

Directing Discipline: State Medical Board Responsiveness to State Legislatures

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Abstract

State medical boards are increasingly responsible for regulating medical and osteopathic licensure and professional conduct in the United States. Yet, there is great variation in the extent to which such boards take disciplinary action against physicians, indicating that some boards are more zealous regulators than others. We look to the political roots of such variation and seek to answer a simple, yet important, question: are nominally apolitical state medical boards responsive to political preferences? To address this question, we use panel data on disciplinary actions across 65 state medical boards from 1993-2006 and control for over-time changes in board characteristics (e.g., composition, independence, budgetary status), regulatory structure, and resources. We show that as state legislatures become more liberal [conservative], state boards increasingly [decreasingly] discipline physicians, especially during unified government and in the presence of highly professional legislatures. Our conclusions join others in emphasizing the importance of state medical boards and the contingent nature of political control of state regulation. In addition, we emphasize the roles that oversight capacity and strategy play in offsetting concerns regarding self-regulation of a powerful organized interest.

State regulatory agencies, including professional licensing boards, tend to shy from public attention as well as from political and academic scrutiny. Yet, from time to time, a board earns unwanted celebrity and political attention. Such has been the fate of the Medical Board of California (MBC) since late 2012. The MBC was exposed by a series of *Los Angeles Times* articles for neglecting its duty to protect the public from unprofessional or incompetent doctors (Girion and Glover 2012a; Girion and Glover 2012b; Glover and Girion 2012; Glover, Girion, and Branson-Potts 2012). In particular, the *Times* found that nearly half of southern California’s 3,700 prescription drug-related deaths from 2006-2011 could be attributed to overuse (and thus over-prescription) of a *legally* prescribed drug and that 0.1% of practicing physicians in the area wrote the prescriptions that led to 17% of these deaths (Girion and Glover 2012a). The *Times* explicitly assigned blame to the MBC for failing to identify and punish physicians whose prescribing behavior contributed to the epidemic of opioid-related deaths.¹

These articles and the broader public awareness they generated appeared to be effective in mobilizing political attention, as a number of oversight hearings in the California State Legislature soon followed. Responding to increased public concern, legislators were quick to scrutinize the MBC and the timing of the *Times* stories was such that it closely preceded the legislature’s decennial sunset review of the MBC’s statutory authority. As such, political attention to MBC behavior coincided with institutional incentives that primed its willingness to respond to the preferences of the legislature. The terms and stakes of the oversight hearings were neither trivial nor subtle. In April of 2013, Senator Curren Price (D) and Assemblyman Richard Gordon (D) from the joint committee reviewing the MBC’s performance sent a scathing letter to then MBC president Dr. Sharon Levine, explicitly threatening to dissolve the MBC unless it showed immediate and significant progress in protecting patients from dangerous doctors (Perkes 2013). Legislators followed this initial threat by introducing a bill that would have dissolved the disciplinary arm of the MBC and transferred such power to the Office of the Attorney General.

¹Girion and Glover (2012a) state: “The board has repeatedly failed to protect patients from reckless prescribing by doctors. . . . At the heart of these shortcomings is the board’s approach to oversight. It investigates when it receives a complaint of abuse or poor treatment of a specific patient or patients. It generally does not look for evidence of wider problems in a physician’s practice.”

The Board assured that they took these legislative concerns seriously and would do all it could to increase its enforcement activity. The official MBC report requesting a 5-year extension of its statutory authorities detailed a number of administrative measures that would lead to increased enforcement, especially regarding over-prescribing doctors.² In direct response to a request by Senator Price, the MBC committed to train investigators to use the state’s Controlled Substance Utilization Review and Evaluation System (CURES) for more proactive prosecutions of over-prescribing behavior.³ The MBC also promised to quickly fill 14.5 vacant FTE positions so that it could more quickly conduct investigations and more effectively suspend doctors under investigation.⁴

In the case of California, we see a nominally independent regulatory board in the context of a political firestorm of pressure to change its regulatory behavior. Political science research has often addressed whether and under what conditions regulatory agencies are responsive to political preferences, but much of this work exclusively examines federal agencies and the U.S. Congress. Much less is known about whether state regulators are similarly responsive to political principals. In addition, very little research examines how responsive *self-regulators* — professionally-based licensing and regulatory boards, for example — are to political actors. In this paper, we explore whether the California anecdote is reflective of a general tendency of state medical boards to respond to political preferences regarding their regulatory behavior.

We argue that the responsiveness of the MBC is not anomalous, nor, however, is such responsiveness inevitable. Indeed, a number of contextual factors played a role in facilitating the Board’s compliant behavior. For one, the MBC is subject to regular sunset review and this review coincided with the the publication of the unfavorable *Los Angeles Times* articles. In addition, this was a period of unified political pressure, with the legislature’s demands actively supported by Governor Jerry

²See http://www.mbc.ca.gov/Publications/Sunset_Report/sunset_report_responses.pdf

³This database, California’s prescription drug monitoring program, collects information (from both patients and prescribers) concerning the prescription of controlled substances. These programs are commonly used in the states to identify “doctor shoppers” (GAO 2011), but they can also be utilized by law enforcement, including medical boards, to identify reckless prescribers (Girion and Glover 2012b). See Davis, Pierce, and Dasgupta (2014).

⁴See http://www.mbc.ca.gov/Publications/Sunset_Report/sunset_report_2013_supp.pdf

Brown. This support and the knowledge that the governor would not veto a bill to strip the MBC of disciplinary authority made the legislature’s threat credible. Legislatures do not always have the will to affect medical board behavior, and even when they do, they may not have the institutional means to enforce responsiveness. Our primary goal is to establish the conditions under which state medical boards are responsive to legislative preferences. In doing this, we add to a developing understanding of the roles of regulatory agencies in the states and of medical boards in particular. Overall, this research helps elucidate how institutional variation interacts with changes in political preferences for regulation to shape how regulators make important decisions in the U.S. states.

State Medical Boards and Physician Discipline

State medical licensing boards (SMBs) exist in all states and many territories of the United States.⁵ SMBs began as boards of examiners, created by state legislatures and territorial governments to regulate professional market entry.⁶ Historically, these boards, along with separate boards for other professions and occupations, established and enforced licensing criteria for initial examinations, continuing education and “professionalization,” and non-educational criteria, such as licensing and maintenance fees.⁷ While boards still carry out these roles, SMBs have increasingly regulated

⁵See the following for a directory of all current medical and osteopathic boards: <http://www.fsmb.org/about-fsmb/directory-hub>

⁶All states had some form of physician licensing law by 1901 (Starr, 1982). SMBs make initial licensing decisions based on the following criteria: medical education in the form of a MD or DO degree, postgraduate medical training, passage of licensing examinations, and fitness to practice medicine (Federation of State Medical Boards (FSMB), 2014). States have varying requirements in terms of the cost to apply, the number of test attempts an applicant can make, and the time period in which the exams must be taken (FSMB, n.d.). Following initial licensure, states set Continuing Medical Education (CME) requirements in terms of the number of hours expected and over what duration of time (FSMB, 2015).

⁷The occupational jurisdiction of these boards varies across the states. For instance, some states have separate boards for osteopathic medicine and various less general medical and healing arts boards. Others have a single medical board responsible for more types of professional activity. As Peterson, Pandya, and Leblang (2014, p. 49) note, these occupational divisions are often endogenous to professional lobbying, as “scope of practice” regulations can draw what can seem to be artificial boundaries between occupations and

physician discipline as well (Ameringer, 1999).⁸

Prior to the 1980s, SMBs disciplined physicians infrequently (Derbyshire, 1983; Ameringer, 1999; Johnson and Chaudhry, 2012).⁹ Societal trends, such as greater demand for accountability by the public and the media, and market pressures, such as the increasing importance of Medicaid Managed Care, likely contributed to the changes in physician discipline since this period (Johnson and Chaudhry, 2012). Disciplinary actions available to SMBs include probation and revocation, suspension, and voluntary surrender of license (Derbyshire, 1983). In addition to violation of medical licensing law, examples of discipline-worthy offenses include criminal conviction, drug or alcohol abuse, sexual misconduct with a patient, disciplinary action taken by a different state, and, as in the case of California discussed above, drug over-prescription (Ameringer, 1999).

The legal authority to license and discipline physicians is rooted in the policy process: state legislatures write laws outlining the activity and composition of SMBs. Legislatures delegate this authority to professional experts; yet, they should not wish to completely cede control to boards. While extant empirical studies of the the determinants of board decision-making consider the tension between self-regulation (and its potential pitfalls, including, for example, regulatory capture (see e.g.,

functions. We limit our attention to general medical boards and boards of osteopathic medicine, as defined by the Federation of State Medical Boards (<http://www.fsmb.org>).

