

# Reform Fatigue <sup>\*</sup>

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## Abstract

We present a rational theory of reform fatigue. At each instant a politician chooses to divide effort between reforms and the status quo. This choice is modeled as a two-armed bandit problem. Reforms are expected to yield a higher rate of output to the voter than the status quo, conditional on the politician being competent. We interpret competence as the administrative ability to ensure successful implementation of reforms. The politician’s competence is unknown ex-ante to both the politician and the voter. In addition the voter is unable to observe the politician’s effort on reform, but only observes aggregate output. In equilibrium the voter gives the politician endogenous term lengths that depend on the timing of success. The politician experiments with reforms at the beginning of his first term, but gradually decreases the rate of reforms in the absence of early success. We call this gradual reduction in experimentation *reform fatigue*. The theory thus predicts that reform fatigue follows a political cycle. We provide empirical evidence of reform fatigue cycles in financial policies among presidential countries.

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“No good deed goes unpunished.” -*Clare Boothe Luce*

# 1 Introduction

Many governments embark on market reforms, for example, liberalization of international trade, financial markets, and reduced regulation. However, it is often the case that the pace of these reforms diminishes over time, leaving intended reforms incomplete. This was true of many Latin American countries in the 1980s and 1990s, Turkey in the 1990s, Poland in the mid 2000s and, more recently, Greece. This phenomenon has come to be known in the media as “reform fatigue”.<sup>1</sup>

A common explanation for reform fatigue is that, in the absence of improvements in outcomes, reforming policymakers fear that reforms will lose voters’ support, and consequently the policymakers themselves will be removed from office (see, for example, Lora et al., 2003). Financial reforms, such as those recommended by the International Monetary Fund (IMF), are often a source of tension between voters and elected officials, and politicians must make trade-offs between the political cost of implementing the reform and the perceived benefit to voters. We illustrate the time-trend of financial reforms in Figure 1, on a scale from 0 to 100—with 100 being most liberal.<sup>2</sup> The figure indicates that financial reforms are, on average, implemented to a large extent in the long-run. However, financial reforms do appear to exhibit a political cycle, consistent with the political explanation. Figure 2 gives the average pace of reforms within a politician’s term in office. The average term is three years in the sample of countries we examine. In the figure, year 0 is the election year, and the change in reforms ranges from  $-28$  to  $38$ .<sup>3</sup> It shows that, on average, a new politician quickly begins pursuing reforms at the beginning of a term in office, but decreases the pace of reforms thereafter.

Although the term reform fatigue has been used in modern times with particular reference to financial reforms initiated by the IMF, such trade-offs are not restricted to IMF reforms, nor are they new. As an example, in December 1887 Grover Cleveland attempted to reduce high protective tariffs and subsequently lost his bid for re-election. He was quoted as saying “What is the use of being elected or re-elected unless you stand for something?”<sup>4</sup> In the case of Grover Cleveland, the choice of a policy whose benefits were not directly observable to the

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<sup>1</sup>See ‘Why reform fatigue has hit the East’, *Financial Times*, September 26, 2006, and ‘IMF warns reform fatigue holding Greece back’, *Wall Street Journal*, June 2014.

<sup>2</sup>This index of financial reforms comes from Abiad et al. (2008), and is described in more detail in Section 6.1.

<sup>3</sup>See Table B.1 in the Appendix for descriptive statistics of this series.

<sup>4</sup>See Freidel and Sidey (2006).

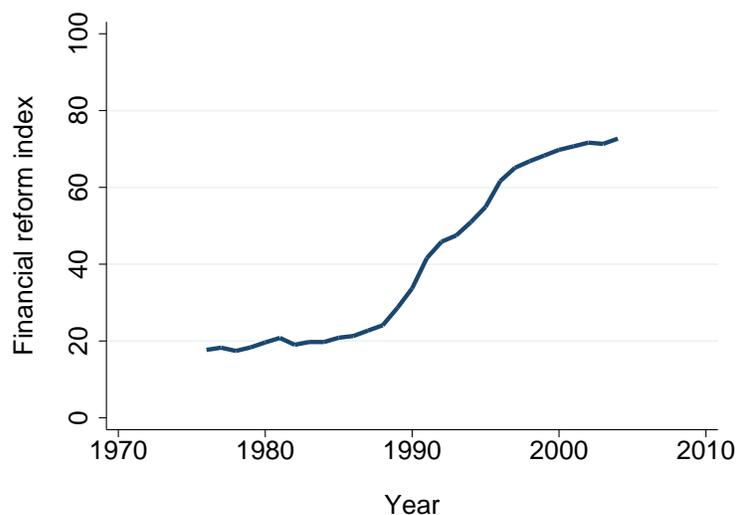


Figure 1: Time series of financial reforms averaged across countries.

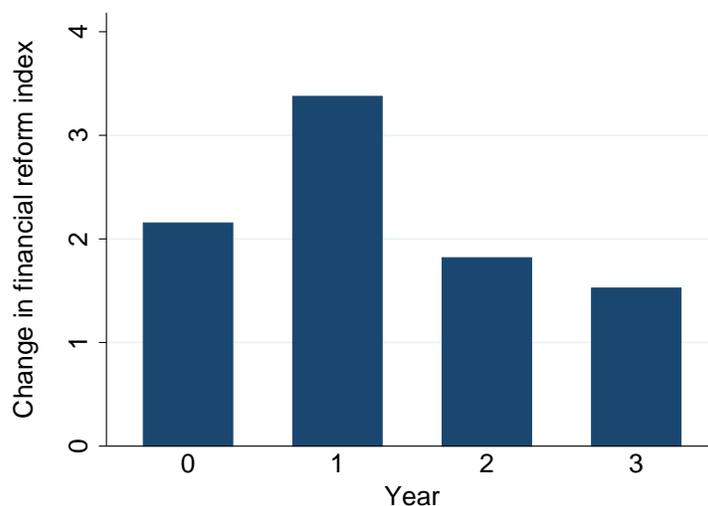


Figure 2: Average change in reforms within a term.

voters, but perceived to be beneficial by the executive, was electorally costly.

The political explanation for reform fatigue presents the following puzzle: if voters are cognizant of the stochastic nature of reform output and believe that incumbents are earnestly pursuing beneficial reforms, why would rational voters punish reform efforts at the polls? In this paper we offer a resolution to this puzzle based on voters' beliefs about the politician's *competence* to conduct reforms. We posit that voters do not lose confidence in the reform *per se*, but lose confidence in the politician's ability to successfully implement them. A politician

may also be uncertain of his ability to conduct reforms, and thus experiments with reforms until he believes that he will be unable to successfully implement them. This paper thus presents a rational theory of reform fatigue.

The problem of reform fatigue is not restricted to the political context. Many organizations require the use of talented individuals who can produce success with relatively high frequency, but talent may be unknown *ex-ante* to both the organization and the individual. Much of the economics literature has focused on incentives to *select* the individual who knows he is talented. However, in many economic situations talent is proved only once the individual is on the job, and thus may not be known with certainty *ex-ante* to the individual or the organization. Examples include junior faculty at a university, professional athletes, entertainers, and mutual fund managers. In the case of junior faculty, the university would like to encourage junior faculty to take on ambitious projects, but the competence of the junior faculty member in executing such ambitious projects may be unknown to both the faculty member and the university. Many professional athletes enter their careers highly touted but do not “live up to the hype”. Yet it takes a coach some time to become sufficiently pessimistic about the athlete’s ability to dismiss the athlete. A difficulty common to these settings is identifying and rewarding uncertain talent that can be hard to distinguish from luck, when effort and the source of output is unobservable to the organization. While we find these applications interesting, the problem of retention (without the use of transfers) is most applicable in the context of a politician seeking to engage in reforms, which is what we study.

We present a continuous time, infinite horizon model of reforms in the spirit of the career concerns literature and introduce experimentation.<sup>5</sup> A politician is drawn at random and at each instant he can allocate a divisible unit of effort to the reform or the status quo. At any instant, the voter can choose to replace the politician at some cost, and is unable to commit to replace the politician at any given time. While in office, the politician obtains a flow payoff, but receives no payoff if fired, and is thus purely office-motivated. The voter gets a unit of benefit each time output is realized. Output may be generated from the reform or the status quo.

A politician entering office is either competent or incompetent. We regard competence as “administrative IQ”, as suggested by Rogoff (1990). In this respect, competence to conduct reform entails, for example, the ability to build coalitions to support and pass reform policy, write the text of legislation so that the enacted policy reflects the original intent, and ensure the successful implementation of the policy. A politician who is competent at reforming must be competent at each stage, and failure to execute may be interpreted as a failure of the

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<sup>5</sup>Experimentation is modeled as in Keller et al. (2005). We describe our relationship to this literature in the literature review.

reform. An article describing the situation in Greece said

In a wide-ranging review of the Greece program [...], the I.M.F. found that many of its predictions had failed. There was a sharp fall in imports, but little gain in exports. Public debt overshot original predictions. Predicted revenues from selling public assets were way off. The banking system, perceived as relatively sound at the beginning of the bailout, began having problems as the economy soured. Looking back, the I.M.F. concluded that many errors had been made, including too much emphasis on raising taxes instead of cutting expenses. In addition, the monetary fund overestimated the ability of the government to deliver the changes it was demanding...<sup>6</sup>

We take the perspective that effort exerted on reform does not deterministically translate into success. We thus model the politician's choice to conduct reform or pursue the status quo as a two-armed bandit problem. The first arm is the "reform" (or risky) arm, and the second is the "status quo" (or safe) arm. Conditional on the politician being competent, the reform yields a unit of output (or, in the language of the bandit literature, a "success") at a higher rate than the status quo per unit of effort. An example of reforms that were implemented on paper, but the actual impact was uncertain for some time were Mexico's education reforms implemented in 2013. David Calderon, director of the education reform advocacy group Mexicans First commented on the reform saying, "Of course it's just a change in the rules that still has to be turned into reality".<sup>7</sup> We assume that greater effort on reform translates into a higher probability of success, however effort by an incompetent politician will yield no success on the reform.

Consistent with the literature on career concerns, we assume that neither the politician nor the voter knows the politician's competence (or type) at the beginning of his term. Instead, the politician and the voter share a common prior belief about the politician's type. Thus, the politician, uncertain about his reform ability, must attempt reforms to learn his type. As an example, the Patient Protection and Affordable Care Act was signed into law in 2010 after passing several legislative hurdles, yet it met implementation challenges during the rollout of healthcare.gov, the website largely responsible for delivering insurance made possible by the act. It is reasonable to assume that a newly elected politician will be uncertain that he can be successful along every dimension, and so will the voter.

We assume that the allocation of effort to the reform and the status quo is unobserved to the voter. Much of the work to conduct reforms, for example organizing coalitions and writing

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<sup>6</sup>See 'Greek Patience with Austerity Nears its Limit', *New York Times*, December 29, 2014.

<sup>7</sup>See 'Mexico Education Reform Passed By Senate, Looks To Remake Public School System', *Huffington Post*, September 4, 2014.

legislation is largely unseen to ordinary citizens. Some of this effort can be observed to the interested researcher or reporter, but we argue that the cost of acquiring such information is prohibitive to the average person. Further, we assume that the voter will observe if a success occurs (for example voters observe an increase in gross domestic product), but whether it was the reform or the status quo that generated the success is unobserved to the voter. The arm that generated the success is observed only by the politician. When a success is observed by the voter it is not always clear if it was due to the reform or to luck while pursuing the status quo. For example, in the case of IMF suggested financial reforms, if personal incomes rise subsequent to the reform, it may be unclear to the voter if this was due to success of the financial reforms, or a positive income shock. An observed success on the reform means that the politician is competent for certain. Thus the voter and the politician may learn about the politician's competence gradually, but potentially at different rates. This reflects the reality that voters often re-elect a politician without being completely certain that he is competent, but a politician is likely to have more information about his competence than the voter by the end of a term in office.

To simplify the problem we consider an institutional setting in which the voter can commit to a success threshold and grants tenure to the politician if the success threshold is achieved.<sup>8</sup> The voter however, is unable to commit to firing the politician at any given time, and at any moment can fire the politician before tenure is granted.<sup>9</sup> Following much of the literature on strategic experimentation, the solution concept used throughout is Markov perfect equilibrium (MPE).

In the simplest case of interest, where two successes are required, in equilibrium the voter gives the politician a fixed time to achieve the first success, and gives the politician an endogenous length of time in which to generate the second success. The voter thus gives the politician an endogenous term length. This endogenous term decreases with the length of time it takes to achieve the politician's first success.

To see why the endogenous term length occurs in equilibrium, note that because of the voter's lack of commitment, the voter cannot learn the politician's type with certainty when there is a conflict of interest. A conflict of interest occurs when the belief about the politician's type is sufficiently low that the myopic best action is to choose the status quo, but the voter prefers further experimentation with reform because of her dynamic incentives. If the politician exerts no effort on the status quo in equilibrium, and is revealed to be good with certainty, then the voter will want to grant him tenure immediately. As a consequence, the

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<sup>8</sup>One might also think of the tenure reward as the politician's legacy payoff.

