

# From Weber to Kafka: Political Activism and the Emergence of an Inefficient Bureaucracy

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October 13, 2015

## Abstract

A well functioning bureaucracy can promote prosperity, as advocated by Max Weber. But when bureaucracy gets jammed, it causes stagnation, as described by Franz Kafka. We propose a dynamic theory of the interaction between the production of laws and the efficiency of bureaucracy. When bureaucracy is inefficient the effects of politicians legislative acts are hard to assess. Therefore, incompetent politicians have strong incentives to pass laws to acquire the reputation of skill-full reformers. But too many, often contradictory reforms can in turn lead to a collapse in bureaucratic efficiency. This interaction leads to the existence of both Weberian and Kafkian steady states. A temporary surge in political instability, a strong pressure for reforms by the public, and the appointment of short-lived technocratic governments can determine a permanent shift towards the Kafkian nightmare steady state. Using micro-data for Italy, we provide evidence consistent with one key prediction of the theory: the relative supply of laws by incompetent politicians increases when legislatures are expected to be short.

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# 1 Introduction

*Corruptissima re publica plurimae leges*  
[When the republic is at its most corrupt the laws are most numerous]  
Cornelius Tacitus, *Annals*, Book III, 27

The term “bureaucracy” typically refers to the body of non-elective government officials providing services to individuals and firms, like regulation and certification, as well as enforcing and implementing laws. Max Weber (1922) argued that a well-functioning bureaucracy reduces organization and transaction costs in the economy, guarantees order, maximizes efficiency and eliminates favoritism.<sup>1</sup> But the Weberian view is by no means pervasive. In fact, bureaucracy is often associated with Franz Kafka’s description of the Habsburg Monarchy administration at the beginning of the 20th century, characterized by a disorienting and often menacing complexity, ultimately leading to the kingdom’s stagnation.<sup>2</sup> In practice, the nature of bureaucracy can change over time. In the 19th century, the bureaucracy of the Habsburg Monarchy was perceived as a model of bureaucratic efficiency (Becker, Boeckh, Hainz and Woessmann, 2015). Yet, by Kafka’s time, the Habsburg bureaucracy had collapsed: the payment of a simple tax in Wien required the contribution of 27 public officials; the cost of collecting taxes in Dalmacia exceeded tax revenue (MacMillan, 2013). Bureaucrats actions, as Kafka’s novel hints, had become disconnected from reality, hard to predict, even absurd. What can cause a transition from the Weberian dream to the Kafkian nightmare? And once occurred, is a transition difficult to revert? We argue that the answers to these questions are at least partly related to the connection between bureaucratic efficiency and the legislative activism of politicians. When bureaucracy is inefficient, laws are implemented slowly and their quality is hard to learn. Thus, politicians, especially the least competent ones, have strong incentives to try acquire the reputation of skill-full reformers by passing laws that the inefficient bureaucracy will implement slowly, if at all. Too many and often contradictory reforms can in turn lead to the collapse of a country’s bureaucracy. Thus, an inefficient bureaucracy increases political activism and too much political activism makes bureaucracy inefficient. This naturally leads to the existence of both Weberian and Kafkian steady states which arise and persist over time due to the accidents of history.

We model bureaucracy as a technology which provides services to the public by implementing the reforms initiated by politicians. This technology exhibits decreasing re-

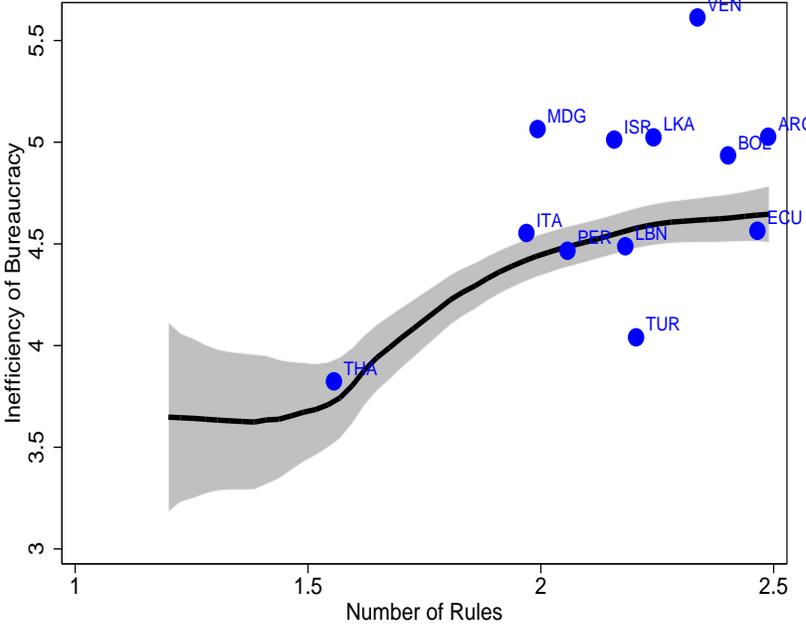
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<sup>1</sup>To be fair Max Weber was well aware that an excessive bureaucratization of human life can trap individuals in an “iron cage” of rule-based, rational control, but his overall evaluation of bureaucracy remained one of necessity and efficiency.

<sup>2</sup>This characterization is contained in his two unfinished novel “Der Process” (the Trial), published in 1925 and “Das Schloss” (the Castle), published in 1926.

turns: the larger the stock of reforms from the past, the more difficult for the bureaucracy to complete the reforms supplied by the politicians. The idea is that the accumulation of laws and regulations (often on the same specific issue) mechanically *demand*s more and more difficult bureaucratic tasks in terms of implementation, interpretation or enforcement, slowing down the bureaucracy’s delivery of services and opening spaces for biased decisions and abuses. Figure 1 provides some support for this intuitive relation: countries with a greater number of laws and regulations tends to also have a more inefficient bureaucracy. The focus of the model is on a novel *supply-side* feedback mechanism: whenever bureaucracy is more inefficient, politicians—and especially so the least competent ones—tend to supply more laws or reforms.

**Figure 1: Number of Rules and Bureaucratic efficiency**



*Notes* The number of regulations is measured by the average number of procedures needed to start businesses, to register property, to get electricity, and to obtain a construction permit in the country. The level of inefficiency—or power—of bureaucracy is measured by the time (in days) bureaucracy takes to provide these services. Both data are from 2012 and they come from the Doing Business Dataset by the World Bank. Area in grey corresponds to 90 percent confidence interval. Political instability is measured by the number of Major Government Crises (domestic4) per year over the period 1980-2006. Government crises are defined as any rapidly developing situation that threatens to bring the downfall of the present regime, excluding situations of revolt aimed at such overthrow. The data come from the Cross-National Time-Series (CNTS) data archive 2014. The dots in the plot correspond to the countries in the top quartile of the distribution of political instability in the sample.

We model this supply side mechanism by assuming that in every legislative term,

politicians in office can start a reform, but only competent ones can come up with useful reforms. Competence is private information, and can be fully revealed only if the reform is completed by the bureaucracy by the end of the term. If instead a reform remains uncompleted, the public can only observe that the politician has started it. At the end of the term, the public revises its beliefs about the politician's competence by using Bayesian updating. All politicians care about their competence reputation either because it determines career opportunities outside politics (see e.g. Mattozzi and Merlo, 2008) or simply because they want to be reelected.<sup>3</sup> In equilibrium, competent politicians never start bad reforms. Instead, incompetent politicians face a trade-off: starting a bad reform that remains uncompleted by the end of the mandate signals competence, while if the reform is completed, it reveals the incompetence of the politician. The first effect becomes more important when competent politicians are more likely to start reforms themselves, the second less important when bureaucracy is more inefficient. Therefore incompetent politicians are more active when a greater need for reforms also increases competent politicians activism and when the bureaucracy is more inefficient. Moreover, the equilibrium frequency of bad reforms decreases with the expected length of the legislature, which is a proxy for the degree of political stability.

The preliminary evidence in Figure 1 suggests that this mechanism might help explaining some cross-country variation in the efficiency of bureaucracy. The figure indicates that the countries with the highest degree of political instability (top quartile) tend to be characterized by a greater number of laws and regulations as well as by a highly inefficient bureaucracy. Clearly this cross-country evidence, while suggestive and consistent with our supply-side mechanism, is by no means evidence of it. To test the model we use data on Italy and look for evidence for one key implication of our theory: that incompetent politicians should become relatively more active than good politicians, when the legislature is anticipated to be shorter. Italy provides an ideal laboratory to test this implication. First, we can gauge an objective measure of politicians quality by observing members of parliament market earnings before and after term. Due to institutional features, over our sample this measure was not easily available to the public to gauge politicians quality. Second, of the seven legislatures covered by our sample, three ended after two years, much before the natural term of 5-years. Importantly, legislature duration is triggered by the margin of Senate seats in excess of the quorum on which the governing coalition can count: the margin is random (a result of the election) but once

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<sup>3</sup>For analytical convenience, we conduct all the infinite horizon dynamic analysis under the former assumption, and then show that the results are robust to the latter pure reelection incentive assumption in a two-period model.

realized it allows to predict well legislation duration. Relative to high quality politicians, in a shorter legislature low quality politicians present 1.2 more bills—which represents a 18% increase over an average number of bills per capita per legislature of 6.7— and promote 30% more laws than average. These results support the key implication of the model that expected shorter legislatures strengthen low quality politicians incentives to produce (possibly harmful) legislation. An effect that can set up a pernicious dynamics that pushes the economy from the Weberian to the Kafkian equilibrium.

In the theoretical analysis, we provide conditions for the existence of a Weberian steady state—with efficient bureaucracy and low incentives to propose useless reforms—and of a Kafkian steady state—with high frequency of useless reforms and highly inefficient bureaucracy. We also provide conditions for the co-existence of the two steady states and characterize how temporary shocks can trigger a permanent drift towards a Kafkian steady state. Temporary increases in the need for reforms (such as economic crises), temporary surges in political instability, and even the temporary appointment of a technocratic government meant to institute useful reforms, can all lead the economy to a Kafkian steady state. In all three cases, too many temporary reforms (bad reforms in the first two cases, but also good ones in the third) suddenly increase the stock of reforms the bureaucracy is asked to handle. In turn, this initial shock can raise the frequency of bad reforms thereafter, through the supply-side mechanism described above, paving the way to a Kafkian future.

In our baseline model, an excessive promulgation of laws leads to a fall in production just because it increases bureaucracy workload. This mechanic effect can be reinforced through other mechanisms. For example, we show that if we endogenize the supply of bureaucrats and politicians, we uncover a sort of *Gresham's law* of bureaucracy, whereby “bad bureaucracy drives out good politicians”. A drop in the efficiency of bureaucracy lowers the relative supply of competent politicians, because it reduces their expected reputation gain from office. Moreover, it is conceivable that politicians incentives to reform an inefficient bureaucracy vanish when the quality of politicians in power deteriorates below a critical level, because low quality politicians are those who benefit the most from the status quo. This can condemn the country to a secularly inefficient polity.

The claim that a more inefficient bureaucracy can lead to a multiplication of laws is consistent with our initial quotation. Tacitus' conviction was that when bureaucracy is inefficient and corrupt the legislators have stronger incentives to pass laws to fight political enemies, protect vested interests or appropriate rents in the economy. Our mechanism is different and more likely to be relevant in advanced modern democracies, as suggested by our evidence for Italy. In our model an efficient bureaucracy provides an effective

monitoring technology to evaluate politicians' *acts* (laws produced) on the basis of *facts* (consequences of the laws). But when bureaucracy is inefficient, facts are harder to observe and low quality politicians have strong incentives to try build up their reputation by passing acts that deliver no facts.

Section 2 describes the economy. Section 3 solves the problem of politicians in power. Section 4 analyzes the possible multiple steady state equilibria of the model. Section 5 shows that transitory shocks can cause permanent shifts to a Kafkian steady-state and that reverting the shift is difficult, especially when the quality supply of politicians and bureaucrats is made endogeneous. Section 6 contains the empirical analysis on Italian MPs data over the 1987-2008 period. Section 7 concludes and discusses the relation to the literature. The Appendix contains some proofs, our re-election extension, and more details on data.

## 2 Model

**The economy** Time is continuous and indexed by  $\tau \geq 0$ . There is a representative household with zero discount rate that has instant utility given by aggregate income

$$A\tilde{k}_\tau \tag{1}$$

where  $A > 0$  and  $\tilde{k}_\tau > 0$  is the time- $\tau$  stock of (public) *capital*. Our analysis focuses on the joint production of capital by politics and bureaucracy.

**Politics and bureaucracy** Time is divided in *legislatures* of length  $\ell \geq \underline{\ell} > 0$ . Each legislature  $t = 1, 2, \dots$  begins at time  $\tau_t \equiv (t - 1)\ell$  and is run by a unit mass of politicians, indexed by  $i \in [0, 1]$ .<sup>4</sup> Each politician remains in power for one legislature. In Appendix B we consider a two-period extension where politicians can be reelected. We refer to politician  $i$  in legislature  $t$  as *politician  $it$* .

Politician  $it$  has competence  $\theta_{it} \in \{0, 1\}$  and is endowed with a reform of quality  $\omega_{it} \in \{0, 1\}$ . Both the politician  $it$ 's competence and the quality of her reform are her private information. We say that politician  $it$  is *competent* if  $\theta_{it} = 1$  and *incompetent* otherwise; her reform is *good* if  $\omega_{it} = 1$  and *bad* otherwise. Each politician  $it$  is competent with identical probability  $\pi \equiv \Pr(\theta_{it} = 1) \in (0, 1)$  and her reform is good with probability  $p\theta_{it}$ , with  $p \equiv \Pr(\omega_{it} = 1 \mid \theta_{it} = 1) \in (0, 1)$ . Notice that only competent ministers can be endowed with a good reform. We interpret  $p$  as measuring the economy's *need for reforms*. At the

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<sup>4</sup>Assuming a continuum of politicians guarantees deterministic aggregate dynamics.

start of legislature  $t$ , and after observing her competence  $\theta_{it}$  and the quality of her reform  $\omega_{it}$ , politician  $it$  chooses whether to *start* the reform she is endowed with.<sup>5</sup>

Once a reform has been started, it is completed by the bureaucracy at Poisson arrival rate

$$\alpha_t \equiv \alpha(h_t), \text{ for all } \tau \in [\tau_t, \tau_{t+1})$$

where  $h_t$  is the stock of uncompleted reforms inherited from previous legislatures and  $\alpha : \mathbb{R}_+ \rightarrow \mathbb{R}_+$  is non-increasing, which means that a larger stock of reforms from the past makes it more difficult for the bureaucracy to complete the reforms started by politicians. We interpret  $\alpha_t$  as the level of *bureaucratic efficiency* in legislature  $t$ .

Once completed, reforms can produce capital. The quantity of public capital produced by a completed reform depends both on its quality and on the time passed from the end of the legislature in which it was started: a reform started by politician  $it$  and completed at time  $\tau$  yields an expected amount of capital equal to

$$\begin{cases} q\omega_{it} & \text{for all } \tau \in [\tau_t, \tau_{t+1}); \\ q\omega_{it}e^{-\nu(\tau-\tau_{t+1})} & \text{for all } \tau \geq \tau_{t+1}. \end{cases}$$

Notice that bad reforms,  $\omega_{it} = 0$ , produce no capital, even when completed. A good reform,  $\omega_{it} = 1$ , yields up to  $q$  additional units of capital, when completed. The process of depreciation of capital is as follows: competent politicians maintain their good reforms up-to-date during their mandate by adapting it to the changing economic environment; thereafter, good (either completed or uncompleted) reforms become obsolete and useless at Poisson arrival rate  $\nu > 0$ . So  $e^{-\nu(\tau-\tau_{t+1})}$  is the probability that a good reform has not depreciated by time  $\tau \geq \tau_{t+1}$ .<sup>6</sup>

At the end of each legislature  $t$  and for each politician  $it$ , the public observes (i) whether politician  $it$  has started a reform, (ii) whether her reform has been completed, and (iii), if completed, the amount of capital the reform has produced. This means that there are four possible events that might occur by the end of the legislature:

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<sup>5</sup>Our model assumes that reforms must be started at the beginning of the legislature and that a politician with a good reform cannot start a bad reform. Both assumptions are without loss of generality given our standard equilibrium refinement. See Appendix A. That is, in any equilibrium of the game where politicians are allowed to choose the timing of their reform, politicians would start their reforms either at the beginning of the legislature or never. Similarly, in any equilibrium, a politician would prefer to start a good reform rather than a bad one, if given the choice.

<sup>6</sup>We will see below that some depreciation of uncompleted good reforms is needed to have that the efficiency of bureaucracy matters for aggregate welfare—which is equal to average-over-time long-run aggregate income.

