby reduce economic performance. Many US states and the federal government have attempted to enact regulatory reforms to reduce the amount of inefficient regulations (see, for examples and discussion, Hahn 2000; Shapiro 2010; Shapiro and Borie-Holtz 2011b). Some of these reforms require more stringent constraints on the initial enactment stage, while others create a process for reviewing existing regulations.

Most of the literature examining the effectiveness of state regulatory process constraints and rules are case studies that evaluate the actions of one state before and after a rule-process change or are anecdotal and/or narrative examinations only, meaning their findings may not be generalizable. Even more problematic is that these studies have found mixed results. There is no clear evidence about whether or how these rules affect the amount of total regulation or to eliminate inefficient regulations.

This article undertakes the first systematic empirical study, using data on all fifty US states, to see how these state procedural rules regarding constraints on both the enactment of new regulations and the review of existing regulations affects the level of regulation in a state. The purpose of this exercise then is to better pinpoint specific regulatory review processes that affect the level of regulation and thereby open up important avenues for future researchers and policy makers to determine which help promote economic growth and regulatory efficiency.

We begin with a literature review and discussion of the economic theory of regulation. This article continues by using these theories and models to hypothesize about which regulatory constraints might be expected to work or not work. We then present our main empirical results. Overall, our findings suggest that sunset provisions and, interestingly, cost–benefit analysis based on the impact that a proposed regulation will have on government revenue appear to reduce the level of regulation in a state most consistently.

The Economic Theory of Regulation

The economic theories of regulation can be grouped into two distinct approaches: the "public interest" approach and the "public choice" approach. The public interest approach, following the seminal work of authors such as Pigou (1938), assumes that government agents and regulators are benevolent individuals whose purpose in designing regulations is to

correct market failures and maximize social welfare by increasing economic efficiency. These social planner models generally assume political decision makers have full information on the costs and benefits of policies and consciously enact only those that maximize social welfare.

Even if this public interest view of political action were correct, however, in the real world where information and foresight isn't perfect there would be cases where seemingly efficient regulations create unforeseeable outcomes, unintended consequences, or secondary effects that become known only once the regulation is in force. For example, the employment provisions of the Americans with Disabilities Act (ADA) were passed with the intention of lowering barriers to employment for disabled persons. The legislation prohibits discrimination based on disability status and further requires employers to make reasonable accommodations for employees with disabilities.

However, DeLeire (1997, 2000) empirically estimated the impact that the ADA had on levels of employment and wages and found that in practice the ADA significantly reduced both for disabled Americans. By increasing the cost of hiring disabled workers and making it harder to fire them, this legislation has resulted in a reduction in employment among disabled individuals. After adjusting for other factors, DeLeire concludes that 80 percent of this decline was caused by the unintended incentives created by the ADA.

Thus, even if regulations are passed with the best of social intentions and careful consideration, as the public interest view suggests, there will be mistakes. This creates a need for a regulatory review process to identify and remove regulations that have unintended consequences, do not live up to their stated goals, or do accomplish their desired goals but in such a costly way that it does not justify the benefit (i.e., they are ex post economically inefficient). More stringent or different types of regulatory review procedures, the subject of our current study, may help to avoid cases like these as they can either help policy makers better foresee these consequences or at least can help to identify them once a regulation is in place.

Another important matter that needs to be considered is that the process through which regulations are *actually* created is conducted within a political process influenced by voters, special interest groups, bureaucratic agents, legislators, and other political decision makers. In this light, the public choice approach, following the seminal work of Buchanan and Tullock (1962), suggests that individuals react to the incentives and constraints they face in both their private, market actions and their public, political actions. In this context, participants in the political process have their own personal,

self-interested goals, and reasons for their actions that may differ from or even be at odds with the public interest. A legislator may pass a regulation, for example, to gain political contributions or support for his or her reelection.

Because of the political nature of regulatory policy, in many cases new regulations are passed because they benefit well defined, concentrated interest groups, even when they are clearly inefficient (see, e.g., Weingast, Shepsle, and Johnsen 1981; Ekelund and Tollison 2001). Similarly, a regulatory agency may attempt to broaden its powers and scope through new regulations simply to increase the budget or personal prestige of the bureaucrats heading the agency (Niskanen 1968, 1971, 1975). Therefore, it may be that new regulations that are passed are generally not purely based on benevolent concerns over whether the regulation is economically efficient.

The public choice literature also suggests that, once enacted, regulations and the very agencies in charge of imposing or enforcing them can become "captured" by the businesses and industries they are supposed to regulate. Once captured, these agencies impose regulations that are no longer in the public interest but in the interest of the industry itself (Stigler 1971). Similar literature suggests that regulation is implemented so as to increase opportunities for politicians and regulators to "rent extract" (McChesney 1987; Frye and Shleifer 1997; Shleifer and Vishny 1998). If regulatory policy creates excess profits, or rents, for the industry or firms being regulated, regulators and politicians can extract some of those private rents through campaign contributions, votes, or even outright bribes (Djankov et al. 2002). Overall, this may benefit both political actors and business interests but leads to less-than-desirable outcomes for consumers and the general public.

Therefore, whether certain types of regulatory review processes can actually affect the overall level of regulation is the key question we focus on in this study, given the potential for inefficiencies to emerge. In doing so, we provide opportunities for future researchers to better disentangle which types of review processes may, in fact, weed out inefficient and foster efficient regulations by providing an important first step in identifying those regulatory review processes that have any effect at all. We continue with a discussion of the previous literature on the impact of regulatory oversight and review.

The Regulatory Review Process

Although the economics literature has analyzed at length the economic impact and implications of regulation, far less economic scholarship has

been undertaken regarding how the procedural checks and balances created to oversee regulators affect regulatory outcomes. However, a growing body of literature within political science has partially explored these issues. The seminal work of McCubbins, Noll, and Weingast (1987, 1989) and Ferejohn and Shipan (1990) opened a door to theoretical understanding of this phenomenon. These studies discuss how oversight procedures may ensure that the preferences of the legislative body that initially empowered the agency are carried forward through time and how the presidential veto and judicial review impact regulatory outcomes. Several studies have empirically evaluated these theories (Golden 1998; Croley 2003; Yackee 2006).

