Learning to Love Democracy: A Theory of Democratic Consolidation and Breakdown*

Milan W. Svolik†

April 2010

Abstract

A central promise of democracy is to deliver good governance by holding politicians accountable for their performance in office. I show why political accountability may fail in young democracies and thus lead to their breakdown. I model the process by which elections allow candidates to build reputations for performing well and weed out candidates that cannot be deterred from performing poorly by the threat of a removal from office. When successful, this process gradually strengthens voters' trust that elections can deliver political accountability and leads to the consolidation of democracy, a state in which democratic breakdowns no longer occur. This theory explains why economic recessions lead to democratic breakdowns, why young democracies break down more often than established ones, why rich democracies consolidate sooner than poor ones, why public trust in democracy declines during economic recessions, and why candidates perform better in established democracies.

*I would like to thank Larry Bartels, Carles Boix, José Cheibub, Jeff Cohen, Jude Hays, Carrie Konold, Beth Leech, Mathew McCubbins, and Bonnie Weir for helpful comments. I would also like to thank the Center for the Study of Democratic Politics at Princeton University for generous support.

†Department of Political Science, University of Illinois at Urbana-Champaign. Email: msvolik@illinois.edu.

1 Introduction

Economic decline is one of the most robust predictors of the breakdown of democracy. Between 1848 and 2008, democracies was more than twice as likely to revert to dictatorship during an economic recession than during a period of economic growth.[1] This association between economic decline and democratic breakdown is especially relevant for young democracies: When democracies break down, nine in ten do so before they are 20 years old. Figure 1 illustrates this association by separately plotting non-parametric estimates of the hazard of a democratic breakdown during economic recessions and expansions. The rise of the Nazi Party amidst the economic hardship brought on the Weimar Republic by the Great Depression as well as the return to authoritarianism under Vladimir Putin following the distress and chaos of the Russian transition to democracy under Boris Yeltsin are two, prominent examples of the existential danger that economic downturns represent for young democracies.

Yet while the empirical association between economic decline and the breakdown of democracy has been examined extensively, the causal process that connects the two is not well understood. Democratic theory suggests that an economic recession - as far as it can be attributed to the incumbent's performance in office - should be punished as any other poor performance by an elected politician: voters should replace the incumbent with a challenger (see e.g. Fiorina 1981). In other words, existing theories of electoral accountability assume that the political consequences of policy failures will be contained exclusively within the boundaries of the democratic process. In turn, we lack an explanation for a major consequence of policy failures in new democracies: the breakdown

[1] This association is robust to controlling for various covariates (see e.g. Bernhard et al. 2001; Boix 2003; Cheibub 2007; Przeworski et al. 2000) and estimation techniques (see e.g. Svolik 2008).

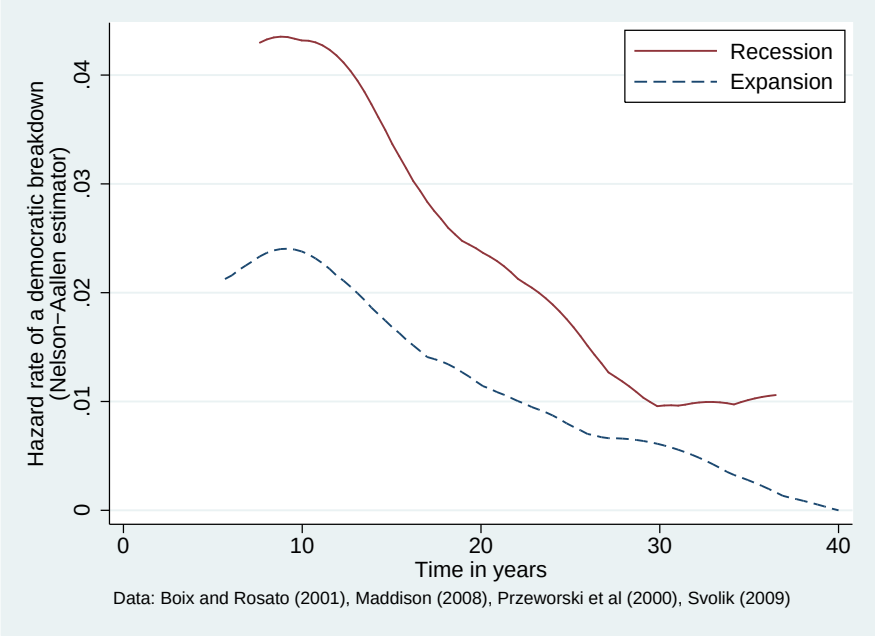

Figure 1: The hazard of democratic breakdowns during recessions (annual decline in GDP per capita) and expansions (annual increase in GDP per capita)

of democracy.

Why is it then that policy failures lead to the mere sacking of the incumbent in some democracies, but result in the very breakdown of democracy in others? Why are young democracies more likely to revert to authoritarianism in the face of a recession than older ones? In this paper, I develop a new theoretical model of democratic consolidation and breakdown that explains these puzzles as well as several other, prominent regularities uncovered in the empirical research on transitions to democracy and democratic consolidation.

I start with the observation that a central promise of democracy is to deliver good governance by holding politicians accountable for their performance in office. In new democracies, this promise is harder to fulfill because some candidates enter politics only to exploit office for personal gain rather than serve in it and voters lack information that

would enable them to distinguish between those candidates who only wish to exploit office and those willing to serve in office if properly motivated. I examine the process by which policy outcomes in new democracies shape voters' expectations about whether democracy can in fact deliver political accountability – and thus better governance – than dictatorship. I show that a succession of policy failures in new democracies may result in a complete breakdown of political accountability: voters will no longer find it worthwhile to distinguish among candidates based on their performance and conclude that "all politicians are crooks." In turn, a public that is so disillusioned with democratic governance will lack the key rationale for defending democracy against a leader with authoritarian aspirations.

However, I also demonstrate that, absent such disastrous policy outcomes, elections allow candidates to build reputations for good performance and weed out those candidates that cannot be deterred from exploiting office for personal gain by the threat of a removal. This process gradually strengthens voters' belief that elections – and thus democracy – can actually deliver political accountability. In fact, I show that as this belief strengthens, voters demand a better performance from incumbents and those candidates who enter politics only to exploit office find it increasingly harder to get re-elected. When successful, this process leads to the consolidation of democracy, a state in which the breakdown of democracy no longer occurs. Specifically, in a consolidated democracy, a succession of policy failures will not shake voters' belief about the ability of elections to deliver accountability to the extent that they would conclude that "all politicians are crooks" and "democracy does not work." To put it metaphorically, in a consolidated democracy, voters' expectations and politicians' behavior positively reinforce each other to the extent that a few bad apples can no longer spoil the whole barrel.

The theoretical model of democratic consolidation and breakdown that I develop

provides a unified explanation for a range of empirical findings in the research on transitions to democracy, political accountability, and popular attitudes towards democracy. The theoretical model implies that i) economic recessions should lead to democratic breakdowns in young but not established democracies, ii) public trust in democracy should decline during economic recessions in young but not established democracies, iii) young democracies should break down more often than established ones, iv) rich democracies should consolidate sooner than poor ones, and v) candidates should perform better in established democracies. Although most of these associations have been established empirically, what has often been lacking is an explicit statement of their underlying microfoundations and the theoretical intuition that drives them, which the present theory offers within a unified framework.

In the next section, I relate my motivation and assumptions to research on electoral accountability and transitions to democracy. I then develop a new formal model of democratic consolidation and breakdown, study its equilibria, present my main findings, and give numerical illustrations of these findings. I conclude with an examination of the empirical implications of my arguments and show that they are consistent with key findings in empirical research on transitions to democracy, popular attitudes towards democracy, as well as a self-standing data analysis that I conduct using data on democratic breakdowns.

2 Electoral Accountability and the Success of Democracy

A central promise of democracy is to deliver good governance by holding politicians accountable for their performance in office. In this paper, I show that electoral

accountability may fail in new democracies and thus fail to fulfill that promise. I model the process by which dissatisfaction with the performance of individual politicians turns into doubts about the value of democracy as a political system. After a series of policy failures, even voters who are initially optimistic about the ability of democracy to deliver political accountability may conclude that their particular democracy has been captured by politicians who only see office as an opportunity for personal gain. Political accountability fails when such expectations fuel a mutually reinforcing cycle of voter apathy and corrupt candidate behavior. The resulting disenchantment with democracy dampens the public's willingness to defend democracy against attempts to subvert it, thus eliminating a key deterrent to politicians or groups with authoritarian ambitions.

This argument is consistent with the frequent assertion that a democracy that does not deliver good governance loses legitimacy, a fact which may be exploited by leaders with authoritarian tendencies and thus lead to its breakdown.[2] Unfortunately, most discussions of democratic legitimacy remain vague about its precise meaning and the causal mechanism that connects policy outcomes, legitimacy, and breakdowns (Przeworski 1991b). The arguments in this paper suggest one, concrete understanding of democratic legitimacy as voters' belief that their particular democracy – rather than democracy as an abstract ideal – can in fact deliver better governance than a dictatorship. Thus the model that I examine offers the microfoundations for the dynamic by which poor performance under democracy results in voters' scepticism about its value and, in turn, makes it vulnerable to a breakdown.

The model that I develop in this paper is also consistent with two distinct notions of democratic consolidation employed in the research on democratic transitions. According to

[2]See Lipset (1959a, 28), Linz (1978, Part I), and Diamond (1999, Chapter 1).

one of these notions, which we may call substantive, consolidation describes the process of attitudinal change that results in widespread popular acceptance of democracy (Almond and Verba 1963; Inglehart 1997). In the present model, a democracy consolidates when candidates who are willing to serve in office establish reputations that are sufficiently strong so that those candidates who compete for office only to exploit it for personal gain conclude that their chances of assuming or maintaining office are too small to be worth the costs of running for office and withdraw from politics. In turn, once a democracy consolidates, voters conclude that democracy can in fact deliver political accountability and they correctly interpret policy failures as the result of the uncertainty inherent in policy-making rather than the capture of electoral politics by candidates bent on exploiting office for personal gain. Such endogenous, equilibrium change in popular beliefs about the value of democracy thus accords with Linz and Stepan's (1996, 16) prominent characterization of consolidated democracies as those in which

> "a strong majority of public opinion, even in the midst of major economic problems and deep dissatisfaction with incumbents, holds the belief that democratic procedures and institutions are the most appropriate way to govern collective life..."

Equilibrium behavior in this paper is also consistent with another notion of democratic consolidation, which we may call prospective. According to this notion, consolidation corresponds to the expectation of a democracy's continuing survival (Schedler 1998, 103). As I outlined above, barring factors exogenous to my argument, voters will defend consolidated democracies because they do deliver political accountability and thus better governance than dictatorships. Hence in the present setting, consolidation also implies the continuing survival of democracy. This logic therefore offers one explanation of how

democracy becomes "the only game in town."[3]

I develop my theoretical arguments about democratic consolidation and breakdowns with the help of a new formal model of electoral accountability. I depart from classic models of electoral accountability (Barro 1973; Ferejohn 1986; Austen-Smith and Banks 1989; Banks and Sundaram 1993) in two ways that capture the distinct challenges to accountability in new democracies. First, I allow for the possibility that some candidates enter politics as their "one-time opportunity to get rich," and therefore the threat of a removal from office cannot deter them from exploiting office for personal gain. Indeed, evidence from new democracies indicates that political corruption is a major concern for voters (Mishler and Rose 1997; Anderson 2003; Seligson 2002; Chang and Chu 2006), and that political parties that may otherwise limit the entry of such "bad" candidates are frequently the vehicles for their corrupt ambitions (Carothers 2006; Grzymała-Busse 2007; McFaul et al. 2004).

Therefore, I argue, voters in new democracies must use elections in order to both weed out such "bad" candidates as well as to motivate "normal" candidates – who do respond to electoral incentives – to perform in a desirable manner. In the model that I develop below, elections may fail to accomplish both of these ends if voters conclude that political competition has been captured by candidates of the first, "bad" type. I build on Myerson (2006), who shows that electoral accountability may fail if forward-looking voters hold pessimistic expectations about any politician's performance.

The second departure from classic models of electoral accountability that brings this model closer to the political realities in new democracies is that voters have the choice to either acquire and assess a politician's performance record at a small cost or to ignore such

[3]See Di Palma (1990, 113), Przeworski (1991a, 26), and Linz and Stepan (1996, 5).

information. This option to remain "rationally ignorant" (Downs 1957) is consistent with a large literature on the role of information in the democratic process (see e.g Ferejohn and Kuklinski 1990; Lupia and McCubbins 1998), which finds that voters habitually, and often intentionally, ignore relevant political facts. But in the present context, this assumption of "costly monitoring" primarily reflects the difficulties that voters confront when evaluating politicians' performance in new democracies: transitions to democracy frequently occur in countries where voters lack previous democratic experience, where a history of centralized, state-controlled media facilitates the incumbent's influence over news coverage, and where large-scale political and economic reforms occur simultaneously. Therefore even those voters who would like to acquire unbiased information about politicians' performance may find doing so especially challenging.

