Norms and Dynamics of Power Alternation

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Abstract

We explore the economic origin and spontaneous practice of power alternation in the presence of holdup problem and information asymmetry. In each period, two parties decide on whether to jointly rule a productive regime with one party serving as the incumbent. Survival of the regime is threatened by security shocks that arrive stochastically. The incumbent monopolizes access to information and fully controls revenue allocation. The key challenge to joint rule is the incumbent's holdup problem in compensating the uninformed opposition. We prove that, to resolve this challenge, power alternation and certain norms guiding its practice could arise endogenously as efficient and self-enforcing cooperative arrangements. A full characterization of the resulting political dynamics is then provided. Our approach advances the dynamic principal-agent framework by characterizing history-dependent schemes in which the identity of the principal is subject to renegotiation. We apply this framework to analyze dynamics of the Whig-Tory alternation in England from 1688 to 1830.

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1. Introduction

Members of poleis, states, and other organizations are divided into those who rule and those who are ruled. Cooperative relationships thrive on goodwill among people, and especially, those who rule must be trusted. Nevertheless, their legitimacy is inevitably vulnerable. Hierarchical structure of power entails inherently differentiated access to information and difficulty in maintaining the credibility of promises, sowing the seeds of discord and mistrust. Formal institutions or informal norms arise to sustain the resilience of such relationships. Among them are political and social arrangements of power alternation which accommodate fluctuating legitimacy and enduring cooperation.[1] As Aristotle famously emphasized, people "must be capable of ruling and being ruled in turn" (Hansen, 1999, 74).

Peaceful power alternation has become a defining feature of democracy in modern literature of political science. Przeworski (1991) famously states that democracy is a system in which parties lose power. Przeworski et al. (2000, 1996) propose a minimalist definition of democracy as "a regime in which those who govern are selected through contested elections" and argue that "alternation in office constitutes prima facie evidence of contestation." To determine whether a regime qualifies as a democracy, "the incumbent government and the opposition must have alternated in power at least once" (Cheibub et al., 2010; Svolik, 2012).[2] However, when the modern party system first emerged in 18th-century Britain (Brewer, 1976; Skjönsberg, 2021), it was not greeted with lofty democratic ideals in Western philosophy but was instead met with skepticism and criticism.[3] Most importantly, parties were perceived as vehicles for intensifying factional

[1] Examples of power alternation include the alternating governance between the Whigs and the Tories in Britain, which we will discuss later, the replaceability of leadership in early chiefdoms (Earle, 1997), and even the flexible designation of the captaincy among a crew of pirates (Leeson, 2009).

[2] This idea of the "turnover test" can also be found in Huntington (1991), where he proposes that "a democracy can be considered consolidated when it passes the two-turnover test, meaning that the ruling party peacefully transfers power to the opposition, which subsequently also cedes power."

[3] Hofstadter (1969) wrote: "Political discussion in eighteenth-century England and America was pervaded by a kind of anti-party cant. Jonathan Swift, in his Thoughts on Various Subjects, had said that 'Party is the madness of many, for the gain of the few.' This maxim, which was repeated on this side of the Atlantic by men like John Adams and William Paterson, plainly struck a deep resonance in the American mind. Madison and Hamilton, when they discussed parties or factions in The Federalist, did so only to arraign their bad effects. In the great debate over the adoption of the Constitution both sides spoke ill of parties. The popular sage, Franklin, gave an eloquent warning against factions and 'the infinite mutual abuse of parties, tearing to pieces the best of characters.' George Washington devoted a large part of his political testament, the Farewell Address, to stern warnings against 'the baneful effects of the Spirit of Party.' His successor, John Adams, believed that 'a division of the republic into two great parties... is to be dreaded as the greatest political evil under our Constitution.' If there was one point of political philosophy upon which these men, who differed on so many things, agreed quite readily, it was their common conviction about the baneful effects of the spirit of party."

interests rather than as instruments for promoting the public good.[4] Political philosophers envisioned various ideal forms of governance, yet none included party alternation. Nevertheless, parties eventually became indispensable[5]—a reality that has long puzzled scholars and one that we suspect is driven by the pragmatic demands of economic efficiency. While political philosophers were slow to acknowledge this reality, once they did, they celebrated it as one of the greatest feats of political engineering ever conceived—one that became a fundamental part of constitutional democracy (Dahl, 1971; Huntington, 1991; Przeworski, 1991; Przeworski et al., 2000, 1996; Schumpeter, 1942).

In this paper, we explore the economic origin and spontaneous practice of power alternation. We show how norms of power alternation may emerge from efficient self-enforcing cooperative arrangements and characterize different types of political dynamics of legitimacy, compromise, and alternation of power. Specifically, we consider a model in which two parties repeatedly cooperate and negotiate the control right over the revenue generated by a productive regime. At the beginning of each period, the parties jointly rule the regime, with the control right residing with one party to whom we refer as the *incumbent*, while the other party is the *opposition*. Both parties can decide whether to stay in or exit the regime. The cooperative relationship dissolves if at least one party leaves and takes the outside option. In contrast, staying requires a party to exert costly effort to continue ruling the regime.[6] Joint rule under which both parties stay and exert effort makes the regime more productive. The control right endows the incumbent with monopolistic access to information and full authority in allocating revenue. After the revenue has been realized, the incumbent privately observes whether the regime is hit by a stochastic security shock. This party then dictates how much to spend on coping with the shock and how much to share with the other party. The opposition observes nothing except for the revenue transferred to it. The regime collapses absent a sufficient amount of revenue used to ensure its survival in the event of a security shock. Finally, provided that the regime survives, the incumbent decides whether to abdicate and relinquish the control

[4] "They [opposition] leave no means unattempted to draw your majesty's faithful subjects into factions and cabals, and to engage them in schemes prejudicial to the public good; they endeavour to clog the wheels of government; they would rather see their country in ruins, than in other hands beside their own faction." (To the King, BELISARIUS, London Evening Post, 17 February 1770). Bolingbroke similarly viewed parties as inherently hostile to the common good. In *The Idea of a Patriot King*, he wrote: "Parties, even before they degenerate into absolute factions, are still numbers of men associated together for certain purposes and certain interests, which are not, or are not allowed to be, those of the community by others."

[5] Bolingbroke conceded that parties are as inevitable as they are undesirable, as he admitted: "This has been and must always be in some measure, the course of human affairs." Hofstadter (1969) wrote: "Yet they... were rapidly driven, in spite of their theories, to develop a party system."

[6] "Effort" can be interpreted broadly to include, for instance, investments specific to the productive asset of the regime.

right to the opposition at a cost. Power alternation occurs if the incumbent abdicates.

In this model, any social arrangement with a fixed power structure cannot sustain joint rule in the long run. Privileges inherent in the control right give rise to two intertwining contracting frictions that might splinter any cooperative relationship and result in demise of the regime. The first one is the incumbent's holdup problem. Fully controlling revenue allocation, the incumbent is able to expropriate all the cooperative gains, leaving the opposition uncompensated. Second, due to asymmetric information between the two parties, when the incumbent fails to honor the promised share, the opposition cannot determine whether it is appropriated or diverted for the imperative to ensure the regime's survival. Consequently, dynamic incentives are necessary for joint rule, but entail continuation punishments whenever a security shock hits the regime. We show that in any equilibrium without power alternation, punishments inevitably become so severe within finite periods that joint rule has to henceforth dissolve. The intertwining of the two contracting frictions potentially undermines cooperation within hierarchical structures of power, which is consistent with anthropological evidence on the fragility of tribes in the early history. Examples include wool-producing pastoral tribes which once inhabited Thy in the extreme northwest of Jutland, Denmark. Chiefs of these tribes were in charge of the trade with other tribes, which created the temptation of appropriation and differentiated access to information, central to our model. Whenever a chief returned with meager proceeds, other members would suspect that the trade yields had been embezzled, even though the shortfall could have resulted from negative shocks to wool prices. Legitimacy of such chiefs was therefore vulnerable to vagaries of trade conditions, which easily led to the demise of these tribes (Earle, 1997).

Can joint rule persist in the efficient social arrangement in which the power structure is under ongoing negotiation? Will power alternation occur and how is it conducted? From a technical perspective, to characterize the equilibrium that maximizes the joint welfare, we must consider history-dependent schemes in which the payoff-relevant state—the identity of the incumbent—can be renegotiated by the two parties. This, however, poses two challenges in the absence of readily available tools in the literature of dynamic games. First, the possibility of power alternation allows the two parties to renegotiate the continuation play. Nonetheless, in contrast to most of the literature (for instance, Miller and Watson, 2013; Safronov and Strulovici, 2018; Watson et al., 2020) we impose no prescription of any bargaining protocol that governs the negotiation over incumbency, nor do we introduce any cooperative solution to power alternation. Instead, one of the main purposes of our paper is to explore how the efficiency of social arrangements *per se* endogenously implies some protocol and associated distribution of bargaining power amid

the process of power alternation. Second and more subtly, in our model, the continuation game differs from the original game if power alternation occurs. This fact implies that the standard self-generation approach developed by Abreu et al. (1990) is not readily applicable. Underlying this approach is the premise that an equilibrium payoff is the weighted sum of an immediate payoff and a continuation payoff produced by another equilibrium of the original game. In contrast, in our model, the set of continuation values that can be credibly promised under the incumbency of one party consists of not only equilibrium payoffs under this party's incumbency, but also those under the other party's incumbency via power alternation. Consequently, in order to characterize the equilibrium payoff set under one party's incumbency, we must first characterize the equilibrium payoff set under the other party's incumbency. This self-reference nature, back and forth between the two incumbencies, leads to nontrivial difficulty in identifying equilibrium play.

To address this difficulty, we first establish that the frontier of the set of credible continuation values (i.e., *the promise frontier*) under one party's incumbency is the smallest concave function above the frontiers of the sets of equilibrium payoffs (i.e., *the payoff frontiers*) under both incumbencies. In other words, the promise frontier under one party's incumbency is obtained from *concavification* of the joint of the payoff frontiers under the incumbencies of both parties. This important observation allows us to derive a sharp characterization of the promise frontier under each incumbency, which, in turn, gives the shape of each payoff frontier. These results enable us to describe behavior in an efficient equilibrium that maximizes the ex ante joint welfare of the two parties.

Our main findings show that in an efficient equilibrium, power alternation could arise endogenously to help the two parties sustain joint rule in the long run. Furthermore, certain norms of power alternation emerge as a result of efficiency, dictating how power alternation is conducted and circumstances under which it happens. A critical feature of an efficient equilibrium is that utility transfers from the incumbent to the opposition reduce the joint welfare of the two parties. In other words, any compromise made by the incumbent entails a social cost. This result is the product of the two intertwining contracting frictions discussed above. On the one hand, to deter the incumbent's temptation of appropriation, the incumbent is punished to make more generous compromise in the continuation play should he share no revenue with the opposition. On the other hand, due to information asymmetry, such punishments occur even if the promise is broken because of the imperative to cope with a security shock. Consequently, the incumbent's payoff declines following every security shock. However, to maintain credibility in revenue sharing, lower payoff necessitates more severe punishment that involves in the nearer future either costly power alternation or dissolution of joint rule, implying lower

joint welfare. The immediate implication is that efficiency favors the incumbent, minimizing compromises made to the opposition, provided the relational incentives remain effective.

Two norms of power alternation are inherent in an efficient equilibrium whenever power alternation can occur on the equilibrium path. Both norms originate from efficiency gains to prolong every incumbency to the extent that joint rule never dissolve. The first one is a *norm of almighty inauguration*. In an efficient equilibrium, if power alternation occurs, the abdicating incumbent always receives under the new incumbency the minimal continuation payoff that makes it willing to yield power. As a result, efficiency coincides with optimality for every new incumbent, constrained by the requirement that power alternation from an old incumbent to a new one be incentive compatible. This norm can be understood as an implicit bargaining protocol for power alternation that gives the maximal bargaining power to the inaugurating incumbent. Following the protocol, the inaugurating incumbent first proposes a continuation play after power alternation. The old incumbent then chooses whether to accept it or reject and henceforth rule the regime alone.