<sup>9</sup>For comparison, we study the case of commitment in Section 5. The commitment case does not yield the gradual reform fatigue observed in practice, thus we think this case is less relevant to observed reforms.

politician will seek to maximize the immediate chance of success, and so will have an incentive to deviate to the status quo as this is myopically best. For the voter to remain uncertain, the politician must be induced to take an intermediate action, i.e., allocate resources to both the reform and the status quo at every instant. The voter, must therefore keep the politician indifferent between the reform and the status quo at every instant when there is a conflict of interest. Since the politician can only be rewarded with more time in office, the voter uses the endogenous term length to provide sufficient flexibility to allow this indifference. Flexibility is required because beliefs, and hence payoffs, are evolving through time.

In equilibrium, a gradual decrease in the level of experimenting with reform is chosen if no success is observed for some period of time. This reflects the observed reform fatigue. If a success occurs during the period of intermediate experimentation, the voter is uncertain if the success was from the reform or the status quo, and the voter's belief about the politician's competence diverges from that of the politician. In this case, the voter may reelect an incompetent politician with some probability, or conversely, may dismiss a competent politician. These will depend on the realization of the stochastic output.

As is true in many bandit problems with strategic choice, the politician under-experiments with reforms in equilibrium. By conducting the voter's optimal level of reform (a seemingly good deed), the politician is punished by the voter if no success is obtained. (As the opening quote by Clare Booth Luce says, 'no good deed goes unpunished'.) We show that reform fatigue is mitigated (i.e. reform effort increases) with a lower cost of replacement, and the endogenous term length decreases. These results are intuitive, as with a lower cost of replacement, the voter has a greater incentive to replace the politician, and thus the equilibrium induces higher effort from the politician.

We empirically investigate reform fatigue in financial policies, and show that the model delivers the sort of rich dynamics we see in the data. We show that the cycle is present among countries with presidential systems. Countries with parliamentary systems, where executives are not elected directly, exhibit no such cycle. This is consistent with our framework, which presumes politicians are directly accountable to voters. The model predicts that, conditional on being close to the end of the term, reforms may increase in response to an increase in output. We also see that this is true in the data. As the theory does not rely on an external organization to generate reform fatigue, we investigate the role of the IMF and demonstrate that reform fatigue cycles do not vary significantly when countries are participating in an IMF program. In fact, the fatigue cycle is present among both program participants and non-participants. This is counter to the conventional wisdom that reform fatigue is a phenomenon connected to IMF initiated reforms.

### *Literature review*

There are at least two competing explanations for reform fatigue. One is that the benefits of the reform to various constituencies are uncertain and potentially uneven. When information about reforms are revealed and a sufficiently large constituency expects to lose from reforms, they will oppose those reforms. This explanation has been studied by Fernandez and Rodrik (1991) and more recently by Strulovici (2010). Another explanation is that there are different types of reforms with varying degrees of difficulty and reformers enact “easy” reforms in the beginning and are simply unable to enact more difficult reforms later on, hence reforms appear to cease. This *gradualism* in reforms has been explored by Dewatripont and Roland (1992) and Dewatripont and Roland (1995). Unlike Fernandez and Rodrik (1991), Dewatripont and Roland (1995) not only consider the ex-ante choices, but the choices of the median voter after the realization of the outcome from initial reforms as the median voter learns about the reform. These explanations are appealing, but we show empirically that reform fatigue follows a political cycle, a prediction absent in these theories.<sup>10</sup>

This paper is related to the substantial body of political economy research studying political failures first identified by Besley and Coate (1998). In this paper we investigate when political institutions fail to provide incentives for efficient levels of experimentation on reforms by a politician. A similar question is explored theoretically in Canes-Wrone et al. (2001) and empirically in Canes-Wrone and Shotts (2004) in the context of pandering. Our contribution is to study the evolution of this trade-off between the reform policy and the populist policy throughout a politician’s term in office as he learns about his own competence. We show that the politician’s incentive to learn about his type induces more effort on reform early in a term, but in the absence of output leads to a decrease in effort on reform.

We study a politician concerned about retaining his position, thus, our paper is related to the large career concerns literature recently summarized by Ashworth (2012).<sup>11</sup> Our theory is closest to Jackson and Aghion (Forthcoming) who also consider the problem of motivating a politician through replacement incentives when there is learning about the quality of the politician. There are two main differences in Jackson and Aghion (Forthcoming). First we include the problem of hidden actions and hidden types, so the choice of the politician and the politician’s true beliefs are unobserved to the voter. Second, in our model, the competence of the politician is related to his ability to deliver on reforms, rather than his ability to perfectly observe the random state of the world.

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<sup>10</sup>Tornell (1998) also provides a theory of reform, but does not focus on the electoral timing of reform.

<sup>11</sup>This literature includes Alesina and Cukierman (1990), Besley and Case (1995*b*), Banks (1998), Holmstrom (1999), Ashworth (2005), Berliant and Duggan (2010), DeMarzo and Sannikov (2014), Bonatti and Hörner (Forthcoming), Duggan and Forand (2014), Besley and Case (1995*a*) and Canes-Wrone et al. (2001). These papers do not consider political accountability for reforms, with reforms modeled as a bandit problem.

There is a large literature on bandit problems in economics including the classic work of Keller et al. (2005), however, few papers have incorporated moral hazard, and adverse selection.<sup>12</sup> One notable exception is Halac et al. (Forthcoming), which has several differences with the current paper. Halac et al. (Forthcoming) are interested in an optimal monetary contract, whereas we are interested in a setting where the voter’s only means of creating incentives is to retain or replace the politician. In other words, we consider that wages are fixed, and the “contract” that the voter can offer is a replacement contract—a somewhat blunt tool.<sup>13</sup> Second, in Halac et al. (Forthcoming) the politician knows his type prior to beginning the project, hence learning is only about the quality of the project.<sup>14</sup> A small number of authors have applied the tools of the bandit literature to the study of reforms, including Strulovici (2010). Similar to our work, Strulovici (2010) considered reforms as risky experiments. As mentioned, unlike our work, Strulovici (2010) considers that reforms have heterogeneous effects on voters that are learned over time, and the theory does not predict a reform cycle.<sup>15</sup>

Empirical studies have also advanced reasons for reform to be higher when new governments first come to office. For example, some have suggested that new incumbents will want to undertake reforms right away so that they can realize gains prior to the next election, assuming that gains may be delayed. This is also known as the “honeymoon hypothesis” (Krueger, 1993; Abiad and Mody, 2005). Abiad and Mody (2005) investigate if the tendency to reform is higher during the incumbent’s first year in office, as a part of their broader exploration of what determines financial reforms. They find partial support for this hypothesis—the first year effect is typically positive but imprecisely estimated. Consistent with Abiad and Mody (2005) we find a significant positive effect on reform during the first year after the election. As we are concerned with investigating the entire dynamic path of the elected official’s time in office, we also show a significant negative effect for the year prior to the next election.<sup>16</sup> This pattern is consistent with the rational theory of reform fatigue we present. We are unaware of any papers that theoretically examine the honeymoon hypothesis with rational voters.

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<sup>12</sup>Recent contributions include Garfagnini (2011), Hörner and Samuelson (2013) and Guo (Forthcoming).

<sup>13</sup>See Bowen and Mo (Forthcoming).

<sup>14</sup>In this sense, it is closer in spirit to Klein (Forthcoming). However in Klein (Forthcoming) there is a single politician, and the voter’s objective is to induce the politician to always experiment. In our setting always experimenting is not always optimal for the voter, in some cases the voter would prefer if the politician stopped experimenting.

<sup>15</sup>Other contributions to the literature on reforms include Lizzeri and Persico (2011), Callander and Harstad (2015). These do not model reforms as a bandit problem.

<sup>16</sup>Note that we use data similar to Abiad and Mody (2005), but with different observations. Whereas Abiad and Mody (2005) cover both parliamentary and presidential regimes between 1973-1996, and have 805 observations, we focus on only presidential regimes and have 1195 observations covering 1975-2005. Our cycle is more precisely estimated than in Abiad and Mody (2005).

A number of papers have empirically examined the relationship between reforms and other outcomes, such as growth, the level of democracy, or labor market performance (e.g., Christiansen et al., 2013; Giuliano et al., 2013; Di Tella and MacCulloch, 2005; Feldmann, 2012). Lora et al. (2003) use survey data to explore the causes of reform fatigue in Latin American. They define reform fatigue as the lack of public support for reform, and identify economic factors as the main reason—that is, the modest economic growth generated from reforms probably fell below expectations. They also point to a political implication of reform fatigue, which is that it is electorally costly. This, they suggest is a reason for concern, as policymakers will account for this in their decisions to reform. While their definition of reform fatigue is different from the one we use, these stylized facts are consistent with the theory we present. None of these studies focus on electoral cycles.

There are a significant number of papers studying political cycles, including the seminal works of Nordhaus (1975) and Rogoff (1990). The political budget cycle is well documented and summarized in Drazen (2001), and a political aid cycle is documented in Faye and Niehaus (2012). More recent work in this literature includes Canes-Wrone and Shotts (2004) and Ales et al. (2014). A common feature is that the cycle studied is an outcome easily observed by the voter and the researcher such as the business cycle. In contrast, we study policies that are not perfectly observable to the voter, and where the output from these policies may also be imperfectly observable.

The remainder of the paper is organized as follows. In Section 2 we present our stylized model of reforms with experimentation and private information. Section 1 discusses the first best level of experimentation for the voter. Section 4 constructs the MPE with reform fatigue. Section 5 gives the MPE for the case in which the voter can commit to a firing policy. Section 6 provides empirical evidence of reform fatigue and Section 7 concludes.

## 2 Model

We present a stylized model of a politician choosing reforms versus the status quo under the shadow of electoral incentives. A voter (she) and an incumbent politician (he) interact during the politician’s time in office. Time is continuous and the horizon is infinite. The voter and politician discount the future at a common rate  $r$ . The politician has a type, which is either competent or incompetent. We denote by  $\theta \in \{0, 1\}$  the politician’s type, where the politician is competent if  $\theta = 1$ . The politician and the voter share the common prior belief that the politician is competent with probability  $q_0$ .

At every instant that he is in office, the politician must choose to divide one unit of

work resource between two tasks—reform and the status quo.<sup>17</sup> The tasks are modeled as a two-armed exponential bandit as in the classic work of Keller et al. (2005). If the politician works  $x$  units on the reform during a small period  $[t, t + dt)$  (and so works  $1 - x$  on the status quo during that same period), the reforms generate one unit of output with probability  $1 - e^{-\lambda_r \theta x dt} \approx \lambda_r \theta x dt$ , and the status quo generates one unit of output with probability  $1 - e^{-\lambda_s (1-x) dt} \approx \lambda_s (1-x) dt$ . If a unit of output is generated on either reform or status quo, we say that a success has occurred. The probability of successes are independent across time and tasks. We assume  $\lambda_r > \lambda_s$  so that the reform delivers output at a higher rate than the status quo, and  $q_0 > \lambda_s / \lambda_r$  so that experimentation is myopically optimal for the voter at the beginning of the term.

At any instant, the voter can decide to replace the politician. Thus the length of the politician’s time in office is endogenous. We assume that, in general, the voter cannot commit to fire or retain the politician at any point in time, thus the voter makes her choice based on the information she has available at the time.<sup>18</sup> When she replaces the politician, the voter gets a lump sum payment  $\lambda_p / r$ . Alternatively, we might consider that when the voter replaces the current politician she has to pay a cost  $C$  and gets a new politician with prior  $q_0$ . For every  $C > 0$ , there exists some  $\lambda_p$  such that the lump sum  $\lambda_p / r$  corresponds to the continuation payoff of getting new politician while incurring replacement cost  $C$ . We assume  $\lambda_s < \lambda_p < \lambda_r$ . In addition we assume that the voter can commit, up front, to a number of successes  $N$  after which the politician cannot be replaced—i.e., the politician is granted tenure. If  $N = \infty$ , the voter does not commit to giving tenure to the politician.

The voter values successes independently of how they are generated. That is, the voter values output whether it comes as a result of reform, or good luck with the status quo. Each success gives the voter a payoff normalized to 1.<sup>19</sup> She gets zero payoff the rest of the time the politician is hired. The politician gets a flow payoff of 1 per unit of time during the time he is hired. The politician, thus, only cares about retaining office.

The politician observes the successes as they occur and observes which task generates them. The politician’s actions are hidden, that is, the voter does not observe how the politician divides his work between the status quo and reform. The voter observes successes, but does not know where they came from. Neither the politician nor the voter observes the politician’s type ex-ante, rather, they learn about it over time.

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<sup>17</sup>Equivalently, in the interpretation of Hörner and Samuelson (2013), the politician randomizes over the status quo and reform.

<sup>18</sup>We consider the case in which the voter can commit in Section 5.

<sup>19</sup>It is also possible that payoff amounts are generated randomly, but we normalize payoffs to 1 for simplicity.

