Online Appendix to "From Weber to Kafka: Political Instability and the Overproduction of Laws"

Gabriele Gratton, Luigi Guiso,
Claudio Michelacci and Massimo Morelli*

October 22, 2020

Abstract

Appendix O1 proves uniqueness of the equilibrium when designing bad reforms is costly. Appendix O2 shows that our theoretical results carry over to a more general environment in which the endowment of reforms is assumed to be constant per unit of time and politicians can be reelected for a second term. Appendix O3 further describes the data and contains additional empirical results. Appendix O4 reports a list of Italian laws popularly known after the name of their main sponsor.

O1 Uniqueness and cost of introducing bad reforms

Assume that there is a cost $\gamma_\theta > 0$ of introducing a bad reform and that the cost varies with the politician's type θ with $\gamma_0 < \gamma_1$. This assumption captures the idea that incompetent politicians are capable of reaching national power only if they are relatively talented in the production of seemingly useful, but in reality useless, reforms.

*Gratton: UNSW Business School, UNSW Sydney, email: g.gratton@unsw.edu.au. Guiso: EIEF and CEPR, email: luigi.guiso@eief.it. Michelacci: EIEF and CEPR, email: c.michelacci1968@gmail.com. Morelli: Bocconi University, IGIER and CEPR, email: massimo.morelli@unibocconi.it.

In this version of the model we can prove that the equilibrium discussed in the main text corresponds to the unique divine equilibrium of the model when γ_θ is arbitrarily small:

Proposition 1. *When the cost of initiating a bad project of reforms γ_θ converges to zero ($\gamma_\theta \to 0$) for all $\theta \in \{0,1\}$, the unique Divine equilibrium converges to the equilibrium characterized in Proposition 1.*

Proof. We begin by establishing two properties of our model that will be useful in proving uniqueness. Notice that $\rho^g_{i\ell} = 1$ as the information set for event g is a singleton. Thus, the expected payoff of politician $i\ell$ when she passes her reform is given by:

$$E\left[u_{i\ell}\left(\theta_{i\ell},\omega_{i\ell}\right) \mid 1\right] = \left(1-\eta\left(\alpha_\ell,\lambda_\ell\right)\right)\rho^y_{i\ell} + \eta\left(\alpha_\ell,\lambda\right)\left[\omega_{i\ell} + \left(1-\omega_{i\ell}\right)\rho^b_{i\ell}\right] - \left(1-\omega_{i\ell}\right)\gamma_{\theta_{i\ell}}.$$

Fact 1. *For any $\left(\rho^y_{i\ell},\rho^b_{i\ell}\right)$,*

$$E\left[u_{i\ell}\left(1,1\right) \mid 1\right] > E\left[u_{i\ell}\left(0,0\right) \mid 1\right] > E\left[u_{i\ell}\left(1,0\right) \mid 1\right].$$

The expected payoff of being inactive is instead given by

$$E\left[u_{i\ell}\left(\theta_{i\ell},\omega_{i\ell}\right) \mid 0\right] = \rho^n_{i\ell}.$$

Fact 2. *The expected payoff when inactive does not depend on either the politician's competence or the quality of her project of reforms.*

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

Lemma 1. *In any divine equilibrium,*

1. *if n is off-equilibrium, then $\rho^n_{i\ell} = 1$;*

2. *if y is off-equilibrium, then* $\rho^y_{i\ell} = 1$;

3. *if b is off-equilibrium, then* $\rho^b_{i\ell} = 0$.

Proof of Lemma 1. Let (σ^*, ρ^*) be a sequential equilibrium and suppose that there exist an event $e \in \{n, y, g, b\}$ occurring with probability 0 if politicians follow σ^*. Let $\Sigma^e(\theta, \omega)$ be the set of strategies, for a politician with competence θ and quality of reform ω, which lead to e occurring with strictly positive probability. Also, let $\Xi^e(\sigma^*)$ be the set of beliefs $\rho = \left(\rho^n_{i\ell}, \rho^y_{i\ell}, \rho^g_{i\ell}, \rho^b_{i\ell}\right)$ consistent with σ^*. For any pair (θ, ω), we can define

$$\bar{\Xi}^e_{\theta\omega}(\sigma^*) \equiv \{\rho \in \Xi^e(\sigma^*) : E[u_{i\ell}(\theta, \omega) \mid \sigma] \geq E[u_{i\ell}(\theta, \omega) \mid \sigma^*] \text{ for some } \sigma \in \Sigma^e(\theta, \omega)\}$$

$$\Xi^e_{\theta\omega}(\sigma^*) \equiv \{\rho \in \Xi^e(\sigma^*) : E[u_{i\ell}(\theta, \omega) \mid \sigma] > E[u_{i\ell}(\theta, \omega) \mid \sigma^*] \text{ for some } \sigma \in \Sigma^e(\theta, \omega)\}.$$

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

$$\rho \in \bar{\Xi}^e_{\theta\omega} \Rightarrow \rho \in \Xi^e_{\tilde{\theta}\tilde{\omega}},$$

then the public beliefs ρ^* upon observing event e give probability 0 to type θ.

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—do not pass their reform. We want to show that $\rho^b_{i\ell} = 0$ in all divine equilibria. From Facts 1 and 2, for any belief $\rho_{i\ell}$ for which a competent politician with a bad reform would (weakly) prefer to deviate to pass it, an incompetent politician 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 pass their reforms (with probability 1). We want to show that $\rho^n_{i\ell} = 1$ in all divine

equilibria. From Facts 1 and 2, for any belief $\rho_{i\ell}$ for which an incompetent politician would (weakly) prefer to deviate to not passing her reform, a competent politician 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 do not pass their reforms. Notice that event b is also off-equilibrium and therefore, as proven above, $\rho^b_{i\ell} = 0$ in any divine equilibrium. We want to show that $\rho^y_{i\ell} = 1$ in all divine equilibria. From Facts 1 and 2, for any belief $\rho_{i\ell}$ for which an incompetent politician would (weakly) prefer to deviate to passing her reform, a competent politician with a good reform would strictly prefer to do so. Thus, public beliefs upon observing y should give probability 0 to incompetent politicians. ■

Facts 1 and 2 together with Lemma 1 immediately imply the following two Lemmas:

Lemma 2. *In any divine equilibrium, whenever competent politicians with bad reforms (weakly) prefer to pass their reforms,*

1. *competent politicians with good reforms strictly prefer to pass theirs;*

2. *incompetent politicians strictly prefer to pass theirs.*

Lemma 3. *In any divine equilibrium, whenever incompetent politicians prefer to pass their reforms, competent politicians with good reforms strictly prefer to pass theirs.*

We can now prove that:

Lemma 4. *In any divine equilibrium, competent politicians with bad reforms do not pass their reforms.*

Proof of Lemma 4. From Lemma 2, in any divine equilibrium, either (i) competent politicians with good reforms and incompetent politicians pass their reforms with probability 1 ($\sigma_{i\ell}(1,1) = \sigma_{i\ell}(0,0) = 1$) or (ii) competent politicians with bad reforms do not pass theirs ($\sigma_{i\ell}(1,0) = 0$). 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 passing a reform for an incompetent politician is a (strictly) convex combination of $\rho^y_{i\ell} - \gamma_0$ and $\rho^b_{i\ell} - \gamma_0$. By Bayes' rule

$$\begin{aligned}
\rho^y_{i\ell} &= \frac{\pi_\ell \left[p_\ell + (1-p_\ell)\,\sigma_{i\ell}(1,0)\right]}{\pi_\ell \left[p_\ell + (1-p_\ell)\,\sigma_{i\ell}(1,0)\right] + (1-\pi_\ell)} \leq \pi_\ell; \\
\rho^b_{i\ell} &= \frac{\pi_\ell (1-p_\ell)\,\sigma_{i\ell}(1,0)}{\pi_\ell (1-p_\ell)\,\sigma_{i\ell}(1,0) + (1-\pi_\ell)} < \rho^y_{i\ell}; \\
\rho^n_{i\ell} &= 1 > \pi_\ell;
\end{aligned}$$

which implies that incompetent politicians would strictly prefer to not pass their reforms:

$$E\left[u_{i\ell}(0,\omega_{i\ell}) \mid 1\right] < \pi_\ell - \gamma_0 < 1 = E\left[u_{i\ell}(0,\omega_{i\ell}) \mid 0\right].$$

■

Therefore, all equilibria feature competent politicians with bad reforms not passing their reforms and either incompetent politicians do not pass theirs or they pass them with probability strictly between zero and one. We now consider the two cases separately

No bad reform is ever passed. Suppose that all (competent and incompetent) politicians with bad reforms do not pass them. Then, by Bayes' rule and Lemma 1, $\rho^n_{i\ell} \leq \pi_\ell$, $\rho^b_{i\ell} = 0$, and $\rho^y_{i\ell} = 1$. Which implies that competent politicians strictly prefer to pass their reforms: $\sigma^*_{i\ell}(1,1) = 1$. Furthermore, an incompetent politician with a bad reform would prefer to

be inactive only if $(1-\eta(\alpha_\ell,\lambda_\ell))-\gamma_0 \leq \rho^n_{i\ell}$.[1] It is straightforward to see that when γ_0 goes to zero (and with $\sigma^*_{i\ell}(1,1)=1$) this condition converges to $1-\eta(\alpha_\ell,\lambda_\ell) < \underline{\rho}\ell$.