The second is a *norm of backloaded abdication*, prescribing that an incumbent holds onto power and refuses to initiate negotiation over power alternation, until its abdication is necessary to sustain joint rule in the future. The incumbent postpones abdication as much as possible. Power alternation occurs only after the regime has been hit by sufficiently many consecutive security shocks, in which case the incumbent's payoff becomes so low that the cooperative relationship under the current incumbency cannot withstand any further shock.

Building on the norms of power alternation, we describe dynamics in an efficient equilibrium. The payoff of an incumbent provides an equilibrium interpretation of its legitimacy, which declines if it fails to share the promised revenue with the opposition, and recovers if the promise is honored. As its legitimacy declines, the incumbent has to make more generous compromise to deter joint rule from dissolution, promising to allocate a larger share of revenue to the opposition. Moreover, with a sufficiently low level of incumbency, the incumbent has to yield its power with positive probability if a security shock hits the regime. We say that a party's incumbency is *hegemonic* if its legitimacy is sufficiently high that it bears no risk of losing power in the face of a single security shock and *precarious* otherwise.

To better delineate the implications of the norms of power alternation, we identify three ideal types of political dynamics, assuming that the parties are symmetric and the cost of abdication is infinitesimal. The typology follows two criteria: whether or not hegemonic incumbency can be attained and whether or not a new incumbency begins as hegemonic. The first type is *unstable political dynamics*, in which no incumbency is ever hegemonic.

Whenever a security shock hits the regime, the incumbent relinquishes its power to the opposition with positive probability. The second type, *stable political dynamics*, is the opposite. Every inaugurating incumbent achieves hegemony immediately after power alternation. The party holds onto power until the regime has been hit consecutively by sufficiently many security shocks. The last and most interesting type is *stabilizable political dynamics*. A party ascends to power with a precarious incumbency from the outset, possibly yielding the control right should a security shock hit in the early stages. Hegemony, nonetheless, can be built up gradually following periods without failure of promises. We place this type of political dynamics into a historical context, showing how the spontaneous Whig-Tory power alternation in England (1688-1830) exemplifies our theoretical analysis.

Related literature. Our paper explores how norms of power alternation arise endogenously as a result of the intertwining of the holdup problem and information asymmetry. Therefore, we build on the theoretical literature in dynamic contracting in which the promise maker with limited commitment has private information (Halac, 2012; Hörner and Sanktjohanser, 2025; Li and Matouschek, 2013; Li et al., 2023). Closely related is Li and Matouschek (2013) who consider a relational contracting environment in which the manager privately observes her opportunity costs of paying the worker in each period. In the optimal relational contract, the manager's expected profits decline gradually following negative shocks but otherwise recover instantaneously. This pattern of periodical conflicts is reminiscent of dynamics of legitimacy within each incumbency in efficient equilibria of our model. Moreover, they show that whenever the manager is liquidity constrained, the relationship inevitably terminates over time, which resonates with the impossibility of long-run joint rule without power alternation as implied by our model. Li et al. (2023) and Hörner and Sanktjohanser (2025) consider similar environments where analogous patterns of dynamics arise. Despite the similarity, our focus is on how the contracting frictions affect the ongoing negotiation over the identity of the incumbent. The possibility of power alternation renders the analytical structure of our model essentially different from theirs.

Several papers in this literature consider subjective performance evaluation. Both the second part of Levin (2003) and Fuchs (2007) allow the principal to privately observe the output generated by the agent's private effort. They show that the optimal contractual arrangements entail money burning in the form of termination in order to maintain the credibility of the principal's promises. In contrast to these papers which assume private monitoring, our model features only one-sided private information and hence preserves the recursive structure. Furthermore, we show that dissolution of joint rule is optimal only

when power alternation cannot be sustained in an efficient equilibrium. Broadly, our paper relates to the literature on dynamic games with hidden information, for instance, Abdulkadiroglu and Bagwell (2013); Athey and Bagwell (2001, 2008); Athey et al. (2004); Hauser and Hopenhayn (2008). In particular, Ales et al. (2014) consider a model in which political turnover and economic cycles are driven by limited commitment and private information on the side of the policymaker. Contrary to our paper, the incumbent is replaced by a new policymaker whenever political turnover occurs.

Our main findings show how the power structure evolves in an efficient equilibrium. Rayo (2007) and Ferreira and Li (2025) explores the endogenous principal in relational contracts, extending the problem of moral hazard in teams (Holmstrom, 1982) to dynamic environments. Whereas both papers study the optimal structure of interpersonal power designed as a tool to sustain better relational contracts, our point of entry is to understand how certain norms of power alternation spontaneously emerge from the efficient self-enforcing cooperative arrangement.

To characterize norms of power alternation, we consider history-dependent schemes in which the payoff-relevant state—the identity of the incumbent—can be repeatedly renegotiated by the two parties. Hence, this paper combines two parallel literature in political economy. The first literature (Acemoglu et al., 2011; Aguiar and Amador, 2011; Dixit et al., 2000) concerns how the dynamics of production and allocation are affected by the intertwining of limited commitment and power fluctuations. Although these paper characterize the history-dependent schemes, switches of power follow exogenously given Markov processes. This contrasts to our paper, in which power alternation endogenously arises from efficient equilibria. The second literature (Acemoglu et al., 2008, 2012, 2015; Gomes and Jehiel, 2005) focuses on settings where the payoff-relevant states evolve as a result of negotiation among players. However, their analyses assume Markov strategies, precluding the use of continuation promises and punishments.

More broadly, our model contributes to the political economy of institutions. The premise of our paper is to understand the practice of power alternation as an equilibrium outcome that emerges to ensure constrained efficiency given relevant contracting frictions, rather than formalized rules designed to eliminate these frictions. Our point of entry therefore resonates with the "institutions as equilibria" perspective (Greif, 2006; Greif and Kingston, 2011; Greif and Laitin, 2004; North et al., 2009), arguing that institutions are endogenous in the sense that they must be self-enforcing. Existing theories mostly concern with how specific institutions that eliminate either the holdup problem or information asymmetry are endogenously adopted to improve efficiency. For instance, in Myerson (2008), Boix and Svolik (2013), and Fearon (2011), regularly convened parliaments or

competitive elections reveal private information that undermines accountability. In North and Weingast (1989) and models of democratization (Acemoglu and Robinson, 2000, 2001, 2017; Castañeda Dower et al., 2018), incumbents are assumed to be able to completely eliminate their holdup problems by forgoing their control over revenue allocation. Our model, in contrast, shows that even when both these contracting frictions persist, power alternation as a self-enforcing arrangement leverages the benefits of holding office as a stake to prevent the incumbent from embezzling.

2. Model

There are two *parties*, indexed by $i \in \{0,1\}$, interacting at $t = 0, 1, 2, ...$ Initially, the two parties jointly rule a *regime*. At the beginning of each t, both parties simultaneously choose whether to leave the regime, $e_{i,t} \in \{0,1\}$ for each i, where $e_{i,t} = 1$ indicates to stay. Staying and continuing ruling the regime requires some effort that costs each party $c > 0$. Leaving is permanent: if $e_{i,t} = 0$, then $e_{i,t'} = 0$ holds for all $t' \geq t$. The value of the outside option that each party receives from leaving the regime is normalized to 0.

At each t, the regime generates the revenue of $y_t \in \{0,1\}$ and

$$\Pr(y_t = 1 | e_{0,t}, e_{1,t}) = e_{0,t}e_{1,t} + e_{0,t}(1 - e_{1,t})q_0 + (1 - e_{0,t})e_{1,t}q_1,$$

where $q_0, q_1 \in (0,1)$. Hence, the more parties stay and rule the regime, the more productive the regime, and the more likely it generates the revenue of $y_t = 1$. The two parties may consume the revenue or spend it on coping with a *security shock*, represented by $\theta_t \in \{0,1\}$, that arises with probability $\Pr(\theta_t = 1) = \mu \in (0,1)$ at each t.

Every t has one of the two parties in *power*, denoted as $I_t \in \{0,1\}$ and is referred to as the *incumbent*, while the other party, $1 - I_t$, is the *opposition*. The incumbent has two privileges: it has the sole authority in allocating revenue and monopolizes access to information. Formally, the incumbent *privately* observes the revenue the regime generates, y_t, and whether the regime is facing a security shock, θ_t, then dictates how much revenue to spend on security $w_t \geq 0$ and how much to share with the opposition $x_t \geq 0$, subject to the budget constraint that

$$w_t + x_t \leq y_t.$$

The opposition is only informed about how much revenue it receives, x_t.

At the end of t, the regime either *survives* or *fails*, represented by $\ell_t \in \{0,1\}$. First, failure of the regime is permanent: if $\ell_t = 0$, then $\ell_{t'} = 0$ holds for all $t' \geq t$. Second, if $t = 0$

or $\ell_{t-1} = 1$, survival of the regime is guaranteed absent a security shock, $\theta_t = 0$; and against a security shock, $\theta_t = 1$, the regime survives if and only if a whole unit of revenue is spent on security, $w_t = 1$. Formally, if $t = 0$ or $\ell_{t-1} = 1$, then

$$\ell_t = 1 - \theta_t + \theta_t \mathbb{I}\{w_t = 1\}.$$

Conditional on survival, $\ell_t = 1$, the incumbent consumes $y_t - w_t - x_t$, while the opposition consumes x_t.

Given that the regimes survives at the end of t, $\ell_t = 1$, the incumbent makes one last decision on whether to *abdicate* and yield power to the opposition, $a_t \in \{0, 1\}$, at the cost of $k > 0$. *Power alternation* occurs at the end of t if $a_t = 1$. Hence, the incumbent at $t + 1$ is

$$I_{t+1} = (1 - a_t)I_t + a_t(1 - I_t).$$

The stage game at any t that the regime has not yet failed begins with the identity of the incumbent I_t being publicly observed and has the following timing.

1. *Each party i simultaneously and publicly chooses $e_{i,t} \in \{0, 1\}$.*
2. *The regime generates the revenue of $y_t \in \{0, 1\}$.*
3. *The security shock $\theta_t \in \{0, 1\}$ realizes.*
4. *I_t privately observes y_t and θ_t, then chooses w_t and x_t, with only x_t observed by $1 - I_t$.*
5. *Survival of the regime $\ell_t \in \{0, 1\}$ realizes and is publicly observed.*
6. *If $\ell_t = 1$, I_t chooses whether to abdicate, $a_t \in \{0, 1\}$.*

The two parties observe two public signals $\zeta_t, z_t \in [0, 1]$ drawn from the uniform distribution. ζ_t is observed before step 1, which allows the two parties to coordinate on randomizations with regard to all the decisions other than abdication. z_t is observed between step 5 and 6, which allows the two parties to publicly randomize over power alternation.

The flow payoff of the incumbent at t is

$$\ell_t(y_t - w_t - x_t) - e_{I_t,t}c - a_t k$$

and that of the opposition is

$$\ell_t x_t - e_{1-I_t,t}c.$$

Both parties care about the future and share a common discount factor $\delta \in (0,1)$. Hence, at each t, each party seeks to maximize its expected average discounted payoff (payoff).