3 A Model of Democratic Consolidation and Breakdown

Consider the following electoral *accountability game* between a *voter* and two *candidates* ($i = 1, 2$). At the beginning of any period $t \in \{1, 2, \dots\}$, one of the two candidates is the *incumbent* and either *serves* in office or *exploits* office. Any candidate prefers exploiting office to serving in office. More precisely, serving in office is costly to an incumbent, $c > 0$, whereas exploiting it is costless, $c = 0$. Additionally, each candidate prefers to remain in office in the next term rather than be replaced by the *challenger*. I normalize the payoffs from being in office and out of office to $b > 0$ and 0, respectively.

The voter does not observe the incumbent's action directly, instead she either *monitors* or *ignores* the incumbent's performance. If she monitors the incumbent's performance, she

observes a policy outcome, which is an informative but imperfect signal of the incumbent's action. More precisely, the *outcome* k is either a policy *success* or *failure*, $k \in \{S, F\}$. If the incumbent serves in office, the voter observes a policy success with probability γ_s and a policy failure with probability $1 - \gamma_s$. If the incumbent exploits office, the corresponding probability of a success is γ_e. I assume that $0 < \gamma_e < 1/2 < \gamma_s < 1$, so that policies may fail even if the incumbent serves in office but are less likely to do so than when the incumbent exploits office. In order to keep the formal analysis as simple as possible, I assume that the voter does not discriminate between the two candidates in her decision to monitor or ignore the incumbent's performance, and I let $\gamma_e = 1 - \gamma_s$.

At the end of the period, the voter either *keeps* or *replaces* the incumbent. The voter prefers a policy success to policy failure, with the corresponding payoffs $r > 0$ and 0.[4] In turn, the voter prefers that the incumbent serves in office rather than exploits office. However, if the voter ignores the incumbent's performance, she does not observe the policy outcome and must decide whether to keep or replace the incumbent without such information.[5] On the other hand, the candidates observe the voter's actions as well as policy outcomes, but each candidate only observes his own action. The candidates and the voter discount future payoffs by a discount factor $\delta_i, \delta \in (0, 1)$, respectively. I will notationally distinguish between δ_i and δ only when I focus on player-specific discount factors.

The following two assumptions distinguish this accountability game from standard models of electoral accountability and lead to a new equilibrium dynamic and predictions.

[4] I only consider a single, representative voter in order to focus on the problem of motivating desirable candidate performance. Since the preferences of all voters are identical – each prefers the incumbent to serve rather than exploit – we may reasonably assume that any single voter sees elections as an opportunity to act strategically vis-à-vis the candidates rather than other voters.

[5] The payoffs realize at the end of any period. Thus when the voter ignores the incumbent's performance, she will ultimately be able to infer from her payoff whether the policy was a success or failure, but she will not be able to use that information when she is deciding whether keep or replace the incumbent.

First, each candidate may be one of two types. A candidate is *normal*, if the threat of a removal from office will deter him from exploiting it. Thus for a normal candidate, $b > c$. On the other hand, a candidate is *bad*, if he would prefer exploiting to serving even if a removal from office was a sure consequence of such an action, $c > b$. Therefore we may alternatively think of c as the benefit from exploiting office, and of the bad candidate type as one for whom the benefit from exploiting office in the present term is more attractive than re-election for another term. Importantly, a candidate's type is his private information: the voter does not know the candidates' types and each candidate knows his own type but not the type of the other candidate. The second new aspect of the present setting is that – as I indicated above – the voter can choose whether to *monitor* or *ignore* the incumbent's performance and monitoring entails a cost $m > 0$.

These two new assumptions – two candidate types and costly monitoring of policy outcomes – reflect two major obstacles to electoral accountability in new democracies. A candidate who exploits office may be understood as one who adopts policies that benefit himself at the expense of the voter. In turn, we may think of the bad candidate type as one who sees entering politics in a new democracy as his "one-time opportunity to get rich." But note that the normal type of a candidate is no angel either: if not threatened with a removal from office, he would prefer to exploit rather than serve in office, too.

The assumption of costly monitoring also reflects a concern that is particularly pronounced in new democracies. At a minimum, we can interpret the parameter m as the cost of following and evaluating news reports on the incumbent's performance and, more broadly, as the cost of civic engagement. As I noted in the introduction, assessing a candidate's performance may be particularly costly in new democracies where large political and economic changes frequently occur simultaneously and in the absence of

established media or civil society.

3.1 Political Accountability without Bad Candidates

Before examining the equilibrium behavior in this accountability game, it will be useful to consider the problem of electoral accountability in a simpler setting, with only the normal type of candidate. Such a setting is closer to standard models of electoral accountability and we may use results based on this simpler setting as a benchmark to which we can compare the results that emerge in the more complex setting with normal as well bad types of candidates.

When only normal candidates are present, the threat of a removal from office following a policy failure will motivate them to serve in office, as long as both the voter and the candidates are sufficiently patient. Furthermore, the effect of the parameters on demands on patience is intuitive: demands on patience are less stringent when the voter strongly prefers that candidates serve rather than exploit office, when candidates value office highly, when the cost of serving and monitoring is low, and when the policy outcome is a precise signal of the incumbent's action.

More specifically, the following strategies constitute an equilibrium: in any period, the voter monitors the incumbent and conditions re-election on a policy success, and each candidate serves in office, as long as the voter conditioned re-election on a policy success in any previous period. Otherwise, the voter ignores policy outcomes and re-elects the incumbent, and each candidate exploits office.[6]

To see that these strategies constitute an equilibrium, suppose that the voter

[6]In contrast to standard models electoral accountability (see e.g. Ferejohn 1986), the voter's strategy is fully forward-looking; forward looking strategies are supported by the grim trigger condition "as long as the voter conditioned re-election on a policy success in any previous period."

conditioned re-election on a policy success in any previous period and consider candidate i's expected discounted payoff $u_i(in, serve)$ from serving in office,

$$u_i(in, serve) = b - c + \delta_i[\gamma_s u_i(in, serve) + (1 - \gamma_s)u_i(out)], \tag{1}$$

where $u_i(out)$ is candidate i's expected discounted payoff when he is out of office and the other candidate serves in office,

$$u_i(out) = \delta_i[\gamma_s u_i(out) + (1 - \gamma_s)u_i(in, serve)]. \tag{2}$$

Solving (1) and (2) for $u_i(in, serve)$ we obtain

$$u_i(in, serve) = \frac{(1 - \gamma_s\delta_i)(b - c)}{(1 - \delta_i)[1 - \delta_i(\gamma_s - \gamma_e)]}.$$

On the other hand, candidate i's expected discounted payoff $u_i(in, exploit)$ from exploiting office is

$$u_i(in, exploit) = b + \delta_i[\gamma_e u_i(in, exploit) + (1 - \gamma_e)u_i(out)], \tag{3}$$

when candidate j plans to serve in office. Solving for $u_i(in, exploit)$ and substituting $\gamma_e = 1 - \gamma_s$ we obtain,

$$u_i(in, exploit) = \frac{(1 - \gamma_s\delta_i)b}{(1 - \delta_i)}.$$

In turn, candidate i prefers serving to exploiting as long as

$u_i(in, serve) \geq u_i(in, exploit)$, or equivalently

$$\delta_i \geq \frac{c}{(\gamma_s - \gamma_e)b} = \delta_i^*.$$

Observe that the threshold discount factor δ_i^* is positive, increasing in c and γ_e, decreasing in b and γ_s, and smaller than 1 as long as $b > c/(\gamma_s - \gamma_e) = \underline{b}$. Thus candidates have stronger incentives to serve in office when they value office highly, the cost of serving is low, and when the policy outcome is a precise signal of the incumbent's action.

Now consider the voter's incentive to monitor the incumbent's performance and condition re-election on a policy success. When she does so and the candidates serve in office, her expected discounted payoff is

$$v(monitor) = \gamma_s r - m + \delta v(monitor) = \frac{\gamma_s r - m}{1 - \delta}.$$

On the other hand, both candidates will exploit office following any period in which the voter ignores the incumbent's performance and keeps him in office. Thus the voter's expected discounted payoff from ignoring the incumbent's performance is

$$v(ignore) = \gamma_s r + \delta \underline{v}, \quad \text{where} \quad \underline{v} = \frac{\gamma_e r}{1 - \delta}. \tag{4}$$

In turn, the voter will monitor the incumbent's performance and condition re-election on a policy success as long as $v(monitor) \geq v(ignore)$, or equivalently

$$\delta \geq \frac{m}{(\gamma_s - \gamma_e)r} = \delta^*.$$

Note that the voter's threshold discount factor δ^* is positive, increasing in m and γ_e,

decreasing in r and γ_s, and smaller than 1 as long as $r > m/(\gamma_s - \gamma_e) = \underline{r}$. Thus the voter is willing to monitor the incumbent's performance and condition re-election on a policy success when she values the incumbent's serving in office highly, the cost of monitoring is low, and when the policy outcome is a precise signal of the incumbent's action.

To summarize, we see that in this simple, benchmark setting – with only the normal type of candidate – the threat of a removal from office after a policy failure motivates both candidates to serve in office as long as the candidates and the voter are sufficiently patient, $\delta_i \geq \delta_i^*$ and $\delta \geq \delta^*$. In order focus on interesting scenarios in the rest of the paper, I assume that this patience condition as well as the associated lower bounds on b and r, $b \geq \underline{b}$ and $r \geq \underline{r}$, hold. Accordingly, we may say that, with only the normal type of candidate, electoral accountability *succeeds* when $\delta_i \geq \delta_i^*$, $\delta \geq \delta^*$, $b \geq \underline{b}$, and $r \geq \underline{r}$.

Proposition 1. *In a subgame perfect equilibrium, each candidate serves in office while the voter monitors and conditions re-election on a policy success, as long as $\delta_i \geq \delta_i^*$, $\delta \geq \delta^*$, $b \geq \underline{b}$, $r \geq \underline{r}$, and the voter conditioned re-election on a policy success in any previous period.*

Proof. Follows directly from the text. □

3.2 The Trap of Pessimistic Expectations

Consider now whether electoral accountability succeeds once we let each candidate be either the normal or bad type, which is privately observed. The timing of moves is as follows: At time $t = 0$, nature determines the type of each candidate and determines (with equal probability) which candidate will be the incumbent in period one. Independently, each candidate i will be normal with probability π_i^0 and bad with probability $1 - \pi_i^0$, where $\pi^0 = (\pi_1^0, \pi_2^0)$ is a vector of initial, possibly distinct beliefs about each candidate's type.

The following stage game ensues in each subsequent period $t = 1, 2, \ldots, \infty$. First, the incumbent serves in office or exploits office. Second, the voter decides whether to monitor or ignore the incumbent's performance. If the voter ignores the incumbent's performance, she either keeps or replaces the incumbent. If the voter monitors the incumbent's performance, nature determines whether the policy outcome is a success or a failure, and the voter observes the outcome and either keeps or replaces the incumbent.

I will examine the perfect Bayesian equilibria of this repeated game. Since the bad type of the incumbent always exploits office, we only look for equilibrium strategies for the normal type and the voter. Consider the set of strategies examined above, according to which the voter monitors the incumbent and conditions re-election on a policy success, and each normal candidate serves in office, as long as the voter conditioned re-election on a policy success in any previous period.

For any period $t \geq 1$, denote by π_i^t the voter's belief that candidate i is normal. Equivalently, we may call π_i^t candidate i's *reputation* for serving in office. The voter updates her belief $\pi_i^{t+1}(\pi_i^t, k)$ about the incumbent's type using Bayes' rule. If the voter monitors the policy outcome, then after observing a policy success in period t, the voter's belief that the incumbent is normal in period $t+1$ will increase to

$$\pi_i^{t+1}(\pi_i^t, S) = \frac{\gamma_s \pi_i^t}{\gamma_s \pi_i^t + \gamma_e(1 - \pi_i^t)}.$$

On the other hand, if the voter observes a policy failure in period t, her belief that the incumbent is normal in period $t+1$ will decline to

$$\pi_i^{t+1}(\pi_i^t, F) = \frac{(1 - \gamma_s)\pi_i^t}{(1 - \gamma_s)\pi_i^t + (1 - \gamma_e)(1 - \pi_i^t)}.$$

If the voter ignores the policy outcome in any period $t-1$, then the normal type of candidate exploits office in any following period. In turn, the voter's belief about both candidates' type remains constant across periods, $\pi_i^{t+1}(\pi_i^t, k) = \pi_i^t$. Finally, candidates update their beliefs about each other's type according to Bayes' rule as well, but they observe policy outcomes in any period. [7]

Can the voter motivate normal candidates to serve in office by conditioning re-election on a policy success? Consider a scenario in which the voter comes to believe that both candidates are most likely of the bad type. That is, π_i^t is close to zero for $i = 1, 2$. Because monitoring policy outcomes is costly, there will be a level of π_i^t at which the voter concludes that monitoring candidate performance is not worth its cost, since both candidates are most likely bad and will exploit office regardless of the voter's actions. In turn, the voter should ignore policy outcomes and might as well keep the incumbent in office. Anticipating that, even a normal incumbent will exploit office. Thus after a series of policy failures, electoral accountability may *fail* even if both candidates are normal and willing to serve in office if sufficiently motivated.

