The Prince - or better no prince?
The strategic value of appointing a successor*

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Abstract

Appointing a successor (the "*prince*") allows the ruler (the "*king*") to alter the structures of conflicts that take place between him and his potential challengers, as well as the structures of conflicts that take place among his potential challengers. Motivated by historical examples and using an infinite horizon rulership competition game, we show that while an appointed prince constitutes a powerful and dangerous threat to the incumbent ruler (the *elevated threat effect*), the appointed prince can also offer the incumbent ruler increased protection against other potential challengers (the *barrier effect*). We determine conditions when the overall effect of appointing a successor benefits the incumbent ruler and enables him to acquire a larger share of the governance rent in equilibrium.

Key words: coup, ruler, governance rent, successorship regimes.

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1 Introduction

"The king is dead, long live the king!" In a number of countries this proclamation was used to announce the death of the incumbent king and the immediate successorship by a previously designated prince. It hints at an important dimension of a wide range of governance structures, whether they are kingdoms, dictatorships or other autocratic regimes, democratic regimes, or even companies in the business world. The immediate succession of rulership in many of these contexts is assigned to a designated successor: a 'prince.' This paper studies when it is beneficial for a self-interested incumbent to have a prince than not having a prince. We also study how the appointment of a prince affects the rent captured by the incumbent, the appointed prince, and potential challengers to the rulership.

Appointing a prince allows the incumbent (the 'king') to alter not only the structures of conflicts that take place between him and his potential challengers, but also the structures of conflicts that take place among his potential challengers.[1] The later include those conflicts that only take place after the incumbent's "death." The incumbent cares about the structures of those conflicts that take place after his death, and this is true even for an incumbent who has no concern about his legacy but is only motivated to maximize the rent he can capture during his rulership. Even for a self-interested incumbent, the structures of future conflicts for succession among the elite after his death matter because such structures affect potential challengers' incentives to revolt against him. Appointing a prince changes the potential challengers' strategic calculus regarding revolting. This affects the rent that the incumbent has to give them to discourage them from revolting.

More specifically, appointing a prince has two main effects. First, the prince constitutes an additional hurdle for contenders who aim at taking over the power from the incumbent. Appointing a prince may stabilize the regime of the incumbent, as the existence of a prince makes it more difficult for a member of the elite to replace the incumbent. Second, the appointment of an heir apparent places the prince in an elevated position: a position which makes a coup easier for the prince than for one of the many contenders. In case the incumbent leader dies or is removed, the prince is the natural successor. Hence, a prince offers increased protection against the rest of

[1]For simplicity, we shall use male pronouns instead of the more precise expression "he/she"to refer to the ruler.

the elite (the *barrier effect*), but the prince himself becomes a powerful and potentially dangerous contender (the *elevated threat effect*).

The difficulties for the incumbent leaders to defend their elevated position to avoid "political death"–or even physical death–is well illustrated in autocracies. Eisner (2011) analyzes a large database on major monarchies in Europe ranging from AD 600 to 1800. He finds 219 sure or likely regicides, which was about 15 percent of all deaths. In about 40 percent of these regicides one of the members of the group associated with the assassination became the king. Eisner points out that this regicide rate is higher than any historical estimates of homicide rates in Europe's general population during this time period. This regicide rate is also higher than the homicide rate in Ciudad Juarez in Mexico, which is one of the most murderous cities in the contemporary world. Eisner concludes that European kingship prior to the Industrial Revolution was "amongst the most dangerous occupations found anywhere in the world" (Eisner, 2011, p.564), and also speculates about a possible relationship between violent conflict and succession rules (Eisner 2011, p.572). Similarly, Svolik (2012, p. 4n.) considers a database of 316 authoritarian leaders governing some time during 1946 and 2008, and finds that 205 of these were removed by insiders by coups and other non-constitutional means.

Aspects of the incumbents' violent struggle for power have been described in many important papers in economics (see, e.g., Stephan and Ursprung (1998), Azam (2002), Azam and Mesnard (2003), Mehlum and Moene (2004), Acemoglu et al. (2009), and Virág (2009)). The 'king' and his 'dukes' are not just rival enemies, however. Some collaboration between them is necessary for the provision of elementary governance tasks. An incumbent needs the support of his powerful subordinates against external threats, as well as in the protection of property rights, the provision of other essential public goods, and the smooth operation of the governance system that yields tax revenue and keeps the ruler in power. This suggests that support and collaboration between the incumbent and the elite yields a positive governance rent, and also creates a distributional conflict between the incumbent and his elite.[2] In compensation for their continued support, the incumbent may share the spoils of rulership. In their pioneering work on political survival and the mutual dependency between a ruler and

[2]Machiavelli (1988, p.82) observed that "a prince who is not himself wise cannot be soundly advised, unless he happens to put himself in the hands of a man who is very able and controls everything. Then he could certainly be well advised, but he would not last long, because such a governor would soon deprive him of his state."

the 'selectorate'–the group of players who have the power to support or replace the incumbent–political scientists Bueno de Mesquita et al. (2002, 2003) argue that it is these returns on their support that makes the elite willing to lend their support, rather than trying to replace the incumbent.

The simultaneous existence of collaboration and competition between the incumbent and the elite applies to both autocracy and democracy, to party leaders and their high-ranking party officers in democracy. Many aspects of this interaction and the role of institutional differences have been studied by now. Flores (2009) applies the selectorate theory to study empirically the political survival of foreign ministers. Egorov and Sonin (2011) study the trade-off between loyalty and competence of persons in key positions. Competence helps stabilizing the regime and defending it against external threats. But a more competent deputy is also a threat to the incumbent. We abstract from external threats in this paper, but focus on the competition between rival members of the elite who may wage a coup. Flores and Smith (2011) focus on how regime differences affect the hiring and firing of ministers by the leader. Bueno de Mesquita and Smith (2009) apply the selectorate theory to study the implications of revolutionary threats for institutional change. Bueno de Mesquita and Smith (2014) discuss and compare various types of threats to the incumbent's power. Sekeris (2011) considers a ruler's choice of supporters from a heterogeneous set of individuals, how the ruler can use this choice to enhance his own rent, and how this choice depends on the ruler's strength. Francois et al. (2014) pursue related questions focusing on the role of the experience of subordinates, where higher experience may increase their ability to stage a coup. Che et al. (2014) study a model of leader accountability in which the leader's own decision regarding whether to perform or to embezzle affects his ability to use the prize of eventual promotion to leadership to discourage his subordinates from embezzling. These considerations may also apply to private governance structures, such as the relationship between CEOs and their immediate subordinates.[3]

In both economics and political science, scholars have recently emphasized that while the literature on autocratic performance and autocratic stability traditionally focuses on the threat of popular revolts, more attention needs to be devoted to the importance of violent conflicts between the incumbent leader and the elite in determining

[3]See Zhang and Rajagopalan (2010) for a discussion of the interaction of CEO and CEO-in-waiting in firms.

regime stability and performance.[4] Despite the fact that succession arrangements are critical in shaping the interaction between the incumbent leader and the elite as well as among the elite, to our knowledge, this paper is the first contribution that formally analyzes how the incumbent can strategically choose succession arrangements to maximize his life-time rents in a dynamic model of mutual collaboration and competition between the incumbent and the elite.

Our analysis will be cast in terms of interactions between the "king," his "dukes" and the "prince." The insights obtained from our analysis regarding how the incumbent balances the trade-off between the elevated threat effect and the barrier effect when making succession decisions, however, are also relevant for other settings characterized by simultaneous collaboration and competition between the incumbent and his powerful subordinates. These include, for example, interactions between party leaders and their high-ranking party officers in democracy, between CEOs and their immediate subordinates in firms, and between leaders and their subordinates in other organizations such as unions and possibly even criminal and terrorist organizations.[5]

The fact that strategic considerations in conflicts surrounding succession are impor-

[4]Drawing from Bueno de Mesquita et al. (2003), Besley and Kudamatsu (2008) present empirical evidence that effective threats by the powerful selectorate to remove ineffective leaders lead to stronger performance in autocratic regimes. Acemoglu et al. (2010) emphasize that the military can help the leader maintain power but can also pose a threat to his rule. In political science, besides the pioneering work by Bueno de Mesquita et al. (2002, 2003), Magaloni (2008) and Svolik (2009, 2012) recently study power sharing, and Svolik (2012) also emphasizes that a dictator, when deciding how much resources to give to the military, balances the need to use the military to suppress popular revolts and the need to reduce the threat of a military coup. A related emerging literature examines how intraelite conflict leads to democratic transition. For example, Lizzeri and Persico (2004) and Llavador and Oxoby (2005) articulate related but different mechanisms regarding how conflict of interest within the elite led to franchise extension. Fleck and Hanssen (2013) show that intraelite conflict in Greek *poleis* led to the emergence of tyranny, and the tyrant's rule, through growth-promoting policies, laid the foundation for transition to democracy.