The solution concept is *perfect public equilibrium* (equilibrium). Specifically, strategies condition only on public history (history): $h^0 = I_0$ and for each $t \geq 1$,

$$h^t = (h^{t-1}, \zeta_{t-1}, e_{0,t-1}, e_{1,t-1}, x_{t-1}, z_{t-1}, a_{t-1}, I_t).$$

A history h^t is under *party i's incumbency* if $I_t = i$. Let $\mathcal{H}_i$ denotes the set of all histories under party i's incumbency and $\mathcal{H} := \mathcal{H}_0 \cup \mathcal{H}_1$ is the set of all possible histories. Party i's strategy is denoted as σ_i. For each $h^t \in \mathcal{H}_i$, σ_i specifies party i's choice of whether to leave the regime $e_{i,t}$ given h^t and ζ_t; revenue allocation choices w_t and x_t given h^t, ζ_t, $e_{0,t}$, $e_{1,t}$, y_t, and θ_t; and abdication decision a_t given h^t, ζ_t, $e_{0,t}$, $e_{1,t}$, y_t, x_t, z_t, and that $\ell_t = 1$. For each $h^t \in \mathcal{H}_{1-i}$, σ_i specifies party i's choice of whether to leave the regime $e_{i,t}$ given h^t and ζ_t. A strategy profile $\sigma = (\sigma_0, \sigma_1)$ specifies a strategy for each party. At each history h^t, the continuation of σ is denoted as $\sigma|h^t$ and it induces a payoff

$$U_i(\sigma|h^t) = (1-\delta)\mathbb{E}^\sigma\Bigg(\sum_{\tau=t}^{\infty}\delta^{\tau-t}\Big(\mathbb{I}(h^\tau \in \mathcal{H}_i)\left(\ell_\tau(y_\tau - w_\tau - x_\tau) - e_{i,\tau}c - a_\tau k\right) + \mathbb{I}(h^\tau \in \mathcal{H}_{1-i})(\ell_\tau x_\tau - e_{i,\tau}c)\Big) \mid h^t\Bigg)$$

for each party i, given that both parties make their decisions according to $\sigma|h^t$. A strategy profile is an *equilibrium* if at each history, the strategy of each party maximizes its payoff given that of the other party. An equilibrium is *efficient* if it maximizes the surplus of the two parties at $t = 0$. Formally, let Σ denote the set of all equilibria and $\Sigma^* \subseteq \Sigma$ denote the set of all efficient equilibria. First, $\sigma \in \Sigma$ if

$$U_i(\sigma_i, \sigma_{1-i}|h^t) \geq U_i(\sigma_i', \sigma_{1-i}|h^t)$$

holds for all σ_i', $h^t \in \mathcal{H}$, and i. Second, $\sigma \in \Sigma^*$ if

$$U_0(\sigma|h^0) + U_1(\sigma|h^0) \geq U_0(\sigma'|h^0) + U_1(\sigma'|h^0)$$

holds for all $\sigma' \in \Sigma$.

We aim at characterizing efficient equilibria. For convenience, we assume without loss of generality that $q_0 \leq q_1$ and suppress the subscript "t" whenever it causes no confusion.

3. The difficulty of joint rule

Throughout we impose the following assumption.

Assumption 1. $c < (1-\mu)\min\{q_0, 1-q_1\}$.

Assumption 1 has two implications for the stage game. First,

$$(1-\mu)q_i - c > 0$$

holds for each i. Hence, given that party $1-i$ has left the regime, it is efficient for party i to stay and rule alone. Second and more importantly,

$$1-\mu-2c > (1-\mu)q_i - c$$

holds for each i. Therefore, *joint rule*, that $e_0 = e_1 = 1$, is efficient. Namely, total surplus of the stage game is maximized if both parties choose to stay and rule jointly. Because joint rule is efficient, both parties are willing to burden the cost of staying and continuing ruling the regime, provided that they can properly share the revenue the regime generates, so that each can be sufficiently compensated. In what follows, we investigate two problems that make sustaining joint rule difficult despite its efficiency. The two problems correspond to the two privileges of the incumbent. The first is the incumbent's *holdup problem* that originates from its sole authority in allocating revenue, while the second is the *information asymmetry* between the two parties created by the incumbent's monopolistic access to information.

Proposition 1. *There exists a unique Markov perfect equilibrium $\underline{\sigma} \in \Sigma$ and in this equilibrium, the following hold for each $i \in \{0,1\}$:*

1. *if $I = i$, then party i chooses $e_i = 1$, $w = \theta y$, $x = 0$, $a = 0$, and gets the payoff of*

$$U_i(\underline{\sigma}|I=i) = \underline{u}_i := \frac{(1-\delta)\left((1-\mu)q_i - c\right)}{1-\delta(1-\mu+\mu q_i)} \in \left(0, (1-\mu)q_i - c\right);$$

2. *if $I = 1-i$, then party i chooses $e_i = 0$ and gets the payoff of*

$$U_i(\underline{\sigma}|I=1-i) = 0.$$

Moreover, in any equilibrium $\sigma \in \Sigma$, for each $i \in \{0,1\}$, and at each $h \in \mathcal{H}_i$, party i chooses $e_i = 1$ and $w = \theta y$.

Proposition 1 fully characterizes the unique *Markov perfect equilibrium* $\underline{\sigma}$, in which both parties employ *Markovian* strategies that depend on history only via incumbency, that is, the only payoff-relevant state variable in our game. This equilibrium is stationary. On the one hand, the incumbent never leaves the regime, always spends all the available revenue on security in the case the regime is hit by a security shock, never shares any revenue with the opposition, and never abdicates. On the other hand, the opposition always leaves the regime right away. As a result, joint rule can never be sustained and the incumbent always rules alone.

The failure of joint rule in $\underline{\sigma}$ is due to the incumbent's holdup problem. Because the incumbent fully controls how to allocate revenue and because in $\underline{\sigma}$, how the revenue is distributed bears no consequence for the future play, the incumbent would always holdup all the revenue the regime generates, leaving the opposition nothing to consume. As a result, the cost the opposition would suffer from staying and continuing ruling the regime can never be compensated at all, so that it leaves the regime to begin with.

A natural question is whether joint rule can be sustained when the two parties employ *non-Markovian* strategies. In particular, whether the incumbent is able to credibly promise to adequately compensate the opposition's cost of continuing ruling the regime, given that failing the promise is consequential to the future play. The incumbent cares about the future play only to the extent that affects its continuation value.

Consider any period in which both parties choose to stay and rule jointly, while the incumbent promises to share x with the opposition. To make its promise credible, the incumbent must have two continuation values u_I' and u_I'' such that

$$(1-\delta)x \leq \delta(u_I'' - u_I'), \tag{1}$$

where u_I' corresponds to the case when the incumbent fails its promise and u_I'' corresponds to that when it honors the promise. Under condition (1), the incumbent would find it optimal to honor its promise by sharing x with the opposition.

Condition (1) implies that $u_I' \leq u_I''$, so that u_I' can be interpreted as the *punishment* the incumbent incurs by failing its promise, while u_I'' as the reward for keeping its promise. According to Proposition 1, in the case a security shock occurs, $\theta = 1$, the incumbent would spend all the available revenue on security, $w = y$, to ensure that the regime survives. This, though benefits both parties, prevents the incumbent from sharing the promised revenue of x with the opposition and thus the incumbent would be punished by receiving the continuation value of u_I'. The punishment cannot be excused because, due to the incumbent's monopolistic access to information, the opposition cannot tell whether there is indeed a security shock

that justifies the incumbent's failure to share x.

Therefore, given x, u_I', and u_I'', the incumbent has the payoff of

$$u_I = (1-\mu)\overbrace{((1-\delta)(1-x-c)+\delta u_I'')}^{\theta=0} + \mu\overbrace{(-(1-\delta)c+\delta u_I')}^{\theta=1}. \tag{2}$$

Conditions (1) and (2) together imply that

$$u_I' \leq \frac{1}{\delta}u_I - \left(\frac{1}{\delta}-1\right)(1-\mu-c) < u_I, \tag{3}$$

where the last inequality is due to $u_I \leq 1-\mu-2c < 1-\mu-c$. Hence, the incumbent's payoff must drop every time the regime survives through a security shock. The following result, however, shows that in any period, joint rule can be sustained only when the incumbent has a sufficiently large payoff.

Lemma 1. *For any $\sigma \in \mathcal{E}$, $i \in \{0,1\}$, and $h \in \mathcal{H}_i$, if $e_0 = e_1 = 1$ at h, then*

$$U_i(\sigma|h) \geq \hat{u}_i := (1-\delta)(1-\mu-c) + \delta\underline{u}_i.$$

The intuition behind Lemma 1 is that given that the opposition chooses to stay and continue ruling the regime, $e_{1-I} = 1$, the incumbent can ensure at least the payoff of $\hat{u}_I$ by choosing to stay, $e_I = 1$, holding up all the revenue, $x = 0$, and then playing $\underline{\sigma}$ in all subsequent periods. Because the incumbent must have a sufficiently large payoff to sustain joint rule and because, under joint rule, the incumbent's payoff must drop every time the regime survives through a security shock, joint rule cannot last without power alternation.

Definition 1. $\sigma \in \Sigma$ is an equilibrium that *involves no power alternation* if for each history $h^t \in \mathcal{H}$ on its equilibrium path such that $t > 0$, $a_{t-1} = 0$; otherwise, σ is an equilibrium that *involves power alternation*.

In an equilibrium that involves no power alternation, the initial incumbent never abdicates. For instance, $\underline{\sigma}$ is such an equilibrium.

Proposition 2. *If $\sigma \in \Sigma$ is an equilibrium that involves no power alternation, then there is a stochastic and finite $T \geq 0$ such that $\sigma|h^t = \underline{\sigma}$ holds for all $t \geq T$ and $h^t \in \mathcal{H}$ on the equilibrium path of σ.*

To see the intuition behind Proposition 2, consider an equilibrium that involves no power alternation in which the two parties rule jointly to begin with and the event that the regime lives through a series of N consecutive security shocks. This event happens with a positive

probability $\mu^N > 0$. Let $u_I \geq \hat{u}_I$ be the incumbent's payoff before the series of security shocks. Then, inductively applying (3) implies that after the series of security shocks, the incumbent's payoff must drop to some

$$u_I^N \leq \frac{1}{\delta^N} u_I - \left(\frac{1}{\delta^N} - 1\right)(1 - \mu - c) < \hat{u}_I,$$

where the last inequality holds when N is sufficiently large. According to Lemma 1, joint rule cannot be sustained when the incumbent has such a low payoff.

An important implication of Proposition 2 is that in any equilibrium that involves no power alternation, the regime fails sooner or later. After the breakdown of joint rule, the incumbent rules alone. Hence, whenever a security shock hits and the incumbent fails to generate enough revenue, which happens with probability $\mu(1 - q_I)$, the regime is gone.

Besides the incumbent's holdup problem, information asymmetry between the two parties also contributes to the ultimate failure of joint rule in any equilibrium that involves no power alternation. The incumbent fails its promise to share revenue with the opposition in two possible scenarios. On the one hand, it is possible that the regime is facing a security shock, so that the incumbent must divert the revenue promised to the opposition to let the regime survive, for the common good of the two parties. On the other hand, it is possible as well that the regime faces no threat and the incumbent just embezzles all the revenue for its own consumption. Lack of information about the security shock, θ, and the incumbent's security spending, w, the opposition cannot tell the difference between these two cases. As a result, for credibility, the incumbent must be punished by a lower continuation value whenever it fails to share the promised revenue with the opposition, even if the revenue is indeed diverted to ensure survival of the regime.

4. Equilibrium characterization

Consider any period in which joint rule is sustained and let (u_I, u_{1-I}) be the pair of payoffs the two parties receive. This equilibrium payoff pair must consist of three entities: an amount of revenue x the incumbent promise to share with the opposition, a pair of continuation values (u'_I, u'_{1-I}) for the case when the incumbent fails to share x, and another pair of continuation values (u''_I, u''_{1-I}) for the case when the incumbent does share x. The pairs of continuation values (u'_I, u'_{1-I}) and (u''_I, u''_{1-I}) are credible only when they are derived from possible equilibrium outcomes in the continuation play.

4.1. Sets of equilibrium payoff pairs and credible continuation promises

Under party i's incumbency, there are three qualitatively different classes of credible pairs of continuation values. The first class consists of all possible equilibrium payoff pairs under party i's own incumbency. These are continuation values that require no power alternation. Formally, for each i,

$$\mathcal{E}_i := \{(U_i(\sigma|I_0 = i), U_{1-i}(\sigma|I_0 = i)) : \sigma \in \Sigma\}$$

is the *set of equilibrium payoff pairs* under party i's incumbency.