I now examine when the above dynamic depicts an equilibrium. When the voter's beliefs about the incumbent and the challenger are π_i^t and π_j^t, respectively, her payoff from monitoring candidate performance in office and conditioning re-election on a policy success is

$$v^i(\pi_i^t, \pi_j^t) = \pi_i^t v^{iN} + (1 - \pi_i^t)v^{iB}, \tag{5}$$

where v^{iN} and v^{iB} are the voter's expected discounted payoffs from the normal and the bad type of incumbent i, respectively. When the normal type serves in office, the voter's

[7] On the equilibrium path, candidates' beliefs about each other's type will be identical to the voter's beliefs.

expected discounted payoff is

$$v^{iN} = -m + \gamma_s(r + \delta v^{iN}) + (1 - \gamma_s)\delta v^j(\pi_j^{t+1}, \pi_i^{t+1}),$$

where $v^j(\pi_j^{t+1}, \pi_i^{t+1})$ is the voter's payoff if the challenger j is elected in period $t+1$. Because the bad type always exploits office, the voter's expected discounted payoff from a bad incumbent is

$$v^{iB} = -m + \gamma_e(r + \delta v^{iB}) + (1 - \gamma_e)\delta v^j(\pi_j^{t+1}, \pi_i^{t+1}).$$

For $i = 1, 2$, equation (5) constitutes a system of two linear equations in two unknowns, $v^1(\pi_1^t, \pi_2^t)$ and $v^2(\pi_2^{t+1}, \pi_1^{t+1})$. Its solution has the form

$$v^i(\pi_i^t, \pi_j^t) = \frac{G_i + D_i G_j}{1 - D_i D_j} r - \frac{m}{1 - \delta},$$

where

$$D_i = \frac{(1 - \gamma_s)\delta\pi_i^t}{1 - \gamma_s\delta} + \frac{(1 - \gamma_e)\delta(1 - \pi_i^t)}{1 - \gamma_e\delta} \quad \text{and} \quad G_i = \frac{\gamma_s\pi_i^t}{1 - \gamma_s\delta} + \frac{\gamma_e(1 - \pi_i^t)}{1 - \gamma_e\delta}.$$

We see that the voter's payoff when candidate i is in office consists of the discounted monitoring cost $m/(1-\delta)$ and the benefit from candidate i serving in office r weighted by the term $\frac{G_i + D_i G_j}{1 - D_i D_j}$, which summarizes the interaction between candidates' reputations, re-election probabilities, and the discount factor. In the appendix, I show that this term is increasing in both the incumbent's and the challenger's reputations, π_i^t and π_j^t. Intuitively, the voter's payoff is increasing in both candidates' reputation. Moreover, as the candidates' reputations decline, the voter's expected per-period payoff approaches $\gamma_e r - m$, which is

less than she would obtain if she ignored the incumbent's performance and simply kept him in office. That is,

$$\lim_{\pi_j \to 0^+} \left(\lim_{\pi_i \to 0^+} \frac{G_i + D_i G_j}{1 - D_i D_j} \right) = \frac{\gamma_e}{1-\delta}, \text{ and in turn, } \lim_{\pi_j \to 0^+} \left[\lim_{\pi_i \to 0^+} v^i(\pi_i^t, \pi_j^t) \right] = \frac{\gamma_e r - m}{1-\delta} < \underline{v}.$$

Recall that $\underline{v} = \gamma_e r/(1-\delta)$ is the payoff that the voter obtains when both candidates exploit office while the voter ignores the incumbent's performance and keeps him in office. Hence the equation

$$v^i(\pi_i^t, \pi_j^t) = \underline{v} \tag{6}$$

implicitly defines a pair of threshold beliefs $(\underline{\pi_i}, \underline{\pi_j})$ such that for $\pi_i^t < \underline{\pi_i}$ and $\pi_j^t < \underline{\pi_j}$, the voter prefers to ignore candidate performance and keep the incumbent in office.

In the appendix, I show that when candidate i is the incumbent, candidate i's threshold reputation $\underline{\pi_i}$ is a decreasing function of candidate j's current reputation π_j^t; thus I write $\underline{\pi_i}(\pi_j^t)$. That is, the stronger candidate j's reputation, the worse candidate i must perform before the voter gives up on monitoring candidate performance. Thus in new democracies, one candidate's success in office is a positive externality from which all candidates benefit.

I furthermore show that the threshold reputation $\underline{\pi_i}(\pi_j^t)$ is binding, that is positive, only when π_j^t is below some threshold $\underline{\pi_j} > 0$. In other words, the voter will not give up on monitoring candidate performance when candidate i is in office as long as her belief that candidate j is the normal type is sufficiently strong: the voter must believe sufficiently strongly that *both* candidates are crooks, before she gives up on monitoring policy outcomes.

Once the threshold $\underline{\pi_i}(\pi_j^t)$ has been crossed, the voter no longer monitors candidate

performance and simply keeps the last incumbent in office.[8] Thus when $\pi_i^t < \underline{\pi_i}(\pi_j^t)$, electoral accountability *fails*. Importantly, once the threshold $\underline{\pi_i}(\pi_j^t)$ has been crossed, the voter's skepticism about candidate behavior is self-fulfilling: even a normal incumbent – one who would be willing to serve in office if threatened with a removal from office otherwise – will choose to exploit office. Accordingly, we may call this equilibrium the *trap of pessimistic expectations*.[9]

Proposition 2. *In a perfect Bayesian equilibrium,*

(i) if $\pi_i^t \geq \underline{\pi_i}(\pi_j^t)$ and as long as the voter conditioned re-election on a policy success in any previous period, the normal candidate serves in office, and the voter monitors policy outcomes and conditions re-election on a policy success;

(ii) otherwise, the normal candidate exploits office, and the voter ignores policy outcomes and keeps the incumbent in office.

Proof. See appendix. □

3.3 The Breakdown of Democracy

The above analysis implies that a sequence of policy failures may result in a complete failure of electoral accountability. Once a democracy enters the trap of pessimistic expectations, elections no longer serve as a tool for either motivating candidates to serve in office or deciding which candidate will be in office. In turn, the voter has no stake in

[8] Once the threshold $\underline{\pi_i}(\pi_j^t)$ has been crossed, the voter is also equally well off when she replaces the incumbent at the end of each term, without monitoring his performance. However, this equilibrium is not robust to the inclusion of an arbitrarily small cost or risk of replacing the incumbent. Myerson (2006) makes this assumption in a model of electoral accountability.

[9] Note that the voter and the candidates may coordinate on any $\pi_i^t > \underline{\pi_i}(\pi_j^t)$ as a threshold below which they will act as they would in the trap of pessimistic expectations. Nonetheless, we may plausibly consider $\underline{\pi_i}(\pi_j^t)$ to be a focal belief threshold, since it is the lowest π_i^t at which the trap of pessimistic expectations can be avoided and therefore most desirable from both the voter's and the candidates' point of view.

defending democracy against an attempt to subvert it. On the other hand, since voter's actions no longer determine who will be in office, the candidates have an incentive to turn to non-democratic ways in order to maintain or acquire power. Thus the failure of electoral accountability may result in the breakdown of democracy.

I will now extend the above accountability game and show that the breakdown of democracy will be an equilibrium outcome whenever a democracy enters the trap of pessimistic expectations. However, the main reason why the voter will no longer resist any attempt to subvert democracy lies in the voter's scepticism about the ability of democracy to deliver good governance – the origins of which I examined above. I will therefore present only a rudimentary extension of the accountability game.

Suppose that at the beginning of any period $t = 1, 2, \ldots, \infty$, before any of the existing moves in the accountability game, each candidate decides whether to *subvert* or *comply* with democracy. If both candidates comply, the stage game continues as previously. If an attempt to subvert democracy occurs, the voter either *acquiesces* or *defends* democracy; defending democracy is associated with a small cost $d > 0$. If the voter acquiesces, the game ends in a *breakdown* of democracy and the voter receives the discounted payoff $\underline{v}$. If only one candidate subverts democracy, the candidate who subverted enters office and obtains the per-period payoff b in any subsequent period; if both candidates subvert, the incumbent stays in office.[10] If the voter defends democracy, any attempt to subvert democracy fails, any candidate that attempted to subvert democracy leaves the game, receives a negative payoff $\underline{u} < 0$, a new candidate enters the game in his place, and the stage game continues as previously.

In this extended model, a modification of equation (6) that accounts for the cost of

[10]This is a tie-breaking rule; it does not affect the main results in this section.

defending democracy,

$$v^i(\pi_i^t, \pi_j^t) - d = \underline{v}, \tag{7}$$

implicitly defines a new pair of threshold beliefs $(\underline{\pi_i}, \underline{\pi_j})$ such that for $\pi_i^t < \underline{\pi_i}$ and $\pi_j^t < \underline{\pi_j}$, the voter prefers to ignore candidate performance and keep the incumbent in office. In turn, once a democracy enters the trap of pessimistic expectations – according to the new threshold beliefs defined by (7) – both candidates subvert, the voter acquiesces, and the game ends in a breakdown of democracy after which the incumbent remains in office. Accordingly, we may call $\underline{\pi_i}(\pi_j)$ the *breakdown threshold*. Yet as long as candidate reputations are above the breakdown threshold, the voter has an incentive to defend democracy for a sufficiently small cost $d < d^*$, because her expected payoff under a democracy, $v^i(\pi_i^t, \pi_j^t)$, is greater than her payoff once democracy breaks down, $\underline{v}$.

Proposition 3. *In a perfect Bayesian equilibrium,*

(i) if $\pi_i^t \geq \underline{\pi_i}(\pi_j^t)$, $d < d^*$, and as long as the voter conditioned re-election on a policy success in any previous period, both candidates comply with democracy, and the voter defends democracy;

(ii) otherwise, both candidates subvert democracy, and the voter acquiesces.

Proof. See appendix. □

3.4 Reputation Building and Democratic Consolidation

My analysis so far implies that, as long as the incumbent's reputation is above $\underline{\pi_i}(\pi_j^t)$, the voter will monitor incumbent performance, which will in turn motivate the candidates to serve in office. In the long run, however, any democracy will fall into the trap of pessimistic expectations: with a positive probability, a sequence of policy failures will occur that is

sufficiently long to bring any incumbent's reputation under the threshold $\underline{\pi_i}(\pi_j^t)$.

This result is the consequence of the assumption that the pool of candidates that compete for office is fixed. I now relax that assumption and let candidates enter and exit this political accountability game. I show that once the incumbent's reputation grows past a threshold, $\overline{\pi}_i$, all bad types will exit and never enter again. Once this occurs, equilibrium strategies in this game will be identical to those in the accountability game with normal types only, which I examined earlier. Thus we may say that once candidate reputations are sufficiently strong, electoral accountability *succeeds* and a democracy *consolidates*.

Suppose that at the beginning of any period $t = 1, 2, \ldots, \infty$, before any other moves in the game, each of the two candidates decides whether to *run* or *exit*. If both candidates run, the game continues as previously. On the other hand, any candidate that exits obtains a per-period payoff $x > 0$, which reflects the benefit from an alternative career. Nature then replaces the exiting candidate by a new one, which will be normal with some probability π^0. This process continues until there are two candidates willing to run at the beginning of any period. The timing of the moves in the rest of the period is as previously.

Consider now the payoff to a normal type of candidate who serves in office. When candidate i is the incumbent, his expected discounted payoff is the same as in (1), but his payoff when he is the challenger will depend on the incumbent's type,

$$u_i^N(out) = \tag{8}$$
$$\delta\left(\pi_j^t[(\gamma_s u_i^N(out) + (1-\gamma_s)u_i(in, serve)] + (1-\pi_j^t)[\gamma_e u_i^N(out) + (1-\gamma_e)u_i(in, serve)]\right).$$

Solving (1) and (8) for $u_i^N(out)$ we obtain

$$u_i^N(out) = \frac{(1-\delta Q)(b-c)}{(1-\delta)[1+(1-\gamma_s)\delta - \delta Q]}, \quad \text{where} \quad Q = \gamma_e(1-\pi_j^t) + \gamma_s \pi_j^t.$$

On the other hand, when the bad type is in office, his expected discounted payoff is the same as in (3), but his payoff when he is the challenger also depends on the incumbent's type,

$$u_i^B(out) = \tag{9}$$
$$\delta\left(\pi_j[(\gamma_s u_i^B(out) + (1-\gamma_s)u_i(in, exploit)] + (1-\pi_j)[\gamma_e u_i^B(out) + (1-\gamma_e)u_i(in, exploit)]\right).$$

Solving (3) and (9) for $u_i^B(out)$ we obtain

$$u_i^B(out) = \frac{(1-\delta Q)b}{(1-\delta)[1+(1-\gamma_e)\delta - \delta Q]}.$$

In the appendix, I show that the expected discounted payoff of both the normal and the bad type of challenger j, $u_j^N(out)$ and $u_j^B(out)$, is decreasing in the incumbent's reputation π_i^t. Furthermore, the normal type of challenger obtains a greater expected discounted payoff than the bad type when the incumbent's reputation π_i^t is close to 1 and the cost of serving in office is sufficiently small $c < b(\gamma_s - \gamma_e)\delta$. That is

$$\lim_{\pi_i \to 1^-} u_i^N(out) > \lim_{\pi_i \to 1^-} u_i^B(out) \quad \text{as long as} \quad c < b(\gamma_s - \gamma_e)\delta.$$

This is because normal types – who serve when in office – are more likely to get re-elected. In turn, a bad challenger expects to be out of office longer and stay in office shorter than a

normal type.