⁸Boards also engage in formal rulemaking, which often serves to set the terms for their own licensure and disciplinary behavior. Yet, rulemaking sometimes goes beyond these roles and sets more general policy affecting society at large. For example, a 2013 Iowa Board of Medicine rule requires that a licensed physician be physically present when a patient is given an abortion-inducing drug, limiting the common rural practice of doctors teleconferencing with on-site nurses during such procedures (Schenker 2015). The Iowa Supreme Court countered this particular rule, declaring it unconstitutional, highlighting the sensitive political nature of board rulemaking (Leys 2015).

⁹SMBs gained the legal authority to discipline based on technical incompetence by 1965 (Grad and Marti, 1979). Scholars believe that boards did not initially take disciplinary actions based on incompetence due to the difficulty of judging the art of medicine and remaining impartial to different physician approaches (Carr-Saunders and Wilson, 1933). However, art has slowly made way for science: the rise of evidence-based medicine and the decline of organized medicine's political power has compelled boards to begin administering disciplinary actions based on competence.

Stigler 1971; Kleiner 2000)) and the public good, these works pay scant attention to the potential role of political actors to intervene and affect board behavior through oversight. To ameliorate this shortcoming, we draw from principal-agent theories of delegation and political oversight and identify specific conditions under which we might expect legislatures to have more or less influence over state medical board behavior.

Empirical Literature on State Medical Board Behavior

Previous literature has examined determinants of SMB behavior in two main arenas: medical licensing, which includes initial licensure and maintenance thereof, and disciplinary activity. Work on licensure tends to focus on boards' willingness or ability to grant initial licenses or issue renewals to certain groups, such as those who wish to practice medicine in multiple states (Hiemenz, Leung, and Park, 2014), international medical graduates (Peterson, Pandya, and Leblang, 2014), inactive physicians (Freed, Dunham, and Abraham, 2009; Kenagy, et al., 2011), and persons with disabilities (Polfiet, 2008; Schroeder, et al., 2009). These works often look to state-level variation in demographics or labor markets or to cross-sectional board-level characteristics to understand variation in licensing activity and differential barriers to entry across SMBs (Svorny and Toma 1998).

Physician discipline is a particularly difficult activity to evaluate normatively. As figure 1 shows, there is much cross-sectional and over-time variation in rates of physician discipline in the states. The fact that the Arizona Medical Board regularly disciplines more physicians (per 1,000 licensed and practicing doctors) than the Delaware Board of Medical Licensure and Discipline does not mean that Arizona doctors are more reckless than their Delaware counterparts. Nor does it mean that the former board is necessarily more efficient than the latter at catching offending physicians. In the California case discussed above, legislators responded to what they saw as a public health crisis, not to the MBC's disciplining behavior *per se*. That is, there is nothing inherently wrong with infrequent discipline. In fact, there can be significant negative consequences to disciplining doctors too vigorously, such as doctor shortages or increased costs. Medical boards might simultaneously fail to discipline doctors deserving of punishment, while punishing those whose infractions bear only tangentially on the competent practice of medicine (Sawicki 2009). In sum, there is no normatively optimal level of discipline and state regulators might value either public health or professional

freedom more than the other. Thus, research has sought to examine the empirical determinants of SMB discipline and has attempted to explain some of the variation apparent in figure 1.

Figure 1 goes here.

In particular, scholars have identified demographic (Morrison and Wickersham, 1998; for a review, see Reich and Maldonato, 2011) and organizational factors (Dolan and Urban, 1983; Law and Hansen, 2010) that are associated with SMBs taking punitive actions against physicians. Law and Hansen (2010), for example, found that boards with more members, more staff, and organizational independence from the legislature have higher rates of discipline.¹⁰ However, budgetary independence (i.e., whether the board receives state funds) and board financial resources (i.e., whether the board's revenues are taxed by the state government) seem to not have a significant effect on discipline.

Research further suggests that SMBs differ in their disciplinary responsiveness to policy change. Jesilow and Ohlander (2010a; 2010b) compared the years immediately before and after the advent of the National Practitioner Data Bank (NPDB) and found that SMBs increased physician sanctioning in the years that followed. Analyzing NPDB data from 1990 to 2009, researchers from Public Interest found that a majority of physicians with clinical privilege actions against them did not receive discipline from the SMB (Levine, Oshel, and Wolfe, 2011). This indicates that, while the NPDB may have changed SMB behavior, the magnitude of disciplinary behavior may not align with actual rates of discipline-worthy offenses. Research has also examined the effects of tort reforms and has generally concluded that such reforms have led to an increase in SMB discipline (Jesilow and Ohlander, 2010b; Stewart, et al., 2012).

We seek primarily to contribute to this empirical literature by more directly studying the effects of legislature preferences on SMB behavior. For example, Jesilow and Ohlander (2010a; 2010b) were unable to measure board ideology directly and instead rely on a proxy measure: a categorical variable based on state votes in the 1988 and 1992 presidential elections, where states that voted Republican (Democratic) in both elections were labeled conservative (liberal) and states that were split were labeled moderate. Law and Hansen (2010) test their bureaucratic autonomy and principal-agent

¹⁰Independent boards are those that do not have to consult with state government in their decision-making. See Law and Hanson (2010) for more details.

hypotheses using measures of budgetary and organizational independence from state legislatures. However, boards may also anticipate the preferences of political principals. Finally, while Svorny and Toma (1998) found that the presence of a part-time legislature increases the probability of SMB budgetary autonomy, they do not consider more direct effects of legislative professionalism on board behavior. We add to this literature by drawing more directly from literature on the nature of political “control.” In particular, we identify conditions under which changes in legislative preferences should lead SMBs to preemptively change their regulatory behavior to avoid formal oversight. We test our predictions using state-of-the-art measures of legislative preferences in the states and confirm that characteristics of state legislatures have strong independent effects on board behavior. Additionally, by extending the data from Law and Hansen (2010), we confirm the importance of the many of the institutional factors found by previous research to affect board discipline.

Delegation and Control in State Regulatory Policy

In this paper, our focus is disciplinary actions against physicians. This type of action falls within the realm of state regulatory policy, which is characterized by both monitoring and enforcement activities. Enforcement can be prospective, in that rules and other policies can be instituted to serve as a disincentive or to prohibit certain activities. It can also be adjudicative, as seen in case-by-case regulation and disciplinary sanctions.¹¹ We contend that the key feature of state medical board decision-making is the role that SMBs play as legislatively-created agents of state legislatures. Decades of research have focused on such legislative delegation at the federal level (Moe 1984; Gilligan and Krehbiel 1987; Bawn 1995; Epstein and O’Halloran 1999), in the U.S. states (Potoski 1999; Huber and Shipan 2002; Volden 2002; McGrath 2013; Krause and Woods 2014), and

¹¹A large body of literature details reasons for over- and under-utilization of sanctions (for an overview, see Baldwin, Cave, and Lodge 2011). For example, in the environmental regulation context, Gray and Shimshack (2011) note that imposed fines may be less severe than what is allowed based on the law and what is suggested based on the level of infraction. However, a study of OSHA enforcement found that imposing lower penalties had the same favorable effect on injury outcomes as larger ones. Further, these lower penalties required less investigation time, suggesting that lower penalties are more efficient regulatory behavior (Gray and Scholz 1991).

across the globe (Thies 2001; Martin and Vanberg 2004; Baum 2007). We employ such theories of political control to structure our empirical analyses and to better understand the conditions under which state boards respond to political pressure.

Legislative delegation is particularly important with respect to regulatory policy. First, legislatures lack the expertise to produce detailed policy in complex regulatory areas, such as health and medicine, environmental protection, or energy policy (Aranson, Gellhorn, and Robinson 1982; Mashaw 1985; Epstein and O'Halloran 1999). This is especially true as state legislatures, in comparison to Congress, lack the capacity to address pressing social issues effectively through legislation alone (Huber and Shipan 2002; McGrath 2013; Krause and Woods 2014). With respect to state medical boards, legislatures have often conceded that they do not possess the expertise necessary to effectively regulate physician qualifications and instead prefer to delegate increasingly vast authority (Johnson and Chaudhry 2012).¹²

Much research has taken such delegation of regulatory authority as a given and subsequently focused on the extent to which legislatures can “control” agency policymaking. Although such control is often difficult to achieve, legislatures (and executives, such as presidents and state governors) possess numerous tools they can use to affect agency regulatory behavior.¹³ First, legislators can write delegation contracts (e.g., laws that create agencies, constitutions, administrative procedures acts, individual statutes¹⁴) in ways that limit the potential for “bureaucratic drift” (Shepsle 1992): that is, the situation where agencies make policy inimical to the interests of the delegating legislative principal. As another mechanism of control, political actors often share the prerogative to appoint and confirm

¹²Peterson, Pandya, and Leblang (2014) offer an alternative motivation for extensive delegation in this area, arguing that delegation gives physicians, as a well-organized interest group, regulatory autonomy (perhaps allowing them to increase their material self-interest). Regardless of the motivation, significant delegation exists in this policy area and legislatures would not expect to lose their influence over the behavior of state medical boards.