Some bad reforms are passed. Now consider the case where incompetent politicians pass their reforms with strictly positive probability. In any such equilibrium, $\rho^b_{i\ell}=0$ as—by Lemma 4—only incompetent politicians produce bad reforms in equilibrium. Also, by Lemma 3, competent politicians pass their reforms with probability 1. Since we ruled out equilibria in which both competent politicians with good reforms and incompetent politicians pass their reforms with probability 1 (property (i) above), it must be that incompetent politicians pass their reforms with probability strictly between 0 and 1. The following indifference condition must then hold:

$$(1-\eta(\alpha_\ell,\lambda_\ell))\,\rho^y_{i\ell}-\gamma_0=\rho^n_{i\ell}$$

$$(1-\eta(\alpha_\ell,\lambda_\ell))\,\frac{\pi_\ell p_\ell}{\pi_\ell p_\ell+(1-\pi_\ell)\,\sigma^*_{i\ell}(0,0)}-\gamma_0=\frac{\pi_\ell(1-p_\ell)}{\pi_\ell(1-p_\ell)+(1-\pi_\ell)\left(1-\sigma^*_{i\ell}(0,0)\right)}$$

where the last passage follows from Bayes' rule. It is straightforward to see that the equation above implies that

$$\lim_{\gamma_0\to 0}\sigma^*_{i\ell}(0,0)=\sigma(\Omega_\ell).$$

■

O2 Model extensions

We extend the model in "From Weber to Kafka" to impose that the the endowment of reforms is constant per unit of time. To do so, we explicitly account for time within leg-

[1] Recall from Lemma 1 that if the public anticipates bad reforms never to be passed, then $\rho^b_{i\ell}=0$. Thus

$$E[u_{i\ell}(\theta_{i\ell},\omega_{i\ell})\mid 1]=[1-\eta(\alpha_\ell,\lambda_\ell)]\,\rho^y_{i\ell}+\eta(\alpha_\ell,\lambda_\ell)\,\rho^b_{i\ell}-\gamma_0=\eta(\alpha_\ell,\lambda_\ell)-\gamma_0.$$

islatures. For notational convenience, we study a model with constant parameters λ,π, and p, and then return to shocks to the parameters only when discussing the dynamics from a Weberian to a Kafkaesque steady state. In particular, we assume that time is discrete, indexed by $t = 1, 2, \ldots$, and divided into *legislatures*. Each legislature $\ell = 1, 2, \ldots$ runs for $\lambda \geq 1$ periods, so that legislature ℓ begins in period $t_\ell \equiv \lambda(\ell - 1) + 1$. At the beginning of legislature ℓ, each politician is endowed with a *project of reforms*: a collection of small reforms contributing to a unitary project. Politician $i\ell$'s project is *good* ($\omega_{i\ell} = 1$) with probability $p\theta_{i\ell}$, and *bad* ($\omega_{i\ell} = 0$) with probability $1 - p\theta_{i\ell}$. At the beginning of legislature ℓ, each politician $i\ell$ chooses whether to carry out her project of reforms, in which case we say that she is *active*. An active politician passes one reform per period, unless there is hard evidence that her project is bad.[2] The reputation of politician $i\ell$ at the end of the legislature is then determined by one of the following four events:

- y: the politician was active, but no reform was implemented;
- n: the politician was inactive;
- b: at least one bad reform has been implemented;
- g: at least one good reform has been implemented.

O2.1 Equilibrium

We denote by

$$\eta(\alpha_\ell, s) \equiv 1 - (1 - \alpha_\ell)^{\sum_{k=1}^{s} k} = 1 - (1 - \alpha_\ell)^{\frac{s(s+1)}{2}}$$

the probability that at least one reform passed by an active politician in legislature ℓ is not outstanding by the end of the s-th period of the legislature.

[2] We assume that politicians start passing reforms at the beginning of the legislature and that politicians with a good project of reforms cannot initiate a bad one. Both assumptions are without loss of generality: if politicians could delay their reforms or start a bad one when they have a good one, they would not do so in any equilibrium that survives standard refinements. We could also test the hypothesis that incompetent politicians strategically decide to postpone the initiation of their reforms, finding little evidence in favor of any strategic delaying.

Propositions 1 and **2**, as well as the respective proofs, in "From Weber to Kafka" then hold verbatim substituting λ for λ_ℓ and "being active" for "passing a reform" as needed.

Given α_ℓ, the stock of outstanding reforms at the end of legislature ℓ satisfies

$$h_\ell = (1-\alpha_\ell)^\lambda h_{\ell-1} + \frac{1-(1-\alpha_\ell)^\lambda}{\alpha_\ell}\pi p + (1-\pi)\,\sigma(\Omega_\ell)\,\chi(\alpha_\ell,\lambda) \tag{1}$$

where

$$\chi(\alpha_\ell,\lambda) \equiv \sum_{j=1}^{\lambda}(1-\eta(\alpha_\ell,j))(1-\alpha_\ell)^{\lambda-j}. \tag{2}$$

The first term in the right hand side is the contribution of the backlog of outstanding reforms inherited from legislature $\ell-1$; the second (third) is the number of good (bad) reforms passed in legislature ℓ and still outstanding at its end.[3]

The following proposition characterizes the relation between the steady state number of outstanding reforms at the end of each legislature, $h_{\ell-1} = h_\ell = h^*$, and the steady state level of bureaucratic efficiency α^*.

Proposition 3$*$: In a steady state, the stock of outstanding reforms at the end of each legislature satisfies

$$h^* = \frac{\pi p}{\alpha^*} + (1-\pi)\,\sigma(\Omega_\ell)\,\frac{\chi(\alpha^*,\lambda)}{1-(1-\alpha^*)^\lambda} \tag{3}$$

which is decreasing in the steady state level of bureaucratic efficiency α^* and in λ. The steady state stock of public capital is equal to

$$\tilde{k}^* = \frac{\alpha^*\pi p}{\delta\left[1-(1-\alpha^*)(1-\delta)\right]}. \tag{4}$$

[3]The third term is obtained by noticing that there are $(1-\pi)\,\sigma(\Omega_\ell)$ active incompetent politicians, each of them generating an expected number of outstanding bad reforms equal to $\chi(\alpha_\ell,\lambda)$. The expression in (2) uses the assumption that an incompetent politician stops passing reforms as soon as her project of reforms is discovered to be bad. To understand this expression, notice that the incompetent politician introduces a reform in period $j = 1,2,...\lambda$ only if none of her previously passed reforms have been implemented (which happens with probability $1-\eta(\alpha_\ell,j)$) and this reform will still be outstanding at the end of legislature ℓ with probability $(1-\alpha_\ell)^{\lambda-j}$. Summing over all periods in the legislature yields (2).

Proof. We start considering the function

$$g(\alpha,\lambda)=\frac{\chi(\alpha,\lambda)}{1-(1-\alpha)^{\lambda}}\equiv\frac{(1-\alpha)^{\lambda}\sum_{j=1}^{\lambda}(1-\alpha)^{\frac{j(j-1)}{2}}}{1-(1-\alpha)^{\lambda}}. \tag{5}$$

From immediate inspection of (5) it follows that, $\forall\alpha\in(0,1)$, $g(\alpha,\lambda)$ is decreasing in α. We now prove that, $\forall\lambda>1$, the function g is also decreasing in λ. To prove this, notice that

$$g(\alpha,\lambda+1)-g(\alpha,\lambda)=\frac{(1-\alpha)^{\lambda+1}}{1-(1-\alpha)^{\lambda+1}}\left\{(1-\alpha)^{\frac{(\lambda+1)\lambda}{2}}-\left[\frac{(1-\alpha)^{-1}-1}{1-(1-\alpha)^{\lambda}}\right]\sum_{j=1}^{\lambda}(1-\alpha)^{\frac{j(j-1)}{2}}\right\}$$

which, given that $\alpha\in(0,1)$, has the same sign as

$$\xi(\lambda)\equiv(1-\alpha)^{\frac{\lambda(\lambda+1)}{2}}-\frac{(1-\alpha)^{-1}-1}{1-(1-\alpha)^{\lambda}}\sum_{j=1}^{\lambda}(1-\alpha)^{\frac{j(j-1)}{2}}$$

We want to show that $\xi(\lambda)<0$ for all $\lambda\in\mathbb{N}^{+}$, i.e.,

$$(1-\alpha)^{\frac{\lambda(\lambda+1)}{2}}<\frac{(1-\alpha)^{-1}-1}{1-(1-\alpha)^{\lambda}}\sum_{j=1}^{\lambda}(1-\alpha)^{\frac{j(j-1)}{2}}$$

which is equivalent to proving that

$$1<\frac{(1-\alpha)^{-1}-1}{(1-\alpha)^{\frac{\lambda(\lambda+1)}{2}}\left[1-(1\text{-}\alpha)^{\lambda}\right]}\sum_{j=1}^{\lambda}(1-\alpha)^{\frac{j(j-1)}{2}}=\frac{\sum_{j=1}^{\lambda}\left[(1-\alpha)^{\frac{j(j-1)}{2}-1}-(1-\alpha)^{\frac{j(j-1)}{2}}\right]}{\sum_{j=1}^{\lambda}\left[(1-\alpha)^{\frac{\lambda(\lambda+1)}{2}+j\text{-}1}-(1-\alpha)^{\frac{\lambda(\lambda+1)}{2}+j}\right]}. \tag{6}$$

where the last equality follows from the fact that

$$(1-\alpha)^{\frac{\lambda(\lambda+1)}{2}}-(1-\alpha)^{\frac{\lambda(\lambda+1)}{2}+\lambda}=\sum_{j=1}^{\lambda}\left[(1-\alpha)^{\frac{\lambda(\lambda+1)}{2}+j-1}-(1-\alpha)^{\frac{\lambda(\lambda+1)}{2}+j}\right].$$

The exponential function with basis $x\in(0,1)$, x^{a}, is decreasing and convex in its argument a. Then, for any pair of functions $a(i)$ and $b(i)$ such that $a(i)<b(i)\ \forall i\in\mathbb{N}^{+}$ we

have that, provided $x \in (0,1)$,

$$\sum_{i=1}^{n}\left(x^{a(i)-1}-x^{a(i)}\right)>\sum_{i=1}^{n}\left(x^{b(i)-1}-x^{b(i)}\right).$$

By using this result with $\alpha \in (0,1)$ and since

$$\frac{j\left(j-1\right)}{2}<\frac{\lambda\left(\lambda+1\right)}{2}+j,\ \forall j\in\{1,\ldots,\lambda\},$$

we can conclude that

$$\sum_{j=1}^{\lambda}\left[\left(1-\alpha\right)^{\frac{j(j-1)}{2}-1}-\left(1-\alpha\right)^{\frac{j(j-1)}{2}}\right]>\sum_{j=1}^{\lambda}\left[\left(1-\alpha\right)^{\frac{\lambda(\lambda+1)}{2}+j-1}-\left(1-\alpha\right)^{\frac{\lambda(\lambda+1)}{2}+j}\right],$$

which proves that (6) holds, allowing us to conclude that $\xi\left(\lambda\right)<0$ for all $\lambda \in \mathbb{N}^{+}$.

Since (i) $g\left(\alpha,\lambda\right)$ is decreasing in α and λ, (ii) by Proposition 2, $\sigma\left(\Omega_{\ell}\right)$ is decreasing in α and λ, and (iii) the first term in the right hand side of (3) is decreasing in α, it immediately follows that h^{*} in (3) is also decreasing in α and λ.