The second class consists of equilibrium payoff pairs under party $1-i$'s incumbency via power alternation. These are continuation values supported with power alternation. Formally, under party i's incumbency, the two parties can have any (u_i, u_{1-i}) such that

$$\begin{aligned} u_i &\geq \underline{u}_i \\ \left(u_{1-i}, u_i + \frac{1-\delta}{\delta}k\right) &\in \mathcal{E}_{1-i}. \end{aligned}$$

Recall that the incumbent incurs the cost of k at the moment of passing incumbency. Hence, party i's continuation value u_i is its equilibrium payoff under party $1-i$'s incumbency net the annuitized cost of abdication, $(1-\delta)/\delta k$. The requirement $u_i \geq \underline{u}_i$ is to make power alternation incentive compatible for party i: by refusing to abdicate, party i can at least ensure the payoff of $\underline{u}_i$.

The third class consists of randomizations between the first two classes via the public randomization device z.

Therefore, for each i, the set of all possible credible pairs of continuation values under party i's incumbency is

$$\overline{\mathcal{E}}_i := \text{co}\left(\mathcal{E}_i \cup \left\{(u_i, u_{1-i}) : u_i \geq \underline{u}_i, \left(u_{1-i}, u_i + \frac{1-\delta}{\delta}k\right) \in \mathcal{E}_{1-i}\right\}\right),$$

which is referred to as the *set of credible continuation promises* under party i's incumbency. Clearly, $\mathcal{E}_i \subseteq \overline{\mathcal{E}}_i$. The set of credible continuation promises, however, needs not coincide with the set of equilibrium payoff pairs. If there exists at least one equilibrium that involves power alternation under party i's incumbency, $\mathcal{E}_i \neq \overline{\mathcal{E}}_i$.

Lemma 2. *For each $i \in \{0, 1\}$,*

1. $(u_i, u_{1-i}) \in \mathcal{E}_i$ *if and only if* $u_i \in [\underline{u}_i, \overline{u}_i]$ *and* $u_{1-i} \in [0, v_{1-i}(u_i)]$, *where*

$$\overline{u}_i := \sup\{u_i : \ (u_i, u_{1-i}) \in \mathcal{E}_i \ \exists u_{1-i}\} \in [\underline{u}_i, 1-\mu-2c)$$
$$v_{1-i}(u_i) := \sup\{u_{1-i} : \ (u_i, u_{1-i}) \in \mathcal{E}_i\} \in [0, 1-\mu-2c-u_i)$$

and v_{1-i} *is continuous, concave,* $v_{1-i}(\overline{u}_i) = 0$, *and* $v_{1-i}(\underline{u}_i) = 0$;

2. $(u_i, u_{1-i}) \in \overline{\mathcal{E}}_i$ *if and only if* $u_i \in [\underline{u}_i, \overline{u}_i]$ *and* $u_{1-i} \in [0, \overline{v}_{1-i}(u_i)]$, *where*

$$\overline{v}_{1-i}(u_i) := \sup\{u_{1-i} : \ (u_i, u_{1-i}) \in \overline{\mathcal{E}}_i\} \in [v_{1-i}(u_i), 1-\mu-2c-u_i)$$

and $\overline{v}_{1-i}$ *is continuous, concave,* $\overline{v}_{1-i}(\overline{u}_i) = 0$, *and* $\overline{v}_{1-i}(\underline{u}_i) \geq 0$;

3. *if* $\sigma \in \Sigma^*$, *then for each* $i \in \{0,1\}$ *and* $h \in \mathcal{H}_i$ *on the equilibrium path of* σ,

$$U_{1-i}(\sigma|h) = \overline{v}_{1-i}\left(U_i(\sigma|h)\right).$$

The first part of Lemma 2 summarizes standard features of the set of equilibrium payoff pairs. For party i, this set is fully characterized by function v_{1-i}, which is referred to as the *payoff frontier* of party i's incumbency. The concavity of v_{1-i} is due to the public randomization device ζ. The property that $v_{1-i}(\overline{u}_i) = 0$ implies that party i maximizes its equilibrium payoff under its own incumbency by fully extracting party $1-i$, leaving the latter indifferent between whether to leave the regime. The property that $v_{1-i}(\underline{u}_i) = 0$ holds because under party i's incumbency, $\underline{\sigma}$ is the only equilibrium that renders party i the payoff of $\underline{u}_i$ and this equilibrium leaves party $1-i$ the payoff of 0.

Likewise, the second party of Lemma 2 summarizes features of the set of credible continuation promises. For party i, this set is fully characterized by function $\overline{v}_{1-i}$, which is referred to as the *promise frontier* of party i's incumbency. The concavity of $\overline{v}_{1-i}$ is due to the convexity of set $\mathcal{E}_i$. The property that $\overline{v}_{1-i}(\overline{u}_i) = 0$ implies that party i's maximal credible continuation value comes from the maximal equilibrium payoff under its own incumbency, for which party $1-i$ is fully extracted. The property that $\overline{v}_{1-i}(\underline{u}_i) \geq 0$ and is not necessarily equal to 0 holds because party i could have the continuation value of $\underline{u}_i$ via power alternation, for which the continuation value of party $1-i$ is at least $\underline{u}_{1-i} > 0$.

Most importantly, the last part of Lemma 2 shows that in any efficient equilibrium, the two parties always coordinate on continuation values on the promise frontier of the current incumbency. As a result, the payoffs the two parties receive on the equilibrium path always move along and across the two promise frontiers corresponding to the two incumbencies. Hence, to characterize the set of efficient equilibria and their equilibrium dynamics, it is

necessary to characterize the shape of the promise frontier for each incumbency.

Theorem 1. *For each $i \in \{0,1\}$, $\overline{v}_{1-i}$ is the concavification of* $\max\{v_{1-i}, f_{1-i}\}$*, where*

$$f_{1-i}(u_i) := \begin{cases} \max\left\{u_{1-i} : u_i + \frac{1-\delta}{\delta}k \leq v_i(u_{1-i})\right\}, & \left\{u_{1-i} : u_i + \frac{1-\delta}{\delta}k \leq v_i(u_{1-i})\right\} \neq \emptyset \\ 0, & \left\{u_{1-i} : u_i + \frac{1-\delta}{\delta}k \leq v_i(u_{1-i})\right\} = \emptyset \end{cases}.$$

Moreover, for each $i \in \{0,1\}$, $\overline{v}_{1-i}$ has the following properties:

1. *if $\overline{v}_{1-i}(u_i) = v_{1-i}(u_i)$ for $u_i < \overline{u}_i$, then $\overline{v}_{1-i}(u_i') = v_{1-i}(u_i')$ for all $u_i' \in [u_i, \overline{u}_i]$;*
2. *if $\overline{v}_{1-i}(u_i) = f_{1-i}(u_i)$ for $u_i > \underline{u}_i$, then $\overline{v}_{1-i}(u_i') = f_{1-i}(u_i')$ for all $u_i' \in [\underline{u}_i, u_i]$.*

By definition, $v_{1-i}(u_i)$ represents the maximal equilibrium payoff party $1-i$ can get under party i's incumbency, given that party i has the payoff of u_i. In Theorem 1, $f_{1-i}(u_i)$ represents the maximal equilibrium payoff party $1-i$ can get under its own incumbency right after party i abdicates, given that party i has the payoff of u_i. By definition and the concavity of v_i, f_{1-i} is decreasing and concave. As illustrated in Figure 1, Theorem 1 implies that the promise frontier of party i's incumbency, $\overline{v}_{1-i}$, must be the smallest possible concave function that majorizes the maximal equilibrium payoff party $1-i$ can get under party i's incumbency, v_{1-i}, and that at inauguration right after party i abdicates, f_{1-i}. For convenience, we adopt the following definitions.

Definition 2. For each $i \in \{0,1\}$,

1. $\overline{v}_{1-i}$ is *supported without power alternation* at u_i if $\overline{v}_{1-i}(u_i) = v_{1-i}(u_i)$;
2. $\overline{v}_{1-i}$ is *supported with power alternation* at u_i if $\overline{v}_{1-i}(u_i) = f_{1-i}(u_i) > v_{1-i}(u_i)$;
3. $\overline{v}_{1-i}$ *involves power alternation* if there exists a $u_i \in [\underline{u}_i, \overline{u}_i]$ such that $\overline{v}_{1-i}$ is supported with power alternation at u_i.

Theorem 1 also shows two convenient properties of $\overline{v}_{1-i}$ that follows immediately from the concavity of v_{1-i} and f_{1-i}. As illustrated in Figure 1, $\overline{v}_{1-i}$ has at most three qualitatively different parts: a first part that coincides with v_{1-i} when u_i is sufficiently large, where $\overline{v}_{1-i}$ is supported without power alternation; a second part that coincides with f_{1-i} when u_i is sufficiently small, where $\overline{v}_{1-i}$ is supported with power alternation; and a third part that is a line segment connecting the first two parts when u_i is intermediate, corresponding to randomizations.

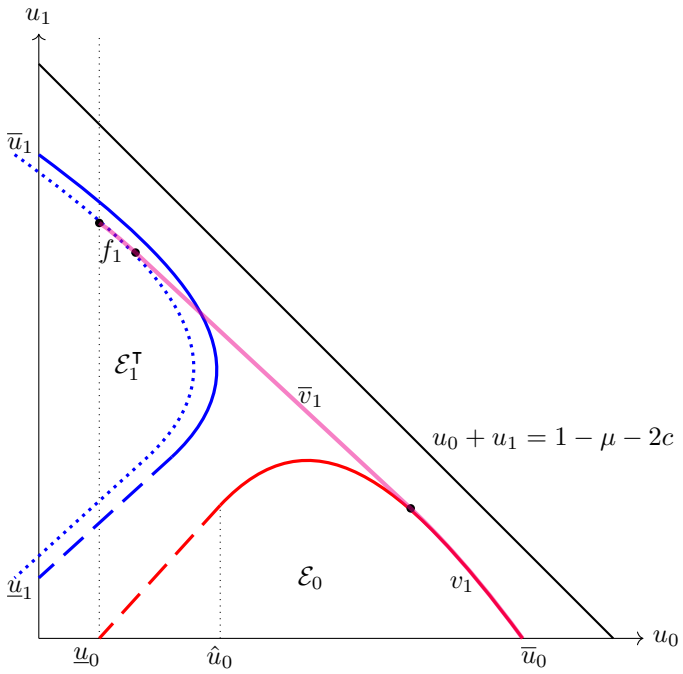


Figure 1: Concavification

4.2. Power alternation and its norms

When the cost for each party to stay and continue ruling the regime is sufficiently low, so that Assumption 1 holds, joint rule is efficient. Hence, the *Coase Theorem* indicates that were there no contracting frictions, the two parties should have been able to properly distribute revenue so as to sustain joint rule and obtain the maximal total surplus of $1-\mu-2c$. However, the two privileges of the incumbent imply two contracting frictions: the incumbent's hold up problem resulted from its sole authority of allocating revenue and information asymmetry between the two parties resulted from the incumbent's monopolistic access to information. And, as shown in Proposition 2, these two contracting frictions make sustaining joint rule in the long run impossible without alternating which party holds power.

Theorem 2. *$\overline{u}_i \geq \hat{u}_i$ and that $\overline{v}_{1-i}$ involves power alternation hold for both $i \in \{0,1\}$ if and only if $\delta > \delta^*$ and $k \leq k^*(\delta)$, where $\delta^* \in (0,1)$ and $k^*(\delta) > 0$.*

Theorem 2 indicates that if the two parties are sufficiently patient and the cost of abdication is sufficiently low, then both promise frontiers must involve power alternation. Below is a direct implication.

