

Civil Service Reform in U.S. States: Structural Causes and Impacts on Delegation*

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Abstract

This paper studies the causes and consequences of the introduction of an independent bureaucracy. We demonstrate with a theoretical model that legislators establish an independent bureaucracy where their interests diverge (i.e. where government is divided). We take this claim to data by studying civil service reforms in U.S. states in the second half of the 20th century. Consistent with the model, we find that states tend to introduce stronger merit systems when there is divided government (that is, different political party control of legislature and governorship). Next, we examine the impact of these reforms on legislative complexity, using new methods from computational linguistics. We find that after civil service reform, legislatures start writing more complex statutes that contain more legal provisions. This is consistent with a model in which a more independent bureaucracy requires more specific instructions to avoid agency drift, rather than a model in which a more technocratic bureaucracy should be given less instructions and more discretion (Huber and Shipan, 2002, 2008). Finally, we find evidence that more legislation fosters economic growth. These findings suggest the role of divided government in the creation of a more independent bureaucracy and in the enactment of more precise laws, which ultimately lead to a more efficient economy.

1 Introduction

Civil service reform – the introduction of an independent, technocratic bureaucracy – is a key feature of democratic historical development and a central topic in political economy research. In one major strand of the literature, an incumbent party accrues private benefits from the patronage system but entrenches the bureaucracy through reform when it is about to lose (Geddes 1994; Ruhil and Camões 2003; Ting, Snyder, Hirano and Folke 2013). In the other major strand, a professional civil service is introduced to increase the efficiency of public goods production by government agencies (Huber and Ting 2016). The reform benefits those in power by improving reelection chances. Recently, political economists have sought to reconcile these two contrasting claims, by looking at the interaction between parties. Incentives to invest in an independent bureaucracy will be higher if the opposition has preferences which are not so far from those of the incumbent party (Huber and Ting 2016).

This paper seeks to understand the causes and consequences of an independent bureaucracy. We provide a theoretical model to guide the analysis of the relationship between civil service reform and divided government. We then use this model to analyze a panel data set of civil service reforms in the U.S. states. We make three contributions, described as follows.

The first contribution (Section 3) is a simple model, which helps explain under which type of government (divided or unified government) incentives push legislators to reform bureaucracy. The model assumes that politicians have two ways to increase their utility: following ideology and following Nature, which means increasing the overall efficiency of the political and economic system. We find that under unified government politicians can always follow ideology and sometimes, also Nature. Hence they are not motivated to create an independent bureaucracy. Under divided government, gridlock makes following ideology or Nature difficult. Hence, under divided government legislators tend to prefer a civil service reform, thanks to which they can always follow Nature and, sometimes, ideology.

The second contribution (Section 4) is empirical. We test the main observable implication

of our model by looking at whether the introduction and extent of merit rules across the civil services of U.S. states is related to divided government. Findings suggest that states with no party controlling the government are more likely to introduce stronger civil service reforms. This result is robust to different measures of divided government. Thanks to the use of fixed effects regressions and the inclusion of a large number of time-varying factors, we are able to exclude a series of alternative explanations suggested by the literature. This work represents a significantly improved empirical research design over previous studies of civil service reform.¹

As a third contribution (Section 5), we look at the consequences of the introduction of an independent bureaucracy. By relying on the delegation literature (Huber and Shipan 2002, 2008), we argue that once an independent bureaucracy is established, legislators start worrying about agency drift. As such, legislators will put into place a series of control mechanisms in order to restrain the bureaucracy, such as writing more detailed laws (Huber and Shipan 2008). The logic underpinning this claim is the substitutability of control mechanisms (Huber and Shipan 2008). As the introduction of an independent bureaucracy weakens ex post control mechanisms, such as the possibility of hiring and firing bureaucrats at will, legislators introduce ex ante control mechanisms, such as writing more detailed statutes.

We test this argument by looking at the effects of the introduction of merit systems in the civil service in US states. We test whether, as a result of the introduction of the merit systems, legislators start writing more detailed laws. In so doing, we introduce a novel linguistic measure of the level of detail of legislation, based on recent developments in computational linguistics, applied to a unique dataset which consists of the full text of U.S. state session laws from 1900 to 2000. We find that the introduction of the merit systems across U.S. states is associated with statutes containing more legal provisions. This suggests

¹ Previous empirical research in political economy has generated some empirical evidence on this issue. Folke, Hirano and Snyder (2011), Ruhil and Camões (2003), Ting et al. (2013), and McGrath (2013) suggest that civil service reform is more likely to occur under unified government. One of the reasons might be the different definition of divided government. In fact, with few exceptions (Folke, Hirano and Snyder 2011), large- N studies on civil service reform do not consider who controls the governor office (Ruhil and Camões 2003; Ting et al. 2013; McGrath 2013).

the introduction of stronger ex ante control mechanisms to discipline the more independent bureaucracy.

Finally, we are interested in the implications of these processes for economic growth. In particular, what is the effect of legislative complexity on state GDP? Section 6 provides causal evidence on this question using an instrumental variables approach based on Bartik (1994). We find that at the margin during our time period, more legislation is associated with more growth. This is in line with the literature on government growth (Kirchner 2012). The effect of complexity on growth validates a causal channel for how merit reforms – and (indirectly) divided government – can result in a more efficient, productive economy.

The next section (Section 2) provides an historical and literature background on these issues. The rest of the paper then unfolds with the model (Section 3), the impact of divided government on civil service reform (Section 4), the impact of civil service reform on legislative complexity (Section 5), and the impact of legislative complexity on economic growth (Section 6). Section 7 provides a brief concluding discussion.

2 Background: Divided Government and Civil Service Reform

This section provides background on civil service reform in the United States. After outlining the history, we proceed to discuss the traditional explanations for civil service reform provided by the literature, which focus mostly on the provision of public goods and the creation of private benefits. Finally, we show how the political economy literature has recently made sense of these traditional explanations by looking at legislators' electoral incentives. In so doing, political economists have tried to reconcile the two contrasting views by going beyond models of civil service reform based on single party motivations and focusing on the strategic interaction between parties.

2.1 A Brief History

In 1801, the presidency changed political parties for the first time in history and the issue emerged of how to deal with politically affiliated public servants (Congress 1976). The newly elected president Thomas Jefferson opted for a strategy of equal division of government offices between parties, which was then followed by his successors (Congress 1976). Until the 1830s, relatively low turnover and high stability characterised the federal civil service. By the mid-1830s under Andrew Jackson, patronage criteria started to dominate the recruitment of civil servants and arbitrary removal for political reasons became a widespread practice. This led to high instability and a decrease in the professionalization of civil servants (Congress 1976).

After the civil war, several attempts at reforming the civil service were made, but they all failed. In the 1870s some minor provisions were passed through executive orders (Naff, Riccucci, Shafritz, Rosenbloom and Hyde 2001; Shafritz 2012). During the Hayes presidency various civil service reform associations were established, with the New York civil service reform association as the first one (Congress 1976). In 1881, the newly elected President Garfield was shot by a job seeker disappointed by the patronage system (Dresang 1982; Naff et al. 2001; Shafritz 2012). This sparked national attention to the issue of civil service reform. In the same year, Senator Pendleton presented a bill to the Senate, which was approved two years later (Congress 1976; Naff et al. 2001). The Pendleton Act established three principles in civil service: competitive examination, political neutrality, and security of tenure (Congress 1976; Shafritz 2012).

Beginning in the 1880s through the 1920s, Congress passed a series of minor laws which sought to strengthen the merit system. These included the 1912 Lloyd-La Follette Act, which improved protection from dismissal (Huber and Ting 2016). Finally, by the 1930s, two main pieces of legislation were enacted. First, the 1930 Hatch Act sought to restrict political activity by civil servants (Congress 1976). Second, in 1939 the Congress amended the Social Security Act, requiring the establishment of merit systems in those state departments cooperating with the administration of the Act. By the beginning of WWII, a strong merit

system was in place at federal level and it was not subject to any major change until the Civil Service Reform Act in 1978, which established performance review and merit pay, and the 1993 National Performance Review, which continued along the line of increasing public servants' accountability and reducing their independence (McGrath 2013).

Civil service reforms at the federal level triggered an active debate at the state level.² Nonetheless, 50 years after the Pendleton Act, only nine states had introduced comprehensive merit systems. The real push came with the 1939 amendment to the Social Security Act. In response to this, states adopted limited merit systems covering all agencies administering funds under this act (Ujhelyi 2014). Simultaneously and in some cases independently from the pressure from the federal level, states started to reform their civil service in a radical way. New York and Massachusetts were the first states to implement a comprehensive merit system at the end of the 19th century. These were followed by most of the states before WWII and a few laggards in the 1950s and 1960s. West Virginia came last with a comprehensive merit system at the end of the 1980s.

2.2 Public Goods and Private Benefits

Several factors are considered relevant for civil service reform across the U.S. states. Traditional explanations focus on the reformist movement for good government of the 19th century (Johnson and Libecap 1994; Kernell and McDonald 1999; Weber and Brace 1999; Ruhil and Camões 2003; Folke, Hirano and Snyder 2011; McGrath 2013; Housel 2014; Ujhelyi 2014). At the end of the 19th century, a militant minority composed by politicians from both parties and civil society members started to exert increasing pressure on the federal government to improve the efficiency of bureaucracy (Johnson and Libecap 1994). Similar dynamics were in place at the state level. In 1950s Oklahoma, for example (Housel 2014), an advocacy coalition composed of newspapers, educators, a few legislators, and the League of Women Voters was behind the governor's efforts to introduce a comprehensive civil service reform.

²It should be noted that the initial stimulus for reform at federal level came from the New York civil service reform association. Policy diffusion between the federal and the state level was not exclusively top-down.

The reform extended merit principles to most state employees.

The reason for the emergence of this progressive movement was arguably the perceived inefficiency of the patronage system. A spoils system meant a bureaucratic system characterised by high turnover (especially for high level positions) and mismanagement of human resources (Johnson and Libecap 1994; Folke, Hirano and Snyder 2011; McGrath 2013; Housel 2014; Ting et al. 2013). Under a patronage system, at every change in government, a high share of employees used to be fired and new ones hired. In 1950s Pennsylvania, more than two thirds of public employees in highway positions changed jobs when Democrats took power (Sorauf 1959). In Michigan, a constitutional amendment aimed at watering down merit rules increased personnel turnover from 18 percent in 1936 to almost 28 percent in 1939 (Litchfield 1941).

High turnover was coupled with a serious mismanagement of human resources. Civil servants were not hired or allocated according to efficiency criteria, but according to political affiliation and also other aspects, such as friendship and ethnicity (Sorauf 1959; Johnston 1979). Civil servants were supposed to spend a good portion of their working time participating in political activities, such as attending political meetings, canvassing voters, and so on (Ting et al. 2013).

The consequences of this system were drastic: a huge loss of resources, amounting to millions of dollars in some states (Housel 2014); loss of trust in the government (Housel 2014); a very low consideration for public service as an occupation (Stahl, Mosher et al. 1956); strong sense of insecurity in public employment (Sorauf 1959); low salaries, especially compared with the private sector (Folke, Hirano and Snyder 2011). The traditional explanations focusing on the reformist movement for a good government were later incorporated into a more contemporary public management approach to civil service reform (McGrath 2013).

