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Rich or alive? Political (in)stability, political leader selection and economic growth

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ABSTRACT

We develop a model that studies the incentives of the ruling elite regarding the selection of the political leader. We show that it is optimal for the ruling elite to choose leaders with more military experience in a politically unstable regime while more educated leaders are preferred in politically stable regimes. Using a dataset that includes 1569 national leaders from 177 countries over the period 1946–2011, we find empirical evidence that political stability contributes to the selection of more educated leaders, while the reverse holds for leaders with high military ranks. The empirical findings are robust to different subsamples, various proxies for educational and military attainment, and different measures for political stability. Our results suggest that leader selection is another reason why political instability is harmful for economic growth.

1. Introduction

Several studies have emphasized the importance of competent political leaders for good economic policy and economic growth. Jones and Olken (2005), for example, show that unexpected leadership changes influence the economic growth path of countries. The importance of the political leader is also emphasized by Besley et al. (2011), who find that the educational background of political leaders is an important determinant of economic growth. Other studies report similar findings and stress the importance of personal characteristics for the willingness to reform economically (Dreher et al., 2009), the type of defense policy (Horowitz and Stam, 2012), or the choice of diplomatic policies (Dreher and Yu, 2019, and Dreher and Jensen, 2013).

Political leaders are not selected randomly. Several models describe the selection and survival of political leaders. For example, the citizen-candidate models of Osborne and Slivinski (1996) and Besley and Coate (1997) describe what type of citizens will run for political selection. Bueno de Mesquita et al. (2003)'s selectorate theory model studies the strategic interaction between the incumbent and political challengers. Yu and Jong-A-Pin (2016) introduce heterogeneous leaders in the selectorate theory and study the interaction between political leader characteristics and the size of the ruling elite (i.e., the winning coalition). In a similar vein, the relation between the institutional framework and the type of political leaders is analyzed empirically by Besley et al. (2011), who find that it is more likely that well educated politicians are selected in democracies than in autocracies.

In this paper, we focus on heterogeneous leaders and examine leader selection in the context of political instability. That is, we argue that political elites in countries suffering from political instability lack the incentives to select economically competent leaders.

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As politically unstable countries often find themselves in a so-called coup-trap, where coups are most likely to be followed by another coup d'état (see [Londregan and Poole, 1990](#)), it is in the best interest of political elites to select strong military leaders to protect the position and interests of the elite group. However, according to [Yu and Jong-A-Pin \(2016\)](#), selecting a military competent political leader most often comes at the cost of not selecting an economically competent leader. As such, political elites face a trade-off between rent protection in the short-run and a higher probability of economic growth in the medium to long-run. That is, whereas military competent leaders may possess the ability to appease coup attempts ([Jong-A-Pin and Yu, 2010](#)), educational attainment is associated with higher economic growth ([Besley et al., 2011](#)). In this paper, we show that when the level of political stability is low, ruling elites sacrifice their long-term economic benefits and rather have a military strong leader than an economically competent one. Consequently, we derive the hypothesis that high political stability leads to the selection of more educated leaders with less military attainment and vice versa.

Our hypothesis is empirically tested using a sample of 1569 political leaders that ruled in the 1946–2011 period. This result is robust to different subsamples, various proxies for educational and military attainment, and different measures for political stability. Our empirical analysis also focuses on the link between political stability and economic growth via leader selection. We analyze random exits of leaders (like [Jones and Olken, 2005](#) and [Besley et al., 2011](#)) to examine whether highly educated leaders contribute to economic growth positively and whether the reverse holds for leaders with high military ranks. Our findings confirm earlier work by [Besley et al. \(2011\)](#), whereas we are the first to report results on the (ir)relevance of military attainment for economic growth.

The model and evidence reported in this paper provide an alternative channel why political stability is an important determinant of long-term economic growth. Apart from channels via investment ([Benhabib and Rustichini, 1996](#)), economic reform, ([Svensson, 1998](#)) and building state capacity ([Besley and Persson, 2009](#)), we show that political stability affects economic growth via leader selection, because the stable environment increases the likelihood of the selection of an economically competent leader.