There is also a growing literature that analyzes procedural checks and balances at the state level. However, given the diverse nature of state procedural safeguards, most of these works only involve a small subsample of states or are individual case studies. For instance, Shapiro and Borie-Holtz (2011a) use data on regulatory procedures across twenty-eight states to test the impact of these procedures on the total number of regulations as well as to determine their economic impact. This literature finds little evidence that procedural safeguards had any significant impact on regulatory output within a state.

Similar work at the state level has also found mixed results for a number of regulatory procedures and oversight. Daley, Haider-Markel, and Whitford (2007) analyzed certain aspects of regulatory review across forty-eight states, finding legislative review to be the only factor affecting overall compliance costs of regulation. Woods (2004) conducted a survey of regulatory review procedures across fifteen states, finding that gubernatorial as opposed to legislative review influenced regulatory rule making.

Other research has studied both gubernatorial and legislative review over regulatory agencies. Again, much of this work has yielded at best mixed results regarding the overall impact that this oversight has on regulatory stringency (Ethridge 1984; Koski 2007; Poggione and Reenock 2009), how the strength of given veto players (both gubernatorial and legislative rejections) in state government affects regulatory outcomes (Gerber, Maestas, and Dometrius 2005), and how procedural safeguards themselves are shaped by the makeup of state government (Hahn 2000; Grady and Simon 2002).

As given previously, it is possible to hypothesize as to why some of these regulatory review processes may be expected to be more effective than others in constraining the regulatory process. To do so requires differentiating two decision nodes, the initial enactment stage for new regulations and then the process for reviewing existing regulations. At the "creation/enactment"

stage of regulations, constitutional rules or legal constraints can be enacted either to restrict the scope of activities that can be regulated by government or to require some type of cost–benefit study or economic impact analysis prior to a new regulation being approved.

Thus, at the enactment stage, constitutional rules are the primary check on what can and cannot be regulated. These constitutional constraints are then generally enforced through the judicial branch of government. Differences in the regulatory climates across states—at least at this enactment stage—may thus be more determined by the structure of state constitutions and the effectiveness of state courts in enforcing these constitutional rules. However, new constitutional rules are hard to enact, and attempting to change regulatory policy based on constitutional amendments is not an easy process. Therefore, while differences in constitutions and courts across states may help to explain why some states have more efficient regulatory climates than others, it is a much less promising area for regulatory reform policies to target.

At the enactment stage, requirements for cost–benefit analysis for new regulations may provide policy makers with a better approximation of the true economic effect of a proposed regulation, though shortcomings exist here too. First, the true costs and benefits of a regulation are often hard to estimate prior to the regulation going into effect within the market. Forecasting how prices and economic actors will respond is an imperfect science. In retrospect, what may have appeared as an efficient regulation based on forecasts can turn out not to be or vice versa.

For example, in the process of adopting the 1990 Clean Air Act, both the Environmental Protection Agency (EPA) and the utility industry forecasted costs per ton to reduce sulfur dioxide emissions under the new regulatory scheme of tradable permits (*Washington Post* 1994). The utility industry estimated the cost at up to US$1,500 per ton, while the EPA estimated approximately US$600. By 1994, the tradable permit mechanism embodied in the bill created strong incentives for firms to innovate with the result that the permits were selling for US$150 a ton—reflecting the *true* cost per ton.

The second problem with attempting to base regulatory reform on cost–benefit requirements at the enactment stage is that the procedure for undertaking the analysis can itself be subject to political failures. For instance, the very groups who influence the political process can also attempt to influence the process that estimates the costs and benefits. Entrenched stakeholders may also attempt to influence empirical estimates and the information stream flowing into the political decision process, even when it is subject to cost–benefit rules (see, e.g., Holcombe's [1998] application

of this idea to tax policy based on elasticity estimates). The selection of who will do the cost–benefit analysis is endogenous, and regulators or politicians may simply select individuals to perform the estimates who they know will provide the answers they desire (Holcombe 2010). Thus, the extent to which cost–benefit analysis affects the level of regulation, if at all, may be ambiguous.

In addition to requirements for *economic* cost–benefit analysis, some states mandate a *government* cost–benefit analysis that only requires an estimation of how the regulation will affect the expenditures and revenues of the government itself. Because regulations require enforcement, they do increase government expenditures, and because regulations may reduce economic activity they may also reduce tax revenue. Rather than pointing out the net costs of regulations to private actors in the economy, these cost–benefit tests point out the net costs of these regulations to the government.

When a regulation results in reduced tax revenue, and requires expenditures that cannot be spent on other government programs that please interest groups or voters, the regulation may not be in the best interest of the political actors charged with deciding on the enactment of the regulation. Because government cost–benefit analysis points out how the regulations may impact the self-interested activities of government actors, rather than simply appealing to how the regulation affects the social welfare, public choice theory predicts it would likely be a more useful tool to prevent some regulations from being imposed than to overturn existing regulations.

Another area where regulatory review may have an effect is in the process of after-the-fact review of existing regulations. Some states have review processes for new or existing regulations that focus only on a "legality review," asking simply whether the regulation accords with state constitutional and statutory law. However, even for review processes that examine more than just the legality of a regulation, previous evidence from the literature suggests that most review rules are either ineffective or unenforced (Hahn 2000; Schwartz 2010). The entity or source performing the review may matter, as some states have independent agencies doing reviews while others have reviews internal to the legislative or executive branch.

One additional process that forces some type of recurring review is the presence of a "sunset" provision. Sunset provisions require periodic renewal of new regulations or agencies; without renewal, they expire. Anecdotal evidence regarding sunset provisions has suggested they may not be very effective. Tennessee's sunset provision, adopted in 1982, requires that all newly enacted rules sunset after one year. However, it is often

circumvented by the state legislature. According to Hahn (2000, 882–83), in Tennessee, "the legislature routinely votes to eliminate the expiration date of the sunset provision, defeating its original purpose." Schwartz (2010, 371) points out that "Tennessee has not aggressively used its power to sunset rules. In the 1990s, the legislature voted to extend nearly all rules beyond the expiration date of the sunset provision." He continues, from "2005 through 2010, only one rule has not been extended by the annual legislation on sunsetting rules."