Corollary 2.1 (Efficiency via power alternation)**.** *If $\delta > \delta^*$ and $k \leq k^*(\delta)$, then for any efficient equilibrium $\sigma \in \Sigma^*$ and any $h \in \mathcal{H}$ on its equilibrium path, $e_0 = e_1 = 1$ and $\sigma|h$ involves power alternation.*

Therefore, with the presence of the incumbent's holdup problem and information asymmetry, power alternation arises endogenously to help the two parties sustain joint rule in the long run and attain constrained efficiency as long as the two parties are sufficiently patient and the cost associated with power alternation is sufficiently low. Under these conditions, every efficient equilibrium features everlasting power alternation between the two parties and, consequently, joint rule persists and the regime never perishes.

In what follows, we maintain the assumptions that the two parties are sufficiently patient and that the cost of abdication is sufficiently low, then focus on analyzing how power alternation are conducted and circumstances under which it occurs.

Assumption 2. *$\delta > \delta^*$ and $k \leq k^*(\delta)$.*

The following theorem summarizes our main findings.

Theorem 3. *For each $i \in \{0, 1\}$,*

1. *(Social cost of compromise) $u_i + \overline{v}_{1-i}(u_i)$ is strictly increasing in u_i;*
2. *(Norm of almighty inauguration) if $\overline{v}_{1-i}$ is supported with power alternation at u_i, $\overline{v}_{1-i}(u_i) = f_{1-i}(u_i) > v_{1-i}(u_i)$, then $u_i = \underline{u}_i$;*
3. *(Norm of backloaded abdication) $\overline{v}_{1-i}$ is supported without power alternation at u_i, $\overline{v}_{1-i}(u_i) = v_{1-i}(u_i)$, if and only if $u_i \geq \hat{u}_i$.*

The first part of Theorem 3 indicates the failure of the Coase Theorem. In any pairs of credible continuation values on a promise frontier, the total surplus between the two parties is strictly increasing in the incumbent's continuation value. The implication is that any compromise the incumbent can credibly make to the opposition must impose on the two parties a *social cost*. In other words, utility transfers from the incumbent to the opposition are always socially costly. The more generous the compromise, the larger the social cost. The social cost is a product of the incumbent's holdup problem and information asymmetry. Due to the incumbent's holdup problem, any compromise in terms of revenue sharing the incumbent makes to the opposition is credible only if the incumbent is punished after reneging. Due to information asymmetry, the incumbent must be punished even if it fails to share revenue because of the emergence to cope with a security shock. As shown in (1), the larger the compromise, the more severe the punishment necessary to ensure credibility. Hence, with a larger the compromise, after the regime survives through a security shock, the incumbent's payoff must drop "closer" to the point where continuation play must involve power alternation, which generates deadweight losses.

Compromises are necessary to sustain joint rule so as to compensate the opposition's burden of staying and continuing ruling the regime. Hence, the social costs associated with these compromises are inevitable. Consequently, the two parties can never attain unconstrained efficiency, maximizing their total surplus to $1-\mu-2c$. Moreover, because more generous compromises are socially more costly, constrained efficiency requires the incumbent to be as less generous as possible in compromising with the opposition. Below is a direct implication.

Corollary 3.1 (Optimality for initial incumbent)**.** *If $\sigma \in \Sigma^*$, then for each $i \in \{0,1\}$,*

$$U_i(\sigma|I_0 = i) = \overline{u}_i$$
$$U_{1-i}(\sigma|I_0 = i) = 0$$

and for all $\sigma' \in \Sigma$, $U_i(\sigma|I_0 = i) \geq U_i(\sigma'|I_0 = i)$.

Corollary 3.1 shows that constrained efficiency coincides with optimality for the initial incumbent. In the initial period, maximizing the total surplus the two parties share is equivalent to maximizing the payoff of the initial incumbent. Both maximization problems require minimizing the initial incumbent's compromise to the opposition so as to minimize the social cost.

The second part of Theorem 3 implies that if a pair of credible continuation values on a promise frontier is supported with power alternation, then the abdicating incumbent's continuation value must be identical to its payoff in $\underline{\sigma}$, that is, its lowest possible payoff in any equilibrium.

Corollary 3.2 (Constrained optimality for new incumbents)**.** *If $\sigma \in \Sigma^*$, then for each $i \in \{0,1\}$ and each $h \in \mathcal{H}_i$ on the equilibrium path of σ that follows party $1-i$'s abdication,*

$$U_i(\sigma|h) = \overline{v}_i(\underline{u}_{1-i})$$
$$U_{1-i}(\sigma|h) = \underline{u}_{1-i} + \frac{1-\delta}{\delta}k$$

and for all $\sigma' \in \Sigma$ such that h is on the equilibrium path of σ', $U_i(\sigma|h) \geq U_i(\sigma'|h)$.

Corollary 3.2 shows that if power alternation occurs in an efficient equilibrium, then the abdicating incumbent's payoff right after yielding power is always equal to its payoff in $\underline{\sigma}$ plus the annuitized cost of power alternation. Hence, the abdicating incumbent must be indifferent at the moment when deciding whether to pass incumbency. Formally, if party

$1-i$ is the abdicating incumbent,

$$\overbrace{-(1-\delta)k+\delta\left(\underline{u}_{1-i}+\frac{1-\delta}{\delta}k\right)}^{a_{1-i}=1}=\overbrace{\delta\underline{u}_{1-i}}^{a_{1-i}=0},$$

where the left hand side is party $1-i$'s payoff by abdicating and the right hand side is that by refusing to yield power. As a result, the inaugurating incumbent must receive the largest possible equilibrium payoff at the beginning of the new incumbency, while keeping the old incumbent willing to abdicate. In other words, constrained efficiency does not only coincide with optimality for the initial incumbent, it also coincides with optimality for each new incumbent constrained by the old incumbent's incentive compatibility to alternate power.

Interestingly, Corollary 3.2 implies that constrained efficiency entails a *norm of almighty inauguration*: the inaugurating incumbent must have maximal bargaining power amid the process of power alternation. This norm can be understood as a "bargaining protocol" for power alternation that renders all bargaining power to the inaugurating incumbent. Specifically, the bargaining protocol first has the inaugurating incumbent propose an equilibrium continuation play after power alternation and then has the old incumbent choose whether to accept, that is, to yield power and play the proposed equilibrium, or to reject, that is, to hold onto power and switch to play $\underline{\sigma}$ forever. Under this bargaining protocol, the inaugurating incumbent would maximize its own payoff subject to making abdication incentive compatible for the old incumbent.

The norm of almighty inauguration originates from the social cost of compromise. Maximizing the total surplus the two parties share at the moment of power alternation requires maximizing the total surplus at the beginning of the new incumbency, which, due to the social cost of compromise, requires minimizing the compromise the new incumbent makes at inauguration, while keeping the old incumbent willing to abdicate.

At last, to interpret the third part of Theorem 3, recall that by Lemma 1, joint rule can be sustained under party i's incumbency only when party i has a payoff at least as large as $\hat{u}_i$. Hence, the third part of Theorem 3 shows that if a pair of credible continuation values lies on either of the two promise frontiers, it cannot be supported with power alternation or any randomization that assigns a positive probability of power alternation, unless the incumbent's continuation value is too low to sustain joint rule. Then, because of Lemma 2 that continuation values in efficient equilibria must lie on the promise frontier of the current incumbency, constrained efficiency gives rise to a *norm of backloaded abdication*: the incumbent must hold onto power and refuse to abdicate, until power alternation is necessary to sustain joint rule.

Consider any period under party i's incumbency in which joint rule is sustained and let $u_i \geq \hat{u}_i$ be party i's payoff. As shown in (3), joint rule is sustained by party i's promise to share some revenue with party $1-i$, made credible by the punishment of a lower continuation value $u_i' \leq 1/\delta u_i - (1/\delta - 1)(1 - \mu - c) < u_i$. If a security shock occurs in that period, preventing party i from honoring its promise, it does end up with the continuation value of u_i'. The norm of backloaded abdication requires that at the end of that period, party i must hold onto power as long as $u_i' \geq \hat{u}_i$, so that joint rule can still be sustained in the next period under its own incumbency. However, if $u_i' < \hat{u}_i$, party i must abdicate with a positive probability to have joint rule sustained in the next period. Moreover, even in the case of $u_i' \geq \hat{u}_i$, if the regime under party i's incumbency continue experiencing sufficiently many consecutive security shocks after which party i's continuation drops below $\hat{u}_i$, power alternation must eventually happen with a positive probability to have joint rule sustained afterwards.

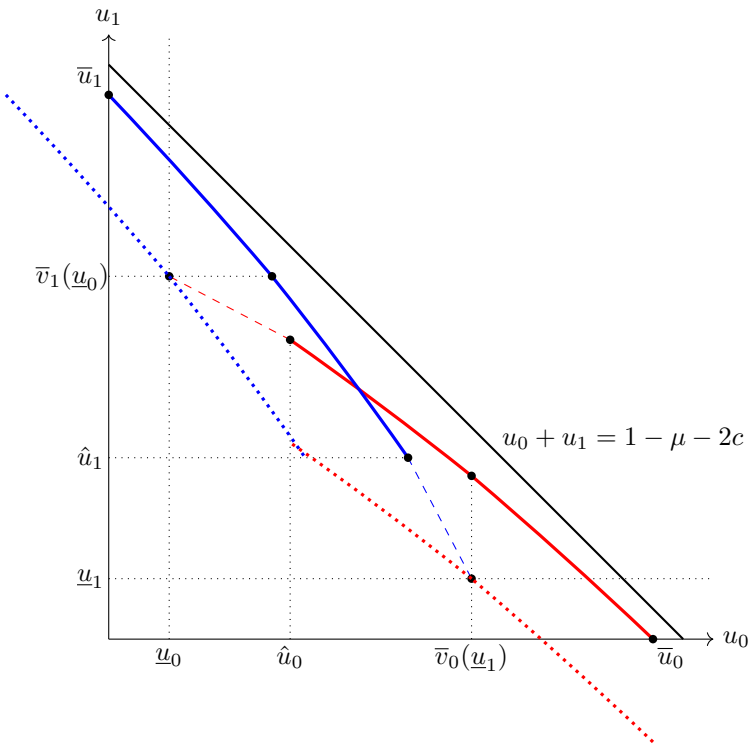


Figure 2: Promise frontiers

The norm of backloaded abdication originates directly from the deadweight loss of power alternation, $k > 0$. If sustaining joint rule necessitates power alternation after a series of consecutive security shocks, it is to the common interest for the two parties to postpone power alternation as much as possible into the future until joint rule can no longer be sustained without it.

The last two points of Theorem 3 are informative about the shapes of the two promise frontiers, as illustrated in Figure 2. In particular, if $\overline{v}_1$ must contain a straight line that connects $(\hat{u}_0, v_1(\hat{u}_0))$ and $(\underline{u}_0, \overline{v}_1(\underline{u}_0))$, while $\overline{v}_0$ must have a straight line connecting $(v_0(\hat{u}_1), \hat{u}_1)$ and $(\overline{v}_0(\underline{u}_1), \underline{u}_1)$. Continuation values on the interiors of these straight lines consist of randomizations that assign positive probabilities on power alternation.

5. Dynamics in efficient equilibria

According to Lemma 2, payoffs of the two parties in an efficient equilibrium always lie on the promise frontier of the current incumbency. Therefore, the equilibrium path of any efficient equilibrium $\sigma \in \Sigma^*$ is fully characterized by the trajectory of a state vector (I, u_I), where $I \in \{0, 1\}$ indicates the current incumbency, $u_I \in [\underline{u}_I, \overline{u}_I]$ indicates the equilibrium payoff of the incumbent, and that of the opposition must be $\overline{v}_{1-I}(u_I)$. Because the incumbent's payoff drops every time it fails to share the promised revenue with the opposition, u_I can be interpreted as the level of *legitimacy* for the current incumbent. The lower the legitimacy, the closer the two parties are to power alternation or the breakdown of joint rule.