¹³The literature on “political control” is quite large. For comprehensive reviews of the theoretical issues and empirical findings regarding such control, see, e.g., Huber and Shipan (2000; 2006).

¹⁴See McCubbins and Schwartz 1984; McCubbins, Noll, and Weingast 1987, 1989; Horn and Shepsle 1989; Bawn 1995; Epstein and O'Halloran 1999; Huber and Shipan 2002

agency leaders/board members (and chairs). In their portrayal of canonical episodes of political control, Wood and Waterman (1991) highlight the importance of the appointment power in affecting agency regulatory behavior.¹⁵ Other research has found that agency organization/reorganization matters for political control (Lewis 2003), that agencies respond to budgetary signals (Carpenter 1996), and that legislative oversight, or its threat, can cause agencies to change their regulatory behavior (Weingast and Moran 1983; Moe 1985; Ferejohn and Shipan 1990; Shipan 2004).

We are primarily interested in this final mechanism of legislative control of agency regulatory behavior. In particular, we follow research at the federal level (Weingast and Moran 1983; Wood and Waterman 1991, 1993; Olson 1995, 1996) and in the states (Boehmke and Shipan N.d., *forthcoming*) in assessing the contemporaneous influence of legislative ideology on agency regulatory behavior. The process of relating changes in the aggregate ideology of legislatures or important subunits therein (like committees or leaders) to proximate changes in agency regulation dates back to the pre-war period (Herring 1936; Cushman 1941, as cited in Shipan 2004). More recent work proceeds from Weingast and Moran’s (1983) argument that as relevant members of Congress (i.e., members of an oversight subcommittee) became more conservative in the late 1970s, the Federal Trade Commission became less active in pursuing consumer protection cases and more active in pursuing regulation that would help small businesses. From this finding and the “congressional dominance” approach that it reflected, there developed many studies that sought to confirm or disconfirm the finding with other federal regulatory bodies. These works are many (see Shipan 2004 for a detailed review) and focus on a wide range of federal regulatory agencies,¹⁶ but each makes a critical assumption that we adopt as well. Indeed, in identifying political preferences and comparing those preferences with agency regulation, these studies assume that liberal legislators prefer more regulation than do

¹⁵Wood and Waterman (1991) examine several time series of federal agencies and their regulatory behaviors, including the EEOC Office of General Counsel’s discretionary litigation behavior, FTC enforcement actions, and FDA product seizures, among others.

¹⁶Besides the seven agencies studied by Wood and Waterman (1991), other scholars have examined regulatory actions such as FDA monitoring, drug approval rates, recalls, and inspections (Olson 1995, 1996; Carpenter 1996), antitrust enforcements by the department of Justice’s Antitrust Division (MacMillan 2012), and state-run inspections of nursing home facilities (Boehmke and Shipan N.d., *forthcoming*).

conservative legislators, and that preference for regulation increase with such policy liberalism.

Drawing from this literature, we expect that as a legislature becomes more liberal, it should prefer more regulation—in the form of disciplinary actions—from state medical boards. On the other hand, as a legislature becomes more conservative, it should prefer less regulation. These are not individual-level expectations, as legislator’s ideologies are very stable over time (Poole and Rosenthal 1997; Poole 2007). Instead, they are *ceteris paribus* expectations tied to changes in legislative composition driven by election results.¹⁷ Given this assumed relationship between legislative ideology and preference for regulation and the tools that legislators possess for inducing agency compliance, we would expect that changes in legislative preferences would lead to changes in board regulatory behavior, in much the same way as previous literature has found with respect to other federal and state regulatory bodies. This literature, including the current article, cannot adjudicate among mechanisms of influence (when influence is found). The most we can infer is that the appearance of agency “responsiveness” is driven by the combination of *ex ante* controls (such as the appointment power, or statutory language allowing or prohibiting certain types of agency action (MacDonald 2010)) and the threat of *ex post* sanctions (such as embarrassing oversight hearings, or reductions in agency appropriations).

In addition, we do not expect the relationship between legislative preferences and board regulation to be unconditional or deterministic, even when it holds. In particular, previous research has identified contextual conditions that should mediate the relationship between legislative preferences and regulatory output.

Conditional Political Control

First, legislatures are not unilateral principals of agencies and boards. The existence of multiple principals makes policy agreement under unified government an important condition of political control generally, and we expect this will be an important empirical consideration with respect to state medical board regulatory behavior. Second, legislatures are not equally adept at designing

¹⁷Importantly, such compositional changes in state legislatures are largely exogenous to the public’s demand for regulation by state medical boards. In particular, there is little reason to believe that citizens base their electoral votes on legislators’ expected oversight of medical boards.

beneficial delegation controls, nor are they equally capable of conducting effective oversight. Thus, following previous research, we additionally account for varying levels of legislative professionalism.

Unified Principals

Governors, like presidents at the national level, possess powerful tools for controlling the bureaucracy alongside the powers that legislatures possess. In fact, chief executives are often thought to be in the most privileged position to affect bureaucratic output. Executives usually can choose who they appoint to manage agencies and to serve on boards. And even if the legislature has veto power over these appointments, governors and presidents can manage the bureaucracy through excepted service appointments as well as by proactively and strategically choosing acceptable appointees for the constitutionally created “advice and consent” appointments (Lewis 2008). In addition, executives often possess more oversight and monitoring resources than legislatures, especially in the states (see below and, e.g., Boushey and McGrath 2014).

Spatial models of policymaking emphasize the importance of separation-of-powers institutions in shaping the policy system. Supermajority rules, such as the executive veto, bicameralism, and the requirement that two legislative chambers and the governor (or the veto override pivot in the legislature) must assent to policy change all serve to bias the system toward policy stability (or, more pejoratively, gridlock) (Brady and Volden 1998; Krehbiel 1998). This system also gives multiple actors (lower chambers, lower chamber committees, upper chambers, upper chamber committees, governors/presidents) authority over agencies. Theoretical literature shows that when there are multiple principals with divergent goals, agents possess more discretion to act as they please without fear of unified reprisal (Hammond and Knott 1996; Snyder and Weingast 1999; Volden 2002b). Under conditions of divergent preferences among principals, political actors compete amongst themselves for influence over the bureaucracy, resulting in little contemporaneous political influence over regulatory behavior. At the very least, multiple and competing principals cannot coordinate the resources and attention needed to effectively control the bureaucracy, nor will agencies respond preemptively to threats that they know will be vetoed by some other principal (Hammond and Knott 1996; Shipan 2004).

This can be seen in the California example. In its own report regarding issues with the MBC,

the California joint oversight committee recognized that the board had been ignoring its wishes for increased regulation for nearly a decade.¹⁸ Yet, from 2003-2011, the unified Democratic state legislature had to vie with Republican governor Arnold Schwarzenegger for influence over board behavior. Although Schwarzenegger never explicitly directed the board to regulate doctors less vigorously, his appointments affected the composition of the board, and fiscal crises led him to drastically cut board resources, making it much more difficult for the MBC to satisfy legislative preferences (Moyer 2010). In addition, in the absence of gubernatorial cooperation, it became much more difficult for the state legislature to make decisions inimical to powerful interest groups, such as the California Medical Association, who vociferously opposed legislative reforms that would have given the MBC more disciplinary authority. The election of and subsequent vocal support from Gov. Jerry Brown assisted the legislature in making its threats of sunset revocation credible (Shipan 2004). In the end, the California oversight committees effectively coerced the MBC to increase its disciplinary behavior and to take other measures to satisfy the legislature's preferences, but the Democratic legislature was capable of enforcing responsiveness only when it was joined by a Democratic governor equally concerned with consumer protection. Drawing from this particular case and the general literature cited above, we would expect legislative preferences to have an effect on board regulatory behavior only when there is general policy agreement among the board's political principals (i.e., unified government).

Legislative Professionalism

As scholars have attempted to identify political control in the U.S. states, the field has become increasingly aware of how across-state institutional variation shapes delegation and oversight strategies (Krause and Woods 2014). Legislative professionalism, in particular, has been shown to condition legislative relations with state bureaucracies (Potoski 1999; Huber and Shipan 2002; Woods and Baranowski 2006; McGrath 2013). Simply, state legislatures vary in the their lengths of session, the compensation they afford legislators, and the staff resources given to legislators and

¹⁸In particular, the committee noted that the number of MBC investigations had dropped considerably from 2001 to 2012 and that the length of investigations nearly doubled in this time period: http://www.mbc.ca.gov/Publications/Sunset_Report/sunset_report_responses.pdf

committees (Squire 2007; Bowen and Greene 2014).

More professional legislatures have the capacity and expertise to write detailed statutory requirements for agencies to follow, if the legislature indeed wants to maintain close control (Huber and Shipan 2002; McGrath 2013). Professional legislatures are also more adept at creating effective “fire alarms” (McCubbins and Schwartz 1984) that enable outside interest groups to closely monitor agency regulatory behavior (see Potoski (1999) for how this plays out with respect to state environmental policy). Finally, professional legislatures are more likely to engage in *ex post* oversight, as they have more staff resources available for monitoring agency actions and for preparing for hearings (see, e.g., Reenock and Poggione (2004)). Taken together, more professional legislatures have better capacity to monitor and control state agency policymaking (Krause and Woods 2014). Previous work has thus argued that, taken together, these components of professionalism enable legislatures to conduct effective contemporaneous oversight of state regulatory bodies (Boehmke and Shipan N.d., *forthcoming*).