One final aspect of state policy worth discussing is the process of voter initiatives. In states with voter initiatives, citizens can collect signatures to put a proposed law on the ballot. By doing so, citizens can circumvent the normal state political process and the legislature. Many of the major reforms constraining government, such as term limits and tax/expenditure limits, for example, have come from voter initiatives. The literature suggests that states with voter initiatives have smaller government sectors and that the voter initiative can be an effective tool for constraining government and the regulatory process within a state (Matsusaka 1995).

In the next section, we contribute to this literature with an empirical analysis of the regulatory procedures across all fifty states and simultaneous analysis of all the procedural safeguards that each state has in place. To the best of our knowledge, such analyses have never been undertaken by any other study. While other studies have attempted to see how the total level of regulation in a state impacts state economic activity, we turn this question on its head by asking what factors determine the level of regulation in a state. That is, why do some states have more regulations than others, and do the procedural rules have a significant impact on the overall level of regulation in a state?

Data and Empirical Analysis

In order to study empirically the impact that procedural rules have on regulatory outcomes, we have compiled data from a number of sources on all fifty states. To measure the level of regulation in each state, we use the following six unique variables: the *Forbes* magazine ranking for each state's regulatory climate, per capita regulatory enforcement expenditures, the number of regulations per capita that are challenged in each state's supreme court, the number of regulations per capita that are reversed or overturned by a state supreme court, the number of regulatory rules per capita issued per year by each state's regulatory agencies, and the number of regulatory

rules per capita that have an economic impact issued per year by each state's regulatory agencies.

While there is no one perfect measure of the amount of regulation in each state, these six unique variables are all clearly correlated with the total level of regulation, with some more directly measuring the overall efficiency of regulations specifically.[1] Four of these regulatory measures directly aim at capturing the total amount of regulation in a state (the *Forbes* ranking, enforcement expenditures, and the two based on counts of rules). Further, the measures of regulations being challenged (or overturned) in state courts would seem to be more closely related to measuring inefficient, undesirable, or contradictory regulations, although we also think it is positively related to the overall level of regulation (in the same way, illegal drug use can be measured to some degree by arrests). Four of these measures of the regulatory climate that we employ as dependent variables are available for all fifty US states, while two (the number of regulatory rules per capita issued per year by each state's regulatory agencies and the number of regulatory rules per capita which have an economic impact issued per year by each state's regulatory agencies) are from Shapiro and Borie-Holtz (2011a), who were able to calculate the rule counts only for a subsample of twenty-eight states. A full list of the variables we employ, with their descriptions and sources can be found in the Appendix.

As variables to explain the level of regulation, we use a set of fourteen procedural safeguards drawn from Schwartz (2010) and one procedural safeguard drawn from The Council of State Governments (2010). These include a number of regulatory review procedures: various measures of cost–benefit analysis, sunset provisions, as well as whether the state has a voter initiative. Each of these dummy variables is coded as 1 if a state has the specific regulatory review and 0 otherwise. The specific powers of review from Schwartz (2010) we consider first are *who* does the review:

1. whether a state attorney general has the authority to review regulations,
2. whether the power to review exists in some other office of the executive branch,
3. whether a state legislature has formal review powers,
4. whether or not a state government has granted an independent agency review powers, or,
5. whether an agency is required to review its own regulatory impacts.

We also include variables drawn from Schwartz (2010) to indicate the *type* of review:

1. whether some branch of a state government is required to review the legality of a proposed regulation,
2. whether some branch must determine if a regulatory agency has the authority to issue a proposed regulation,
3. whether or not some branch of state government reviews a proposed regulation based on "reasonableness or effective" application, and
4. whether or not some branch of state government reviews a proposed regulation based on its "consistency and conformity to state code" (which we term "any factor review").

Finally, we also include cost–benefit analysis requirements based on:

1. whether or not there is a requirement to give a detailed report of a proposed regulation's impact on government funds and revenues,
2. whether or not there is a requirement to give a detailed report of a proposed regulation's impact on economic outcomes to private or regulated parties impacted by the proposed regulation, and
3. whether or not an agency must propose alternatives to the regulation that would provide a lower-cost means of achieving the same policy goal as the regulation.

In order to study formally the impact that each of these variables may have on the regulatory outcomes listed previously, we ran ordinary least squares (OLS) regressions using each of the six indicators of a state's regulatory environment against these procedural safeguards. Our empirical results are presented in table 1. A negative coefficient on an independent variable suggests that variable lowers the total amount of regulation in a state.

The first four independent variables, under the heading *Source of Review*, measure the "who does it" question in regulatory review requirements across states. The variables reflecting the presence of review by the state attorney general, other executive branch review, and independent review, are statistically insignificant in all specifications. Legislative review is negative and is statistically significant in one of the six specifications (the *Forbes* rank), but is insignificant in all others. Overall, these results do not seem to suggest that the source of the review matters, in that a state's total level of regulation is not significantly and robustly correlated with who is doing the regulatory review. While legislative review is

Table 1. OLS Regression Results for State Regulatory Climate—Per Capita Versions

Independent variables	Forbes regulatory rank	State regulatory enforcement expenditures per capita	Number of regulations in court per capita	Number of regulations reversed by court per capita	Total number of regulatory rules per capita	Number of economic rules per capita
			Dependent variable			
Source of review						
Attorney general review	7.195 (0.016)	−1.326 (0.299)	29.839 (1.284)	8.741 (1.281)	12.361 (0.426)	17.621 (1.080)
Other executive review	1.697 (0.438)	−2.688 (0.660)	−11.823 (0.544)	−5.303 (0.800)	29.160 (1.004)	−15.272 (0.948)
Legislative review	−15.786** (2.588)	−10.189 (1.494)	7.677 (0.423)	−1.370 (0.230)	23.105 (0.432)	−31.322 (1.204)
Independent review	2.399 (0.670)	6.860 (1.494)	−14.389 (1.105)	−4.605 (1.206)	−21.346 (0.750)	−4.533 (0.250)
Type of review						
Legality review	3.011 (0.581)	0.614 (0.111)	4.749 (0.284)	2.335 (0.440)	−3.717 (0.078)	−29.339 (1.112)
Authority review	5.381 (1.112)	0.445 (1.491)	11.632 (0.469)	1.463 (0.191)	−87.747** (2.519)	−16.969 (0.907)
Efficiency review	−4.717 (1.339)	−14.848*** (3.472)	20.767 (1.232)	7.474 (1.382)	1.547 (0.570)	0.582 (0.034)
Any factor review	−0.679 (0.140)	−6.523 (1.202)	8.397 (0.437)	3.706 (0.621)	−50.821 (1.639)	−18.314 (1.237)
Government cost–benefit	−12.245** (2.545)	−1.862 (0.343)	−46.566* (2.019)	−12.718* (2.011)	−156.231*** (3.818)	−91.699*** (4.211)