To obtain the expression for the steady state stock of public capital in (4), notice that over time t the stock of public capital evolves as follows

$$\tilde{k}_{t+1}=\left(1-\delta\right)\tilde{k}_{t}+\alpha^{*}\tilde{k}_{gt} \tag{7}$$

where $\tilde{k}_{gt}$ is the stock of public capital in outstanding good reforms which evolves as follows

$$\tilde{k}_{gt+1}=\left(1-\alpha^{*}\right)\left(1-\delta\right)\tilde{k}_{gt}+\pi p. \tag{8}$$

Let $\tilde{k}^{*}$ and $\tilde{k}_{g}^{*}$ denote the steady state stock of existing public capital and the steady stock of public capital in outstanding good reforms, respectively. By imposing the steady state

condition in (7) and (8) we obtain

$$\begin{aligned}\tilde{k}^* &= \frac{\alpha^* \tilde{k}_g^*}{\delta} \\ \tilde{k}_g^* &= \frac{\pi p}{1-(1-\alpha^*)(1-\delta)}\end{aligned}$$

which correspond to (4). ■

As in our benchmark model, the following condition guarantees the existence of a Weberian steady state.

Assumption 1. *The Weberian implementation rate $\overline{\alpha}$ satisfies $\frac{\pi p}{\overline{\alpha}} \leq \overline{h}^K$ and $\eta(\bar{\alpha}, \lambda) \leq \underline{\rho}$.*

Proposition 4∗: If Assumption 1 holds, there exists a Weberian steady state with a stock of outstanding reforms equal to

$$h_W \equiv \frac{\pi p}{\overline{\alpha}} \leq \overline{h}^K. \tag{9}$$

A Kafkaesque steady state exists if and only if

$$h_K \equiv \frac{\pi p}{\underline{\alpha}} + (1-\pi)\sigma(\underline{\alpha}, p, \lambda, \pi)\frac{\chi(\underline{\alpha}, \lambda)}{1-(1-\underline{\alpha})^\lambda} > \overline{h}^K \tag{10}$$

The Kafkaesque steady-state is more likely to exist when (i) there are greater reform opportunities (p high), (ii) legislatures are shorter (λ low), (iii) there are fewer competent politicians (π low), and (iv) a Kafkaesque bureaucracy is more inefficient ($\underline{\alpha}$ low).

Proof. Follows directly from the properties of $\sigma(\Omega_\ell)$ in Proposition 1 together with the result proved in the proof of Proposition 3∗ that $\frac{\chi(\alpha,\lambda)}{1-(1-\alpha)^\lambda}$ is decreasing in both α and λ. ■

When Assumption 1 and condition (10) are both satisfied, transitory shocks can cause a transition from a Weberian to a Kafkaesque steady state. To characterize the transition,

consider a legislature ℓ which is initially in Weberian steady state: the stock of outstanding reforms is $h_W = \frac{\pi p}{\overline{\alpha}}$ and bureaucratic efficiency is $\overline{\alpha}$. Given (1), the number of outstanding reforms at the end of the legislature ℓ is equal to

$$h\left(\lambda_\ell, p_\ell, \pi_\ell\right) \equiv \left(1-\overline{\alpha}\right)^{\lambda} h_W + \left[1-\left(1-\overline{\alpha}\right)^{\lambda}\right] \frac{\pi_\ell p_\ell}{\overline{\alpha}} + \left(1-\pi_\ell\right) \sigma\left(\Omega_\ell\right) \chi\left(\overline{\alpha}, \lambda_\ell\right) \tag{11}$$

where λ_ℓ, p_ℓ, and π_ℓ correspond to the values in legislature ℓ of λ, p and π, respectively.

Proposition 5 then holds verbatim.

Proof. Since Assumption 1 holds, we have that $\sigma\left(\Omega_\ell\right) = 0$ and $\frac{\pi p}{\overline{\alpha}} < \overline{h}^K$. It follows from Proposition 2 that

$$h\left(\lambda_\ell, p, \pi\right) = \frac{\pi p}{\overline{\alpha}} + \left(1-\pi\right) \sigma\left(\Omega_\ell\right) \chi\left(\overline{\alpha}, \lambda_\ell\right) > \overline{h}^K \tag{12}$$

can happen only if $\lambda_\ell < \lambda$ so as to make $\sigma\left(\Omega_\ell\right) > 0$. We now prove that a reduction in λ to $\lambda_\ell < \lambda$ can indeed lead to a transition to a Kafkaesque steady state. Set $\overline{h}^K$, $\bar{\alpha}$ and λ such that the two conditions characterizing Assumption 1 both hold as an equality: $\frac{\pi p}{\bar{\alpha}} = \overline{h}^K$, and $1 - \eta\left(\bar{\alpha}, \lambda\right) = \underline{\rho}$. This configuration of parameters can always be found since $\overline{h}^K$ affects the first but not the second condition characterizing Assumption 1. Given this parameter configuration $\lambda_\ell < \lambda$ immediately makes the inequality in (12) satisfied and necessarily leads to a transition to a Kafkaesque steady state.

Regarding shocks to p, notice that Proposition 2 implies that

$$h\left(\lambda, p_\ell, \pi\right) = \left(1-\overline{\alpha}\right)^{\lambda} h_W + \left[1-\left(1-\overline{\alpha}\right)^{\lambda}\right] \frac{\pi p_\ell}{\overline{\alpha}} + \left(1-\pi\right) \sigma\left(\Omega_\ell\right) \chi\left(\overline{\alpha}, \lambda\right)$$

is globally increasing in p_ℓ, so $h\left(\lambda, p_\ell, \pi\right) > \overline{h}^K$ can happen only if $p_\ell > p$. To prove that it can exist $p_\ell > p$ that leads to a transition to a Kafkaesque steady state, one can follow the same reasoning used above to prove that there can exist $\lambda_\ell < \lambda$ causing a transition

to a Kafkaesque steady state.

To analyze the effects of shocks to π notice that Proposition 2 together with Assumption 1 imply that $\sigma(\Omega_\ell) = 0 \; \forall \pi_\ell > \pi$. It follows that $\forall \pi_\ell > \pi$ we have that

$$h(\lambda, p, \pi_\ell) = (1 - \overline{\alpha})^{\lambda} h_W + \left[1 - (1 - \overline{\alpha})^{\lambda}\right] \frac{\pi_\ell p}{\overline{\alpha}}$$

is increasing in π_ℓ. A sufficiently big π_ℓ can then lead to $h(\lambda, p, \pi_\ell) > \overline{h}^K$. To prove that $\pi_\ell > \pi$ can indeed lead to a transition to a Kafkaesque steady state, one can then follow the same reasoning as above. ■

O2.2 Reelection model

We now study an extension of the model in which politicians can be reelected for a second term. In particular, we assume that politician $i\ell$ is reelected in legislature $\ell+1$ with probability $\rho_{i\ell}$ and that reelected politicians have no incentives to posture and signal their type in their second (and last) mandate. Notice that the equilibrium behavior of newly elected politicians is still characterized by Propositions 1 and 2. Nevertheless, the probability of reelection of competent and incompetent politicians affect the equilibrium distribution of politicians in the following legislature.

In equilibrium, the ex ante probability that a competent politician is reelected in legislature ℓ is equal to

$$r_\ell(\alpha_\ell) \equiv r(\Omega_\ell) = p\left[\eta(\alpha_\ell,\lambda) + (1-\eta(\alpha_\ell,\lambda))\,\rho_\ell^y\right] + (1-p)\,\rho_\ell^n, \tag{13}$$

which, after using Proposition 1, can be written as follows:

$$r_\ell(\alpha_\ell) = \begin{cases} \frac{p+\pi-2\pi p}{1-\pi p} & \text{if } 1-\eta(\alpha_\ell,\lambda) < \underline{\rho}; \\ \pi + (1-\pi)\,p\eta(\alpha_\ell,\lambda) & \text{otherwise;} \end{cases} \tag{14}$$

The re-election probability of a (random) politician is equal to

$$\pi r_\ell(\alpha_\ell) + (1-\pi)\left\{\sigma_\ell(\Omega_\ell)\,(1-\eta(\alpha_\ell,\lambda))\,\rho_\ell^y + [1-\sigma_\ell(\Omega_\ell)]\,\rho_\ell^n\right\} = \pi. \tag{15}$$

The term in curly brackets is the ex-ante probability that an incompetent politician is reelected at the end of her first mandate. The equality in (15) means that the fraction of re-elected politicians is constant and equal to π.[4] Finally notice that (15) also implies that in

[4]This result follows from the assumption that a politician's probability of being reelected is equal to the posterior belief that she is competent: the ex-ante expected posterior that the politician is competent (equal to the reelection probability) is a martingale and therefore equal to the prior that the politician is competent (equal to π).

legislature $\ell+1$ the fraction of competent politicians in the pool of re-elected politicians is equal to $r_\ell(\alpha_\ell)$.

For any legislature $\ell = 1, 2, \ldots$, the stock of outstanding reforms at the end of the legislature, h_ℓ, evolves according to

$$h_\ell = (1-\alpha_\ell)^\lambda h_{\ell-1} + \frac{1-(1-\alpha_\ell)^\lambda}{\alpha_\ell}\left[(1-\pi)+r_{\ell-1}(\alpha_{\ell-1})\right]\pi p + (1-\pi)^2\sigma_\ell(\Omega_\ell)\chi(\alpha_\ell,\lambda) \tag{16}$$

where the first term in the right hand side is the contribution of the backlog of outstanding reforms inherited from legislature $\ell-1$, the second is the number of good reforms passed in the legislature still outstanding at the end of the legislature, while the third term is the number of outstanding bad reforms passed by the mass of active incompetent politicians, equal to $(1-\pi)^2\sigma_\ell(\alpha_\ell)$, each of them generating an expected number of outstanding reforms equal to $\chi(\alpha_\ell,\lambda)$.