While the explanations discussed above focus on the incapacity of patronage systems to create public goods, other explanations look at the private benefits the patronage system used to create for specific constituents. Some studies emphasise the variation in preferences

between different constituents to which different bodies were accountable as a crucial factor determining the introduction of the merit system. As Housel (2014) points out with respect to the introduction of a comprehensive civil service in Oklahoma, traditionally the legislature used to represent the rural part of the state, whereas the governor the urban part, which used to benefit the most from the patronage system. These dynamics are also found at the federal level, where the introduction of rural free delivery routes, a central part of the programme which replaced the patronage system in the postal office, became central for Republicans to gain the support from farmers in key areas (Kernell and McDonald 1999).

A similar claim is made for migrant communities (Ujhelyi 2014). In many states the patronage system used to benefit key communities and its repeal inevitably triggered opposition from these communities. For instance, in a study of patronage in New Haven in the aftermath of WWII, Johnston (1979) finds that the Democrats managed to overwhelmingly control the mayor office for most of the 1950s, all of the 1960s and most of the 1970s. The strong patronage machine managed to raise support from the growing Italian (and black) population at the expense of the Irish one, which had always been central in New Haven politics but had been declining.

2.3 Reconciling the Two Contrasting Views

Recent work in political economy has tried to make sense of these two contrasting views by looking at the electoral incentives behind legislators' behaviour. Huber and Ting (2016) distinguish between the so-called "insurance" and "investment" views. The insurance view suggests that incumbents will favour civil service reform when they are electorally vulnerable, in order to constrain policy implementation (Geddes 1994; Ruhil and Camões 2003; Ting et al. 2013). According to Ting et al. (2013), the incumbent party will create an independent bureaucracy when it is losing ground, to avoid that the other party gets in control of the bureaucracy under a spoils system. The intuition of this model is that for the incumbent party, an independent civil service is preferable to a spoils system controlled by the opposing

party. This follows from an electoral advantage to incumbency due to a spoils system. With a merit system, moreover, the incumbents can lock in both policies and loyal employees as agents, at least in the short term (Ruhil and Camões 2003; Ujhelyi 2014).

This advantage has been documented empirically by Folke, Hirano and Snyder (2011) among others. According to Enikolopov (2014), indeed, patronage allows targeting a particular group of voters and solving the commitment problem in vote buying.³

Conversely, the investment argument says that incumbents will favour delegation when they are electorally secure, as politicians need the assurance of remaining in power to reap the benefits of delegation (Huber and Ting 2016). This logic is in line with those explanations discussed above which look at the efficiency of the bureaucratic system in creating public goods.

In sum, these contrasting views center on the provision of private benefits and public goods, and the electoral incentives behind these two dynamics (Huber and Ting 2016). The insurance view emphasises that a spoils system is good for the incumbent in electoral terms, as it provides private benefits to key constituents. The investment view suggests that a merit system is better able to create public goods, hence increasing public support for the party in power and for government in general.

The political economy literature has recently tried to reconcile these two views by focusing on party polarization. The model proposed by Huber and Ting (2016) assumes that incumbents choose the mix between patronage appointees, functional to provide private benefits, and civil servants, functional to generate public goods, depending on the opposing

³This view has been criticised by several historical accounts, which suggest that patronage systems were not such effective vote machines. In a detailed study of the patronage system in Pennsylvania in the mid-1950s, Sorauf (1959) finds that patronage in highway jobs often failed to create loyal voters and activists. Although political appointment is found to trigger party contributions, hence is effective in extracting political activity among highly skilled jobs, most of the time local parties used to work as recruitment agencies, hiring people to fill in low skilled jobs, with little political purpose (Sorauf 1959). Moreover, patronage benefits were dispensed not only according to loyalty but also according to different logics, such as friendship and ethnicity (Sorauf 1959; Johnston 1979). As such, patronage was not as effective in creating electoral benefits for the party in power as the mainstream literature would suggest. Rather, it sometimes might have had the opposite effects. Indeed, Schattschneider (1942) finds that patronage used to advantage 'local bosses' against central parties. Patronage used to reinforce a series of centrifugal tendencies which tended to erode party cohesion, hence threatening electoral benefits (Schattschneider 1942).

party's preferences. Investments in good government accrue benefits in the future and help the opposing party once they get into power. Therefore incentives to invest in civil service will be higher if the opposition has similar policy preferences. This is still dependent on the prospect of winning, however; when the incumbent is electorally vulnerable, the incumbent puts greater weight on the opposition's preference and capacity.

3 An Illustrative Model of Civil Service Reform under Divided Government

This section aims to clarify the logic behind our claim that civil service reform should be expected to occur more likely in periods of divided government. We do so by means of a simple (toy) model.

Assume that politicians are motivated by information and ideology.⁴ For example, slow economic growth with lower-than-expected investments might signal the need for lower interest rates, and a politician should be influenced by this information (or realization of a state of Nature) regardless of her ideology. Given that both ideology and information matter for politicians, the intuitive difficulty in presence of a divided government is that following a change in the state of Nature usually finds opposition by the party with the ideology that is not favored by the shock. An independent bureaucracy usually has a flexibility advantage over politicians in terms of following the changes in the state of Nature. To reflect this, we assume below that in case of delegation to an independent bureaucracy the latter will always follow Nature automatically.

Take two parties, L and R, positioned at the extremes of the policy spectrum (respectively, at -1 and 1), where the status quo of the policy is in between them (at 0). We assume a natural shock that gives information to politicians about which direction the policy should

⁴We consider directly a reduced form, since for the argument we make it is irrelevant to know whether politicians' ideological utility and common value utility components are intrinsic preferences or are derived by what voters want.

move from the status quo. For instance, a slow economic growth might signal the need for a change in fiscal policy. Formally, we assume that natural shocks will require the policy to move from 0 either to -1 or to 1. More specifically, let us consider the illustrative case in which 50 per cent of the times nature will require the policy to move to -1 and the other 50 per cent of the times to 1. Also, politicians do not know ex ante which way the information conveyed by the shock will go.

Let ι be an indicator function which takes value 1 when the policy moves towards the direction suggested by Nature and 0 otherwise. Let ϵ be the common value that politicians attach to following Nature. Hence, the expected common value component of the policy is equal to $\iota\epsilon$, which equals ϵ when the policy follows Nature and 0 otherwise. On top of this common value component, the politician L has a standard loss function equal to $-|x + 1|$ (for the politician R, this function is $-|x - 1|$), where x is the value assumed by the policy. The utility of the politician L is

$$U_L = -|x + 1| + \iota\epsilon \tag{1}$$

Building on this, we can calculate the expected utilities under unified and divided government for the scenarios where decisions are left to politicians and where they are delegated to independent bureaucrats. We demonstrate that where preferences diverge (i.e. under divided government) delegation to bureaucracy is more likely to take place. Conversely, under unified government, delegation is never strictly profitable and hence less likely to occur.

Proposition: In the symmetric uncertainty model described above there is never any strict incentive to delegate to an independent bureaucracy under unified government, whereas under divided government there is a strict incentive to delegate when $\epsilon < 2$.

Proof. Consider first the case of a unified government – say left government, without loss of generality. If the shock requires the policy to move to -1, then the incumbent L politician will follow it no matter what ϵ is; if the shock requires the policy to move to +1,

then politician L in power will follow Nature only if ϵ (the common value component) is greater than 2 (the ideological loss in going from -1 to 1).⁵

Hence, the L politician's expected utility from not delegating when $\epsilon < 2$ is $\frac{\epsilon}{2}$, whereas when $\epsilon > 2$ the expected utility of not delegating is the same as the expected utility of delegating to an independent bureaucracy which will always follow Nature automatically, i.e. $\epsilon - 1$. Thus, delegation is strictly worse than maintaining the spoil system for any $\epsilon < 2$ and delegation for higher ϵ values would not generate any difference in terms of expected payoff for the politician.

Under divided government, the politician L will follow Nature if ϵ is greater than 2. In this case, the expected utility is $\epsilon - 1$. Conversely, if ϵ is smaller than 2, when Nature requires the policy to move to +1, L will nonetheless want to move to -1, but the politician R will not allow it. Under divided government, if $\epsilon < 2$ we have a gridlock problem: each party cares more about ideology than about information, but since the approval of both parties is needed for any change of the status quo, the consequence of not delegating would be a tug of war leaving the policy in the status quo. This yields an expected utility of -1. Given that delegation yields $\epsilon - 1$, delegation is preferable.

In conclusion, under divided government there is a strict incentive to delegate to an independent bureaucracy if $\epsilon < 2$. Under unified government there is a strict incentive not to delegate if $\epsilon < 2$. For higher ϵ values, delegation would not generate any difference in terms of expected payoff for the politician **QED**.

This simple model allows us to make a clean prediction without any assumptions on the future. If we wanted to complicate the picture with forward looking politicians, it is easy to imagine that the incentives to delegate under divided government should be the higher the higher is the probability of remaining in a divided government situation also in the future. Suppose for example that politicians consider today and tomorrow, but the expectation is

⁵Here we are assuming that if L decides not to follow Nature when Nature suggests to go to 1 then L will go to -1. If we assumed instead that not following Nature by remaining at 0 is significantly less bad than not following Nature by going to -1, for example with some quadratic loss from not following Nature, then the threshold of indifference would be less than 2, but the logic of the proof would be identical.

that tomorrow one of the two parties will likely obtain a unified government; in this case such a party with a positive outlook on the future might want to avoid delegation if endowed with a sufficiently high discount factor.

4 Evidence on Divided Government and Civil Service Reform

The model described in the previous section generates a clean prediction that creation of an independent bureaucracy is more likely under divided government. This section takes this prediction to the data.

4.1 Anecdotal Evidence

Before discussing the statistical analysis, we provide some anecdotal evidence that: the push for civil service reform was mainly bipartisan; there was an important role played by the governor's office during these debates; the main reforms across the U.S. states were enacted when a single party did not have full control over the government. This is different from what the contemporary political economy literature normally assumes.

The semi-annual Book of the States (BoS) provides detailed discussions of the process of state government reorganization. The BoS documents that reorganization is often overseen by bi-partisan commissions and supported by the use of study groups and public opinion polls (BoS 1954 Section IV). The introduction of the merit system across U.S. states was no different. In the 1940s and 1950s, a series of Little Hoover Commissions, modeled after the Hoover Commission at the federal level, were central in making proposals for strengthening central personnel agencies in several states, such as Montana, Nevada, Illinois, Louisiana, and New Mexico (BoS 1954 Section IV).

An interesting example of this process was Louisiana's 1940 law enacting a comprehensive civil service. The law was drafted by a group of citizens with the help of public interest at-

torneys, rather than by lobbyists or legislators themselves (Hyneman 1940). The legislation set up a state civil service commission, composed of individuals appointed by state universities and confirmed by the governor, to oversee the implementation of the merit system. The drafters realized that the merit system would need strong public support to survive (Hyneman 1940).