[5]Leeson (2007, p.1050) observes that the internal governance of criminal organizations has received relative little attention in the literature on criminal organizations, and presents an analysis of the internal organization of pirates. His focus, however, is not on the question of succession. Gambetta (1993, p.283n13) observes that an appointed successor can pose a threat to the boss of a mafia and reports examples of succession warfares in mafia (p.282n10). Price (2012, p.19) argues that leaders of terrorist groups know that they "live and die by the sword," and their concerns for possible coups against them make them reluctant to "provide subordinates with the knowledge and skills to run the organization in their place". This makes succession problem particular severe in terrorist organizations.

tant in shaping societal and organizational governance has been recognized by scholars in many fields. The political scientist Herz (1952, p.30) refers to the "crown-prince problem": To install a crown prince may come along with a transfer of authority, and a strong crown prince may challenge the king even prior to natural death or voluntary demise. Reflecting on succession arrangements in different societies, the anthropologist Goody (1966, p.2) argues that succession conflicts "may loom so large that some societies, both monarchies and party systems, refuse to name a successor lest he should be tempted to succeed too soon." The economist Tullock (1987, p.151) argued that if a dictator formally appoints a successor, "this gives the successor both strong motives for assassinating him and reasonable security that he will get away with it." In her study of successions in the Song dynasty in China, the historian Ebrey (2006, p.54) observes that both emperors Taizong and Zhenzong were reluctant to name an heir, and argues that this reluctance reflected a deep understanding by these rulers that "the appointment of an heir apparent would change the political dynamics of their court." Students of corporate governance have also emphasized that the threat of challenges by insider senior executives against the CEOs–especially challenges by potential successors–is important in affecting the functioning of firms (Ocasio, 1994; Shen and Cannella, Jr., 2002). The economist Congleton (2011, p.62) suggests that founders of business organizations and political regimes often adopt organizational practices that make themselves irreplaceable, so as to avoid their removal. Such tactics imply that the exit or death of the founder often leads to crisis for the organization or the regime.

Using an infinite horizon rulership competition game, we analyze how appointing a prince changes the structure of rulership contests among possible contestants, and how this feeds back and determines the division of rents for the incumbent. In particular, we ask if the appointment of a prince increases the incumbent's payoff. A prince is defined here as a designated successor in case of the incumbent's death or removal from power. The existence of a designated successor changes the elite members' incentives for a coup. The coup may become more attractive for the designated prince and less attractive for other members of the elite. In turn, this changes the equilibrium distribution of rents. Our key question is if and when the appointment of a prince is in the interest of the incumbent and stabilizes his regime. We show that under both the princeless regime and the regime with a prince, the total probabilities of success in a coup are proportional to the payments that are required to make such a coup unattractive. This implies that the incumbent's rent in the regime with a prince is

higher than in a comparable regime without a prince if the sum of the probabilities of success in a coup is smaller in the regime with a prince. Whether this condition holds depends on the institutional environment and technological conditions.

The literature on succession discussed above clearly recognizes that a successor can pose a threat to the incumbent, and there is also some recognition that appointing a successor can "change the dynamics" among the elite. To our knowledge, however, this paper is the first that articulates the barrier effect as an illustration of how appointing a successor can change the dynamics among the potential challengers to the incumbent. Our analysis also highlights the hitherto neglected insight that even a self-interested leader who does not care about his legacy per se has the incentive to use succession decisions to manipulate the structures of succession conflicts among the contenders for the rulership, because the structures of conflicts after his death can still affect the rent that the incumbent can capture during his lifetime.

Our formal analysis focuses on the trade-off between the barrier effect and the elevated threat effect and how it affects the king's rent in equilibrium. The rationale for appointing a prince may, of course, have many further dimensions. After presenting our analysis, we discuss how our model can be extended to deal with some other dimensions of the succession problem.

2 The formal structure

We consider an infinite horizon rulership game. There is a large set $\mathcal{K}$ of players. At the beginning of each period t there are $n+1$ players who are potentially active in this period: one king and n dukes or one king, $n-1$ duke and one prince. Whether or not there is a prince distinguishes two regimes which we analyze first separately and compare the outcomes subsequently. Players are infinitely lived. All players are identical in their preferences along all dimensions, but in each period only these $n+1$ players are assigned to roles in which they can potentially make active choices. All other players are inactive. Some of these inactive players have been dukes, kings, or princes, or a combination of these roles in previous periods, and will never be active in the future. As will become clear, one or more players in a given period may suffer a permanent loss of their status as king, prince or duke and exit for the rest of the time horizon. All players who have never been in the role of a king, a prince or a duke previously are in the 'replacement set'. Players who are not currently king, prince or

duke in a given period cannot make any decision and receive a period payoff of zero in this period. If, in the ongoing period, a duke or the king or a prince are forced to exit, the replacement set is used to make random draws from this set to replace these players for the next period.

2.1 The princeless structure

Consider first a governance structure without a prince. One of the players is the incumbent ruler at the beginning of any given period $t = 1, 2, ...$ We refer to this player as the incumbent in t and denote this player R_t. Further, there are n dukes at the beginning of each current period, and the set of these is $\mathcal{S}_t \equiv \{S_{1t}, S_{2t}, ..., S_{nt}\}$. Possible actions and their sequencing in each period t is as follows. First, the king firmly commits to pay identical and non-negative shares s_t in the total governance rent to each of the n dukes in the current period.[6,7] We limit the per-duke share to $s_t \in [0, \frac{1}{n}]$, as the king cannot pay more than the governance rent. Next, we assume that one of the ex ante identical dukes is determined at random to have an opportunity to revolt. We denote S_{it} the duke who is selected in period t.[8] Duke S_{it} chooses $\eta_{it} \in \{0, 1\}$,

[6]Similar short-term commitment is also assumed, for instance in contract theory, when principals offer a contract menu and stick to it even though once the agent has made a (type-revealing) choice, the principal has the incentive to renege from the original offers. It is also assumed in the related work by Konrad and Skaperdas (2007). Short-term commitment cannot be taken for granted, but is intuitively more plausible than commitment on a contract that lasts for many periods.

[7]It is possible to allow for a set of heterogeneous shares and to discuss a whole set of possible types of collective decision-making inside the group of supporters. For instance, if the decision to challenge the ruler must be taken by majority voting, the ruler may choose to give only to a subset of supporters. However, this is a different line of research which we do not pursue here.

[8]The randomness of revolt opportunities is borrowed from related work on revolt against political leaders by Acemoglu et al. (2004) and Francois et al. (2014). If periods stretch over time, it seems natural that the course of events may open up revolt opportunities for different dukes at different times. For example, suppose all the jurisdictions of the dukes have equal distance to the capital, and also have the same probability distribution regarding weather conditions. Although the dukes are ex ante identical, ex post, random events– such as the random draws from the distribution of the weather conditons that affect the road condition from each jurisdiction to the capital–may determine which duke has the cacpacity to launch an attack on the capital. An alternative justification may come from the theory on endogenous timing by Hamilton and Slutzky (1990). In a previous version of this paper available upon request, we consider a model in which two dukes simultaneously decide whether to revolt. This requires the consideration of multiple equilibria including a mixed strategy equilibrium,

where $\eta_{it} = 1$ denotes the decision to revolt and $\eta_{it} = 0$ the decision not to revolt.

If duke S_{it} chooses $\eta_{it} = 0$ the economy stays peaceful in the respective period, a governance rent of size 1 accrues and is distributed between the king and his dukes according to the announced shares. The king receives $1 - ns_t$, and each duke receives s_t. This then ends period t and period $t + 1$ starts, without any change in the identity of the king, or in the identity of the dukes.

If duke S_{it} chooses $\eta_{it} = 1$, the revolt destroys the governance rent in the respective period. Nothing can be distributed between the king and the dukes in the respective period. The revolt is successful with probability f^N. This, and all similar revolt success probabilities are exogenous and intertemporally invariant.[9] In case of success the king is removed and receives a zero payoff in all future periods. The revolting duke becomes the king at the beginning of the next period. And a new duke is drawn from the replacement set. If the revolt is unsuccessful, the revolting duke is dismissed and receives zero payoff from then on. The non-revolting dukes remain in place independent of the outcome of the revolt.[10] With probability $1 - f^N$ the coup fails. The revolting duke is dismissed and replaced.

Players who are active in a given period may condition their actions on different own or others' actions in the past, and also on the identity of players in the different roles at different times, and this may lead to a whole wealth of possible equilibrium interaction outcomes. For each period t, we could outline the full history of the game and define strategies that could be dependent on aspects of this history. We limit the analysis to stationary Markov perfect strategies: this is, we analyze a game in which we constrain the local strategies of players to be functions of players' own current status

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but the payoffs in Proposition 1 below can again be supported in equilibrium. We are grateful to a reviewer, whose helpful suggestion that we should adopt a sequential-move structure because it will make the princeless regime and the regime with a prince more comparable and simplifies the analysis, inspired us to adopt this current assumption.