- $y$ : a reform is started but is not yet completed;
- $n$ : a reform is not started;
- $b$ : a bad reform is completed;
- $g$ : a good reform is completed.

politician  $it$  has reputational concerns. Let  $\rho_{it}$  denote the public belief that politician  $it$  is competent at time  $\tau_{t+1}$  and let  $\rho_{it}^e$  denote the value of  $\rho_{it}$  if event  $e \in \{y, n, b, g\}$  has occurred. politician  $it$ 's payoff is given by

$$u_{it}(\theta_{it}, \omega_{it}) = \phi \rho_{it} - \gamma \theta_{it} \mathbb{I}(b) \quad (2)$$

where  $\mathbb{I}$  denotes the indicator function so that  $\mathbb{I}(b) = 1$  if and only if event  $b$  occurs.  $\phi > 0$  measures the private value of reputation to politician  $it$ , regardless of her true type; while  $\gamma > 0$  is a cost of reputation loss that is only incurred by good politicians if they were discovered to have enacted a bad reform. There are several reasons why reputation matters to politicians. First, reputation for competence has value in the private market after a political career ends, as emphasized by Mattozzi and Merlo (2008) and Gagliarducci and Nannicini (2013). Second, reputation of competence increases a politician's chances of re-election (see Appendix B). Therefore, (2) should be interpreted as the expected continuation payoff that politician  $it$  would obtain in a sub-game where (i) some principals (voters or employers) take an action (reelecting the politician or hiring her in the private market) with a probability linearly increasing in their beliefs about the politician's competence  $\rho_{it}$  and (ii) the politician  $it$ 's payoff is increasing in the value of this action.<sup>7</sup> Since the value of  $\phi$  does not play any specific role in our analysis, we take it as an exogenous parameter rather than trying to endogenize the value of reputation in the model. A positive  $\gamma$  reflects the fact that a truly competent individual has much more to lose than an incompetent individual from being regarded as incompetent, for example because she might lose the option value of entering a labor market where her competence would be revealed with strictly positive probability. The equilibrium we characterize below for each legislature would exist even for  $\gamma = 0$ , but having a positive differential cost  $\gamma$  (even infinitesimal) serves the purpose to make our (divine) equilibrium unique.

**Strategies and solution concept** A strategy for politician  $it$  is a function  $\sigma_t : \{0, 1\}^2 \times \mathbb{R}_+ \rightarrow [0, 1]$  where  $\sigma_t(\theta_{it}, \omega_{it}, \alpha_t)$  is the probability that, at the start of legislature  $t$ , when

<sup>7</sup>The utility specification in (2) implies that politician  $it$  cares just about her reputation at the end of her mandate. Any further update after the end of the mandate is limited, because the quality of reforms randomly depreciates over time and because the mass of past reforms that simultaneously comes to completion makes it difficult to separately identify the contribution of each single past reform to capital accumulation.

bureaucratic efficiency is  $\alpha_t$ , a politician of type  $\theta_{it}$  endowed with a reform of quality  $\omega_{it}$  starts a reform.

In what follows, we first characterize the equilibrium behavior of politicians in each single legislature  $t$ , taking the level of bureaucratic efficiency  $\alpha_t$  as given. We then turn our attention to the aggregate equilibrium dynamics where  $\alpha_t$  evolves endogenously due to the dynamics of the stock of uncompleted reforms  $h_t$ .

In every legislature  $t$ , our model admits multiple perfect Bayesian equilibria, sustained by unreasonable off-equilibrium beliefs. We characterize the unique *symmetric divine equilibrium* (henceforth *equilibrium*) of Banks and Sobel (1987) and Cho and Kreps (1987). Divinity is a standard refinement in signalling games. In our context, it requires the public to attribute a deviation to those types of politicians who would choose it for the broadest set of public beliefs.

### 3 Political equilibrium

In this section we characterize the unique equilibrium of the model. We begin by describing how public beliefs affect politician  $it$ 's incentives to start a reform. Given (2), politician  $it$ 's expected payoff of not starting a reform is equal to

$$E_t [u_{it} (\theta_{it}, \omega_{it}) \mid \sigma_{it} = 0] = \phi \rho_t^n \quad (3)$$

where  $\sigma_{it} \equiv \sigma_t (\theta_{it}, \omega_{it}, \alpha_t)$ . Obviously, in any equilibrium, if the reform is completed and revealed to be good, the politician is known to be competent for sure:  $\rho_t^g = 1$ .<sup>8</sup> Thus, politician  $it$ 's expected payoff of starting a reform is equal to

$$E_t [u_{it} (\theta_{it}, \omega_{it}) \mid \sigma_{it} = 1] = e^{-\alpha_t \ell} \phi \rho_t^y + \left(1 - e^{-\alpha_t \ell}\right) \left[ \omega_{it} \phi + (1 - \omega_{it}) \left( \phi \rho_t^b - \gamma \theta_{it} \right) \right]. \quad (4)$$

The first term is the payoff in case the reform is not completed by the end of the legislature; the second is the payoff in case the reform is completed. Notice that the expected payoff from not starting a reform in (3) is independent of both the politician's competence  $\theta_{it}$  and the quality of her reform  $\omega_{it}$ . Instead, the expected payoff from starting a reform in (4) depends both on  $\theta_{it}$  and  $\omega_{it}$  so that, for any  $(\rho_t^y, \rho_t^b)$ ,

$$E_t [u_{it} (1, 1) \mid \sigma_{it} = 1] \geq E_t [u_{it} (0, 0) \mid \sigma_{it} = 1] > E_t [u_{it} (1, 0) \mid \sigma_{it} = 1]. \quad (5)$$

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<sup>8</sup>Notice that the information set containing  $g$  is a singleton.

The first inequality says that competent politicians with a good reform are those with the largest incentives to start a reform. The second inequality says that competent politicians with a bad reform are those with the smallest incentives. Intuitively, starting a good reform carries no risk for a politician: if the reform is completed by the end of the legislature, it will reveal that the politician is good. In contrast, a politician with a bad reform faces the risk that her reform will reveal itself to be bad. Thus, the first inequality holds strictly whenever  $\rho_t^b < 1$ . The second inequality is due to the extra cost  $\gamma$  that an incompetent politician incurs if her reform is revealed to be bad. Thus, the incentive to start a bad reform is greater for an incompetent politician. These two inequalities are key to characterize the politicians' behavior in the unique equilibrium of the model, summarized by the following proposition (proved in Appendix A):

**Proposition 1** (Equilibrium in legislature  $t$ ). *In the unique equilibrium,*

1. *competent politicians start a reform if and only if it is good;*
2. *incompetent politicians start a (bad) reform with probability*

$$\sigma(\alpha_t) \equiv \sigma_t(0, 0, \alpha_t) = \begin{cases} 0 & \text{if } \alpha_t \ell > -\ln(\underline{\rho}); \\ p - \frac{p(1-p)(1-e^{-\alpha_t \ell})}{(1-\pi)[1-p(1-e^{-\alpha_t \ell})]} & \text{otherwise;} \end{cases} \quad (6)$$

where  $\underline{\rho} \equiv \frac{\pi(1-p)}{1-\pi p}$ ;

3. *public beliefs are given by*

$$\begin{aligned} \rho_t^y &= \left[ 1 + \frac{1-\pi}{\pi} \frac{\sigma(\alpha_t)}{p} \right]^{-1} \\ \rho_t^n &= \left[ 1 + \frac{1-\pi}{\pi} \frac{1-\sigma(\alpha_t)}{1-p} \right]^{-1} \\ \rho_t^b &= 0 \text{ and } \rho_t^g = 1. \end{aligned}$$

We offer the key elements to construct the equilibrium in Proposition 1. Uniqueness is guaranteed by our divinity refinement.<sup>9</sup> Whenever  $\alpha_t \ell > -\ln(\underline{\rho})$ , only competent politicians with good reforms start their reforms. Instead, politicians—competent and incompetent—with bad reforms do not start them. To see why competent politicians start their reforms, notice that the expected payoff of starting a reform for a competent

<sup>9</sup>Lemma 1 in Appendix A formally characterizes off-equilibrium beliefs in any (divine) equilibrium of our model.

politician equals  $\phi \rho_t^y = \phi$ , which is obviously greater than her expected payoff of not starting a reform  $\phi \rho_t^n = \phi \underline{\rho} < \phi$ . Instead, an incompetent politician faces a trade-off: on the one hand, starting a reform signals competence, as  $\rho_t^y = 1$ ; on the other hand, her reform will reveal to be bad with probability  $1 - e^{-\alpha_t \ell}$ . As the public believes that bad reforms come from incompetent politicians ( $\rho_t^b = 0$ ), an incompetent politician's expected payoff of starting a reform equals  $\phi e^{-\alpha_t \ell}$ . She will therefore (strictly) prefer not to start it if  $\phi e^{-\alpha_t \ell} < \phi \underline{\rho}$ , which is equivalent to the condition  $\alpha_t \ell > -\ln(\underline{\rho})$  in Proposition 1. Notice that the second inequality in (5) also guarantees that a competent politician with bad reforms will strictly prefer not to start them.

When instead  $\alpha_t \ell \leq -\ln(\underline{\rho})$ , incompetent politicians are indifferent between starting and not starting their reforms. Notice that the inequalities in (5) and  $\rho_t^b = 0$  imply that whenever incompetent politicians are indifferent, competent politicians strictly prefer to start good reforms and strictly prefer not to start bad reforms. The indifference condition for an incompetent politician is

$$e^{-\alpha_t \ell} \rho_t^y = \rho_t^n,$$

which after applying Bayes's rule yields

$$e^{-\alpha_t \ell} \frac{\pi p}{\pi p + (1 - \pi) \sigma(\alpha_t)} = \frac{\pi(1 - p)}{\pi(1 - p) + (1 - \pi)(1 - \sigma(\alpha_t))}.$$

Solving for  $\sigma(\alpha_t)$  we obtain

$$\sigma(\alpha_t) = p - \frac{p(1 - p)(1 - e^{-\alpha_t \ell})}{(1 - \pi)[1 - p(1 - e^{-\alpha_t \ell})]} \quad (7)$$

which is the expression in the second line of (6). Notice that the unique equilibrium is stationary in the sense that the equilibrium strategies of politicians in legislature  $t$  do not depend on  $t$  and vary in time only due to changes in the efficiency of the bureaucracy  $\alpha_t$ .

We can derive the following comparative statics on the probability that incompetent politicians start bad reforms  $\sigma(\alpha_t)$ .

**Proposition 2** (Comparative statics). *The probability that an incompetent politician starts a bad reform  $\sigma(\alpha_t)$  is*

1. *increasing in the need for reforms  $p$ ;*
2. *decreasing in the duration of the legislature  $\ell$ , the probability that a politician is competent  $\pi$ , and the level of bureaucratic efficiency  $\alpha_t$ ;*

*The difference  $p - \sigma(\alpha_t)$  is*

1. *strictly positive;*
2. *increasing in the duration of the legislature  $\ell$  and the level of bureaucratic efficiency  $\alpha_t$ ;*
3. *decreasing in the need for reforms  $p$ .*

The comparative statics in Proposition 2 are the result of the trade-off faced by an incompetent politician, who, on the one hand wants to start a reform to mimic the behavior of a competent politician with a good reform, but on the other hand knows that by doing so she incurs the risk of being discovered to be incompetent whenever her reform comes to completion by the end of the legislature. A more efficient bureaucracy (higher  $\alpha_t$ ) or a longer legislature (longer  $\ell$ ) both increase this risk and discourage incompetent politicians from starting reforms. When competent politicians have a good reform with higher probability (higher  $p$ ), competent politicians are more likely to be active and incompetent politicians start a reform with greater probability, because political activism is now a better signal for competence.

## 4 Steady state equilibrium

We now turn to the dynamic analysis of our model. Recall that reforms started at beginning of legislature  $t$  are completed at Poisson arrival rate  $\alpha_t = \alpha(h_t)$ , for all  $\tau \in [\tau_t, \tau_{t+1})$ , where  $h_t$  is the stock of uncompleted reforms inherited from the previous legislatures, which evolves endogenously as a result of the decisions of politicians. We assumed that the function  $\alpha$  is decreasing in  $h_t$ . There are several reasons why the efficiency of bureaucracy is decreasing in  $h_t$ . One could be technological: more reforms congestion the bureaucratic apparatus that becomes inefficient due to its limited ability to handle an excessive stock of information. But we can also think that more political reforms  $h_t$  give more *power to bureaucracy* and a more powerful bureaucracy becomes opaque, complex and obsessed with formalism. This is the natural reaction of an institution that builds up complexity to preserve its power.

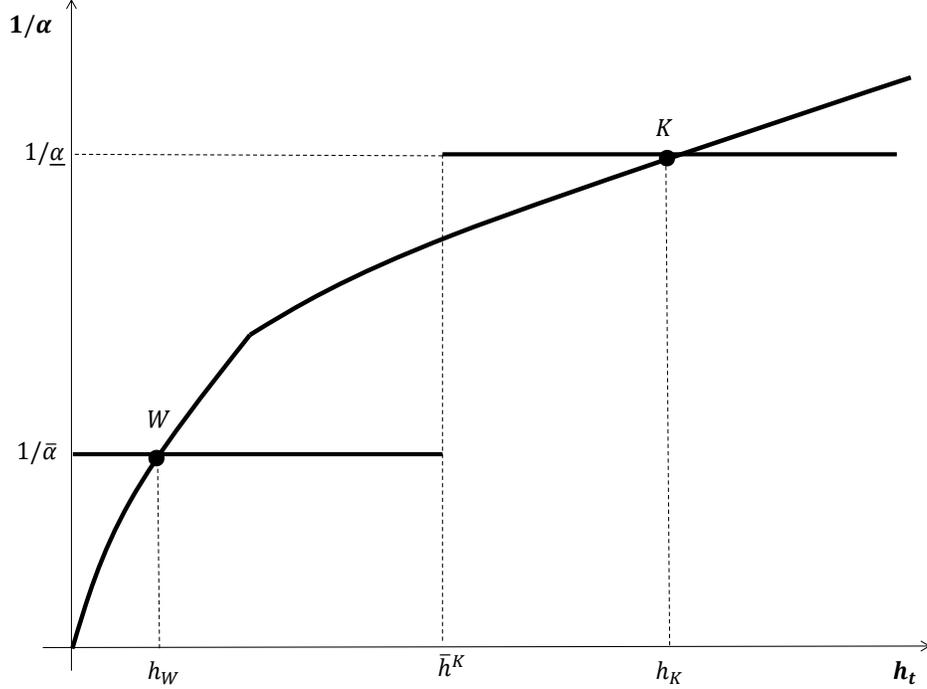
For simplicity, in the rest of the analysis we assume that  $\alpha_t$  can assume only two values,  $\underline{\alpha}$  and  $\bar{\alpha}$ , with  $0 < \underline{\alpha} < \bar{\alpha}$ , so that

$$\alpha(h_t) = \begin{cases} \bar{\alpha} & \text{if } h_t \leq \bar{h}^K, \\ \underline{\alpha} & \text{if } h_t > \bar{h}^K \end{cases} \quad (8)$$

where  $\bar{h}^K$  is the *Kafkaian threshold* of uncompleted reforms beyond which bureaucratic ef-

efficiency collapses from  $\bar{\alpha}$  to  $\underline{\alpha}$ . We refer to a bureaucracy with  $\alpha_t = \bar{\alpha}$  as *Weberian* and to

**Figure 2: Steady state equilibrium**



a bureaucracy with  $\alpha_t = \underline{\alpha}$  as *Kafkian*. In Figure 4, we plot our function  $\alpha(h_t)$  in (8) by having the stock of hanging reforms  $h_t$  on the x-axis and a measure of the inefficiency of bureaucracy  $1/\alpha(h_t)$  on the y-axis.