Weberian and Kafkaesque steady states. Let α^* be the steady state implementation rate of reforms. Given (16), the steady state stock of outstanding reforms at the end of each legislature is equal to

$$h^* \equiv \frac{\left[(1-\pi)+r(\alpha^*,p,\lambda,\pi)\right]\pi p}{\alpha^*} + (1-\pi)^2\sigma(\alpha^*,p,\lambda,\pi)\frac{\chi(\alpha^*,\lambda)}{1-(1-\alpha^*)^\lambda} \tag{17}$$

which is increasing in bureaucratic inefficiency $1-\alpha^*$ (follows from Proposition 2, and the result proved in the proof of Proposition 3$*$ that $\frac{\chi(\alpha,\lambda)}{1-(1-\alpha)^\lambda}$ and $r(\alpha,p,\lambda,\pi)/\alpha$ are decreasing in α). A steady state equilibrium is characterized by an intersection between the law of motion and the other line, which is now determined by (17) rather than by 3. It is then easy to prove that:

Proposition 4$**$: A Weberian steady state with $\alpha^* = \overline{\alpha}$ is more likely when $\overline{\alpha}$, λ and $\overline{h}^K$ are

high. A Kafkaesque steady state with $\alpha^* = \underline{\alpha}$ requires that $\underline{\alpha}$, λ and $\overline{h}^K$ are small. Generally the Weberian and the Kafkaesque equilibrium both exist when there are large differences in the efficiency of bureaucracy in the two regimes, so that $\overline{\alpha} - \underline{\alpha}$ is large enough.

Dynamics. We now characterize how transitory shocks can cause a shift from a Weberian to a Kafkaesque steady-state. For simplicity, we study the effects of a temporary reduction in the duration of legislature ℓ_0 to $\lambda' < \lambda$. All the other legislatures last λ periods. Given (16), we define the function

$$\begin{aligned} h\left(h_{\ell-1}, \lambda_{\ell-1}, \lambda_\ell, \alpha_{\ell-1}, \alpha_\ell\right) \equiv\ & \left(1-\alpha_\ell\right)^{\lambda_\ell} h_{\ell-1} + \frac{1-\left(1\text{-}\alpha_\ell\right)^{\lambda_\ell}}{\alpha_\ell}\left[\left(1\text{-}\pi\right) + r\left(\alpha_{\ell-1}, p, \lambda_{\ell-1}, \pi\right)\right]\pi p \\ & + \left(1-\pi\right)^2 \sigma\left(\alpha_\ell, p, \lambda_\ell, \pi\right)\chi\left(\alpha_\ell, \lambda_\ell\right), \end{aligned} \tag{18}$$

Figure O1 plots $h\left(h_{\ell-1}, \lambda_{\ell-1}, \lambda_\ell, \alpha_{\ell-1}, \alpha_\ell\right)$ as a function of $h_{\ell-1}$, for four different combinations of $\lambda_{\ell-1}$, λ_ℓ, $\alpha_{\ell-1}$, and α_ℓ. Notice that the derivative of $h\left(h_{\ell-1}, \lambda_{\ell-1}, \lambda_\ell, \alpha_{\ell-1}, \alpha_\ell\right)$ with respect to $h_{\ell-1}$ is less than one, so that, for given $\lambda_{\ell-1}$, λ_ℓ, $\alpha_{\ell-1}$, and α_ℓ, the function h is flatter than the forty five degree line. We now describe the four cases of Figure O1 starting from the bottom to the top. The first case corresponds to the function $h(h_{\ell-1}, \lambda, \lambda, \overline{\alpha}, \overline{\alpha})$, which crosses the forty five degree line in point W. This characterizes the Weberian steady state before the occurrence of the shock. The second line corresponds to the function $h(h_{\ell-1}, \lambda, \lambda', \overline{\alpha}, \overline{\alpha})$, which characterizes the behavior of politicians during legislature ℓ_0 after the shock: it allows to recover the stock of uncompleted reforms at the end of the legislature ℓ_0, which corresponds to point A_1 in the figure. The third line corresponds to the function $h(h_{\ell-1}, \lambda, \lambda, \underline{\alpha}, \underline{\alpha})$, which characterizes a Kafkaesque steady state. The function $h(h_{\ell-1}, \lambda, \lambda, \underline{\alpha}, \underline{\alpha})$ crosses the forty five degree line at point K, by the assumption that the Weberian and the Kafkaesque steady state equilibrium coexist. This

schedule characterizes the behavior of politicians starting from the legislature $\ell_0 + 2$, so that the stock of outstanding reforms at the end of the legislature $\ell_0 + 2$ corresponds to point A_3 in the figure. The fourth line corresponds to the function $h(h_{\ell-1}, \lambda', \lambda, \overline{\alpha}, \underline{\alpha})$, which characterizes the behavior of politicians during the legislature $\ell_0 + 1$: the stock of outstanding reforms at the end of legislature $\ell_0 + 1$ corresponds to point A_2 in the figure. By using the definition of the function h in (18) one can check that $\forall h_{\ell-1}$ we have that $h(h_{\ell-1}, \lambda', \lambda, \overline{\alpha}, \underline{\alpha}) > h(h_{\ell-1}, \lambda, \lambda, \underline{\alpha}, \underline{\alpha})$, which justifies the Figure. Then Figure O1 fully characterizes the transition of an economy, which is initially in a Weberian steady state and then moves to a Kafkaesque steady state just due to a shortening in the duration of legislature ℓ_0: h_{ℓ_0-1} is characterized by point W, h_{ℓ_0} by point A_1, h_{ℓ_0+1} by point A_2, h_{ℓ_0+2} by point A_3 and then h_ℓ converges asymptotically to point K along the $h(h_{\ell-1}, \lambda, \lambda, \underline{\alpha}, \underline{\alpha})$ line.

This transition occurs if, at the end of legislature $\ell_0 + 1$, bureaucratic efficiency has collapsed to $\underline{\alpha}$. So to converge to a Kafkaesque steady state it has to be the case that the two following conditions both hold:

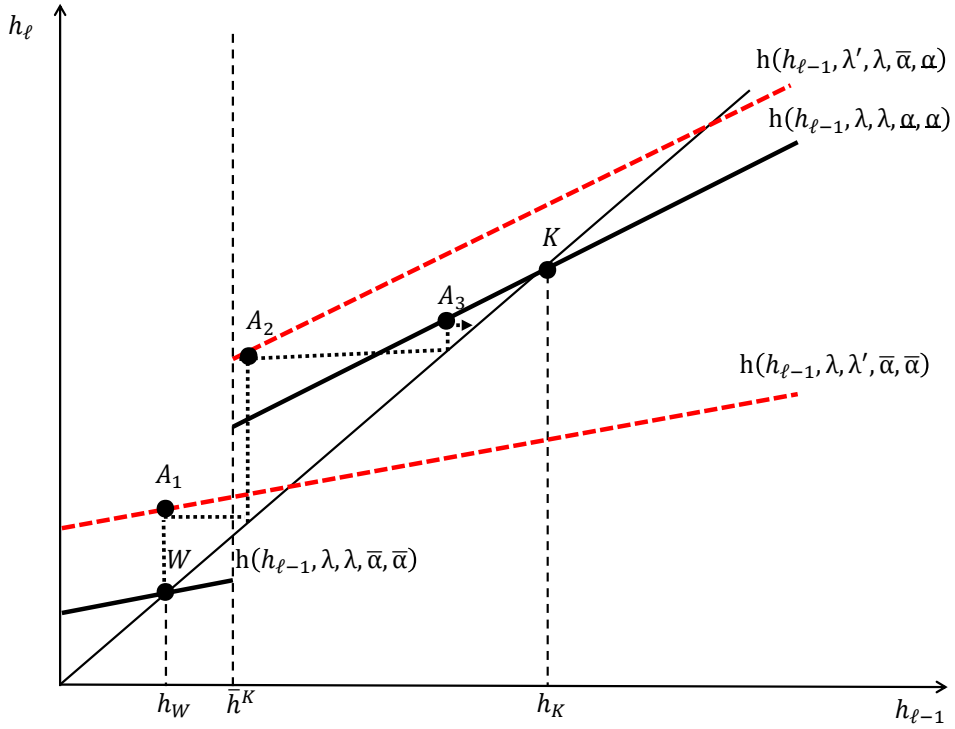
$$h_{\ell_0} = h(h_W, \lambda, \lambda', \overline{\alpha}, \overline{\alpha}) > \overline{h}^K \tag{19}$$

$$h_{\ell_0+1} = h(h_{\ell_0}, \lambda', \lambda, \overline{\alpha}, \underline{\alpha}) > \overline{h}^K \tag{20}$$

In practice the fact that $h(h_{\ell-1}, \lambda', \lambda, \overline{\alpha}, \underline{\alpha}) > h(h_{\ell-1}, \lambda, \lambda, \underline{\alpha}, \underline{\alpha})$ and that system will always converge to a Kafkaesque steady state whenever (19) holds. We can summarize this discussion through the following proposition:

Proposition 5∗∗: Assume that, in the reelection model, both a Weberian and a Kafkaesque steady state exist. Then a transitory reduction in the duration of a legislature from λ to $\lambda' < \lambda$ leads the economy to a Kafkaesque steady-state equilibrium if condition (19) hold,

Figure O1: Transition to a Kafkaesque steady state due to a temporary reduction of λ to λ' in legislature ℓ_0



which is more likely to happen when $\bar{h}^K$, and π are small.

O3 Further description of the data and additional results

We first describe the source of data for our text analysis of the quantity and quality of laws. Second, we discuss how we constructed the salience indexes of the bureaucratic problem in Italy and individual MPs' citations in the press. Finally, we discuss our data on Italian MPs.

O3.1 Quantity and quality of Laws

We downloaded all Italian laws issued by the Italian Parliament from `www.normattiva.it` using Python. Normattiva is an official website created by Law n. 388, 23 December 2000. It collects all laws published on the Official Gazette of the Italian Republic. For each law issued over the period 1948-2016 we have retrieved: (i) the *id* of the law; (ii) the date when the law was passed; (iii) the name and *id* of the main sponsor of the law ("Primo Firmatario"); and computed the following variables: (iv) the number of words in the law after excluding stop-words; (v) the number of pages covered by the law in the Official Gazette; (vi) the number of other laws cited; (vii) the existence of a preamble; (viii) the average length of sentences (in number of characters); (ix) the number of verbs in the gerund form used. We use (i)-(iii) to match each single law to the data for individual MPs discussed below. To construct aggregate time series for the total number of words of laws issued, summed the number of words of all laws issued in the quarter. The resulting sum is divided by 1,000. To calculate the time series for the number of pages per law, number of gerunds per word of law and the number of other laws cited per word of law, we summed the corresponding figure for all laws issued in the quarter and then divided it by the total number of words issued in the quarter.