5.1. Dynamics within and across incumbencies

First, the dynamics within party i's incumbency, that is, when $I = i$, can be characterized by two functions

$$\chi_i : [\underline{u}_i, \overline{u}_i] \to [0, 1]$$
$$\pi_i : [0, 1] \times [\underline{u}_i, \overline{u}_i] \to [\underline{u}_i, \overline{u}_i]$$

In any period under party i's incumbency, given its current level of legitimacy u_i, party i promises to share $x = \chi_i(u_i) \in [0, 1]$ with party $1 - i$ at the beginning of that period; while at the end of that period, party i expects the continuation value of $\pi_i(x|u_i) \in [\underline{u}_i, \overline{u}_i]$ given the amount of revenue x it actually shares with the opposition and the continuation value of party $1 - i$ is $\overline{v}_{1-i}(\pi_i(x|u_i))$. Second, the transition from party i's incumbency to party $1 - i$'s is characterized by a function

$$\alpha_i : [0, 1] \times [\underline{u}_i, \overline{u}_i] \to [0, 1].$$

At the end of any period under party i's incumbency, given its current level of legitimacy u_i and the amount of revenue it actually shares with party $1 - i$, party i abdicates, so that transition to party $1-i$'s incumbency occurs, with probability $\alpha_i(x|u_i) \in [0, 1]$. At last, with

the "bang-bang" property, it is without loss of generality to characterize $\chi_i(u_i)$, $\pi_i(\cdot|u_i)$, and $\alpha_i(\cdot|u_i)$ for all $u_i \in \mathcal{U}_i$, where for each i,

$$\mathcal{U}_i := \left\{ u_i : (u_i, \overline{v}_{1-i}(u_i)) \in \text{ext}(\overline{\mathcal{E}}_i) \right\}.$$

By definition, $(u_i, \overline{v}_{1-i}(u_i))$ is an extreme point of $\overline{\mathcal{E}}_i$ if and only if $u_i \in \mathcal{U}_i$.

Proposition 3 (Dynamics in efficient equilibria)**.** *For each $i \in \{0,1\}$ and $u_i \in \mathcal{U}_i$ such that $u_i \geq \hat{u}_i$, when party i holds power and has the legitimacy of u_i, then:*

1. *party i promises to share with party $1-i$*

$$\chi_i(u_i) = \min\left\{ \frac{(1-\delta)(1-\mu-c) + \delta\overline{u}_i - u_i}{1-\delta}, 1 \right\};$$

2. *after sharing x with party $1-i$, party i's continuation value is*

$$\pi_i(x|u_i) = \begin{cases} \frac{u_i - (1-\delta)(1-\mu-c)}{\delta}, & x < \chi_i(u_i) \\ \frac{u_i - (1-\delta)(1-\mu-c) + (1-\delta)\chi_i(u_i)}{\delta}, & x \geq \chi_i(u_i) \end{cases};$$

3. *after sharing x with party $1-i$, party i abdicates with probability*

$$\alpha_i(x|u_i) = \max\left\{ \frac{\hat{u}_i - \pi_i(x|u_i)}{\hat{u}_i - \underline{u}_i}, 0 \right\}.$$

On the equilibrium path party i always honors its promise by sharing $x = \chi_i(u_i)$ with the opposition in the absence of any security shock, $\theta = 0$; while in the case when the regime is hit by a security shock, $\theta = 1$, party i shares $x = 0$ and spends all the available revenue on security. Hence, for each $u_i \in \mathcal{U}_i$, it matters only to specify $\pi_i(x|u_i)$ and $\alpha_i(x|u_i)$ for $x = \chi_i(u_i)$ and $x = 0$.

The first two parts of Proposition 3 summarize the dynamics in an efficient equilibrium within each incumbency. First, with a lower level of legitimacy, the incumbent must promise to share a larger amount of revenue with the opposition to sustain joint rule. Formally, $\chi_i(u_i)$ is decreasing in u_i and strictly decreasing if $u_i > \tilde{u}_i$, where for each i,

$$\tilde{u}_i := -(1-\delta)(\mu + c) + \delta\overline{u}_i.$$

Moreover, $\chi_i(u_i) = 1$ for all $u_i \leq \tilde{u}_i$. Hence, when the incumbent has a sufficiently low level of legitimacy, it has to be extremely generous, promising to allocate all the revenue to the opposition, so as to prevent the latter from leaving the regime. Recall that every time

the regime survives through a security shock, the incumbent, if not abdicating, must have a lower payoff and thus its legitimacy declines. Hence, if an incumbency survives through a series of consecutive security shocks, the incumbent's promise to the opposition would grow larger and larger, until the incumbent's level of legitimacy is so low that it has to promise all the available revenue.

Second, incumbent's legitimacy must decline whenever it fails to honor its promise, $\pi_i(0|u_i) < u_i$. However, whenever the incumbent honors its promise, its legitimacy recovers in the next period. Formally,

$$\pi_i\left(\chi_i(u_i)|u_i\right) > u_i$$

holds for all $u_i < \overline{u}_i$. Moreover, $\pi_i\left(\chi_i(u_i)|u_i\right) = \overline{u}_i$ holds for all $u_i \geq \tilde{u}_i$ and is strictly increasing in u_i for all $u_i < \tilde{u}_i$. Hence, the more legitimate the incumbent, the more quickly its legitimacy recovers after honoring its promise. In particular, as long as the incumbent, say party i, has a sufficiently high level of legitimacy, $u_i \geq \tilde{u}_i$, honoring the promise to share $\chi_i(u_i)$ with the opposition would fully restore its legitimacy to the upper bound $\overline{u}_i$. The difference between the risk of losing legitimacy and the prospect of improving it incentivizes the incumbent to share the promised revenue with the opposition when the regime is free from any security shock. The sharper the difference, the stronger the incentive.

The last part of Proposition 3 characterizes the dynamics in an efficient equilibrium across the two incumbencies, provided that power alternation is possible. First, whenever the incumbent honors its promise, it holds onto power regardless of its current level of legitimacy. Formally,

$$\alpha_i\left(\chi_i(u_i)|u_i\right) = 0$$

always holds. This result is implied by the norm of backloaded abdication. In any period in which the incumbent has a sufficiently high level of legitimacy to sustain joint rule, if the incumbent in addition honors its promise, its legitimacy improves and by holding onto power, the incumbent in the next period would have an even higher level of legitimacy to have joint rule sustained. In this case, the norm of backloaded abdication requires the incumbent to hold onto power.

Second, when the incumbent fails its promise, it suffers no risk of losing power if and only if it currently has a sufficiently high level of legitimacy. Formally, $\alpha_i(0|u_i) = 0$ holds if and only if $u_i \geq u_i^\dagger$, where for each i,

$$u_i^\dagger := (1-\delta)(1-\mu-c) + \delta\hat{u}_i = (1-\delta^2)(1-\mu-c) + \delta^2\underline{u}_i.$$

The condition $u_i \geq u_i^\dagger$ is equivalent to $\pi_i(0|u_i) \geq \hat{u}_i$. Hence, like the previous one, this result is also implied by the norm of backloaded abdication. Following the norm, the incumbent, say party i, would not abdicate even after failing its promise if it currently has a very high level of legitimacy, $u_i \geq u_i^\dagger$, so that it would still be able to sustain joint rule in the next period after its legitimacy declines to $\pi_i(0|u_i) \geq \hat{u}_i$.

Third, power alternation occurs with a positive probability when the incumbent currently has a sufficiently low level of legitimacy and fails to share the promised revenue with the opposition. Formally,

$$\alpha_i(0|u_i) = \frac{\hat{u}_i - \pi_i(0|u_i)}{\hat{u}_i - \underline{u}_i} > 0$$

holds for all $u_i < u_i^\dagger$. In this case, the incumbent's continuation value, say $\pi_i(0|u_i)$ for party i, that is necessary to make its promise of sharing $\chi_i(u_i)$ with the opposition credible is too low to continue sustaining joint rule under its own incumbency. Hence, with probability $\alpha_i(0|u_i)$, party i abdicates and the two parties continue to rule jointly under party $1-i$'s incumbency, which begins with the initial legitimacy of $\overline{v}_{1-i}(\underline{u}_i)$. With the complementary probability, party i holds onto power with its legitimacy declining to $\hat{u}_i$, while the two parties continue ruling jointly in the next period under party i's incumbency. However, if a security shock hits again in the next period, party i must abdicate with certainty, as $\alpha_i(0|\hat{u}_i) = 1$.

At last, note that in any period under its incumbency, party i suffers no risk of abdication when its legitimacy is sufficiently high, so that $u_i \geq u_i^\dagger$. At the end of that period, party i is certain to hold onto power regardless of whether there is a security shock. In contrast, in any period party i's legitimacy is sufficiently low, so that $u_i < u_i^\dagger$, its incumbency is vulnerable to a single security shock. If a security shock hits in that period, preventing party i from sharing revenue with party $1-i$, party i must have a positive probability to abdicate. For this reason, we adopt the following definitions to represent vulnerability of an incumbency against security shocks.

Definition 3. With the legitimacy of u_i, party i's incumbency is *hegemonic* if $u_i \geq u_i^\dagger$; otherwise, party i's incumbency is *precarious*.

It takes a single security shock for power alternation to happen under a precarious incumbency, whereas it requires at least two consecutive security shocks to topple a hegemonic incumbency.

5.2. Three ideal types of political dynamics

Here, we consider the scenario when the two parties are homogeneous, $q_0 = q_1 = q$, and when the cost of power alternation is infinitesimal, $k \downarrow 0$. These simplifications allow us to elaborate on the dynamics in efficient equilibria. Depending on parametric values, three ideal types of political dynamics are possible: *stable*, *unstable*, and *stabilizable*. Because the two parties are symmetric, it is without loss of generality to focus on party 0's incumbency.

First, because the cost associated with abdication is infinitesimal, $k \downarrow 0$, persistent joint rule generates a total surplus approaching $1 - \mu - 2c$. As a result, the highest possible level of legitimacy party 0 can possibly have under its incumbency is $\overline{u}_0 = 1 - \mu - 2c$. Hence, party 0's incumbency can possibly be hegemonic if and only if

$$\overline{u}_0 = 1 - \mu - 2c \geq u_0^{\dagger}. \tag{H}$$

When (H) fails, hegemonic incumbency does not exist. In this case, incumbencies are vulnerable to a single security shock: power alternation occurs with positive probability as soon as a single security shock hits. Hence, the political dynamics are *unstable* and each incumbency must be precarious.

Second, consider the period right after party 1 passes incumbency to party 0. Because the total surplus is approaching $1-\mu-2c$ and because party 1 must have the payoff approaching $\underline{u}_1$ right after abdication, party 0's payoff, that is, its level of legitimacy, at the beginning of its new incumbency is

$$u_0^* := 1 - \mu - 2c - \underline{u}_1.$$

Hence, right after power alternation, party 0's new incumbency begins with hegemony if and only if

$$u_0^* = 1 - \mu - 2c - \underline{u}_1 \geq u_0^{\dagger}. \tag{S}$$

Because $\underline{u}_1 > 0$, (S) implies (H). When (S) holds, new incumbencies are hegemonic. In this case, the political dynamics are *stable* in the sense that each new incumbency is invulnerable to a single security shock.

Finally, the most interesting case is when (H) holds but (S) fails. In this case, hegemonic incumbency does exist yet legitimacy at inauguration is low, so that new incumbencies are precarious to begin with but has the potential to stabilize into hegemonies. We refer to this type of political dynamics as *stabilizable*.

Definition 4. Suppose $q_0 = q_1 = q$ and $k \downarrow 0$. Then, an efficient equilibrium features

1. *unstable political dynamics* if (H) fails;
2. *stable political dynamics* if (S) holds;
3. *stabilizable political dynamics* if (H) holds but (S) fails.

First, as illustrated in Figure 3a, under unstable political dynamics, all incumbencies are precarious. Although incumbencies remain unaltered absent any security shock, incumbents must abdicate with positive probabilities whenever hit by a security shock. In this case, an incumbency is always vulnerable to a single security shock regardless of its historical performances. As a result, unstable political dynamics involve frequent power alternations.