#### 4.1 The Tacitus line

We now characterize the law of motion of the stock of uncompleted reforms at the beginning of each legislature,  $h_t$ . For any  $t = 1, 2, \dots$ ,  $h_t$  evolves according to the following first order difference equation:

$$h_t = e^{-\alpha_{t-1}\ell} (h_{t-1} + r_{t-1}) \quad (9)$$

This says that the stock of uncompleted reforms immediately before the beginning of legislature  $t$  is equal to the fraction  $e^{-\alpha_{t-1}\ell}$  of reforms present at the beginning of the  $t - 1$ th legislature that have not come to completion. The amount of uncompleted reforms at the beginning of the  $t - 1$ th legislature is equal to the sum of uncompleted reforms inherited from all the legislatures prior to the  $t - 1$ th, equal to  $h_{t-1}$ , plus the mass of newly started

reforms in the  $t - 1$ th legislature, which is given by

$$r_{t-1} = \pi p + (1 - \pi) \sigma(\alpha_t) \quad (10)$$

which is equal to the sum of the good reforms started by competent politicians  $\pi p$  plus the mass of bad reforms started by incompetent politicians, equal to  $(1 - \pi) \sigma(\alpha_t)$ . After substituting the expression of  $\sigma(\alpha_t)$  in (6) of Proposition 1,  $r_{t-1}$  can finally be expressed as equal to

$$r_{t-1} = \begin{cases} \pi p, & \text{if } \alpha_{t-1} \ell > \ln\left(\frac{\rho}{\underline{\rho}}\right) \\ \frac{p}{p+(1-p)e^{\alpha_{t-1}\ell}}, & \text{otherwise.} \end{cases} \quad (11)$$

The law of motion in (9) implies that the steady state number of uncompleted reforms at the start of each legislature is constant over time and equal to  $h_t = h_{t-1} = h^*$ , characterized by the following proposition

**Proposition 3** (The Tacitus Line). *The steady state stock of uncompleted reforms at the start of each legislature is given by*

$$h^* = \frac{r^*}{e^{\alpha^* \ell} - 1} \quad (12)$$

where

$$r^* = \begin{cases} \pi p, & \text{if } \alpha^* \ell > \ln\left(\frac{\rho}{\underline{\rho}}\right) \\ \frac{p}{p+(1-p)e^{\alpha^* \ell}}, & \text{otherwise.} \end{cases} \quad (13)$$

denotes the steady state flow of new reforms started at the beginning of each legislature and  $\alpha^*$  is the steady state level of bureaucratic efficiency.

(12) establishes a positive relation between the stock of uncompleted reform  $h$  and the degree of inefficiency of bureaucracy  $1/\alpha$ . When bureaucracy is more inefficient, the completion rate of reform is lower, which pushes down the denominator of (12), and pushes up the numerator of (12). Both effects tend to increase the number of uncompleted reforms in the system  $h$ . Given our initial quotation, we refer to this relation as a *Tacitus* line. An example of Tacitus line is plotted in Figure 4. A steady state equilibrium is characterized by an intersection between the power of bureaucracy line in (8) and the Tacitus line determined by (12).

## 4.2 Weberian and Kafkian steady states

The Tacitus line in (12) immediately implies that the following assumption guarantees the existence of a Weberian equilibrium steady state

**Assumption 1.** *The Weberian completion rate of reforms  $\bar{\alpha}$  is such that*

$$\frac{\pi p}{e^{\bar{\alpha}\ell} - 1} \leq \bar{h}^K \quad (14)$$

and

$$\bar{\alpha}\ell \geq -\ln(\underline{\rho}). \quad (15)$$

Condition (14) guarantees that  $\forall \ell \geq \underline{\ell}$  a Weberian economy remains Weberian if only good reforms are started. Condition (15) guarantees that in equilibrium only good reforms are started when the bureaucracy is Weberian. We now keep analyzing our economy under Assumption 1.

Given Assumption 1, a Kafkian equilibrium can exist if two conditions are satisfied. The first is that incompetent politicians start reforms when bureaucracy is Kafkian,  $\sigma(\underline{\alpha}) > 0$ , which, given Proposition 1 requires that  $\underline{\alpha}\ell < -\ln(\underline{\rho})$ . The second is that the resulting steady state stock of uncompleted reform is higher than the critical Kafkian threshold  $\bar{h}^K$  that leads to a collapse in bureaucratic efficiency. Now notice that

$$\frac{\partial \ln(\underline{\rho})}{\partial p} = \frac{p(1-\pi)}{(1-\pi p)(1-p)} > 0$$

while

$$\frac{\partial \ln(\underline{\rho})}{\partial \pi} = -\frac{1}{\pi(1-\pi p)} < 0$$

which says that incompetent politicians are more likely to start a reform when  $p$  is high or  $\pi$  is low. Using Proposition 3, we can then conclude that

**Proposition 4** (Weberian and Kafkian steady state equilibrium). *Let assumption 1 always hold. Then there always exists a Weberian steady-state with*

$$h^W \equiv \frac{\pi p}{e^{\bar{\alpha}\ell} - 1} \leq \bar{h}^K. \quad (16)$$

*A Kafkian steady state exists if and only if both*

$$\underline{\alpha}\ell < \ln\left(\frac{1-\pi p}{\pi(1-p)}\right) \equiv \ln \underline{\rho} \quad (17)$$

and

$$h^K \equiv \frac{p}{[p + (1-p)e^{\underline{\alpha}\ell}](e^{\underline{\alpha}\ell} - 1)} > \bar{h}^K \quad (18)$$

The *Kafkian steady-state* is more likely to exist when (i) the need for reforms is high ( $p$  high), (ii) legislatures are short ( $\ell$  low), (iii) there are few competent politicians ( $\pi$  low), and (iv) a *Kafkian bureaucracy* is highly inefficient ( $\underline{\alpha}$  low).

High  $p$ , low  $\ell$  and low  $\underline{\alpha}$  make more likely that both conditions (17) and (18) are satisfied, while low  $\pi$  makes more likely that the *Kafkian equilibrium* can arise by making condition (17) more likely to be satisfied. Figure 4 characterizes a configuration of parameters such that both a *Weberian* and a *Kafkian steady state equilibrium* exist. This means that Assumption 1 holds—which guarantees the existence of a *Weberian steady state equilibrium*—but also conditions (17) and (18) are satisfied—which guarantee the existence of a *Kafkian steady state equilibrium*.

### 4.3 Welfare and the optimal duration of legislatures

Given our assumption that the economy is populated by a representative household with zero discount rate, aggregate welfare is equal to average-over-time long-run aggregate income. In the steady state equilibrium of our model, all quantities at the beginning of each legislature (the capital stock as well as the stock of uncompleted reforms) are constant over time, but the aggregate capital stock exhibits some deterministic dynamics within each legislature. After manipulating the key differential equations of our economy, we show in Appendix A that the level of welfare in the economy is fully characterized by the following Proposition

**Proposition 5.** *Aggregate welfare is proportional to the steady state average-over-time capital stock which is equal to*

$$\bar{k}^* = \frac{\int_0^\ell \tilde{k}_{\tau_i+s} ds}{\ell} = \frac{q\pi p}{v\ell} \left( 1 - \frac{ve^{-\alpha^*\ell}}{\alpha^* + v} \right), \quad (19)$$

*which is monotonically increasing in the steady state completion rate of reforms  $\alpha^*$ .*

This means that different steady states are ranked according to the efficiency of their bureaucracy. Even if agents have a zero discount rate, a higher  $\alpha^*$  increases welfare because it reduces the risk that good reforms becomes obsolete before they are completed, which implies that good reforms yield greater expected income. Notice that the level of efficiency of bureaucracy  $\alpha^*$  matters for welfare provided that the depreciation rate of reforms  $v$  is strictly positive.

We can also study what it would be the duration of a legislature  $\ell$  that maximizes welfare. With no asymmetric information, there are no reputation concerns because the type of politicians is perfectly observable. So (i) incompetent politicians do not start any

reforms and (ii) competent politicians start reforms only if they have a good reform. If Assumption 1 holds we then have that the long-run completion rate of reforms  $\alpha^*$  is equal to  $\bar{\alpha}$ . Since we have that  $\frac{\partial \bar{k}^*}{\partial \ell} < 0$  we have that the first best duration of a legislature is the lowest possible,  $\ell_{FB} = \underline{\ell}$ . This is because a shorter legislature allows to maximize the flow of good reforms into the system with no costs in terms of bureaucratic efficiency.

When the politicians' type is unobservable, the duration of a legislature  $\ell$  can also affect the incentives of incompetent politicians to start bad reforms, which could ultimately lead to a collapse in the bureaucratic apparatus. In this sense the steady completion rate of reforms  $\alpha^*$  becomes function of  $\ell$ . Proposition 4 has established sufficient conditions for the existence of an equilibrium where the completion rate of reforms is maximum and equal to  $\bar{\alpha}$ . Under these conditions, setting  $\ell$  equal to  $\underline{\ell}$  would be optimal as in the first best economy without asymmetric information. However, in choosing the optimal duration of legislatures, we might not only want to maximize steady welfare but also eliminate the risk of ending up in a Kafkian trap, where welfare is low because of the excessive amount of reforms which are progressively introduced in the system by incompetent politicians. To rule out a Kafkian equilibrium, the duration of the legislature  $\ell$  must be either greater than

$$\ell^* = \frac{-\ln\left(\frac{\rho}{\underline{\rho}}\right)}{\underline{\alpha}} \quad (20)$$

or greater than

$$\frac{p}{[p + (1-p)e^{\underline{\alpha}\ell^{**}}]} (e^{\underline{\alpha}\ell^{**}} - 1) = \bar{h}^K, \quad (21)$$

If  $\ell \geq \ell^*$  in (20) incompetent politicians never start a reform. If  $\ell \geq \ell^{**}$  in (21), the steady state mass of uncompleted reforms remains lower than the critical Kafkian threshold  $\bar{h}^K$  beyond which bureaucratic efficiency collapses, even if incompetent politicians start a reform. A planner might then want to maximize the aggregate average-over-time capital stock  $\bar{k}^*$  in (19) subject to the constraint that a Kafkian equilibrium can never be sustained. Under this welfare criterion we can conclude that

**Proposition 6** (The optimal duration of legislatures). *Under Assumption 1, the length of the legislature which maximizes steady state welfare in the economy with no asymmetric information is  $\ell_{FB} = \underline{\ell}$ , where  $\underline{\ell}$  is the minimal feasible duration of a legislature. The optimal length of legislatures in the economy with asymmetric information is generally bigger than under complete information and it is equal to*

$$\ell_O = \max \{ \ell_{FB}, \min \{ \ell^*, \ell^{**} \} \}$$

where  $\ell^*$  and  $\ell^{**}$  are the unique lengths of legislatures that solve (20) and (21), respectively.

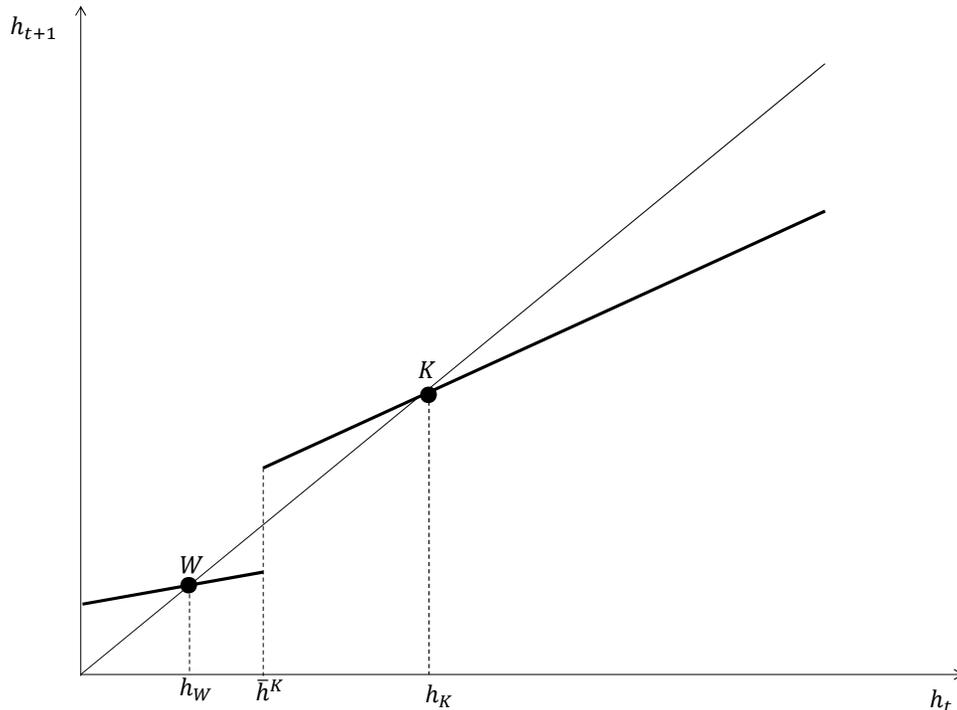
## 5 Dynamics

In what follows, we will first show that transitory shocks can suffice to make an economy drop from a Weberian to a Kafkaian equilibrium permanently; then we will discuss the further amplification of the problem that would obtain from allowing an endogenous quality supply of politicians and bureaucrats; and, finally we discuss the difficulties in reverting a shift from a Weberian to a Kafkaian equilibrium.

### 5.1 Transitory shocks and permanent shifts

The law of motion of  $h_t$  is given by (9) where  $r_t$  is as in (11). As  $\alpha_{t-1} = \alpha(h_{t-1})$ , we obtain that (9) implies a simple first order difference equation for  $h_t$ . In Figure 5.1 we plot the law of motion of  $h_t$  as a function of  $h_{t-1}$ , when both the Weberian and the Kafkaian equilibrium steady state can arise. The Weberian equilibrium steady state corresponds to point  $W$  in Figure 5.1, the Kafkaian equilibrium steady state to point  $K$ . Notice that (9) implies that  $h_t$  is always flatter than the 45 degree line.

Figure 3: Phase diagram



A key feature of the model is that, when (17) and (18) hold, transitory shocks can lead the economy to a transition from a Weberian equilibrium to a Kafkian equilibrium, which will then persist. Generally this happens because a temporary increase in the amount of new reforms introduced in the system can lead to a fall in bureaucratic efficiency, which makes  $\alpha_t$  fall. But with a lower  $\alpha$  incompetent politicians start to introduce bad reforms (see Proposition 1), which inundates the system with a "tsunami of reforms", which makes the Kafkian equilibrium persist.

We now isolate three transitory shocks that could lead to transition towards the Kafkian equilibrium: (i) a temporary increase in  $p$ , which we associate with an increase in the need of reforms of the country; (ii) a temporary reduction in the duration of legislature  $\ell$ , which we associate with a temporary surge in political instability; and (iii) a transitory increase in  $\pi$ , which we associate with a temporary increase in the competence of governments, say because the government is temporarily led by technocrats. We now analyze these three cases in detail.

**Too many reform opportunities** When (17) and (18) hold a Kafkian steady state exists. Now suppose that during legislature  $t$ ,  $p$  increases to  $p_t > p$ . Also assume that the economy is initially in a Weberian steady state with a stock of hanging reform  $h^W$  as defined in (16). Then the transitory shock surely leads to a Kafkian steady state if

$$h_{t+1} = e^{-\bar{\alpha}\ell} (h^W + \pi p_t) > \bar{h}^K.$$

These considerations immediately lead to the following proposition:

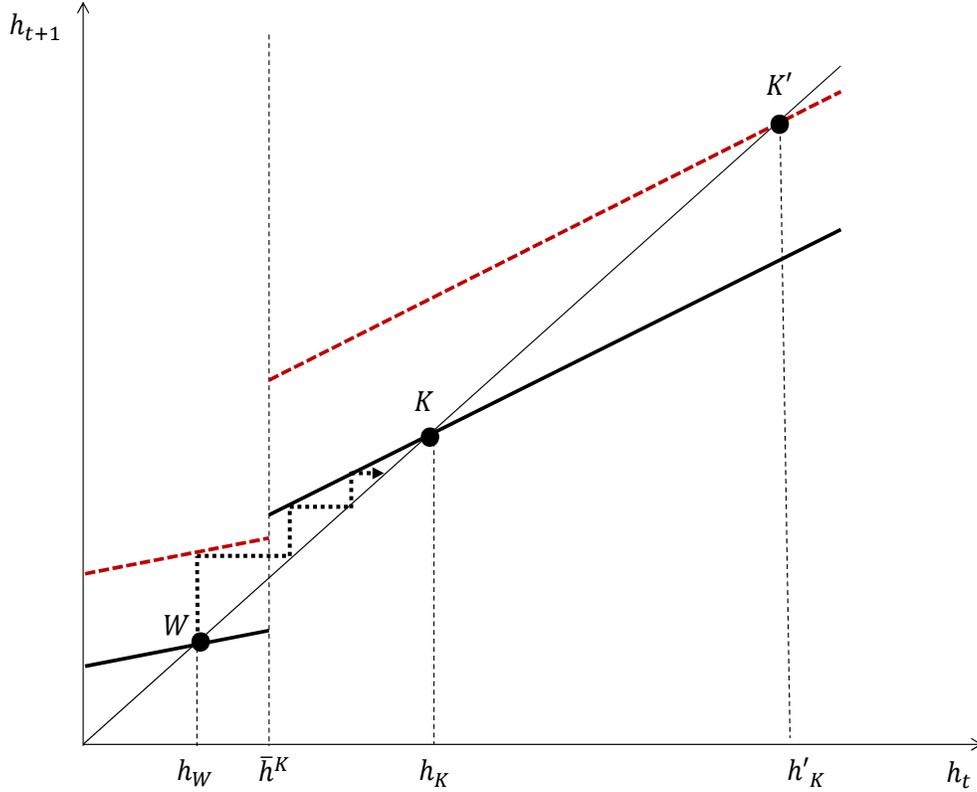
**Proposition 7** (The reform opportunity fallacy). *Suppose that conditions (17) and (18) hold and the economy is initially in a Weberian steady state with a mass of hanging reforms  $h^W$ . Then, a temporary increase in  $p$  in legislature  $t$  to a value  $p_t > p^K$  equal to*

$$p^K \equiv \frac{e^{\bar{\alpha}\ell}\bar{h}^K - h^W}{\pi} \tag{22}$$

*leads the economy to a Kafkian steady-state.*

Figure 5.1 characterizes the dynamic response of the system to the once-and-for-all temporary increase in  $p$  during legislature  $t$ . The temporary increase in the number of hanging reforms during legislature  $t$  makes bureaucratic efficiency fall. But with an inefficient bureaucracy politicians now find optimal to introduce bad reforms that eventually collapses the efficiency of the bureaucratic apparatus, even when the transitory shock vanishes. This makes the Kafkian equilibrium persist.