The paper is structured as follows. [Section 2](#) contains our theoretical model from which we derive our hypothesis. [Section 3](#) discusses data and the empirical strategy. [Section 4](#) presents the estimation results, and [Section 5](#) contains a robustness analysis. [Section 6](#) studies the impact of leaders' personal characteristics on economic growth. [Section 7](#) concludes the paper.

2. Theoretical model

We set up a simple one-period model to show how ruling elites select leaders in the presence of political instability.² Like in [Choucri et al. \(2006\)](#), political (in)stability is defined as the regime's (in)ability to withstand violent activities against the regime. That regimes their resilience drops after coup attempts has been well documented in [Londregan and Poole \(1990\)](#) and [Collier and Hoeffler \(2005\)](#). In our model, we assume that political stability drops after a coup attempt and restores gradually over time (see also [Lehoucq and Pérez-Liñán, 2014](#)). We find that, as the state becomes more resilient to coup threats, the ruling elite is more likely to select an economically competent leader rather than a military competent leader.

2.1. The main setup

Consider a country with an elite. The elite has a constant population and consists of two factions, i.e., the ruling elite (R) and the opposing elite (O). The two factions are assumed to have size 1.³ Each faction has a continuum of members. Similar to the concept of the winning coalition in [Bueno de Mesquita et al. \(2003\)](#), we assume that the ruling elite selects the political leader. The opposing elite can try to mount a coup to become the new ruling elite.

The ruling elite selects their leader from a candidate pool. The candidate has an economic competence level (e) and a military competence level (m). Following [Yu and Jong-A-Pin \(2016\)](#), e is uniformly distributed between 0 and 1. We assume that economic competence determines the rents available to the ruling elite, whereas military competence determines the failure rate of a coup when it is initiated by the opposing elite.⁴ We assume a negative correlation between a candidate's economic competence level and military competence level, i.e., $E(m) = 1 - e$.⁵ The incumbent's economic competence level is observed by both the ruling elite and the opposing elite. However, the identity of the challenger is unknown when the ruling elite selects the incumbent. The challenger only reveals himself (i.e. his economic competence level, π , $\pi \sim U[0, 1]$) to the opposing elite when the opposing elite decides to launch a coup. Therefore, the ruling elite can only form an expectation of the challenger's economic competence level at the beginning of the period.

Aggregate output is realized at the end of period t and (for simplicity) fully depends on the leader's economic competence, where the aggregate output (y) equals e if the incumbent remains in power at the end of period t , and π otherwise:

² The results of the one-period model can be extended to multiple periods. The extension can be found in the Appendix A3.

³ This assumption can be generalized by introducing the size of the ruling faction within the elite group. This is done by [Bueno de Mesquita et al. \(2003\)](#) and is similar to the concept of de-facto democracy as in [Acemoglu and Robinson \(2006\)](#). This generalization does not change the main results, which is illustrated in Appendix A2.

⁴ Here we implicitly assume that the rents to the elite are a fixed proportion of aggregate output, which is determined by the incumbent's economic competence level. As the incumbent's economic competence level increases, the rents to the elite increases accordingly.

⁵ Evidence for this correlation is reported by [Yu and Jong-A-Pin \(2016\)](#). This assumption can be generalized such that a candidate's military competence level is $m = 1 - e + \epsilon$ where ϵ is assumed to follow a normal distribution, $N(0, 1)$, which would account for misjudging a leader's military competence or less than perfect correlation. Modification of this assumption does not change the results, as $E(m)$ remains equal to $1 - e$. The results remain when relaxing the assumption further to $E(m) = 1 - ae$ where a is a known constant and $a \in [0, 1]$. See Appendix A1 for details.

$$y = \begin{cases} e; & \text{if incumbent is in power} \\ \pi; & \text{if challenger is in power} \end{cases}. \quad (1)$$

A fraction, x of output (i.e., rents) is shared evenly among the ruling elite such that $\frac{1}{2} < x \leq 1$. The remaining output is distributed among the opposing elite members (O). Under the incumbent, it follows that members of the ruling faction expect to receive xy at the end of period t , while members of the opposing factions expect to obtain $(1 - x)y$.