[9] In Section 4, we consider endogenous revolt success probabilities in a two-period variant of our model. Also, rulership regimes may follow life-cycle patterns, as discussed in Francois (2014). This issue is interesting, but tangential to the main focus of our analysis.

[10] We borrow this assumption from Konrad and Skaperdas (2007) in their 'conclave regime'. The evidence from ancient imperial Rome as well as for ancient imperial China is that non-revolting dukes need not lose their elevated position in the course of a revolt. As we shall discuss in Section 4 below, the experience of the rule of the Chinese Communist Party was that the paramount leaders survived all political conflicts, and it was the prince (the designated successor) who perished.

(as incumbent ruler, as a duke who has an opportunity to revolt, or one of the other dukes) and of actions taken in the current period by other players. That is, a player's local strategy at a period t depends on the player's role in this period and of other players' actions taken in this period. If the player i is inactive in that period (member of the replacement set, or a replaced king or duke, or a duke without the opportunity to revolt), the choice set is empty. If the player is the incumbent king, his local strategy is a choice of $s_t \in [0, \frac{1}{n}]$. If the player is the 'active' duke with an opportunity to revolt, his local strategy at period t is a function $\eta_{it}(s_t) : [0, \frac{1}{n}] \to \{0, 1\}$. Note that this setup also includes a stationarity property: for instance, the set of local strategies of an incumbent at period t is the same as the set of local strategies of the player who is the incumbent king at period $t + k$.

Players' expected payoff in the current and all future periods is the sum of all discounted expected period payoffs and depend on their and the other players' actions and on the possible random outcomes in coup-periods. We denote the discount factor $\delta \in (0, 1)$ and assume that all players use the same discount rate.

We show the following proposition:

Proposition 1 *The princeless regime has a peaceful Markov perfect equilibrium (MPE) in stationary strategies with payments to each duke in each period of*

$$s_t = s^N \equiv \frac{\delta f^N}{1 + n\delta f^N} \tag{1}$$

The king's rent per period in this equilibrium is

$$r^N = \frac{1}{1 + n\delta f^N}. \tag{2}$$

Proof. Consider the following candidate for a stationary Markov-perfect equilibrium: the king offers $s_t = s^N$ as in (1) for all t. The active duke chooses not to revolt if $s_t \geq s^N$ and chooses to revolt if $s_t < s^N$.

To confirm optimality of these strategies we make use of the one-stage deviation principle.[11] Assuming that all players choose actions according to the candidate equi-

[11] Using Theorem 4.2 in Fudenberg and Tirole (1991, p.110) the one-stage-deviation principle can be applied here if the game is continuous at infinity. For this condition we need to consider the present value of payoff differences that can result from strategies that differ only after period t. We need to confirm that the supremum of these differences converges to 0 as $t \to \infty$. By construction, any player's period payoff cannot exceed 1 and cannot fall short of 0. Accordingly the present value of the supremum falls short of $\delta^t/(1-\delta)$ and $\lim_{t\to\infty}(\delta^t/(1-\delta)) = 0$.

librium in all future periods $t+1, ...$, we consider payoffs that emerge for possible local deviations from equilibrium play in period t.

First, consider the active duke S_{it}. He compares his payoff

$$s_t + \delta \frac{s^N}{1-\delta} \tag{3}$$

from $\eta_{it} = 0$ with the expected payoff from $\eta_{it} = 1$, which is

$$f^N \delta \frac{(1 - ns^N)}{1-\delta}. \tag{4}$$

We find that $\eta_{it} = 0$ is optimal if and only if $s_t \geq s^N$.

Second, consider R_t. Again, we use the one-stage deviation principle. Taking candidate equilibrium play of dukes in the period subgame as just described, and equilibrium play of all active players in future periods into account, any $s_t > s^N$, even though it will prevent revolt, is dominated by $s_t = s^N$. The alternative to $s_t = s^N$ which has the highest period payoff among all alternatives other than $s_t = s^N$ is $s_t = 0$. This choice will trigger $\eta_{it} = 1$. The present value of expected payoff from $s_t = 0$ as a possible deviation from the candidate equilibrium is

$$\delta(1 - f^N) \frac{1 - ns^N}{1-\delta} \tag{5}$$

For any $s^N < (1/n)$ these values are smaller than $(1 - ns^N)/(1 - \delta)$ - the present value of rulership in the candidate equilibrium. Hence, there is no optimal individual deviation from the local strategy in the candidate equilibrium for both the king and for the dukes if $ns^N < 1$. As

$$ns^N = \frac{n\delta f^N}{1 + n\delta f^N} < 1 \tag{6}$$

this condition holds.

The king's rent is $r^N = 1 - ns^N$ in each period. Inserting the equilibrium value (6) and simplifying yields (2). This completes the proof. ■

Proposition 1 describes a peaceful MPE in stationary strategies for a regime without a prince. It can be shown that there does not exist any peaceful MPE in stationary strategies in which the king offers a share to each duke that is lower than s^N.[12] Furthermore, note that $r^N > s^N$: the king is always better off than each duke in the equilibrium.

[12]Suppose a stationary peaceful MPE exists for which the share given to each duke is $\hat{s} < s^N$. In

The MPE in Proposition 1 has intuitively plausible properties. The rent allocation is determined by the dukes' threats, i.e., by the success probabilities of revolting. Discounting matters. The king's period rent is positive and is smaller if the future is more important, i.e., for a higher δ. The extreme case reveals the intuition. For $\delta = 0$ it is not worthwhile to revolt, even if s_t is negligible, because this reduces payment in the current period to zero and, for $\delta = 0$, whatever could be gained in the future, is discounted to zero.

2.2 The regime with a prince

We now consider a governance structure that is identical to the baseline structure, except for the modification which is at the focus of our research: starting with an incumbent king and n dukes, the king can give one of the dukes a special and recurrent role and appoints this duke as his designated successor, or, borrowing from the terminology used in monarchies, a 'crown prince' (hereafter simply 'prince'). The existence of the prince changes the game in each period, as the prince is the natural successor for a king who is replaced, and the prince is also in an elevated position that may allow him to organize a coup in any period. This framework gives the prince a pole position, should some misfortune happen to the king.

Compared to the case when he was a duke, the prince's elevated status can make it easier for him to succeed in launching a coup against the king. Furthermore, when he succeeds he is in the position to get control of the king's resources which may give him a strategic advantage when facing a possible challenge by a duke. These effects make the prince a more dangerous adversary for the incumbent than a duke. We shall

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this case, an active duke's payoff if not revolting is

$$\hat{s} + \delta \frac{\hat{s}}{1-\delta} < s^N + \delta \frac{s^N}{1-\delta}.$$

As

$$s^N + \delta \frac{s^N}{1-\delta} = f^N \delta \frac{1 - n s^N}{1-\delta}$$

by the definition of s^N, this implies

$$f^N \delta \frac{1 - n s^N}{1-\delta} > \hat{s} + \delta \frac{\hat{s}}{1-\delta}.$$

The duke thus has an incentive to revolt, and this contradicts the claim that the MPE with compensation shares $\hat{s}$ is peaceful.

refer to this as the *elevated threat effect* when the king appoints a prince. At the same time, because the prince possesses a pole position, even if a duke who is not elevated as the prince succeeds in eliminating the king, the prince can become the king and will be armed with the king's resources when engaging in conflict with a revolting duke. This implies that a revolting duke now needs to eliminate the king and the prince, and the prince now constitutes an additional barrier. This barrier effect makes it more difficult for a duke to become a king, and reduces the duke's threat. We are interested in comparing these two effects and in determining conditions under which one effect dominates the other.

More precisely, the differences in the set-up compared to the no-prince section is as follows. The king chooses (p_t, s_t). The component p_t is the share in period t's governance rent offered to the prince. Each of the $n-1$ dukes is offered a share s_t. These shares are, again, firmly committed and paid at the end of the concurrent period. The prince chooses not to revolt ($\eta_{pt} = 0$) or to revolt ($\eta_{pt} = 1$). If the prince revolts, this destroys the governance rent in period t completely. Then one of the dukes is chosen at random to have the opportunity to revolt. This 'active' duke S_{it} chooses between $\eta_{it} = 0$ and $\eta_{it} = 1$. If $\eta_{pt} = 1$ and/or if $\eta_{it} = 1$ this again destroys the governance rent in period t . The governance rent is positive and equal to 1 if $\eta_{pt} = \eta_{it} = 0$.