In regards to professionalism, California’s legislature is regularly considered the most professional legislature in the United States apart from the U.S. Congress. Yet, even this highly professional body required the assistance of the *Los Angeles Times* to focus its attention on the MBC and subsidize its oversight efforts with crucial information.¹⁹ Again thinking back to how the MBC responded to legislative pressure, we would not expect all legislatures to provoke such an immediate and unambiguous response. Some legislatures, like that of Texas, meet only every 18 months, so there are fewer opportunities for legislators to monitor regulatory behavior, never mind coordinate oversight effort to change it (Boushey and McGrath 2014).

In the following empirical sections, we seek to assess the insights of the political control literature in the context of state medical board regulatory behavior. To summarize, we expect that as a legislature becomes more liberal [conservative], it should prefer more [less] regulation from state medical boards. Yet, these changing preferences should variably affect agency board responsiveness depending on both policy agreement among political principals and the professionalism of the legislature in question. We assess these expectations below using fine-grained measures of legislative

¹⁹McCubbins and Schwartz (1984) call this kind of legislative attention “fire alarm” oversight to distinguish it from routine legislative monitoring, or “police patrol” oversight.

ideology and a detailed indicator of board regulatory behavior.

Data and Empirics

As an operationalization of SMB regulatory activity, we build on previous literature (most directly on Law and Hansen 2010) and measure disciplinary frequency using reports provided by the Federation of State Medical Boards from 1993-2010.²⁰ These reports provide information for each board²¹ regarding, among other data, how many times the board 1) removed a physician's license or licensed privilege, 2) restricted a license or licensed privilege, and 3) took another form of prejudicial disciplinary action against a physician.²² We add these categories of disciplinary action for each board-year to calculate the total number of disciplinary actions. We then normalize this total by the physician population in each state-year by dividing this by the total number of licensed physicians practicing in state, also available in the FSMB reports.²³ Figure 1, referenced above, shows both the extensive cross-sectional and over-time variation that exists in medical board disciplinary behavior in the states.²⁴

The data are organized as a panel of total disciplinary actions per thousand physicians from 1993-2010. We include numerous control variables in our analyses, which limit the data to span the

²⁰Specifically, we use the annually published *Summary of Board Actions*, available at http://library.fsmb.org/fpdc_basummaryarchive.html.

²¹There are a total of 65 medical and osteopathic boards in the data. The names of each included board can be found in the first column of table A2.

²²The summaries also variably report the number of non-prejudicial advisory actions a board had taken in a year.

²³*Summary of Board Actions* reports give the physician population relevant for each board, so if there is a separate osteopathic board in a state, the relevant physician population for that board includes only licensed DOs, and the MD population is counted for that state's medical board. There are some missing data in these reports. We treat missing disciplinary data as missing and drop them from all analyses. But, when there exist disciplinary data, but no information regarding the number of licensed in-state physicians, we use cubic spline interpolation to fill in these observations.

²⁴For ease of presentation, we exclude osteopathic boards from this figure. A figure including osteopathic boards can be obtained from the authors.

1993-2006 period. The major empirical issues to accommodate with such a data structure include the possibility of serial autocorrelation over time, correlated errors across and within states due to unobserved sources of heterogeneity, and potential omitted variable bias. To deal with the first issue, we include year fixed effects in each of the models we estimate.²⁵ To deal with the second issue, we include board fixed effects. As a result, coefficients should be interpreted as within-state estimates for each covariate.²⁶

Measuring Legislative Preferences

The vast majority of existing work examining how legislative preferences for regulation map onto agency behaviors has used measures of legislative *ideology*. Weingast and Moran (1983) began this research program by using ADA scores for individual members of Congress to measure their preferences for or against FTC regulation.²⁷ Subsequent work has either used similar interest group measures of ideology (e.g., Shipan 2004) or more general and comparable (across institutions and time) measures (e.g., Kim 2008, who uses DW-NOMINATE scores (Poole and Rosenthal 1997)) to measure legislative preferences, with each equating policy liberalism with a preference for more regulation. Although general one dimensional ideology scores are a blunt and imperfect measure of a preference for regulation, recent work on political control in the states relies on an even more coarse measure: partisanship. For example, Boehmke and Shipan (N.d., *forthcoming*) show that as the proportion of Democrats in a state legislature increases, so does regulation and oversight of state nursing facilities. We build on this research by incorporating a more nuanced proxy for a

²⁵Alternatively, we include a time counter and time squared as continuous regressors. Our results are robust to this alternative specification.

²⁶That is, state FE models eliminate sources of (observed and unobserved) state-level heterogeneity in determining the influence of within-state variation in the included covariates. We do alternatively model disciplinary actions with random effects models in appendix C, but diagnostic Hausman tests indicate the appropriateness of fixed effects for our context (see Wooldridge 2002, pp. 288-291). The random effects models do demonstrate that our results are robust to this choice.

²⁷ADA scores are regularly assigned by an interest group, Americans for Democratic Action, after observing how individual legislators voted on a number of key bills important to that liberal group: <http://www.adaction.org/pages/publications/voting-records.php>

legislature’s preference for regulation.²⁸

In particular, we make use of innovative legislator-level ideology scores for state legislatures to proxy legislative preferences for levels of medical board regulation (Shor and McCarty 2011). Such scores²⁹ are derived from legislative roll calls in state chambers and made comparable across chambers, states, and over time by using candidate survey data collected by Project Vote Smart.³⁰ Scores are available for individual legislators³¹ and summary measures are available for chambers. *State Legislative Ideology* is the mean of the two chamber median Shor-McCarty scores for a state-year.³² This measure is intended to give a general sense of how liberal (positive values) or conservative (negative values) a state legislature is in a given year.³³ Figure 2 presents the state-level variation in Shor-McCarty ideology over time.

Figure 2 goes here.

Having thus measured our theoretically relevant independent variable, we turn now to specifying empirical models of board disciplinary actions.

²⁸We alternatively assess whether partisanship itself drives our results and find, in appendix B, that it does not.

²⁹Available at <http://americanlegislatures.com/data/>

³⁰<http://votesmart.org> — It is important that scores be comparable across states and time, as it allows us to interpret changes in score distributions as meaningful changes in legislative ideology, rather than an artifact of different state or time baseline scores.

³¹Individual scores are time invariant and estimated from all recorded roll call votes. Therefore, changes in chamber and committee summary measures are driven entirely by compositional changes in the legislature.

³²All included states have bicameral legislatures. Nebraska, with its unicameral legislative, is omitted because it is nominally nonpartisan and we do not have reliable ideology scores for Nebraska legislators.

³³We reverse coded the scores for ease of interpretation. We also calculated a *Health Committee Ideology* score that measures the mean of all committees in a state legislature with oversight jurisdiction over the state medical board. We then alternatively estimated models where the committee measure was our primary indicator of legislative preferences for regulation and the results were largely similar to what we report below.

Disciplinary Actions

As mentioned above, we measure disciplinary behavior by summing the total number of punitive disciplinary actions from FSMB *Summary of Board Action* reports and normalize this count across boards per one thousand licensed and practicing in-state physicians.³⁴ As a baseline, we specify the following empirical model:

$$y_{ist} = \alpha + I_{st}\beta + C_{ist}\gamma + X_{st}\delta + T_t + B_i + \epsilon_{ist}$$

Where y_{ist} is the number of *Total Disciplinary Actions* per 1,000 physicians by a given board in a given year, I_{st} is the *State Legislative Ideology* in a state-year, C_{ist} are time-varying board characteristics, discussed below, and X_{st} are time-varying state control variables, also discussed below. T_t and B_i are year and board fixed effects.³⁵

We account for a number of time-varying board characteristics that previous research has identified as determining board disciplinary actions.³⁶ First, *Board Independence*, indicates whether a board is independent or semi-independent/advisory (for more detail, including descriptive evidence that boards change status over time, see Law and Hansen (2010)). Semi-independent and advisory boards operate in the penumbra of another state agency, so we dichotomize the variable to indicate fully independent boards. Boards sometimes expand or contract in membership size, and, lacking reliable data on board budgets, we see board size as a proxy for resources, so we measure *Board Members*

³⁴This is a count variable, bounded by 0, so we alternatively estimate fixed effects poisson and negative binomial models, with these results fully consistent with what we present below. We thus report results from linear models for ease of interpretation.

³⁵Our dataset overlaps with the contentious health reform debates of the early 1990s. While physician discipline is a state-level policy, it may be the case that federal policy changes could alter state-level practice. One example of a federal-level change that had the potential to affect state-level discipline was the liability component of the failed Clinton health reform effort. However, a change would apply to all states equally and would thus not bias our board-level results.