(continued)

Table 1. (continued)

Independent variables	Dependent variable					
	Forbes regulatory rank	State regulatory enforcement expenditures per capita	Number of regulations in court per capita	Number of regulations reversed by court per capita	Total number of regulatory rules per capita	Number of economic rules per capita
Economic	4.667	−1.482	2.412	1.367	10.398	31.006
cost–benefit	(0.842)	(0.332)	(0.120)	(0.206)	(0.277)	(1.421)
Alternative	−10.582**	−0.499	−19.787	−8.355*	−82.874	−55.139*
cost–benefit	(2.256)	(0.118)	(1.576)	(1.880)	(1.571)	(1.848)
Periodic review						
Agency review	−1.479	1.636	−24.916**	−4.148	7.625	0.275
	(0.405)	(0.491)	(2.468)	(1.217)	(0.232)	(0.016)
Nonagency	5.524	3.211	8.076	3.762	29.013	17.247
review	(1.280)	(0.930)	(0.443)	(0.662)	(1.024)	(1.003)
Sunset	−9.219**	−6.855*	−30.246*	−10.028*	−85.249**	−65.268**
provision	(2.652)	(2.021)	(1.788)	(1.880)	(2.324)	(2.976)
Other variables						
Voter initiative	−3.112	−1.872	0.829	−0.484	−33.818	−22.235
	(0.796)	(0.535)	(0.060)	(0.111)	(1.176)	(1.369)
Constant	47.813***	46.250***	61.771***	21.377***	345.508***	235.372***
	(11.154)	(6.496)	(3.177)	(3.372)	(8.144)	(9.677)
Observations	50	50	50	50	28	28
R^2	.386	.419	.325	.276	.722	.770

Note: Absolute value of *t*-statistics in parentheses. All models employ White's heteroscedasticity-consistent standard errors. OLS = ordinary least squares. Statistical significance as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

significant in one specification, the fact that it is insignificant in the other five specifications means the result is weak at best and that there is little robust evidence in favor of a true impact.

The next seven independent variables, under the heading *Type of Review*, measure the metrics by which regulations are judged in the review process. The first of these, legality review, is the requirement that each new regulation be reviewed to ensure that the power to regulate the activity is legal under state constitutional and statutory law. The variable is never statistically significant. Authority review is whether new regulations are subject to a review for consistency with legislative intent or determination of whether the agency actually has the authority to issue such a regulation. In one of the models (number of regulatory rules per capita), it is negative and statistically significant. Efficiency review is whether new regulations are subject to a review based on reasonableness, efficiency, or effectiveness. Similar to authority review, it is statistically significant and negative in only one of these cases (state regulatory enforcement expenditures per capita). Any factor review is a code for if the review can be done based on any factor and does not specifically mandate one type of criterion to be used or considered. It is never statistically significant. Thus, for these first four factors, there is weak evidence at best that they matter in terms of changing the total amount of regulation in a state.

Continuing with the next three independent variables under the heading *Type of Review*, these measure whether the review process specifically mandates cost–benefit testing and of what type. Government cost–benefit is when a regulation must be studied for its effect on the government budget through increased expenditures or lower tax revenue from a new regulation. Government cost–benefit requirements appear to be robustly statistically significant. The variable is negative and statistically significant in five of the six cases. Some of the coefficients are sizable as well, implying that the impact is not only statistically significant but also economically significant. Interestingly, whether a cost–benefit analysis must be done to determine the overall private economic efficiency of the regulation is never significant; this implies that the requirement of a cost–benefit analysis has no discernible impact on the level of regulation.

Government cost–benefit matters but economic cost–benefit doesn't seems counterintuitive. However, this result would appear to conform with public choice theory, where self-interested political actors may care more about how these regulations impact their budgets, but have less concern for the overall public interest. The final cost–benefit variable codes whether the cost–benefit review must also present alternatives to the regulation for

achieving the same policy goals (e.g., a tax that could be imposed be used in place of the regulation to produce the same outcome). This is statistically significant and negative in half (three) of the specifications. Thus, for these three cost–benefit factors, there is evidence that requiring government cost–benefit analysis and the presentation of alternatives does matter in terms of lowering the total amount of regulation in a state.

The next three independent variables, under the heading *Periodic Review*, examine not the process by which new regulations are subjected to review, but rather the process for reviewing existing rules and regulations. The first two of these variables reflect whether a requirement for periodic review is present and done either internally by the regulatory agency itself or by some other entity (nonagency). Agency review is statistically significant and negative in only one specification (the number of regulations challenged in the state supreme court per capita). Nonagency review is never statistically significant. Thus, there is little robust evidence that the "who" in periodic review matters.

The final independent variable in the periodic review section, the presence of a sunset provision, is robustly statistically significant—being negative and significant in all six different measures of state regulatory climates. The coefficients are also economically significant. Sunset provisions do appear to reduce the total level of regulation in a state significantly, despite the anecdotal evidence from Tennessee discussed earlier. This appears to hold both for the measures that reflect the flow of new regulations (the final two specifications of rule counts) and the remaining measures that more closely reflect the total stock of existing regulations in a state. The final two independent variables, under the heading *Other Variables*, are the constant and a variable reflecting whether the state has a process for voter initiatives. However, voter initiative is never statistically significant.