### 3 First best

We present the best solution for the voter if all information is observable, and the voter can dictate the politician's action. In the solution to the first best, the voter would prefer to fire the politician and obtain the continuation payoff  $\lambda_p/r$  rather than switch to the status quo and obtain the continuation payoff  $\lambda_s/r$ . Thus the voter's optimal solution is equivalent to the first best solution with a two-armed bandit, for which the safe arm generates output with probability  $\lambda_p$ . As in Keller et al. (2005), the voter sets a stopping time  $T^*$  to replace the politician who has not gotten any success. At any time the politician is hired, the politician should put full effort on reform. The time  $T^*$  is found by making the voter indifferent between firing the politician at  $T^*$  or keeping the politician one more instant. Let  $q_t$  be the politician's belief at  $t \leq T^*$  if the politician has not gotten any success. This is given by

$$q_t = \frac{q_0 e^{-\lambda_r t}}{q_0 e^{-\lambda_r t} + 1 - q_0}.$$

The voter's indifference condition is, to the first order in  $dt$ ,

$$\frac{\lambda_p}{r} = \lambda_r q_{T^*} dt \left[ 1 + \frac{\lambda_r}{r} \right] + (1 - \lambda_r q_{T^*} dt - r dt) \frac{\lambda_p}{r}.$$

This indifference condition characterizes the first best stopping time  $T^*$  and we denote the first best threshold belief as  $q^* = q_{T^*}$ . We summarize the first best in the following proposition.

**Proposition 1.** *In the first best solution, the politician puts full effort on reform until the belief that the politician is good reaches the threshold belief*

$$q^* = \frac{\lambda_p}{\lambda_r + \frac{\lambda_r}{r}(\lambda_r - \lambda_p)}.$$

*If no success is obtained before the belief reaches  $q^*$ , then the politician is fired, but if a success is obtained before  $q^*$ , then the politician is retained forever and puts full effort on reform thereafter.*

The proof of Proposition 1 follows from Keller et al. (2005).

We note that the first best can be obtained in an equilibrium if the voter can observe the politician's action. The voter could simply fire the politician before  $T^*$  if the politician deviates from full effort on reform. Thus with observable actions, the first best is achievable and no reform fatigue is observed. A politician who does not choose reform, or does not have success on reform sufficiently early is fired.

There can be no conflict of interest between the voter and politician if the myopic threshold belief for the politician  $\lambda_s/\lambda_r$  is lower than the optimal threshold belief for the voter  $q^*$ . Hence, we assume from now on that  $\lambda_s/\lambda_r > q^*$ , which is the necessary and sufficient condition for a conflict of interest to occur.

## 4 Markov perfect equilibrium

We focus on Markov perfect equilibria, following much of the literature on strategic experimentation. The state variables are, for the voter, the probability that the politician is competent, and the distribution over the politician's belief. For the politician, the state variables are the voter's state variables, and the probability that he is competent given his own information.

An equilibrium is a reform policy  $\chi_t : [0, 1] \times \mathbb{B} \rightarrow [0, 1]$  for the politician and a replacement policy  $\Upsilon_t : \mathbb{B} \rightarrow \{0, 1\}$  for the voter, where  $\mathbb{B}$  is the space of beliefs of the voter. Beliefs are updated via Bayes' rule. Note that the politician may have more information than the voter and, as a result, the beliefs of the politician and the voter about the politician's competence may diverge.

Consider the simplest case of  $N = 1$ , that is, the institution is such that the voter is required to tenure the politician after a single success. Since the prior belief is above the myopic threshold  $q_0 > \lambda_s/\lambda_r$  we can show that a continuum of equilibria exist in which the politician pursues reform starting at time zero and for any length of time up to when the politician's belief  $q_t$  is at the myopic threshold, and then switches to the status quo until the first success. The voter will keep the politician after the first success, regardless of where the success came from per the institutional requirement. After the first success, the politician will pursue the voter's first best. It is clear that the voter will have an incentive to tenure the politician when the first success occurs (and not before) since at that time  $q_t \geq \lambda_s/\lambda_r > q^*$ . Furthermore, the voter will have no incentive to fire the politician before the belief is at the myopic threshold, because  $\lambda_s/\lambda_r > q^*$ . The voter thus has no incentive to deviate. The politician has no incentive to deviate, since any deviation is unobserved to the voter, hence cannot affect his probability of re-election. In these equilibria (and any equilibrium when  $N = 1$ ) the politician never exerts effort on both the reform and the status quo at the same instant, and thus will have no information that is private regarding his type. We are interested in equilibria in which the politician may be replaced, and is able to use his private information about his type. We explore the simplest version of this next.

## 4.1 Equilibrium with replacement

We seek an equilibrium in which the voter replaces the politician with some probability on the equilibrium path and in which the politician uses his private information about his type. We ask if such an equilibrium exhibits reform fatigue, in the sense of a gradual reduction of effort on reforms. Since the case with one success does not exhibit a gradual reduction, we consider the next simplest case in which the voter commits to giving the politician tenure after 2 successes. We have the following result.

**Proposition 2.** *For  $N = 2$ , there exists a Markov perfect equilibrium in which the politician is replaced on the equilibrium path with some probability. This equilibrium exhibits reform fatigue. That is, effort on reform is gradually reduced if there is no early success.*

The proof of the proposition follows from the construction of the equilibrium. In fact, there exists a continuum of equilibria with reform fatigue, but we focus on the one that maximizes the payoff of the voter.

We describe the equilibrium briefly and then provide a more precise construction below. In equilibrium, conditional on no success being observed, a politician puts full effort on reform until the myopic threshold belief is reached at time  $T_m$ . The politician is fired at a time  $T_1$  if no success has occurred before  $T_1$ . The politician who got a first success at time  $t \leq T_1$  will get a length of time  $\Delta_t$  to get a second success, and if he fails to do so, he gets replaced. If he succeeds, he is granted tenure. Denote  $\tau$  as the time as which the first success occurs, then  $T_2 = \tau + \Delta_\tau$  is the time at which the politician is fired if there is no second success. The equilibrium thus consists of three phases: phase I is before the first success, phase II is after the first success and before the second, and phase III is after the second success. These phases are illustrated in Figure 3. We proceed by backward induction, beginning with phase III.

### Phase III: After the second success

After the second success, the voter's criterion is met, the politician is granted tenure and so there is no conflict of interest. In the equilibrium we are looking for, the politician does what is best for the voter when there is no conflict of interest. Let  $H(q_t)$  be the voter's continuation value after the second success when the politician has belief  $q_t$ . Following Keller et al. (2005) in the first best there is a cutoff belief  $\bar{q}$  given by

$$\bar{q} = \frac{\lambda_s}{\lambda_r + \frac{\lambda_r}{r}(\lambda_r - \lambda_s)},$$

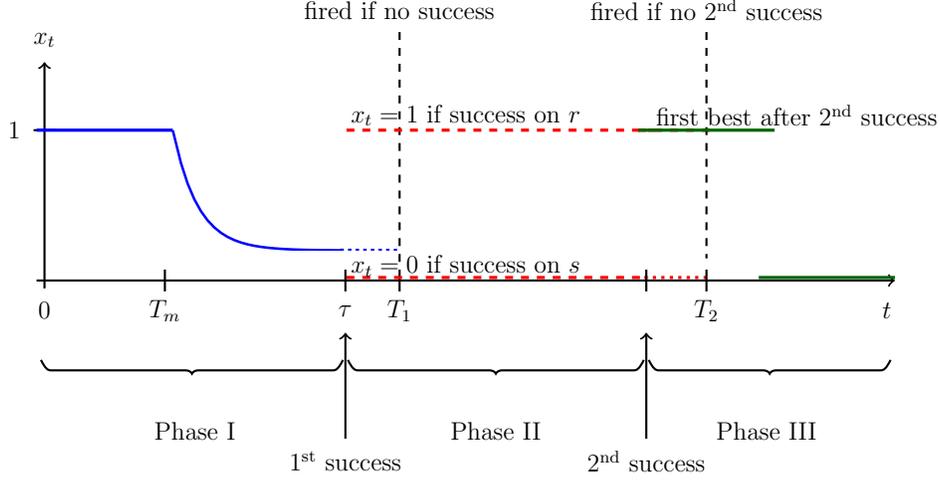


Figure 3: Equilibrium phases

such that below the cut-off it is optimal to put full effort into reform and above the cutoff it is optimal to put full effort into the status quo. Note that we assume the politician is granted tenure after the second success, so the voter cannot fire the politician to obtain  $\lambda_p/r$  if the politician is sufficiently pessimistic about his type. The best thing for the voter is for the politician to switch to the status quo. The value to the voter after a second success is thus

$$H(q_t) = \begin{cases} \frac{1}{r} \left[ \lambda_r q_t + (\lambda_s - \lambda_r \bar{q}) \left( \frac{1-q_t}{1-\bar{q}} \right) \left( \frac{(1-q_t)\bar{q}}{(1-\bar{q})q_t} \right)^{\frac{r}{\lambda_r}} \right] & \text{if } q_t > \bar{q} \\ \frac{\lambda_s}{r} & \text{if } q_t \leq \bar{q}. \end{cases} \quad (1)$$

### Phase II: After first success, before second success

After the first success, but before the second success, the politician knows that he is retained forever if he gets a second success. The politician therefore has a myopic incentive to get a second success as quickly as possible, and there is no future benefit from experimentation. If the politician got the first success from the reform, the politician knows that he is competent and will put full effort on reform thereafter. If the politician got the first success on the status quo, the politician does not know that he is competent, and will put full effort on the status quo until the second success.<sup>20</sup>

Recall that  $\Delta_t$  is the time the voter has given to the politician to get a second success conditional on the first success occurring at time  $t$ . If the politician was exerting effort on

<sup>20</sup>This assumes his belief is below his myopic threshold  $\lambda_s/\lambda_r$  which will be true in equilibrium.

the reform and the status quo at the time the first success was obtained, the voter's belief will diverge from the politician's belief. Let  $\tau$  be the time of the first success and  $q_\tau$  is the politician's belief that the politician is good at time  $\tau$ . Note that given the conjectured equilibrium,  $q_\tau$  is also the voter's belief that the politician is good at time  $\tau$ , and is thus known to the voter. Let  $x_\tau$  be the action played by the politician at that time, and let  $p_t$  be the voter's belief at time  $\tau + t$  that the first success was obtained on the reform. Note that this is different from the voter's belief that the politician is good. By Bayes' rule we have

$$p_0 = \frac{\lambda_r x_\tau q_\tau}{\lambda_r x_\tau q_\tau + \lambda_s (1 - x_\tau)}.$$

Thus at the instant the success is obtained, the voter forms the belief  $p_0$  that the success was obtained on the reform. By Bayes' rule, this belief is the probability of obtaining a success on reform, as a fraction of the total probability of observing a success.

Recall that once the first success is obtained (but before the second success), the politician will put full effort on reform if the success was obtained from the reform, and otherwise will put full effort on the status quo in equilibrium. Thus at any time  $t$  after the first success, the voter is unaware of the politician's actions. Conditional on observing no success, the voter updates the probability that the success was obtained on reform according to

$$p_t = \frac{e^{-\lambda_r t} p_0}{e^{-\lambda_r t} p_0 + e^{-\lambda_s t} (1 - p_0)}.$$

Substituting  $p_0$  into the expression for  $p_t$  gives

$$p_t = \left[ 1 + e^{(\lambda_r - \lambda_s)t} \frac{\lambda_s (1 - x_\tau)}{\lambda_r x_\tau q_\tau} \right]^{-1}. \quad (2)$$

We use these beliefs to derive the politician's effort at any time  $t$ . This is summarized in the next lemma.

**Lemma 1.** *If a first success occurs at time  $\tau$  then the effort exerted on reform at time  $\tau$  is*

$$x_\tau = \left[ 1 - e^{-(\lambda_r - \lambda_s)\Delta_\tau} \frac{\lambda_r q_\tau (\lambda_r - \lambda_p) (1 + \lambda_r/r)}{\lambda_s [\lambda_s (1 + H(q_\tau)) - \lambda_p (1 + \lambda_s/r)]} \right]^{-1}. \quad (3)$$

The proof of Lemma 1, and henceforth all proofs, are included in the Appendix unless otherwise indicated.

From Lemma 1 we have the effort on reform before the first success  $x_\tau$  as a function of beliefs  $q_\tau$  and the evaluation period for the second success  $\Delta_\tau$ . The next lemma gives the

voter's expected continuation payoffs after the first success.

**Lemma 2.** *If the first success is obtained at time  $\tau$ , then the voter's expected continuation payoff if the politician obtained the first success on reform is*

$$V_\tau^R = \frac{\lambda_r}{r} - \left[ \frac{\lambda_r}{r} - \frac{\lambda_p}{r} \right] e^{-(r+\lambda_r)\Delta_\tau}, \quad (4)$$

and the voter's expected continuation payoff if the politician obtained the first success on the status quo is

$$V_\tau^S = \frac{1 + H(q_\tau)}{1 + r/\lambda_s} - \left[ \frac{1 + H(q_\tau)}{1 + r/\lambda_s} - \frac{\lambda_p}{r} \right] e^{-(r+\lambda_s)\Delta_\tau}. \quad (5)$$

### Phase I: Before the first success

Let  $q_t$  be the politician's belief that he is competent at time  $t$ , before the first success. At all times  $t \leq T_m$  there is no conflict of interest, and the politician will put full effort on reform. If  $t \leq T_m$  then  $\Delta_t = \infty$ . At all times  $T_m < t \leq T_1$  there is a conflict of interest. The unsuccessful politician will play action  $x_t \in (0, 1)$ . For this intermediate action to be an equilibrium, the politician has to be indifferent between the status quo and reform. This indifference allows us to calculate the politician's continuation payoff  $W_t$  at any time  $t$  in phase I.