For Germany, we downloaded all the Official Gazettes of the German Federal Gov-

ernment ("Bundesgesetzblatt") since 1955 until 2017, available at `https://www.bgbl.de/xaver/bgbl`. The Bundesgesetzblatt contains all Federal laws, regulations and decrees passed by the Federal Parliament ("Bundestag"). We focused the analysis on all laws ("Gesetze") and decrees ("Verordnung") published in the Official Gazettes. For each year we calculated the number of words of laws published in an average quarter. Words are measured in thousands. We also calculated the number of references to other laws cited by each law per one thousand words in the law.

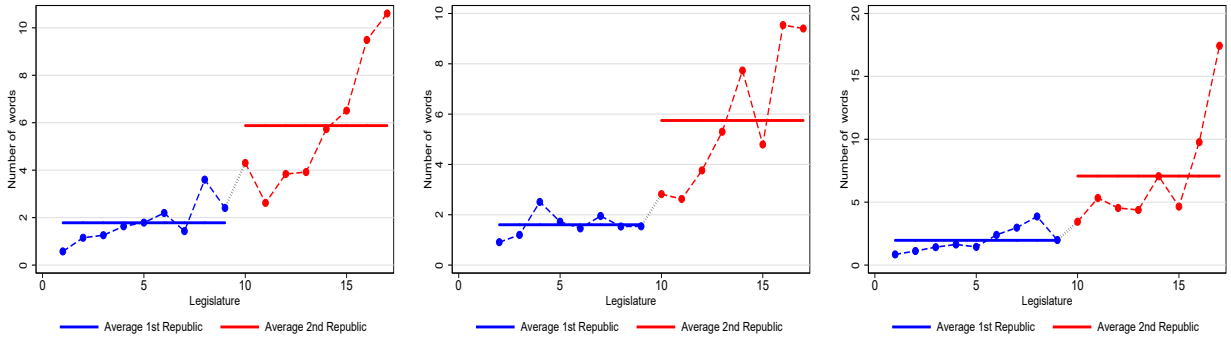
O3.2 Number of words by topic

To classify laws by topic we use a unique feature of the Italian legislative process. Articles 87 and 90 of the Italian Constitution establish that laws are enacted by the President of the Republic, but his writs must be countersigned by the Prime Minister as well as by all Ministers whose offices are relevant for the matter of the law.[5]

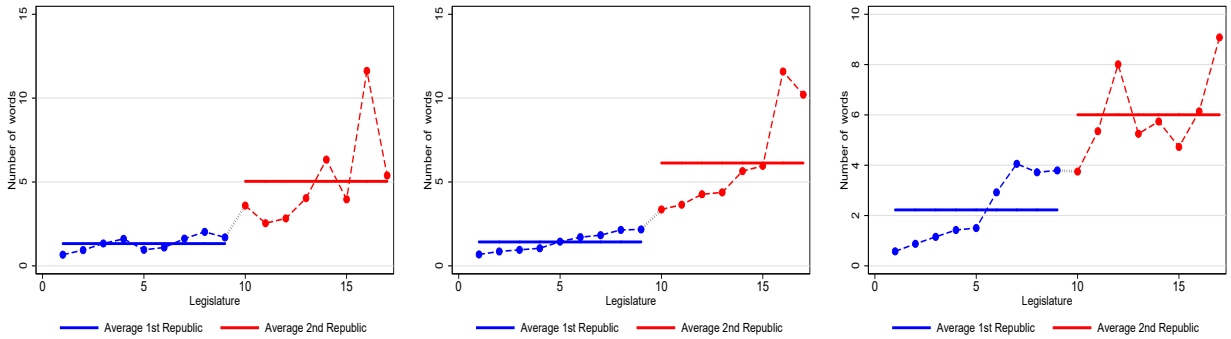
We process all Italian laws and assign each law to the matter of competence of the minister who countersigned the writ by the president. For each topic we calculate the number of words of laws issued, see Figure O2. For the sake of summarizing results we have grouped laws into 9 topics: "Agriculture" if laws are signed by the ministers of agriculture, fisheries, and animal resources; "Leisure" if they are signed by the ministers of cultural heritage, environment, sport or tourism; "Communication" if signed by the ministers of transportation or communication; "Defense" if signed by the ministers of defense; "Economics" if signed by the ministers of the economy, finance or labor; "Foreign policy" if signed by the ministers of foreign policy; "Law & order" if signed by the min-

[5]This feature is inherited by the Statuto Albertino of 1848 where it was introduced to protect the king: because "the king can do no wrong," the countersignature by the king's ministers was a way of protecting the sacred and infallible character of the king by making the ministers liable for any hypothetical crime associated with the introduction of a law. In the Italian Constitution the same principle protects the President of the Republic.

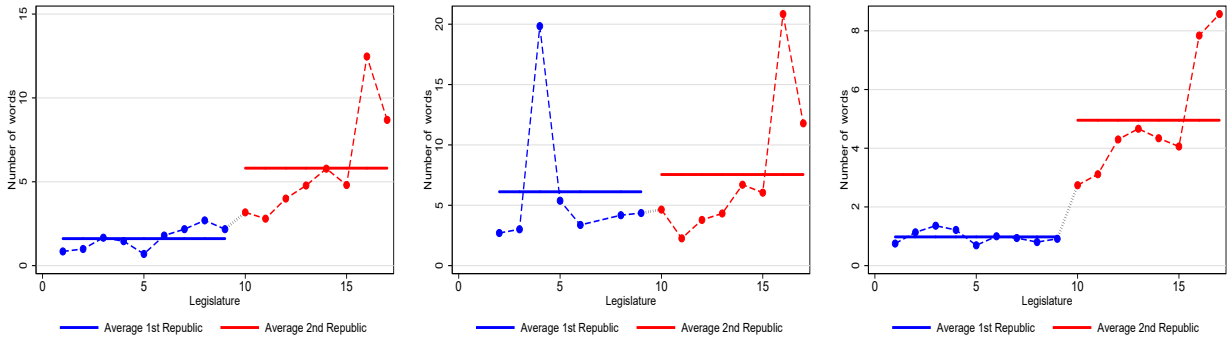
Figure O2: Number of words of laws by topic



(a) Agriculture **(b) Leisure** **(c) Communication**



(d) Defense **(e) Economics** **(f) Foreign policy**



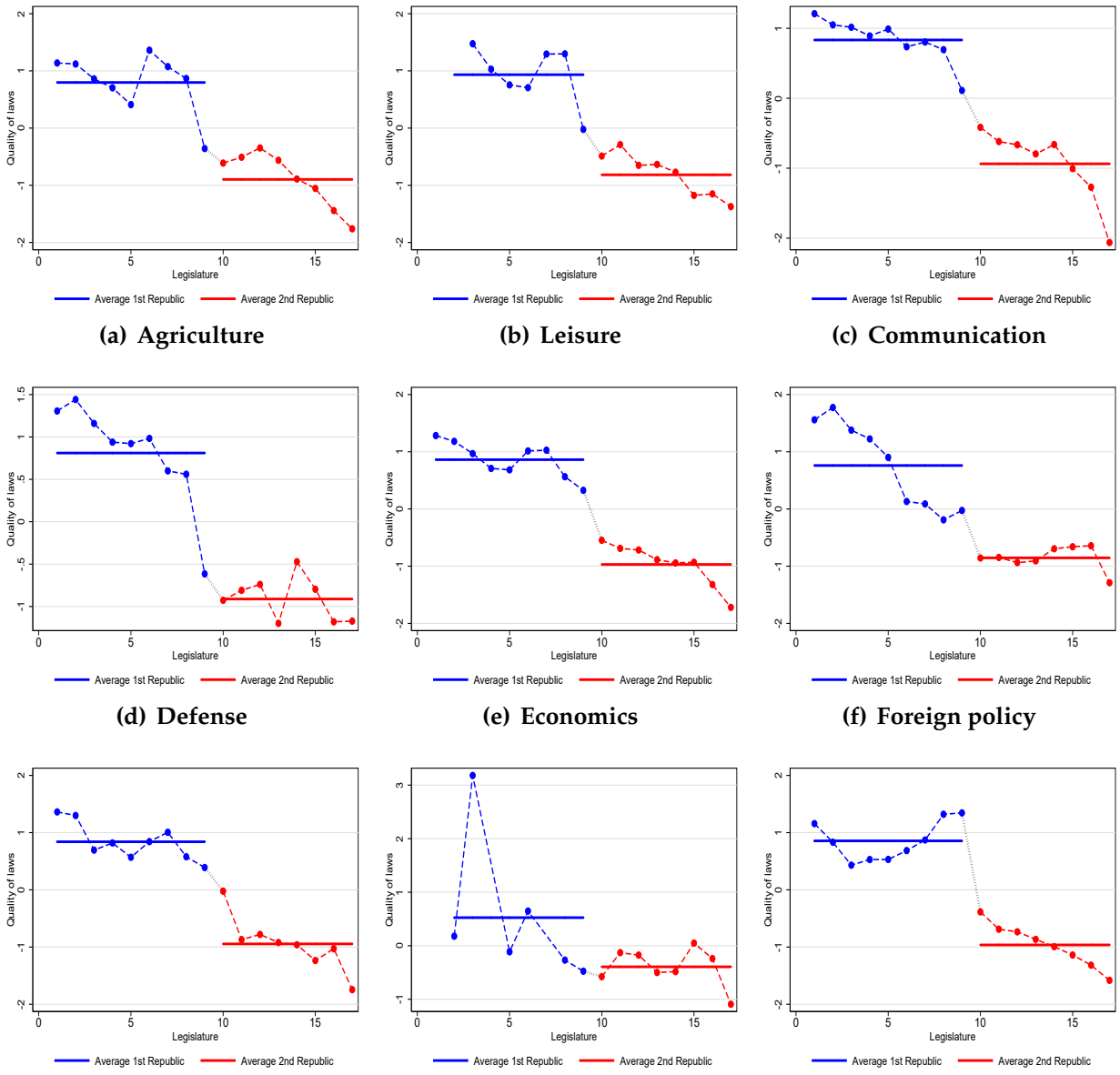
(g) Law & order **(h) Public administration** **(i) Health & Education**

The topic of the law is identified using the countersignature by the competent Minister relevant for the matter of the law. "Agriculture" corresponds to the all laws signed by the minister of agriculture, fisheries and animal Resources. "Leisure" corresponds to those signed by the minister of cultural heritage, environment, sport or tourism; "Communication" to those signed by the minister of transportation or communication; "Defense" corresponds to those signed by the minister of defense; "Economics" to those signed by the minister of economy, finance or labor; "Foreign Policy" to those signed by the minister of foreign policy; "Law & order" to those signed by the minister of justice or interior; "Public administration" to those signed by the minister public administration; "Health & Education" to those signed by the minister of health or education. The total number of words of laws does not add up to the number in Section 6 in the main text because the same law might be signed by more than one minister.

isters of justice or interior; "Public administration" if signed by the ministers of public administration; "Health & Education" if signed by the ministers of health or education. Since the same law might be signed by more than one minister, the total number of words of laws in the panels do not always add up to the number in Section 6 in the main text.