Overall then, these initial results provide some interesting implications. First, there would appear to be very few regulatory review procedures in place that actually affect the level of regulation. This finding is significant from both an academic and a policy perspective. Even more important are the regulatory review procedures that would appear to impact relatively more inefficient regulatory rules. Again, although a detailed analysis of this latter issue is well beyond the scope of this study (though worthy of future research), as noted we did include two variables that would seem to target relatively inefficient rules. Here specifically, the results suggest that both government cost–benefit and sunset provisions reduced the occurrence of both, with each result statistically significant. Finally, alternative

cost–benefit and agency review were statistically significant and each reduced the number of regulations reversed by a state court and the number of regulations in court, respectively. All of those results combined then, along with what follows, should provide future researchers ample opportunity to evaluate which types of regulatory review may better target the promotion of efficient relative to inefficient regulations.

Robustness Checks

In this section, we attempt to see if the results reported earlier are robust to changing the way the regulatory variables are measured and to including additional control variables. We first begin by performing our same regressions mentioned earlier, but this time including several socioeconomic and political control variables—namely, the state's unemployment rate, median household income (in thousands of dollars), the percentage of the population in the state with a bachelor's degree, and the percentage of the state voting Democrat in the 2008 election. The results are found in table 2.

Because we are mostly interested in whether and how our results change, the following discussion will be in terms of a comparison to our results from table 1. First, the only two variables that show significance in a large number of the specifications are again the presence of sunset provisions and government cost–benefit review. Sunset provisions remain statistically significant and negative in all specifications, and government cost–benefit is now significant in four of the six specifications. The requirement for presenting alternatives in the cost–benefit analysis is now significant in only one specification after the controls are included. Thus, the evidence in favor of this having a robust impact is weakened. Some variables now become significant that were not in our original model; however, most are only significant in one specification. In particular, both independent review and efficiency review are now negative and significant in two specifications, but positive and significant in one specification each. Four other review structure variables become significant in just one isolated specification, and three of these are negative.

Given these results, we find no substantial changes to the conclusions we reached based on the findings presented in table 1 that sunset provisions and the requirement of government cost–benefit analysis do reduce the level of regulation. However, there is much weaker evidence that requiring alternative policies to be presented in a cost–benefit analysis has a discernible effect on the level of regulation to the point where it is no longer a robust finding. Further, for the regulations in court and regulations overturned in

Table 2. OLS Regression Results for State Regulatory Climate—Per Capita with Controls

Independent variables	Forbes regulatory rank	State regulatory enforcement expenditures per capita	Number of regulations in court per capita	Number of regulations reversed by court per capita	Total number of regulatory rules per capita	Number of economic rules per capita
			Dependent variable			
Source of review						
Attorney	−1.278	−0.993	20.592	4.651	21.243	29.051
general review	(0.291)	(0.205)	(0.974)	(0.699)	(0.604)	(1.739)
Other executive	2.701	−3.127	−18.082	−6.602	−25.242	−28.801
review	(0.700)	(0.763)	(0.865)	(1.042)	(0.638)	(1.508)
Legislative	−13.226*	−11.823	−23.836	−8.186	−28.383	−32.086
review	(2.002)	(1.600)	(1.152)	(1.257)	(0.581)	(1.475)
Independent	−2.742	7.853*	−28.174*	−11.450**	−19.221	8.285
review	(0.696)	(1.695)	(1.778)	(2.269)	(0.496)	(0.439)
Type of review						
Legality review	3.289	0.676	9.290	3.189	−32.952	−31.890*
	(0.661)	(0.119)	(0.540)	(0.627)	(1.085)	(2.185)
Authority review	2.177	11.045*	24.768	3.341	−24.357	2.909
	(0.417)	(1.700)	(1.160)	(0.499)	(0.649)	(0.164)
Efficiency review	−2.700	−15.537***	22.821*	9.598*	11.203	−1.970
	(0.806)	(4.019)	(1.707)	(2.177)	(0.405)	(0.149)
Any factor	−0.035	−5.976	29.990	9.934	−28.995	−21.954
review	(0.007)	(1.053)	(1.655)	(1.617)	(0.694)	(1.090)

(continued)

Table 2. (continued)

Independent variables	Forbes regulatory rank	State regulatory enforcement expenditures per capita	Number of regulations in court per capita	Number of regulations reversed by court per capita	Total number of regulatory rules per capita	Number of economic rules per capita
			Dependent variable			
Government cost–benefit	−8.692 (1.583)	−2.587 (0.485)	−48.828** (2.212)	−10.272* (1.744)	−169.480*** (4.055)	−82.363*** (4.817)
Economic cost–benefit	2.251 (0.369)	−0.612 (0.127)	2.201 (0.126)	0.052 (0.010)	73.863 (1.523)	52.261* (2.204)
Alternative cost–benefit	−7.158 (1.462)	−1.471 (0.314)	−15.183 (1.399)	−4.802 (1.232)	−86.406 (1.734)	−55.044* (2.284)
Periodic review						
Agency review	−2.613 (0.753)	2.373 (0.634)	−19.172 (1.646)	−3.969 (1.082)	9.326 (0.282)	9.885 (0.560)
Nonagency review	1.612 (0.310)	4.080 (1.125)	13.834 (0.984)	2.260 (0.512)	41.412 (1.240)	−1.413 (0.081)
Sunset provision	−8.606** (2.644)	−6.977* (1.994)	−39.976** (2.297)	−9.472** (2.270)	−97.402** (2.778)	−67.124*** (3.768)
Other variables						
Voter initiative	−0.644 (0.156)	−2.524 (0.702)	2.168 (0.180)	1.703 (0.467)	−69.361* (2.222)	−19.832 (1.297)
Unemployment rate	−1.214 (0.712)	−0.473 (0.258)	−12.928 (1.221)	−4.843 (1.479)	−26.491 (1.258)	−19.717* (1.932)

(continued)

Table 2. (continued)

Independent variables	Forbes regulatory rank	State regulatory enforcement expenditures per capita	Number of regulations in court per capita	Number of regulations reversed by court per capita	Total number of regulatory rules per capita	Number of economic rules per capita
			Dependent variable			
Median household income (thousands)	0.478 (1.098)	−0.151 (0.360)	1.713 (0.954)	0.816 (1.349)	−4.932 (1.400)	−3.693* (2.164)
Percentage with bachelor degree	−1.435* (1.930)	0.220 (0.295)	−4.216* (1.742)	−1.809** (2.186)	−1.061 (0.214)	−1.339 (0.571)
Percentage voting democrat	0.419 (1.330)	−0.113 (0.479)	−1.412 (1.212)	−0.129 (0.364)	−0.426 (0.191)	2.041* (2.034)
Constant	46.682** (2.365)	55.665*** (3.275)	239.919*** (3.168)	63.487*** (2.922)	751.650*** (5.518)	403.089*** (5.657)
Observations	50	50	50	50	28	28
R^2	.459	.424	.453	.427	.781	.848

Note: Absolute value of *t*-statistics in parentheses. All models employ White's heteroscedasticity-consistent standard errors. OLS = ordinary least squares. Statistical significance as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

court, again both government cost–benefit and sunset provisions are negative and significant for both of those dependent variables. Now alternative cost–benefit and agency review are no longer statistically significant; however, efficiency review is positive and significant, while independent review is negative and significant for both of those dependent variables.