Figure 4: Transition to a Kafkaian equilibrium due to a temporary shock in  $p$



Notice that Proposition 7 just sets a sufficient condition for a transition from a Weberian to a Kafkaian steady state. From Proposition 1 we know that an increase in  $p$  makes more likely that incompetent politicians start introducing bad reforms in the system (since  $\partial \underline{\rho} / \partial p < 0$ ), which could lead to  $\sigma(\alpha_t) > 0$  and thereby make more likely that the next period stock of hanging reforms  $h_{t+1}$  is above the critical Kafkaian threshold  $\bar{h}^K$ , which leads to a collapse in bureaucracy.

**A temporary surge in political instability** The same logic can be applied to a temporary reduction in the duration of the legislature  $t$ , which characterizes a temporary surge in political instability. This allows to conclude that

**Proposition 8** (A surge in political instability). *Suppose that conditions (17) and (18) hold and the economy is initially in a Weberian steady state with a mass of hanging reforms  $h^W$ . Then, a temporary reduction in the duration of the legislature  $t$  to a value  $\ell_t < \ell^K$  equal to*

$$\ell^K = \frac{1}{\bar{\alpha}} \ln \left( \frac{h^W + \pi p}{\bar{h}^K} \right) \quad (23)$$

causes the economy to move to a Kafkaian steady-state.

Notice that, once again, Proposition 7 just sets a sufficient condition for a transition from a Weberian to a Kafkaian steady state. Given Proposition 1, a reduction in  $\ell$  makes more likely that incompetent politicians start introducing bad reforms in the system (since  $\underline{\alpha}\ell$  obviously falls), which could lead to  $\sigma(\alpha_t) > 0$  and thereby make more likely that the next period stock of uncompleted reforms  $h_{t+1}$  is above the critical Kafkaian threshold  $\bar{h}^K$ . For simplicity we avoid stating the necessary and sufficient conditions whereby a temporary surge in political instability lead to a transition from a Weberian to a Kafkaian steady state.

**Short-lived governments led by technocrats** There are plenty of examples of economies that experienced a temporary reliance on technocratic governments, which typically remain in power for a short time. These governments are typically formed by highly competent politicians (high  $\pi$  in the model) who are asked to reform the country in a short amount of time. By applying the same considerations as above we can then conclude that

**Proposition 9** (The malady of short-lived technocratic governments). *Suppose that conditions (17) and (18) hold and the economy is in a Weberian steady state with a mass of hanging reforms  $h^W$ . Then, a temporary increase in the competence of government in legislature  $t$  to a value  $\pi_t > \pi^K$  equal to*

$$\pi^K \equiv \frac{e^{\bar{\alpha}\ell}\bar{h}^K - h^W}{p} \quad (24)$$

leads the economy to a Kafkaian steady-state.

The simplest intuition for our result about technocratic governments is that a jump up in  $\pi$  leads to a temporary violation in the condition for existence of a Weberian steady state. Due to this, the precipitation towards the Kafkaian steady state is unavoidable. Notice that, differently from Proposition 8 and 7, Proposition 9 sets a necessary and sufficient condition for a transition from a Weberian to a Kafkaian steady state. By Proposition 1 and the fact that  $\partial\rho/\partial\pi > 0$ , an increase in  $\pi$  makes less likely that incompetent politicians start introducing bad reforms in the system, which implies that  $\sigma(\alpha_t)$  remains equal to zero even in the legislature that experiences the temporary increase in  $\pi$  to  $\pi_t$ .

## 5.2 The Gresham's law of bureaucracy

An efficient bureaucracy allows the public to properly measure the talent of politicians. So an inefficient bureaucracy discourages talented people from starting a career in politics. We call this the Gresham's law of bureaucracy: "bad bureaucracy drives out good

politicians". So far we have assumed that the fraction of competent politicians in the economy  $\pi$  is exogenous. In practice this will depend on the relative endogenous supply of good and bad politicians. We now show that when bureaucracy becomes inefficient the relative supply of incompetent politicians increases and  $\pi$  falls. This is what we call the Gresham's law of bureaucracy.

Let  $U_1$  denote the expected utility of a competent politician in power. This is equal to

$$U_1 = \phi p \left[ 1 - (1 - \rho_t^y) e^{-\alpha_t \ell} \right] + \phi(1 - p)\rho_t^n. \quad (25)$$

Similarly let  $U_0$  denote the expected utility of an incompetent politician in power. This is equal to

$$U_0 = \phi \sigma_t e^{-\alpha_t \ell} \rho_t^y + \phi(1 - \sigma_t)\rho_t^n \quad (26)$$

In general, the probability that a politician is competent depends on the supply of competent relative to incompetent politicians. We can think that the supply of each type of politicians depends on the utility that she expects to obtain once in power. So we can postulate that the relative supply of competent politicians is given by  $L(U_1/U_0)$  so that

$$\pi = L\left(\frac{U_1}{U_0}\right) \quad (27)$$

where  $L : \mathbb{R}_+ \rightarrow [0, 1]$  is strictly increasing.<sup>10</sup> The following proposition (proved in the appendix) states that  $\pi$  falls when  $\alpha_t$  falls:

**Proposition 10** (The Gresham's law of bureaucracy). *A fall in the efficiency of bureaucracy  $\alpha_t$  leads to a fall in the relative supply of competent politicians, so  $\pi$  falls.*

Notice that a lower  $\pi$  can only exacerbate the conditions for the existence of a Kafkian equilibrium, see Proposition 4. Also notice that (11) implies that when  $\sigma_t > 0$  the flow of new reforms introduced in the system is independent of  $\pi$ . This means that the fall in  $\pi$  does not alter the amount of hanging reforms in the system. It just reduces the inflow of good reforms. Hence the welfare consequences of a permanent shift to a Kafkian steady-state (or the welfare consequences of a reduction in  $\underline{\alpha}$ ) are clearly bigger than those predicted with an exogenous value of  $\pi$ .

We could also endogenize the quality of bureaucrats along the same lines. For example we could assume that in the economy there are bureaucrats of different skill  $s$ . A

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<sup>10</sup>This intuitive mapping from relative utility for different types from an occupation and the incentives of such different types to apply for such an occupation is consistent with multiple occupational choice models. See e.g. Caselli and Morelli (2004).

bureaucrat of skill  $s$  completes reforms at Poisson arrival rate

$$\alpha_t(h_t) s$$

where  $\alpha_t(h_t)$  is as in (8). The equilibrium completion rate of reforms is then equal to

$$\tilde{\alpha}_t = \alpha_t(h_t) \bar{s}_t$$

where  $\bar{s}_t$  denotes the average quality of bureaucrats in society. Now suppose that bureaucrats are promoted on the basis of merit, as measured by the amount of completed reforms. When  $\alpha_t(h_t)$  falls then the return to bureaucratic skills falls and as a result the average quality of bureaucrats  $\bar{s}_t$  falls (for given outside options), which leads to a fall in the equilibrium completion rate of reforms  $\tilde{\alpha}_t$ . This further increases the amount of hanging reforms in the system, that further reduces the quality of bureaucrats and worsens the welfare properties of the Kafkian equilibrium. So the Gresham's law of bureaucracy apply to both good politicians and good bureaucrats, and eventually we have that "Bad bureaucracy drives out both good politicians and good bureaucrats". This further exacerbates the negative welfare consequences of a Kafkian equilibrium.

Broadly speaking, the Gresham's law of bureaucracy implies that excessive political activism by incompetent politicians can lead the economy to a Kafkian trap also through self-selection of individuals into political and bureaucratic careers.

### 5.3 Discussion on ways out

Once the economy is stuck in a Kafkian steady state with a highly inefficient bureaucracy, the system needs to be shocked with a sufficiently large parametric change (especially if temporary) in the opposite direction (jump down in  $p$  or jump up in  $\ell$  for example) in order to cause a transition back to a Weberian steady state.

Beside the possibility of exogenous shocks in the opposite direction to those causing the Kafkian collapse, we can discuss some types of policy interventions and their difficulties. The first idea that comes to mind is that of *Banning reforms*. Once the economy is in a Kafkian steady state, banning reforms would allow to decongestion the bureaucratic apparatus. Depending on parameters, it could be the case that "no reform is better than a good reform". How can we give politicians the incentive to stop reforming the system? How can we temporarily stop even competent politicians from starting their good reforms? Which incentives can the public provide to them? In the model this could be obtained by modifying the utility function of politicians: in a world where the public

becomes aware of the direct and indirect consequences of reforms on the bureaucracy, a reputation cost  $\gamma'$  should be added to discourage reforms, but this requires coordination among the various principals (voters, lobby groups, etc) that implicitly determine the reputation career concerns.

A second natural consideration is that of *dropping old reforms*. Once the system is in a Kafkian steady state, dropping an old sometimes obsolete reform is better than introducing a new good reform. How can the public reward politicians in power for dropping old obsolete reforms rather than for introducing new reforms? Such a mechanism could not be very different from the one aimed to shut down all reforms, because selective dropping has the same problem as reform creation: the same pooling equilibrium incentives affecting the introduction of reforms would also affect the elimination of them, since the incompetent politicians who cannot find good reforms would not be able, for consistency, to detect which uncompleted reforms should be dropped.

A potentially important role could be played by *Political leaders*: In our economy, inefficient outcomes arise because politicians act competitively and do not internalize the cost of their reforms on the efficiency of bureaucracy. But political leaders and prime ministers might at least partly internalize this externality and might decide to constrain the number of reforms introduced by their politicians. Leaders might also decide to reform bureaucracy by investing resources to increase  $\bar{h}^K$  and  $\underline{\alpha}$ . A successful reform of bureaucracy might grant leaders important political rewards by a public that recognizes the reform as successful.

In practice, a successful reform of bureaucracy can take time and leaders who start the reform are unlikely to reap the political benefits of their interventions. More importantly, our previously discussed “Gresham’s law of bureaucracy” implies that a drop in the efficiency of bureaucracy lowers the relative supply of competent politicians. But when the quality of politicians in power deteriorates below a critical level, politicians incentives to reform an inefficient bureaucracy vanish, because low quality politicians are the ones who benefit the most out of the status quo. So even well intended leaders might find hard to obtain a large enough constituency of political peers who support a grand plan of reforming bureaucracy. But other (here not modelled) vicious circles could also play a role in eroding government incentives to reform an inefficient bureaucracy. For example, an excessive number of laws and reforms gives more discretionary power and control to bureaucracy which progressively becomes essential to run the state. Any government attempt to reform bureaucracy could then lead to a complete block in government activities for some time, which could represent an unsurmountable reputational cost for governments—especially for those in office for just a short term. All this can condemn

the country to a secularly inefficient polity, as emphasized in this paper.

## 6 Empirical evidence

In this section we provide evidence on the key mechanism through which political instability can drift an economy from the Weberian efficient bureaucracy to a Kafkaian equilibrium. We do so by relying on data on Italy’s members of parliament (MPs) legislative activity covering 26 years and seven legislatures, from the X to the XVI. Italian data are particularly fit for our task. First, Italy is the country that, according to the Cross National Time Series Data Archive has the highest number of major government crisis over the past 40 years, with an average number of 1.2 per year (Figure 4). If our mechanism is present, this latent political instability offers a good chance for it to be detected. Indeed, the length of the legislatures varies considerably, as some terminate well before their natural term. Over our sample period three out of seven legislatures have ended before the 5-year statutory term, in all cases after two years from start. This provides variation in MPs incentives to rely on legislation activism. Third, using within country data has the great advantage of holding constant a large number of institutional features (formal and informal) that would be a source of confound if cross country data were used. Finally, we have access to MPs individual level information on their earnings capacity both during term and, most importantly, before, with separate details on the compensation as MP and the earnings from any market activity. This will prove important to obtain a measure of MPs ability: we identify it with their ability to produce market income, as in Gagliarducci and Nannicini (2013). We first discuss the empirical model, then the data and finally the evidence.

### 6.1 Empirical model

The main prediction of our theory that we want to test is that bad politicians have stronger incentives to rely on legislative activism when they anticipate a shorter legislature. We test this implication by estimating variants of the following empirical model

$$A_{itl} = \alpha + \beta Z_{itl} + \gamma B_{itl} + \delta L_l \times B_{itl} + f_l + \epsilon_{itl}$$

where  $A_{itl}$  is a measure of legislative activism by MP  $i$ , in year  $t$  and legislature  $l$ . The vector  $Z_{itl}$  includes a number of characteristics of the MPs, except their quality. This is measured by  $B_{itl}$  which is an index of bad politicians, while  $L$  is the length of the  $l^{th}$  legislature,  $f_l$  a set of legislature dummies and  $\epsilon_{itl}$  an error term. Our model has a distinct

implication for  $\delta$ —the coefficient on the interaction term between the length of the legislature and the index of bad politicians. The latter should be relatively less active when they anticipate a longer legislature, i.e. when there is less political instability. It is this specific prediction that we will test.

## 6.2 Data

We have data on all Italian MPs, for both chambers, the House of Representatives and the Senate. These data come into separate files. The first reports, for each bill proposed in each of the legislatures in the sample, data on the date of presentation, when and whether it was discussed in a Commission, presented to the chambers and approved (if not turned down) as law and when. For each bill we observe the identifier of the main MP signer. The second dataset reports for each MP her demographic characteristics (age, gender, marital status, number of kids, level of education, and region of birth) and indicators of her parliamentary career and appointments (previous parliamentary experience, whether she is a life senator, appointment at a party at national or local level, president or secretary of a committee, member of a committee, deputy or politician in government, political affiliation), which we use as controls in the empirical model.

### 6.2.1 Measuring legislative activity

From the first dataset we measure legislative activity  $A_{itl}$  by the number of bills presented by MP  $i$  in year  $t$  in legislature  $l$ ; as an additional measures we use the number of laws instead of the number of bills.

### 6.2.2 Measuring politicians quality

One unique feature of this dataset is that, because since 1982 MPs have to disclose their incomes, we have data on the various sources of income of each politician. Not only we observe the compensation as MPs but also all the earnings for any market activity they held during term and the incomes from labor they earned in the year before appointment, gross and net of tax. We use these data to obtain an estimate of the ability of MPs. Drawing on a large literature in labor (e.g. Card, 1999), we infer politicians ability from their earnings capacity in the market. Because we have a panel of observations for all MPs, with their incomes varying over time and covering both the earnings while in term as well as (for those newly elected) the income from labor in the year before the term, we run mincerian regressions on total earnings. Because we control for total compensation

as MP, the residual variation only reflects market earnings. We explain the latter with time fixed effects to capture common time variation and individual fixed effects. We take the latter as our measure of politicians ability. From this continuous measure we define  $B_{itl}$ —the indicator of low quality politician—setting it equal to 1 if the estimated fixed effect is below the cross sectional median; a tighter definition uses the 25th percentile as a threshold for low quality. Alternatively, we run the same regressions without the fixed effects but adding a vector of individual controls in addition to the time dummies. We then take the residuals from these regression and define two similar alternative indicators of  $B_{itl}$ . We call the first the fixed-effect indicator and the second the "residuals" indicator. Empirically the two measures are correlated (correlation 0.3). Table 1 shows summary statistics for our data.<sup>11</sup>

### 6.2.3 Legislature duration predictability

For our empirical strategy to work it is necessary that members of parliament can predict legislature duration since its very beginning so as to adapt their behavior to this expectation. Interestingly, in our data predictability of the duration of the legislature is easily inferred from the strength of the majority supporting the coalition following the elections. In particular, because the Italian parliamentary system is a perfect bicameral one with a Senate (315 members) and a Lower Chamber (630 members), a Government needs to gain a vote of confidence in each chamber. But because of the smaller number of seats in the Senate, the strength (and stability) of the legislature depends critically on the number of seats in this chamber in excess of the quorum, available to the coalition supporting the government. As shown in Appendix C (Table C1) the three legislatures that ended before the term all share a distinctive feature: the government coalition has a weak majority in the Senate compared to the completed legislatures. In one of these legislatures (the XV) it has only one seat in excess of the quorum, in another (the XII) it is short of three seats (a vote of confidence was obtained thanks to the support of a few life senators) and in the third (the XI) it has 12 seats—a margin that is lower than the average margin enjoyed in the completed legislatures (20 seats). Because the number of seats in the Senate supporting the governing coalition is the random result of the election, we can count on exogenous variation in the length of the legislature. And because the

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<sup>11</sup>Our model assumes that voters do not observe politicians quality, which they infer just from the success of the laws they promote. This requires that they do not observe easily our measure of politicians quality. This is indeed the case. Despite the fact that since 1982 MPs have to report their income tax statements, this information is only available on paper from the archives of the Senate and Lower Chamber and thus essentially unaccessible to voters. Only in 2013 it has become available on line (at <http://www.camera.it/leg17/1003>).

strength of the coalition is observed at the start of the legislature, members of parliament can form a reliable expectation about the length of the legislature. Furthermore, because pension entitlements only mature if the legislature lasts for at least two years, even when the legislature is likely to end before its term, MP can easily guess it will not end before the two-year limit. This is confirmed in the data: legislatures that end before the term, end all exactly after two years (see Table C1, duration of non completed legislatures).