³⁶The FSMB collects myriad data on board characteristics in their *Exchange/Regulatory Trends and Actions Report* publications. Due to the inclusion of board fixed effects, we consider only those that vary over our sample period. We collected each of the following variables from various years of FSMB reports, filling in values based on the previous recorded value for missing years.

per 1,000 Physicians. We also measure the *Share of Outside Members on Board* to assess whether the presence of non-physicians on a board makes it more or less likely to discipline doctors. Lastly, we include a measure (*Reporting Requirements*) of the number of organizations that are required to report potential infractions to the state medical boards, as boards that have more organizations required to report to them will have a larger pool of initial information regarding physician behavior.

We also control for relevant state characteristics that may affect board behavior. First, we include a variable for *Democratic Governor* which indicates gubernatorial partisanship, as, following the logic from above, Democratic governors may prefer more regulation than their Republican counterparts and can use unilateral tools to manage board behavior. Likewise, we control for *Citizen Ideology*, as described and calculated by Berry et al. (1998), to capture the public mood for regulation as distinct from the preferences of elected preferences.³⁷ *State Government Spending as Share of GSP* controls for changes in the size of state governments, and logged *State Population* controls for changes in demand for regulation that population change may induce. As Medicaid HMOs often impose rigorous utilization reviews, a state's *Managed Care Share* might affect the clarity of SMB attention to physicians, so we include a measure of this in our models. We also account for the number of large *Medical Malpractice Awards per 1,000 Physicians*³⁸ to control for the possibility of substitution between discipline applied in the judicial system and the disciplinary behavior of SMBs. We also include a variable (*PDMP Law in Effect*) measuring whether a Prescription Drug Monitoring Program was in effect in each state-year. Such programs may make it easier for boards to identify individuals for discipline proactively, as in the California example, or they may alternatively reduce demand for discipline by improving prescribing behavior in a state via the transparency they provide. Finally, while our theoretical approach is largely focused on internal political dynamics, it is possible that state board discipline may be additionally affected by neighboring states through a process of "policy diffusion" (Walker 1969; Berry and Berry 1990). For example, Boehmke (2009) finds

³⁷These data are available at <http://www.bama.ua.edu/~rcfording/ideo6014.xlsx>.

³⁸We collected these data from the National Practitioner Data Bank: <http://www.npdb.hrsa.gov>. We collected all medical malpractice awards with an inflation-adjusted dollar value above \$50,000. The NPDB splits these data by whether the provider in question is a DO or MD, so we used this variable to assign malpractice awards to medical boards, osteopathic boards, or joint boards, as appropriate.

that state boards with low capacity follow policy adoption patterns from neighbor states regarding pain management policies. To control for such diffusion with regard to disciplinary regulation, we measure a variable capturing the *Mean Disciplinary Actions in Neighbor States*. This variable is simply the value of the dependent variable for neighboring contiguous states.

In addition to controlling for these factors that may affect board disciplinary behavior, theory suggests that we also measure *Unified Government* and *Legislative Professionalism* for us to interact with our ideology variable. *Unified Government* indicates that the majority party of both chambers of a state legislature is also the party of the governor. This variable takes a zero value when either the legislature itself has split party control, or when the legislature is unified against an opponent governor. Legislative professionalism is usually measured as a continuous index of legislative salary, staff resources, and session length (Squire 2007). While this is useful in many applications of state politics research, the index is quite slow-moving to include in models with state board fixed effects, especially in the time period we study (Bowen and Greene 2014). As an alternative, we follow the National Conference of State Legislatures and categorize state legislatures cross-sectionally as professional (e.g., California, New York, Michigan), semi-professional (or “hybrid,” e.g., Iowa, Maryland, Virginia), or citizen (e.g., Nevada, New Hampshire, South Dakota). Recall that we expect *State Legislative Ideology*, as measured, to positively determine disciplinary actions, but only during *Unified Government*, and especially with respect to professional legislatures.

Table 1, column 1, shows estimates from the baseline model of SMB disciplinary actions. Here, and across our models, we corroborate a number of the key findings from Law and Hansen (2010). In particular, *Board Independence* and *Board Members per 1,000 Physicians* significantly increase board disciplinary behavior, while *Share of Outside Members on Board* has a strong negative effect. These findings are particularly interesting, since they fit what Law and Hansen (2010) call a “bureaucratic autonomy” story. Contrary perhaps to the preferences of the architects of mid-1990s reforms that added outside (non-physician) members to state medical boards and relocated boards in other state departments, it seems that boards are more likely to discipline physicians when the profession is given more autonomy to self-regulate. Given the resource-dependent nature of disciplinary investigations, it is less surprising that boards with more resources (proxied here by

board size³⁹) are able to conduct more investigations and discipline more physicians. We also find that state boards decrease their disciplinary behavior after the passage of state Prescription Drug Monitoring Programs. We interpret this effect to suggest that the increased transparency that comes with PDMPs elicits physician prescribing behavior such that there is less demand for discipline after the implementation of a state PDMP. We find strong evidence for the diffusion of increased discipline across the various models, although further research is needed to better discern the precise mechanisms of this diffusion (Shipan and Volden 2008).

Table 1 goes here.

Notably, *State Legislative Ideology* is positive, but not estimated precisely enough to distinguish an effect from zero in this first model. As we argue above, this is not particularly surprising, given the multiple and perhaps countervailing determinants of board behavior. In fact, this is consistent with previous research at the state level regarding unconditional agency “responsiveness” to legislative preferences for regulation. Recall that our argument is that legislative threats of oversight are most credible when there are no veto players (e.g., another legislative chamber or the governor) who prefer the status quo level of board regulation. In the presence of such policy disagreement between political principals of a state medical board, a board will be able to play one principal off another and carve out more regulatory discretion for itself (Hammond and Knott 1996). This implies a null effect for changes in legislative preferences on board regulation. On the other hand, when there is unified government, boards will need to increase [or decrease] their regulatory behavior to align with legislative will or risk the (very real) possibility that the legislature can statutorily change a board’s authority or cut its budget. Column 2 of table 1 thus includes an interaction of *State Legislative Ideology* with *Unified Government* so that we may assess the effect of legislative preferences conditional on the presence of unified government.

³⁹Ideally, we would also include measures of board staff resources and budgetary resources. We have collected the total number of FTE positions filled by each board over time, but are missing data for a number of key states. In fact, state officials in Michigan have warned us that any such calculations of board staff or budgets for boards housed in large agencies are likely to be inaccurate. All of our results maintain when we include this measure in models and the estimated effect of this variable is positive and generally statistically significant.

The coefficient for this interaction term is positive and statistically distinguishable from zero. This provides support for our perspective, as does the insignificant constitutive term of *State Legislative Ideology*, which indicates a zero effect during periods of divided government. The magnitude of the interaction coefficient (3.59) suggests a substantively meaningful effect. In particular, as ideology changes by a standard deviation (a not uncommon electoral occurrence when an opposition party sweeps a sitting majority party), we would expect the number of disciplinary actions to increase (if the shift is in a liberal direction) or decrease (if the shift is in a conservative direction) by about 1.7 actions *per 1,000 physicians*. As the mean number of in-state practicing physicians for each medical board (excluding osteopathic boards for this calculation) is just over 13,000, this would lead to a change in over 22 disciplinary actions for the average board. Interpreting this another way, the significant interaction also indicates that a state legislature need not switch its partisanship to elicit a board reaction. Instead, a consistently liberal or conservative legislature can drive discipline up or down following a switch from divided to unified government. Given the motivating example of California, this switch is what enabled a newfound board commitment to disciplining over-prescribing doctors, rather than a wholesale change in the ideological composition of the General Assembly.⁴⁰

In columns 3 and 4 of table 1, we assess the additional expectation that medical boards are most responsive to professional legislatures. The reasoning behind this expectation is straightforward and motivated by previous research. Simply, some legislatures lack the ability to effectively monitor the actions of medical boards. Most boards are required to periodically report their activities to the legislature, but knowing when regulation is more or less needed requires a certain amount of expertise. Voluminous literature in state politics has found that legislators in professional legislatures

⁴⁰As mentioned above, we confirm these findings when we alternatively measure *Health Committee Ideology* in a state rather than the aggregate state legislative ideology. Using this variable is meant to more accurately capture the ideology of more institutionally relevant actors in the policy system, and we expected this to be especially important in the rare cases where a health committee has significantly different preferences from its parent legislature (McGrath and Ryan 2014). Yet, we found no distinguishable difference between these committee effects and the aggregate legislature effects that we report, suggesting that committee expertise largely transmits to parent legislatures (Gilligan and Krehbiel 1990).

can develop and utilize such specialized expertise, but lawmakers in part-time and poorly funded assemblies lack this capacity (e.g., Kousser 2005; Krause and Woods 2014; Shipan and Volden 2014). Instead, part-time legislators focus primarily on district-specific concerns or broad policies related to their concurrent extra-legislative professions.