Our next robustness check is to redefine some of the dependent variables that measure the level of regulation in a state by looking at the raw numbers and not as variables in per capita terms. In the raw data, the most populous states clearly have the highest levels of regulatory spending and number of regulatory rules and regulations going to court. For example, the two most populous states contained in the rule count data, New York and Illinois, have 681 and 381 total rules (or 514 and 183 when looking only at economic rules), respectively, while the two least populous states in the data, Wyoming and South Dakota, have 194 and 78 total rules (or 80 and 45 when looking only at economic rules), respectively. Regulatory enforcement expenditures are also greater in more populous states for obvious reasons, as enforcement costs increase even under a fixed number of rules as the population increases.

Given this, there may be arguments that measures of the number of regulations should not be defined on a per capita basis. If any given regulation applies to everyone, it would seem that a state should only have one of these rules regardless of the size of its population. Therefore, it is clear that larger states simply have more diverse types of industries and areas, so a larger state with many different industries would likely have more rules. Further, states with larger populations may have full-time legislatures or more professional governments in general.

With the inclusion of population into the analysis, it may also be possible to better determine the extent to which regulation is a public or private good, and thus the extent to which either the public interest or the public choice theories of regulation might dominate. Also, although a detailed discussion is beyond the scope of this work, including population may help to indicate whether, at the margin, regulation is efficient or inefficient. Specifically, if regulation is a public good, then population should not be correlated with the level of regulation. However, if regulation is more a private good, driven largely by rent-seeking and regulatory capture, then we would expect population to be correlated with the level of regulation, as a larger population would have a higher demand for regulation.

Table 3 presents results similar to those in table 2 with the exception that population is now included as an independent variable and all dependent variables that were in per capita terms are instead measured as their total values.

In the specifications presented in table 3, the variable that is again robustly negative and significant in the largest number of regressions is the presence of sunset provisions. It remains negative and statistically significant in three of the specifications, and in two additional ones it is just slightly short of statistical significance. Again, however, it is the most robust finding in the results. For the final two columns of rule counts, three additional variables are now significant in both of those specifications (although they are still insignificant in all four other specifications). These are the voter initiative, legality review, and any factor review. Just as in table 2, efficiency review has conflicting results with one result positive and significant, and two negative and significant.

The evidence in favor of requiring alternatives be presented in the cost–benefit analysis, which was significant in three of the six original regressions in table 1, but fell to only one of the six in table 2 with controls, now becomes stronger again, with two of the six results negative and significant. The only source of review variable that was significant in our original specifications in table 1 was legislative review, but it was so in only one specification (which was also the case in table 2), and in table 3 it is now significant in two of the six specifications. This is stronger, but again we would hope for it to be significant across a greater number of models in order to reach a more concrete conclusion. The one major change from previous results is in the robust significance of the government cost–benefit variable. While it was significant and negative in five of the six specifications originally, and four of the six with controls, it is now never significant in any specification.

Thus, when we redefine our variables as levels, the strongest remaining robust result is that sunset provisions do seem to be correlated with lower levels of regulation in a state. The correlation of lower levels of regulation with the source of review being the legislature and with the requirement for alternatives to be presented in the cost–benefit analysis would be the next most robust results; however, these results are not clearly as strong or uniformly significant. Finally, there are some results only present in these forms of the model, such as voter initiative, legality review, and any factor review, that are significant in the two rule count specifications that were not generally significant in our previous results.

Also when evaluating the levels for the number of regulations in court and the number of regulations reversed in court, it would appear that only alternative cost–benefit analysis reduces both and is statistically significant. Therefore, between these results and those obtained from the original specification it would seem that government cost–benefit analysis and sunset

Table 3. OLS Regression Results for State Regulatory Climate—Levels with Controls

Independent variables	Forbes regulatory rank	State regulatory enforcement expenditures	Number of regulations in court	Number of regulations reversed by court	Total number of regulatory rules	Number of economic rules
Source of review						
Attorney general	−3.464	−86,583.580	16.545	7.238	−41.448	66.431
review	(0.808)	(1.075)	(1.086)	(1.408)	(0.496)	(1.669)
Other executive	0.851	−24,907.958	7.087	−2.559	−162.467	−148.446*
review	(0.240)	(0.539)	(0.442)	(0.536)	(1.204)	(2.206)
Legislative	−16.355**	−286,684.17**	14.171	3.634	−27.420	−135.978
review	(2.595)	(2.435)	(0.768)	(0.585)	(0.160)	(1.576)
Independent	0.381	60,854.355	10.359	1.226	−93.192	13.135
review	(0.099)	(0.739)	(0.835)	(0.287)	(0.885)	(0.246)
Type of review						
Legality review	4.332	18,179.042	9.663	0.306	−273.242*	−246.414***
	(0.790)	(0.264)	(0.619)	(0.061)	(2.335)	(3.855)
Authority review	5.639	100,121.855	−0.305	−3.117	−1.747	26.180
	(1.027)	(1.131)	(0.018)	(0.495)	(0.013)	(0.387)
Efficiency review	−3.134	−167,367.98**	13.608	8.236**	−86.620	−73.307*
	(0.935)	(2.749)	(1.281)	(2.145)	(1.565)	(2.273)
Any factor	2.538	−74,256.178	−2.329	2.468	−259.183**	−179.774**
review	(0.579)	(0.925)	(0.192)	(0.548)	(2.425)	(3.451)

(continued)

Table 3. (continued)