Second, as illustrated in Figure 3b, under stable political dynamics, inaugurating incumbents immediately achieve hegemonies right after power alternations. The political dynamics are stable because new incumbencies will not have to abdicate soon even after a single shock, so that power alternations are infrequent. Incumbencies are only vulnerable to security shocks after their levels of legitimacy decline and they become precarious.

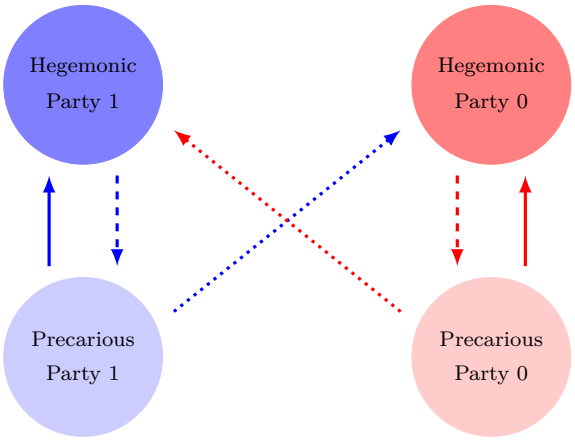
Third, as illustrated in Figure 3c, under stabilizable political dynamics, new incumbencies are precarious but have the potential to establish hegemonies with favorable historical records. Right after power alternation, the new incumbency is *precarious* and is vulnerable: a single shock could force the incumbent to abdicate from its newly achieved incumbency. However, if the new incumbent is fortunate enough to have no security shock around its inauguration, it will gradually build up its hegemony, under which there is no immediate risk of abdication after a single security shock hits. As a result, this political dynamics have cycles between stable phases in which one party firmly holds onto power and unstable phases in which power frequently alternates between the two parties.

What type of political dynamics arises depends on parametric values. In particular, it is determined by the cost of ruling the regime normalized by the expected revenue under joint rule, $c/(1-\mu)$, and the incumbent's need for the opposition's cooperation, (inversely) q. If the cost is larger, the incumbent must transfer more utilities to compensate the opposition's cost of ruling, so that power alternation is more likely to happen and the political dynamics tend to be less stable. If q is smaller, so that the incumbent relies more heavily on the opposition's cooperation to generate revenue, the incumbent can credibly transfer more utilities to the opposition by abdication. Hence, power alternation can be backloaded further, so that the political dynamics tend to be more stable.

Though we can fully characterize the necessary and sufficient conditions for the existence of different types of political dynamics, we focus on the most interesting case in which

(a) Unstable

(b) Stable



(c) Stabilizable

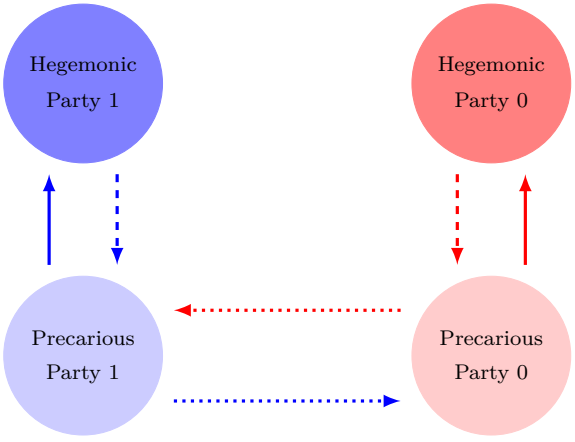


Figure 3: Types of political dynamics

$c/(1-\mu)$ is intermediate. Under these circumstances, all types of political dynamics are possible depending on the value of q. The results are summarized below.

Proposition 4 (Types of political dynamics)**.** *Suppose* $q_0 = q_1 = q$*,* $k \downarrow 0$*, and*

$$\frac{c}{1-\mu} \in \left(\frac{\delta^2}{1+\delta}, \frac{\delta^2}{1+\delta^2} \right). \tag{4}$$

Then, there are $0 < q^s < q^h < q^a < 1$ *such that any efficient equilibrium* $\sigma \in \Sigma^*$

1. *involves no power alternation if* $q \geq q^a$*;*[7]
2. *features unstable political dynamics if* $q \in \left[q^h, q^a \right)$*;*
3. *features stabilizable political dynamics* $q \in \left(q^s, q^h \right)$*;*
4. *features stable political dynamics if* $q \leq q^s$*.*

5.3. Simulating political dynamics

To further illustrate the differences between different ideal types of political dynamics, we simulate our model and depict the dynamics of legitimacy and power alternation. We set $\mu = 0.3$, $c = 0.19$, and $\delta = 0.65$ to satisfy (4). We simulate our model for 25 periods based on our theoretical characterization of the equilibrium dynamics. We show that even under the same initial condition and shock path, different types of political dynamics have distinct patterns. In the following figures, periods under party 0's incumbency are represented by black dots and those under party 1's incumbency are represented by white dots. Moreover, each period that experiences no security shock has a circle shape and each that is hit by a security shock has a diamond shape. Furthermore, periods within a single incumbency are connected by a dashed line.

Figures 4a and 4b represent the two extreme cases regarding the vulnerability of incumbencies. With q set to 0.42, Figure 4a illustrates the unstable political dynamics, where power alternations are frequent and a single shock can force the incumbent to abdicate. With q set to 0.28, Figure 4b represents stable political dynamics. Every incumbency starts with hegemony and power alternation occurs only after at least two consecutive security shocks.

[7] The following inequalities are equivalent: (1) $q < q^a$, (2) $\delta > \delta^*$, and (3)

$$1 - \mu - \left(\frac{1}{\delta} + 1 \right) c > \max_{i \in \{0,1\}} \left(\frac{1}{\delta} \underline{u}_i + \underline{u}_{1-i} \right).$$

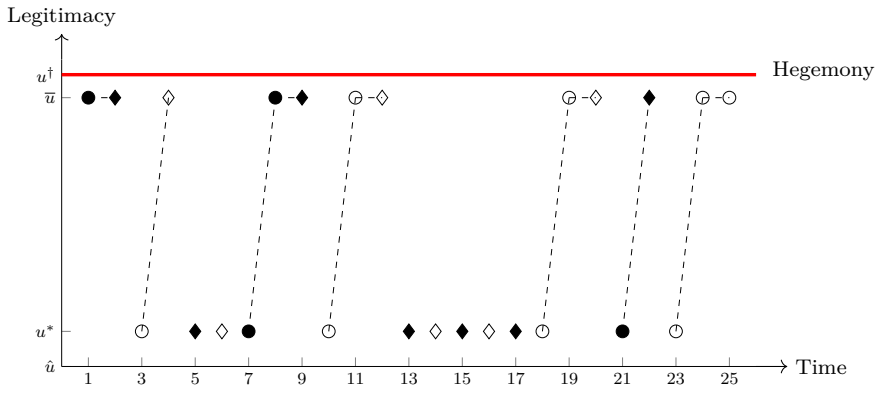
The most interesting case is Figure 4c, where q is set to 0.35 and the political dynamics are stabilizable. Periods 1 to 5 are under party 0's incumbency. The incumbency is hegemonic at the beginning, with no power alternation even after the security shock in period 2. However, after the consecutive security shocks in periods 4 and 5, party 0 loses first its hegemony and then its incumbency. The new incumbency of party 1 is precarious at its inauguration. Hence, party 1 quickly loses its incumbency due to a security shock around its accession. Party 0's new incumbency begins as precarious at the beginning of period 7, but is consolidated into a hegemony after experiencing no security shock in that period. Party 0 loses its incumbency again at the end of period 13 after the consecutive security shocks in period 12 and 13. What follows is an era of instability where no party builds its hegemony and the regime is subject to frequent power alternations. Finally, party 1 acquires incumbency at the beginning of period 18, establishes its hegemony after experiencing no security shock in periods 18, and continues to hold power to period 25. Figure 4c clearly illustrates how hegemony is established and lost, and how power alternation occurs as a result of optimal strategies of incumbents under security shocks.

6. The Whig-Tory alternation in England, 1688-1830

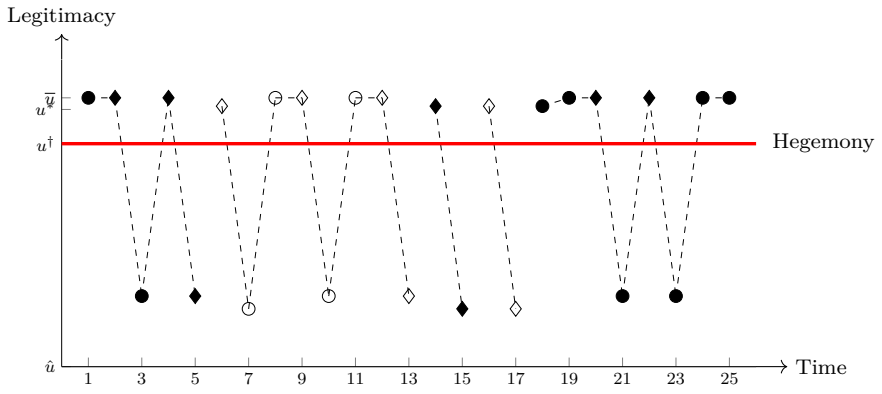
Between 1688 and 1830, Britain's political landscape was increasingly shaped by the Whig and Tory parties. Power alternation was initially uneven in the early 18th century, with the Whigs dominating under Robert Walpole (1721–1742) and beyond, but it became more evident in the late 18th century. Over time, ministries relied more on parliamentary support than royal will, particularly during and after the reign of George III. Meanwhile, elections remained highly restrictive, with most contests settled through elite agreements rather than popular vote. This period saw the entrenchment of political oligarchy, which was reinforced by measures such as the Septennial Act of 1716 and endured until the parliamentary reforms of the 1830s.

In the following, we examine major political shifts in Britain (1688-1830), assessing how well the predictions of our model align with historical developments. We conceptualize Britain during this period as existing in a stabilizable political equilibrium, with power alternations driven by a sequence of exogenously determined security shocks. Specifically, security shocks—particularly Britain's gains and losses in geopolitical competition—remained central to political discourse and the shifting fortunes of high politics, and they could lead to a party losing power, "no matter how hard they tried to insure against adversity, British statesmen knew that any number of strategic wild cards – a diplomatic revolution, a lost battle, the sudden death of a monarch, a palace coup or a

(a) Unstable



(b) Stable



(c) Stabilizable

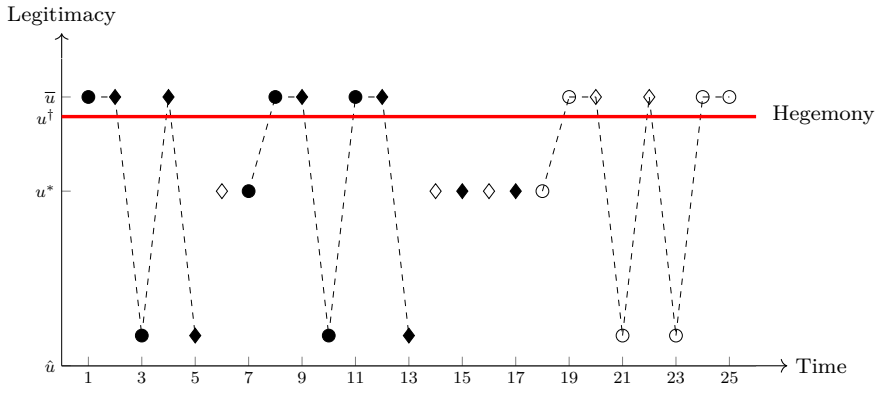


Figure 4: Simulating political dynamics

rebellion – might overturn all their calculations. The price for failure might be loss of power or disgrace... (Simms, 2008)."