We thus split our sample between citizen/semi-professional legislatures and professional legislative bodies. Institutional reforms can sometimes affect the categorization of a particular legislature, but there are no instances in our timeframe of a state moving from a non- or semi-professional legislature to being professional in later periods, making it impossible to identify effects for changes in the variable given our inclusion of board fixed effects. Instead, we opt to split the sample based on the type of legislature, allowing us at least to test whether there are heterogeneous effects of our primary variables given different levels of legislative professionalism. Column 3 demonstrates that *State Legislative Ideology x Unified Govt.*, while positive and large in magnitude, fails to reach a standard level of statistical significance. On the other hand, this relationship is significant and substantively large when estimated on the subsample of professional legislatures only (column 4). Interestingly, it appears as though board outcomes are far more precisely estimated for these professional legislatures, while there is more inherent variability in disciplinary actions when boards are supported by legislatures with less capacity.

We have thus demonstrated that state medical boards discipline more when there exists unified government and a liberal legislature and less when there unified government coincides with a conservative legislature. Our measurement of legislative preferences has assumed that policy liberalism is associated with a general preference for regulation and we have sought to measure this liberalism as granularly as we could using existing data. Yet, it is also possible that our results are driven by a more coarse and partisan process. Thus, we alternatively examine whether unified Democratic governments coincide with increased discipline and whether unified Republican governments coincide with decreased discipline. Results are shown in appendix table B1, but the general finding is null: without accounting for within-party ideological heterogeneity, party has no discernible effect on SMB disciplinary behavior.⁴¹ Importantly, this more partisan-based

⁴¹We additionally alternatively measure ideology with a continuous measure of party strength (*Proportion Democrats in the Legislature*), as in Boehmke and Shipan (N.d., *forthcoming*), but find null results here as

measurement approach is closest to attempts in the SMB literature to uncover political determinants of disciplinary actions (e.g., Law and Hansen (2010)), reinforcing our contribution to this literature.

Conclusion

We have provided strong evidence that state medical boards are at least conditionally responsive to legislative principals. When legislators have the will (a strong preference for more or less regulation than boards currently provide) and the means (that is, under unified government and with sufficient professional expertise and resources), they can apply pressure to state medical boards to prioritize public health concerns over particularized interests, such as perpetuating professional autonomy or satisfying the needs of state medical associations. In fact, what we have found is undoubtedly an *underestimate* of legislative influence, as legislatures also determine the institutional structure of boards and can significantly affect the resources that boards have to fulfill their goals. In fact, the most direct way that legislatures can affect board behavior is to give (or withhold, if legislative preferences align more with professional autonomy than with public health) boards more resources. In addition, state legislatures can make it easier for boards to access and analyze data collected in the state's Prescription Drug Monitoring Program.

However, the political will and institutional means do not always align and, thus, pressure is rarely applied. What does this mean for public health? The 1999 Institute of Medicine report, *To Err is Human*, defined medical errors as “the failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim.” The report found that at least 44,000 hospital deaths can be attributed to professional medical errors annually. While many of these errors are systemic, rather than the result of a rash of “bad apple” physicians, a percentage of these deaths occurred due to professional negligence, whereby reasonable standards of care were not met. One study focusing on Utah and Colorado found that about 30 percent of adverse events, some resulting in death, could be attributed to professional negligence (Studdert, et al., 2000). This suggests that professional negligence occurs to the detriment of a noticeable number of patients. However, not all instances of negligence will be met with professional sanction by the medical board. It is noteworthy

well.

from a public health perspective that changes in the political arena appear to affect medical board regulation of physician discipline.

Some may argue that this oversight effect is inconsequential because private legal action may be substituting for board sanction. However, the very fact that these are, in many cases, private decisions deprives the public of information about actions taken against health care providers. In contrast, formal disciplinary actions taken by SMBs are available in searchable online databases. Further, SMBs are the only entity with the legal ability to revoke licensure for those who recklessly or illegally practice medicine. Thus, there are reasons why a private adjudication system should not supplant the important role of the state medical boards.

The California example indicates that medical professionals can be reactive when it comes to disciplining their own. Our results suggest that SMBs respond to legislative preferences when they can be realized under unified government. On the other hand, this study provides further evidence for what Law and Hansen (2010) found, where well-resourced boards appear to be more proactive in enacting discipline. A recent *JAMA* Viewpoint article noted that the role of SMBs is two-fold: “not only in fulfilling the responsibility to ensure that the physicians of today and tomorrow remain highly competent and professional, but also in ensuring the future of self-governance and professionalism in medicine” (Chaudhry, Gifford, and Hengerer, 2015). This suggests that physicians’ associations should have an interest in pushing for staffing and financial resources for medical boards. While the presence of unified government or the ideological orientation of the legislature is outside the control of any one organized interest, groups can lobby for adequate resources to ensure adequate discipline and, in turn, greater autonomy in the form of self-governance.

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Tables

Table 1: Linear Models of Total Board Disciplinary Actions per 1,000 Physicians, 1993-2006

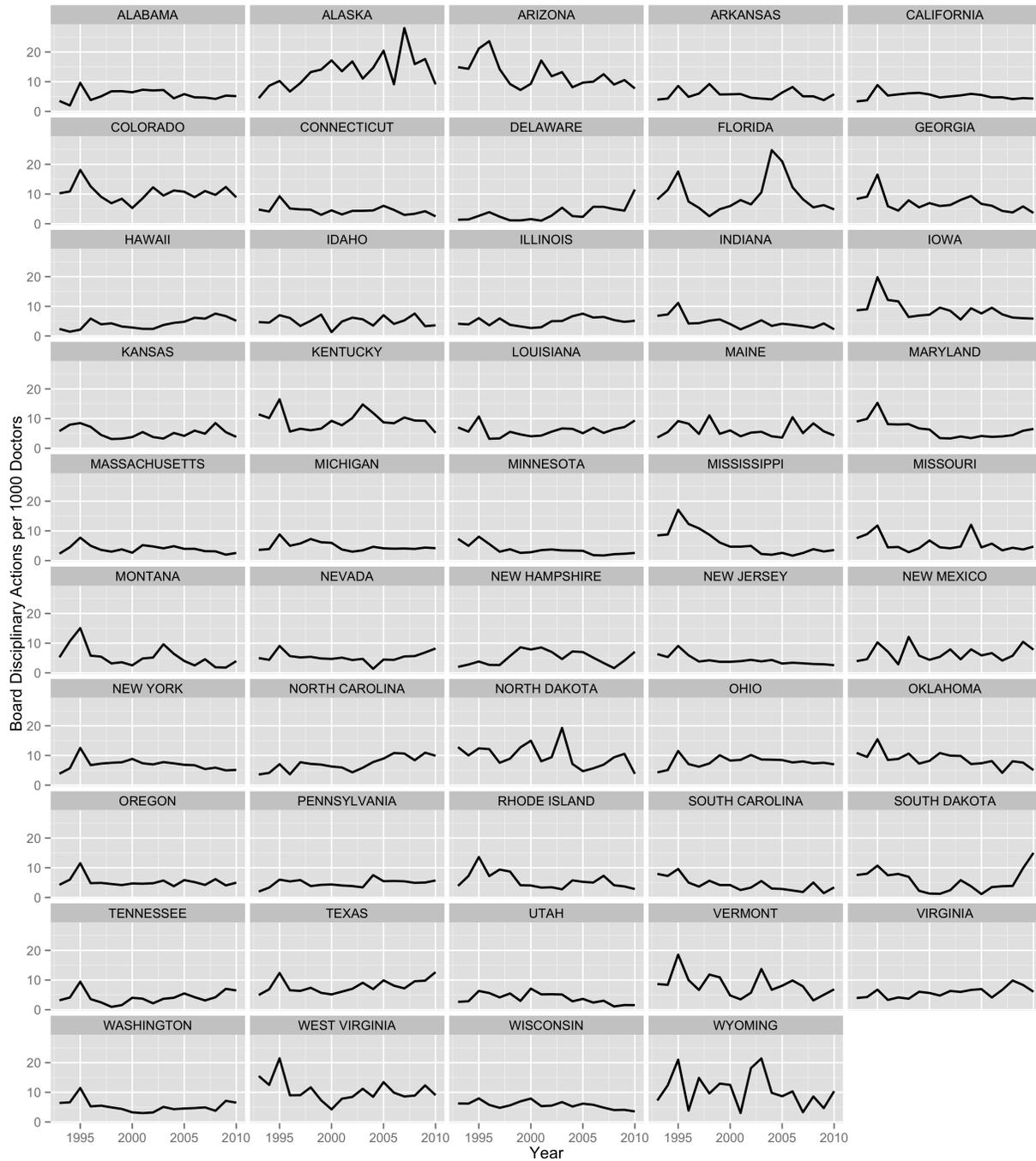
	(1) All	(2) Unified Principals	(3) Non/Semi-Prof.	(4) Professional
State Legislative Ideology	1.407 (1.262)	-.084 (1.427)	-.832 (1.943)	-1.141 (1.233)
State Legislative Ideology × Unified Govt.		3.591** (1.664)	3.328 (2.541)	2.453* (1.396)
Unified Government		.704 (.619)	.329 (.832)	.095 (.614)
Democratic Governor	.298 (.670)	-.885 (.853)	-.197 (1.092)	-1.918* (1.055)
Citizen Ideology (higher scores more liberal)	-.090 (.058)	-.096* (.059)	-.093 (.071)	-.119 (.093)
Board Independence	3.303*** (1.092)	3.013*** (1.125)	3.706** (1.726)	1.673 (1.078)
Board Members per 1,000 Physicians	1.268*** (.075)	1.271*** (.076)	1.273*** (.086)	1.288*** (.400)
Share of Outside Members on Board	-15.422** (6.460)	-15.511** (6.462)	-17.556* (9.452)	-9.317** (4.684)
Reporting Requirements	-.099 (.150)	-.077 (.149)	-.181 (.214)	.204 (.153)
State Govt. Spending as Share of GSP	44.367 (33.652)	35.723 (33.742)	56.807 (40.889)	-43.670 (50.234)
Managed Care Share	3.896** (1.885)	3.716** (1.885)	3.372 (2.413)	1.212 (2.120)
Medical Malpractice Awards per 1,000 Physicians	-.060 (.058)	-.066 (.058)	-.070 (.072)	.095 (.069)
PDMP Law in Effect	-1.575* (.919)	-1.928** (.929)	-2.479** (1.238)	-1.092 (.751)
Mean Disciplinary Actions in Neighbor States	.435*** (.125)	.454*** (.125)	.398** (.158)	.189 (.185)
State Population (logged)	-9.295 (11.083)	-11.895 (11.122)	-14.466 (14.164)	33.043** (14.838)
Constant	145.331 (169.328)	186.028 (169.955)	222.688 (216.094)	-560.973** (257.152)
Board FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	683	683	522	161
R^2	.766	.768	.780	.681
AIC	4209.371	4206.828	3281.580	753.526
BIC	4603.479	4609.893	3600.354	882.945