These results imply that once the incumbent's reputation π_j^t is sufficiently strong, there will be a range of discounted exit payoffs $u(exit) = x/(1-\delta)$, for which bad types prefer to exit but normal types prefer to run. The bad type of challenger will exit when the incumbent's reputation π_i^t approaches 1 as long as $u(exit) > \lim_{\pi_i \to 1^-} u_i^B(out)$. The normal type of challenger will stay when the incumbent's reputation π_i^t approaches 1 as long as $u(exit) < \lim_{\pi_i \to 1^-} u_i^N(out)$. Hence the condition

$$u(exit) \in \left(\lim_{\pi_i \to 1^-} u_i^B(out), \lim_{\pi_i \to 1^-} u_i^N(out) \right)$$

asks that outside opportunities be good enough so that bad types find it worthwhile to leave politics as their competitors' reputations improve, but not too good so that even the normal types abandon politics.

Denote the lowest value of the incumbent's reputation at which the bad types no longer prefer running to exiting by $\overline{\pi}$. Then $\overline{\pi}$ solves the equation $u_i^B(out) = u(exit)$,

$$\overline{\pi} = \frac{x[1 + (\gamma_s - \gamma_e)\delta] - b\gamma_s\delta}{(x-b)(\gamma_s - \gamma_e)\delta}.$$

Once $\pi_i^t > \overline{\pi}$, any bad challenger has exited and any bad candidate that nature may draw to run will exit as well. It may still be the case that the incumbent is a bad type but he will exit as soon as he is replaced in office, since the new incumbent is a normal type for sure. Denote the period in which this occurs by T^*. Then from period T^* onward, only normal types of candidates will compete and the voter's consistent belief is $\pi_i^t = 1$ for $i = 1, 2$. In turn, the voter will correctly interpret any policy failure as the result of bad luck rather than a bad incumbent's policy choice. Consequently, this democracy can no

longer enter the trap of pessimistic expectations and break down.

Accordingly, we may call any equilibrium of this accountability game in which $\pi_i^t > \overline{\pi}$ a *consolidated democracy*, the threshold belief $\overline{\pi}$ the *consolidation threshold*, and time T^* the *consolidation time*. By contrast, the set of equilibria in which candidate reputations are above the breakdown but below the consolidation thresholds may be called *transitional democracy*.

Proposition 4. *In a perfect Bayesian equilibrium, bad types of candidates exit and normal types run if* $\pi_i^t > \overline{\pi}$, $c < b(\gamma_s - \gamma_e)\delta$, $u(exit) \in \left(\lim_{\pi_i \to 1^-} u_i^B(out), \lim_{\pi_i \to 1^-} u_i^N(out)\right)$, *and as long as the voter conditioned re-election on a policy success in any previous period.*

Proof. See appendix. □

3.5 An Illustration

According to my analysis, the voter's and candidates' equilibrium strategies constitute a process of endogenous change in the voter's beliefs about the type of candidates that she is facing and, eventually, whether democracy can deliver accountability. An incumbent's equilibrium policy choice determines the most likely policy outcome, which in turn shapes the voter's belief about the incumbent's type. While changes in the voter's beliefs occur, a democracy is transitional. Eventually however, this process results in one of two outcomes: the breakdown or the consolidation of democracy. I now illustrate this dynamic with examples and simulations of the equilibrium behavior predicted by this model.

Suppose $r = 1$, $m = 0.17$, $b = 1$, $c = 0.1$, $d = 1$, $\gamma_s = 0.7$, and $\delta = 0.95$. In Figure 2, I plot the breakdown and consolidations thresholds $\underline{\pi_i}(\pi_j)$ and $\overline{\pi}_i$, as well as the set of candidate reputations that may occur in equilibrium. The latter are plotted as thin dotted lines. Meanwhile, the breakdown and consolidations thresholds when candidate 1 and 2 is

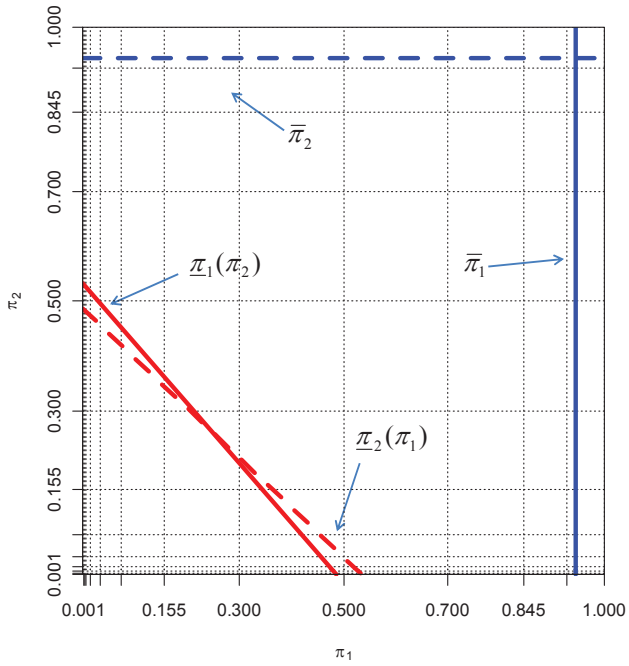

Figure 2: Breakdown and consolidation thresholds when candidate 1 (solid lines) and 2 (dashed lines) is the incumbent. Thin dotted lines plot the set of candidate reputations that may occur in equilibrium.

the incumbent are plotted as thick solid and dashed lines, respectively. As I showed earlier, the breakdown threshold when candidate i is the incumbent, $\underline{\pi_i}(\pi_j)$, is decreasing in the challenger's reputation π_j and is positive only below some threshold $0 < \underline{\pi_j} < 1$ on the challenger's reputation. On the other hand, the consolidation threshold when candidate i is the incumbent, $\overline{\pi}_i$, is independent of the challenger's reputation. In this example, $\underline{\pi_i}(\pi_j) = 11.73 - \frac{144.57}{12.86-\pi_j}$, $\underline{\pi_j} = 0.53$, $\overline{\pi}_i = 0.94$.

Thus we see that any democracy for which initial beliefs about candidate types lie above the breakdown but below the consolidation thresholds will start as a transitional democracy. By contrast, polities in which initial beliefs about candidates are so pessimistic that they lie below both breakdown thresholds will start in the trap of pessimistic

expectations and are doomed to break down.[11] Meanwhile, those polities where initial beliefs are so optimistic that they lie above one of the consolidation thresholds will consolidate immediately. But for most real-world cases, a reasonable set of initial beliefs will be neither too pessimistic to result in an immediate breakdown of democracy nor too optimistic to lead to an immediate consolidation of democracy.[12]

Suppose therefore that initial beliefs about candidate types are in this empirically plausible range; for instance, let $\pi^0 = (0.5, 0.7)$. Then it takes at least three consecutive policy successes for a democracy to consolidate. Meanwhile, it takes at least four consecutive policy failures – for instance, two by each candidate – for a democracy to fall into the trap of pessimistic expectations and break down. Note that candidate 2's three consecutive policy successes will be sufficient for consolidation, but it takes at least one failure by each candidate before a democracy breaks down. That is, a single successful candidate can bring about the consolidation of democracy, but for a sufficiently optimistic combination of initial beliefs, it will take at least one failure by each of the two candidates before a democracy breaks down.

What percentage of democracies will eventually consolidate and what percentage will break down? The equilibrium path of this game can be statistically represented by a discrete-time absorbing Markov chain where any belief vector that lies above the breakdown but below the consolidation thresholds constitutes a *transient* state whereas transitions to belief vectors immediately below or above these thresholds constitute transitions to the

[11] Myerson (2006) shows that federal constitutions enable the emergence of good political reputations even in democracies that start with such initial pessimistic expectations.

[12] Empirically, these initial beliefs may be the product of previous democratic experience (as in Czechoslovakia), reputations that candidates acquired because the dictatorship prior to the transition to democracy allowed for some electoral competition (as in Mexico), or the exposure to democracy via neighboring countries (as in East Germany). The last alternative is consistent with the finding that democracies that are surrounded by other democracies are more like to endure (see e.g. Brinks and Coppedge 2006); the present model thus offers a mechanism that explains this finding.

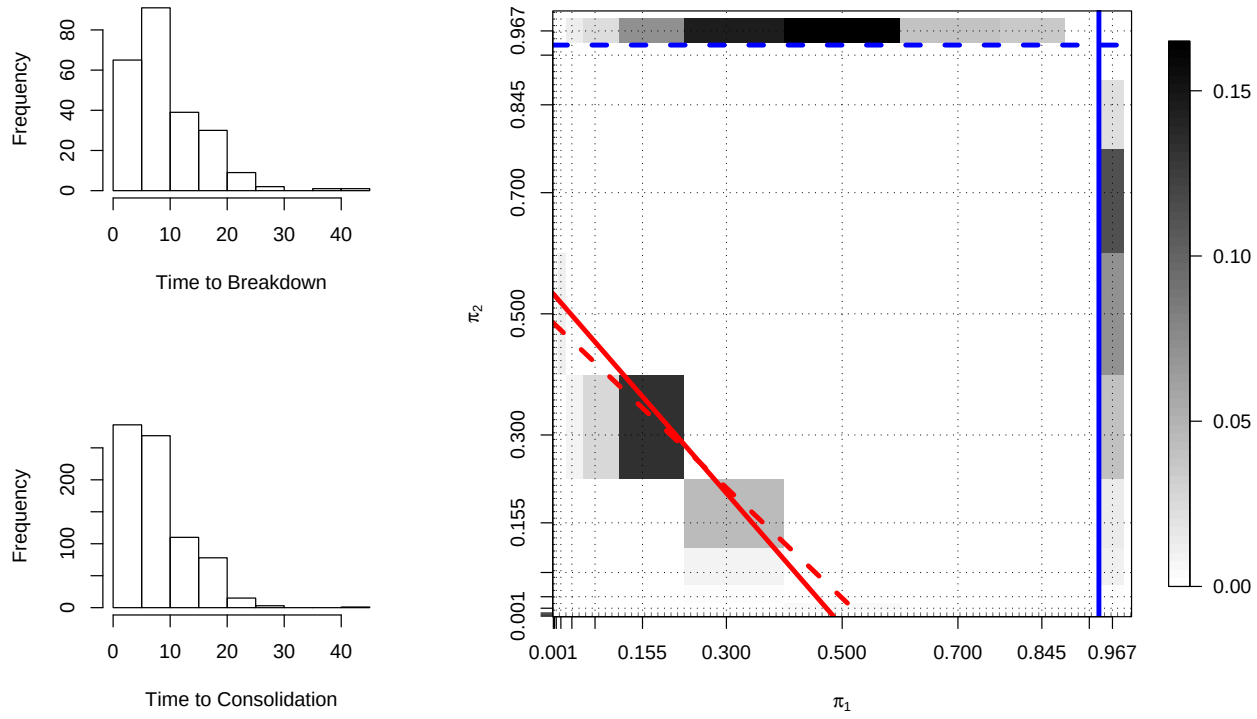

Figure 3: Distribution of time to breakdown and consolidation (left) and the distribution of beliefs at which breakdown and consolidation occurred (right).

absorbing states of breakdown and consolidation, respectively. While a democracy is transitional, only transitions to neighboring states occur with a positive probability. These probabilities depend on the type of candidate in office and are thus either γ_s and $1-\gamma_s$ or γ_e and $1-\gamma_e$. Since the two absorbing states can be reached in one or more steps from any transient state, a democracy will eventually either consolidate or break down.

As an illustration of expected equilibrium behavior, I simulate the distribution of time to consolidation and breakdown.[13] I ran 100,000 simulations of equilibrium behavior

[13]Note that the number of transient states is (countably) infinite, since the voter's belief about any single candidate may drop arbitrarily low. Thus we cannot use the power method to obtain the distribution of time to breakdown and consolidation.