**Lemma 3.** *The politician's continuation payoff for a fixed  $\Delta_t$  is*

$$W_t = e^{(\lambda_s+r)t} \int_{T_1}^t \frac{\lambda_s [e^{-(\lambda_s+r)(z+\Delta_t)} - e^{-(\lambda_s+r)z}]}{r} dz. \quad (6)$$

We calculate  $\Delta_t$  next. Consider  $t \in (T_m, T_1)$  when the politician is indifferent between the reform and status quo. If at time  $t$  the politician's belief is  $q_t$  and his continuation payoff is  $W_t$ , then the equilibrium  $\Delta_t$  solves

$$\lambda_r q_t [W_t^R - W_t] = \lambda_s [W_t^S - W_t],$$

which is the politician's indifference condition. We can show that  $W_t^S = \frac{1}{r} [1 - e^{-(\lambda_s+r)\Delta_t}]$  and  $W_t^R = \frac{1}{r} [1 - e^{-(\lambda_r+r)\Delta_t}]$ .<sup>21</sup> Substituting  $W_t^R$  and  $W_t^S$  into the above expression and

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<sup>21</sup>The derivation of  $W_t^S$  is given in the proof of Lemma 3 in the Appendix. The derivation of  $W_t^R$  is analogous.

rearranging gives

$$\lambda_r q_t \left[ \frac{1}{r} - \frac{1}{r} e^{-(\lambda_r+r)\Delta_t} \right] - \lambda_s \left[ \frac{1}{r} - \frac{1}{r} e^{-(\lambda_s+r)\Delta_t} \right] = (\lambda_r q_t - \lambda_s) W_t. \quad (7)$$

We must solve for  $q_t$  in order to solve (7) for  $\Delta_t$ . The law of motion for beliefs is  $q'_t + q_t(1 - q_t)\lambda_r x_t = 0$ , where  $x_t$  is given in equation (3). The boundary condition for  $q_t$  at time  $t = T_1$  is given by what happens at  $t = T_1$ , which is given in the next lemma.

**Lemma 4.** *The values  $q_{T_1}$ ,  $x_{T_1}$ , and  $\Delta_{T_1}$  are implicitly given by the following three equations:*

$$q_{T_1} = \frac{\lambda_s [1 - e^{-(r+\lambda_s)\Delta_{T_1}}]}{\lambda_r [1 - e^{-(r+\lambda_r)\Delta_{T_1}}]}, \quad (8)$$

$$x_{T_1} = \frac{\lambda_p - \lambda_s(1 + V_{T_1}^S - \lambda_p/r)}{\lambda_r q_{T_1}(1 + V_{T_1}^R - \lambda_p/r) - \lambda_s(1 + V_{T_1}^S - \lambda_p/r)}, \quad (9)$$

and

$$\left[ 1 - \frac{\lambda_r(1 + \lambda_r/r) - \lambda_p(1 + \lambda_r/r)}{\lambda_s(1 + H(q_{T_1})) - \lambda_p(1 + \lambda_s/r)} \right]^{-1} = \left[ 1 + e^{(\lambda_r - \lambda_s)\Delta_{T_1}} \frac{\lambda_s(1 - x_{T_1})}{\lambda_r x_{T_1} q_{T_1}} \right]^{-1}. \quad (10)$$

The equilibrium values before  $T_1$  are calculated recursively starting at  $T_1$  and using the previously given formulas. This completes the construction of the equilibrium.

## 4.2 Discussion

To aid the discussion of the equilibrium, we solve the system of equations numerically and obtain results as illustrated below in Figure 4. The parameter values used in Figure 4 are  $\lambda_r = 0.3$ ,  $\lambda_s = 0.1$ ,  $\lambda_p = 0.15$  and  $r = 1$ . For these parameter values  $T_m = 0.207$  and  $T_1 = 1$ . Thus if a success is obtained before  $T_m$  the voter is certain that the politician is good and will keep the politician. That is,  $\Delta_t = \infty$  for all  $t \leq T_m$ .

If a success occurs in the interval  $(T_m, T_1)$  the voter is still uncertain, but updates his belief about the politician's competence positively. We provide an example of a success occurring in this interval in Figure 5. In Figure 5 we plot the voter's belief that the politician is good conditional on observing a success. Denote the voter's belief at time  $t$  that the politician is good by  $p_t^g$ . This is

$$p_t^g = p_t + (1 - p_t)q_r.$$

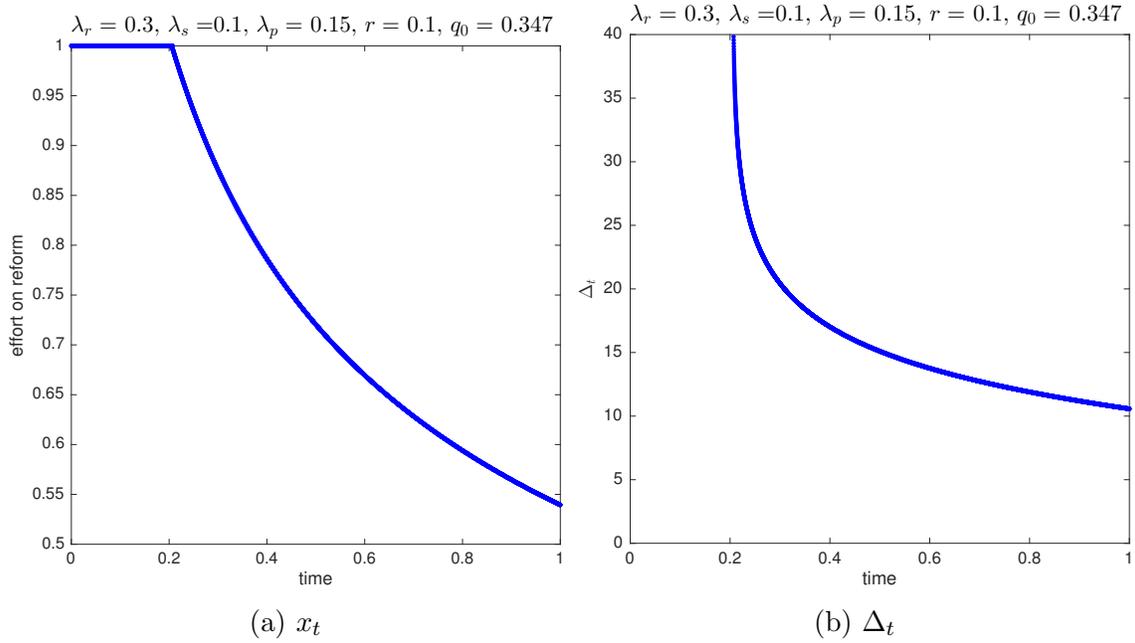


Figure 4: Equilibrium values assuming no success,  $T_1 = 1$

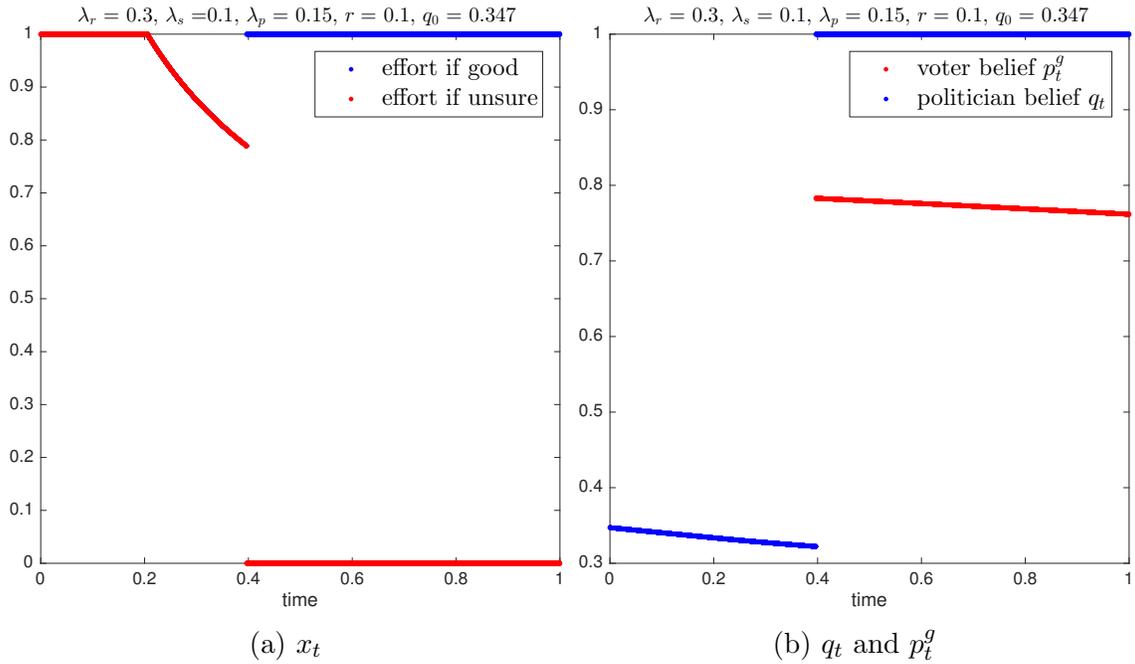


Figure 5: Equilibrium values assuming one success,  $T_1 = 1$

In Figure 5, a success occurs at  $\tau = 0.34$  and, assuming that the success was obtained from the reform, the politician's belief jumps to 1, but the voter's belief does not jump all the way to 1. (In the event that the success was obtained from the status quo, the politician's

belief would evolve in the same way it had prior to the success, and thus would continue to decrease and be lower than the voter’s belief.) Furthermore, the voter’s belief will decrease if there is no other success, and the voter is never certain that the politician is good.

Note that in the example of Figure 5 there is under-experimentation. That is, the first best belief at which the politician should be replaced is  $q^* = 0.20 < q_{T_1} = 0.32$ . Thus, when there is no commitment, the voter replaces the politician sooner than is optimal in equilibrium assuming no success. This is generally true in equilibria with reform fatigue.

An increase in the prior belief  $q_0$  is illustrated in Figure 6. Since the equilibrium values at  $T_1$  do not depend on  $q_0$ , increasing  $q_0$  simply increases the time it takes to reach the myopic threshold  $\lambda_s/\lambda_r$  and, correspondingly,  $q_{T_1}$ . Thus increasing  $q_0$  increases the time before which the politician is fired if there is no first success. This is intuitive, as a politician believed to be competent with high probability, will be given more “wobble room” than one who is believed to be incompetent. This is summarized in the next lemma.

**Lemma 5.** *The time at which the voter fires the politician after no success  $T_1$  is increasing in the prior belief that the politician is good  $q_0$ .*

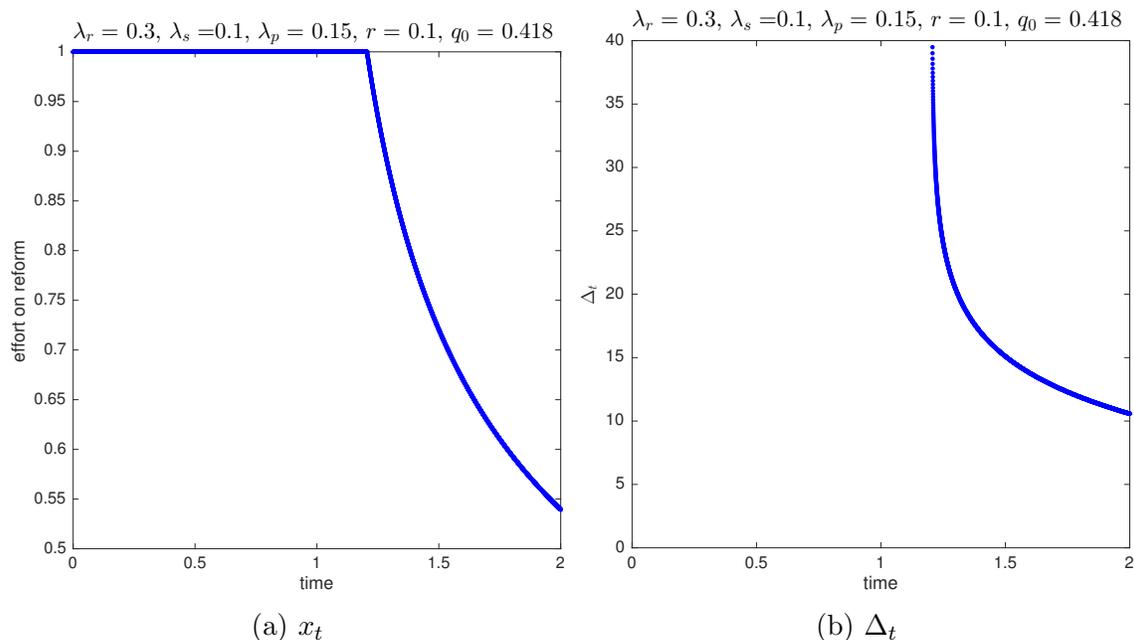


Figure 6: Equilibrium values assuming no success,  $T_1 = 2$

An increase in the rate of return from the reform  $\lambda_r$  is illustrated in Figure 7. Panel (a) shows that the politician experiments longer with the reform when the rate of return on the reform is higher. Panel (b) shows that the voter also gives the politician more time to

implement the reform because the future value of a success on the reform is higher. Intuitively, the belief that the politician is good decreases at a faster rate with a higher value of  $\lambda_r$ , because more effort is being exerted on the reform, and the rate of updating is higher. We summarize this in Lemma 6.