If the prince revolts ($\eta_{pt} = 1$) this revolt is successful with probability π_p and unsuccessful with probability $1 - \pi_p$. If the prince is not successful, the prince will be removed and replaced by a new prince at the beginning of the next period; if the prince is successful, the prince replaces the king and the former king is replaced for the current and all future periods. Hence, an attack by the prince leads to a situation in which there is a king or a designated king but no prince for the remainder of the period. This may seem an opportunity for the active duke, as he has to overthrow only one player, rather than two, in order to get a chance to succeed as the incumbent king in the next period. Should a prince who overcame the incumbent king be attacked by the duke, in analogy with the princeless regime we denote the probability that the duke overcomes the prince in this attack as f^N, assuming the same technology as between a duke and a king in the princeless framework. We define $f_p = \pi_p(1 - f^N)$. This is the probability by which a prince's revolt is eventually successful and by which the prince becomes the new incumbent ruler in period $t + 1$. This reflects the fact that if the prince challenges the incumbent in period t, and, if this challenge is successful, the

prince will be attacked by the duke in the same period t.

If the prince does not revolt, the active duke decides whether to revolt. A successful coup by the active duke requires a removal of both the king and the prince. We assume that the duke's revolt either removes both the king and the prince or none of them. If the coup fails, the king and the prince stay in office, but remove the duke and replace him by a new one. If the coup succeeds, then the duke becomes the new king, and this king draws a new prince and a new duke from the replacement set. We denote the probability of the revolting duke to succeed in this coup as f_s. All inactive dukes keep their position for the next period.

Again, we could describe histories for each player and behavioral strategies more formally, but for brevity we abstain, as we impose Markov restrictions on local strategies. We can state the following proposition:

Proposition 2 *A regime with a prince has a peaceful Markov perfect equilibrium in stationary strategies with payments to the prince of*

$$p_t = p = \frac{\delta f_p}{1 + (n-1)\delta f_s + \delta f_p} \tag{7}$$

and to each duke of

$$s_t = s = \frac{\delta f_s}{1 + (n-1)\delta f_s + \delta f_p} \tag{8}$$

in each period if $f^N > f_s$. Moreover, the king's per-period rent in this equilibrium is

$$r = \frac{1}{1 + (n-1)\delta f_s + \delta f_p}. \tag{9}$$

Proof. Consider the following candidate for a stationary Markov-perfect equilibrium: The king offers $(p_t, s_t) = (p, s)$ as in (7) and (8) in all periods. When $p_t \geq p$ and $s_t \geq s$, both the prince and the active duke will not revolt. When $p_t < p$ or $s_t < s$, both the prince and the duke will revolt.

We make use of the one-stage deviation principle again. Consider first the active duke S_{it}'s decision for given offers s_t and p_t if $\eta_{pt} = 0$. The payoff from $\eta_{it} = 1$ is

$$f_s \delta \frac{1 - p - (n-1)s}{1 - \delta}$$

and the payoff from $\eta_{it} = 0$ is

$$s_t + \delta \frac{s}{1 - \delta}.$$

The $s_t = s$ that equalizes these present values is

$$s = \frac{(1-p)\delta f_s}{1+(n-1)\delta f_s}. \tag{10}$$

Given the perspective of playing the peaceful candidate equilibrium in all future periods, if $\eta_{pt} = 0$ the choice $\eta_{it} = 0$ is optimal only if $s_t \geq s$.

Turn next to the optimal choice η_{it} if $\eta_{pt} = 1$. Either the prince was successful and replaced the king, or the prince was unsuccessful and was removed, but not replaced in the ongoing period. In either case the duke revolts against one player only: the incumbent king, or the former prince who just became the king. The probability that the duke is successful in replacing this player is f^N. Let

$$f^N > f_s,$$

which says that it is easier to overthrow a single incumbent king than to overthrow an executive government consisting of an incumbent and a prince.

When $\eta_{pt} = 1$, if the active duke revolts when facing an executive government that consists of a single incumbent king now, his payoff will be $f^N \delta \frac{1-p-(n-1)s}{1-\delta} > f_s \delta \frac{1-p-(n-1)s}{1-\delta}$. We know, however, from the above discussion regarding the active duke's decision for given offers s_t and p_t when $\eta_{pt} = 0$, that $f_s \delta \frac{1-p-(n-1)s}{1-\delta} = s + \delta \frac{s}{1-\delta}$ (which reflects the fact that s is such that it makes the active duke indifferent between revolting or not revolting when the prince does not revolt). Note that when $\eta_{pt} = 1$, the governance rent in period t is zero . Thus, if the duke revolts when facing a single incumbent king, regardless of the value of the offered share s_t in this period, the duke will get a zero payoff in the current period and will therefore get a payoff of $\delta \frac{s}{1-\delta}$ by not revolting.

Combining these observations, the active duke chooses $\eta_{it} = 1$ if $\eta_{pt} = 1$ as

$$f^N \delta \frac{1-p-(n-1)s}{1-\delta} > f_s \delta \frac{1-p-(n-1)s}{1-\delta} = s + \delta \frac{s}{1-\delta} > \delta \frac{s}{1-\delta}.$$

We take this into consideration when we now return to the choice of the prince, as the active duke's revolt is what a prince expects to happen if the prince challenges the incumbent. The prince observes (p_t, s_t) and chooses η_{pt}. The size of p_t obviously matters, but s_t is important for the prince, too. This s_t guides the behavior of the active duke in case the prince did not revolt.

Consider first the case $s_t \geq s$, for which the active duke does not revolt if the prince did not revolt. If the prince revolts, his payoff is

$$\delta f_p \frac{1-p-(n-1)s}{1-\delta}. \tag{11}$$

This anticipates that the revolt destroys the governance rent in period t and makes the duke revolt, for whatever s_t was promised. If the prince accepts p_t, the duke will not revolt given that $s_t \geq s$, and the prince has a payoff from accepting of

$$p_t + \delta \frac{p}{1-\delta}.$$

Accordingly, the prince will not revolt if

$$p_t \geq p = \delta f_p \frac{1-(n-1)s}{1+\delta f_p},$$

and revolts otherwise. Inserting this p into (10) and solving for s yields

$$s = \frac{\delta f_s}{1+(n-1)\delta f_s + \delta f_p} \text{ and } p = \frac{\delta f_p}{1+(n-1)\delta f_s + \delta f_p}$$

We have shown that if $p_t \geq p = \frac{\delta f_p}{1+(n-1)\delta f_s+\delta f_p}$ and $s_t \geq s = \frac{\delta f_s}{1+(n-1)\delta f_s+\delta f_p}$, both the prince and the active duke will not revolt.

Now consider $s_t < s$, the prince's payoff from revolting is again (11). If the prince does not revolt, then the active duke revolts. The payoff of the prince becomes

$$\delta(1-f_s)\frac{p}{1-\delta}.$$

Because $s = \frac{\delta f_s}{1+(n-1)\delta f_s+\delta f_p}$ and $p = \frac{\delta f_p}{1+(n-1)\delta f_s+\delta f_p}$, and $1 > \delta(1-f_s)$,

$$\delta f_p \frac{1-p-(n-1)s}{1-\delta} > \delta(1-f_s)\frac{p}{1-\delta}.$$

For any offer with $s_t < s$, the duke is paid too little and will revolt even if the prince does not. This in turn implies that the prince will prefer to revolt if $s_t < s$, even if $p_t \geq p$. Summing up, the best responses of the prince and the active duke are as follows: When $p_t \geq p$ and $s_t \geq s$, both the prince and the duke will not revolt. When $p_t < p$ or $s_t < s$, both the prince and the duke will revolt.

Using the one-stage deviation principle, we now show that the king prefers payments of $s_t = s$ and $p_t = p$ in period t to any other alternatives in period t. At a cost of

$p + (n-1)s$, the king can prevent both the prince and the dukes from revolting by offering $p_t = p$ and $s_t = s$. Because only offers with $p_t \geq p$ and $s_t \geq s$ will ensure that both the prince and the active duke will not revolt, any offer other than (p, s) that will prevent revolt by both the prince and the active duke must have a cost $(n-1)s_t + p_t > p + (n-1)s$ and is dominated by (p, s). Furthermore, any offer with $p_t < p$ or $s_t < s$ triggers revolt and destroys the governance rent in the ongoing period and further exposes the king to the risk of being displaced, and is therefore dominated by (p, s).

Finally we calculate the king's rent as $r = 1 - (n-1)s - p$, or

$$r = \frac{1}{1 + (n-1)\delta f_s + \delta f_p}.$$

This completes the proof. ■

Following lines similar to the ones in footnote 12, it can be shown that there does not exist any peaceful MPE in stationary strategies that will give the king a higher payoff than the equilibrium in Proposition 2. Such an MPE would have to be peaceful and would require either a lower s or a lower p. Together with a higher r, this is incompatible with both the prince and the duke prefer to abstain from revolting.