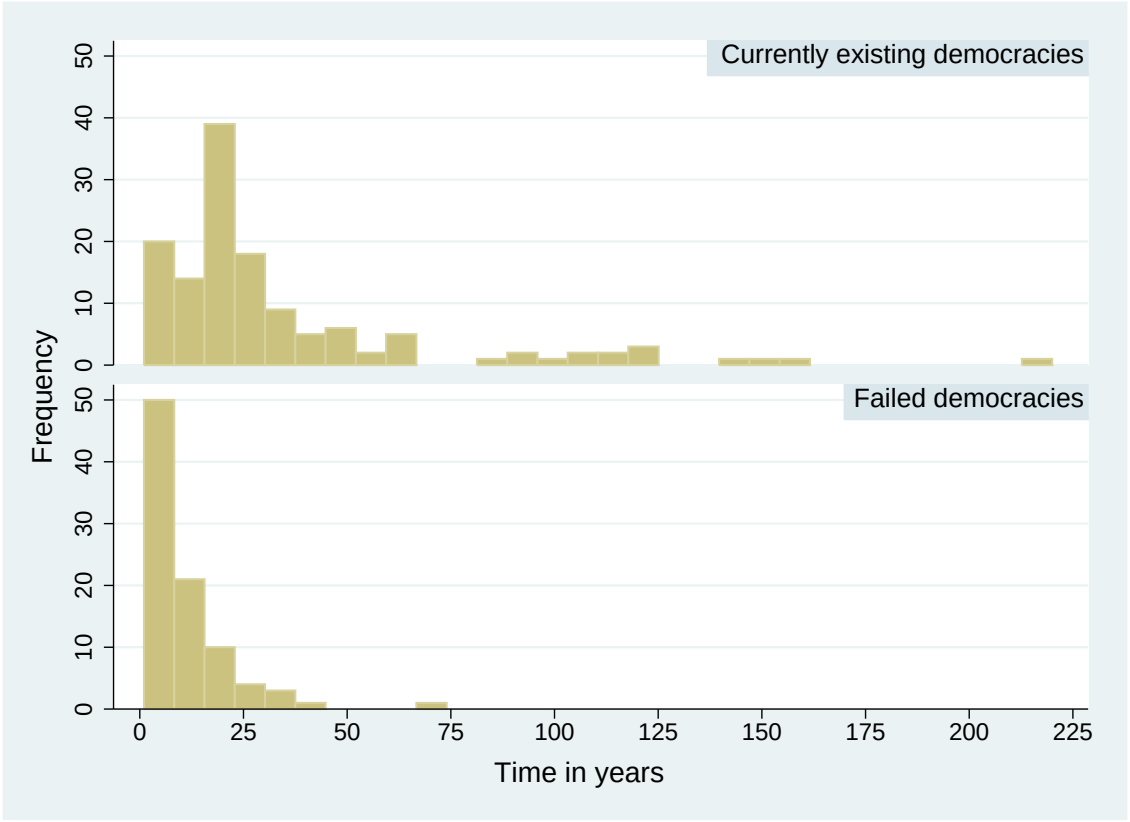

Figure 4: Distribution of Survival Time of Currently Existing and Failed Democracies, 1789-2008.

following the initial belief vector $\pi^0 = (0.5, 0.7)$. In Figure 3, I plot the distribution of time to breakdown and consolidation as well as the distribution of beliefs at which breakdown and consolidation occurred. The latter provides information about the equilibrium path by which either outcome occurred: we see that the voter's higher initial belief that candidate 2 is the normal type makes him more likely to be the first to pass the consolidation threshold and it makes candidate 1 more likely to be the first to fall under the breakdown threshold. Importantly, the simulated distribution of time to breakdown is close to its distribution in actual data, which I plot in the bottom part of Figure 4. At our parameter values, 23.8% of democracies eventually break down, 76.2% consolidate, and the median times to breakdown and consolidation are 8 and 7, respectively.

4 Implications for the Empirical Study of Democratic Survival

The model of democratic consolidation and breakdown that I examined has a range of implications for empirical research on democratic survival. First, the long-run statistical distribution of several outcomes that have been prominently examined in the literature on democratic survival – notably the timing of the breakdown and the consolidation of democracy – directly follow from the equilibrium behavior in the model. This theoretically informed knowledge of these distributions may in turn be used to guide the choice of appropriate statistical techniques for the analysis of data on democratic survival. Second, my analysis leads to a new, intuitive prediction about the relationship between economic downturns, the age of democracy, and the likelihood of democratic breakdowns that has not been previously examined in the literature, but is supported by an empirical analysis that I conduct in this section. And finally, the equilibrium analysis predicts several substantive, empirical associations between policy outcomes, voter attitudes, and the survival of democracy. Some of these associations have been examined empirically, but often without an explicit statement of the underlying, theoretical microfoundations. The present model provides such microfoundations.

As the simulations in the previous section suggest, the voter's and candidates' equilibrium strategies result in a particular, long-run statistical distribution of democratic breakdowns. This long-run equilibrium behavior has two key implications for the statistical analysis of data on democratic survival. First, breakdowns and consolidation are competing risks. As time progresses, transitional democracies either consolidate or break down and the fraction of transitional democracies among surviving democracies decreases.

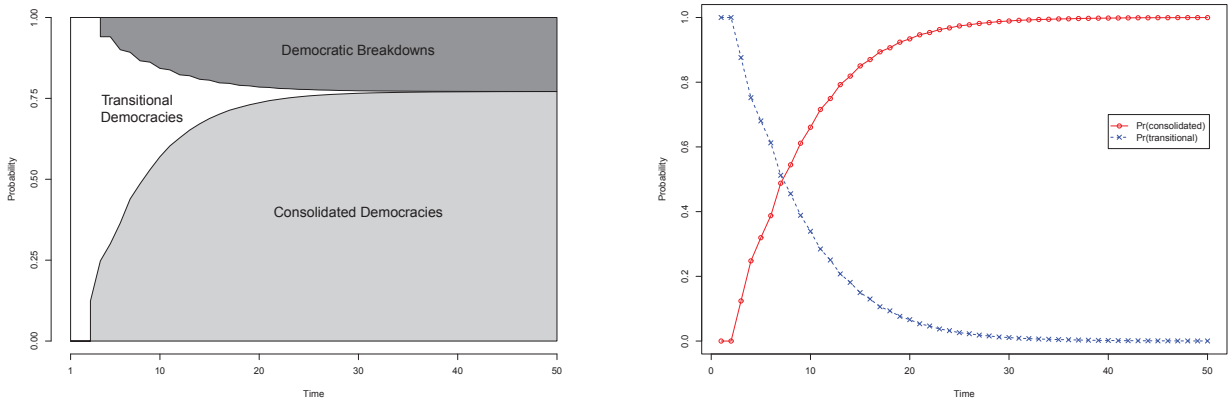

Figure 5: The distribution of transitional, consolidated, and failed democracies over time (left) and the probability that a surviving democracy is consolidated (right)

This dynamic is illustrated in Figure 5. Crucially, given the limitations of large-N data, we typically cannot directly distinguish consolidated democracies from transitional ones. In turn, the data on surviving democracies will be a mixture of transitional and consolidated democracies, and the latter will survive arbitrarily long. We see evidence of this in the distribution of survival times of existing democracies in the top part of Figure 4, where a large fraction of democracies survives beyond what we would expect based on the empirical distribution of time to breakdown (bottom part of Figure 4.) Proper inference for such data must therefore account for the possibility that a fraction of surviving democracies will no longer be at the risk of a breakdown. Svolik (2008) applied such techniques, known as cure rate or split-population models, to the data on democratic survival. He found that a fraction of existing democracies is indeed consolidated and that the level of economic development raises the likelihood of consolidation, as implied by Proposition 4.

The long-run equilibrium behavior in our model also suggests a particular shape of the hazard rate of democratic breakdowns. Recall that in the empirically plausible case when

any democracy starts as a transitional democracy, it takes $k > 0$ more policy failures than successes before a democracy falls into the trap of pessimistic expectations and breaks down. Thus the hazard rate of democratic breakdowns will be zero during the first $k - 1$ periods. After that, the hazard rate will be a mixture of two hazard rates, each corresponding to the type of one of the two candidates. Because of the discrete nature of transition to the absorbing state of breakdown, the hazard rate may fluctuate sharply between neighboring time periods. However, it will in general be first increasing and then decreasing over a sufficiently large interval and converge to zero as all transitional democracies either consolidate or break down.[14] This dynamic is illustrated in Figure 6, which plots the hazard rate of democratic breakdowns after policy failures, using simulation results from the previous section. Hence the equilibrium behavior in our model suggests that statistical models for the analysis of democratic survival should allow for a hazard rate that is sufficiently flexible to describe an increase followed by decrease in the hazard rate.[15]

4.1 Economic Downturns, the Age of Democracy, and Democratic Breakdowns

The long-run equilibrium behavior in the consolidation model also leads a new prediction about the relationship between economic downturns, the age of democracy, and the likelihood of democratic breakdowns. As Figure 6 illustrates, the probability that a

[14] Proof of this claim is available from the author. The probability mass function of the time of democratic breakdowns follows a generalization of the stochastic process by which a sequence of Bernoulli trials ends after k more successes than failures.

[15] Among standard parametric survival models, the loglogistic, lognormal and the generalized gamma parameterizations of the hazard rate satisfy this requirement but the Weibull does not. Estimates based the loglogistic, lognormal and the generalized gamma parameterizations indeed yield a hazard rate that is first increasing and then decreasing. The semi-parametric Cox model does not impose any restrictions on the shape of the hazard rate and is thus most flexible. See e.g. Box-Steffensmeier and Jones (2004, Chapters 3 and 4).

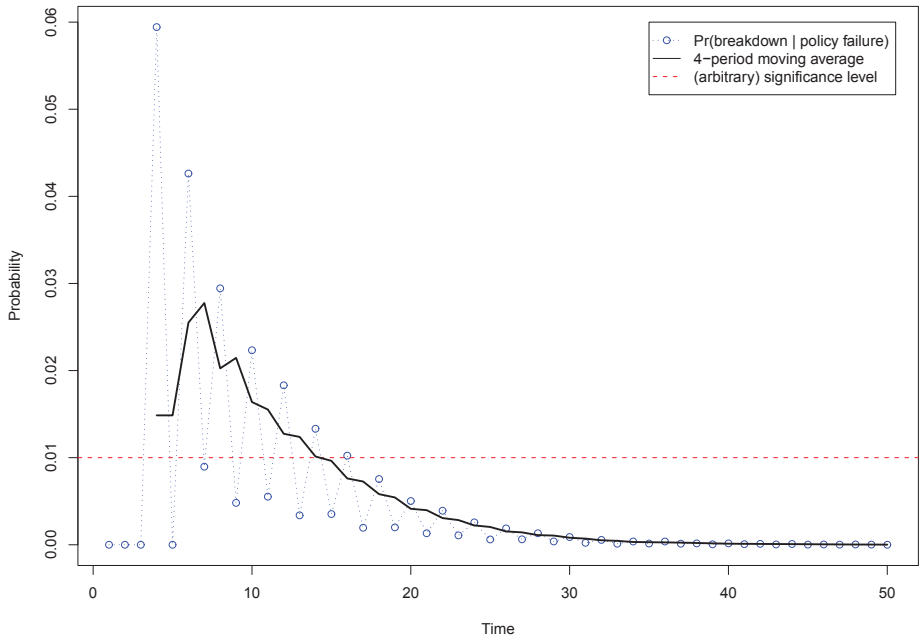

Figure 6: Age of democracy and the probability that a surviving democracy breaks down after a policy failure

surviving democracy breaks down after a policy failure converges to zero as a democracy grows older.[16] Adopting economic downturns as a measure policy failures, the present model implies that the effect of economic downturns on democratic breakdowns will be *conditional* on the age of democracy. More precisely, this effect should be positive and statistically significant early on but should be vanishing over time. Thus after some point in time, the likelihood of democratic breakdowns during economic downturns should be statistically indistinguishable from the likelihood of breakdowns during expansions. In Figure 6, the solid line that plots the 4-period moving average of the hazard rate can be viewed as a continuous-time approximation of the hazard of democratic breakdowns

[16]Recall that the voter's beliefs about candidates decline only after policy failures and thus a democracy can break down only after a policy failure.

following policy failures implied by our model. We see that as a democracy ages, this hazard becomes indistinguishable from zero under an arbitrarily strict significance level.

In order to evaluate this hypothesis properly, we need to estimate the effect of economic downturns on democratic breakdowns before and after an unknown *change-point* in time τ. I therefore estimate a change-point Cox survival model, according to which the effect of economic growth β on the hazard rate λ changes at an unknown point in time τ,

$$\lambda(t, Z, \mathbf{X}) = \lambda_0 \exp[\beta_{t \leq \tau} Z + \beta_{t > \tau} Z + \boldsymbol{\gamma}' \mathbf{X}]. \tag{10}$$

In (10), λ_0 is an unspecified baseline hazard rate, $\beta_{t \leq \tau}$ and $\beta_{t > \tau}$ capture the time-dependent effect of growth Z on the hazard rate λ, and $\boldsymbol{\gamma}$ is a vector of coefficients that capture the time-independent effect of control covariates $\mathbf{X}$ on the hazard rate λ. The unknown change-point τ is estimated along with the coefficients $\beta_{t \leq \tau}$, $\beta_{t > \tau}$, and $\boldsymbol{\gamma}$ by maximizing the partial log-likelihood of the Cox model over a set of candidate change-points corresponding to all breakdown times in the data.[17]

I use data on democratic survival that cover the period 1789-2008 and are based on my own data collection as well as a revision of the regime type data compiled by Przeworski et al. (2000), Boix and Rosato (2001), and Cheibub and Gandhi (2005). The complete data contain 4,390 democracy-years with 73 breakdowns in 193 democratic spells from 133 countries. My key covariate of interest is *GDP growth* which is based on data in Maddison (2008). I also include controls typically employed in the literature on democratic survival (see e.g. Przeworski et al. 2000; Bernhard et al. 2001; Boix 2003; Cheibub 2007). I control

[17] I estimate a change-point Cox model because it does not rely on parametric assumptions about the shape of the baseline hazard rate. Thus any estimated changes in the effect of economic downturns on the likelihood of democratic breakdowns will be due this change and not due to a possibly misspecified, parametric restriction placed on the shape of the baseline hazard rate. The literature on the Cox model with a change-point is large; see e.g. Matthews and Farewell (1982), Liang et al. (1990), and Luo et al. (1997).

for *GDP per capita*, *fuel and ore exports* (a dummy that takes the value one if a country's fuel and ore production amounts to more than 40% of its exports and zero otherwise), the constitutional foundation for the executive (*parliamentary*, *presidential*, or *mixed*), the type of the dictatorship that preceded the transition to democracy (*military*, *civilian*, *monarchy*, *Communist*, or *not-independent*), the fraction of a democracy's *neighbors* that were also democratic in any given year, and a *Cold War* period effect (a dummy that takes the value one between the years 1945 and 1990, and zero otherwise.) These data come from Maddison (2008), World Bank (2008), Cheibub and Gandhi (2005), and my own data collection. After accounting for missing covariates, the data cover 3,769 democracy-years with 72 breakdowns in 173 democratic spells from 138 countries during the period 1841-2007.