Whig rule (1688-1710)[8]. After the Glorious Revolution of 1688, the Whigs emerged as a dominant political force in Britain. The revolution, which brought William III and Mary II to the throne, was largely supported by the Whigs. They were deeply invested in Britain's involvement in European conflicts, particularly the War of the Spanish Succession (1701–1714), aiming to curb French power. The ups and downs of the war sometimes strained Whig legitimacy, but the party avoided consecutive political shocks by securing several decisive victories on the battlefield. This, in turn, enabled the Whigs to maintain political dominance for much of the period. However, as Britain's military fortunes in Europe faltered, the Whigs' political fortunes waned. The protracted conflict eventually became increasingly unpopular in partisan debates. At the heart of Tory criticism was the belief that the Whig ministry engaged in self-dealings by misallocating tax revenues, especially from the land tax, to fund an unnecessary war that primarily served their own private interests. Swift, a Tory-leaning commentator, described the system as "a racket that worked against the Tories' 'landed interest' while enriching the Whigs' 'moneyed interest'—or the fiscal-military complex that sustained the war (Simms, 2008)." These attacks were devastating, as the Whigs found it impossible to disprove the accusations of an alleged plot. Whig ministers were either replaced or resigned, clearing the way for Robert Harley to form a new Tory-led government in 1710. By April 1711, Tory negotiators had settled on the preliminary terms of the Treaty of Utrecht. In sum, the shift of power from the Whigs to the Tories in 1710 was the result of a series of security shocks brought by the Spanish Succession War, which ultimately weakened the legitimacy of Whig rule, bringing it below the threshold necessary to sustain joint rule.

Tory rule (1710-1714). From the model, we know that in a stabilizable political equilibrium, a party's hold on power is precarious at the outset, solidifying only after a sustained period without security shocks. However, the Tories did not have such luck. Their time in office was brief, almost immediately marred by allegations of secretive and corrupt dealings with France in the negotiation of the Treaty of Utrecht. A barrage of accusations followed, alleging that Harley and his associates had "set on foot a private, separate, dishonourable, and destructive negotiation of peace (Article I); that the Duke of Ormonde had been instructed not to press his military advantage in the field (Article VIII); that 'the good friends and ancient allies of Her Majesty and these kingdoms' were

[8]There was a brief period of Tory rule between 1710 and 1714 under Queen Anne, but it is left out of historical analysis and simulations for the sake of simplicity. This should not detract from the main discussion.

abandoned and that the 'Protestant Succession' was endangered (Article X); that he had conspired 'to dispose of the Kingdom of Sicily to the Duke of Savoy' at Austria's expense (Article XIV); that he had misrepresented 'the most essential parts of the negotiations' to the Queen and Parliament (Article XV) (Simms, 2008)." This was again the kind of suspicion of self-dealings, against which the Tories, much like their predecessors, could not effectively defend themselves. Harley faced impeachment in 1715, which destroyed his reputation and influence. Most Tories, including Viscount Bolingbroke, were largely marginalized, especially after the fall of the Tory government following Queen Anne's death.

Whig hegemony (1714-1760). As Plumb (1967) has so ably argued, the first half of the 18th century saw the rise of a stable political order. According to Brewer (1976), "the period of Whig hegemony, and especially the years 1725 to 1754, marked the consolidation of a system designed to ensure political equilibrium and equanimity." These were the halcyon days of oligarchical politics, disturbed only occasionally by security shocks, such as the Jacobite Rebellions (1715, 1719, 1745), the South Sea Bubble Crisis (1720), the War of Jenkins' Ear (1739–1748), and the War of Austrian Succession (1740–1748). These crises posed a threat to Whig rule, but Whig leadership, particularly Sir Robert Walpole, was both fortunate and skilled enough to address individual crises and prevent a consecutive sequence of shocks, thereby maintaining the party's legitimacy above the necessary threshold to sustain joint rule.

Alternating rule (1760-1783). As the global imperial crisis unfolded in the 1760s, Britain found itself in a precarious position, grappling with a series of security shocks stemming from colonial affairs—primarily the aftermath of the Seven Years' War and the growing unrest in America that would later lead to the War of Independence. These conflicts ultimately ended Whig hegemony and triggered a period of political instability, with frequent shifts in power between Whig and Tory in the late 18th century. This suggests that the frequent shocks prevented either party from consolidating its legitimacy and stabilizing its rule, forcing their governments out of office whenever a shock arose. It was only with the signing of the Treaty of Paris (1783) and Britain's formal recognition of U.S. independence that this period finally came to a conclusion, resolving its most pressing security challenge. At the outset, the Whig minister Newcastle resigned after struggling to justify his war policy toward the end of the Seven Years War, amid accusations that it was 'bloody and expensive'—a criticism reminiscent of the War of the Spanish Succession. The subsequent Tory minister Bute remained in office for only a year before resigning due to the controversial Treaty of Paris (1763), which was criticized for conceding too much to France and Spain—a criticism reminiscent of the Treaty of Utrecht. Following Bute's resignation, successive British ministers—including Grenville, Rockingham, Chatham, and

Grafton—attempted to restore British authority in America but failed to overcome colonial resistance. The succeeding Tory minister, Lord North, remained in office for a longer period but eventually resigned in 1782 after a vote of no confidence, following the surrender at Yorktown (1781), which cast doubt on his wartime leadership. After bringing down several other ministries—including those of Shelburne and the Fox-North coalition—the war finally ended with the Treaty of Paris (1783).

Tory hegemony (1783-1830). From 1783 to 1830, the Tories enjoyed a period of "hegemony", even while facing occasional political storms such as the Irish Rebellion (1798), the Napoleonic Wars (1799–1815), and intensifying calls for parliamentary reform. This was likely the result of the strong foundation laid under William Pitt the Younger's leadership, particularly through his substantial fiscal reforms, which ensured that the war effort was properly financed even amid financial strains. These measures helped the Tory Party gain considerable legitimacy and establish hegemony, aided by extended periods without major shocks. As a result, subsequent Tory leaders had the room to manage isolated shocks without jeopardizing their grip on power.

When history meets theory. Several characteristics of British politics during this period are closely tied to the mechanisms outlined in this paper.

First, the ruling party indeed allocates revenue, mainly through the patronage system. It was claimed under the umbrella of Walpolean whiggery, "treasury appointments proliferated under the financial and administrative pressures of war; appointments in the armed forces were increasingly politicised; the diplomatic service, colonial administration and the church were all harnessed to the whig gravy-train (Brewer, 1976)." Moreover, "growing wealth, frequent wars and the acquisition of an empire had created an enormous executive, and thereby enormous powers of patronage for the government. Sectarian and particular interests - notably those of financiers, merchant contractors and stock-jobbers - were tied to administration. Similarly placemen - Treasury officials, members of the diplomatic and colonial services - as well as pensioners, courtiers and members of the armed forces were dependent for at least part of their livelihood upon the good offices of the Crown (Brewer, 1976)."

Second, when security shocks diminish the legitimacy of the ruling party, it often seeks to distribute more benefits to the rival party in order to retain its allegiance to the regime. It had been a common practice in Britain during this period for the ruling party to incorporate members of the opposing faction into key positions in a bid to stabilize its rule during times of crisis. One early instance of this strategy was during Robert Walpole's Whig government in the 1740s. Amid the turbulence of the War of Austrian Succession, Walpole appointed several Tory admirals—such as Sir Cloudesley Shovell and Henry Killigrew—into prominent

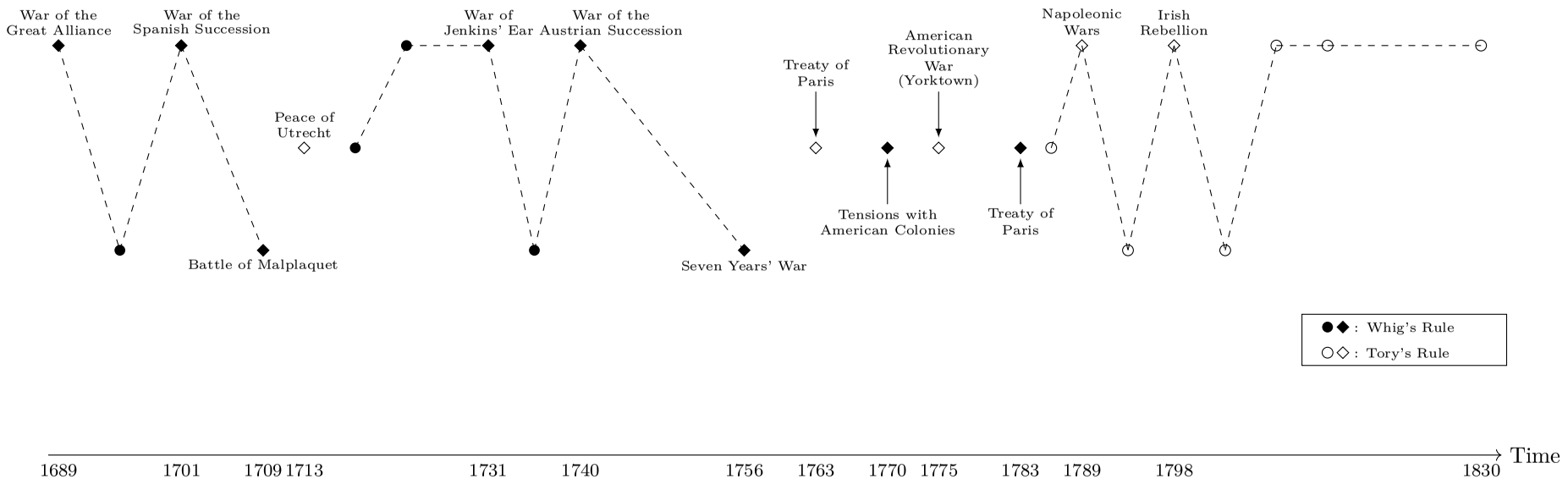


Figure 5: The Whig-Tory Alternation in England, 1688-1830

naval roles, thus bridging the political divide to secure a unified front in defense of Britain's interests. In the 1780s, Lord North's Tory government, reeling from the devastating loss of the American colonies, sought to broaden its base of support by seeking cooperation from Whigs, such as Charles James Fox, a vocal critic of the government's colonial policy. Another notable instance occurred in the early 19th century when the Tory government under King George IV, facing mounting pressure over the issue of parliamentary reform, worked with Whig reformers such as Earl Grey, who later played a key role in passing the Reform Act of 1832.

Third, when a party newly ascends to power, it typically negotiates for the most favorable conditions, often involving the replacement of previous patronage appointees with its own loyal supporters. For example, Brewer (1976) documents how "Pitt's reluctance to deal with anyone but the king, and then only if he was given carte blanche, had finally paid dividends. The king gave him total control over the new administration; he was generalissimo once more." There was also the "so-called 'Massacre of the Pelhamite Innocents,'" which was "the wholesale removal of Newcastle's supporters from office" after Lord Bute became Prime Minister in 1762 (Brewer, 1976). In fact, political purges, while not always sweeping, were a frequent consequence of power transitions, although their prevalence declined as Britain transitioned to a more professional bureaucratic system from the late 18th century onward.

Finally, the very fate of the British state reaches its crescendo during periods of party hegemony, only to decline when neither party commands a strong hold on power. This is because, in a stabilizing political equilibrium, rapid shifts between two parties inevitably lead to a low total surplus, as alternation entails costs; moreover, in this scenario, neither party can sustain itself when a security shock occurs, given their low legitimacy, which, in turn, further hinders them from reclaiming legitimacy and achieving hegemony. For example, historians describe the Alternating Rule Period (1760–1783) as: "The constant changes of ministry, and especially of secretaries of state for foreign affairs, was extremely disruptive... It contrasted sharply with the stability of the early eighteenth century... Just how far Britain had fallen from the pinnacle of 1763 was to become apparent in a series of reversals from 1768... Britain's reputation abroad had never been lower; her colonial possessions never more fractious and exposed; British arms never less successful, except perhaps at the outset of the Seven Years War; conquests never more conspicuously absent; commerce never less synchronized with the war effort; and – above all – Britain's alliance system never before in such a state of complete and terminal disrepair (Simms, 2008)."

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