The equilibrium in Proposition 2 also has intuitive properties. Rents in the equilibrium are determined by the success probabilities of revolt. The probability by which the prince or a duke is successful in a coup if they initiate a coup determines the size of the king's rent. The higher this probability, the more attractive is a coup for the respective type of player, and the higher the compensation that is required to prevent the respective type from initiating a coup, which, in turn, reduces the king's rent. Further, $r > s$ and $r > p$. The prince is better off than a duke if $f_p > f_s$. The comparative static results are also intuitively plausible. The king's period rent r is smaller if the prince or the duke impose a higher threat, and if the future is less strongly discounted.

2.3 Comparing regimes

We can now compare the king's rents in the two regimes for the peaceful Markov perfect equilibrium that is characterized in Propositions 1 and 2. We find

Proposition 3 *For the comparison of the leader's rents it holds that* $r > r^N$ *iff* $f_p + (n-1)f_s < nf^N$.

Proof. The result follows directly from comparing (2) to (9). ■

Using a dynamic model, we show that under both the princeless regime and the regime with a prince, the total probabilities of success in a coup are proportional to the amounts of payments that are required to make a coup unattractive. This translates into the condition in Proposition 3: the king's rent in the regime with a prince is higher than the rent in a regime without a prince if the sum of revolt success probabilities of potential challengers to the king is smaller in the regime with a prince. For $n = 2$, this condition can be re-written as $f_p - f^N < f^N - f_s$. If the prince has a higher revolt success probability than a duke under a princeless regime, then the leader will appoint a prince only if appointing a prince leads to a significant enough offsetting decrease in the revolt success probability of the duke who is not appointed as the prince. Furthermore, because the benefit of the barrier effect is increasing in the number of dukes, an increase in n increases the king's incentive to appoint a prince.[13] When $f_s < f^N$, if $n >> 2$, then even if the prince is powerful and f_p is high, the regime with a prince becomes superior for the king.

3 Rent-maximizing versus conflict-minimizing succession arrangements

Our analysis highlights how the trade-off between the elevated threat effect and the barrier effect affects the leader's decision regarding whether to appoint a successor. Many anecdotes can be found in early imperial Rome under the rule of Caligula, Claudius, Nero, Galba, Otho and Vitellus. As documented by Christ (2009) and Winterling (2011), some incumbent emperors seemingly gave preference to leaving successorship open to the end of their rulership; sometimes a prince is appointed, and the prince was often a player with little own power (small f_p).[14]

Our analysis so far focuses on when an incumbent who is only concerned about maximizing his life-time rent will find it in his own interest to appoint a successor. The

[13]Let $\Delta(n) = nf^N - [f_p + (n-1)f_s]$ be the change in total revolt success probabilities due to the appointment of a prince, which can be thought as the king's incentive to appoint a prince. The king will appoint a prince iff doing so reduces the total revolt success probabilities. That is, iff $\Delta(n) > 0$. An increase in n from n_1 to n_2 increases the incentive to appoint a prince, as $\Delta(n_2) - \Delta(n_1) = (n_2 - n_1)\left(f^N - f_s\right) > 0$.

[14]See, e.g., Winterling (2011) who describes the incumbency fights during the regime of Tiberius who governed from AD 14 to AD 37.

threat of conflicts that occurred after the incumbent's departure can affect potential challengers' incentives to revolt against the incumbent, and our analysis shows how the incumbent can strategically manipulate the structures of such conflicts to his advantage when making succession decisions.[15] The fact that conflicts among the contenders for successorship that occurred after his political or physical death impose significant costs on both the citizens and the elite is of no concern to such a purely self-interested incumbent. In short, the succession arrangement chosen by a strategic rent-maximizing incumbent ruler may often not minimize conflict effort.

In contrast, the existing literature on succession emphasizes how succession arrangements may reduce the conflicts among contenders after the incumbent's departure, often (implicitly) emphasizing how avoiding such conflicts is beneficial to the elite, the citizens, and an incumbent who has concerns about his legacy. For example, Tullock (1987, p.162) argued that while hereditary succession does not always guarantee a peaceful transition from father to son, it "seems to be more peaceful than other methods." Political scientists acknowledged that power transition may create a wasteful struggle for power (see Kokkonen and Sundell (2014), for a survey of this literature). The insecurity in the period of power transition is seen as a problem to be avoided (Herz, 1952). Kurrild-Klitgaard (2000) suggests that an automatic and unambiguous succession rule may be a possible solution to this problem. Using a dataset covering 961 monarchs ruling 42 European states between 1000 and 1800, Kokkonen and Sundell (2014) find that fewer monarchs were deposed in states practicing primogeniture than in states practicing alternative succession rules.

These observations suggest that the elite and the citizens face a *political agency problem in the choice of succession arrangements*. Suppose we relax the assumption that the incumbent only cares about his own life-time rent, and allow for the possibilities that he may care about his legacy, has concerns about the survival of the regime beyond his own political survival, or has altruistic concerns for his designated successor (though still mindful about the threat posed by the successor). Even for an incumbent

[15]Konrad and Skaperdas (2007) illustrate in a formal model that the threat of violent conflict among the set of the possible would-be rulers may be beneficial for the incumbent ruler. The threat of violent struggle in the period of power transition may threaten the overall governance system, but helps the incumbent ruler, as it provides a powerful incentive that prevents members of the ruling elite from overthrowing the ruler. Konrad and Skaperdas (2007), however, do not consider the incumbent's decision regarding whether to appoint a successor.

with concerns beyond his narrow self-interest, from the perspectives of the elite and the citizens, the incumbent will always be putting excessive weights on his own political survival and rent maximization while putting insufficient weights on how succession conflicts may impose costs on others.

Our current analysis is cast in the context of a self-interested incumbent deciding whether to appoint a successor when there is no socially-instituted rules governing succession, but it also sheds lights on when the incumbent may want to deviate from existing norms or institutional arrangements governing succession. The evolution of succession rules in many societies and organizations can be thought as driven to some extent by attempts of the elite–and to a lesser extent the citizens, through their threat of popular revolt–to impose constraints on the rulers and force them to internalize some of the costs borne by the citizens and the elite when succession conflicts occurred.

Our analysis suggests that if the formal appointment of a specific successor according to the existing succession rule increases the total probabilities of success in a coup compared to the alternatives of delaying the formal appointment or appointing an alternative successor, then the incumbent may prefer to deviate from the established rules of succession. This can occur if the appointment of the successor designated by the existing rules does not generate a significant barrier effect, or if this successor poses too much of a threat to the incumbent. In her study of successions in the Song dynasty in China, Ebrey (2006, p.54) points out that Taizong–who succeeded his elder brother and founder of the dynasty Taizu when the latter died in somewhat suspicious circumstances–did not follow the established norm of appointing his eldest son as his successor. Furthermore, he was reluctant to appoint an heir at all, and when he finally appointed his third son as his heir, he was uneasy that the people were pleased with this appointment. Similarly, we alluded to the emperors in early imperial Rome and their strategic behavior with respect to appointing weak princes and deposing them once they become popular and powerful.

Future research can study more carefully this political agency problem in the choice of succession arrangements faced by the elite and the citizens under different environments to understand when socially-instituted rules are effective and when they fail in binding the behavior of the incumbent. For example, the literature on political transition emphasizes how splits among the elite (Przeworski, 1991) and succession crises (Geddes, 1999) open up windows of opportunity for democratic transition in autocracy. A careful study of the political agency problem in succession may generate

useful insights and policy implications regarding how divergent interests and strategic interactions among the incumbent, the elite, and the citizens facilitate or prevent the emergence of such windows of opportunity for democratic transition.

4 Discussion

In this section we consider some extensions, and discuss limitations of the current analysis and directions for future research.

Endogenous probabilities of successful revolts In this subsection, we sketch a two-period finite horizon variant of our model, which endogenizes the revolt success probabilities. This simple example illustrates how the king's decision regarding whether to appoint a prince is determined by the trade-off between the elevated threat effect and the barrier effect in a non-stationary environment with endogenous revolt success probabilities.[16] Main changes of the model are as follows.

We consider two periods $t = 0, 1$. There is an incumbent king at the beginning of period $t = 0$ and two further players. In one case these are two dukes, in the other case these is one duke and one prince. The king chooses non-negative payment offers to share the period-0 governance rent with the other two players. This governance rent is G_0. These are (s^N, s^N) in the regime without a prince and (p, s) in the prince regime. The governance rent that accrues in period 1 has a present value in period 0 that is denoted by δG_1 which may exceed or fall short of G_0, but is normalized to $\delta G_1 = 1$, where δ is again the discount factor and is assumed to be the same for all players. In particular, the incumbent may have to take some investments to stabilize his regime in period 0, or period 1 may be longer.

In the no-prince regime, one of the dukes is randomly chosen to be active in period 0. This duke has the opportunity to revolt in this period. If he revolts then the duke chooses revolt effort $e \in [0, a/2]$ at a cost $C(e) = e$. We assume that this translates into a revolt success probability[17]

[16] We are grateful to a reviewer for helpful comments that inspired us to pursue this extension.