### 6.3 Results

Table 2 shows the results of the estimates of our model. The first column uses the fixed-effect measure of politicians quality, the second is based on the average residuals. For brevity, we only report the relevant coefficients. Being a low quality politician in itself has no effect on legislative activism. However, low quality politicians are systematically and significantly less active when operating in a complete legislature. When the legislature ends prematurely and thus shortens their horizon, low quality politicians are relatively more active in presenting bills. Relative to a high quality politician, a low quality politician presents 1.2 more bills in a shorter legislature. Because MPs present on average 6.7 bills, this effect amounts to 18% of the sample mean. The effect is of similar size if the second measure of politicians' quality is used (column 2). We also find similar results if instead of running a regression for activism with the interaction between politician quality and the complete legislature dummy, we run separate regressions for complete and incomplete legislatures (columns 3 and 4). Only in the latter low quality politicians are more active than the high quality ones and the effect is larger than that estimated in columns 1 and 2.

These results support the prediction of the model that when the legislature is shorter, low quality MPs have a stronger incentive to rely on bills and laws to signal their activism because laws, like durable goods, reveal their quality only with time. Hence, low quality laws are more likely to be found to be so only after the end of the legislature.

Table 3 reports some robustness exercises. The first three columns use the fixed-effect measure of politicians quality and the other three the residuals-based measure. As a first robustness check, we define low quality as those MPs with a fixed-effect (or average residual) below the 25th percentile of the cross sectional distribution. Second, we drop 51 outliers observations of MPs that are very active in originating bills; third we restrict the sample to MPs that present at least one bill, loosing 1239 cases of MPs/legislature that presented no bills. Results are basically unchanged. The effect is somewhat smaller than in Table 1, but of the same order of magnitude. Not surprisingly, precision is lost when

we drop those that presented no bills, but even in this case the point estimate of the effect is of the same size. Results are similar using the residuals-based measure.

Table 4 measures activism with the number of laws instead of the number of bills. Results go through also using this alternative measure: low quality politicians are more active in signing and proposing new bills that translate into laws when the length of legislature is shorter. On average they propose 0.3 more laws in an aborted legislature compared to high quality politicians. Since the mean number of laws per MP is 0.91, this difference is quite sizeable as it amounts to 1/3 of the sample mean.

Finally, in Table 5 we try to provide some validation of our measure of MPs quality. Only a fraction of the bills presented make it into laws and they have to pass a number of filters that, among other things, screen for quality. If our measure of politicians quality actually captures some notion of ability, we would expect that bills signed by low quality politicians are less likely to end up as laws. The table shows Tobit estimates of the share of bills proposed by each MP that are approved as laws, which is a measure of the success rate of the bills signed. We unambiguously find that bills proposed by low quality politicians are less likely to be successful. The difference in the probability of success is between 2 and 6 percentage points depending on the definition of politician quality. An effect that ranges between 25 and 75% of the sample mean.

It would be tempting to think that low quality politicians, anticipating that an early presentation of bills of dubious quality raises the chances that this is found out, time bills presentation, procrastinating it, particularly during complete legislatures. If so, low quality politicians should reveal a higher survival rate of the bills presented compared to higher quality MPs, particularly in complete legislatures. Our model however predicts that this strategy is unlikely to be observed. In fact, because the timing of presentation of the bills is observed, delaying it would reveal the quality of the politician. To avoid this, bad politicians should mimic good politicians and follow the same timing as theirs. Figure 5 shows Kaplan-Meier survival estimates according to politicians quality and by legislature completion. The figure concurs with the model: low quality politicians mimic closely the behavior of their colleagues. Table 6 reaches this conclusion using formal regressions.

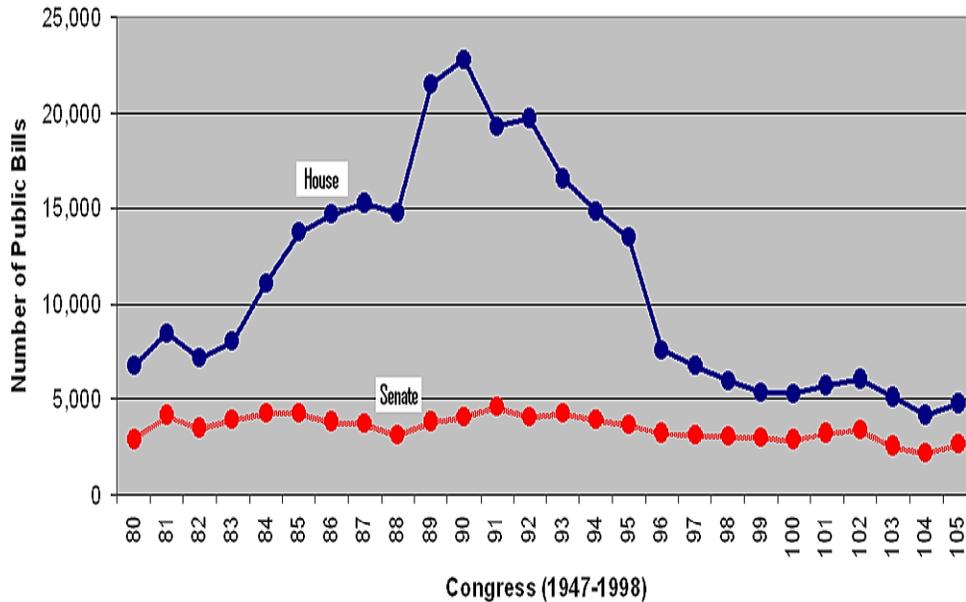
To conclude, the microeconomic evidence lends support to the mechanism highlighted in the model. Bills and laws are proposed to signal activism and when political instability becomes more marked this incentive is amplified, resulting in overproduction of laws.

## 7 Concluding remarks and relation to literature

We have proposed a simple dynamic theory for why bureaucracy promotes efficiency in some countries, as advocated by Max Weber, while it leads to stagnation in others, as emphasized by Franz Kafka. The theory relies on a two-way relation between bureaucracy inefficiency and legislative production. On the one hand, too many laws mechanically jam bureaucracy. On the other, whenever bureaucracy is more inefficient, incompetent politicians tend to supply more laws to acquire the reputation of skill-full reformers. This interaction leads naturally to the possibility of multiple steady states. A temporary surge in political stability, a strong pressure for reforms by the public, and short-lived technocratic governments can determine a permanent shift towards the Kafkian steady state. Using micro-data for Italy, we have provided evidence for one key building block of the theory that the relative supply of laws by incompetent politicians tends to increase when legislatures are expected to be short.

There is abundant evidence that politicians are motivated by career concerns (see for example Ash, Morelli and Van Weelden (2015) and references therein), but our focus on the supply of laws and its interaction with the efficiency of bureaucracy is novel. While our evidence of the key mechanism behind our model (legislator sponsor bills just to signal their activism to the voters) draws on Italian data, the use of the number bills as a signal of political activism is likely to be a general feature of modern democracies. Figure 7 shows the number of bills introduced by the US Congress separately for the Senate and for the House of Representative from the 80th to the 105th legislature. While the number of bills introduced in the Senate is constant at around 5,000, bill proposal activity in the House is hump shaped: initially close to the activity in the Senate, it peaks in the early 1970s to around 22,000 bills per legislature (91th Congress), more than four times the analogous value in the Senate. This value then drops after the 96th Congress to its initial level of around 5,000 bills per legislature. As argued by Thomas and Grofman (1993), Cooper and Young (1989) and particularly Adler and Wilkerson (2012), much of this trend can be attributed to changes in House rules relating to cosponsorship. Between the 83rd Congress and the 91st Congress cosponsorship was not allowed; in the 91st Congress the rule changed again, allowing cosponsors but with a cap of 25; finally, in the 96th Congress the cap was eliminated. The incentive to sponsor bills for position-taking purposes was stronger prior to these reforms and, not surprisingly, sponsorship activity declines after these reforms. This suggests that the pernicious dynamics emphasized in this paper is an essential feature of advanced democracies and that tackling this problem is important to guarantee the preservation of well functioning bureaucratic institutions.

Figure 7: Bills introduced in US congress



The previous literature has mostly appealed to factors related to the internal functioning of the bureaucracy to explain bureaucratic performance. To highlight the relationship between bureaucratic efficiency and legislative activism, we instead keep bureaucracy internal functioning as a black box. Gailmard and Patty (2012) provide an overview of the large literature on the agency problems in the construction of a bureaucracy. In a nutshell, this literature focuses on the additional moral hazard and adverse selection problems that may further exacerbate the inefficiency, which in our framework is due simply to excessive tasks given by politicians. Even in terms of empirical work, once again most scholars have focused on the internal functioning of the bureaucracy (see e.g. Bertrand, Burgess, Chawla and Xu (2015) and references therein). Nath (2015) provides evidence that electoral competition affects negatively bureaucratic performance, but the mechanism she focuses on relates to the internal functioning of the bureaucracy rather than on the legislators' incentives in terms of excessive productions of laws.

An important observation about our approach is that we view politics and bureaucracy as complementary in the production of public capital. Maskin and Tirole (2004), Alesina and Tabellini (2007; 2008) ask under what conditions it is better to delegate choices to a bureaucracy and under what conditions it is better to let elected officials make the policy calls. We believe instead that most policies require *both* a legislative or executive

decision by politicians *and* necessary procedures of enforcement, implementation and interpretation by the non-elective bureaucracy. Castanheira et al (2015) start from the same premise about complementarity of politicians and bureaucrats in policy making, but focus the analysis on the bureaucracy demand side rather than on the politicians' supply side.

Persson and Tabellini (2000) and Rogoff and Sibert (1988) are the main references for general discussion of the negative effects of politicians' career concerns. Dewatripont and Seabright (2006) show an incentive to overspend (rather than over reform) by politicians, but without distinction in terms of quality of politicians.

Finally a brief mention of the experience in the Habsburg monarchy, which lies behind the work of Kafka and that has partly motivated our analysis. There is some indication that political instability has played a role in causing the collapse of the Habsburg bureaucracy. In the few decades before the writing of Kafka's books, ethnic conflicts often manifested themselves as political confrontations, and substantial nationalistic pressures from more than 12 different ethnicities and tensions between different ideologies (liberalism versus ancient regime) gave rise to a big jump in political instability. As a result the number of political parties exploded—for example there were 50 political parties participating to the election of 1911—and the number of MPs in the Lower house increased substantially—from 203 to 516 over the 1867-1918 period. Over the same period, Austria had 29 politicians Presidents. We leave for further research the question whether the strategic mechanism emphasized in this paper has played a major role in shaping the experience of Habsburg bureaucracy.

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# A Omitted Proofs

## A.1 Proof of Proposition 1

We begin by establishing two properties of our model that will be useful in proving Lemma 1, which is needed to prove Proposition 1. Notice that  $\rho_t^g = 1$  as the information set for event  $g$  is a singleton. Thus, the expected payoff of politician  $it$  when starting a reform is given by:

$$E_t [u_{it}(\theta_{it}, \omega_{it}) \mid \sigma_{it} = 1] = \underbrace{e^{-\alpha_t \ell} \phi \rho_t^y}_{\text{not completed}} + \underbrace{(1 - e^{-\alpha_t \ell}) \left[ \omega_{it} \phi + (1 - \omega_{it}) (\phi \rho_t^b - \gamma \theta_{it}) \right]}_{\text{completed}}.$$

**Fact 1.** For any  $(\rho_t^y, \rho_t^b)$ ,

$$E_t [u_{it}(1, 1) \mid \sigma_{it} = 1] \geq E_t [u_{it}(0, 0) \mid \sigma_{it} = 1] > E_t [u_{it}(1, 0) \mid \sigma_{it} = 1]$$

with the first inequality holding strictly whenever  $\rho_t^b < 1$ .

The expected payoff of not starting a reform is instead given by

$$E_t [u_{it}(\theta_{it}, \omega_{it}) \mid \sigma_{it} = 0] = \phi \rho_t^n.$$

**Fact 2.** The expected payoff of not starting a reform does not depend on either the politician's competence or the quality of her reform.

The following lemma greatly simplifies the analysis of our model by characterizing the off-equilibrium beliefs of the public in any (divine) equilibrium.

**Lemma 1.** In any equilibrium,

1. if  $n$  is off-equilibrium, then  $\rho_t^n = 1$ ;
2. if  $y$  is off-equilibrium, then  $\rho_t^y = 1$ ;
3. if  $b$  is off-equilibrium, then  $\rho_t^b = 0$ .

*Proof.* For any event  $e \in \{n, y, g, b\}$ , let  $\Sigma^e(\theta, \omega)$  be the set of strategies, for a politician with competence  $\theta$  and quality of reform  $\omega$ , which leads to  $e$  occurring with strictly positive probability. Also, let  $\Xi^e$  be the set of beliefs  $\rho = (\rho_t^n, \rho_t^y, \rho_t^g, \rho_t^b)$  consistent with event  $e$  occurring with probability 0. For any pair  $(\theta, \omega)$ , we can define

$$\begin{aligned} \bar{\Xi}_{\theta, \omega}^e &\equiv \{\rho \in \Xi^e : E_t [u_{it}(\theta, \omega) \mid \sigma] \geq E_t [u_{it}(\theta, \omega) \mid \sigma] \text{ for some } \sigma \in \Sigma^e(\theta, \omega)\} \\ \Xi_{\theta, \omega}^e &\equiv \{\rho \in \Xi^e : E_t [u_{it}(\theta, \omega) \mid \sigma] > E_t [u_{it}(\theta, \omega) \mid \sigma] \text{ for some } \sigma \in \Sigma^e(\theta, \omega)\}. \end{aligned}$$

In our context divinity requires that, if for some  $\theta \in \{0, 1\}$  and all  $\omega \in \{0, 1\}$  there exists  $\theta', \omega' \in \{0, 1\}^2$  such that for

$$\rho_t \in \bar{\Xi}_{\theta, \omega}^e \Rightarrow \rho_t \in \Xi_{\theta', \omega'}^e$$

then public beliefs upon observing event  $e$  give probability 0 to type  $\theta$ .

**For event  $b$**  Suppose event  $b$  occurs with probability 0. Notice that event  $b$  requires the politician to have a bad reform. Then it must be that all politicians with a bad reform—whether competent or incompetent—never start their reforms. We want to show that  $\rho_t^b = 0$  in all (divine) equilibria. From Facts 1 and 2, for any belief  $\rho_t$  for which competent politicians with a bad reform would (weakly) prefer to deviate to starting a reform, incompetent politicians would strictly prefer to do so. Thus, public beliefs upon observing  $b$  should give probability 0 to competent politicians.

**For event  $n$**  Suppose event  $n$  occurs with probability 0. Then it must be that all politicians always start their reforms (notice that by Bayes' rule this implies  $\rho_t^b < 1$ ). We want to show that  $\rho_t^n = 1$  in all (divine) equilibria. From Facts 1 and 2, for any belief  $\rho_t$  for which incompetent politicians would (weakly) prefer to deviate to not starting a reform, competent politicians with a bad reform would strictly prefer to do so. Thus, public beliefs upon observing  $n$  should give probability 0 to incompetent politicians.