The reform in Michigan, around the same time, also demonstrates the importance of a bipartisan commission. According to Litchfield (1941, p.80) , “The amendment seeks to set up a system in which the actual administration is conducted by a competent personnel director, who is to be advised by, and in the last analysis checked by, a non-salaried, bipartisan commission”.

Similarly, bipartisan commissions and civil society groups were central in the first wave of civil service reform at the end of the 19th century. The New York Civil Service Reform Association is the exemplary case, which inspired the Civil Service Commission created by the Pendleton Act at federal level.⁶

Comprehensive civil service reforms were introduced at times when no single party had a strong hold over the government. As pointed out by Dresang (1982, p. 44):

the cluster of states where reforms have been most frequent and far-reaching are states where there is meaningful two-party conflict in gubernatorial races and where there have indeed been changes in governors and in party control of that office during the period being examined.

This was true also at federal level, where the discussion about the introduction of a merit system started between the Democrat President Johnson and the Republican controlled Congress (Ruhil and Camões 2003).

There is anecdotal evidence that state governors were central in reforming and administering the patronage system. For example, as documented by Sorauf (1959) in the case

⁶ The New York Civil Service Reform Association had also a huge role at federal level. They drafted the bill which then the Senator Pendleton submitted to the Senate, what then became the Pendleton Act.

of 1950s Pennsylvania, the governor is in charge of appointing most of the civil servants under the patronage system in place. As noted by Folke, Hirano and Snyder (2011), indeed, in most states the executive had formal authority over hiring and firing (even though the governor had to negotiate with the legislators for funding etc.).

The governor also played a central role in the introduction of the civil service. In Oklahoma, the newly elected governor Edmonson embarked on a long and convoluted negotiation process with the legislators to push the reform through. Housel (2014, p. 70) cites Edmondson's Chief of Staff in describing the logrolling behind closed doors to push the reform: "in the final hours . . . there were enough highway construction deals cut with legislators to keep the Transportation Department busy well into the next decade". Similar dynamics were in place in the introduction of the civil service in Michigan (Litchfield 1941). One of the main reasons for the high role of the governor in administering the patronage system and in its reform is the fact that in several states the legislature was a part-time body characterised by high turnover and low professionalism, until the 1960s (Rosenthal 1982). Hyneman (1940) finds that this was the reason for the high role of the governor in managing the civil service and its reform in Louisiana.

4.2 Data

This subsection describes the data used for the analysis of divided government and civil service reform.

The time period studied is 1965 through 1983. We use this time period because we have data on appointment rules for the personnel executive. Over this period, 12 states with patronage systems introduced comprehensive merit systems. Additionally, by looking at reforms that changed the strength of bureaucratic independence, there were 38 changes in 26 states (Ujhelyi 2014). Overall, we have variation in the dependent variable for 30 states.

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⁷It should be noted that this sample allows controlling for the influence of vertical policy diffusion from the federal level and horizontal policy diffusion across states. Indeed, the period of analysis ends simultaneously

We have the following variables for variation in civil service rules. First, we have a dummy variable for the introduction of a comprehensive merit system in the state bureaucracy. Second, we have reform intensity, namely, whether the personnel executive is appointed by the governor or an independent body (Ujhelyi 2014). Under governor appointment, there is less independence.⁸ In the preferred specification, we combine these two variables together, deriving a single index to summarize independence. This variable takes value 0 where no comprehensive merit system is in place, value 1 where a comprehensive merit system (with no independent personnel executive) is in place, and value 2 where a comprehensive merit system (with an independent personnel executive) is in place.

The variable ‘Divided Government Veto’ is taken from Klarner (2003). This variable takes value 1 where government is divided (where the two chambers and the governor are not controlled by the same party) and value 0 where a single party controls all three institutions. The measure ignores the party of the governor when there are veto-proof majorities in the state legislature (Klarner 2003). This is a common measure of government divisiveness for separation of powers systems (Epstein and O’Halloran 1994, 1999; Volden 2002). In the Appendix, we use another measure of divided government, to check the robustness of our results (see Table A3).

Control variables are taken from Ujhelyi (2014), which include the following. Citizen ideology measures how liberal congressional candidates are, irrespective of their parties, and use their vote share to measure the ideology for the electorate (Berry, Ringquist, Fording

to the entry into force of the Civil Service Reform Act, which started a period of retrenchment of the merit principles in the public administration, at federal and then at local level (McGrath 2013; Ujhelyi 2014). Pre-1980s reform are more comparable in this regard (Ujhelyi 2014). Second, the time period starts in the 1960s. Indeed, 19th century and early 20th century reforms at state level were strongly influenced by top-down policy diffusion from the federal level (Ruhil and Camões 2003). For instance, the 1930 Hatch Act represented an important piece of legislation for the civil service, restricting the ability of civil servants to take part to political activities at federal level and had a strong effect on the civil service reforms enacted after that year at state level. Also, in 1939 the Congress amended the Social Security Act, requiring the establishment of merit systems in those departments cooperating with the administration of the Act. As such, in the study of the causes of civil service reform, it is advisable to concentrate on the reforms which started after these waves of policy diffusion from the federal level.

⁸As explained in the Appendix, we also thoroughly reviewed the primary and secondary sources suggested by Ujhelyi (2014) and Ting et al. (2013) (see Table A1).

and Hanson 1998). The fraction of urban population measures the percentage of the total population in a state living in urban areas, according to the US Census. Finally, we also take into consideration the number of full-time state employees, according to the US Census. For more information on these variables, see the Appendix in Ujhelyi (2014). These control variables allow accounting for the alternative explanations the literature has so far put forward. As discussed above, the difference between rural and urban regions was crucial in the political debate for the introduction of the civil service, for instance. Also number of full-time public employees might influence the introduction of a merit system, as a higher number of civil servants employed under a patronage system might lead to a stronger opposition to a reform. Table A2 in the Appendix shows the descriptive statistics of the variables used in this analysis.

4.3 Empirical Strategy

Our empirical approach is differences-in-differences, with estimation using ordinary least squares. We use state fixed effects to control for any time-invariant state-level confounding factors. We use year fixed effects to control for nationwide time-varying factors. We use state-level time trends to allow for pre-existing confounding trends.

We estimate a linear model of $MeritIPE_{st}$, which equals zero for no reforms, one with a merit system (but no independent personnel executive), and two for a merit system with an independent personnel executive. The model is

$$MeritIPE_{st} = \alpha DividedGovernment_{st} + X'_{st}\beta + \gamma_s + \delta_t + \phi_{st} + \varepsilon_{st} \quad (2)$$

where $DividedGovernment_{st}$ measures whether the two chambers and the governor are not controlled by the same party (taking into consideration the governor's veto powers), X_{st} is a vector of time-varying state characteristics, γ_s and δ_t are state and year fixed effects and ϕ_{st} represents state-time trends.

We cluster standard errors by state to allow serial correlation within state over time (Bertrand, Duflo and Mullainathan 2004). Consistent estimation of treatment effects follows from the standard assumptions on parallel trends.

4.4 Results

Table 1 below shows the results of the fixed effects regression analysis. Divided government is the treatment variable of interest. The result in Column 1 show that there is a large within-state effect of divided government on the probability of strengthening the merit system. In Column 2, we see that result is robust to including state-level time trends ($p = 0.06$) . In addition, we see that the coefficient barely changes when adding state-level time-varying controls, consistent with a causal effect (Column 3, $p = 0.06$) . Under divided government, state governments are 8% more likely to introduce or strengthen merit reforms.

Figure 1 provides graphical evidence of this relationship. This is a binned scatterplot, a non-parametric method of plotting the conditional expectation function. We regressed the independent and dependent variables on the control variables (in this case, state and year dummies) and generated residuals. Then, we grouped the residualized variable in the horizontal axis into 23 equal sized bins, computed the mean of the residuals of each variable within each bin, and created a scatterplot of these 23 data points. Each point shows the average level of civil service reform for a given level of divided government, holding the controls constant. The slope clearly illustrates a positive relationship.

Table A3 in the Appendix shows the results of regression models with different measures of divided government. This variable takes veto proof majorities and super-majority requirements for budget passage and tax increases into account (Klarner 2003). Table A4 and Table A5 show the results of the ordered logit regression analysis with the two measures of divided government as main independent variable. Finally, Table A6 shows the results of the ordered logit regression with whether the personnel executive is appointed by an independent body or by the governor as dependent variable. Results are robust to different measures of the

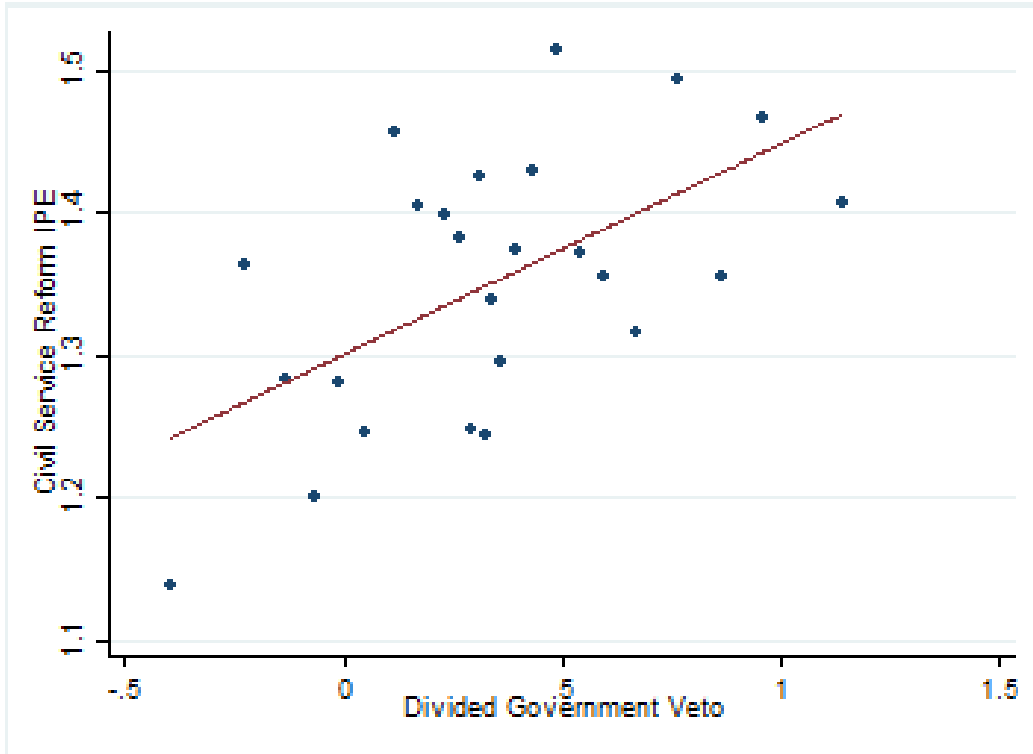
Table 1: Divided Government and Civil Service Reform

VARIABLES	(1)	(2)	(3)
Divided Government	0.149*** (0.0520)	0.0846* (0.0470)	0.0804* (0.0460)
Citizen Ideology			0.648** (0.258)
Percent Urban			2.497 (8.030)
Income			0.653 (0.430)
Income2			-0.0270 (0.0172)
Full-time Employment			0.202 (0.388)
Observations	830	830	830
R-squared	0.633	0.836	0.842
Clustered SE	YES	YES	YES
State FE	YES	YES	YES
Time FE	YES	YES	YES
State-Time Trends FE		YES	YES

Standard errors clustered by state in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Figure 1: Binned Scatterplot



dependent and independent variables and model specifications.