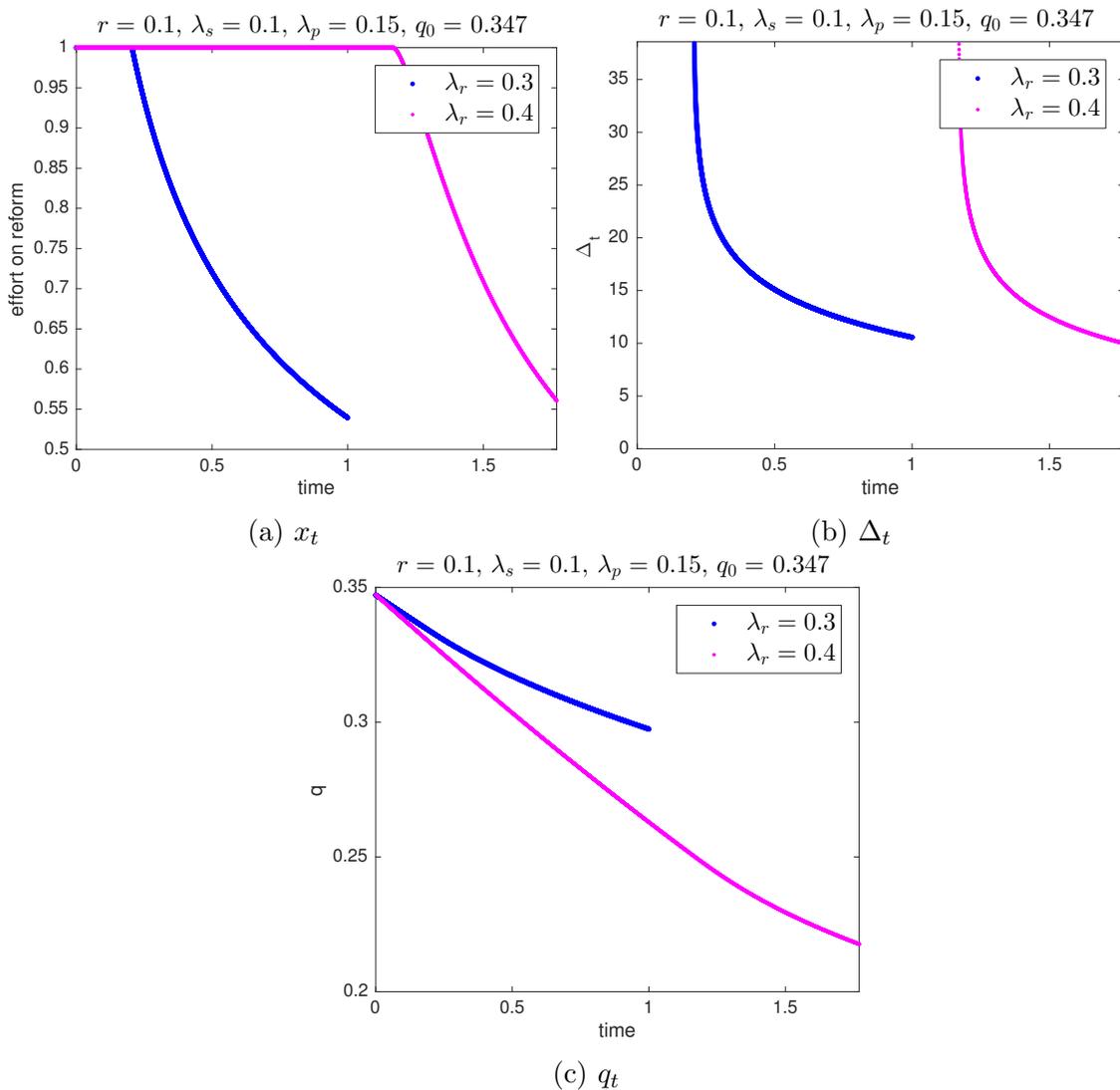


Figure 7: Increasing  $\lambda_r$

**Lemma 6.** *If the rate of success on the reform  $\lambda_r$  increases, then*

1. *the effort on reform  $x_t$  increases;*
2. *the endogenous evaluation period  $\Delta_t$  increases;*

3. *the voter's belief  $q_t$  decreases.*

An increase in the voter's payoff if the politician is fired  $\lambda_p$  is illustrated in Figure 8. As discussed in Section 2, an increase in  $\lambda_p$  is equivalently thought of as a decrease in the cost of firing the incumbent  $C$ . This can be thought of as an institution that makes it easier to replace the incumbent. Panel (a) shows that the politician experiments more with the reform, Panel (b) shows that the voter gives the politician less time to implement the reform and Panel (c) shows that the belief that the politician is good decreases at a faster rate with a higher value of  $\lambda_p$ . These changes are consistent with the intuition that the politician will have a greater incentive to exert effort on reform if he believes that he is more likely to be replaced. Correspondingly, the voter gives him less time to achieve successes, because her incentive to replace is higher. We summarize this result in Lemma 7.

**Lemma 7.** *If the return from firing the politician  $\lambda_p$  increases (equivalently, if the cost of firing the politician  $C$  decreases), then*

1. *the effort on reform  $x_t$  increases;*
2. *the endogenous evaluation period  $\Delta_t$  decreases;*
3. *the voter's belief  $q_t$  decreases.*

## 5 Commitment

For comparison, we discuss the case in which the voter can commit to the criteria for replacement. One can think of this case as one in which the voter can design an optimal firing policy for the politician, assuming that the politician will best respond to it at every instant given his information. The voter chooses the firing policy so as to maximize her payoff.

The politician decides at every instant how much to work on the reform (devoting the remaining work resource to the status quo) as a function of his information. The voter decides at the outset the number of successes  $N \geq 0$  needed for the politician to be kept, and then subsequently at every instant decides to replace the politician or not as a function of her information. If  $N = \infty$ , the voter chooses to never commit to retaining the politician.

### 5.1 One success with commitment

The voter can commit to a time  $T_m$  when to replace the unsuccessful politician. The politician will put full effort on reform at all times when  $q_t > \lambda_s/\lambda_r$  and will put full effort on the status quo when  $q_t < \lambda_s/\lambda_r$ ; here  $q_t$  is the politician's belief that he's competent at time  $t$ .

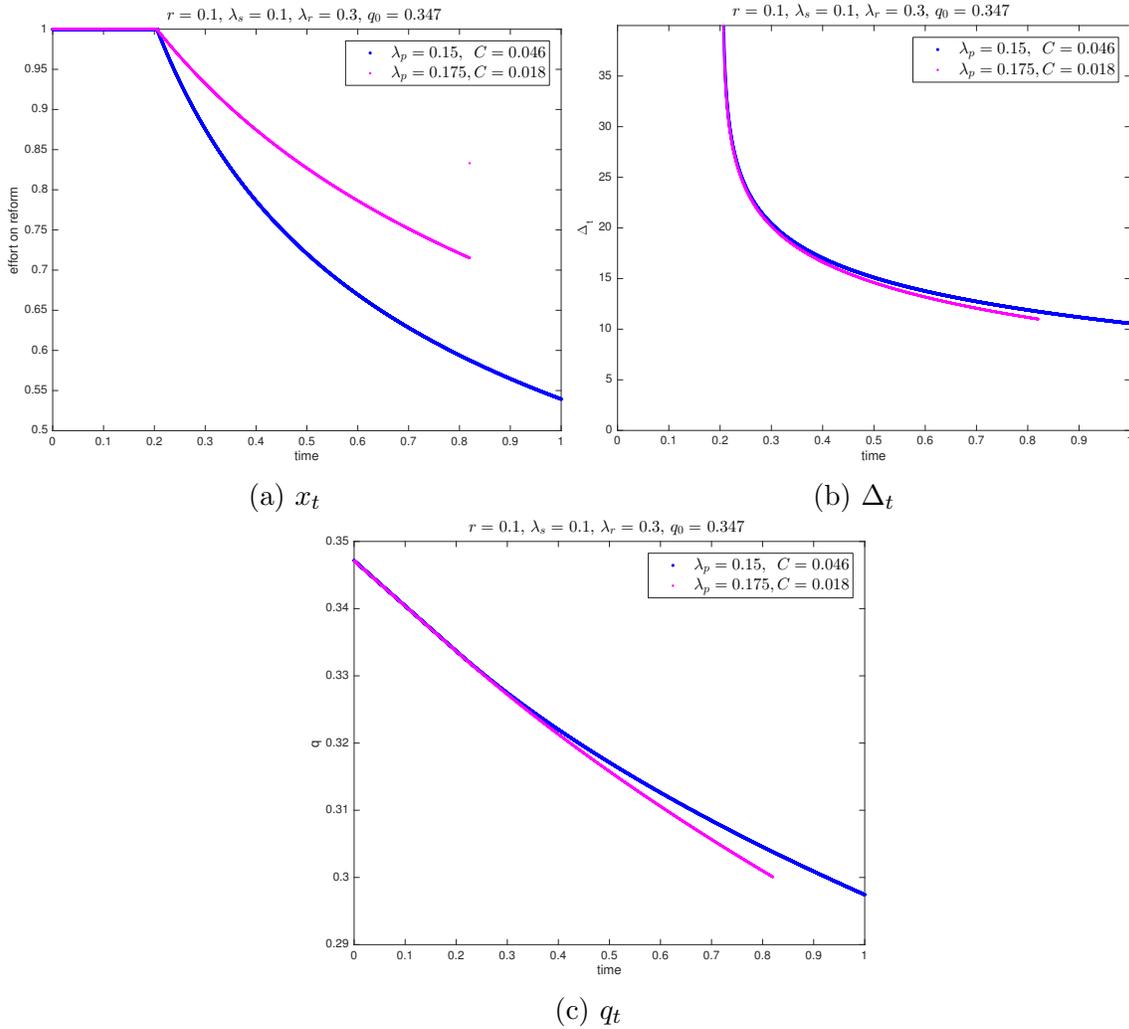


Figure 8: Increasing  $\lambda_p$

The voter will therefore anticipate this, and will want to hire the politician up until the point where the unsuccessful politician reaches  $q_t = \lambda_s/\lambda_r$ , then replace the unsuccessful politician. Thus  $T_m$  is the solution to

$$\frac{q_0 e^{-\lambda_r t}}{q_0 e^{-\lambda_r t} + 1 - q_0} = \frac{\lambda_s}{\lambda_r}.$$

The voter hires the politician until  $T_m$ . If the politician gets a success before that, he is given tenure. Otherwise, he is replaced at time  $T_m$ . Note that in the case with only one success, the politician is replaced sooner than is optimal, i.e.  $T_m < T^*$ .

## 5.2 Two successes with commitment

We consider the case when two successes are required for the politician to be retained. We have the following result.

**Proposition 3.** *Consider the case with commitment. For  $N = 2$ , there exists a unique Markov equilibrium in which the politician is replaced on the equilibrium path with some probability, and this improves the voter's payoff relative to the case with no commitment.*

The proof of the first part again follows from the construction of the equilibrium. In this equilibrium, the politician puts full effort on reform all the time he is hired. However, the politician is indifferent along the equilibrium no-success path, so he could play any another action.

The politician who has not gotten any success by a time  $\hat{T}$  (decided optimally by the voter) gets replaced. If the politician gets a success at time  $t \leq \hat{T}$ , the politician gets hired for an additional duration  $\Delta_t$ , also optimally decided by the voter. If the politician gets no second success during that period, the politician is replaced. Otherwise, the politician is hired forever.

**Before  $\hat{T}$ .** The politician plays action 1, hence his belief is at  $t \leq \hat{T}$  is

$$q_t = \frac{q_0 e^{-\lambda_r t}}{q_0 e^{-\lambda_r t} + 1 - q_0}.$$

Once the politician has obtained a success on the reform, he will put full effort on reform all the time, no matter the  $\Delta_t$  decided by the voter.

The voter prefers to keep a politician who is competent, and hence,  $\Delta_t$  should be the maximum possible duration that induces the politician to put full effort on reform before the first success. If  $q_t \geq \lambda_s/\lambda_r$ , so if  $t \leq T_m$ , there is no conflict of interest and the voter can set  $\Delta_t = \infty$ . If  $t > T_m$ , the value  $\Delta_t$  makes the politician indifferent between the reform and the status quo arm, so it solves:

$$\lambda_r q_t \left[ \frac{1}{r} - \frac{1}{r} e^{-(\lambda_r+r)\Delta_t} \right] - \lambda_s \left[ \frac{1}{r} - \frac{1}{r} e^{-(\lambda_s+r)\Delta_t} \right] = (\lambda_r q_t - \lambda_s) W_t$$

where  $W_t$  is the politician's continuation value at  $t$  if he has not obtained any success by that time. Let  $\Delta_t = \Delta(q_t, W_t)$  be the solution to the above equation. Conjecture that for any  $W \in [0, 1/r)$  and any  $q \in (0, \lambda_s/\lambda_r)$ , the solution exists and is unique.