Estimation results from the change-point model are summarized in Table 1. Model 1 preserves the largest number of observations; model 2 incorporates all control covariates. Estimated coefficients are presented in the form of hazard ratios: a coefficient greater than one implies that the associated covariate raises the relative risk of democratic breakdowns. My theoretical analysis predicts that economic growth will at first significantly reduce the risk of breakdowns, $\beta_{t\leq\tau} < 1$, but that this effect should become statistically insignificant over time, $\beta_{t>\tau} = 1$. Estimates from both models in Table 1 support this prediction: each percentage point decline in economic growth raises the risk of a democratic breakdown by about 5%, as long as a democracy has existed for no more than 24 years. The first and third quartiles of growth are 0.10 and 4.45; in interquartile decrease in economic growth thus corresponds to a 81% increase in the risk of a democratic breakdown. Yet after the age 24, the effect of growth on breakdowns is no longer statistically significant.[18] Hence we

[18]One-sided Wald and likelihood-ratio tests reject the null hypothesis $\beta_{t\leq\tau} = \beta_{t>\tau}$ at the 10% significance level. There are seven breakdowns in a total of 1,593 country-years after the change-point estimate of 24 years.

Table 1: The time-dependent effect of economic decline on the hazard of democratic breakdowns

	(1)	**(2)**
GDP growth before τ, $\beta_{t\leq\tau}$	0.960***	0.952***
	(0.014)	(0.015)
GDP growth after τ, $\beta_{t>\tau}$	1.112	1.144
	(0.116)	(0.150)
Log of GDP per capita	0.463***	0.530***
	(0.070)	(0.099)
Fuel and ore Exporter		0.974
		(0.301)
Presidential (v. parliamentary)		1.081
		(0.318)
Mixed (v. parliamentary)		1.212
		(0.530)
Military (v. civilian)		1.985**
		(0.575)
Monarchy (v. civilian)		1.811
		1.066)
Communist (v. civilian)		2.307
		(1.616)
Cold War		2.948***
		(0.897)
Democratic neighbors		0.240***
		(0.113)
Change-point τ	24	24
$H_0 : \beta_{t\leq\tau} = \beta_{t>\tau}$	1.95*	1.93*
Log-likelihood	-328.574	-298.223
Democratic country-years	4,117	3,769
Democratic spells	177	173
Democratic breakdowns	74	72

Note: A change-point Cox survival model; coefficients are expressed as hazard ratios.
Significance levels *10%, **5%, ***1%; one-sided Wald test for H_0. Breslow method for ties.
Data Sources: See text. All covariates are lagged by one year.

see support for the conditional, time-dependent effect of economic decline on the hazard of a democratic breakdown that the theoretical model in Section 3 predicts.

4.2 Further Empirical Support

The empirical implications that I have presented so far are unique to the present model of democratic consolidation and I therefore examined them in detail. Yet this model is also consistent with several other empirical associations between policy outcomes, voter attitudes, and the survival of democracy that have been established in the research on transitions to democracy.

A key finding in the model that I examined in section 3 is that electoral accountability may fail in new democracies to the extent that the polity will be "trapped" in an equilibrium in which voters no longer make distinctions among politicians, and importantly, even politicians who would otherwise respond to electoral incentives rationally choose to exploit political office for personal gain rather than serve in it. Qualitative evidence from a range of new democracies corroborates that such a "trap of pessimistic expectations" indeed occurs. One observer of Azerbaijan's 2000 parliamentary election remarks that "the low voter turnout was a sign of political apathy among a substantial part of the population, who expected ... that voting would not change anything. They had no confidence that the fragmented opposition parties could run the country better than the present regime or that they would be any less prone to corruption" (Cornell 2001, 129). Statements such as "all crows under heaven are equally black" (O'Brien and Li 2006, 125-6) or "it makes no sense to replace a full tiger with a hungry wolf" (Li and O'Brien 1996, 34) exemplify the disenchantment with village elections in China after their failure to restrain corrupt behavior by local officials. In both of these instances, the advent of

democratic institutions was at first heralded with great enthusiasm. The arguments in this paper help us understand the causes of this reversal of initial optimism and the ensuing cycle of voter apathy and political corruption.

In the present model, the voter's belief about whether democracy can in fact deliver political accountability improve only gradually and as a result of successful candidate performance in office. Consistently with this dynamic, studies of voter attitudes in new democracies find that political corruption contributes to the lack of trust in democracy in these polities (Mishler and Rose 1997; Anderson 2003; Seligson 2002; Chang and Chu 2006) and that voters' trust in democracy improves with their economic performance (Inglehart 1997; Mishler and Rose 2001) and declines during economic downturns (Córdova and Seligson 2009). Consider for instance Russia after its transition to democracy: its GDP per capita declined from $2,602 to $1,870 between 1990 and 2001, a fall of almost 30 per cent. Concurrently, the percentage of Russians who would not disapprove if their parliament was closed down and parties abolished rose from 35 to 51 percent. Compare these trends to those in Hungary, where throughout the same period the GDP per capita rose by 15 percent from $4,279 to $4,898 and the percentage of Hungarians who would not disapprove if their parliament was closed down and parties abolished declined from 30 to 12 percent.[19]

Thus my arguments and the above example suggest that undesirable policy outcomes, such as an economic recession, can have a disproportionately adverse effect on a democracy's chances of survival early after the transition to democracy. This is a period when the demands on elections as an instrument of accountability are greatest because voters are still forming beliefs about whether "democracy works" and candidates who only

[19]The data on GDP per capita come from World Bank (2008); the question "If parliament was closed down and parties abolished, would you approve?" comes from the New Europe Barometer Surveys (Rose 1990-2001).

see political office as an opportunity for personal gain can still easily enter politics. During this period, assistance to new democracies that helps voters better distinguish those policy failures that are due to the candidates' actions in office from those outside their control – for instance by strengthening the civil society and independent media – may be decisive for the success of democracy.

The present model also offers a new explanation for one of the most prominent empirical findings in the research on democratic survival: the positive association between the survival of democracy and income per capita (Lipset 1959b; Przeworski et al. 2000). According to my arguments, consolidation occurs only when sufficiently attractive, non-political careers are available to bad candidate types for whom competing for or maintaining office becomes increasingly difficult as their competitors' reputations improve. In poor democracies, where politics may be "the most profitable game in town," even increasingly competitive elections may not discourage bad candidates from running for office. This logic implies that poor democracies will either take longer to consolidate or not consolidate at all and remain transitional. Either of these paths implies that poor democracies will be more likely to revert to a dictatorship than rich ones.

My arguments also imply that democratic consolidation results in a better policy performance: once a democracy consolidates, only normal candidates run for office and they serve in office rather than exploit it. In turn, voters correctly expect to observe more policy successes in a consolidated democracy than in a transitional democracy. In a working version of this paper, I extend the model in section 3 and let normal candidates choose a level of voter-benefiting effort while the voter sets a re-election threshold. I show that an increase in their competitors' reputation motivates normal candidates to exert greater effort when in office, which in turn allows the voter to demand more of candidates

as their reputations improve. Thus as a democracy consolidates, electoral competition intensifies because voters demand more from candidates while candidates perform better and alternate in office more frequently. The latter result agrees with the emphasis on alternation in office that we encounter in the empirical measurement of democracy (Przeworski et al. 2000) and consolidation (Huntington 1993).

Finally, according to the present model, even after a democracy consolidates, voters remain realistic about how politicians would behave in the absence of any electoral restraints. This is consistent with Cleary and Stokes' (2006) research on popular beliefs and accountability in Mexico and Argentina. They find that democracy works especially well when voters are skeptical about politicians and believe they serve voters best when checked by elections and institutions. In the present model, Cleary and Stokes' (2006) "rational skepticism" constitutes equilibrium behavior in and on the path to consolidated democracy.

References

Almond, Gabriel A. and Sidney Verba. 1963. *The civic culture: Political attitudes and democracy in five nations.* Newbury Park, CA: Sage.

Anderson, Christopher J. 2003. "Corruption, Political Allegiances, and Attitudes toward Government in Contemporary Democracies." *American Journal of Political Science* 47(1):91–109.

Austen-Smith, David and Jeffrey Banks. 1989. "Electoral Accountability and Incumbency." In Ordeshook, Peter C. (Ed.), "Models of Strategic Choice in Politics," Ann Arbor: University of Michigan Press, pp. 121–148.

Banks, Jeffrey S. and Rangarajan K. Sundaram. 1993. "Adverse selection and moral hazard in a repeated elections model." In Barnett, William A., Melvin J. Hinich, and Norman J.

Schofield. (Eds.), "Political economy: institutions, competition, and representation," New York: Cambridge University Press, pp. 295–311.

Barro, Robert. 1973. "The control of politicians: An economic model." *Public Choice* 14:19–42.

Bernhard, Michael, Timothy Nordstrom, and Christopher Reenock. 2001. "Economic Performance, Institutional Intermediation, and Democratic Survival." *Journal of Politics* 63(3):775–803.

Boix, Carles. 2003. *Democracy and Redistribution*. Cambridge: Cambridge University Press.

Box-Steffensmeier, Janet M. and Bradford S. Jones. 2004. *Event History Modeling*. New York: Cambridge University Press.

Brinks, Daniel and Michael Coppedge. 2006. "Diffusion Is No Illusion: Neighbor Emulation in the Third Wave of Democracy." *Comparative Political Studies* 39(4):463–489.

Carothers, Thomas. 2006. *Confronting the weakest link: Aiding political parties in new democracies*. Washington, D.C.: Carnegie Endowment for International Peace.

Chang, Eric C. C. and Yun-han Chu. 2006. "Corruption and Trust: Exceptionalism in Asian Democracies?" *Journal of Politics* 68(2):259271.

Cheibub, José Antonio. 2007. *Presidentialism, parliamentarism, and democracy*. New York: Cambridge University Press.

Cheibub, José Antonio and Jennifer Gandhi. 2005. "Classifying Political Regimes: A Six-Fold Measure of Democracies and Dictatorships." Dataset.

Cleary, Matthew R. and Susan C. Stokes. 2006. *Democracy and the Culture of Skepticism: Political Trust in Argentina and Mexico*. New York: Russell Sage Foundation.

Córdova, Abby and Mitchell A. Seligson. 2009. "Economic Crisis and Democracy in Latin America." *PS: Political Science & Politics* 42:673–678.

Cornell, Svante E. 2001. "Democratization Falters in Azerbaijan." *Journal of Democracy* 12(2):118–131.

Di Palma, Guiseppe. 1990. *To Craft Democracies: An Essay on Democratic Transitions*. Berkeley: University of California Press.

Diamond, Larry. 1999. *Developing Democracy: Toward Consolidation*. Baltimore: Johns Hopkins University Press.

Downs, Anthony. 1957. *An economic theory of democracy*. New York: Harper.

Ferejohn, John. 1986. "Incumbent performance and electoral control." *Public Choice* 50:5–26.

Ferejohn, John A. and James H. Kuklinski. 1990. *Information and democratic processes*. Urbana: University of Illinois Press.

Fiorina, Morris P. 1981. *Retrospective voting in American national elections*. New Haven: Yale University Press.

Grzymała-Busse, Anna. 2007. *Rebuilding Leviathan: Party competition and state exploitation in post-communist democracies*. New York: Cambridge University Press.

Huntington, Samuel P. 1993. *The third wave: Demoratization in the late twentieth century*. Norman: University of Oklahoma Press.

Inglehart, Ronald. 1997. *Modernization and postmodernization: cultural, economic, and political change in 43 societies*. Princeton, NJ: Princeton University Press.

Li, Lianjiang and Kevin J. O'Brien. 1996. "Villagers and Popular Resistance in Contemporary China." *Modern China* 22(1):28–61.

Liang, Kung-Yee, Steven G. Self, and Xinhua Liu. 1990. "The Cox Proportional Hazards Model with Change Point: An Epidemiologic Application." *Biometrics* 46(3):783–793.

Linz, Juan J. 1978. *The breakdown of Democratic Regimes*. Baltimore: Johns Hopkins

University Press.

Linz, Juan J. and Alfred Stepan. 1996. *Problems of democratic transition and consolidation: Southern Europe, South America, and post-communist Europe*. Baltimore: Johns Hopkins University Press.

Lipset, Seymour M. 1959a. *Political Man: The Social Bases of Politics*. Garden City, NY: Doubleday.

Lipset, Seymour M. 1959b. "Somee Social Prerequisites for Democracy: Economic Development and Political Legitimacy." *American Political Science Review* 53:69–105.

Luo, Xiaolong, Bruce W. Turnbull, and Larry C. Clark. 1997. "Likelihood Ratio Tests for a Changepoint with Survival Data." *Biometrika* 84(3):555–565.

Lupia, Arthur and Mathew D. McCubbins. 1998. *The democratic dilemma*. New York: Cambridge University Press.

Maddison, Angus. 2008. "Statistics on World Population, GDP and Per Capita GDP, 1-2006 AD."