Overall, the findings support the idea that when state governments are divided, that increases the probability of strengthening the merit system. This is consistent with the model mechanisms from Section 3.

5 Consequences of Reform: Delegation and Legislative Complexity

This section extends the analysis to the impacts of civil service reform. We test the effects of the introduction of an independent bureaucracy on legislation, building on the delegation literature.

In recent decades, the literature on bureaucracy has focused on whether politicians delegate tasks to bureaucrats and how they do so. In other words, they look at which control

instruments they put in place to manage policy implementation (McCubbins, Noll and Weingast 1987; Levine and Forrence 1990; Epstein and O’Halloran 1994; Martin 1997). Legislators can use either ex ante or ex post control mechanisms (Martin 1997). Ex post control mechanisms refer, for instance, to the hiring and firing of bureaucrats. Different forms of ex ante mechanisms can be put in place, but the literature has focused especially on the level of detail of legislation: detailed laws, they argue, are used to micro-manage policy implementation (Huber and Shipan 2002). The delegation literature studies whether these two types are substitutes (Huber and Shipan 2008).

Building on these ideas, we ask whether after the introduction of an independent bureaucracy, legislators facing agency drift will write more detailed legislation in order to control policy implementation and restrain bureaucracy. We take the introduction of merit systems in the civil service in U.S. states as a form of delegation which decreases the ex post control of politicians over bureaucrats (Ting et al. 2013). We ask whether, as a result of the introduction of merit systems, legislators started to write more detailed laws (as ex ante mechanism to control bureaucracy).⁹

There is a countervailing factor that might reduce the need for ex ante control. That is, the merit system might result in more talented bureaucrats which should be given more discretion. Ash and MacLeod (2015) and Ash and MacLeod (2016) provide evidence for this process in the case of state supreme court judges. If legislators care about the quality of public goods provision, and merit-appointed bureaucrats are able to provide high-quality output without specific instructions, then laws may become less detailed after civil service reform.

5.1 Measuring the Level of Detail of Legislation

The level of detail of legislation is central in delegation studies. For example, Huber and Shipan (2002) seek to examine the variation in the level of detail of the statutes implementing

⁹The use of the design of bureaucratic agencies to measure their discretion is a well established practice in the literature (Volden 2002; Wood and Bohte 2004).

the federal Medicaid program across U.S. states. First, they select the relevant statutes for Medicaid by searching legal databases. Second, they manually code the policy specificity of the words contained in these statutes. In so doing, they distinguish between procedural and policy language, arguing that procedural language is less constraining than policy language (Huber and Shipan 2002) . The logic is that

a bureaucrat can comply with the need to write a report or to consult particular groups or to conclude his or her work in a specified time period without being sharply constrained with respect to the policy actually implemented. But if the statute says to do X, the bureaucrat cannot do Y (at least without some risks) (Huber and Shipan 2002, p.48).

Our approach is close in spirit to this one. The goal is to automatically extract legally relevant information from texts.

Information Extraction

By relying on lexical and syntactic information, recent NLP techniques allow one to extract legal provisions (Ash, Morelli and Vannoni 2017). These techniques allow us to determine how many obligations, entitlements, permissions, and constraints a statute contains.

Information extraction relies on two stages: the a priori definition of the legal ontology and the lexical and syntactic analysis of the text. The researcher first decides the lexical and syntactic features of the legal provisions she is interested in. In this work, we decide to focus on four legal ontologies, commonly used in legal studies: delegation, constraint, permission and entitlement (Soria, Bartolini, Lenci, Montemagni and Pirrelli 2007; Francesconi and Passerini 2007). Then, the researcher extracts lexical and syntactic information from the text and she looks for those sentences which match the legal ontologies previously identified.

Creating an ontology means encoding shared knowledge and making it explicit, through a set of rules, such as which components constitute a phenomenon, which relations between these components are present and so on (Indurkha and Damerau 2010). In information

Table 2: Lexical Units

STRICT MODALS	'shall', 'must', 'will'
PERMISSIVE MODALS	'may', 'can'
OTHER MODALS	'should', 'would', 'could', 'might'
OBLIGATION VERBS	'require', 'expect', 'compel', 'oblige', 'obligate', 'have to', 'ought to'
CONSTRAINT VERBS	'prohibit', 'forbid', 'ban', 'bar', 'restrict', 'proscribe'
PERMISSION VERBS	'allow', 'permit', 'authorize'
ENTITLEMENT VERBS	'have', 'receive', 'retain'

extraction, researchers use what are called domain ontologies, which specify the language in a specific domain. The construction of domain ontologies requires deep knowledge of the field of application (Indurkha and Damerau 2010). In this work, we use uncontroversial ontologies, namely ontologies which are used as common practice in legal studies. We rely on legal databases, where information on lexical and syntactic units from various legal texts have been manually annotated by lawyers and associated with specific provisions, such as FrameNet (Baker, Fillmore and Lowe 1998; Ruppenhofer, Ellsworth, Petruck, Johnson and Scheffczyk 2006) and WordNet (Villata, Rizzi, Governatori and Dragoni 2016), to build these ontologies.

The construction of a legal ontology starts from the identification of the lexical units. Table 2 shows the lexical units associated with the four ontologies we choose to look at in this paper.

As shown in Table 2, we start by looking for deontic modals (modals which relate to obligations and permissions), which can be either strict, namely restricting the action of the agent, such as 'shall', or permissive, namely empowering the agent, such as 'may'. Then, we also look for special verbs, namely those verbs which often appear in legal documents as associated with the provision types mentioned above. For instance, an obligation will contain verbs such as 'require', 'expect' and so on.

The next phase is to build the syntactic structure of each legal ontology, by relying on the lexical units above. Legal databases, such as FrameNet, provide guidance also for this. For instance, an obligation can be characterised by three syntactic structures:

- [agent] [strict modal] [verb]
- [agent] [strict modal] [obligation verb]
- [agent] [obligation verb]

In all three cases the sentence is positive. In the first scenario we have a strict modal (e.g. ‘shall’) and an action verb (i.e. any verb which is not among the special verbs identified above). In the second scenario, we have a strict modal and a obligation verb (e.g. ‘require’). In the third scenario, we have a obligation verb, without any modal. Table A7 in the Appendix outlines in detail the syntactic structures of all types of provisions and provides some examples.

Once the researcher knows which syntactic structures to look for, the next stage is to retrieve the actual syntactic structure of the sentences in the text under analysis. To do so, the researcher needs to parse the text for syntactic dependencies.

The syntactic structure of a sentence is described in terms of the words contained in that sentence and the grammatical relations between them (Jurafsky and James 2000). A grammatical relation consists of a head, such as a verb, and a dependent, such as a complement, which are related to each other through a function. Examples of functions are nominal subject, direct object and so on. More formally, a dependency structure $G = (V, A)$ consists of vertices V , the set of words in a sentence, and arcs A , the head-dependent and grammatical relations (Jurafsky and James 2000; Choi and Palmer 2012). Usually dependencies are displayed as (projective) ‘parse trees’, which represent the relations between words in a recursive hierarchical structure. Dependency trees are graphs where: 1) there is a single head, with no incoming arc; 2) each vertex (apart from the head) has at least one incoming arc; 3) there is a unique path from the root node to each vertex (Jurafsky and James 2000; Goldberg and Nivre 2012).

Figure 2 shows an example of a dependency tree.¹⁰ The letters below the words represent

¹⁰This figure is taken from displaCy, a graphical interface for Spacy, the dependency parser used in this work.

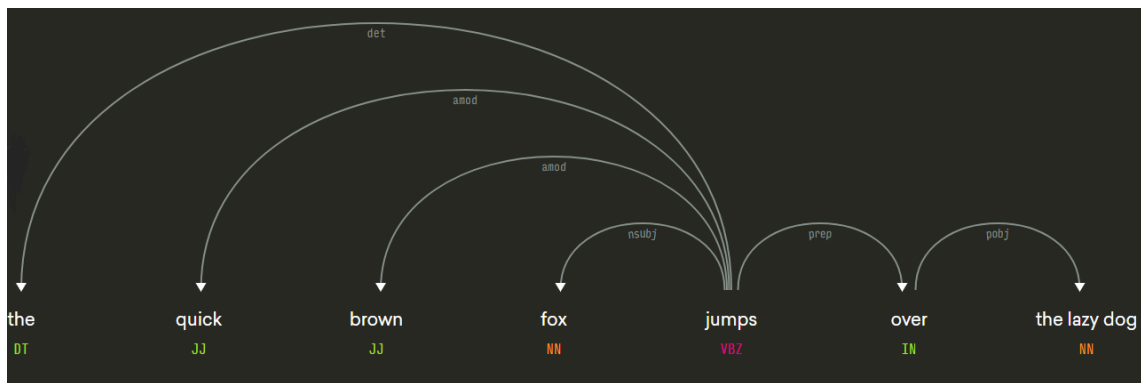


Figure 2: Dependency Parse Tree

the part of speech (POS) tags. A prerequisite of syntactic dependency parsing, indeed, is POS tagging. The latter assigns labels (‘tags’) to the tokens in a sentence according to their function, such as noun, verb and adjectives.¹¹ For instance, the article ‘the’ is tagged as determiner (DT) and ‘quick’ and ‘brown’ as adjectives (JJ). Although POS tagging provides important information on the single token, it does not say much on its own about its relations with the other tokens in a sentence: this is where dependency parsing comes into play.

The arcs above the sentence in Figure 2 represent the syntactic relations between words. First of all, the parser identifies the head of the sentence, namely the main verb, which is ‘jumps’ in this case. Then, the parser identifies the subject of the sentence, namely ‘fox’, and tells the researcher also that it is a nominal subject. Indeed, in some cases, the subject may be a clause. The subject is then associated to a determiner, ‘the’, and two adjectival modifiers, ‘quick’ and ‘brown’. These are adjectives which modify the meaning of the noun. Finally, the parser looks at the other side of the sentence and, in this case, identifies a preposition, namely ‘over’, and the object of this preposition, namely ‘the lazy dog’.¹²

One of the most common approaches to derive dependency parse trees is called transition-based (Bird, Klein and Loper 2009). This approach starts with a list of tokens as input and outputs a list of head indices, representing the edges in a dependency parse tree (Honnibal, Johnson et al. 2015). The algorithm to get the final list of head indices works through

¹¹A full list of POS tags can be found here (accessed June 2017).