The continuation value of the unsuccessful politician,  $W_t$ , evolves according to the ordinary differential equation (ODE)

$$\frac{dW_t}{dt} - (\lambda_s + r)W_t = -\frac{\lambda_s}{r} [1 - e^{-(r+\lambda_s)\Delta(q_t, W_t)}]$$

with boundary condition  $W_{\hat{T}} = 0$ . The solution to  $W_t$  and  $\Delta_t$  can be found numerically but not in closed form.

As in the case of no commitment, we calculate the equilibrium belief and endogenous term at the time  $\hat{T}$ . We have the following result.

**Lemma 8.** *The values  $\Delta_{\hat{T}}$  and  $q_{\hat{T}}$  are given implicitly by*

$$(\lambda_r q_{\hat{T}} + r) \frac{\lambda_p}{r} = \lambda_r q_{\hat{T}} [1 + V^R(\Delta_{\hat{T}})],$$

$$V^R(\Delta_{\hat{T}}) = \frac{\lambda_r}{r} - \left[ \frac{\lambda_r}{r} - \frac{\lambda_p}{r} \right] e^{-(r+\lambda_r)\Delta_{\hat{T}}}$$

and

$$\lambda_r q_{\hat{T}} \left[ \frac{1}{r} - \frac{1}{r} e^{-(\lambda_r+r)\Delta_{\hat{T}}} \right] - \lambda_s \left[ \frac{1}{r} - \frac{1}{r} e^{-(\lambda_s+r)\Delta_{\hat{T}}} \right] = 0.$$

Lemma 8 gives the equations that determine the values of  $\Delta_{\hat{T}}$ ,  $q_{\hat{T}}$  and  $\hat{T}$ . We use this as the initial condition to determine the equilibrium values at  $t < \hat{T}$ .

As before we solve this system of equations numerically and obtain results as illustrated below in Figure 9. Figure 9 panel (a) shows that beliefs fall faster in the case of commitment, because more effort is being exerted on the reform. Experimentation is thus higher with commitment and closer to the first best. Figure 9 panel (b) illustrates that the voter gives the politician the same amount of time to get the first success, but gives more time for the second success, once a first success is achieved. As we do not observe sharp decreases in experimentation in practice, we believe the no commitment case is the empirically relevant one, and we take this to the data in the next section.

## 6 Empirical evidence

In this section, we present empirical evidence broadly consistent with the model's predictions. While we do not consider this to be a test of the theory, we believe it supports the model's empirical validity. Specifically, from the stylized model, we interpret  $T_1$  as the first election after the politician has held office for some time, when they could be potentially replaced. Although  $T_1$  is endogenous in the model, elections in presidential systems typically occur

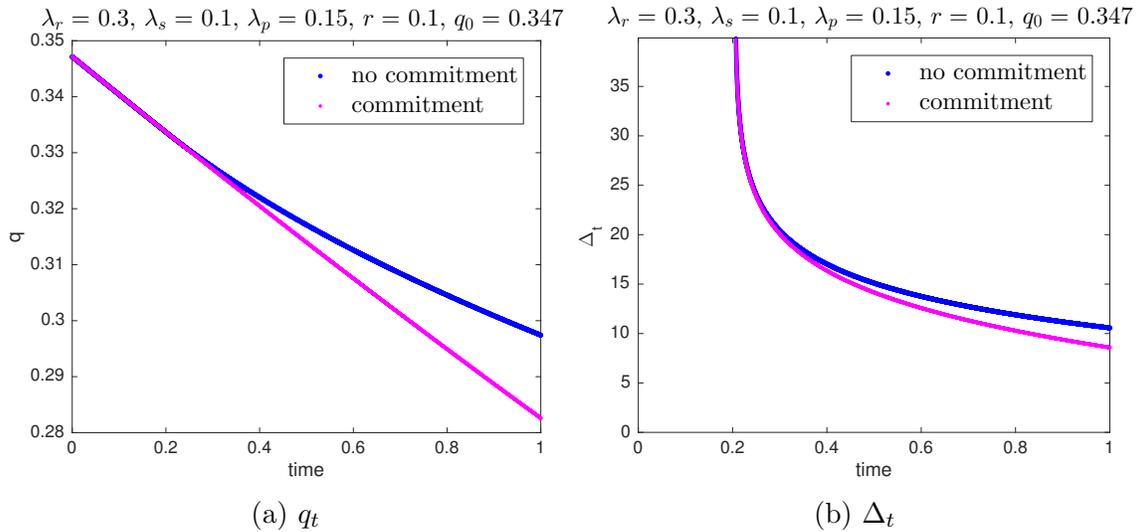


Figure 9: Equilibrium values assuming no success. No commitment versus commitment

after a fixed number of years as determined by the country’s constitution.<sup>22</sup>

The theory generates two key predictions with regards to the pattern of reform effort in the period up to  $T_1$ . First, as demonstrated in Figure 4, in phase I (before the first success), there is a general pattern of reform fatigue. From the time the politician takes office to the end of his term at  $T_1$ , reform effort is non-increasing, even if the pace of decline may vary. Second, as illustrated in Figure 5, in phase II (after first success, before second success), we see that there are two cases, which hold different implications for how output affects the reform cycle. In the first case, if a success (high output) is observed before  $T_1$ , and this success was achieved on the reform, the politician will exert full effort on the reform thereafter. This case implies that high output mitigates reform fatigue, i.e. increases effort on reforms. In contrast, if a success is observed before  $T_1$ , but was achieved on the status quo, then the politician will exert full effort on the status quo. This second case implies that high output will reinforce or exacerbate reform fatigue. In short, the model implies that high output from reform will mitigate reform fatigue while high output from status quo will exacerbate it. Since we cannot distinguish output from reform versus status quo in the data, we cannot test this prediction directly—instead, we use the theory to interpret the pattern we observe in the empirical findings.

<sup>22</sup>While early elections do occur, they are usually the result of coups or takeovers in weakly institutionalized settings.

## 6.1 Data

We document reform cycles using cross-national regression analyses. To do so, three pieces of information are required: a measure of reforms which impact the economy and are unobserved to the voter, election years, and (per capita) output.

The measure of reforms used is a market liberalization index for the financial sector from Abiad et al. (2008), which covers 91 countries over the 1973-2005 period. An aggregate index is constructed combining seven aspects of financial reforms, and we rescale this index to be between 0 and 100. We study financial reforms for three reasons. First, much of the qualitative debate and anecdotal accounts of reform fatigue have focused on reforms within the financial sector. Second, financial reforms are typically implemented by an executive and it requires effort to build coalitions to pass legislation and write the text of the legislation. This effort of the politician is arguably unobserved to the voter, as they are complicated to implement, requiring reasonably sophisticated legislation and implementation. Third, our theory assumes that effort on the reform arm has a larger probability of generating output than the status quo arm. There is some empirical evidence of positive economic impact of financial reforms (e.g. Prati et al. (2013), Christiansen et al. (2013)). The change in the financial reform index, as measured by the annual first difference, is our main outcome variable—the extent of reforms.

The source for national executive and legislative elections data is the World Bank Database of Political Institutions (DPI). Our analysis will be limited to presidential systems, in which the head of the executive branch is elected either directly or by an electoral college (whose only function is to elect the president). The executive leader is thus directly accountable to voters, without a parliament playing an intermediary role.

Finally, to capture the binary nature of output generated as a result of effort on reforms, we employ data from the Penn World Tables 7.0 and construct an indicator variable for whether the growth rate of GDP per capita is above trend or not. Specifically, for each country, we use the Hodrick and Prescott (1981, 1997) (HP) filter to extract the trend component of GDP per capita, with a smoothing parameter of 100.<sup>23</sup> The variable *Lagged output above trend* is defined to be 1 if lagged GDP per capita is greater than the lagged trend value. We also use a measure of whether the country participates in the IMF program, and present results using this variable in Appendix B.5.

Our regression sample covers 56 countries between years 1976 and 2004. Appendix B

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<sup>23</sup>The use of 100 as a smoothing parameter follows, for instance, Backus and Kehoe (1992) and Barro and Ursúa (2008). However, Appendix Table B.5 shows that our results are robust to using a smoothing parameter of 400, chosen by, for example, Correia et al. (1992) and Cooley and Ohanian (1991). Both 100 and 400 are commonly used (Ravn and Uhlig (2002)).

provides further details on each of the datasets and Appendix Table B.1 provides summary statistics for key variables.

## 6.2 Empirical results

We investigate the relationship between financial market reforms and elections to provide empirical support for the model. Specifically, we use cross-country regression specifications to examine whether annual changes in financial reforms vary over the course of the electoral cycle. The baseline estimation equation is

$$\Delta Ref_{ct} = \beta_1(Lag)_{ct} + \beta_2(Year\ of)_{ct} + \beta_3(Lead)_{ct} + \varphi_c + \varphi_t + \varepsilon_{ct}, \quad (11)$$

where  $\Delta Ref_{ct}$  is the first difference in the financial liberalization index  $Ref$  for a given country  $c$  and for a year  $t$ .  $\varphi_c$  are country fixed effects which sweep out time invariant country characteristics and  $\varphi_t$  are year fixed effects which control for financial reform changes common to the global sample. The variable  $(Year\ of)_{ct}$  is equal to one if the country has an election in that year, and analogously,  $Lag$  denotes the year after the election, while  $Lead$  denotes the year before an election. Note that for these variables, the omitted category is the year(s) in between the lag and lead years. Based on the model's prediction, an increase in the pace of reforms after an election would correspond to a positive sign on  $\beta_1$ , while a slowdown in the pace of reforms prior to an election would correspond to a negative sign on  $\beta_3$ . We estimate equation (11) using OLS. As argued earlier, election timing in presidential systems are determined by the constitution, and can be considered exogenous. In all specifications, we cluster the standard errors at the country level to account for potential serial correlation over time.

Table 1 presents estimates of the main specification. The first three columns consider the impact of executive and legislative elections together; the second three columns consider just executive elections; and the last three columns consider just legislative elections. Within each grouping, we include estimates of equation (11), which simultaneously includes the election year, the election lead and election lag. We also present additional estimates, looking separately at just the election lead or just the election lag. The omitted category in these specifications changes to all years in the electoral cycle not included as regressors.

The results present evidence consistent with reform fatigue in financial reforms. The positive coefficient on the  $Lag$  variable indicates that financial reforms tend to be implemented faster after elections, while the negative coefficient on the  $Lead$  variable suggests that the pace of financial reforms tend to slow down in the run up to an election. These implied effects

Table 1: Financial reforms in presidential regimes

	Executive or Legislative			Executive			Legislative		
Lag	0.748**	0.915**		0.984**	1.157***		0.709*	0.952**	
	(0.374)	(0.383)		(0.459)	(0.441)		(0.429)	(0.438)	
Year of	0.051	0.291	-0.199	0.005	0.185	-0.299	0.059	0.386	-0.195
	(0.358)	(0.328)	(0.308)	(0.409)	(0.381)	(0.370)	(0.417)	(0.368)	(0.358)
Lead	-0.670*		-0.849**	-0.568		-0.862**	-0.875**		-1.060***
	(0.378)		(0.376)	(0.459)		(0.439)	(0.400)		(0.399)
R-squared	0.154	0.151	0.151	0.153	0.152	0.150	0.155	0.151	0.152
Observations	1195	1195	1195	1195	1195	1195	1195	1195	1195
No. countries	56	56	56	56	56	56	56	56	56

*Notes:* The dependent variable is the change in the financial reform index. All regressions include country and year fixed effects. Standard errors are in parentheses, clustered at the country level. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level.

are substantial. Consider the first column. The coefficient of 0.748 on *Lag* indicates that after an election, the pace of financial reforms increased by 36 percent relative to the mean change of 2.099. The coefficient of -0.670 on *Lead* implies that reforms slowed by 32 percent in the year before an election. This suggests substantial differences in the speed of financial market liberalization between the beginning and end of the politician's term. This pattern is even stronger in the other columns when either the *Lag* or *Lead* term is omitted. The disaggregation of the legislative and executive elections suggest that the effects are not driven by either type of election, as the coefficients on the lead variables and lag variables across specifications are not statistically distinguishable from one another at the 5 percent level.<sup>24,25</sup> In Appendix Table B.6, we verify that the the cycle in reform fatigue is not exacerbated by IMF programs. Thus, reform fatigue does not appear to be driven by pressure from the international organization.

Finally, we assess whether financial reforms vary with output changes, as predicted by the model and illustrated in Figure 5. Since we observe the slow down in reforms on the lead term, we interact this term with an indicator of whether (lagged) output was above trend, to determine if the tendency to slow reforms is attenuated (or exacerbated) by high output. As Table 2 shows, the interaction of the election year lead with the (lagged) above trend output variable is positive and statistically significant. This indicates that the tendency to

<sup>24</sup>The theory in Section 4 suggests that reform fatigue should not be present after a politician's first term in office. Consistent with this pattern, when we restrict the regression sample to politicians holding office for a second term or above in Appendix Table B.2, we find a lack of support for any relationship between reforms and the electoral cycle. We show that the cycle is significant when restricted to the first term in Table B.3.