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: Dependent variable is the total number of disciplinary actions by a board per 1,000 in-state licensed and practicing physicians. Columns 3 and 4 present estimates for sample split by legislative professionalism categories.

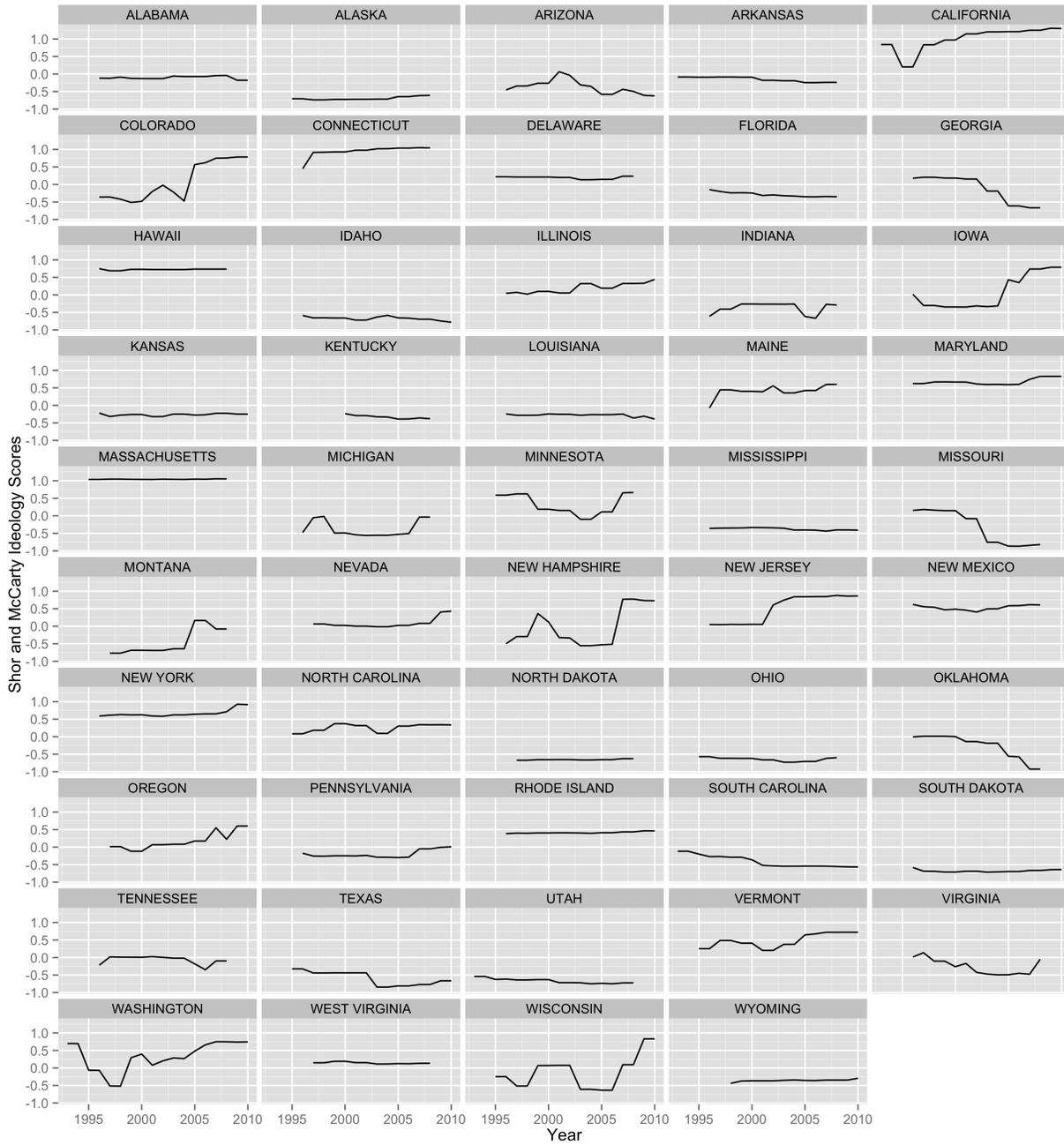
Figures

Figure 1: State Medical Board Disciplinary Actions 1993-2010



Note: Disciplinary Actions = (# License Removals + # License Restrictions + # Other Punitive Actions)/Thousand Doctors in State

Figure 2: State Legislative Ideology 1993-2010



Note: Ideology scores are the means of the two chamber medians. Higher scores indicate a more liberal legislature. Nebraska is omitted, due to its nonpartisan legislature.

Supplementary appendices for Denise F. Lillvis and Robert J. McGrath. N.d. (forthcoming). “Directing Discipline: State Medical Board Responsiveness to State Legislatures.” *Journal of Health Politics, Policy and Law*.

Appendix A - Descriptive Statistics

Table A1: Descriptive Statistics of Variables in Analyses

Dependent variable	N	Mean	SD	Min	Max
Total Disciplinary Actions per 1K Physicians	683	7.99	10.85	0	124.84
Independent variables	N	Mean	SD	Min	Max
State Legislative Ideology	683	-.03	.48	-.86	1.21
Unified Government	683	.41	.49	0	1
Democratic Governor	683	.38	.48	0	1
Citizen Ideology	683	49.24	14.69	8.45	95.97
Board Independence	683	.71	.45	0	1
Board Members per 1K Physicians	683	4.99	11.42	.19	119.04
Share of Outside Members on Board	683	.22	.10	0	.47
Reporting Requirements	683	7.65	3.82	0	15
State Govt. Spending as Share of GSP	683	.12	.02	.07	.31
Managed Care Share	683	.60	.28	0	1
Medical Malpractice Awards per 1K Physicians	683	15.06	7.81	0	57.60
PDMP Law in Effect	683	.31	.46	0	1
Mean Disciplinary Actions in Neighbor States	683	8.14	2.64	3.63	19.84
State Population (ln)	683	15.18	.99	13.1	17.39

Note: Summary statistics for sample included in model estimates found in table 1. All variables vary over time, but some vary less within unit than others: *Board Independence* varies for 19 state boards; *Share of Outside Members on Board* varies for 38 state boards; and *Reporting Requirements* for 55 state boards (out of 65 total state boards). The remaining variables vary more regularly within-state and within-board.