For each law we have also constructed our measure of *Quality of laws* which is equal to (minus) the principal component of the following variables: number of gerunds per word, length of sentences, presence and length of preamble, and number of references to other laws. The evolution of the quality of legislation by topic is reported in Figure O3. Overall there is evidence that the quality of legislation has deteriorated in all topics. The production of words of laws has also increased in all topics with just the remarkable exception of Public Administration (Panel (h)), which, according to our theory, would require more interventions of simplification of the legislation to improve the efficiency of bureaucracy hampered by the excessive production of laws.

Figure O3: Quality of laws by topic



(a) Agriculture **(b) Leisure** **(c) Communication**

(d) Defense **(e) Economics** **(f) Foreign policy**

(g) Law & order **(h) Public administration** **(i) Health & Education**

The topic of the law is identified using the countersignature by the competent Minister relevant for the matter of the law., see legend to Table O2 for a more detailed definition. *Quality of laws* is (minus) the principal component of the following variables: number of gerunds per word, length of sentences, presence and length of preamble, and number of references to other laws.

O3.3 Salience of the bureaucratic problem and citations of MPs

We used information from the historical archive of "Il Corriere delal Sera" (Corsera), the main Italian daily newspaper, available at `http://archivio.corriere.it/Archivio/`

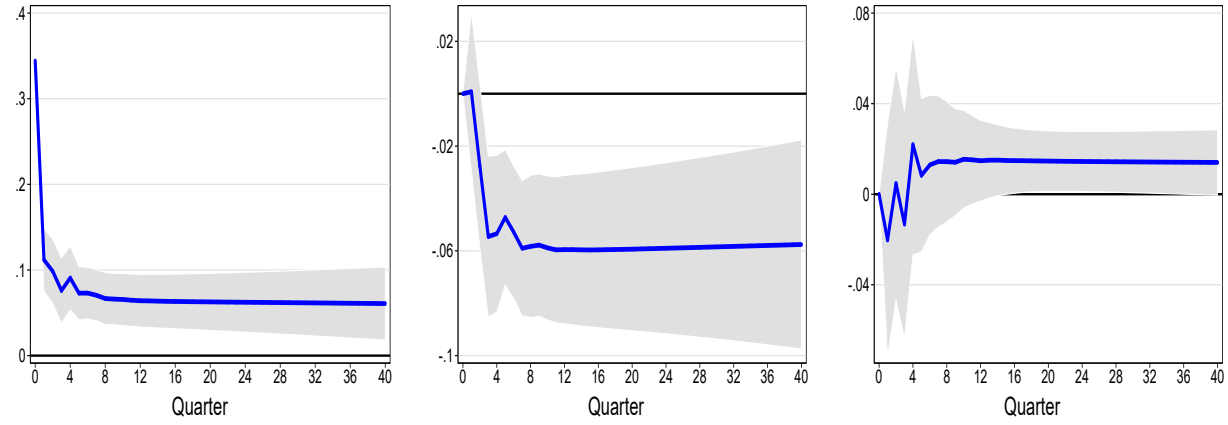
interface/pro.html. For each day since January 1946 to December 2016 we have counted the number of times the word bureaucracy ('burocrazia') appears on the first page of Corsera. This is our index for the salience of the bureaucratic problem in Italy. To construct the number of citations of MPs we used information on the name of the main cosponsor of the bill and counted the number of times his or her name appear on all pages of Corsera in a window covering thirty days before and thirty days after the day when the bill was first discussed in one of the two chambers of the Italian Parliament.

O3.4 Additional SVAR results

We ran the same structural VAR on the Italian data as in the main text but excluding the last years of the sample, where we observed a pronounced spike in our index of bureaucratic inefficiency, as measured by the number of citations in Corsera. Figure O4 plots the effects of the shock from a Vector Autoregression Model (VAR) estimated over the subsample 1946:I-2010:IV. Responses are qualitatively and quantitatively similar to those in the main text.

We also analyzed the effects of a shock to the efficiency of bureaucracy identified by imposing the restriction that, in the quarter of impact, the shock only affects *Bureaucratic inefficiency*; this follows from the realistic assumption that it takes some time for politicians to adjust their legislative activism. Figure O5 reports the impulse response to a one Standard Deviation shock that increases on impact *Bureaucratic inefficiency*. Panel (a) reports the impulse response of our measure for *Bureaucratic inefficiency*; Panel (b) the response of the *Number of words of law* issued in a quarter (our measure of the quantity of legislation); Panel (c) the response of the *Quality of laws*. The figure shows that the increase in bureaucratic inefficiency persistently increases the amount of legislation pro-

Figure O4: Response to a one SD increase in the amount of legislation: Italian subsample



(a) Number of words of law **(b) Quality of laws** **(c) Bureaucratic Inefficiency**

Impulse response to a one Standard Deviation increase in the *Number of Words of law* issued in a quarter (panel (a)) on the *Quality of laws* (panel (b)) and *Bureaucratic Inefficiency* (panel (c)). All variables are in logs. The VAR contains 4 lags and is estimated over the period 1946:I-2010:IV.

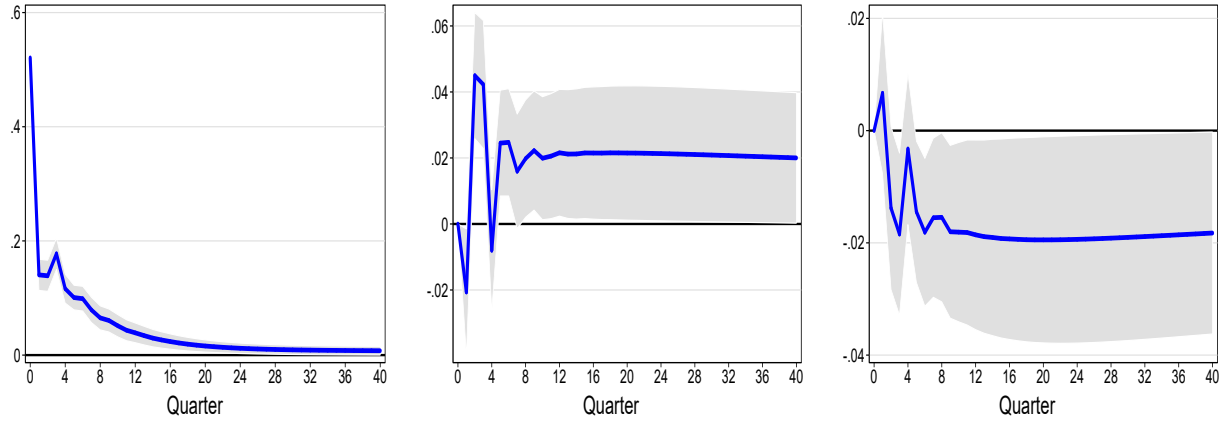
duced and leads to a worsening in its quality. Overall the evidence of Figure O5, together with the evidence in Figure 7 in the paper, supports our theory that the quantity and quality of laws are jointly determined, that an increase in the production of laws leads to a worsening in the quality of bureaucracy, and that a less efficient bureaucracy induces politicians to produce more laws and of worse average quality.

We also estimated the same VAR discussed in the main text using the German data. The VAR contains 4 lags and seasonal dummies and cover the sample period 1955:I-2018:II. The VAR characterizes the stochastic time-series evolution of the following triple:

$$X_t = [\textit{Number of words of law}_t, \textit{ Quality of laws}_t, \textit{ Bureaucratic inefficiency}_t] .$$

All variables are in logs. *Number of words of law* corresponds to the sum of all words of laws passed by the German Federal Parliament in the quarter. *Quality of laws* is equal to minus the number of references to other laws per word of laws. *Bureaucratic inefficiency* is our measure for the public salience of the bureaucratic problem as inferred by

Figure O5: Response to a one SD increase in the inefficiency of bureaucracy

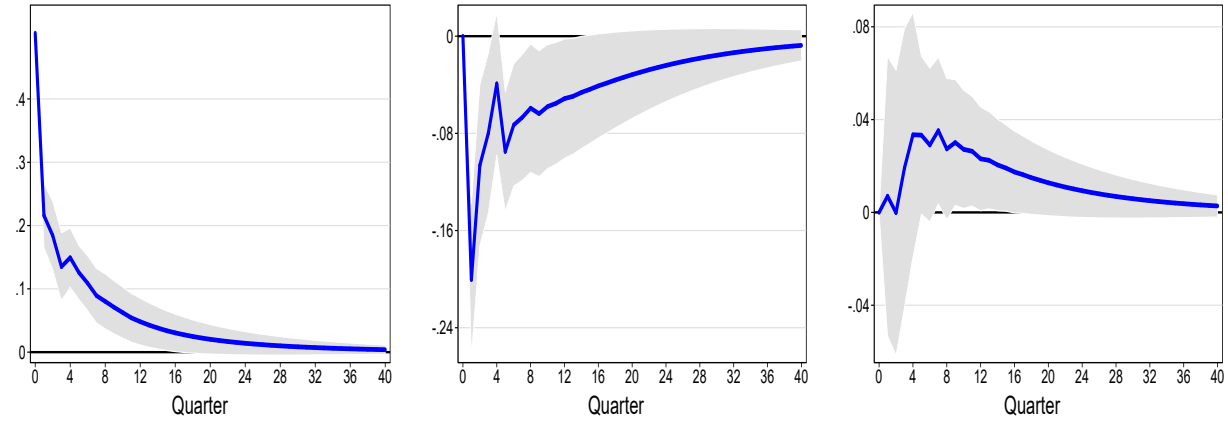


(a) Bureaucratic Inefficiency **(b) Number of words of law** **(c) Quality of laws**

Impulse response to a one Standard Deviation increase in the *Bureaucratic inefficiency* issued in a quarter (panel (a)) on the *Number of words of law* (panel (b)) and the *Quality of laws* (panel (c)). All variables are in logs. The VAR contains 4 lags and is estimated over the period 1946:I-2016:IV.

the number of citations in the front page of the Frankfurter Allgemeine Zeitung. As in the main text we identify a shock to the amount of legislation by imposing the restriction that, in the quarter of impact, the shock affects only the variable *Number of words of laws*, which follows from the assumption (also made in the model) that bureaucratic efficiency is slow-moving. Figure O6 plots the impulse response to a one standard deviation shock to the number of words of laws issued by the Parliament in a quarter. The effects of the shock in Germany are qualitatively similar to those estimated for Italy, but there is one important quantitative difference. The shock is much more persistent in Italy than in Germany and as a result the effects on the quality of legislation and the inefficiency of bureaucracy also persist more over time.