<sup>25</sup>In Appendix Table B.4 we examine financial reforms in parliamentary regimes and demonstrate that there is no corresponding evidence of a cycle in this group of countries. These differing patterns are consistent with the fact that executives in parliamentary systems are not directly elected by voters, but rather by legislators with more information than voters.

slow down reforms in the run up to the election is mitigated when lag output is relatively high. According to the theory, this dampening of the reform cycle is consistent with the initial success being attributed largely to the reforms.<sup>26</sup>

Table 2: Financial reforms and output changes in presidential regimes

	(1)	(2)
Lag	1.036** (0.459)	
Year of	0.067 (0.405)	-0.255 (0.366)
Lead	-1.247** (0.536)	-1.540*** (0.537)
Lagged output above trend	-1.002*** (0.369)	-0.969*** (0.370)
Lead×Lagged output above trend	1.378* (0.771)	1.346* (0.759)
R-squared	0.160	0.156
Observations	1195	1195
No. countries	56	56

*Notes:* The dependent variable is the change in the financial reform index. Output refers to GDP per capita. All regressions include country and year fixed effects. Standard errors are in parentheses, clustered at the country level. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level.

## 7 Conclusion

This paper presents a theory of reform fatigue. The theory is based on the voter’s uncertainty about the competence of the politician. Success on reforms reflect a competent politician, whereas failure may result in the politician losing office. In an equilibrium with reform fatigue, the voter is unable to know the politician’s type with certainty when there is a conflict of interest. For this to happen, the politician must exert an intermediate amount of effort on the reform, so that if a success occurs, it cannot be attributed with certainty to the reform or the status quo. As a result, the voter’s pace of learning about the politician’s type may vary from the politician’s.

For an intermediate amount of effort to be allocated to the reform in equilibrium, the politician must be indifferent between the reform and the status quo as long as there is a

<sup>26</sup>We show that this result is robust to alternative measures of output change in Appendix Table B.5.

conflict of interest. The voter provides endogenous term lengths to create this indifference. The politician's belief that he is competent decreases over time with no success, while his time horizon keeps shrinking. This increases the politician's incentive to switch to the status quo. In order to balance the politician's changes in beliefs and payoffs, the voter decreases the endogenous term length as long as there is no success. The decrease in term length decreases the benefit of a success, and hence decreases the incentive to switch to the status quo. The model predicts that if the reform generates a success, then we should observe an increase in reforms. Otherwise, we should see a decrease in reforms.

We present empirical evidence consistent with the predictions of the model. A reform fatigue cycle is identified in financial reform data across countries. Furthermore, we show that this reform cycle does not appear to be significantly affected by participation in IMF programs, which refutes the conventional wisdom that this is due to the IMF. Rather, our theory suggests that these reform cycles are due to politicians optimally choosing to experiment with reforms under the shadow of electoral incentives. Our empirical results corroborate this prediction by showing a positive correlation between output and reforms as predicted by the model when the politician is competent

# A Theoretical Appendix

## A.1 Proof of Lemma 1

The voter will replace the politician only at time  $\tau + \Delta_\tau$  when he is indifferent between firing the politician and keeping him one more instant. If the voter keeps the politician one more instant, with probability  $p_{\Delta_\tau}\lambda_r$  there is a success on the reform and the politician puts full effort on reform thereafter, giving the voter a payoff  $[1 + \frac{\lambda_r}{r}]$ . With probability  $(1 - p_{\Delta_\tau})\lambda_s$  there is a success on the status quo and the politician, who is still uncertain of his competence, pursues the optimal strategy given his belief  $q_\tau$  and delivers the payoff  $[1 + H(q_\tau)]$  to the voter. If there is no success, the voter strictly prefers to fire the politician and obtains the payoff  $\frac{\lambda_p}{r}$ . Thus the voter's indifference condition at time  $\tau + \Delta_\tau$  is

$$p_{\Delta_\tau}\lambda_r \left[1 + \frac{\lambda_r}{r}\right] dt + (1 - p_{\Delta_\tau})\lambda_s [1 + H(q_\tau)] dt + [1 - p_{\Delta_\tau}\lambda_r dt - (1 - p_{\Delta_\tau})\lambda_s dt - r dt] \frac{\lambda_p}{r} = \frac{\lambda_p}{r}.$$

Rearranging the voter's indifference condition gives

$$p_{\Delta_\tau} = \left[1 - \frac{(\lambda_r - \lambda_p)(1 + \lambda_r/r)}{\lambda_s(1 + H(q_\tau)) - \lambda_p(1 + \lambda_s/r)}\right]^{-1} = \left[1 + e^{(\lambda_r - \lambda_s)\Delta_\tau} \frac{\lambda_s(1 - x_\tau)}{\lambda_r x_\tau q_\tau}\right]^{-1}.$$

The last equality follows from equation (2), which gives the voter's belief  $p_t$  at any time  $t$  after  $\tau$ . This is evaluated at  $t = \Delta_\tau$ . Rearranging the last equality gives

$$x_\tau = \left[1 - e^{-(\lambda_r - \lambda_s)\Delta_\tau} \frac{\lambda_r q_\tau (\lambda_r - \lambda_p) (1 + \lambda_r/r)}{\lambda_s [\lambda_s(1 + H(q_\tau)) - \lambda_p(1 + \lambda_s/r)]}\right]^{-1}. \quad (12)$$

■

## A.2 Proof of Lemma 2

After a first success on the reform at time  $\tau$ , the politician exerts full effort on the reform in phase II of the equilibrium. If another success is obtained before time  $\tau + \Delta_\tau$ , then the politician moves to phase III of the equilibrium in which he is kept forever and maintains full effort on the reform because he knows that he is good at that time. The voter's payoff in

phase III is thus  $\frac{\lambda_r}{r}$ . The voter's payoff after a first success on the reform is thus

$$V_t^R = \lambda_r dt \left[ 1 + \frac{\lambda_r}{r} \right] + (1 - \lambda_r dt - r dt) V_{t+dt}^R.$$

Simplifying, gives the ODE for  $V_t^R$ , which is  $-\frac{dV_t^R}{dt} = \lambda_r \left[ 1 + \frac{\lambda_r}{r} \right] - (\lambda_r + r) V_t^R$ . The voter replaces the politician and time  $\Delta_\tau$ , and thus the boundary condition is  $V_{\Delta_\tau}^R = \lambda_p/r$ . Solving this ODE gives the continuation payoff for the voter if the politician got a first success on the reform and time  $\tau$ . This is

$$V_\tau^R = \frac{\lambda_r}{r} - \left[ \frac{\lambda_r}{r} - \frac{\lambda_p}{r} \right] e^{-(r+\lambda_r)\Delta_\tau}. \quad (13)$$

After a first success on the status quo at time  $\tau$ , the politician exerts full effort on the status quo in phase II of the equilibrium. As before, if another success is obtained before time  $\Delta_\tau$ , then the politician moves to phase III of the equilibrium in which he is kept forever and does the optimal experimentation for the voter, given that his belief that he is competent is  $q_\tau$ . The voter's payoff in phase III is thus  $H(q_\tau)$ . The voter's payoff after a first success on the status quo is thus

$$V_t^S = \lambda_s dt [1 + H(q_\tau)] + (1 - \lambda_s dt - r dt) V_{t+dt}^S$$

Simplifying gives  $-\frac{dV_t^S}{dt} = \lambda_s [1 + H(q_\tau)] - (\lambda_s + r) V_t^S$  with boundary condition  $V_{\Delta_\tau} = \lambda_p/r$ . The continuation payoff for the voter at  $\tau$  if the politician got a first success on the status quo at  $\tau$  is thus

$$V_\tau^S = \frac{1 + H(q_\tau)}{1 + r/\lambda_s} - \left[ \frac{1 + H(q_\tau)}{1 + r/\lambda_s} - \frac{\lambda_p}{r} \right] e^{-(r+\lambda_s)\Delta_\tau}. \quad (14)$$

■

### A.3 Proof of Lemma 3

Recall  $W_t$  is the continuation payoff of the politician, at time  $t$ , who has not obtained any success by  $t$ . We get that  $W_t$  is given by

$$\begin{aligned} W_t = & x_t q_t \lambda_r dt W_t^R + (1 - x_t) \lambda_s dt W_t^S \\ & + [1 - x_t q_t \lambda_r dt - (1 - x_t) \lambda_s dt - r dt] W_{t+dt}, \end{aligned}$$

where  $W_t^R$  and  $W_t^S$  are the politician's continuation payoffs after a success on the reform and status quo respectively. Since the politician is indifferent between the reform and the status quo, we can set  $x_t = 0$  in the above expression. Using the approximation that  $W_{t+dt} = W_t + dW_t$  we have that  $W_t$  evolves according to

$$\frac{dW_t}{dt} = W_t(\lambda_s + r) - \lambda_s W_t^S. \quad (15)$$

If the politician achieves a success on the status quo at time  $t$ , then he has  $\Delta_t$  units of time to obtain the second success. The politician will put full effort on the status quo during this time. If the second success is obtained before  $\Delta_t$ , then the politician is retained permanently and receives discounted payoff  $\frac{e^{-r\Delta_t}}{r}$ . The probability that at least one success is obtained in the interval  $(t, t + \Delta_t]$  is  $1 - e^{-\lambda_s \Delta_t}$ . The politician receives the payoff  $\frac{1}{r} [1 - e^{-r\Delta_t}]$  between  $t$  and  $\Delta_t$ , and thus the politician's payoff after a first success on the status quo is  $W_t^S = \frac{e^{-r\Delta_t}}{r} [1 - e^{-\lambda_s \Delta_t}] + \frac{1}{r} [1 - e^{-r\Delta_t}] = \frac{1}{r} [1 - e^{-(\lambda_s + r)\Delta_t}]$ . Substituting into equation (15) gives

$$\frac{dW_t}{dt} = W_t(\lambda_s + r) - \frac{\lambda_s}{r} [1 - e^{-(\lambda_s + r)\Delta_t}].$$

We thus have a differential equation for  $W_t$  with boundary condition  $W_{T_1} = 0$  since the politician is fired at time  $T_1$  if there is no success. We obtain the closed form solution of  $W_t$

$$W_t = e^{(\lambda_s + r)t} \int_{T_1}^t \frac{\lambda_s [e^{-(\lambda_s + r)(z + \Delta_z)} - e^{-(\lambda_s + r)z}]}{r} dz. \quad (16)$$

■

## A.4 Proof of Lemma 4

We get  $q_{T_1}$  as a function of  $\Delta_{T_1}$  by solving the indifference condition for the politician. Noting that  $W_{T_1} = 0$ , we have

$$\lambda_r q_{T_1} [1 - e^{-(r + \lambda_r)\Delta_{T_1}}] = \lambda_s [1 - e^{-(r + \lambda_s)\Delta_{T_1}}],$$

which gives

$$q_{T_1} = \frac{\lambda_s [1 - e^{-(r + \lambda_s)\Delta_{T_1}}]}{\lambda_r [1 - e^{-(r + \lambda_r)\Delta_{T_1}}]}.$$

We get  $x_{T_1}$  as a function of  $\Delta_{T_1}$  by solving the indifference condition for the voter, to replace the politician at  $T_1$  or to wait one instant later. This indifference condition is

$$\lambda_r x_{T_1} q_{T_1} (1 + V_{T_1}^R) + \lambda_s (1 - x_{T_1}) (1 + V_{T_1}^S) - (r + \lambda_s (1 - x_{T_1}) + \lambda_r x_{T_1} q_{T_1}) \frac{\lambda_p}{r} = 0,$$

where  $V_{T_1}^R$  and  $V_{T_1}^S$  are the voter's continuation payoff after a success on the reform and status quo respectively given by equations (13) and (14) respectively. We get

$$x_{T_1} = \frac{\lambda_p - \lambda_s (1 + V_{T_1}^S - \lambda_p/r)}{\lambda_r q_{T_1} (1 + V_{T_1}^R - \lambda_p/r) - \lambda_s (1 + V_{T_1}^S - \lambda_p/r)}.$$

We get  $\Delta_{T_1}$  by solving the indifference condition for the voter, to replace the politician at  $T_1 + \Delta_{T_1}$  or to wait one instant later:

$$\left[ 1 - \frac{\lambda_r (1 + \lambda_r/r) - \lambda_p (1 + \lambda_r/r)}{\lambda_s (1 + H(q_{T_1})) - \lambda_p (1 + \lambda_s/r)} \right]^{-1} = \left[ 1 + e^{(\lambda_r - \lambda_s) \Delta_{T_1}} \frac{\lambda_s (1 - x_{T_1})}{\lambda_r x_{T_1} q_{T_1}} \right]^{-1}.$$

■

## A.5 Proof of Lemma 5

(To be included)

## A.6 Proof of Lemma 6

(To be included)

## A.7 Proof of Lemma 7

(To be included)

## A.8 Proof of Lemma 8

The voter should be indifferent between firing the politician at  $\hat{T}$ , or waiting one instant later. This indifference condition is

$$(\lambda_r q_{\hat{T}} + r) \frac{\lambda_p}{r} = \lambda_r q_{\hat{T}_m} [1 + V^R(\Delta_{\hat{T}})]$$

where  $V^R(\Delta_{\hat{T}})$  is the voter's continuation value at time  $\hat{T}$  right after the politician got a success from the reform, it can be expressed in closed form

$$V^R(\Delta_{\hat{T}}) = \frac{\lambda_r}{r} - \left[ \frac{\lambda_r}{r} - \frac{\lambda_p}{r} \right] e^{-(r+\lambda_r)\Delta_{\hat{T}}}$$

and we also have  $q_{\hat{T}}$  as a function of  $\Delta_{\hat{T}}$  from the indifference condition of the politician:

$$\lambda_r q_{\hat{T}} \left[ \frac{1}{r} - \frac{1}{r} e^{-(\lambda_r+r)\Delta_{\hat{T}}} \right] - \lambda_s \left[ \frac{1}{r} - \frac{1}{r} e^{-(\lambda_s+r)\Delta_{\hat{T}}} \right] = 0.$$

■

## B Empirical Appendix

### B.1 Data

The financial market reform index from Abiad et al. (2008) is comprised of seven different aspects: (i) credit controls and excessively high reserve requirements (including directed credit and credit ceilings), (ii) interest rate controls, (iii) entry barriers, (iv) state ownership in the banking sector, (v) capital account restrictions, (vi) prudential regulations and supervision of the banking sector, and (vii) securities market policy. Each is assigned a liberalization score of 3, and an aggregate index is constructed by summing up all the categories. We rescale this index to be between 0 and 100. Other reform measures are available, for instance, with regards to the agricultural market, trade, or the labor market (e.g., Ostry et al. (2009), Aleksynska and Schindler (2011)). However, we do not employ these measures either because their economic impact appears weak, or there are very few non-zero changes. For example, there are only 28 non-zero changes in our sample for the agricultural market liberalization index, as opposed to over 400 for financial reforms.