[17] The restriction $e \in [0, a/2]$ is convenient as it makes sure that the revolt success probability $f^N \in [0, 1]$ and is monotonically increasing in effort for all effort levels in the interior of the admissible range.

$$f^N = ae - e^2 \tag{12}$$

where we will restrict a to be from the open interval $(1, \sqrt{6} - 1)$ in order to obtain an interior equilibrium.

If the revolt is successful, the king is removed, and the revolting duke becomes the king in period $t = 1$. If the revolt fails, the revolting duke is removed and replaced by a new duke. The non-revolting duke remains in place in any case.

In the prince regime, the prince has an opportunity to revolt in period 0, and then the duke has an opportunity to revolt, also in period 0. Suppose the prince revolts. He chooses revolt effort $e \in [0, a/2]$ at a cost of $C(e) = e$, and the revolt against the king is successful with probability

$$\pi_p = \lambda ae - \lambda e^2 \tag{13}$$

Here, λ measures the revolt effectiveness of the prince. An elevated threat exists if $\lambda > 1$: for the same given effort, the prince has a higher likelihood to succeed against the king than a duke. If the prince fails, the prince is removed, and a new prince is appointed only next period. If the prince succeeds, the king is removed and the executive government consists of the former prince, now the king. In any case, if the prince revolts, this means there is no prince left as a result. Again, the parametric example requires a parameter restriction, which is that λ is from the open interval $(4/(5 - a^2), 2/a)$.

Given that the prince revolted, the duke may or may not revolt. If the duke does not revolt, the game moves to the next period. If the duke revolts but fails, he is removed and replaced in the next period. If he revolts successfully, he becomes the king in the next period. Borrowing the technology from the no-prince regime, if the duke revolts and chooses effort $e \in [0, a/2]$ his success probability is

$$f^N = ae - e^2 \tag{14}$$

Success or failure of this revolt determines the survival of the players and their roles in $t = 1$.

Suppose the prince does not revolt. Then the duke has the opportunity to revolt against the prince and the king. The duke chooses revolt effort $e \in [0, a/2]$ at a cost $C(e) = e$, and the revolt success probability of removing both the king and the prince is

$$f^s = \beta ae - \beta e^2. \tag{15}$$

Again, for an interior equilibrium, we need to choose a parameter restriction and assume that β is from the interval $(1/a, 1)$. The assumption that $\beta > 1/a$ ensures that the duke's chosen effort in the regime with a prince will be positive in equilibrium. The assumption of $\beta < 1$ says that it is more difficult to overthrow an executive government consisting of an incumbent and a prince than to overthrow a single incumbent king. This assumption will also ensure that $0 < f^s < 1$ in equilibrium.

We made several assumptions about a, β and λ. It is easy to confirm that these assumptions are internally consistent.[18] This completes the description of period 0.

There is no period after period 1. Hence, it does not make sense to attack the incumbent in period 1. Whoever is the incumbent at the end of $t = 0$ receives the full governance rent in period 1. We assumed that the present value of this rent was $\delta G_1 = 1$ and the same for all players.

Proposition 4 *The regime without a prince has a peaceful subgame perfect equilibrium. The king pays* $(a-1)^2/4$ *to each of the two dukes and his payoff is* $G_0 + 1 - 2((a-1)/2)^2$. *The regime with a prince has a peaceful subgame perfect equilibrium in which the incumbent king pays* $(\beta a - 1)^2/(4\beta)$ *to the duke and* $(\lambda a W - 1)^2/(4\lambda W)$ *to the prince, where* $W = (5 - a^2)/4$. *The king's payoff is* $G_0 + 1 - (\beta a - 1)^2/(4\beta) - (\lambda a W - 1)^2/(4\lambda W)$. *The king's equilibrium payoff will be higher under the regime with a prince, if* $2((a-1)/2)^2 > (\beta a - 1)^2/(4\beta) + (\lambda a W - 1)^2/(4\lambda W)$.

The proof of this proposition is in the Online Appendix.

The comparison is very similar to the one in our main model: comparing the two regimes, in the regime with a prince the king gains from a barrier effect and loses from an elevated threat effect. If a prince is appointed this reduces the rent that the king needs to give to the remaining duke from $(a-1)^2/4$ to $(\beta a - 1)^2/(4\beta)$, which is less, because $\beta < 1$. This is the barrier effect. But the amount $(\lambda a W - 1)^2/(4\lambda W)$ that

[18] We assume that $1 < a < \sqrt{6} - 1$, $\frac{1}{a} < \beta < 1$, and $4/\left(5 - a^2\right) < \lambda < 2/a$. Note that $1 < a < \sqrt{6} - 1$ implies $a^2 + 2a - 5 < 0$, which in turn implies that $0 < 1/\left(5 - a^2\right) < 1/(2a)$. This implies $4/\left(5 - a^2\right) < 2/a$. Hence, the first chain of inequalities is consistent with $4/\left(5 - a^2\right) < 2/a$. Note that $1 < a < \sqrt{6} - 1$ implies that $4/\left(5 - a^2\right) > 1$, so the third chain of inequalities implies $\lambda > 1$ as well. The second chain of inequalities characterizes β and is obviously consistent with the other two chains.

needs to be given to the prince in order to appease him now exceeds $(a-1)^2/4$. This is the elevated threat effect. The king will prefer the regime with a prince when the gain from the barrier effect outweighs the elevated threat effect.

Bystander dukes or revolting coalitions? In order to focus on the barrier and elevated effects of appointing a prince, we removed a number of other aspects from the picture. We assume that a failed coup leads to a replacement of the revolting duke, but allows all other dukes to be bystanders and to continue in their position. Alternatively, dukes may be forced to take sides, and may be replaced in case of a failed coup or in case of a change in government, depending on the side they chose. Intuitively, what speaks in favor of this assumption is the uncertainty which a king may feel about who was involved in a failed coup and a general mistrust, which may make it in the interest of the king to remove all dukes.

Both the need to make the dukes take sides and the elements of uncertainty or loyalty considerations are absent in our formal model. Historical examples suggest that a large share of the dukes may survive a coup. The experience of the rule of the Chinese Communist Party under Mao and Deng was that the paramount leader survived all political conflicts with his designated successors, and not all the elite was removed from power when the designated successors were removed.[19] Similar evidence exists for coups in imperial Rome (Christ, 2009). If the share of the elite suspected to be connected to the revolt was large and the boundaries of the set were uncertain, it was not viable for the king who survived the coup to prosecute or eliminate the whole elite.

Successful coups may require the collaborative effort of a group of powerful players. The prince and the dukes themselves may, however, represent the heads of existing power groups that can be seen as coalitions. How such power groups themselves, or coalitions between them, are formed, is outside the scope of our analysis. The formal

[19]Mao purged his deputy Liu Shaoqi and designated Lin Biao as his official successor. Lin was later accused of plotting an assassination against Mao and died while fleeing China. Deng removed his designated successor–the then general secretary of the CCP Hu Yaobang– in 1987, and replaced him with Zhao Ziyang. Zhao was in turn purged in 1989 (Spence, 1990). In all these cases, purges of senior officials occurred after the downfall of Liu, Lin, Hu, and Zhao, but not all members of the elite were removed. For example, Nathan (2003, p. 11) observes that after the purge of Zhao, among Zhao's close associates, some were immediately purged, but not all of them were removed, and some even "continued to advance in their careers."

modelling of the endogenous formation of alliances or coalitions in a non-cooperative framework is challenging, because what is the natural equilibrium concept about coalition stability is not clearly defined already in a static context (see, for a discussion, Hart and Kurz, 1983, pp. 1059-1064, and Bloch, 2009, for a more recent survey and contribution), and the dynamics of a multiple-period add further complexity. Within the context of the relationship between leaders and their power base, work by Bueno de Mesquita et al. (2003) has addressed this issue. While their work does not formally address these theoretical aspects of the stability of coalition structures in an otherwise non-cooperative framework, their work reaches interesting and important conclusions and highlights the importance of the issue.

Our analysis deliberately assumes that the players represent sufficiently powerful groups for a revolt. This also avoids the issue of endogenous formation of such groups, how coalitions coordinate their efforts, and how they solve the internal distributional conflict.[20] The dukes may, however, represent the leaders of power groups within the society and may constitute a stable and powerful coalition with an internal governance structure which we take as given.

More sophisticated appointment decisions In our formal framework the leader makes a zero-one choice regarding whether to elevate one of the dukes to be the prince. A more refined treatment can have the incumbent decides how much to elevate the duke. We are grateful to a reviewer who alerted us to the following example: The sultan in the Ottoman empire typically had many sons, who all were his potential heirs. The succession rule after his death was "first come first serve." Having all of his sons at a equal distance from the capital would imply that they would all be "dukes." Assigning the sons to governorships with different distances from the capital would be designating the one with the closest governorships as the "prince" (Goody, 1966, p.19). By manipulating the degree of asymmetry in the governorships for his sons, the sultan can decide how much to elevate the prince. Future work can investigate the implications of allowing for sophisticated appointment decisions that allow the king to manipulate endogenously the power of the prince.