Figure O6: Response to a one SD increase in the amount of legislation in Germany



(a) Number of words of law **(b) Quality of laws** **(c) Bureaucratic Inefficiency**

Impulse response to a one Standard Deviation increase in the *Number of Words of law* issued in a quarter (panel (a)) on the *Quality of laws* (panel (b)) and *Bureaucratic Inefficiency* (panel (c)). *Number of Words of law* is the number of words in all laws contained in all laws ("Gesetze" or "Verordnung") issued by the federal parliament in the quarter. *Quality of laws* is (minus) the number of references to other laws. *Bureaucratic Inefficiency* is the number of times the word bureaucracy appears on average in the front page of Germany's main daily newspaper (Frankfurter Allgemeine Zeitung). All variables are in logs. The VAR contains 4 lags ad a linear trend and is estimated over the period 1955:I-2018:II.

O3.5 Testing for a structural break in the number of words of law

We test for the existence of a structural break in the time series of the number of words of law per quarter in Italy and in Germany after the fall of the Berlin Wall. Table O1 reports the OLS coefficient of a regression of the number of words of law per quarter against a linear time trend and a dummy for the period spanning the Italian Second Republic. Column (1) refers to the Italian data; column (2) to the German data. We find that the dummy coefficient for post 1992 period is significant only in Italy.

Table O1: Structural break in the evolution of word of laws per quarter

VARIABLES	Italy N. of words per quarter (1)	Germany N. of words per quarter (2)
Post-Unification dummy	182.71	-18.24
	(98.67)	(37.26)
Time trend	0.98	2.38
	(2.59)	(1.02)
Method	OLS	OLS

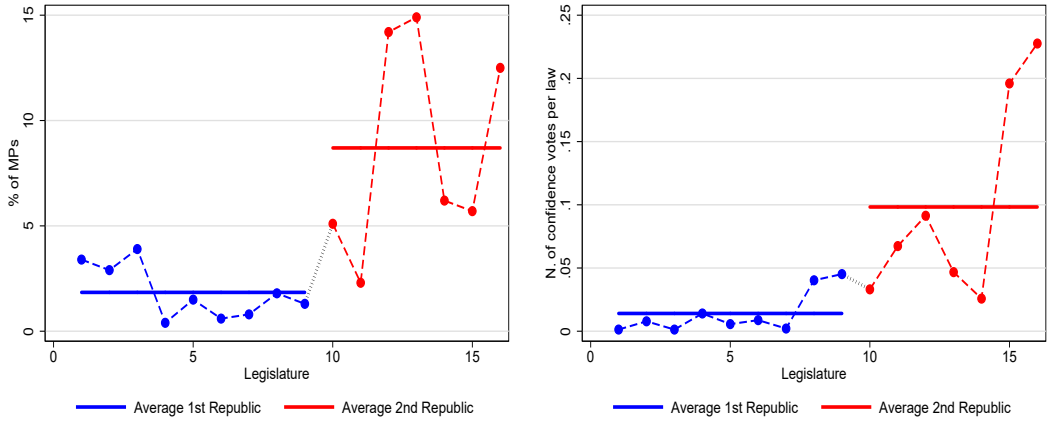
Standard errors in parentheses

The Table reports the OLS coefficient of a regression of the number of words of law per quarter against a linear time trend and a dummy for the period spanning the Italy's 2nd Republic. Column (1) refers to the Italian data. Column (2) to the German data.

O3.6 MPs and legislatures

The Italian Parliament is elected for a five year term and is organized in two chambers—the Chamber of Deputies (630 seats) and the Senate of the Republic (315 seats). Because it is a perfect bicameral system, governments need to gain a vote of confidence in both chambers. This entails at least 158 votes in the Senate and 315 votes in the 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. Figure O7 shows the increased political instability of Italy using fraction of members of the Chamber of Deputies who switched party during the legislature (panel a) and average number of confidence votes per approved law in the legislature (panel b).

Figure O7: Political instability in Italy's Second Republic



(a) Percentage of MPs switching party **(b) Number of confidence votes per law**

Panel (a): fraction of members of the Chamber of Deputies who switched party during the legislature. Panel (b): average number of confidence votes per approved law in the legislature. Solid horizontal lines denote averages during the First and Second Republic.

Table O2 shows that out of the seven legislatures covered in the sample used in Section 5, 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 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 to greatly 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

Table O2: Features of Italian legislatures

Legislature				*Senate*			*Chamber*		
Number	Days	Completed	Coalition	% of Seats Coalition	% of Seats Majoritarian party	Number of Senators slack	% of seats Coalition	% of seats Majoritarian party	Number of MPs slack
X	1.757	Y	Center	0.58	0.40	24	0.56	0.37	51
XI	722	N	Center	0.54	0.34	12	0.54	0.33	27
XII	755	N	Center right	0.49	0.19	-3	0.58	0.18	36
XIII	1.847	Y	Center left	0.54	0.32	11	0.51	0.27	7
XIV	1.794	Y	Center right	0.56	0.26	28	0.58	0.28	53
XV	732	N	Center left	0.50	0.32	1	0.55	0.35	34
XVI	1.781	Y	Center right	0.55	0.46	16	0.55	0.44	29

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

it became clear, as the investigation expanded, that a large part of the political system was involved, delegitimizing the new parliament. This lead first to a technocratic government and then to the end of the legislature and new elections. Therefore, the premature end of this legislature was easily predictable.

Table O3: Additional descriptive statistics

Variable	Mean	Median	SD
Completed legislature $\times$ Incompetent politician	0.27	0	0.50
Age	51.59	51	9.97
Male	0.88	1	0.32
Married	0.57	1	0.50
Life senator	0.01	0	0.09
Number of previous terms	1.25	1	1.77
President or deputy in committee	0.13	0	0.34
Government member	0.06	0	0.24
President/mayor in local government	0.14	0	0.35
Chamber indicator	0.66	1	0.47
Years of education	14.8	17	4.82
Elected in majoritarian system	0.37	0	0.48
Own party in coalition government	0.51	0.35	0.48
Own party expresses Prime Minister	0.27	0.35	0.48
Number of kids	1.17	1	1.27

O3.7 Expected duration of a political career

In Table O4 we calculate the probability that an MP is still in the Parliament x-years after his/her first election in (either chamber of) the Parliament, for both the First and the Second Republic. The implied expected duration of a political career in years is reported in column (4), calculated under the assumption that the career of the MP is a geometric random variable. In Panel A, x is equal to 24 years and we compare MPs of the First Republic first elected in the IV legislature (then followed over the years 1963-1987) with MPs of the Second Republic first elected in the XII legislature (then followed over the years 1994-2018). In Panel B, x is equal to about 20 years and we compare MPs first elected in the I legislature with MPs first elected in the XIII legislature. Finally, in Panel C x is equal to 19 years and we compare MPs first elected in the V legislature with MPs first elected in the XIII legislature. In Panel A the survival rate during the First Republic is 6.1%, three times higher than in the Second Republic (2.1%). In Panel B it is 16.3% in the First Republic compared with 2.8 % in the Second, in Panel (C) it is 11.6% in the First against 4.0% in the Second. Overall, column (4) indicates that the expected duration of the political career of an MP is more than 50% times longer in the First than in the Second Republic. This shortening in the political horizon of politicians drives our theoretical explanation for the break (specific to Italy) in the quantity and quality of laws that we document in the paper.

Table O4: Survival rate of MPs in the First and Second Republic

Republic	Legislatures	Election years (N. of years, x)	Survival rate, %	Expected duration of political career, years
	(1)	(2)	(3)	(4)
A)				
1th	IV-X	1963-1987 (24 years)	6.1	9.1
2th	XII-XVIII	1994-2018 (24 years)	2.1	6.7
B)				
1th	I-V	1948-1968 (20 years)	16.3	11.5
2th	XIII-XVIII	1996-2018 (22 years)	2.8	6.6
C)				
1th	V-X	1968-2018 (19 years)	11.6	9.4
2th	XII-XVII	1994-2013 (19 years)	4.0	6.3

We calculate the probability that an MP is still in the Parliament x-years after his/her first election in the Parliament (either the Chamber of Deputies or the Senate), both in the First and in the Second Republic. In Panel A x is equal to 24 years: we compare MPs first elected in the IV legislature of the First Republic following them over the years 1963-1987 with MPs first elected in the XII legislature of the Second Republic over the years 1994-2018. In Panel B, x is equal to about 20 years, in Panel C x is equal to 19 years. The expected duration of a political career is calculated as equal to $1/\left(1-s^{1/x}\right)$ where s is the survival probability in column (3).

O3.8 Strategic timing

Gratton, Holden and Kolotilin (2018) show that if there is uncertainty about when a reform opportunity arises, incompetent politicians can strategically decide to postpone the initiation of their reforms. Anticipating that the early presentation of bills of dubious quality increases the probability of this being discovered, they could procrastinate such presentation, particularly during complete legislatures where there is greater scope for strategic timing. If so, we should observe that in complete legislatures incompetent politicians reveal a lower hazard rate than high competence MPs in presenting bills. In practice, the scope for strategic timing is limited because too much delay itself could reveal the incompetence of the politician. Table O5 shows the results from estimating a Cox proportional hazard model for the hazard rate of presenting a bill at day n since the start of the legislature on the quality of politicians and its interaction with whether the legislature

is complete. When the quality of politicians is inferred using the fixed-effect measure, we find no evidence that incompetent politicians time their bills strategically. When it is measured using mean residuals, there is some evidence that incompetent politicians strategically delay their bills in complete legislatures.

Table O5: Timing the legislature when presenting a bill

	Politician's incompetence measure			
	FE $<$ median	FE $<$ 25^{th} pct	Resid $<$ median	Resid $<$ 25^{th} pct
Incompetent politician	-0.03	-0.02	0.06	0.06
	(0.425)	(0.599)	(0.007)	(0.007)
Incompetent politician	0.04	0.07	-0.10	-0.10
$\times$ Completed legislature	(0.337)	(0.127)	(0.043)	(0.043)
Observations	35,301	35,301	35,301	35,301

Results of estimating a Cox proportional hazard model for the hazard rate of presenting a bill at day n since the start of the legislature. All regressions include the controls specified in Table **??**. Robust standard errors are clustered at the MP level. p-values in parenthesis.