¹²A full list of dependencies can be found in De Marneffe and Manning (2008).

three transition operators, applied to the list of tokens: 1) the LEFT action asserts a head-dependent relation between the top word in the ‘stack’ (the list of words yet to be processed) and the one beneath and removes the lower word from the stack; 2) the RIGHT action asserts a head-dependent relation between the second and the first word in the stack and removes the word at the top; 3) the SHIFT action removes the word from the initial list of tokens and places it into the stack (Jurafsky and James 2000; Bird, Klein and Loper 2009). Two rules apply: these operators only assert relations between the elements at the top of the stack and once an element is assigned to its head, this element is removed from the stack and the algorithm cannot ‘go back’ (Jurafsky and James 2000).¹³ At every stage, the parser consults a so called ‘oracle’, namely a set of rules for an optimal transition sequence for a sentence, which tells the parser which transition operator to perform (Jurafsky and James 2000). An oracle tells us the transition sequence that derives the correct parse tree for a given sentence (Goldberg and Nivre 2012). The way to do so is to train a classifier to predict the best transition in each configuration on a set of configuration-transition pairs, derived from a dependency treebank (Goldberg and Nivre 2012). This parsing process is concluded when all tokens in the initial list are included in a head-dependent relation.

The final stage of the process is to match the lexical and syntactic structure of the ontologies with that of the sentence in the text, to extract the number of delegations, prohibitions and so on.

5.2 Data

The dataset on legislation consists of the full text of U.S. state session laws from 1900 to 2000. We have the collection of statutes enacted by a legislature during a session, which are published annually or biennially. To ensure consistency, the dataset is built biennially. For more detail on the dataset, see Ash (2016) and Ash, Morelli and Vannoni (2017).

The pre-processing stage consists of four steps. First, we segment the texts into sentences

¹³We see below that in recent applications of this approach, the second rule is relaxed.

using punctuation, capitalization, and other sentence boundary features. Second, we tokenize sentences, namely we divide them into words (or groups of words). Third, we associate parts of speech to each token, such as noun, verb, adjective (this procedure is called tagging). Fourth, we parse the text, namely we derive the syntactic structure of sentences. In so doing, we know which groups of words go together (as ‘phrases’) and which words are the subject or object of a verb. Although several parsing methods are present, we use dependency parsing, as suggested by recent developments in NLP (Dell’Orletta, Marchi, Montemagni, Plank and Venturi 2012; Montemagni and Venturi 2013).

More specifically, we apply the Spacy parser (implemented in Python) to our dataset. Although several parsers are available, such as SyntaxNet, NLTK and CoreNLP, in this work we use Spacy, one of the most accurate and fastest parsers available today (Choi, Tetreault and Stent 2015; Honnibal, Johnson et al. 2015). Spacy uses a transition-based approach, similar to the one described above (Choi and Palmer 2012). Yet, the ‘oracle’ used by Spacy, namely the set of rules for an optimal transition sequence for a sentence, is the one in Goldberg and Nivre (2012), which is ‘dynamic’ and not ‘static’, like the one described above, for illustration purposes. Moreover, several ‘minor’ technical features make Spacy more complex than a simple transition-based parser, such as the use of an improved non-monotonic transition system, which relaxes the rules of dependency parsing and allows the parser to ‘go back’ on its decisions (Honnibal, Johnson et al. 2015). The result is a dataset which contains the number of legal provisions in the texts, with identifiers for state-year.

The main independent variable measures the introduction of a comprehensive merit system in the state bureaucracy from Ujhelyi (2014) (see Table A1). To validate our results, we also take into consideration whether the state repealed the merit system. Starting with Georgia in 1996, several states have undergone a process of decentralization of the state personnel system (McGrath 2013). The date of the repeal of the merit systems is drawn from Table 1 in McGrath (2013).

We also collected the following set of covariates for use in robustness specifications. First,

we have the date of the introduction of a legislative drafting system, drawn from different sources. See Table A8 in the Appendix for more information.¹⁴ One might be concerned that legislative output is affected by the ability of legislators to write detailed laws (Huber and Shipan 2002, 2008). Better-equipped legislators, both in terms of their own skills and in terms of the physical environment, do not need to delegate to bureaucrats. This is why we control for introduction of legislative reference systems in the state’s affected legislative output.

Second, the variable measuring divided government is the same as above and drawn from two sources: Burnham (2017) and Klarner (2003). We calculated a dummy variable where the value 1 is associated with divided government (where the two chambers and the governor are not controlled by the same party) and value 0 with the situation where a single party controls all three institutions. We need divided government as control variable due to alternative factors correlated with civil service reform (Epstein and O’Halloran 1999; Wood and Bohte 2004). It might be that as more negotiation and bargaining are needed to pass and approve legislation, legal complexity would increase. Conversely, gridlock could lead to policy inertia, with less legislation enacted. Table A9 in the Appendix shows some descriptive statistics of the variables used here.

5.3 Empirical Strategy

We test the effect of the introduction of an independent bureaucracy on our measure of legislative detailedness, which is the number of provisions extracted. We analyze 50 U.S. states from 1900 to 2000, with 18 states being treated.

The estimating equation is

$$\log(\textit{LegalProvisions}_{st}) = \alpha \textit{Merit}_{st} + \beta X_{st} + \gamma_s + \delta_t + \phi_{st} + \varepsilon_{st} \quad (3)$$

¹⁴Information for this variable is missing for 18 states, namely those states where the introduction of a legislative reference system occurred after 1935 and hence, are not recorded in the Book of States of that year (to our knowledge, no more up to date information on this aspect is available).

Where $\log(\text{LegalProvisions}_{st})$ represents the logged number of legal provisions in the statutes of the state for every biennium, Merit_{st} is the variable which measures the introduction of a comprehensive merit system, X_{st} is a vector of time-varying state characteristics, γ_s and δ_t are state and time (biennium) fixed effects and ϕ_{st} represents state-time trends.¹⁵ The equation is estimated using ordinary least squares and standard errors are clustered to allow serial correlation within state.

5.4 Results

Table 3 shows the results for the fixed-effects regression. The introduction of the civil service is statistically associated with higher levels of detail in legislation (Column 1). The regression means that introduction of the civil service is associated with a 12% percent increase in legislative detail on average.

The coefficient and standard errors are robust across specifications. First, there is no change from adding the lagged dependent variable (Column 4), which addresses the issues of long-term serial correlation in state panel data documented by Caughey, Xu and Warshaw (2017). Second, there is no change from adding controls for Divided Government (Column 2) or Divided Government interacted with Civil Service Reform (Column 3). This means that our results are not driven by the correlated changes in government structure documented in the previous section. Finally, adding a separate dummy variable for the year of the reform (Column 5) does not change the results either, meaning that the effect happens after the introduction of the merit system and not contemporaneously with it.

Figure 3 shows an event study graph. This graph shows the residuals of the logged number of provisions plotted against a small subset of bienniums, namely four bienniums before the civil service reform and four bienniums after.¹⁶ In other words, this plot shows the deviation

¹⁵Controlling for time fixed effects allow accounting for the competing explanation based on vertical delegation of powers from the federal to the state level. Indeed, it might be argued that the creation of an independent agency and more regulation co-occur when more competences are given to the states. Yet, if we assume that the delegation of competences from the federal to the state level occurs at the same time for all the states (which is usually the case), then time fixed effects control for this.

¹⁶The regression includes state and time fixed effects, state-time trends, clustered standard errors and the

Table 3: Effect of Introduction of Civil Service on Number of Provisions

VARIABLES	(1)	(2)	(3)	(4)	(5)
Introduction Civil Service	0.124** (0.0563)	0.137** (0.0632)	0.147** (0.0713)	0.149** (0.0585)	0.157** (0.0653)
Introduction of Drafting System	0.0846 (0.0796)	0.0755 (0.0816)	0.0764 (0.0813)	0.0831 (0.0757)	0.0775 (0.0813)
Divided Government		-0.0256 (0.0297)	-0.0359 (0.0312)	-0.0252 (0.0294)	-0.0255 (0.0291)
Interaction			0.0384 (0.0653)		
Lag Log Total Provisions				0.140** (0.0667)	
Reform Year					-0.158 (0.102)
Observations	1,552	1,438	1,438	1,382	1,438
R-squared	0.828	0.838	0.838	0.845	0.838
Clustered SE	YES	YES	YES	YES	YES
State FE	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES
State-Time Trends FE	YES	YES	YES	YES	YES

Standard errors clustered by state in parentheses

*** p<0.01, ** p<0.05, * p<0.1

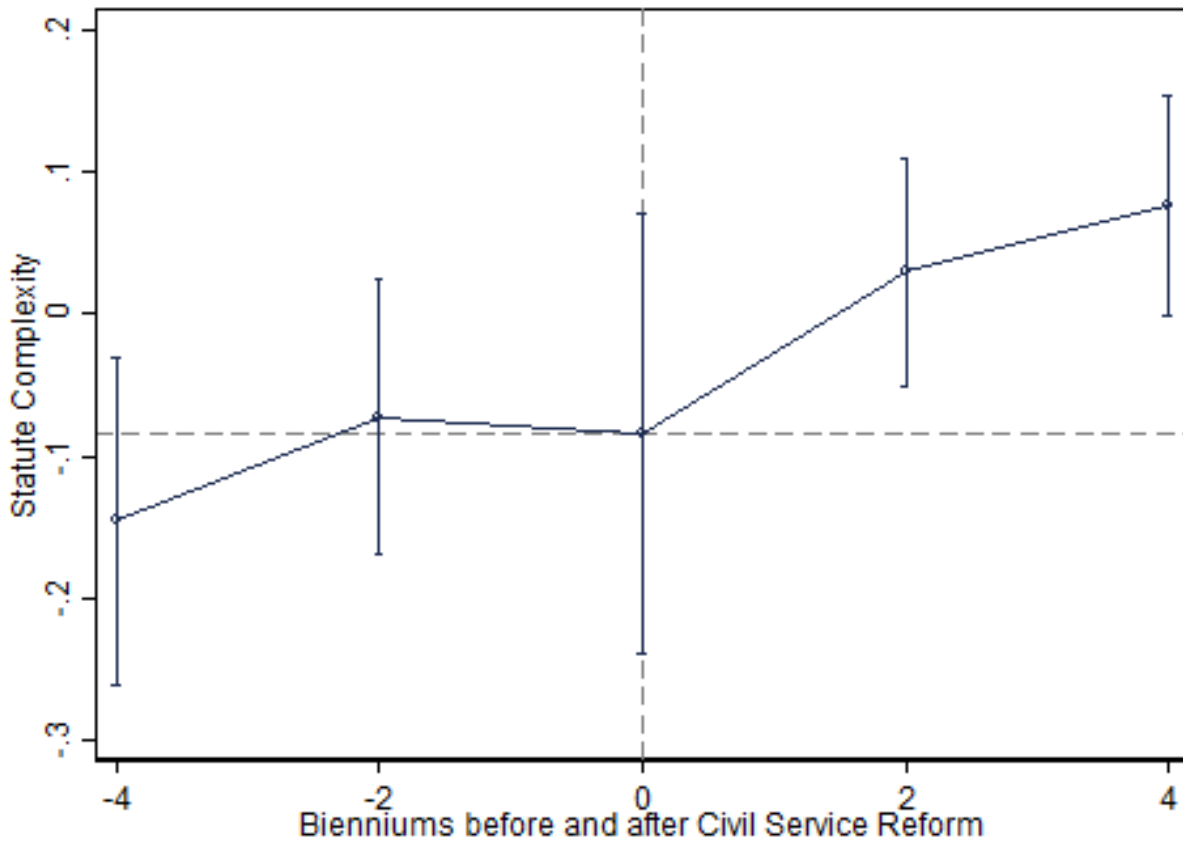


Figure 3: Event Study Graph

in provisions in the years before and after the reform, relative to the year of reform. Results suggest no evidence for pre-trends and that the effect on legislative complexity takes place at least two bienniums after the introduction of an independent bureaucracy.