Matthews, David E. and Vernon T. Farewell. 1982. "On Testing for a Constant Hazard against a Change-Point Alternative." *Biometrics* 38(2):463–468.

McFaul, Michael, Nikolai Petrov, and Andrei Ryabov. 2004. *Between Dictatorship and Democracy: Russian Post-Communist Political Reform*. Washington, DC: Carnegie Endowment for International Peace.

Mishler, William and Richard Rose. 1997. "Trust, Distrust and Skepticism: Popular Evaluations of Civil and Political Institutions in Post-Communist Societies." *Journal of Politics* 59(2):418–51.

Mishler, William and Richard Rose. 2001. "What Are the Origins of Political Trust?" *Comparative Political Studies* 34(1):30–62.

Myerson, Roger B. 2006. "Federalism and Incentives for Success of Democracy." *Quarterly Journal of Political Science* 1:3–23.

O'Brien, Kevin J. and Lianjiang Li. 2006. *Rightful Resistance in Rural China*. New York: Cambridge University Press.

Przeworski, Adam. 1991a. *Democracy and the Market: Political and Economic Reforms in Eastern Europe and Latin America*. Cambridge: Cambridge University Press.

Przeworski, Adam. 1991b. "Some problems in the study of the transition to democracy." In O'Donnell, Guillermo A., Philippe C. Schmitter, and Laurence Whitehead (Eds.), "Transitions from Authoritarian Rule: Comparative Perspectives," Baltimore: Johns Hopkins University Press, pp. 47–63.

Przeworski, Adam, Michael E. Alvarez, Jose Antonio Cheibub, and Fernando Limongi. 2000. *Democracy and Development: Political Institutions and Well-Being in the World, 1950-1990*. New York: Cambridge University Press.

Rose, Richard. 1990-2001. *New Europe Barometer*. Colchester, Essex: UK Data Archive.

Schedler, Andreas. 1998. "What is Democratic Consolidation?" *Journal of Democracy* 9(2):91–107.

Seligson, Mitchell A. 2002. "The Impact of Corruption on Regime Legitimacy: A Comparative Study of Four Latin American Countries." *Journal of Politics* 64(2):408–33.

Svolik, Milan. 2008. "Authoritarian Reversals and Democratic Consolidation." *American Political Science Review* 102(2):153–168.

World Bank. 2008. *World Development Indicators*. WorldBank.

Online Appendix to "Learning to Love Democracy: A Theory of Democratic Consolidation and Breakdown"

This Appendix contains proofs of those technical results that do not follow directly from the discussion in the text. Throughout, I will be using the assumption $\gamma_e = 1 - \gamma_s$ and the notation $\triangle\gamma = \gamma_s - \gamma_e$.

The following lemmas will be useful in proving the claims in Proposition 2.

Lemma 1. $v^i(\pi_i^t, \pi_j^t) = \frac{G_i + D_i G_j}{1 - D_i D_j} r - \frac{m}{1-\delta}$.

Proof. Recall that equation (5) in the paper,

$$v^i(\pi_i^t, \pi_j^t) = \pi_i^t v^{iN} + (1 - \pi_i^t) v^{iB}$$

describes a system of two linear equations in two unknowns for $i = 1, 2$, $v^1(\pi_1^t, \pi_2^t)$ and $v^2(\pi_2^{t+1}, \pi_1^{t+1})$. Substituting

$$\begin{aligned} v^{iN} &= -m + \gamma_s(r + \delta v^{iN}) + (1 - \gamma_s)\delta v^j(\pi_j^{t+1}, \pi_i^{t+1}) \\ v^{iB} &= -m + \gamma_e(r + \delta v^{iB}) + (1 - \gamma_e)\delta v^j(\pi_j^{t+1}, \pi_i^{t+1}) \end{aligned}$$

into (5) and rearranging terms, we obtain

$$v^i(\pi_i^t, \pi_j^t) = \underbrace{\frac{(\gamma_s r - m)\pi_i^t}{1 - \gamma_s\delta} + \frac{(\gamma_e r - m)(1 - \pi_i^t)}{1 - \gamma_e\delta}}_{G_i''} + \underbrace{\left[\frac{(1 - \gamma_s)\delta\pi_i^t}{1 - \gamma_s\delta} + \frac{(1 - \gamma_e)\delta(1 - \pi_i^t)}{1 - \gamma_e\delta}\right]}_{D_i} v^j(\pi_j^{t+1}, \pi_i^{t+1}),$$

where D_i is a label also used in the paper. Solving by substitution and elimination, we

obtain a unique solution

$$v^i(\pi_i^t, \pi_j^t) = \frac{G_i'' + D_i G_j''}{1 - D_i D_j}.$$

Note that

$$G_i'' = G_i r - \left[\frac{\pi_i^t}{1 - \gamma_s \delta} + \frac{1 - \pi_i^t}{1 - \gamma_e \delta} \right] m,$$

where G_i labels the term

$$\frac{\gamma_s \pi_i^t}{1 - \gamma_s \delta} + \frac{\gamma_e (1 - \pi_i^t)}{1 - \gamma_e \delta},$$

as in the paper. Thus we can write

$$v^i(\pi_i^t, \pi_j^t) = \frac{G_i + D_i G_j}{1 - D_i D_j} r - \frac{\frac{\pi_i^t}{1-\gamma_s\delta} + \frac{1-\pi_i^t}{1-\gamma_e\delta} + D_i \left[\frac{\pi_j^t}{1-\gamma_s\delta} + \frac{1-\pi_j^t}{1-\gamma_e\delta} \right]}{1 - D_i D_j} m.$$

In the fraction that multiplies m, the numerator and the denominator part have an identical common denominator $(1 - \gamma_s\delta)^2(1 - \gamma_e\delta)^2$ that cancels out, and after some algebra we obtain

$$\frac{1 - \delta + \delta^2[\gamma_s \triangle\gamma(\pi_i^t + \pi_j^t - 1) + \triangle\gamma^2 \pi_i^t \pi_j^t + \gamma_s \gamma_e] + \delta^3[\gamma_s^2 \triangle\gamma(\pi_i^t - \pi_j^t + 1) + \triangle\gamma^2 \pi_i^t \pi_j^t]}{(1 - \delta)(1 - \delta + \delta^2[\gamma_s \triangle\gamma(\pi_i^t + \pi_j^t - 1) + \triangle\gamma^2 \pi_i^t \pi_j^t + \gamma_s \gamma_e] + \delta^3[\gamma_s^2 \triangle\gamma(\pi_i^t - \pi_j^t + 1) + \triangle\gamma^2 \pi_i^t \pi_j^t])} = \frac{1}{(1 - \delta)}.$$

In turn, we have the solution presented in the paper,

$$v^i(\pi_i^t, \pi_j^t) = \frac{G_i + D_i G_j}{1 - D_i D_j} r - \frac{m}{1 - \delta}.$$

□

Lemma 2. $v^{iN} > v^{iB}$.

Proof. Recall that

$$
\begin{aligned}
v^i(\pi_i^t, \pi_j^t) &= \pi_i^t v^{iN} + (1 - \pi_i^t) v^{iB} && (1)\\
v^{iN} &= -m + \gamma_s(r + \delta v^{iN}) + (1 - \gamma_s)\delta v^j(\pi_j^{t+1}, \pi_i^{t+1}) && (2)\\
v^{iB} &= -m + \gamma_e(r + \delta v^{iB}) + (1 - \gamma_e)\delta v^j(\pi_j^{t+1}, \pi_i^{t+1}) && (3)
\end{aligned}
$$

Suppose $v^j(\pi_j^{t+1}, \pi_i^{t+1}) = v^{jN}$. Substituting $v^j(\pi_j^{t+1}, \pi_i^{t+1}) = v^{jN}$ into (2) and (3), and using $v^{iN} = v^{jN}$, equations (2) and (3) constitute a set of two linear equations in two unknowns, v^{iN} and v^{iB}. We can solve (2) for v^{iN} and substitute it into (3). We obtain

$$
v^{iN} = \frac{\gamma_s r - m}{1 - \delta} \quad \text{and} \quad v^{iB} = \frac{(\gamma_e + \gamma_s\delta - 2\gamma_e\gamma_s\delta)r - m}{1 - \delta}.
$$

Thus $v^{iN} > v^{iB}$ if

$$
\begin{aligned}
\gamma_s r - m &> (\gamma_e + \gamma_s\delta - 2\gamma_e\gamma_s\delta)r - m\\
\gamma_s - \gamma_e &> (\gamma_s - 2\gamma_e\gamma_s)\delta\\
\triangle\gamma &> (1 - 2\gamma_e)\gamma_s\delta\\
\triangle\gamma &> \triangle\gamma\gamma_s\delta\\
1 &> \gamma_s\delta && (4)
\end{aligned}
$$

Inequality (4) holds because $\gamma_s \in (1/2, 1)$ and $\delta \in (0, 1)$. Thus $v^{iN} > v^{iB}$ if $v^j(\pi_j^{t+1}, \pi_i^{t+1}) = v^{jN}$. By an analogous argument, $v^{iN} > v^{iB}$ if $v^j(\pi_j^{t+1}, \pi_i^{t+1}) = v^{jB}$. According to (1), $v^j(\pi_j^{t+1}, \pi_i^{t+1})$ is a convex combination of v^{jN} and v^{jB}. In turn, v^{jN} and v^{jB} are bounds on the values that $v^j(\pi_j^{t+1}, \pi_i^{t+1})$ can take. Therefore, $v^{iN} > v^{iB}$ for any $v^j(\pi_j^{t+1}, \pi_i^{t+1})$. □

Lemma 3. *D_i is decreasing in π_i^t and $D_i \in (0,1)$.*

Proof. Recall that

$$D_i = \frac{(1-\gamma_s)\delta\pi_i^t}{1-\gamma_s\delta} + \frac{(1-\gamma_e)\delta(1-\pi_i^t)}{1-\gamma_e\delta}.$$

Taking the partial derivative of D_i with respect to π_i^t, we obtain

$$\frac{\partial D_i}{\partial \pi_i^t} = \frac{(1-\gamma_s)\delta}{1-\gamma_s\delta} - \frac{(1-\gamma_e)\delta}{1-\gamma_e\delta} = -\frac{\triangle\gamma(1-\delta)\delta}{(1-\gamma_e\delta)(1-\gamma_s\delta)} < 0.$$

Thus D_i is decreasing in π_i^t. Furthermore,

$$\lim_{\pi_i \to 0^+} D_i = \frac{(1-\gamma_e)\delta}{1-\gamma_e\delta} < 1 \qquad \lim_{\pi_i \to 1^-} D_i = \frac{(1-\gamma_s)\delta}{1-\gamma_s\delta} > 0.$$

Thus $D_i \in (0,1)$. □

Lemma 4. *$v^i(\pi_i^t, \pi_j^t)$ is increasing in π_i^t and π_j^t.*

Proof. Recall that after using (2) and (3) to substitute v^{iN} and v^{iB} into equation (5) in the paper,

$$v^i(\pi_i^t, \pi_j^t) = \pi_i^t v^{iN} + (1-\pi_i^t)v^{iB}$$

describes a system of two linear equations in two unknowns for $i = 1, 2$, $v^1(\pi_1^t, \pi_2^t)$ and $v^2(\pi_2^{t+1}, \pi_1^{t+1})$. Treating v^i and v^j as endogenous to π_i^t and treating the remaining terms as parameters, we can totally differentiate this system of two equations with respect to π_i^t. We get

$$\begin{aligned} v^i_{\pi_i^t} &= \frac{\gamma_s r - m + (1-\gamma_s)\delta v^j(\pi_j^{t+1}, \pi_i^{t+1})}{1-\gamma_s\delta} - \frac{\gamma_e r - m + (1-\gamma_e)\delta v^j(\pi_j^{t+1}, \pi_i^{t+1})}{1-\gamma_e\delta} + v^j_{\pi_i^t} D_i \\ v^j_{\pi_i^t} &= v^i_{\pi_i^t} D_j \end{aligned}$$

where $v^i_{\pi_i^t}$ denotes the total derivative of $v^i(\pi_i^t, \pi_j^t)$ with respect to π_i^t. Solving (2) and (3) for v^{iN} and v^{iB}, respectively, we have

$$\begin{aligned} v^{iN} &= \frac{\gamma_s r - m + (1-\gamma_s)\delta v^j(\pi_j^{t+1}, \pi_i^{t+1})}{1-\gamma_s\delta} \\ v^{iB} &= \frac{\gamma_e r - m + (1-\gamma_e)\delta v^j(\pi_j^{t+1}, \pi_i^{t+1})}{1-\gamma_e\delta} \end{aligned}$$

Thus the totally differentiated system of equations can be equivalently rewritten as

$$\begin{aligned} v^i_{\pi_i^t} &= v^{iN} - v^{iB} + v^j_{\pi_i^t} D_i \\ v^j_{\pi_i^t} &= v^i_{\pi_i^t} D_j \end{aligned}$$

We can solve this system of equations by substitution to obtain

$$v^i_{\pi_i^t} = \frac{v^{iN} - v^{iB}}{1 - D_i D_j} \quad \text{and} \quad v^j_{\pi_i^t} = \frac{D_j(v^{iN} - v^{iB})}{1 - D_i D_j}.$$

Lemmas 2 and 3 imply that $v^i_{\pi_i^t} > 0$ and thus $v^i(\pi_i^t, \pi_j^t)$ is increasing in π_i^t. Switching the indices on the solution for $v^j_{\pi_i^t}$, we get

$$v^i_{\pi_j^t} = \frac{D_i(v^{jN} - v^{jB})}{1 - D_i D_j} > 0.$$

Thus $v^i(\pi_i^t, \pi_j^t)$ is increasing in π_j^t. □

Lemma 5. $\lim_{\pi_j \to 0^+} \left[\lim_{\pi_i \to 0^+} v^i(\pi_i^t, \pi_j^t)\right] = \frac{\gamma_e r - m}{1-\delta}$.