Independent variables	Forbes regulatory rank	State regulatory enforcement expenditures	Number of regulations in court	Number of regulations reversed by court	Total number of regulatory rules	Number of economic rules
			Dependent variable			
Government cost–benefit	−7.174 (1.289)	−4,952.789 (0.071)	−0.907 (0.087)	3.170 (0.816)	−111.181 (1.121)	−48.753 (0.985)
Economic cost–benefit	2.015 (0.358)	−75,378.351 (0.934)	15.725 (1.088)	2.899 (0.558)	179.408 (1.165)	113.291 (1.531)
Alternative cost–benefit	−7.247 (1.615)	89,679.055 (1.138)	−34.841*** (3.329)	−12.558** (3.517)	18.401 (0.162)	−56.865 (1.034)
Periodic review						
Agency review	−1.112 (0.372)	−106,211.733 (1.487)	−12.015 (1.191)	0.175 (0.053)	49.804 (0.427)	46.218 (0.764)
Nonagency review	2.662 (0.515)	70,872.652 (1.315)	16.954 (1.312)	4.573 (1.029)	85.655 (0.915)	18.885 (0.414)
Sunset provision	−7.828*** (2.789)	−167,204.38** (2.257)	−11.503 (0.896)	−5.132 (1.345)	−169.055 (1.268)	−248.153*** (3.750)
Other variables						
Voter initiative	0.269 (0.071)	18,747.143 (0.338)	−8.662 (0.764)	0.589 (0.178)	−243.959** (2.412)	−111.845** (2.138)
Unemployment rate	0.211 (0.150)	−11,764.607 (0.445)	1.645 (0.255)	0.397 (0.198)	38.279 (0.586)	−6.383 (0.212)

(continued)

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Table 3. (continued)

Independent variables	Forbes regulatory rank	State regulatory enforcement expenditures	Number of regulations in court	Number of regulations reversed by court	Total number of regulatory rules	Number of economic rules
			Dependent variable			
Median household income (thousands)	0.513 (1.327)	12.958** (2.089)	0.142 (0.147)	0.566 (1.490)	−9.671 (1.382)	−7.877** (2.435)
Percentage with bachelor degree	−1.423** (2.096)	−16,174.610 (1.385)	−1.523 (1.047)	−0.995* (1.813)	−4.188 (0.279)	−7.797 (1.114)
State population (hundred thousands)	−0.845*** (3.804)	49,718.010*** (4.603)	−0.016* (1.983)	−0.589** (2.662)	27.758* (1.989)	33.055*** (4.610)
Percentage voting democrat	0.444 (1.388)	−5,351.619 (1.607)	0.379 (0.490)	0.419* (1.730)	−5.176 (0.885)	−0.897 (0.301)
Constant	38.984* (2.001)	466,381.238 (1.388)	45.760 (0.779)	−7.321 (0.421)	1,340.726** (2.381)	1,185.909*** (4.172)
Observations	50	50	50	50	28	28
R^2	.549	.829	.392	.441	.719	.834

Note: Absolute value of *t*-statistics in parentheses. All models employ White's heteroscedasticity-consistent standard errors. OLS = ordinary least squares. Statistical significance as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

provisions most consistently reduce what would appear to be a proxy for relatively inefficient regulations (each negative and statistically significant in four of the six specifications) followed by alternative cost–benefit which is negative in three of the six specifications.

Finally, the results from the inclusion of population are all statistically significant; however, the sign coefficients are inconsistent, suggesting that whether regulation is, at the margin, efficient or inefficient is an ambiguous finding. Specifically, as population increases, it leads to an increase in state regulatory enforcement expenditures, the total number of regulatory rules, and the total number of economic rules. However, it leads to a higher ranking on the *Forbes* score, fewer regulations in court, and fewer regulations reversed in court. This ambiguity should provide ample opportunity for future researchers to tease out the relative efficiency of regulation then.[2]

As yet another check for robustness, we consider whether multicollinearity among our independent variables may be leading to problems in our results.[3] First, we take each of the main variables of interest and run them separately along with all of the control variables against each of the dependent variables for both per capita and levels, corresponding to tables 2 and 3, respectively.[4] Here, the only major differences for the per capita results suggest that, when run individually, independent review is negative and significant in five of the six specifications, efficiency review is now only statistically significant in one of the six results, any factor review is negative in all specifications and significant in three of the six specifications, government cost–benefit is significant in three of the six specifications versus four of the six in table 2, economic cost–benefit is no longer statistically significant in any specification, alternative cost–benefit is significant in three of the six specifications, agency and nonagency review is significant in one of the six and two of the six results, respectively, while sunset provisions are only significant in one of the six specifications.

Comparing the level effect results from table 3 with each variable run separately also nets little difference between the two. The only differences that do emerge are for Attorney General review, which is now significant in two specifications, other executive review is not significant at all, legislative review is significant in four of the six specifications, independent review is significant in two of the six, legality review is significant in three of the six, authority review is significant in one of the six, efficiency review is significant in two of the six, any factor review is significant in three of the six, government cost–benefit is significant in one of the six, alternative cost–benefit is significant in one of the six, agency and nonagency review are significant in two of the six and one of the six specifications,

respectively, while sunset provisions and voter initiatives are significant in only one of the six and zero of the six specifications, respectively.

We also more thoroughly scrutinize those variable pairs with correlation coefficients of 0.50 or greater. The variable pairs that have a correlation of 0.50 or greater are attorney general review and legality review, authority review and legality review, authority review and efficiency review, and finally, economic cost–benefit analysis and government cost–benefit analysis. In order to examine whether the correlations among these pairs of variables may have impacted our results, we ran each of the dependent variables against those correlated variables individually, along with each of the remaining independent variables that were statistically significant from the initial results in table 1.

For example, when we initially regressed the *Forbes* rank against each of the independent variables, the significant variables were legislative review, government cost–benefit, alternative cost–benefit, and sunset provisions (see table 1). Given this, our new specification runs each of the correlated variables mentioned previously grouped with one of legislative review, alternative cost–benefit, and sunset provisions. In doing so, we can see if any of the coefficient signs or statistical significance levels change substantially. In summary, our results are fairly robust in these alternative specifications as well. The only notable changes were that, in some of the specifications using per capita state regulatory expenditures and the number of regulations in court per capita as dependent variables, the significance level of sunset provisions is reduced, but it still retains a uniformly negative coefficient when run separately with legality review and agency review, then authority and agency review, and finally with efficiency review and agency review.