Our primary source for national elections data is the World Bank Database of Political Institutions (DPI), which covers 178 countries over the 1975-2012 period. Other sources for elections data with large coverage include the Institutions and Elections Project (IAEP) and Golder (2005). We detected some inconsistencies between DPI and these two databases; hence, corrections were made to address them. We make the following changes: no executive elections in Madagascar, 1977, and Mexico, 1997; executive and legislative elections in Colombia, 1998 instead of 1999, and in Kenya, 1988 instead of 1987; executive election in Zimbabwe in 1990.

For data on GDP per capita, we utilize the variable “rgdpch” from the Penn World Tables 7.0, defined as PPP converted GDP per capita (chain series), at 2005 constant prices.

Table B.1 provides summary statistics for these variables.

Table B.1: Summary statistics (1976-2004), presidential regime

	Obs.	Mean	Std. dev.	Min.	Max.
Financial reform index	1195	43.42	27.36	0	100
Change in financial reform index	1195	2.099	5.365	-28.57	38.10
Executive or legislative election	1195	0.268	0.443	0	1
Executive election	1195	0.172	0.377	0	1
Legislative election	1195	0.223	0.416	0	1
Observed executive or legislative election term length	294	3.425	2.382	1	16
Observed executive election term length	175	4.823	1.718	1	16
Observed legislative election term length	234	4.141	2.017	1	16
Lagged output above trend	1195	0.501	0.500	0	1
IMF	1195	0.549	0.498	0	1

*Notes:* An observation for term length is one observed election cycle, i.e., election to election. Years up to first election observed in the sample are not counted as a term. *Lagged output above trend* is equal to 1 if lagged GDP per capita is greater than the lagged trend value. *IMF* is equal to 1 if the country has an outstanding loan with the IMF.

We list the 56 countries with presidential election systems included in the empirical results:

**Africa:** Algeria, Burkina-Faso, Cameroon, Cote d’Ivoire, Ethiopia, Ghana, Israel, Jordan, Kenya, Madagascar, Morocco, Mozambique, Nigeria, Senegal, Tanzania, Tunisia, Uganda, Zimbabwe.

**Americas:** Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Mexico, Nicaragua, Paraguay, Peru, United States, Uruguay, Venezuela.

**Asia:** Bangladesh, South Korea, Nepal, Pakistan, Philippines, Sri Lanka, Taiwan, Thailand.

**Europe & Central Asia:** Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyz Republic, Lithuania, Poland, Portugal, Russia, Spain, Turkey, Ukraine, Uzbekistan.

## B.2 Reform fatigue in first term versus later terms

In Appendix Table B.2, the regression sample is restricted to politicians holding office for a second term or above. There is no statistically significant relationship between reforms and the year in the election cycle, regardless of whether it is with respect to executive or

legislative elections. Conversely, when the sample consists only of politicians in their first term of office, as in Appendix Table B.3, the reform fatigue pattern remains.

Table B.2: Financial reforms in presidential regimes, restricted to second term or above

	Executive or Legislative			Executive			Legislative		
Lag	0.325 (0.680)	0.364 (0.703)		0.779 (0.701)	0.710 (0.721)		0.450 (0.780)	0.653 (0.795)	
Year of	-0.331 (0.593)	-0.294 (0.565)	-0.433 (0.533)	-0.661 (0.817)	-0.732 (0.766)	-0.889 (0.768)	-0.054 (0.626)	0.173 (0.576)	-0.202 (0.547)
Lead	-0.129 (0.374)		-0.225 (0.448)	0.254 (0.432)		0.023 (0.493)	-0.674 (0.439)		-0.801 (0.500)
R-squared	0.254	0.254	0.253	0.259	0.259	0.256	0.257	0.254	0.256
Observations	389	389	389	389	389	389	389	389	389
No. countries	40	40	40	40	40	40	40	40	40

*Notes:* The dependent variable is the change in the financial reform index. All regressions include country and year fixed effects. Standard errors are in parentheses, clustered at the country level. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level.

Table B.3: Financial reforms in presidential regimes, restricted to first term

	Executive or Legislative			Executive			Legislative		
Lag	0.887* (0.463)	1.078** (0.488)		1.052* (0.600)	1.315** (0.590)		0.883* (0.492)	1.112** (0.526)	
Year of	0.248 (0.499)	0.587 (0.467)	-0.070 (0.440)	0.330 (0.545)	0.609 (0.531)	0.001 (0.509)	0.264 (0.546)	0.610 (0.498)	-0.074 (0.499)
Lead	-0.825 (0.519)		-1.021* (0.526)	-0.804 (0.668)		-1.121* (0.648)	-0.840 (0.544)		-1.067* (0.555)
R-squared	0.148	0.144	0.144	0.147	0.144	0.143	0.147	0.144	0.144
Observations	806	806	806	806	806	806	806	806	806
No. countries	55	55	55	55	55	55	55	55	55

*Notes:* The dependent variable is the change in the financial reform index. All regressions include country and year fixed effects. Standard errors are in parentheses, clustered at the country level. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level.

### B.3 Financial reforms in parliamentary regimes

We find no evidence of a political cycle in financial reforms in parliamentary systems. Since executives are not elected directly under parliamentary systems, this is consistent with our framework, which posits that reform cycles emerge when politicians are directly accountable to voters. We present below in Table B.4 the regression for the parliamentary countries in our dataset. Parliamentary regimes typically do not have an executive election that is separate from the legislative election, so we do not present results for executive elections only.

Table B.4: Financial reforms in parliamentary regimes

	Executive or Legislative			Legislative		
Lag	0.415 (0.419)	0.301 (0.341)		0.602 (0.444)	0.419 (0.363)	
Year of	0.187 (0.327)	0.065 (0.267)	-0.001 (0.252)	0.338 (0.346)	0.141 (0.278)	0.056 (0.251)
Lead	0.270 (0.349)		0.093 (0.269)	0.423 (0.369)		0.160 (0.285)
R-squared	0.089	0.088	0.088	0.090	0.089	0.088
Observations	909	909	909	909	909	909
No. countries	41	41	41	41	41	41

*Notes:* The dependent variable is the change in the financial reform index. All regressions include country and year fixed effects. Standard errors are in parentheses, clustered at the country level. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level.

## B.4 Alternate measures of output increase

In Appendix Table B.5, we test for the robustness of the regression results from Table 2. First, in columns (1) and (2), we use 400 as the HP filter smoothing parameter instead of 100. Second, in columns (3) and (4), we use the actual magnitudes of the growth rates for GDP per capita, and interact this with the lead year variable. The results with either measure of output change are consistent with our hypothesis that the pace of reforms slows down less when there is output growth above the trend value.

Table B.5: Financial reforms and output changes in presidential regimes, robustness

	Smoothing parameter = 400		Output growth rate	
	(1)	(2)	(3)	(4)
Lag	1.070** (0.458)		1.102** (0.457)	
Year of	0.073 (0.406)	-0.259 (0.368)	-0.007 (0.385)	-0.352 (0.349)
Lead	-1.190** (0.517)	-1.498*** (0.518)	-0.778 (0.491)	-1.107** (0.471)
Lagged output above trend	-1.303*** (0.370)	-1.259*** (0.373)		
Lead×Lagged output above trend	1.340* (0.698)	1.317* (0.689)		
Lagged output growth rate			-0.052 (0.033)	-0.050 (0.033)
Lead×Lagged output growth rate			0.148** (0.070)	0.148** (0.070)
R-squared	0.164	0.160	0.158	0.153
Observations	1195	1195	1182	1182
No. countries	56	56	56	56

*Notes:* The dependent variable is the change in the financial reform index. Output refers to GDP per capita. Columns (1) and (2) use 400 as the HP filter smoothing parameter to compute *Lagged output above trend*. Columns (3) and (4) use the percentage change of GDP per capita for *Lagged output growth rate*. All regressions include country and year fixed effects. Standard errors are in parentheses, clustered at the country level. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level.

## B.5 Reform Fatigue and the IMF

We consider whether financial reform cycles are influenced by participation in IMF programs. Data on countries' historical lending arrangements with the IMF is downloaded from IMF's website. The dummy variable *IMF* is one if a country has an outstanding loan, yet to expire, from the IMF.<sup>27</sup> IMF programs are quite common in our sample, with just over half of the country year observations falling under such a program. In Table B.6 we present estimates interacting our election variables with an indicator for IMF program participation. The coefficient on the IMF participation variable is positive and significant as expected, however the coefficients on the interaction terms are insignificant across specifications. These results indicate that countries under IMF programs do in fact, implement financial reforms at a faster pace. However, they also show that the political cycle in reform fatigue is neither dampened nor exacerbated by program participation. Thus, reform fatigue appears to not

<sup>27</sup>Loans can be any of the following types: Exogenous Shock Facility, Extended Credit Facility, Extended Fund Facility, Flexible Credit Line, Precautionary and Liquidity Line, Precautionary and Liquidity Line, Standby Arrangement, Standby Credit Facility, and Structural Adjustment Facility Commitment.

be driven by external pressure from this international organization. Rather it is a broader phenomenon appearing among presidential countries more generally.

Table B.6: Financial reforms and IMF program participation in presidential regimes

	Executive or Legislative			Executive			Legislative		
Lag	0.835 (0.538)	0.953* (0.541)		1.043 (0.700)	1.159* (0.698)		0.592 (0.624)	0.743 (0.623)	
Lag×IMF	-0.213 (0.697)	-0.127 (0.699)		-0.050 (0.878)	0.024 (0.861)		0.068 (0.732)	0.248 (0.748)	
Year of	0.612 (0.655)	0.764 (0.618)	0.344 (0.564)	0.255 (0.584)	0.371 (0.564)	-0.064 (0.529)	0.883 (0.752)	1.079 (0.694)	0.664 (0.620)
Year of×IMF	-0.994 (0.872)	-0.846 (0.816)	-0.943 (0.778)	-0.176 (0.873)	-0.095 (0.806)	-0.169 (0.804)	-1.531 (0.962)	-1.299 (0.896)	-1.543* (0.831)
Lead	-0.310 (0.480)		-0.485 (0.478)	-0.299 (0.609)		-0.586 (0.598)	-0.405 (0.545)		-0.545 (0.541)
Lead×IMF	-0.613 (0.658)		-0.606 (0.649)	-0.374 (0.733)		-0.405 (0.719)	-0.852 (0.717)		-0.897 (0.704)
IMF	2.223*** (0.675)	2.002*** (0.586)	2.164*** (0.568)	1.864*** (0.503)	1.787*** (0.471)	1.846*** (0.477)	2.234*** (0.581)	1.953*** (0.522)	2.283*** (0.508)
R-squared	0.173	0.170	0.170	0.171	0.170	0.167	0.176	0.171	0.174
Observations	1195	1195	1195	1195	1195	1195	1195	1195	1195
No. countries	56	56	56	56	56	56	56	56	56
<i>F</i> -test ( <i>p</i> )	0.634	0.519	0.421	0.966	0.990	0.853	0.191	0.124	0.137

*Notes:* The dependent variable is the change in the financial reform index. All regressions include country and year fixed effects. The row *F*-test (*p*) shows p-values associated with the *F*-test for the joint significance of *Lag* × *IMF*, *Year of* × *IMF*, and *Lead* × *IMF*. Standard errors are in parentheses, clustered at the country level. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level.

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