Proof. Observe that

$$\lim_{\pi_i \to 0^+} G_i = \frac{\gamma_e}{1-\gamma_e\delta} \quad \text{and} \quad \lim_{\pi_i \to 0^+} D_i = \frac{(1-\gamma_e)\delta}{1-\gamma_e\delta}.$$

Thus

$$\lim_{\pi_i \to 0^+} \frac{G_i + G_j D_i}{1 - D_i D_j} = \frac{\frac{\gamma_e}{1-\gamma_e\delta} + G_j \frac{(1-\gamma_e)\delta}{1-\gamma_e\delta}}{1 - \frac{(1-\gamma_e)\delta}{1-\gamma_e\delta} D_j},$$

and

$$\lim_{\pi_j \to 0^+} \left(\lim_{\pi_i \to 0^+} \frac{G_i + G_j D_i}{1 - D_i D_j} \right) = \frac{\frac{\gamma_e}{1-\gamma_e\delta} \left(1 + \frac{(1-\gamma_e)\delta}{1-\gamma_e\delta} \right)}{1 - \left(\frac{(1-\gamma_e)\delta}{1-\gamma_e\delta} \right)^2} = \frac{\frac{\gamma_e}{1-\gamma_e\delta}}{1 - \frac{(1-\gamma_e)\delta}{1-\gamma_e\delta}} = \frac{\gamma_e}{1-\delta}.$$

Using the expression for $v^i(\pi_i^t, \pi_j^t)$ derived in Lemma 1, we have

$\lim_{\pi_j \to 0^+} \left[\lim_{\pi_i \to 0^+} v^i(\pi_i^t, \pi_j^t) \right] = \frac{\gamma_e r - m}{1-\delta}$. □

Proof of Proposition 2: Observe that the payoff that the voter obtains when both candidates exploit office while the voter ignores the incumbent's performance and keeps him in office is

$$\underline{v} = \frac{\gamma_e r}{1-\delta}.$$

According to Lemma 5,

$$\lim_{\pi_j \to 0^+} \left[\lim_{\pi_i \to 0^+} v^i(\pi_i^t, \pi_j^t) \right] = \frac{\gamma_e r - m}{1-\delta} < \underline{v}.$$

According to Lemma 4, $v^i(\pi_i^t, \pi_j^t)$ is increasing in π_i^t and π_j^t. Thus there will be a unique pair of threshold beliefs $(\underline{\pi_i}, \underline{\pi_j})$ such that for $\pi_i^t < \underline{\pi_i}$ and $\pi_j^t < \underline{\pi_j}$, the voter prefers to ignore candidate performance and keep the incumbent in office.

The threshold beliefs $(\underline{\pi_i}, \underline{\pi_j})$ are implicitly defined by the equation

$$v^i(\pi_i^t, \pi_j^t) = \underline{v} \tag{5}$$

Since the solution of (5) for $\underline{\pi_i}$ depends on π_j^t – which evolves on the equilibrium path – I treat $\underline{\pi_i}$ as a function of π_j^t and write $\underline{\pi_i}(\pi_j^t)$; I treat the remaining parameters as constants.

Figure 1 illustrates this dependence of $\underline{\pi_i}$ on π_j^t, using the same parameter values as in the paper.

To find the threshold $\underline{\pi_i}$, below which the voter ignores candidate performance in office, we solve

$$v^i(\pi_i^t, \pi_j^t) = \underline{v}$$

or equivalently

$$\frac{G_i + D_i G_j}{1 - D_i D_j} r - \frac{m}{1-\delta} = \frac{\gamma_e r}{1-\delta}$$

for π_i. After some algebra, we obtain

$$\underline{\pi_i}(\pi_j^t) = \frac{m(1-\gamma_s\delta)^2(1+\triangle\gamma\delta) - \pi_j^t\gamma_s\triangle\gamma(1-\gamma_s\delta)\delta[r(1-\gamma_e\delta) - m\delta]}{\triangle\gamma(1-\gamma_s\delta)[r(1-\gamma_e\delta)^2 - m\gamma_s\delta^2] + \pi_j^t\triangle\gamma^2(1-\delta)\delta[r(1-\gamma_e\delta) - m\delta]}.$$

When differentiating $\underline{\pi_i}(\pi_j^t)$ with respect to π_j^t according to the quotient rule, only the numerator is relevant for the sign of the partial derivative. The numerator

$$-\delta(1-\gamma_e\delta)^2(1-\gamma_s\delta)^2(\gamma_s r - m)[(1-\gamma_e\delta)r - \delta m] \tag{6}$$

is negative since all terms in (6) are positive. (The term $\gamma_s r - m$ is positive because $r > m/(\gamma_s - \gamma_e)$ by assumption. To see that the term $(1-\gamma_e\delta)r - \delta m$ is positive, note that it is decreasing in δ and positive for boundary values of δ.) Thus $\underline{\pi_i}(\pi_j^t)$ is decreasing in π_j^t.

Finally, the threshold $\underline{\pi_i}(\pi_j^t)$ is positive only for values of π_j^t below a threshold $\underline{\pi_j} > 0$. In order to find $\underline{\pi_j}$, solve

$$\underline{\pi_i}(\pi_j^t) = 0$$

for π_j^t. We obtain

$$\underline{\pi_j} = \frac{m(1-\gamma_s\delta)(1+\triangle\gamma\delta)}{\gamma_s\triangle\gamma\delta[(1-\gamma_e\delta)r - m\delta]} > 0.$$

□

Proof of Proposition 3: As long as the voter defends democracy, any candidate will comply with democracy because his per-period payoff is nonnegative, regardless of whether he is in office or out of office. By contrast, if the voter defends democracy and the candidate subverts democracy, he receives a negative payoff $\underline{u} < 0$. If the voter acquiesces, the candidate who assumes office after democracy has been subverted obtains the per-period payoff b, which is at least as large as any per-period payoff that he can obtain under democracy. Thus if the voter acquiesces, both candidates subvert democracy.

The new threshold $\underline{\pi_i}(\pi_j^t)$ that accounts for the cost of defending democracy is implicitly defined by

$$v^i(\pi_i^t, \pi_j^t) - d = \underline{v}. \tag{7}$$

Let d^* be the maximum value of d for which the voter will defend democracy. By arguments analogous to those in Lemma 5,

$$\lim_{\pi_j \to 1^-} \left[\lim_{\pi_i \to 1^-} v^i(\pi_i^t, \pi_j^t) \right] = \frac{\gamma_s r - m}{1-\delta} = \overline{v}.$$

Thus $\overline{v}$ is largest expected discounted payoff that the voter can obtain under democracy. In turn, the voter will defend democracy as long as

$$\overline{v} - d \geq \underline{v} \quad \text{or equivalently} \quad \frac{\gamma_s r - m}{1-\delta} - d \geq \frac{\gamma_e r}{1-\delta}.$$

Solving for d, we obtain

$$d^* = \frac{\triangle\gamma r - m}{1-\delta}.$$

□

The following lemmas will be useful in proving the claims in Proposition 4.

Lemma 6. $\lim_{\pi_i \to 1^-} u_i^N(out) > \lim_{\pi_i \to 1^-} u_i^B(out)$ *as long as* $c < b(\gamma_s - \gamma_e)\delta$.

Proof. Note that

$$\lim_{\pi_i \to 1^-} u_i^N(out) = \frac{\gamma_e \delta b}{1-\delta} \quad \text{and} \quad \lim_{\pi_i \to 1^-} u_i^B(out) = \frac{\gamma_e \delta (b-c)}{(1-\delta)(1-\triangle\gamma\delta)}.$$

Solving the inequality

$$\frac{\gamma_e \delta b}{1-\delta} > \frac{\gamma_e \delta (b-c)}{(1-\delta)(1-\triangle\gamma\delta)} \quad \text{we obtain} \quad c < b\triangle\gamma\delta.$$

□

Lemma 7. $u_i^N(out)$ *and* $u_i^B(out)$ *are decreasing in* π_j^t.

Proof. Taking partial derivatives of $u_i^N(out)$ and $u_i^B(out)$ with respect to π_j^t, we obtain

$$\frac{\partial u_i^N(out)}{\partial \pi_j^t} = -\frac{\triangle\gamma\delta(1-\gamma_s\delta)(b-c)}{(1-\delta)(1+\delta\pi_j^t)^2} \quad \text{and} \quad \frac{\partial u_i^B(out)}{\partial \pi_j^t} = -\frac{\triangle\gamma\delta(1-\gamma_e\delta)b}{(1-\delta)[1+\triangle\gamma\delta(1-\pi_j^t)]^2}.$$

Thus $u_i^N(out)$ and $u_i^B(out)$ are decreasing in π_j^t.

□

Proof of Proposition 4: Jointly, lemmas 6, 7, and the discussion in the text prove all claims in Proposition 4. □

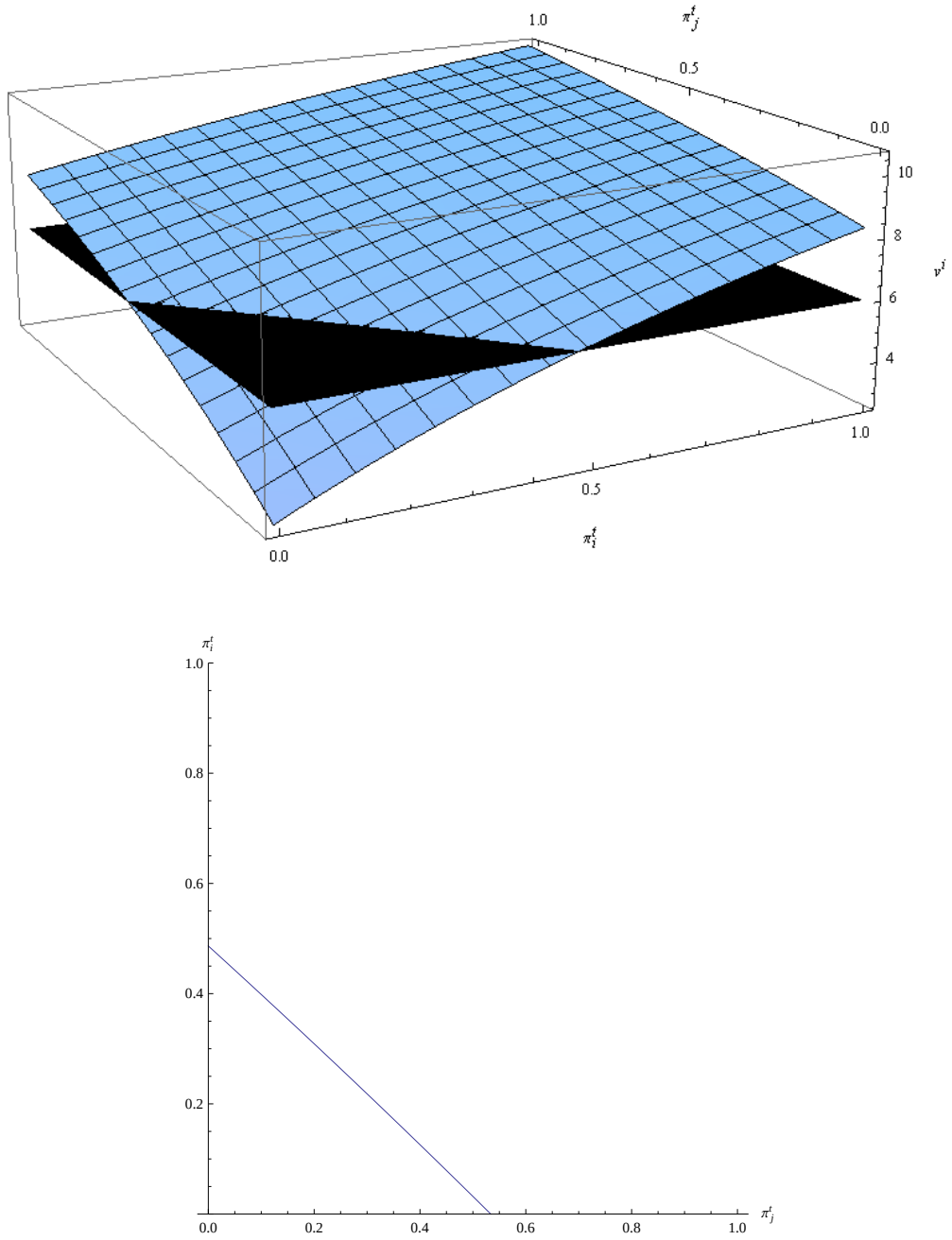

Figure 1: The belief threshold $\underline{\pi}_i(\pi_j^t)$ as an intersection of $v^i(\pi_i^t, \pi_j^t)$ and $\underline{v}$ (top), and as a function of π_j^t (bottom).