Table A2: Disciplinary Actions per 1K Physicians, by Board

Board	Mean (N)	SD
Alabama Board of Medical Examiners	5.62 (15)	1.96
Alaska State Medical Board	11.66 (15)	4.59
Arizona Medical Board	13.32 (15)	4.75
Arizona Board of Osteopathic Examiners in Medicine and Surgery	17.98 (15)	11.57
Arkansas State Medical Board	5.80 (15)	1.67
Medical Board of California	5.22 (15)	1.55
Osteopathic Medical Board of California	8.95 (15)	3.74
Colorado Medical Board	10.01 (15)	2.98
Connecticut Medical Examining Board Department of Public Health	4.67 (15)	1.50
Delaware Board of Medical Licensure and Discipline	2.37 (15)	1.55
Florida Board of Medicine	10.39 (15)	6.25
Florida Board of Osteopathic Medicine	9.84 (15)	5.84
Georgia Composite Medical Board	7.80 (15)	2.89
Hawaii Medical Board	3.44 (15)	1.45
Idaho Board of Medicine	4.99 (15)	1.60
Illinois Division of Professional Regulation	4.68 (15)	1.48
Medical Licensing Board of Indiana	5.29 (15)	2.28
Iowa Board of Medicine	9.62 (15)	3.48
Kansas State Board of Healing Arts	5.26 (15)	1.77
Kentucky Board of Medical Licensure	9.41 (15)	3.16
Louisiana State Board of Medical Examiners	5.72 (15)	1.87
Maine Board of Licensure in Medicine	5.97 (15)	2.55
Maine Board of Osteopathic Licensure	14.62 (15)	9.27
Maryland Board of Physicians	6.79 (15)	3.30
Massachusetts Board of Registration in Medicine	4.13 (15)	1.33
Michigan Board of Medicine	4.82 (15)	1.67
Michigan Board of Osteopathic Medicine and Surgery	7.19 (15)	1.87
Minnesota Board of Medical Practice	4.35 (15)	2.00
Mississippi State Board of Medical Licensure	7.11 (15)	4.52
Missouri Board of Registration for the Healing Arts	6.23 (15)	2.79
Montana Board of Medical Examiners	6.09 (15)	3.42
Nebraska Board of Medicine and Surgery	7.84 (15)	3.65
Nevada State Board of Medical Examiners	4.93 (15)	1.51
Nevada State Board of Osteopathic Medicine	3.64 (15)	3.03
New Hampshire Board of Medicine	5.12 (15)	2.50
New Jersey State Board of Medical Examiners	4.77 (15)	1.54
New Mexico Medical Board	6.27 (15)	2.48
New Mexico Board of Osteopathic Medical Examiners	3.97 (15)	6.09
New York State Office of Professional Medical Conduct	7.07 (15)	2.13
North Carolina Medical Board	6.27 (15)	2.11
North Dakota Board of Medical Examiners	10.73 (15)	3.98
State Medical Board of Ohio	8.03 (15)	1.88
Oklahoma Board of Medical Licensure and Supervision	9.961 (15)	2.84
Oklahoma State Board of Osteopathic Examiners	11.28 (15)	3.83
Oregon Medical Board	5.33 (15)	1.82
Pennsylvania State Board of Medicine	4.39 (15)	1.63
Pennsylvania State Board of Osteopathic Medicine	5.89 (15)	2.50
Rhode Island Board of Medical Licensure and Discipline	6.01 (15)	2.89
South Carolina Board of Medical Examiners	5.29 (14)	2.40
South Dakota Board of Medical and Osteopathic Examiners	4.92 (15)	3.03
Tennessee State Board of Medical Examiners	3.60 (15)	2.03
Tennessee Board of Osteopathic Examination	12.80 (15)	14.61
Texas Medical Board	7.32 (14)	2.00
Utah Physicians & Surgeons Licensing Board	4.18 (15)	1.67
Utah Osteopathic Physicians & Surgeons Licensing Board	58.10 (15)	49.52
Vermont Board of Medical Practice	9.01 (15)	3.76
Vermont Board of Osteopathic Physicians and Surgeons	30.74 (15)	19.78
Virginia Board of Medicine	5.09 (15)	1.28
Washington Medical Quality Assurance Commission	5.44 (15)	2.23
Washington Board of Osteopathic Medicine and Surgery	11.29 (15)	11.21
West Virginia Board of Medicine	10.92 (15)	4.11
West Virginia Board of Osteopathic Medicine	6.17 (15)	3.18
Wisconsin Medical Examining Board	6.21 (15)	.93
Wyoming Board of Medicine	12.07 (15)	5.48

Appendix B: The Partisan Alternative

Table B1: Linear Models of Total Board Disciplinary Actions per 1,000 Physicians, 1993-2006

	(1) Unified Dem.	(2) Unified Rep.	(3) Dems in Leg.
Unified Government	-.940 (.945)	1.095 (.912)	-3.646 (3.055)
Democratic Governor	-1.212 (.808)		-1.053 (.801)
Democratic Governor × Unified Govt.	2.035 (1.520)		
Republican Governor		1.212 (.808)	
Republican Governor × Unified Govt.		-2.035 (1.520)	
Proportion Dems in Legislature			-1.901 (5.371)
Proportion Dems in Legislature × Unified Govt.			7.282 (5.866)
Citizen Ideology (higher scores more liberal)	-.082 (.051)	-.082 (.051)	-.075 (.052)
Board Independence	3.957*** (.998)	3.957*** (.998)	3.880*** (1.017)
Board Members per 1,000 Physicians	1.178*** (.061)	1.178*** (.061)	1.178*** (.061)
Share of Outside Members on Board	-5.711 (4.616)	-5.711 (4.616)	-6.837 (4.745)
Reporting Requirements	.037 (.117)	.037 (.117)	.033 (.125)
State Govt. Spending as Share of GSP	47.880* (29.036)	47.880* (29.036)	45.314 (29.552)
Managed Care Share	4.747*** (1.463)	4.747*** (1.463)	4.557*** (1.495)
Medical Malpractice Awards per 1,000 Physicians	-.089* (.046)	-.089* (.046)	-.096** (.047)
PDMP Law in Effect	-1.433* (.809)	-1.433* (.809)	-1.249 (.819)
Mean Disciplinary Actions in Neighbor States	.361*** (.111)	.361*** (.111)	.371*** (.113)
State Population (logged)	-15.478* (8.318)	-15.478* (8.318)	-14.543* (8.444)
Constant	229.085* (127.336)	227.873* (127.268)	216.159* (129.610)
Board FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	946	946	931
R^2	.704	.704	.704
AIC	5310.864	5310.864	5234.622
BIC	5734.701	5734.701	5656.910

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: Dependent variable is the total number of disciplinary actions by a board per 1,000 in-state licensed and practicing physicians.

Appendix C: Alternative Specifications (Random Effects Models)

Table C1: Linear Models of Total Board Disciplinary Actions per 1,000 Physicians, 1993-2006

	(1) All	(2) Unified Principals	(3) Non/Semi-Prof.	(4) Professional
State Legislative Ideology	1.137 (1.187)	-1.154 (1.388)	-1.780 (1.912)	-.884 (.910)
State Legislative Ideology × Unified Govt.		3.160* (1.728)	2.071 (2.621)	3.090*** (1.343)
Unified Government		.659 (.639)	.332 (.860)	.411 (.556)
Democratic Governor	-.132 (.667)	-1.169 (.861)	-.521 (1.105)	-3.130*** (.968)
Citizen Ideology (higher scores more liberal)	-.129*** (.047)	-.130*** (.048)	-.114* (.061)	-.139*** (.050)
Board Independence	2.646** (1.038)	2.337** (1.065)	2.695* (1.548)	1.116* (.677)
Board Members per 1,000 Physicians	.735*** (.051)	.737*** (.051)	.759*** (.059)	.713*** (.175)
Share of Outside Members on Board	-14.378** (5.778)	-14.315** (5.787)	-15.546* (8.331)	-9.103*** (3.188)
Reporting Requirements	.138 (.138)	.156 (.138)	.170 (.191)	.185** (.093)
State Govt. Spending as Share of GSP	23.403 (25.510)	18.629 (25.584)	27.704 (31.967)	-14.916 (17.995)
Managed Care Share	3.745** (1.786)	3.639** (1.790)	3.191 (2.303)	2.213* (1.192)
Medical Malpractice Awards per 1,000 Physicians	.100* (.053)	.096* (.054)	.116* (.068)	.034 (.027)
PDMP Law in Effect	-.709 (.903)	-.973 (.911)	-1.393 (1.221)	-1.713*** (.557)
Mean Disciplinary Actions in Neighbor States	.483*** (.118)	.508*** (.119)	.438*** (.147)	.621*** (.146)
State Population (logged)	2.460** (.996)	2.333** (.998)	2.573 (1.815)	.430 (.690)
Constant	-36.333** (16.841)	-33.152** (16.908)	-38.718 (29.584)	5.109 (12.859)
Year FE	Yes	Yes	Yes	Yes
Observations	683	683	522	161
R^2 overall	.399	.392	.406	.613
R^2 within	.412	.405	.429	.442
R^2 between	.389	.414	.417	.923
Hausman test Fixed vs. Random Effects (χ^2)	121.93	120.76	109.65	37.89
Hausman test Fixed vs. Random Effects (p-value)	.0001	.0001	.0001	0.079

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: Dependent variable is the total number of disciplinary actions by a board per 1,000 in-state licensed and practicing physicians. Columns 3 and 4 present estimates for sample split by legislative professionalism categories.