However, when running sunset provisions along with economic cost–benefit analysis and agency review, as well as sunset provisions and government cost–benefit and agency review, then finally each of the correlated variables together along with agency review and sunset provisions, sunset provisions return to having a consistent statistically significant negative coefficient. In the specifications using the number of regulatory rules per capita as a dependent variable, sunset provisions become statistically insignificant except when run with government cost–benefit. However, when all of the correlated variables are run together along with sunset provisions, sunset provisions are again statistically significant.[5]

Overall, our results have clear implications for policies targeting regulatory reform. The single most important policy in a state is the

presence of a sunset provision. Requiring new regulations to be studied for their impact on government expenditures and revenues (government cost–benefit analysis) and requiring the presentation of alternative, lower-cost policies to achieve the same regulatory goals may also impact state regulatory systems. Further, the review process should be housed in either the legislature or an independent agency to be most effective. Finally, an initial inspection would suggest that government cost–benefit and sunset provisions along with alternative cost–benefit would seem to best reduce relatively inefficient rules, though these latter findings would require much more detailed future analysis. While there were other review processes that were significant on occasion, the findings listed here tended to be the most robust determinants of the level of regulation across the US states.

Conclusion

In this article, we have provided the first systematic empirical study of how differences in the regulatory review processes across all fifty US states affect the level of regulation. While previous literature has examined how the level of regulation impacts economic activity, none has systematically attempted to explain the level of regulation as the dependent variable. The few studies that have attempted to study the impact of regulatory reform or review have been case studies limited to specific states and some provide anecdotal evidence at best.

Our empirical results, based on six different measures of state regulatory climates, have some potential implications for the types of regulatory reforms that affect regulatory policy. The most important of these is the presence of a sunset provision on all new regulations. By making regulations fight to stay in place sunset provisions force a reevaluation of all regulations and tend to lessen the degree of regulation within a state. Our second most robust finding is the benefit of either a requirement to present alternative policies that may accomplish the same policy goal at lower cost or a requirement to review the overall cost–benefit impact to a state government's finances (meaning the increases in spending necessary to administer and enforce the regulation and the possible reductions in tax revenue due to the regulation lowering business activity). We also find some limited evidence that reviews done through the legislative branch or an independent agency tend to also be more effective.

Appendix

Full Description and Sources for All Variables

Variable name (source)	Description
Dependent variables	
Forbes Regulatory Rank[a]	Ranking by state based on its regulatory environment from *Forbes* Magazine's The Best States for Business and Careers 2010. The Index is based on (1) an index from Pollina Corporate Real Estate; (2) The Tort Liability Index from the Pacific Research Institute; (3) The Regulatory index from the Pacific Research Institute's US Economic Freedom Index; (4) Moody's bond rating on each state's general obligation debt; (5) transportation infrastructure including air, highway, and rail; and (6) whether a state is right to work
State regulatory enforcement expenditures per capita[b]	Data include total expenditures on "protective inspection and regulation" for the year 2008
Number of regulations in court per capita[c]	This variable represents the average number of regulatory actions that received prior regulatory agency scrutiny before being challenged within a state Supreme Court between 1995 and 1998 (variable "agency" in codebook)
Number of regulations reversed by court per capita[c]	This variable represents the number of regulations in court per capita that were overturned by a state Supreme Court between 1995 and 1998
Total number of regulatory rules per capita[d]	These are the total number of regulatory rules passed by each of a sample of twenty-eight states in 2007
Economic rules per capita[d]	These are the total number of regulatory rules passed by each of a sample of twenty-eight states in 2007 which have a direct economic impact. Specifically, this variable eliminates all budgetary rules, administrative rules, and regulations which set rules for an individual state government but not the public at large contained in "Total Number of Regulatory Rules Per Capita"

Appendix. (continued)

Variable name (source)	Description
Independent variables	
Voter initiative[e]	A dummy variable representing whether citizens of a given state have the constitutional right to bring forth constitutional amendments through popular initiative
Unemployment rate[f]	Average unemployment rate by state between 2002 and 2007
Median household income[b]	Average four-person household income by state between 2002 and 2007
Percentage with bachelor degree[b]	Average percentage of the population with a bachelor's degree by state between 2002 and 2007
Percentage voting Democrat[g]	The percentage of the population that voted for President Barrack Obama in the 2008 general election by state

Sources: [a]Data are available at http://www.forbes.com/special-report/2011/best-states-11_land.html.
[b]US Department of Commerce (2010).
[c]Brace, Paul, and Melinda Gann Hall. "The State Supreme Court Data Project." These data are available at http://www.ruf.rice.edu/~pbrace/statecourt/.
[d]Shapiro and Borie-Holtz (2011a).
[e]From Council of State Governments (2010).
[f]Data available from the *Bureau of Labor Statistics* for each of the various years.
[g]Data available from www.cnn.com/Election/2008/results/president/.

Notes

1. For the sake of space, a full table of the correlation coefficients are not presented here, but are available from the authors upon request.
2. We also considered whether endogeneity or reverse causality could be affecting our results. This would be the case if states with high levels of regulation are the ones that adopt more stringent review requirements, creating a relationship where states with stringent review were also the ones with high levels of regulation. This is clearly not an issue in our results because not only would that have produced positive signs on the coefficients (the opposite of what we find) but also because state regulatory review procedures are relatively unchanging and constant in states rather than constantly changing in response to regulatory levels. Thus, there appears to be no evidence that this is affecting our results.
3. The variance inflation factor (VIF) among each of the independent variables was never higher than 8.5. Given that a VIF of 10 is generally considered to be a critical threshold for which multicollinearity would be a concern, we do not believe it is a serious issue. However, to ensure that this is indeed the case, we run a number of additional regression specifications.
4. For the sake of space, we do not provide a full table with these results here. However, they are available from the authors upon request.
5. A full table listing the general empirical findings and how strong the evidence was as to whether or not a given regulatory review procedure affected overall regulation is available from the authors upon request.

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