**For event  $y$**  Suppose event  $y$  occurs with probability 0. Then it must be that all politicians never start their reforms (notice that event  $b$  is off-equilibrium and therefore, as proven above,  $\rho_t^b = 0 < 1$ ). We want to show that  $\rho_t^y = 1$  in all (divine) equilibria. From Facts 1 and 2, for any belief  $\rho_t$  for which incompetent politicians would (weakly) prefer to deviate to starting a reform, competent politicians with a good reform would strictly prefer to do so. Thus, public beliefs upon observing  $y$  should give probability 0 to incompetent politicians.

□

*Proof of Proposition 1.* The following lemmas follow from facts 1 and 2 and Lemma 1. □

**Lemma 2.** *In any equilibrium, whenever competent politicians prefer to start bad reforms,*

1. *competent politicians strictly prefer to start good reforms;*
2. *incompetent politicians strictly prefer to start bad reforms.*

**Lemma 3.** *In any equilibrium, whenever incompetent politicians prefer to start bad reforms, competent politicians strictly prefer to start good reforms.*

Existence. Let  $\alpha_t \ell \geq -\ln(\underline{\rho})$  and let incompetent politicians not start their reforms and competent politicians start their reforms if and only if they are good. By Bayes' rule,  $\rho_t^y = 1$ ,  $\rho_t^n = \underline{\rho}$ , and therefore

$$E_t [u_{it}(1,1) \mid \sigma_{it} = 1] > E_t [u_{it}(\theta_{it}, \omega_{it}) \mid \sigma_{it} = 0] > E_t [u_{it}(0,0) \mid \sigma_{it} = 1].$$

This proves existence in this case.

Let  $\alpha_t \ell \leq -\ln(\underline{\rho})$  and let incompetent politicians start their reforms with probability

$$\sigma_t^*(0, 0, \alpha_t) = p - \frac{p(1-p)(1-e^{-\alpha_t \ell})}{(1-\pi)[1-p(1-e^{-\alpha_t \ell})]}.$$

Using Bayes rule to calculate  $\rho_{it}$ , it is easy to notice that incompetent politicians are indifferent between starting and not starting the reform. By lemmas 2 and 3, then competent politicians strictly prefer to start good reforms and strictly prefer not to start bad reforms. This proves existence for this case.

*Uniqueness.* From Lemma 2, in equilibrium, either (i) competent politicians start all good reforms and incompetent politicians start all bad reforms ( $\sigma_t(1, 1, \alpha_t) = \sigma_t(0, 0, \alpha_t) = 1$ ) or (ii) competent politicians do not start bad reforms ( $\sigma_t(1, 0, \alpha_t) = 0$ ). We now show that there is no equilibrium featuring property (i). To see this, suppose that such an equilibrium exists. Notice that the expected payoff of starting a reform for an incompetent politician is a (strictly) convex combination of  $\phi\rho_t^y$  and  $\phi\rho_t^b$ . By Bayes' rule

$$\begin{aligned}\rho_t^y &= \frac{\pi[p + (1-p)\sigma_t(1, 0, \alpha_t)]}{\pi[p + (1-p)\sigma_t(1, 0, \alpha_t)] + (1-\pi)} \leq \pi; \\ \rho_t^b &= \frac{\pi(1-p)\sigma_t(1, 0, \alpha_t)}{\pi(1-p)\sigma_t(1, 0, \alpha_t) + (1-\pi)} < \rho_t^y; \\ \rho_t^n &= 1 > \pi;\end{aligned}$$

which implies that incompetent politicians would strictly prefer not to start any reform:

$$E_t[u_{it}(0, \omega_{it}) \mid \sigma_{it} = 1] < \phi\pi < \phi = E_t[u_{it}(0, \omega_{it}) \mid \sigma_{it} = 0].$$

We can therefore conclude that:

**Lemma 4.** *In any equilibrium, competent politicians do not start bad reforms.*

Therefore, all equilibria feature competent politicians not starting bad reforms and either incompetent politicians do not start bad reforms or they start them with positive probability. Suppose that no reform is ever started. Then, by Bayes' rule, the reputation of a politician who has not started a reform is  $\rho_t^n = \underline{\rho}$ . Also, if no bad reform is ever started, then either only competent politicians start reforms or no reform is ever started, implying  $\rho_t^y = 1$  (see Lemma 1). In both cases, a competent politician with a good reform would strictly prefer to start her reform. Furthermore, a politician with a bad reform would prefer not to start it only if  $\phi e^{-\alpha_t \ell} \leq \phi \underline{\rho}$ ,<sup>12</sup> which is equivalent to  $\alpha_t \ell \geq -\ln(\underline{\rho})$ . Otherwise incompetent politicians start (bad) reforms with strictly positive probability. In any such equilibrium,  $\rho_t^b = 0$  as—by Lemma 4—only bad politicians start bad reforms.

<sup>12</sup>Recall from Lemma 1 that if the public anticipates bad reforms never to be started, then  $\rho_t^b = 0$ . Thus

$$E_t[u_{it}(\theta_{it}, \omega_{it}) \mid \sigma_{it} = 1] = e^{-\alpha_t \ell} \phi \rho_t^y + (1 - e^{-\alpha_t \ell}) \phi \rho_t^b = \phi e^{-\alpha_t \ell}.$$

Also, by Lemma 3, competent politicians start good reforms with probability 1. Since we ruled out equilibria in which both competent politicians start all good reforms and incompetent politicians start all bad reforms, it must be that bad reforms are started with probability strictly between 0 and 1. The following indifference condition must then hold:

$$e^{-\alpha_t \ell} \rho_t^y = \rho_t^n$$

$$e^{-\alpha_t \ell} \frac{\pi p}{\pi p + (1 - \pi) \sigma_t^*(0, 0, \alpha_t)} = \frac{\pi (1 - p)}{\pi (1 - p) + (1 - \pi) (1 - \sigma_t^*(0, 0, \alpha_t))}$$

$$\sigma_t^*(0, 0, \alpha_t) = p - \frac{p (1 - p) (1 - e^{-\alpha_t \ell})}{(1 - \pi) [1 - p (1 - e^{-\alpha_t \ell})]}$$

where the first passage follows from Bayes' rule.

Notice that  $\sigma_t^*(0, 0, \alpha_t)$  is increasing in  $p$  and decreasing in  $\pi$  and  $\alpha_t \ell$ . Furthermore, evaluating  $\sigma_t^*(0, 0, \alpha_t)$  at  $e^{-\alpha_t \ell} = \underline{\rho}$  gives  $\sigma_t^*(0, 0, \alpha_t) = 0$ , which shows that the equilibrium is unique.

*Comparative Statics.* Given (7), all the comparative statics results are obvious with the possible exception of the result that  $\sigma(\alpha_t)$  is increasing in  $p$ . But from taking the derivative of  $\sigma(\alpha_t)$  with respect to  $p$ , we immediately see that

$$\frac{\partial \sigma(\alpha_t)}{\partial p} = \frac{\sigma(\alpha_t)}{p} + \frac{p e^{-\alpha_t \ell} (1 - e^{-\alpha_t \ell})}{(1 - \pi) [1 - p (1 - e^{-\alpha_t \ell})]^2} > 0.$$

## A.2 Proof of Proposition 5

To prove the proposition we proceed in three steps. In the steady state equilibrium of our model quantities at the beginning of each legislature are constant over time, but the aggregate capital stock exhibits some deterministic dynamics within each legislature. We first prove that, in steady state,  $\forall \tau$  the aggregate capital stock is given by  $\tilde{k}_\tau$  in (33). Then we characterize the value of the capital stock at the beginning of a legislature in steady state, which we prove is equal to  $k^*$  in (38). We finally prove that the average-over time capital stock is given by  $\bar{k}^*$  in (19).

**At any point in time  $\tau$  in steady state capital is given by  $\tilde{k}_\tau$  in (33)** For any  $\tau \in [\tau_t, \tau_t + \ell)$  we denote by  $\tilde{g}_\tau$  the stock of good uncompleted undepreciated reforms inherited from previous legislature at time  $\tau$ . We also denote by  $\tilde{n}_\tau$  the stock at time  $\tau$  of uncompleted good reforms which have been newly started in the current legislature. The stock of good undepreciated old reforms during the  $t$ -th legislature  $\tilde{g}_\tau$  decreases at rate  $\alpha_t + \nu$ , because some of them are completed at Poisson arrival rate  $\alpha_t$  while some get obsolete at Poisson arrival rate  $\nu$ . This implies that for any  $\tau \in [\tau_t, \tau_t + \ell)$  the stock of good uncompleted undepreciated old reforms is equal to

$$\tilde{g}_\tau = e^{-(\alpha_t + \nu)(\tau - \tau_t)} g_t \tag{28}$$

where  $g_t$  is the stock of good undepreciated reforms at the beginning of legislature  $t$ . The amount of newly started uncompleted good reforms at time  $\tau$  is equal to

$$\tilde{n}_\tau = e^{-\alpha_t(\tau-\tau_t)} \pi p, \quad (29)$$

which are all undepreciated. Therefore,

$$g_t = e^{-(\alpha_{t-1}+\nu)\ell} g_{t-1} + e^{-\alpha_{t-1}\ell} \pi p. \quad (30)$$

Finally, for any  $\tau \in [\tau_t, \tau_t + \ell)$ , we have that the stock of capital evolves as

$$\frac{d\tilde{k}_\tau}{d\tau} = q\alpha_t (\tilde{g}_\tau + \tilde{n}_\tau) - \nu\tilde{k}_\tau. \quad (31)$$

We can now substitute (29) and (28) into (31) to obtain that  $\forall \tau \in [\tau_t, \tau_t + \ell)$

$$\frac{d\tilde{k}_\tau}{d\tau} = q\alpha_t e^{-\alpha_t(\tau-\tau_t)} \left[ e^{-\nu(\tau-\tau_t)} g_t + \pi p \right] - \nu\tilde{k}_\tau \quad (32)$$

Notice that (30) and (32) represent a recursive system. Given  $g_t$  and  $\alpha_t$ , we can use (32) to obtain

$$\tilde{k}_\tau = \tilde{k}_{\tau_t} e^{-\nu(\tau-\tau_t)} + \frac{q\alpha_t \pi p}{(\nu - \alpha_t)} \left[ e^{-\alpha_t(\tau-\tau_t)} - e^{-\nu(\tau-\tau_t)} \right] + qg_t \left[ e^{-\nu(\tau-\tau_t)} - e^{-(\alpha_t+\nu)(\tau-\tau_t)} \right] \quad (33)$$

where  $\tilde{k}_{\tau_t}$  denotes the capital stock at the beginning of legislature  $t$ . To prove that (33) holds, we solve for  $\tilde{k}_\tau$  in (32) by guessing and then verifying that for  $\forall \tau \in [\tau_t, \tau_t + \ell)$

$$\tilde{k}_\tau = a e^{-\nu(\tau-\tau_t)} + b e^{-\alpha_t(\tau-\tau_t)} + c e^{-(\alpha_t+\nu)(\tau-\tau_t)} \quad (34)$$

Clearly we also have the initial condition that says that

$$a + b + c = \tilde{k}_{\tau_t} \quad (35)$$

Under the guess in (34) we have that (32) reads as follows

$$\begin{aligned} \frac{d\tilde{k}_\tau}{d\tau} &= -\nu a e^{-\nu(\tau-\tau_t)} - \alpha_t b e^{-\alpha_t(\tau-\tau_t)} - (\alpha_t + \nu) c e^{-(\alpha_t+\nu)(\tau-\tau_t)} \\ &= q\alpha_t \left[ e^{-(\alpha_t+\nu)(\tau-\tau_t)} z_t + e^{-\alpha_t(\tau-\tau_t)} \pi p \right] - \nu a e^{-\nu(\tau-\tau_t)} - \nu b e^{-\alpha_t(\tau-\tau_t)} - \nu c e^{-(\alpha_t+\nu)(\tau-\tau_t)} \end{aligned}$$

which is equivalent to

$$\begin{aligned} & -\alpha_t b e^{-\alpha_t(\tau-\tau_t)} - (\alpha_t + \nu) c e^{-(\alpha_t+\nu)(\tau-\tau_t)} \\ & = q\alpha_t \left[ e^{-(\alpha_t+\nu)(\tau-\tau_t)} z_t + e^{-\alpha_t(\tau-\tau_t)} \pi p \right] - \nu b e^{-\alpha_t(\tau-\tau_t)} - \nu c e^{-(\alpha_t+\nu)(\tau-\tau_t)} \end{aligned}$$

So we have that our guess is verified if and only if

$$\begin{aligned}(v - \alpha_t) b &= q\alpha_t\pi p \\ -(\alpha_t + v) c &= q\alpha_t z_t - v c\end{aligned}$$

After using (35), we conclude that our guess is verified if

$$\begin{aligned}b &= \frac{q\alpha_t\pi p}{(v - \alpha_t)} \\ c &= -qz_t \\ a &= \tilde{k}_{\tau_t} - \frac{q\alpha_t\pi p}{(v - \alpha_t)} + qz_t\end{aligned}$$

This implies that (34) reads as follows

$$\tilde{k}_{\tau} = \tilde{k}_{\tau_t} e^{-\nu(\tau - \tau_t)} + \frac{q\alpha_t\pi p}{(v - \alpha_t)} \left[ e^{-\alpha_t(\tau - \tau_t)} - e^{-\nu(\tau - \tau_t)} \right] + qg_t \left[ e^{-\nu(\tau - \tau_t)} - e^{-(\alpha_t + \nu)(\tau - \tau_t)} \right]$$

which allows to conclude that (33) holds true.

**In steady state, capital at the beginning of a legislature is given by  $k^*$  in (38)** By evaluating (33) at  $\tau_{t+1} = \tau_t + \ell$  and after remembering that by continuity we have  $k_t = \tilde{k}_{\tau_t}$ , we can also write the following first order difference equation in the beginning of legislature capital stock  $k_t$  :

$$k_{t+1} = e^{-\nu\ell} k_t + \frac{q\alpha_t\pi p}{(v - \alpha_t)} \left[ e^{-\alpha_t\ell} - e^{-\nu\ell} \right] + qg_t \left[ e^{-\nu\ell} - e^{-(\alpha_t + \nu)\ell} \right], \quad (36)$$

Now we can use (30) to conclude that in steady state  $g_t$  is equal to

$$g^* = \frac{e^{-\alpha^*\ell} \pi p}{1 - e^{-(\alpha^* + \nu)\ell}} \quad (37)$$

where  $\alpha^*$  denotes the steady state completion rate of reforms. We can now use the expression for  $g^*$  in (37) to replace  $g_t$  in (36). By using (36) and after imposing that the steady state capital stock at the beginning of legislature should satisfy  $k_t = k_{t-1} = k^*$  we obtain that

$$\begin{aligned}k^* &\equiv \frac{1}{(1 - e^{-\nu\ell})} \cdot \left\{ \frac{q\alpha^*\pi p}{(v - \alpha^*)} \left( e^{-\alpha^*\ell} - e^{-\nu\ell} \right) + \frac{e^{-\alpha^*\ell} q\pi p \left[ e^{-\nu\ell} - e^{-(\alpha^* + \nu)\ell} \right]}{1 - e^{-(\alpha^* + \nu)\ell}} \right\} \\ &= \frac{q\pi p}{1 - e^{-\nu\ell}} \left[ \frac{\alpha^* \left( e^{-\alpha^*\ell} - e^{-\nu\ell} \right)}{\nu - \alpha^*} + \frac{1 - e^{-\alpha^*\ell}}{e^{(\alpha^* + \nu)\ell} - 1} \right]\end{aligned}$$

which immediately implies that

$$k^* = \frac{q\pi p}{1 - e^{-\nu\ell}} \left[ \frac{\alpha^* (e^{-\alpha^*\ell} - e^{-\nu\ell})}{\nu - \alpha^*} + \frac{1 - e^{-\alpha^*\ell}}{e^{(\alpha^* + \nu)\ell} - 1} \right]. \quad (38)$$