These findings are consistent with the idea that after the establishment of an independent bureaucracy, legislators start writing more detailed statutes in order to micro-manage policy implementation. The reform of the civil service and the introduction of an independent bureaucracy prevent legislators from using ex post control mechanisms, such as firing bureaucrats at will. Hence, legislators start putting in place ex ante control mechanisms, such as writing detailed legislation. The alternative model, that an independent technocratic bureaucracy requires less instruction, is not supported by the data.

time-varying controls discussed above.

An additional set of model specifications and robustness checks are reported in the appendix. Table A10 in the Appendix shows the results for the regression model with different types of provisions as dependent variables. Results are robust across types, suggesting an increase in entitlements, permissions, constraints, and obligations associated with the introduction of a professional civil service. To further validate our results, we incorporate in the main independent variable the repeal of the merit system, as it occurred in 15 states from 1996. Table A11 shows the results, which are consistent with those in Table 3.

Finally, in the Appendix we run a placebo test, to see whether divided government has an effect on legislative complexity in those years where the merit system was not in place. Results in Table A12 show that in those years there is no effect of divided government on legislative complexity, providing further evidence that the introduction of an independent bureaucracy is the main mechanism linking divided government and legislative complexity.

6 Legislative Complexity and Economic Growth

The previous sections suggest that an independent bureaucracy is needed to allow the policy to follow Nature. One interpretation is that legislation follows the economy: more economic activity needs more regulation. On the other hand, one of the consequences of the delegation of powers to an independent bureaucracy is that legislators start writing more detailed statutes. Legislative complexity might have an effect on the economy as well. This final part looks at the link between legislative complexity and the economy.

6.1 Background

We add to an existing literature examining the relationship between economic performance and legislative/regulatory complexity. Public choice theory holds that excessive regulation could hinder economic growth (Niskanen 1971). On the other hand, Kirchner (2012) documents the positive relationship between government size and long-run economic development

in Australia in the post-WWII period. Does this mean that complex rules result in a complex economy, or that complex rules are a response to a complex economy? Or both? Or, more likely, there is some optimal level of regulatory complexity given the current state of the economy, and deviations from that level would hinder economic growth. But the effect of more complexity would depend on whether the current level is below or above the optimum. Therefore empirical evidence is needed.

6.2 Data

The data is by state and biennium. We gather data on the total and private gross domestic product (GDP) for every U.S. state from the early 1960s to 2010, from the Bureau of Economic Analysis Regional Accounts. We measure complexity with the (logged) number of legal provisions, discussed above. For each biennium, we take the average of the economic variables for each two-year period. Table A13 in the Appendix shows the descriptive statistics.

6.3 Empirical Analysis

As a panel data baseline, we run a linear regression of log private GDP (economic growth) on log number of legal provisions, both first-differenced by state. We include fixed effects for state and biennium (Correia 2016), with the resulting equation

$$\Delta \log(\textit{PrivateGDP}_{st}) = \alpha \Delta \log(\textit{LegalProvisions}_{st}) + \gamma_s + \delta_t + \varepsilon_{st} \quad (4)$$

where $\textit{PrivateGDP}_{st}$ is economic growth, $\textit{LegalProvisions}_{st}$ is the number of legal provisions contained in the statutes of a biennium in a state, γ_s and δ_t are state and time (biennium) fixed effects. The results from the panel data regression are informative, but descriptive. While growth in the economy and growth in complexity tend to co-occur, they could do so for many non-causal reasons.

To demonstrate a causal effect from legislative complexity to economic growth, we use an instrumental variables approach based on what is known in the economic literature as a Bartik instrument. This method was originally used to study the effect of employment on economic growth (Bartik 1994) and it is still used for this purpose (Bartik 2014). The empirical problem is that employment growth is endogenous to economic growth; that is, more economically prosperous regions tend to attract more labour. To address this problem, one can instrument local employment growth with the interaction between pre-treatment local employment shares by sector and national employment growth rates by sector (Goldsmith-Pinkham, Sorkin and Swift 2017; Borusyak and Jaravel 2017). The rationale is that current national trends in sectoral growth are orthogonal to the local sector shares pre-treatment. Bartik instruments therefore isolate changes in employment growth due to these labor demand shocks (rather than due to local supply side responses) (Greenstone, Mas and Nguyen 2014).

While the use in economic growth and employment is still the classic example, more recent applications include migration effects on labour markets (Basso and Peri 2015), imports and economic growth (Autor, Dorn and Hanson 2016), market size and drug innovation (Acemoglu and Linn 2004), small business lending and economic growth (Greenstone, Mas and Nguyen 2014), and effects of democracy on growth (Acemoglu, Naidu, Restrepo and Robinson 2015).

The challenge in our context is to obtain exogenous variation in the complexity of legislation. To do so, we conceive of the flow of legislation as analogous to the flow of economic output. The analogue to economic sectors is legislative topics. The idea is that nationwide growth in topic-specific complexity is reflected in higher complexity on that topic at the state level (instrument relevance), but the state-level pre-treatment topic shares are orthogonal to nationwide growth in legislative complexity. The most comparable approach to that used here is Ash (2016), who instruments for changes in state tax code language using the leave-one-out shocks in neighboring states.

To be more precise, assume that the generation of statute data can be described using a Latent Dirichlet Allocation (LDA) model. This algorithm assumes that every document is a distribution over topics, which in turn is a distribution over words and phrases (Blei, Ng and Jordan 2003). A document is generated by drawing a topic share, and then the words of the document are drawn from those topics. Our procedure follows recent work in political science applying topic models to political documents (Grimmer and Stewart 2013) .

First, we train LDA on our corpus with 25 and then 50 topics using the LDA implementation in python ‘gensim’. There are clearly interpretable topics for vehicle regulation, licensing, courts, project funding, childcare services, trusts and estates, employment law, taxes, land regulation, retirement regulation, etc.

Using the trained model, we assign to every statute a distribution over topics based on the words and phrases in that statute. For each state-biennium, the number of provisions by topic is computed by the sum of provisions in that state-biennium’s statutes, weighted by the topic share of each statute. This process results in a dataset with the number of provisions by topic for the legislation of a state in a biennium.

The instrument is constructed as follows. We have the legislative topic share for topic k in state s at year t , defined as L_{skt} . We construct the pre-treatment topic shares as the average topic shares for the years 1950-1960, with $M_{ks} = \sum_k L_{sk0}$ giving the pre-treatment share of legislation in state s and topic k . The instrument for complexity is the sum, by topic, of the leave-one-out average flow of legislation on that topic in other states, multiplied by this state’s pre-treatment share on that topic:

$$Z_{st} = \sum_k M_{ks} \left(\frac{\sum_{r \neq s} L_{rkt}}{49} \right) \quad (5)$$

where r indexes the other 49 states.

The first stage equation is

$$\log(\text{LegalProvisions}_{st}) = \psi Z_{st} + \gamma_s + \delta_t + \varepsilon_{st} \quad (6)$$

with the second stage given in (4). We estimate the system using GMM with standard errors clustered by state.

The exclusion restriction is that legislative growth by topic in other states is related to a state's GDP only through the nationwide factor driving changes in legislative allocations to that topic.

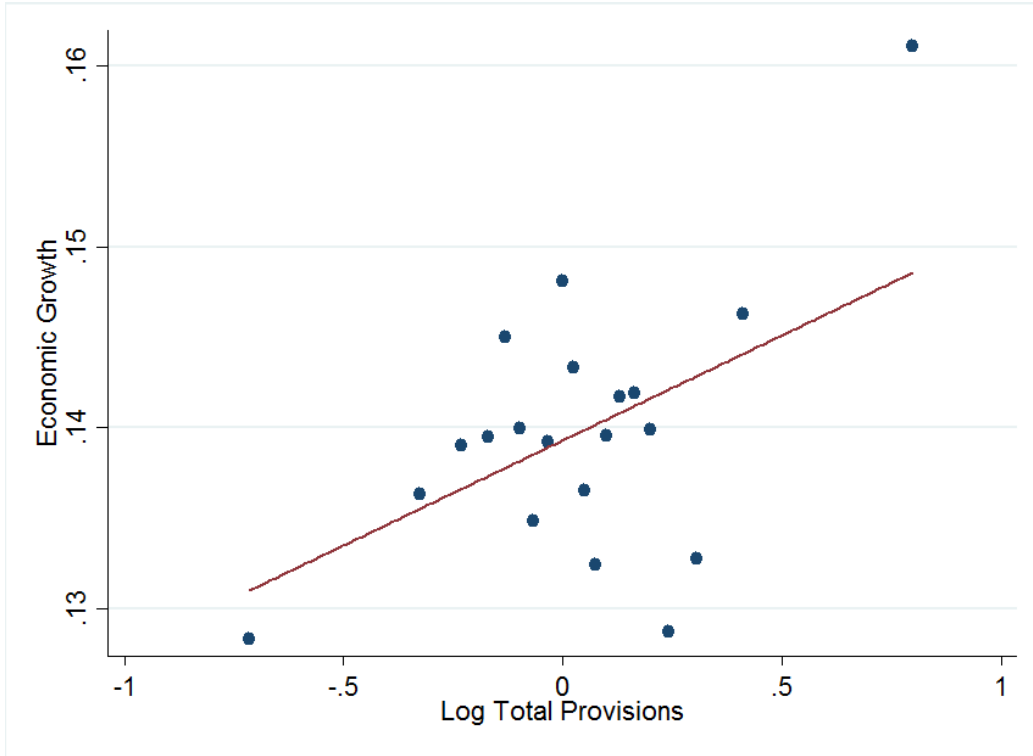
6.4 Results

As the results in Table 4 show, there is a statistically significant and positive relation between the first differenced (FD) logged provision number and economic growth. This positive relation is graphically shown in the binned scatter plot of Figure 4. Higher growth in the economy is associated with higher growth in legislation.

Table 4: The Effect of Legislative Complexity on Economic Growth

(1)	
VARIABLES	Economic Growth
FD Log Provisions	0.0116** (0.00519)
Observations	1,144
R-squared	0.524
Clustered SE	YES
State FE	YES
Time FE	YES
Standard errors clustered by state in parentheses	
*** p<0.01, ** p<0.05, * p<0.1	

Figure 4: Binned Scatterplot



This estimate is consistent with the idea that more economic activity requires more regulation.