O4 Example of Italian laws popularly known after the name of main sponsor

Table O6: Some Italian laws known after the name of main sponsor

Legisl.	Popular Name	Official Identifier	Topic
I	Law On. Fanfani	Legge 28 febbraio 1949, n.43	Piano case
	Law On. Gullo-Segni	Legge 21 ottobre 1950, n. 841	Riforma agraria (land reform)
	Law On. Scelba	Legge 20 giugno 1952, n. 645	Reato di apologia del fascismo
	Law On. Gonella	Disegno di Legge 13 luglio 1951, n. 2100	Riforma scolastica (school reform)
	Law On. Tupini	Legge 2 luglio 1949, n. 408	Edilizia
	Law On. Vanoni	Legge 11 gennaio 1951, n. 25	Riforma sistema tributario
II	Law On. Romita	Legge 21 maggio 1955, n. 463	Autostrade
	Law On. Merlin	Legge 20 febbraio 1958, n. 75	Lotta contro sfruttamento della prostituzione
III	Law On. Gui	Legge 31 dicembre 1962, n. 1859	Scuola media unica
	Law On. Vigorelli	Legge 14 luglio 1959, n. 741	Lavoro
	Law On. Zaccagnini	Legge 24 luglio 1961, n. 729	Autostrade

continue on next page

IV	Law On. Mariotti	Legge 12 febbraio 1968, n. 132	Sanità (Riforma ospedaliera)
V	Law On. Fortuna-Baslini	Legge 1 dicembre 1970, n. 898	Divorzio
	Law On. Pieraccini	Legge 20 novembre 1971, n. 1062	Diritto di autentica nel mercato dell'arte
VI	Law On. Visentini	Legge 2 dicembre 1975, n. 576	Riforma tributaria
	Law On. Reale	Legge 22 maggio 1975, n. 152	Ordine pubblico
	Law On. Merli	Legge 10 maggio 1976, n. 319	Ambiente (tutela e razionale impiego delle acque)
	Law On. Marcora	Legge 15 dicembre 1972 n. 772	Obiezione di coscienza al servizio militare
	Law On. Rumor	art. 42 D.P.R. 29 dicembre 1973, n. 1092	Baby pensioni
VII	Law On. Basaglia	Legge 13 maggio 1978, n. 180	Riforma psichiatrica
	Law On. Bucalossi	Legge 28 gennaio 1977, n. 10	Urbanistica
	Law On. Prodi	Legge 3 aprile 1979, n. 95	Riforma diritto fallimentare
VIII	Law On. Rognoni-La Torre	Legge 13 settembre 1982 n. 646	Prevenzione mafia
	Law On. Formica	Legge 22 aprile 1982, n. 168	Agevolazioni "prima casa"
	Law On. Anselmi	Legge 25 gennaio 1982, n. 17	Associazioni segrete

continue on next page

IX	Law On. Goria	Legge 18 dicembre 1986, n. 891	Prima casa
	Law On. Gozzini	Legge 10 ottobre 1986, n. 663	Rieducazione carceria
	Law On. Galasso	Legge 8 agosto 1985, n. 431	Ambiente (tutela beni paesaggistici e ambientali)
	Law On. Marcora	Legge 27 febbraio 1985, n. 49	Sostegno sviluppo società cooperative
X	Law On. Mammì	Legge 6 agosto 1990, n. 223	Norme sui Mass Media
	Law On. Cossiga-Andreotti	Legge 29 gennaio 1992, n. 113	Ambiente
	Law On. Martelli	Legge 28 febbraio 1990, n. 39	Immigrazione
	Law On. Amato-Carli	Legge 30 luglio 1990, n. 218	Sistema Bancario (Privatisation of Savings and Loans)
	Law On. La Pergola	Legge 9 marzo 1989, n. 86	Recepimento Direttive comunitare
	Law On. Vassalli	Legge 13 aprile 1988, n. 117	Responsabilità civile dei magistrati
	Law On. Tognoli	Legge 24 marzo 1989, n. 122	Urbanistica (parcheggi)
	Law On. Mattarella	leggi 4 agosto 1993 n. 276 e n. 277	Riforma del sistema elettorale (electoral law)
	Law On. Merloni	Legge 11 febbraio 1994, n. 109	Lavori pubblici
	Law On. Galli	Legge 5 gennaio 1994, n. 36	Risorse idriche
	Law On. Mancino	Legge 25 giugno 1993, n. 205	Discriminazione razziale, etnica e religiosa
XII	Law On. Tremonti	Legge 8 agosto 1994, n. 489	Ammortamenti accelerati

continue on next page

	Decreto Biondi	Decreto approvato il 13 luglio 1994	Vieta custodia cautelare per corruzione/concussione
	Riforma Dini	Legge 8 agosto 1995, n. 335	Riforma sistema pensionistico
	Law On. Tatarella	Legge 23 febbraio 1995, n. 43	Legge elettorale Regioni
XIII	Law On. Turco-Napolitano	Legge 6 marzo 1998, n. 40	Immigrazione
	Law On. Simeone-Saraceni	Legge 27 maggio 1998, n. 165	Carceri
	Law On. Ciampi	Legge delega 23 dicembre 1998, n. 461	Banche
	Law On. Treu	Legge delega 24 giugno 1997, n. 196	Contrasto disoccupazione
	Law On. Carotti	Legge 16 dicembre 1999 n. 479	Diritto penale
	Riforma Berlinguer	Legge 10 febbraio 2000, n. 30	Istruzione
	Law On. Tremonti Ambientale	Legge 23 dicembre 2000 n. 388	Ambiente
	Law On. Bassanini	Legge 15 marzo 1997, n. 59	Riforma Pubblica Amministrazione
	Law On. Pinto	Legge 24 marzo 2001, n. 89	Durata dei procedimenti giudiziari
	Law On. Baldini	Legge 16 marzo 2001, n. 88	Investimenti in imprese marittime
	Law On. Maccanico	Legge 31 luglio 1997, n. 249	Norme sui Mass Media
XIV	Law On. Bossi-Fini	Legge 30 luglio 2002, n. 189	Immigrazione
	Law On. Cirielli (ex Cirielli)	Legge 5 dicembre 2005, n. 251	Diritto penale

continue on next page

Law On. (riforma) Castelli	Legge 25 luglio 2005, n. 150	Riforma giustizia
Lodo Schifani (o Lodo Berlusconi)	Legge 20 giugno 2003, n. 140	Diritto penale (immunità delle cariche)
Law On. Stanca	Legge 9 gennaio 2004, n. 4	Accesso dei soggetti disabili agli strumenti informatici
Law On. Pecorella	Legge 20 febbraio 2006 n. 46	Diritto penale
Riforma Moratti	Legge 28 marzo 2003, n. 53; Legge 4 novembre 2005, n. 230	Istruzione
Law On. Buttiglione	Legge 4 febbraio 2005 n. 11	Recepimento Direttive comunitare
Law On. Maroni (o Law On. Biagi)	Legge 14 febbraio 2003, n. 30	Riforma mercato lavoro
Law On. Boato	Legge 20 giugno 2003, n. 140	Diritto penale (immunità delle cariche)
Law On. Storace	Legge n. 26 luglio 2005 n. 149	Medicinali
Law On. Marzano	Legge 18 febbraio 2004, n. 39	Amministrazione straordinaria
Law On. Lunardi	Legge 1 agosto 2002 n. 166	Infrastrutture e trasporti
Law On. Calderoli	Legge 21 dicembre 2005, n. 270	Legge elettorale
Law On. Martino	Legge 23 agosto 2004, n. 226	Sospensione leva obbligatoria
Law On. Marzano	Decreto Legge 23 dicembre 2003, n. 347 convertito in Legge 18 febbraio 2004, n. 39	Diritto fallimentare
Law On. La Loggia	Legge 5 giugno 2003, n. 131	Regioni

continue on next page

XV	Law On. Bersani	Decreto-Legge 31 gennaio 2007, n.7 (convertito con Legge n.40 del 2007)	Concorrenza
	Law On. (riforma) Mastella	Legge 30 luglio 2007, n. 111	Riforma giustizia
	Riforma Damiano-Padoa-Schioppa (o Riforma Prodi, o Riforma Prodi-Damiano)	Legge 24 dicembre 2007, n. 247	Pensioni
XVI	Law On. Fornero	articolo 24 del Decreto Legge 6 dicembre 2011, n. 201	Riforma sistema pensionistico (retirement age)
	Lodo Alfano	Legge 23 luglio 2008, n. 124	Diritto penale (immunità delle alte cariche)
	Law On. (riforma) Di Paola	Legge 31 dicembre 2012, n. 244	Riorganizzazione Forze armate
	Riforma Gelmini	Includes different laws:(i) Legge 6 agosto 2008, n. 133; (ii) Legge 30 ottobre 2008, n. 169; (iii) Legge 9 gennaio 2009 n. 1; (iv) Legge 30 dicembre 2010, n. 240; (v) Decreto ministeriale n. 17 del 22 settembre 2010	Istruzione
	Decreto Balduzzi	Decreto-Legge 13 settembre 2012, n. 158 (convertito in Legge 8 novembre 2012, n. 189)	Sanità
	Law On. Reguzzoni	Legge 8 aprile 2010, n. 55	Tutela del "Made in Italy" nel settore tessile
XVII	Law On. Madia	Legge delega 7 agosto 2015, n. 124	Riforma Pubblica Amministrazione

continue on next page

Law On. Gelli-Bianco	Legge 8 marzo 2017, n. 24	Sanità (responsabilità medica)
Law On. Cirinnà	Legge 20 maggio 2016, n. 76	Unioni civili
Law On. Realacci	Legge 6 ottobre 2017, n. 158	Piccoli comuni
Law On. (riforma) Orlando	Legge 23 giugno 2017, n. 103	Diritto penale
Law On. Lorenzin	Decreto Legge 7 giugno 2017 , n. 73	Vaccini
Law On. (riforma) Delrio	Legge 7 aprile 2014, n. 56	Riforma enti locali
Law On. Zampa	Legge 7 aprile 2017, n. 47	Immigrazione, Minori