**The average-over time capital stock is given by  $\bar{k}^*$  in (19)** We can now calculate the average capital stock over a legislature when the capital stock at the beginning of its legislature is in steady state,  $k_t = k_{t-1} = k^*$ . We then obtain

$$\begin{aligned} \bar{k}^* &= \frac{\int_0^\ell \tilde{k}_{\tau+s} ds}{\ell} = \frac{k^*}{\nu\ell} (1 - e^{-\nu\ell}) + \frac{\alpha^* q\pi p}{\alpha^* - \nu} \left[ \frac{1 - e^{-\nu\ell}}{\nu\ell} - \frac{1 - e^{-\alpha^*\ell}}{\alpha^*\ell} \right] \\ &\quad + qg^* \left[ \frac{1 - e^{-\nu\ell}}{\nu\ell} - \frac{1 - e^{-(\alpha^* + \nu)\ell}}{(\alpha^* + \nu)\ell} \right] \\ &= \frac{q\alpha^* \pi p}{\nu\ell (\nu - \alpha^*)} \cdot (e^{-\alpha^*\ell} - e^{-\nu\ell}) + \frac{q\pi p (1 - e^{-\alpha^*\ell})}{\nu\ell [e^{(\alpha^* + \nu)\ell} - 1]} + \frac{\alpha^* q\pi p}{\alpha^* - \nu} \left[ \frac{1 - e^{-\nu\ell}}{\nu\ell} - \frac{1 - e^{-\alpha^*\ell}}{\alpha^*\ell} \right] \\ &\quad + \frac{e^{-\alpha^*\ell} q\pi p}{1 - e^{-(\alpha^* + \nu)\ell}} \left[ \frac{1 - e^{-\nu\ell}}{\nu\ell} - \frac{1 - e^{-(\alpha^* + \nu)\ell}}{(\alpha^* + \nu)\ell} \right] \end{aligned}$$

where in the first row we used the expression for  $\tilde{k}_\tau$  in (33) and in the second we used (38) to replace  $k^*$  and (37) to replace  $g^*$ . After manipulating the above expression we obtain

$$\begin{aligned} \bar{k}^* &= \frac{q\alpha^* \pi p}{\nu\ell (\nu - \alpha^*)} \cdot (e^{-\alpha^*\ell} - e^{-\nu\ell}) + \frac{q\pi p e^{-(\alpha^* + \nu)\ell} (1 - e^{-\alpha^*\ell})}{\nu\ell [1 - e^{-(\alpha^* + \nu)\ell}]} \\ &\quad + \frac{\alpha^* q\pi p}{\alpha^* - \nu} \left[ \frac{1 - e^{-\nu\ell}}{\nu\ell} - \frac{1 - e^{-\alpha^*\ell}}{\alpha^*\ell} \right] \\ &\quad + \frac{q\pi p}{\nu\ell [1 - e^{-(\alpha^* + \nu)\ell}]} \cdot [e^{-\alpha^*\ell} - e^{-(\alpha^* + \nu)\ell}] - \frac{e^{-\alpha^*\ell} q\pi p}{(\alpha^* + \nu)\ell} \end{aligned}$$

which can be written as follows:

$$\begin{aligned} \bar{k}^* &= \frac{\alpha^* q\pi p}{(\alpha^* - \nu)\nu\ell} \cdot (e^{-\nu\ell} - e^{-\alpha^*\ell}) + \frac{\alpha^* q\pi p}{\alpha^* - \nu} \left[ \frac{1 - e^{-\nu\ell}}{\nu\ell} - \frac{1 - e^{-\alpha^*\ell}}{\alpha^*\ell} \right] \\ &\quad + \frac{q\pi p}{\nu\ell [1 - e^{-(\alpha^* + \nu)\ell}]} \cdot [e^{-\alpha^*\ell} - e^{-(2\alpha^* + \nu)\ell}] - \frac{e^{-\alpha^*\ell} q\pi p}{(\alpha^* + \nu)\ell} \end{aligned}$$

After some manipulation we obtain

$$\begin{aligned}\bar{k}^* &= \frac{\alpha^* q \pi p}{(\alpha^* - \nu) \nu \ell} \cdot (1 - e^{-\alpha^* \ell}) - \frac{\alpha^* q \pi p}{(\alpha^* - \nu) \alpha^* \ell} \cdot (1 - e^{-\alpha^* \ell}) \\ &\quad + \frac{q \pi p}{\nu \ell [1 - e^{-(\alpha^* + \nu) \ell}]} \cdot [e^{-\alpha^* \ell} - e^{-(2\alpha^* + \nu) \ell}] - \frac{e^{-\alpha^* \ell} q \pi p}{(\alpha^* + \nu) \ell}\end{aligned}$$

which can be further simplified to obtain

$$\begin{aligned}\bar{k}^* &= \frac{q \pi p}{\nu \ell} \cdot (1 - e^{-\alpha^* \ell}) \\ &\quad + \frac{q \pi p}{\nu \ell [1 - e^{-(\alpha^* + \nu) \ell}]} \cdot [e^{-\alpha^* \ell} - e^{-(2\alpha^* + \nu) \ell}] - \frac{e^{-\alpha^* \ell} q \pi p}{(\alpha^* + \nu) \ell}\end{aligned}$$

which can also be written as follows

$$\bar{k}^* = \frac{q \pi p}{\nu \ell} \cdot (1 - e^{-\alpha^* \ell}) + \frac{e^{-\alpha^* \ell} q \pi p}{\nu \ell} - \frac{e^{-\alpha^* \ell} q \pi p}{(\alpha^* + \nu) \ell}.$$

After simplifying we obtain

$$\bar{k}^* = \frac{q \pi p}{\nu \ell} - \frac{e^{-\alpha^* \ell} q \pi p}{(\alpha^* + \nu) \ell}$$

which proves (19) and concludes the proof of Proposition 5.

### A.3 Proof of Proposition 10

A market equilibrium is  $\pi \in [0, 1]$  such that

$$\pi = L \left( \frac{U_1}{U_0} \right)$$

and  $U_1$  and  $U_0$  are calculated from Proposition 1.

We begin by showing that  $L(U_1/U_0)$  is decreasing in  $\pi$ . This guarantees a unique solution to  $\pi = L(U_1/U_0)$ . The next step will then be to show that an increase in  $\alpha_t$  shifts the curve  $L(U_1/U_0)$  up for all  $\pi$ . First, notice that  $U_1$  and  $U_0$  are continuous in  $\pi$  because  $\rho_t^y$ ,  $\rho_t^n$ , and  $\sigma(\alpha_t)$  are continuous in  $\pi$ . Then, by Proposition 1,

$$\begin{aligned}\frac{U_1}{U_0} &= \begin{cases} \frac{p}{\rho} + (1-p) & \text{if } \alpha_t \ell > -\ln(\underline{\rho}); \\ \frac{p[1 - (1 - \rho_t^y)e^{-\alpha_t \ell}] + (1-p)\rho_t^n}{\sigma(\alpha_t)\rho_t^y e^{-\alpha_t \ell} + (1 - \sigma(\alpha_t))\rho_t^n} & \text{otherwise.} \end{cases} \\ &= \begin{cases} \frac{p}{\rho} + (1-p) & \text{if } \alpha_t \ell > -\ln(\underline{\rho}); \\ 1 + \frac{p(1 - e^{-\alpha_t \ell})}{\rho_t^n} & \text{otherwise.} \end{cases}\end{aligned}$$

where the last passage follows from incompetent politicians being indifferent between

starting and not starting their reforms:  $\rho_t^y e^{-\alpha_t \ell} = \rho_t^n$ . As  $\underline{\rho}$  is increasing in  $\pi$ , it is easy to see that in the case when  $\alpha_t \ell > -\ln(\underline{\rho})$ ,  $U_1/U_0$  is decreasing in  $\pi$ . For the second case,  $U_1/U_0$  is decreasing in  $\pi$  if and only if  $\rho_t^n$  is increasing in  $\pi$ . Recall that

$$\rho_t^n = \rho_t^y e^{-\alpha_t \ell} = \left[ 1 + \frac{1 - \pi \sigma(\alpha_t)}{\pi(1-p)} \right]^{-1} e^{-\alpha_t \ell}.$$

Since  $\sigma(\alpha_t)$  is decreasing in  $\pi$  (and so is  $\frac{1-\pi}{\pi}$ ), then  $\rho_t^n$  is increasing in  $\pi$ . Using the assumption that  $L$  is monotonically increasing, then we have proven that  $L(U_1/U_0)$  is decreasing in  $\pi$ .

We now turn to the question of whether an increase in  $\alpha_t$  shifts the curve  $L(U_1/U_0)$  up for any  $\pi \in [0, 1]$ . Notice that that  $U_1$  and  $U_0$  are continuous in  $\alpha_t$  because  $\rho_t^y$ ,  $\rho_t^n$ , and  $\sigma(\alpha_t)$  are continuous in  $\alpha_t$ . It is therefore sufficient to show that, for any  $\pi \in [0, 1]$ ,  $U_1/U_0$  is increasing in  $\alpha_t$ .

**Case 1:**  $\alpha_t \ell > -\ln(\underline{\rho})$ . It is easy to see that  $dU_1/d\alpha_t > 0$  and  $dU_0/d\alpha_t = 0$ . Therefore  $d(U_1/U_0)/d\alpha_t > 0$ .

**Case 2:**  $\alpha_t \ell < -\ln(\underline{\rho})$ . By Proposition 1

$$U_1 = \phi p (1 - e^{-\alpha_t \ell}) + \phi e^{-\alpha_t \ell} \rho_t^y = \phi p - \phi (p - \rho_t^y) e^{-\alpha_t \ell} \quad (39)$$

and

$$\frac{dU_1}{d\alpha_t} = \left[ (p - \rho_t^y) \ell + \frac{d\rho_t^y}{d\sigma(\alpha_t)} \cdot \frac{d\sigma(\alpha_t)}{d\alpha_t} \right] \phi e^{-\alpha_t \ell}$$

Recall from Proposition 1 that  $\rho_t^y$  is decreasing in  $\sigma(\alpha_t)$ , while  $\sigma(\alpha_t)$  is decreasing in  $\alpha_t$ . Therefore  $dU_1/d\alpha_t > 0$ . Furthermore,  $U_0 = \phi \rho_t^n$  and

$$\frac{dU_0}{d\alpha_t} = \phi \frac{d\rho_t^n}{d\sigma(\alpha_t)} \cdot \frac{d\sigma(\alpha_t)}{d\alpha_t}$$

Recall from Proposition 1 that  $\rho_t^n$  is increasing in  $\sigma_t$ , while  $\sigma(\alpha_t)$  is decreasing in  $\alpha_t$ . Therefore  $dU_0/d\alpha_t < 0$ . We can conclude that  $d(U_1/U_0)/d\alpha_t > 0$ .

## B Reelection extension

We study a two-legislature extension of our model where voters can re-elect politicians for multiple legislatures. We show that our main message holds in this context: a less efficient bureaucracy and shorter legislatures today lead to more reforms being started by incompetent politicians today and an even less efficient bureaucracy tomorrow.

We consider a simple two-legislature version of our model with re-election. There are two legislatures,  $t = 1, 2$ , each lasting  $\ell \geq \underline{\ell}$ . In each legislature, the economy is ran by a continuum of politicians indexed over the unit interval,  $i \in [0, 1]$ . At the beginning of legislature 1, new politicians are drawn to run ministries  $i \in [0, 1]$ . Each politician is competent with probability  $\pi$  and incompetent with probability  $1 - \pi$ .

At the start of her mandate, politician  $it$  chooses whether to start a reform. At the end of legislature 1, voters can either keep the incumbent politician or replace her with a new one whose type is drawn from an identical distribution.

Each competent politician in each election has an independent probability  $p$  of having an opportunity for a good reform. Voters are forward looking and care about the amount of future good reforms and a random realization of a bias either for the incumbent or for the new draw. That is, voters keep the incumbent politician in ministry  $i$  with probability  $P(\rho_{i1}) \in [0, 1]$ , where  $P : [0, 1] \rightarrow [0, 1]$  is an increasing function of voters' beliefs, with  $P(0) = 0$  and  $P(1) = 1$ .

Politicians value re-election: the expected payoff of a politician of type  $\theta = 0, 1$  in ministry  $i$  elected in legislature 1 is given by:

$$P(\rho_{i1}) [\phi_R - \gamma\theta\mathbb{I}(\rho_{i1,2} = 0)] - [1 - P(\rho_{i1})] \gamma\theta\mathbb{I}(\rho_{i1} = 0)$$

where  $\phi_R$  is the value of re-election and  $\rho_{i,2}$  is the public's belief about the politician elected in legislature 1 at the end of legislature 2. For simplicity, we assume that competent politicians do not start bad reforms and start a good reform whenever they have the opportunity to do so.

**Assumption 2.** *Competent politicians start a reform if and only if they have the opportunity of a good reform.*

We study the unique symmetric perfect Bayesian equilibrium of this model. We show how the equilibrium probability that an incompetent politician starts a reform in legislature 1 and the equilibrium stock of hanging reforms in legislature 2 depend on the initial efficiency of the bureaucracy  $\alpha_1$ , the length of the legislature  $\ell$ , and the need for reforms  $p$ .

For an incompetent politician, the expected payoff of starting starting a reform and not starting a reform are respectively given by

$$\begin{aligned} E[u(\text{reform})] &= e^{-\alpha_1 \ell} P(\rho^y) \phi_R; \\ E[u(\text{no reform})] &= P(\rho^n) \phi_R \end{aligned}$$

where equilibrium beliefs  $\rho_1^y$  and  $\rho_1^n$  are given by Bayes' rule as

$$\begin{aligned}\rho^y &= \frac{\pi p}{\pi p + (1 - \pi) \sigma_1}; \\ \rho^n &= \frac{\pi (1 - p)}{\pi (1 - p) + (1 - \pi) (1 - \sigma_1)}.\end{aligned}$$

As in Section 3.1, we notice that if  $\sigma_t = 0$  (all incompetent politicians never start reforms), the reputation at the end of the mandate of a politician who has not started a reform is equal to  $\underline{\rho} \equiv \frac{\pi(1-p)}{1-\pi p}$ .

The following lemma characterizes the expected payoff functions for an incompetent politician.

**Lemma 5.** *For an incompetent politician, (1) the expected payoff of starting a reform is decreasing in  $\sigma_1$  and (2) the expected payoff of not starting a reform is increasing in  $\sigma_1$ . Furthermore, we have (3):*

$$E [u (\text{reform}) \mid \sigma_1 = 0] < E [u (\text{no reform}) \mid \sigma_1 = 0]$$

if and only if  $\alpha_1 \ell > -\ln(\underline{\rho}/\phi_R)$  and (4):

$$E [u_n (\text{reform}) \mid \sigma_1 = 1] < E [u_n (\text{no reform}) \mid \sigma_1 = 1].$$

*Proof.* Parts (1) and (2) follow from  $\rho^y$  being decreasing in  $\sigma_1$  and  $\rho^n$  being increasing in  $\sigma_1$  for all  $\sigma_1 \in (0, 1)$ , respectively. Thus,

$$\begin{aligned}\frac{dE [u_n (\text{reform})]}{d\sigma_1} &= e^{-\alpha_1 \ell} \frac{dP(\rho^y)}{d\rho^y} \frac{d\rho^y}{d\sigma_1} \phi_R < 0; \\ \frac{dE [u_n (\text{no reform})]}{d\sigma_1} &= \frac{dP(\rho^n)}{d\rho^n} \frac{d\rho^n}{d\sigma_1} \phi_R > 0\end{aligned}$$

for all  $\sigma \in (0, 1)$ .

Part (3) is given by

$$E [u (\text{reform}) \mid \sigma_1 = 0] = e^{-\alpha_1 \ell} \phi_R < \underline{\rho} = E [u (\text{no reform}) \mid \sigma_1 = 0].$$

Part (4) is given by

$$E [u_n (\text{reform}) \mid \sigma_1 = 1] = e^{-\alpha_1 \ell} P\left(\frac{\pi p}{\pi p + (1 - \pi)}\right) \phi_R < \phi_R = E [u_n (\text{no reform}) \mid \sigma_1 = 1]$$

where the inequality follows from  $e^{-\alpha_1 \ell} < 1$  and  $P(\rho) \leq 1$  for all  $\alpha_1 \ell > 0$  and  $\rho \in [0, 1]$ .  $\square$

We now turn to the characterization of the unique equilibrium. Proposition 11 says that when bureaucracy is sufficiently efficient or the legislature is sufficiently long, in equilibrium, the risk an incompetent politician faces when starting a reform is too large and she prefers not to start one.

**Proposition 11.** *The probability  $\sigma_1$  that an incompetent politician starts a reform in legislature 1 is (i) 0 if  $\alpha_1 \ell > -\ln(\underline{\rho}/\phi_R)$  and (ii) strictly decreasing in the efficiency of the bureaucracy and the length of the legislature otherwise.*

*Proof. Step 1:* From Lemma 5, Part 4, there is no equilibrium with  $\sigma_1 = 1$ . Thus, in equilibrium we either have  $\sigma_1 = 0$  and

$$E[u(\text{reform}) \mid \sigma_1 = 0] = e^{-\alpha_1 \ell} \phi_R < \underline{\rho} = E[u(\text{no reform}) \mid \sigma_1 = 0] \quad (40)$$

or  $\sigma_1 \in [0, 1)$  solves

$$E[u_n(\text{reform})] = E[u_n(\text{no reform})]. \quad (41)$$

*Step 2:* From Lemma 5, Parts 1, 2, and 3, equation (41) has exactly one solution in  $[0, 1)$  if  $e^{-\alpha_1 \ell} \phi_R \geq \underline{\rho}$  and no solution in  $[0, 1)$  otherwise.