Results in the table below suggest a statistically significant and positive relationship between the instrument and economic growth. The first column instruments the logged number of provisions with the Bartik ‘leave-one-out’ instrument (‘Bartik’), whereas the other two columns instrument the first differenced logged number of provisions with the Bartik ‘leave-one-out’ instrument (‘Bartik - FD’).¹⁷ All traditional tests for identification suggests that the model is well specified. As above, we run some checks. First, we test the relevance of the Bartik instrument, by regressing the increase in the provisions related to a topic in the state of interest on the increase in the total provisions related to that topic across states (‘topic growth’) and the increase in the legal provisions in that state, for every topic (including state and time fixed effects and clustering standard errors on states). We find

¹⁷In the Appendix in Table A14 we show the same analysis, but with 50 topics. Results do not vary significantly.

that topic growth is statistically significant in the great majority of topics. This suggests that our Bartik instrument is relevant. Second, we test for pre-trends. More specifically, we regress the logged economic growth on future values of the Bartik instruments. Results are not statistically significant, suggesting that there is no evidence of pre-trends. In conclusion, we find evidence that legislative complexity positively affects economic growth.

Table 5: Instrumental Variable Regression: Economic Growth on Legislative Complexity (25 Topics)

	(1)	(2)	(3)
VARIABLES	Bartik	Bartik - FD	Bartik FD
Log Total Provisions	0.0343*** (0.0121)	0.112* (0.0604)	0.0707*** (0.0257)
Observations	1,144	1,144	1,144
Clustered SE	YES	YES	YES
Time FE	YES	YES	YES
State FE			YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

7 Conclusion

The analysis in this paper shows that where the government is divided, it is more likely that a strong civil service reform takes place. Under united government, legislators are able to follow either Nature or ideology, whereas under divided government gridlock tend to lead to policy inertia. In this case, legislators are incentivised to delegate powers to bureaucrats. The second part of the paper looks at the consequences of such a delegation of powers. Building

on the concept of the substitutability of control mechanisms in the delegation literature, we posit that once legislators delegate authority to an independent bureaucracy they start writing more detailed legislation, in order to control bureaucrats *ex ante*. We find empirical evidence for this claim, by demonstrating that the introduction of a merit system in the civil services of US states is associated with an increase in the number of legal provisions contained in statutes.

We conclude the paper with a preliminary analysis of the link between legislative complexity and economic output. We find that more legislation boosts the economy. In the US divided government phases have helped to make bureaucracy work better, and the increase of legislation on *ex ante* controls was a necessary and efficient regulation complement. We can conclude that divided governments phases have been a positive historical factors for the long run economic well-being of the states.

Nonetheless, we anticipate that the positive relation between regulation and economic growth might be related to the time period under analysis. Indeed, we expect this relation to be negative that in the last decades, once regulation reached a critical mass. Existing research emphasises that when extra incentives to legislate come from political instability and bureaucracy is not reformed, in that case the effect on growth might change sign.

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Appendix:
Civil Service Reform and Delegation: the Causes and
the Effects of the Introduction of the Merit System
across US States

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1 Divided Government and Civil Service Reform

i Theoretical Model

i.1 Formal Statements of Proofs

Proposition 1 Proof. Under united government, 50 per cent of the times Nature will move the policy towards -1 and the L politician will follow Nature, hence the utility will be

$$U_L = -|-1 + 1| + \epsilon = \epsilon \quad (1)$$

The other 50 per cent of the times the Nature will suggest that the policy should move to 1, but politicians will still choose -1. In this case, the utility will be

$$U_L = -|-1 + 1| = 0 \quad (2)$$

The average expected utility for the L politician under united government, where decision-making is left in the hands of politicians (the subscript 'p' stands for 'politician'), will be

$$\overline{U_{Lp}} = \frac{\epsilon}{2} \quad (3)$$

If delegation to an independent bureaucracy takes place, the policy will always follows Nature. Hence, 50 per cent of the times the policy will move towards -1 and the other 50 per cent the policy will move to 1. As a result, the L politician's utility will be respectively

$$U_L = -|-1 + 1| + \epsilon = \epsilon \quad (4)$$

$$U_L = -|1 + 1| + \epsilon = \epsilon - 2 \quad (5)$$

The average expected utility of the L politician under united government, where decision-

making is delegated to independent bureaucrats (the subscript ‘b’ stands for ‘bureaucrat’), will be

$$\overline{U_{Lb}} = \frac{(\epsilon + \epsilon - 2)}{2} = \epsilon - 1 \quad (6)$$

In conclusion, delegation will take place if the average expected utility of the L politician where decision-making is delegated to bureaucrats is higher than that where decision-making is in the hands of politicians, namely

$$\overline{U_{Lb}} > \overline{U_{Lp}} \quad (7)$$

$$\epsilon - 1 > \frac{\epsilon}{2} \quad (8)$$

$$\epsilon > 2 \quad (9)$$

Proposition 2 Proof. Under divided government, gridlocks will prevent legislators from following the state of the Nature and the policy will remain at 0. So the average expected utility for the L politician under divided government, where decision-making is left to politicians, is

$$\overline{U_{Lp}} = -|+1| = -1 \quad (10)$$

If delegation takes place, 50 per cent of the times the policy will move to 1 and the others to -1. Hence, the utility for the L politician will be respectively

$$U_L = -|1 + 1| + \epsilon = \epsilon - 2 \quad (11)$$

$$U_L = -|-1 + 1| + \epsilon = \epsilon \quad (12)$$

Hence, the average expected utility for the L politician under divided government, where decision-making is delegated is

$$\overline{U_{Lb}} = \frac{(\epsilon + \epsilon - 2)}{2} = \epsilon - 1 \quad (13)$$

In conclusion, delegation will take place if

$$\overline{U_{Lb}} > \overline{U_{Lp}} \quad (14)$$

$$\epsilon - 1 > -1 \quad (15)$$

$$\epsilon > 0 \quad (16)$$

i.2 Lemma

In this lemma of the theoretical model, we consider the scenario where the L legislator can choose not to move the policy and hence x can also take value 0. Under united government, where decision-making is left in the hands of politicians, if the Nature suggests to move the policy towards the L legislator's position, namely -1, her utility will be ϵ . If the Nature points towards the opposite direction, the legislators can either move the policy to -1 and hence her utility will be 0, as above, or she can leave the policy at 0 and her utility will be -1. In this case, the legislator will always choose to move the policy to -1, being her expected utility higher in this case. The intuition behind this finding is simple. In either cases the L legislator does not follow the Nature, but by moving the policy to -1, she at least gains by following ideology. In conclusion, even if we can relax the assumption of the model in the

main text, results will not change.

In more formal terms, where Nature suggests the policy must move towards 1, if the L legislator moves the policy to -1, her utility will be

$$U_L = -|-1 + 1| = 0 \tag{17}$$

Conversely, if the legislator chooses to leave the policy at 0, her utility will be

$$U_L = -|1| = -1 \tag{18}$$

ii Dates of Adoption of Merit Systems

Table A1 below shows the dates of the adoption of the merit systems across US states. We rely on two main secondary sources, namely Ujhelyi (2014) and Ting, Snyder, Hirano and Folke (2013). Where the dates are the same in these two sources, no further research is carried out. Where these two dates differ, we look for further secondary and primary sources. In some cases, no sources were available and hence we relied on Ujhelyi (2014) ‘as default’. In those cases where we find that primary sources contradict his findings, we specify it in the Notes column.

Table A1: Dates of Adoption of Merit Systems

State	Introduction Merit System			Notes
	Ujhelyi (2014)	Ting et al. (2013)	This Paper	
AK	1960	1960	1960	Same
AL	1939	1939	1939	Same
AR	1969	1968	1969	Ujhelyi (2014) as default
AZ	1968	1968	1968	Same
CA	1913	1913	1913	Same
CO	1919	1918	1918	Colorado Constitution amended in 1918
CT	1937	1937	1937	Same
DE	1968	1966	1966	Law enacting merit system passed in 1966
FL	1967	1968	1967	Florida statute enacted in 1967
GA	1945	1953	1945	Georgia constitution amended in 1945
HI	1955	1955	1955	Same
IA	1967	1966	1966	Iowa Code enacted in 1966
ID	1967	1969	1967	Ujhelyi (2014) as default
IL	1905	1905	1905	Same
IN	1941	1941	1941	Same
KS	1941	1941	1941	Same
KY	1960	1954	1960	Law passed in 1960
LA	1952	1940	1952	Ujhelyi (2014) as default
MA	1885	1885	1885	Same
MD	1921	1921	1921	Same
ME	1937	1937	1937	Same
MI	1941	1937	1940	Ujhelyi (2014) as default
MN	1939	1939	1939	Same
MO	1945	1946	1945	Constitution amended in 1945
MS	1977	1976	1976	Code enacting merit system adopted in 1976
MT	1976	1976	1976	Same
NC	1949	1949	1949	Same
ND	1975	1974	1975	Ujhelyi (2014) as default
NE	1975	1974	1975	Ujhelyi (2014) as default
NH	1950	1954	1950	Ujhelyi (2014) as default
NJ	1908	1908	1908	Same
NM	1961	1962	1961	Ujhelyi (2014) as default
NV	1953	1953	1953	Same
NY	1883	1883	1883	Same
OH	1913	1913	1913	Same
OK	1959	1958	1959	Merit system adopted in 1959
OR	1945	1945	1945	Same
PA	1963	1968	1963	Ujhelyi (2014) as default
RI	1939	1939	1939	Same
SC	1969	1973	1969	Ujhelyi (2014) as default
SD	1973	1968	1973	Ujhelyi (2014) as default
TN	1937	1937	1937	Same
TX				
UT	1963	1962	1963	Ujhelyi (2014) as default
VA	1943	1942	1943	Ujhelyi (2014) as default
VT	1950	1950	1950	Same
WA	1961	1961	1961	Same
WI	1905	1905	1905	Same
WV	1989	1989	1989	Same
WY	1957	1956	1957	Personnel Act adopted in 1957

iii Descriptive Statistics

Table A2: Descriptive Statistics

	Civil Service Reform	IPE	IPE	Divided Government Veto	Divided Government	Tax and Budget	Citizen Ideology	Percent Urban	Income	Income2	Full-time Employment
mean	1.330978	.4546525	.3447905	.3609023	.4319822	.6591878	10.67549	117.5313	10.46766		
sd	.6850796	.4982329	.4755554	.4805204	.1748118	.1429231	1.88923	40.41443	.8456217		
min	0	0	0	0	.0096254	.3212924	5.297487	28.06337	8.434464		
max	2	1	1	1	.8687366	.9170051	15.79997	249.6389	12.39937		

iv Robustness Checks

Table A3: Divided Government Tax and Budget and Civil Service Reform

	(1)	(2)	(3)	(4)
VARIABLES	Model 1	Model 2	Model 3	Model 4
Divided Government Tax and Budget	0.0860*	0.0804*	0.0789*	0.0788
	(0.0474)	(0.0457)	(0.0467)	(0.0469)
Citizen Ideology		0.626**	0.650**	0.644**
		(0.257)	(0.253)	(0.257)
Percent Urban		4.091	2.609	2.433
		(8.223)	(7.994)	(8.012)
Income			0.657	0.649
			(0.430)	(0.430)
Income2			-0.0271	-0.0269
			(0.0172)	(0.0172)
Full-time Employment				0.187
				(0.391)
Constant	-34.53***	-36.63	-18.51	-18.96
	(4.101)	(24.98)	(33.91)	(33.36)
Observations	830	830	830	830
R-squared	0.836	0.838	0.842	0.842
Clustered SE	YES	YES	YES	YES
State FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES
State-Time Trends FE	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A4: Divided Government Veto and Civil Service Reform - Ordered Logit