[20]See Olson and Zeckhauser (1966) and Katz and Tokatlidu (1996) for early considerations in a different context.

5 Concluding remarks

This analysis studies the strategic value of appointing a prince for the incumbent. We find that the appointment of a designated successor changes the elite members' incentives for a coup. The coup may become more attractive for the prince and less attractive for other members of the elite. In turn, this changes the equilibrium distribution of rents. We studied how these two effects balance each other and identified conditions when the governance structure with a successor gives a higher rent to the incumbent.

Our framework has its limitations. In particular, we made it a simple and uncoordinated choice for members of the elite whether to revolt. In our current analysis, we made it easy for players to trigger a coup. We assume that the coup has an uncertain outcome, but can be triggered by a single duke. In a more sophisticated environment in which a coup may require a conspiracy and joint action, the outcome of the coup may depend on the choices of the majority of the dukes. In fact a coup may require establishing a network or a group in a conspiracy. One of the consequences of this is that players care much more about which player launches a coup.

Evidently, there are a whole wealth of questions regarding how succession arrangements can affect the relationship between an incumbent and the elite who may support his regime or may stage a coup. Our formal analysis focuses on the single question regarding how appointing a successor affects the stability of a ruler's regime and the allocation of governance rents, but the discussion in Section 4 illustrates how the framework can be extended to investigate other questions. We are hopeful that the framework can form the basis for further investigations concerning how the incumbent ruler's strategic choices regarding succession arrangements alter the structure of rulership competition and shape the evolution of governance structures.

References

[1] Acemoglu, Daron, Georgy Egorov, and Konstantin Sonin, 2009, Do juntas lead to personal rule? American Economic Review, 99(2), 298-303.

[2] Acemoglu, Daron, James Robinson, and Thierry Verdier, 2004, Kleptocracy and Divide-and-Rule: A Model of Personal Rule, Journal of the European Economic Association Papers and Proceedings, 2(2-3): 162-192.

[3] Acemoglu, Daron, Davide Ticchi, and Andrea Vindigni, 2010, A theory of military dictatorships, American Economic Journal: Macroeconomics, 2(1): 1-42.

[4] Azam, Jean-Paul, 2002, Looting and conflict between ethnoregional groups: lessons for state formation in Africa, Journal of Conflict Resolution, 46(1), 131-153.

[5] Azam, Jean-Paul, and Alice Mesnard, 2003, Civil war and the social contract, Public Choice, 115(3-4), 455-475.

[6] Besley, Timothy, and Masayuki Kudamatsu, 2008, Making autocracy work, in Elhanan Helpman (ed.), Institutions and Economic Performance, Harvard University Press, Cambridge, MA.

[7] Bloch, Francis, 2009, Endogenous formation of alliances in conflicts, unpublished manuscript, Ecole Polytechnique, Palaiseau.

[8] Bueno de Mesquita, Bruce, James D. Morrow, Randolph M. Siverson, and Alastair Smith, 2002, Political institutions, policy choice and the survival of leaders, British Journal of Political Science, 32(4), 559-590.

[9] Bueno de Mesquita, Bruce, James D. Morrow, Randolph M. Siverson, and Alastair Smith, 2003, The Logic of Political Survival, MIT Press, Cambridge, MA.

[10] Bueno de Mesquita, Bruce, and Alastair Smith, 2009, Political survival and endogenous institutional change, Comparative Political Studies, 42(2), 167-197.

[11] Bueno de Mesquita, Bruce, and Alastair Smith, 2014, Political succession: a model of coups, revolution, purges and everyday politics, unpublished manuscript.

[12] Che, Jiahua, Kim-Sau Chung, and Xue Qiao, 2014, Career concerns, Beijing style, mimeo., Chinese University of Hong Kong.

[13] Christ, Karl, 2009, Geschichte der römischen Kaiserzeit, Von Augustus bis zu Konstantin, 6. edition, C.H. Beck, Munich.

[14] Congleton, Roger D., 2011, Perfecting Parliament: Constitutional Reform, Liberalism, and the Rise of Western Democracy, Cambridge University Press, Cambridge, UK.

[15] Ebrey, Patricia, 2006, Succession to high office: The Chinese case, chapter 3 in Olson, David, and Michael Cole, (eds.), Technology, Literacy, and the Evolu-

tion of Society: Implications of the Work of Jack Goody, Lawrence Erlbaum, New Jersey.

[16] Egorov, Georgy, and Konstantin Sonin, 2011, Dictators and their viziers: endogenizing the loyalty-competence trade-off, Journal of the European Economic Association, 9(5), 903–930.

[17] Eisner, Manuel, 2011, Killing kings, Patterns of regicide in Europe, AD 600-1800, British Journal of Criminology, 51(3), 556-577.

[18] Fleck, Robert, and F. Andrew Hanssen, 2013, How tyranny paved the way to democracy: The democratic transition in ancient Greece, Journal of Law and Economics, 56 (2), 389-416.

[19] Flores, Alejandro Quiroz, 2009, The political survival of foreign ministers, Foreign Policy Analysis, 5(2), 117–133.

[20] Flores, Alejandro Qiroz, and Alastair Smith, 2011, Leader survival and cabinet change, Economics & Politics, 23(3), 345-365.

[21] Francois, Patrick, Ilia Rainer, and Francesco Trebbi, 2014, The dictator's inner circle, NBER Working Paper No. 20216.

[22] Fudenberg, Drew, and Jean Tirole, 1991, Game Theory, MIT Press, Cambridge, MA.

[23] Gambetta, Diego, 1993, The Sicilian Mafia: The Business of Private Protection, Harvard University Press, Cambridge, MA.

[24] Geddes, Barbara, 1999, What do we know about democratization after twenty years? Annual Review of Political Science, 2, 115-144.

[25] Goody, Jack, 1966, Introduction, in Jack Goody (ed.), Succession to High Office, paperback edition re-issued 2010, Cambridge University Press, Cambridge UK.

[26] Hamilton, Jonathan H., and Steven Slutsky, 1990, Endogenous timing in duopoly games: Stackelberg or Cournot equilibria, Games and Economic Behavior, 2(1), 29-46.

[27] Hart, Sergiu, and Mordecai Kurz, 1983, Endogenous formation of coalitions, Econometrica, 51(4), 1047-1064.

[28] Herz, John H., 1952, The problem of successorship in dictatorial regimes; a study in comparative law and institutions, Journal of Politics, 14(1), 19-40.

[29] Katz, Eliakim, and Julia Tokatlidu, 1996, Group competition for rents, European Journal of Political Economy, 12(4), 599-607.

[30] Kokkonen, Andrej, and Anders Sundell, 2014, Delivering stability - primogeniture and autrocratic survival in European monarchies 1000-1800, American Political Science Review, 108(2), 438-453.

[31] Konrad, Kai A. and Stergios Skaperdas, 2007, Succession rules and leadership rents, Journal of Conflict Resolution, 51(4), 622-645.

[32] Kurrild-Klitgaard, Peter, 2000, The constitutional economics of autocratic succession, Public Choice, 103(1-2), 63–84.

[33] Leeson, Peter T., 2007, An-*arrgh*-chy: The law and economics of pirate organization, Journal of Political Economy, 115 (6), 1049-1094.

[34] Lizzeri, Alessandro, and Nicola Persico, 2004, Why did the elites extend the suffrage? Democracy and the scope of government, with an application to Britain's "Age of Reform", Quarterly Journal of Economics, 119 (2), 707-765.

[35] Llavador, Humberto, and Robert Oxoby, 2005, Partisan Competition, Growth, and the Franchise, Quarterly Journal of Economics, 120(3), 1155-1189.

[36] Machiavelli, Niccolò, 1967, The Prince, Quentin Skinner and Russell Price, (eds.), Cambridge University Press, Cambridge, UK.

[37] Magaloni, Beatriz, 2008, Credible power-sharing and the longevity of authoritarian rule, Comparative Political Studies, 41(4-5), 715-741.

[38] Mehlum, Halvor, and Karl O. Moene, 2004, So much fighting, so little success, mimeo., University of Oslo.

[39] Nathan, Andrew J., 2003, Authoritarian resilience, Journal of Democracy, 14(1), 6-17.

[40] Ocasio, William, 1994., Political dynamics and the circulation of power: CEO succession in U.S. industrial corporations, 1960-1990, Administrative Science Quarterly, 39(2), 285-312.

[41] Olson, Mancur Jr. and Richard Zeckhauser, 1966, An economic theory of alliances, Review of Economics and Statistics, 48(3), 266-279.

[42] Price, Bryan C., 2012, Targeting top terrorists: How leadership decapitation contributes to counterterrorism, International Security, 36(4), 9-46.