*Step 2:* Suppose  $e^{-\alpha_1 \ell} \phi_R < \underline{\rho}$ , then in equilibrium  $\sigma_1 = 0$ , proving part (i). Suppose  $e^{-\alpha_1 \ell} \phi_R \geq \underline{\rho}$ . Then  $\sigma_1$  solves equation (41). Since  $E[u_n(\text{reform})]$  is decreasing in  $\alpha_1 \ell$ , then also is  $\sigma_1$ , proving part (ii).  $\square$

The total amount of reforms started in legislature 1 is given by  $\pi p + (1 - \pi) \sigma_1$ . The following proposition shows how the total amount of reforms started in legislature 1 changes with the efficiency of the bureaucracy and the length of the legislature.

**Proposition 12.** *The amount of reforms started in legislature 1 is (i) given by  $p\pi$  if  $\alpha_1 \ell > -\ln(\underline{\rho}/\phi_R)$  and (ii) strictly decreasing in the efficiency of the bureaucracy and the length of the legislature otherwise.*

*Proof.* Follows immediately from Proposition 11.  $\square$

We now turn our attention to the stock of uncompleted reforms at the beginning of legislature 2 (i.e., before politicians choose whether to start reforms in legislature 2). Recall that when this stock is higher, then bureaucracy is slower in legislature 2 ( $\alpha_2$  is smaller).

Notice that when legislature 1 is longer ( $\ell$  greater) or the bureaucracy is more efficient ( $\alpha_1$  smaller), the probability that a reform is completed by the end of the legislature 1 –  $e^{-\alpha_1 \ell}$  is greater. Thus, fixed the number of reforms  $r_1$  started at the beginning of legislature 1, a longer legislature or a more efficient bureaucracy reduce the stock of uncompleted reforms at the beginning of legislature 2,  $r_1 (1 - e^{-\alpha_1 \ell})$ . From Proposition 12, the amount of reforms started at the beginning of legislature 1 is also decreasing in the length of the legislature and the efficiency of the bureaucracy. Thus, the total stock of uncompleted reforms at the beginning of legislature 2

$$e^{-\alpha_1 \ell} [\pi p + (1 - p) \sigma_1]$$

is also decreasing in the length of the legislature and the efficiency of the bureaucracy. This proves the following proposition.

**Proposition 13.** *The stock of uncompleted reforms at the beginning of legislature 2 is (i) given by  $e^{-\alpha_1 \ell} p\pi$  if  $\alpha_1 \ell > -\ln(\underline{\rho}/\phi_R)$  and (ii) strictly decreasing in the initial efficiency of the bureaucracy and the length of legislature 1 otherwise.*

Intuitively, a longer legislature and a more efficient bureaucracy contemporaneously decrease the amount of reforms started (Proposition 12) *and* how many of these reforms are still hanging by the end of the legislature.

Recall that

$$\underline{\rho} \equiv \frac{\pi(1-p)}{1-\pi p}$$

and notice that  $\underline{\rho}$  is decreasing in  $p$ . Thus, incompetent politicians are more likely to start bad reforms with positive probability ( $\alpha_1 \ell < -\ln(\underline{\rho}/\phi_R)$ ) when the need for reforms  $p$  is larger. Also, the amount of reforms started in legislature 1,  $r_1 = \pi p + (1-p)\sigma_1$ , and the stock of uncompleted reforms at the beginning of legislature 2,  $e^{-\alpha_1 \ell} r_1$  are both increasing in  $p$ .

**Proposition 14.** *A higher need for reforms induces (i) both competent and incompetent politicians to start more reforms in legislature 1 and (ii) a higher stock of uncompleted reforms at the beginning of legislature 2.*

## C The Italian legislatures: majorities, duration and predictability

The Italian Parliament is elected for a five year term and is organized in two chambers – a Senate and a Lower Chamber. The first has 315 seats the second 630. Because it is a perfect bicameral system, governments need to gain a vote of confidence in both Chambers. This entails at least 158 seats in the Senate and 315 in the Lower Chamber. Because the Senate has fewer seats, the number of senators in excess of the quorum for a majority defines the strength of the coalition supporting the government in a given legislature. As Table C1 shows, out of the seven legislatures covered in our sample, three ended before the term. Interestingly, these legislatures are precisely the ones where the number of seats in excess of the quorum in the Senate was the lowest. For instance, the XII and XV legislatures both

**Table C1. Italian legislatures durations**

The table shows features of the 7 legislatures covered in our sample, and data on the majority in the Senate and the Lower Chamber. Length is the number of days of legislature duration; completed is a dummy = 1 if the legislature is completed and 0 if it ends prematurely. Share of seats of the coalition is the share of seats

Legislature	Length	Completed	Coalition	Senate			Lower Chamber		
				Share of seats of coalition	Share of seat of majoritarian party	N of senators slack	Share of seats of coalition	Share of seat of majoritarian party	N of MP slack
X	1.757	1	Center	0.58	0.40	24	0.56	0.37	51
XI	722	0	Center	0.54	0.34	12	0.54	0.33	27
XII	755	0	Center right	0.49	0.19	-3	0.58	0.18	36
XIII	1.847	1	Center left	0.54	0.32	11	0.51	0.27	7
XIV	1.794	1	Center right	0.56	0.26	28	0.58	0.28	53
XV	732	0	Center left	0.50	0.32	1	0.55	0.35	34
XVI	1.781	1	Center right	0.55	0.46	16	0.55	0.44	29

ended before the term: in the first the coalition supporting the government at the beginning of the legislature was short of three senators, in the second it could only count on 1 senator in excess of the quorum, injecting a clear element of fragility in the coalition. The XI legislature is the third that ended before the term. In this case the government could count on a margin of 12 senators - a number similar to that in XIII legislature which ended regularly; the difference is that the XI legislature started a few months after the discovery of the largest judicial investigation into political corruption in Italy known as “Mani Pulite”(Clean Hands). It started in February 1992, two months before the elections; one first consequence was lower consensus towards the previous majority, which appeared since the very beginning of the investigation to be heavily involved in the scandal. Few months after the elections it became clear, as the investigation expanded, that a large part of the political system was involved, delegitimizing the new parliament. This led first to a technocratic government and then to the end of the legislature and new elections. The premature end of this legislature too was easily predicted.

**Table 1. Summary statistics**

Variable	Mean	Median	sd
Number of bills	6.69	3	11.71
Number of laws	0.91	0	2.12
Success rate	0.08	0	0.179

**Table 2. Legislative activism, legislature duration and politicians quality**

The table shows the results of OLS estimates of the number of bills presented by MPs on members of parliament quality, measured by gross market return to human capital. All regressions control for MPs demographic characteristics (age, gender, marital status, number of kids, level of education, dummies for region of birth), dummies for chamber of parliament, life senator, previous parliament experience, appointment in party at nation and local level, dummies member of European parliament, president or secretary of a committee, member of a committee, deputy-president or minister in government, dummies for political affiliation (left or right), and a full set of legislature dummies. Regression compute robust standard errors;  $p$ -values are shown in parenthesis : \*\*\* significant $\leq$  1%; \*\* significant $\leq$  5% ; \* significant $\leq$  10%.

	Whole sample		Sample splits	
	Quality measure: fixed effect	Quality measure: Mean residual	Complete Legislature	Incomplete Legislature
Low quality politician	-0.63 (0.266)	0.00 (0.995)	-2.10** (0.027)	-0.36 (0.507)
Complete legislature * low quality politician	-1.21** (0.036)	-1.10** (0.044)		
Observations	4,903	4,903	2,610	2,293
R-squared	0.104	0.103	0.090	0.080

**Table 3. Robustness**

The table shows the results of OLS estimates of the number of bills presented on members of parliament quality. In the first column this is measures by net of tax income prior to election. In columns 2 and 3 by gross income prior to election. Column 2 drops observations with more than 54 bills (the 99<sup>th</sup> percentile of the number of bills distribution); the third column only considers MPs with a positive number of bills presented. All regressions control for MPs demographic characteristics (age, gender, marital status, number of kids, level of education, dummies for region of birth), dummies for chamber of parliament, life senator, previous parliament experience, appointment in party at nation and local level, dummies member of European parliament, president or secretary of a committee, member of a committee, deputy-president or minister in government, dummies for political affiliation (left or right), and a full set of legislature dummies. Regression compute robust standard errors;  $p$ -values are shown in parenthesis : \*\*\* significant $\leq$  1%; \*\* significant $\leq$  5% ; \* significant $\leq$  10%.

	Quality measured with fixed effects			Quality measured with average residuals		
	Low quality Fe <25th	No outliers	At least one bill	Low quality Resid <25th	No outliers	At least one bill
Low quality politician	-0.44 (0.369)	-0.32 (0.399)	-1.13 (0.136)	-0.36 (0.417)	-0.37 (0.207)	0.17 (0.753)
Complete legis. * low quality polit.	-0.99* (0.089)	-0.97** (0.014)	-0.88 (0.227)	-0.99 (0.117)	-0.81** (0.036)	-1.12* (0.09)
Observations	4,903	4,852	3,613	4,903	4,852	3,613
R-squared	0.103	0.131	0.100	0.103	0.132	0.098

**Table 4. The effect on the number of laws**

The table shows the results of OLS estimates of the number of laws presented by MPs on members of parliament quality, measured by gross market return to human capital. All regressions control for MPs demographic characteristics (age, gender, marital status, number of kids, level of education, dummies for region of birth), dummies for chamber of parliament, life senator, previous parliament experience, appointment in party at nation and local level, dummies member of European parliament, president or secretary of a committee, member of a committee, deputy-president or minister in government, dummies for political affiliation (left or right), and a full set of legislature dummies. Regression compute robust standard errors; *p*-values are shown in parenthesis : \*\*\* significant<= 1%; \*\* significant< 5% ; \* significant< =10%.

	FE < median	FE 25 <sup>th</sup> pct	Resid median	Resid 25h pct
Low quality politician	0.01 (0.921)	0.05 (0.441)	-0.02 (0.753)	0.01 (0.853)
Complete legislature * low quality politician	-0.32** (0.016)	-0.32** (0.012)	-0.15 (0.255)	-0.44*** (0.004)
Observations	3,613	3,613	3,613	3,613
R-squared	0.161	0.160	0.160	0.163

**Table 5. Successful bills and politician quality**

The table shows the results of Tobit estimates of the share of approved bills on members of parliament quality, measured by gross market return to human capital. All regressions control for MPs demographic characteristics (age, gender, marital status, number of kids, level of education, dummies for region of birth), dummies for chamber of parliament, life senator, previous parliament experience, appointment in party at nation and local level, dummies member of European parliament, president or secretary of a committee, member of a committee, deputy-president or minister in government, dummies for political affiliation (left or right), and a full set of legislature dummies. Regression compute robust standard errors; *p*-values are shown in parenthesis : \*\*\* significant<= 1%; \*\* significant< 5% ; \* significant< =10%.

	FE < median	FE < 25 <sup>th</sup> pct	Resid < median	Resid < 25h pct
Low quality politician	-0.04*** (0.000)	-0.06*** (0.000)	-0.02*** (0.000)	-0.04*** (0.000)
Observations	3,612	3,612	3,612	3,612

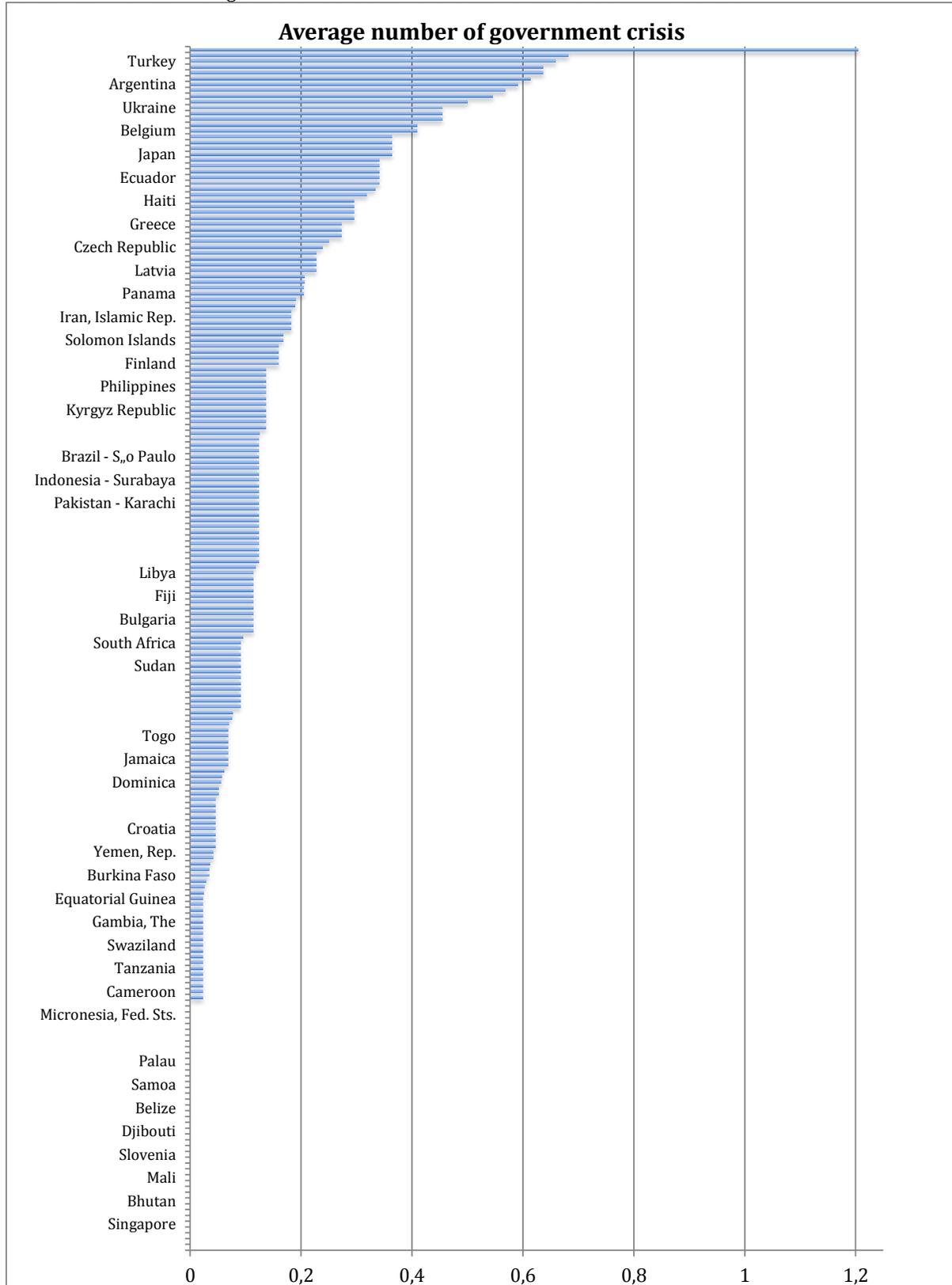
**Table 6. Timing the legislature when presenting a bill**

The table shows the results of a Cox proportional hazard model estimate where OLS regression on the number of days to the end of the legislature when a bill was presented on a dummy for of the probability of not surviving the presentation of a bill after n days since the start of the legislature. All regressions control for MPs demographic characteristics (age, gender, marital status, number of kids, level of education, dummies for region of birth), dummies for chamber of parliament, life senator, previous parliament experience, appointment in party at nation and local level, dummies member of European parliament, president or secretary of a committee, member of a committee, deputy-president or minister in government, dummies for political affiliation (left or right), and a full set of legislature dummies. Robust standard errors are clustered at the MP level. *p*-values in parenthesis. \*\*\* significant <= 1%; \*\* significant < 5% ; \*\*\* significant 10%

	Low politician quality measure			
	FE < median	FE < 25 <sup>th</sup> pct	Resid < median	Resid < 25h pct
Low quality politician	-0.03 (0.425)	-0.02 (0.599)	0.06*** (0.007)	0.06*** (0.007)
Complete legislature * low quality politician	0.04 (0.337)	0.07 (0.127)	-0.10** (0.043)	-0.10** (0.043)
Observations	35,301	35,301	35,301	35,301

### Figure 5. Political instability across countries

Average number of major government crisis per year between 1970 and 2013 from the Cross National Time Series Data Archive. The figures shows the data for the countries with at least one crisis.



**Figure 6. Survival analysis**

Kaplan- Meier survival estimates by legislature completion and politician quality