	(1)	(2)	(3)	(4)
VARIABLES	Model 1	Model 2	Model 3	Model 4
Divided Government Veto	0.811*** (0.265)	0.446 (0.319)	0.546* (0.286)	0.495* (0.275)
Citizen Ideology		-1.091 (1.517)	-0.525 (1.630)	-0.524 (1.548)
Percent Urban		1.932 (1.997)	3.995 (2.517)	5.222* (2.826)
Income			1.182 (1.004)	1.154 (0.981)
Income2			-0.0683 (0.0442)	-0.0688 (0.0430)
Full-time Employment				-0.325 (0.305)
Constant cut1	-20.03*** (1.346)	-0.473 (1.395)	6.075 (5.455)	3.252 (5.974)
Constant cut2	-15.57*** (1.075)	1.798 (1.310)	8.425 (5.455)	5.616 (5.978)
Observations	830	830	830	830
Clustered SE	YES	YES	YES	YES
State FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A5: Divided Government Tax and Budget and Civil Service Reform - Ordered Logit

	(1)	(2)	(3)	(4)
VARIABLES	Model 1	Model 2	Model 3	Model 4
Divided Government Tax and Budget	0.848*** (0.271)	0.441 (0.316)	0.540* (0.283)	0.501* (0.273)
Citizen Ideology		-1.098 (1.514)	-0.539 (1.632)	-0.537 (1.552)
Percent Urban		1.865 (2.007)	3.900 (2.503)	5.170* (2.824)
Income			1.189 (1.009)	1.155 (0.986)
Income2			-0.0685 (0.0443)	-0.0689 (0.0432)
Full-time Employment				-0.332 (0.306)
Constant cut1	-22.87*** (5.920)	-0.501 (1.395)	6.073 (5.488)	3.172 (6.016)
Constant cut2	-18.40*** (4.809)	1.770 (1.309)	8.423 (5.487)	5.537 (6.018)
Observations	830	830	830	830
Clustered SE	YES	YES	YES	YES
State FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A6: Divided Government Veto and IPE - Logit

	(1)	(2)	(3)	(4)
VARIABLES	Model 1	Model 2	Model 3	Model 4
Divided Government Veto	1.024*** (0.389)	1.137*** (0.411)	1.157*** (0.407)	1.158*** (0.409)
Citizen Ideology		10.38*** (3.745)	10.32*** (3.581)	10.31*** (3.566)
Percent Urban		13.88 (26.17)	20.83 (26.99)	21.71 (29.43)
Income			-1.763 (2.355)	-1.729 (2.233)
Income2			0.0881 (0.103)	0.0866 (0.0985)
Full-time Employment				-0.308 (5.734)
Constant	-4.205*** (0.800)	-15.89 (15.87)	-12.37 (17.42)	-10.47 (44.64)
Observations	436	436	436	436
Clustered SE	YES	YES	YES	YES
State FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

2 Delegation and the Level of Detail of Legislation

i Information Extraction

Table A7 shows the syntactic structure of the provisions analysed in this work, written in Python-like programming language. An obligation is characterised by three structures, all positive: either a strict modal followed by an (active) verb, or a strict modal followed by a obligation verb, or a obligation verb without strict modal. Examples are respectively: ‘The Agent shall act’, ‘The Agent shall be required to’ and ‘The Agent is expected to’. Constraints are characterised by a negative structure with either a modal, or a permission verb, or a positive structure with a strict modal and a constraint verb. Examples are: ‘The Agent shall not’, ‘The Agent is not allowed’ and ‘The Agent shall be prohibited to’. Permissions are characterised by a positive structure with either a permission verb or a permissive modal with no special verb (a non-special verb is any verb which does not fall into the categories in Table .. in the main body), or a negative structure with a constraint verb. Examples are: ‘The Agent is allowed to’, ‘The Agent may act’ and ‘The Agent is not prohibited to’. Finally, entitlements are characterised by a positive structure with either an entitlement verb or a strict modal and a (passive) verb, or a negative structure with a obligation verb. Examples are: ‘The Agent retains the power to’, ‘The Agent shall be considered’ and ‘The Agent is not compelled to’.

Table A7: Code for Provision Syntactic Structure

Obligation	not item['neg'] and item['strict_modal'] and item['active_verb']
	not item['neg'] and item['strict_modal'] and item['obligation_verb']
	not item['neg'] and not item['md'] and item['obligation_verb']
Constraint	item['neg'] and item['md'] and not item['obligation_verb']
	not item['neg'] and item['strict_modal'] and item['constraint_verb'] item['neg'] and item['permission_verb']
Permission	not item['neg'] and item['permission_verb']
	not item['neg'] and item['permissive_modal'] and not item['special_verb'] item['neg'] and item['constraint_verb']
Entitlement	not item['neg'] and item['entitlement_verb']
	not item['neg'] and item['strict_modal'] and item['passive'] item['neg'] and item['obligation_verb']

ii Introduction of Reference and Drafting System

Table A8 shows the year of the introduction of a reference and drafting system in the US states. We consider the date of introduction of a separate office purposefully in charge of providing legislators help with the searching, storing and drafting of bills. Before the establishment of such an office, these functions were usually performed to a certain degree by the state librarians and/or the attorney general. Where information on the drafting system is not available (for 25 states), we take into consideration the introduction of a reference system (missing for 18 states). In most cases, the introduction of a reference system precedes the introduction of a drafting system or they occur together. Information is gathered from the following sources: Book of States 1935 Chapter 2, Rothstein (1990) and Squire (2012). In those cases where information is not straightforward we add a note. As mentioned in the main text, this information is present only for those states which established these services before 1935. To our knowledge, after that date no information is present.

Table A8: Dates of Introduction of Reference and Drafting System

State	Legislative Reference	Legislative Drafting	Note
AK			
AL	1907	1907	The office was established in 1901, but was given the function of legislative reference functions in 1907
AR	1917		Legislative drafting is done by the attorney general
AZ	1917	1917	The library was established in 1915, but the legislative reference bureau was introduced by an act in 1917
CA	1904	1913	The legislative reference office of the state library was created in 1904
CO	1931	1931	An earlier and unofficial reference and drafting service was in place from 1913 to 1917. The office currently in charge was created in 1927, but started working in 1931
CT	1907	1901	A law in 1882 established an office where all bills must be reviewed after passing the houses, but this office was given drafting duties only in 1901. Legislative reference work is done by a specific office of the state library
DE			No permanent legislative reference service is present. Two attorneys work as bill drafters
FL			No full time staff devoted to legislative reference or drafting is present
GA	1914	1929	
HI			
IA	1911	1911	The office was established in 1908, but given formal duties in 1911
ID			
IL	1913	1913	
IN	1907	1907	The office was created in 1906, but it started to operate in 1907
KS	1929	1929	
KY			
LA	1921		The legislative reference bureau was created before the 1920s, but was given formal powers only 1921. Legislative drafting is done by the attorney general office
MA	1910	1920	Before 1910 the state library provided reference services. Before 1920 legislative drafting was done by the rules committees of the two branches of the legislature

Table A8: Dates of Introduction of Reference and Drafting System - Continued

State	Legislative Reference	Legislative Drafting	Note
MD	1916	1916	The office was established in 1906 as an administrative unit in the city of Baltimore, but in 1916 was given the duty to assist state legislators
ME	1917		
MI	1907	1917	The legislative reference department was established in 1907 and given bill drafting duties in 1917
MN			Partial services are provided by different offices
MO			
MS			Many duties are performed by the librarian
MT	1909		Bill drafting is carried out by attorney general
NC	1915	1915	
ND	1909	1909	
NE	1911	1911	Since 1907 legislative reference services were provided by the State Historical Society. A 1911 act created the bureau
NH	1913	1913	
NJ	1914		Bill drafting is done by the attorney general office
NM	1921		
NV			A voluntary bureau was organized by the Nevada Bar Association in 1914
NY	1890	1909	From 1893 to 1900 an informal committee in charge of drafting and revising bills was in place, but was little used
OH	1913	1913	The legislative reference department was created as part of the state library in 1910, but in 1913 it was set up as a separate bureau
OK			
OR			Reference and drafting duties are carried out by the state librarian
PA	1909	1909	
RI	1907	1926	From 1907 to 1926 the state librarian was in charge of bill drafting
SC			State solicitors and the attorney general provide legislators with help in legislative reference and drafting
SD	1907	1907	
TN			
TX	1909		Legislative drafting is done by attorney general
UT			
VA	1914	1914	
VT	1911	1912	
WA			
WI	1901	1901	
WV			
WY			Attorneys draft bill and no legislative reference service is present

iii Descriptive Statistics

Table A9: Descriptive Statistics

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Divided Government	2,311	0.370	0.483	0	1
Introduction Civil Service	2,499	0.520	0.500	0	1
Introduction and Repeal Civil Service	2,550	0.506	0.500	0	1
Introduction of Drafting System	1,632	0.848	0.359	0	1
Log Obligations	2,497	8.355	0.913	3.219	11.09
Log Permissions	2,497	7.542	0.984	2.485	10.32
Log Constraints	2,497	6.228	1.047	1.609	9.421
Log Entitlements	2,497	7.980	0.940	2.833	10.69
Log Provisions	2,497	9.173	0.935	4.094	11.93

iv Robustness Checks

Table A10: The Effect of the Introduction of Civil Service on Number of Obligations, Permissions, Constraints and Entitlements

VARIABLES	(1) Log Obligation	(2) Log Permission	(3) Log Constraint	(4) Log Entitlement
Introduction Civil Service	0.134* (0.0720)	0.145** (0.0562)	0.0899 (0.0701)	0.132** (0.0619)
Divided Government	-0.0231 (0.0303)	-0.0324 (0.0307)	-0.0183 (0.0280)	-0.0248 (0.0306)
Introduction of Drafting System	0.0765 (0.0838)	0.112 (0.0802)	0.0779 (0.0835)	0.0459 (0.0826)
Constant	-5.055*** (0.975)	4.589*** (1.008)	-8.658*** (1.229)	-6.185*** (0.932)
Observations	1,438	1,438	1,438	1,438
R-squared	0.827	0.840	0.868	0.836
Clustered SE	YES	YES	YES	YES
State FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES
State-Time Trends FE	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A11: The Effect of the Introduction and Repeal of the Civil Service on the Number of Provisions

VARIABLES	(1) Log Total Provisions	(2) Log Total Provisions
Introduction and Repeal Civil Service	0.120** (0.0536)	0.131** (0.0595)
Introduction of Drafting System	0.0905 (0.0772)	0.0820 (0.0792)
Divided Government		-0.0255 (0.0288)
Constant	-1.188 (0.884)	-2.303** (0.892)
Observations	1,601	1,485
R-squared	0.829	0.838
Clustered SE	YES	YES
State FE	YES	YES
Time FE	YES	YES
State-Time Trends FE	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

3 Legislative Complexity and the Economy

i Descriptive Statistics

Table A12: Descriptive Statistics

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
Log Private GDP	1,200	10.54	1.466	6.581	14.36
Log Total GDP	1,200	10.69	1.452	6.948	14.49

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