[43] Przeworski, Adam, 1991, Democracy and the Market: Political and Economic Reforms in Eastern Europe and Latin America, Cambridge University Press, New York.

[44] Sekeris, Petros G., 2011, Endogenous elites: power structure and patron-client relationships, Economics of Governance, 12(3), 237-258.

[45] Shen, Wei, and Albert Cannella, Jr., 2002, Power dynamics within top management and their impacts on CEO dismissal followed by insider succession, Academy of Management Journal, 45(6), 1195-1206.

[46] Spence, Jonathan D., 1990, The Search for Modern China, W. W. Norton & Company, New York.

[47] Stephan, Joerg, and Heinrich Ursprung, 1998, The social cost of rent seeking when victories are potentially transient and losses final, in: Klaus Jaeger and Karl-Josef Koch (eds.), Trade, Growth, and Economic Policy in Open Economies, Springer, Berlin, 369-379.

[48] Svolik, Milan W., 2009, Power sharing and leadership dynamics in authoritarian regimes, American Journal of Political Science, 53(2), 477-494.

[49] Svolik, Milan W., 2012, The Politics of Authoritarian Rule, Cambridge University Press, Cambridge, UK.

[50] Tullock, Gordon, 1987, Autocracy, Kluwer Academic Publishers, Boston.

[51] Virág, Gabor, 2009, Efficiency and competition in the long run: The survival of the unfit, Games and Economic Behavior, 67(1), 315-330.

[52] Winterling, Aloys, 2011, Caligula, A Biography, University of California Press, Berkeley.

[53] Zhang, Yan, and Nandini Rajagopalan, 2010, CEO succession planning: Finally at the center stage of the boardroom, Business Horizons, 53(5), 455-462.

The Prince - or better no prince?
The strategic value of appointing a successor

Online Appendix

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This appendix proves Proposition 4. Before we solve the game in Section 4 for an equilibrium, we recall the assumptions we make regarding the parameters that allow for interior solutions and that have been shown to be compatible with one another:

$$a \in (1, \sqrt{6}-1),\ \beta \in (1/a, 1) \text{ and } \lambda \in (4/(5-a^2), 2/a).$$

Solving the two-period finite-horizon game backward, we directly find the period-1 payoffs of players. The player who is the king in period 1 receives the governance rent of this period with a period-0 present value that was normalized to $\delta G_1 = 1$. All other players receive zero. This applies in both regimes.

Turn next to period 0. Consider first the no-prince regime. One, randomly chosen duke has an opportunity to revolt. If he revolts, he must choose his revolt effort. Our parameter restrictions make sure that the optimal choice $e^N \in [0, a/2]$ is determined by [1]

$$e^N = \arg \max_{e \in [0, \frac{a}{2}]} \{f^N \cdot 1 - e\} = \frac{a-1}{2}. \tag{A1}$$

From (12) in the text, this leads to $f^N = \frac{a^2-1}{4}$. Our parameter restrictions make sure that f^N is in the interval $(0, 1)$. The revolting duke gets a payoff of

$$f^N - e^N = (\frac{a-1}{2})^2. \tag{A2}$$

This is the minimum that the king needs to offer each duke to prevent a revolt. This gives the king an expected payoff in the best peaceful equilibrium of

$$G_0 + 1 - 2(\frac{a-1}{2})^2. \tag{A3}$$

Turn next to the regime with a prince. We determine the minimum payment offers (p, s) needed to achieve a peaceful outcome. Consider first the optimal effort choices in the various scenarios. If the prince does not revolt, then the duke needs to overthrow an executive government that consists of both the king and the prince. Given our assumptions about a and β, the duke's effort choice is

$$e^s = \arg \max_{e \in [0, \frac{a}{2}]} \{f^s \cdot 1 - e\} = \frac{\beta a - 1}{2\beta}. \tag{A4}$$

Here we need the assumption $\beta > 1/a$ for an interior solution, and $\beta < 1$ reflects the assumption of a barrier effect. This effort determines the revolt success probability of the duke as $f^s = (\beta^2 a^2 - 1)/(4\beta)$. Furthermore, our parametric assumptions imply that

[1] It is straightforward to verify that the objective functions in the optimization problems in (A1), (A4), and (A9) are all concave. Therefore, in all these optimization problems, the effort choices determined by the first-order-conditions are indeed optimal.

$$f^s = \frac{\beta^2 a^2 - 1}{4\beta} < \frac{\beta^2 5 - \beta^2}{4\beta} = \beta < 1$$

and f^s is obviously positive. This gives the revolting duke an expected payoff

$$f^s \cdot 1 - e^s = \frac{(\beta a - 1)^2}{4\beta}. \tag{A5}$$

In order to prevent the duke from revolting, the king needs to offer at least

$$s = \frac{(\beta a - 1)^2}{4\beta}. \tag{A6}$$

Next, suppose the prince revolts. In this case, similar to the stationary framework with infinite horizon, whether the coup fails or succeeds, the duke will revolt. This is important to know for the prince, as the prince faces a revolt should his own revolt be successful. This prospect of facing the revolt by the duke reduces the value of overthrowing the king for the prince. This value is

$$1 \cdot (1 - f^N) = 1 - \frac{a^2 - 1}{4} = \frac{5 - a^2}{4} = W. \tag{A7}$$

Note that because $0 < f^N = \frac{a^2-1}{4} < 1$, $0 < W < 1$. This observation, together with (A7), implies that $\lambda \in (4/(5 - a^2), 2/a)$ is equivalent to

$$1 < \frac{1}{W} = \frac{4}{(5 - a^2)} < \lambda < \frac{2}{a}. \tag{A8}$$

When the prince revolts, his optimal effort is

$$e^p = \arg \max_{e \in [0, \frac{a}{2}]} \{(\lambda a e - \lambda e^2) \cdot \left(\frac{5 - a^2}{4}\right) - e\} = \frac{1}{2} \frac{\lambda a W - 1}{\lambda W}. \tag{A9}$$

From $a \in (1, \sqrt{6} - 1)$, and $\lambda \in (4/(5 - a^2), 2/a)$, we know that $\lambda > \frac{1}{W} > \frac{1}{aW}$, so $e^p \in (0, \frac{a}{2})$. Inserting (A9) in (13) in the text yields

$$\pi_p = \frac{\lambda^2 a^2 W^2 - 1}{4\lambda W^2}.$$

Furthermore, (A8) implies that

$$\pi^p = \frac{\lambda^2 a^2 W^2 - 1}{4\lambda W^2} < \frac{\lambda^2 a^2 W^2 - 1}{4W^2} < \frac{\lambda^2 a^2 W^2}{4W^2} = \frac{\lambda^2 a^2}{4} < 1,$$

and π^p is obviously positive. The prince, hence, receives a payoff $\pi^p \cdot W - e^p$ from revolting, which can be written as

$$\frac{1}{4}\frac{(\lambda aW-1)^2}{\lambda W}. \tag{A10}$$

Accordingly, this is what the king needs to offer the prince to avoid a revolt. Overall this turns the payoff of the king into

$$G_0+1-p-s=G_0+1-\frac{1}{4}\frac{(\lambda aW-1)^2}{\lambda W}-\frac{(\beta a-1)^2}{4\beta}. \tag{A11}$$

We now compare (A2) to (A6). Using $a\in(1,\sqrt{6}-1)$, and $\beta\in(1/a,1)$, we get $\beta>\frac{1}{a}>\frac{1}{a^2}$, or $\beta a^2>1$. Noting that $(1-\beta)>0$, this implies $(1-\beta)<\beta a^2(1-\beta)$, which in turn implies

$$\beta^2a^2-2\beta a+1<\beta a^2-2\beta a+\beta\Longrightarrow\frac{(\beta a-1)^2}{4\beta}<\frac{(a-1)^2}{4}. \tag{A12}$$

The appointment of a prince reduces the duke's payoff. This is the barrier effect.

We now compare (A2) to (A10). Using $a\in(1,\sqrt{6}-1)$ and (A8), we get $\lambda>\frac{1}{W}>\frac{1}{a^2W}$, which implies $\lambda a^2W>1$. Noting that $(1-\lambda W)<0$, we get $(1-\lambda W)\lambda a^2W<(1-\lambda W)$. This in turn implies

$$\lambda a^2W-2\lambda Wa+\lambda W<\lambda^2a^2W^2-2\lambda Wa+1\Longrightarrow\frac{(a-1)^2}{4}<\frac{(\lambda aW-1)^2}{4\lambda W}. \tag{A13}$$

The king needs to offer the prince a higher compensation than when he was a duke under the no-prince regime. This is the elevated threat effect.

We may now compare the king's payoffs in the two regimes. The king is better-off under the prince regime if

$$\frac{(\lambda aW-1)^2}{4\lambda W}+\frac{(\beta a-1)^2}{4\beta}<2\frac{(a-1)^2}{4}.$$