A dissatisfied opposing elite has the option to mount a coup to overthrow the current regime. If the opposing elite launches a coup and replaces the incumbent with the challenger, then the opposing elite becomes the new ruling elite and enjoys higher rents. In that case, the sitting ruling elite will lose their elite status and receive zero rents. If the coup fails, then the composition of the ruling elite stays the same and the opposing elite will be replaced as a punishment. The opposing elites' potential gains (i.e., future rents) and losses (i.e., probability of failure) from a coup attempt determine the probability of having a coup attempt (denoted by χ , $\chi \in [0, 1]$). The coup success rate ($s \in [0, 1]$, conditional on its occurrence) depends on the level of political stability, d and the incumbent's military competence level. That is, coups are more likely to succeed in a politically unstable environment and when the incumbent is military competent (i.e., $s(e, d) = e(1 - d)$, where $d \in [0, 1]$). Given the above, the probability of having a successful coup attempt is $p = \chi s$. It follows that the expected utility function of ruling elite members in the beginning of period t is:

$$EU^R = (1 - \chi)ex + \chi(1 - s)ex + \chi s \times 0 \quad (2)$$

$$= (1 - p)ex \quad (3)$$

When selecting the incumbent, ruling elites have to think about the rents at the end of the period (ex) and the probability of obtaining the rents (p). This choice depends on the size of p , which depends on the opposing elites' decision on the attempt of a coup.

2.2. Timeline

The timeline of the events in our model are as follows:

1. The level of political stability (d) is observed at the start of the period t . The ruling elite picks their leader (and hence e).
2. The chosen candidate becomes the incumbent.
3. The opposing elite decides whether to attempt a coup or not.
 - (a) No coup attempt: the incumbent stays in power. The composition of the ruling elite and the opposing elite does not change;
 - (b) Coup attempt:
 - Coup success: with probability s , the coup succeeds and the challenger comes into power. The current ruling elite loses elite status and the opposing elite becomes the new ruling elite.
 - Coup failure: with probability $1 - s$, the coup fails and the incumbent remains in office. The opposing elites lose their elite status.
4. The rents are paid to the ruling elite and the opposing elite at the end of the period.

Fig. 1 visualizes the timeline/ game tree of the model.

2.3. Equilibrium

The probability of having a coup attempt, p , is determined by the difference between the opposing elites' expected utility from having a coup attempt and their utility from not having a coup attempt. The latter is equal to $e(1 - x)$. The former depends on the

Fig. 1. Timeline / Game Tree of the model.

challenger's revealed economic competence level, which is:

$$EU^O(\text{Coup}) = (1 - s) \times 0 + s\pi x \quad (4)$$

$$= e(1 - d)\pi x \quad (5)$$

Comparing the expected utilities, the opposing elite will launch a coup when $\pi > \frac{1-x}{(1-d)x}$ and $d < 1$.⁶ Since $\pi \sim U[0, 1]$, it follows that $\chi = 1 - \frac{1-x}{(1-d)x}$. Furthermore, since $p = \chi s$, it follows that $p = (2 - d - \frac{1}{x})e$. Inserting the equation for p in Eq. (3), the expected utility function of the ruling elite is found to be a quadratic function of e . Based on the best response function of the opposing elite, χ , the ruling elite will maximize its expected utility by choosing the incumbent's economic competence level:

$$\max_e EU^R(e) = xe - (2x - dx - 1)e^2 \quad (6)$$

If we consider situations for which political stability is sufficiently low (to allow for successful coup attempts) and the rents to the ruling elite are sufficiently high, i.e. p is positive and $x > \frac{2}{3-2d}$, the expected utility of the ruling elite is maximized at $e^* = \frac{1}{4-2d-\frac{2}{x}}$.

The high level of rents (i.e., $x > \frac{2}{3-2d}$) will motivate the ruling elite to make the tradeoff between e and m to maximize their rents.⁷ The political stability level should not be too high to prevent all successful coups from happening (i.e. $p > 0$).⁸

To further examine how the optimal economic competence level of the incumbent evolves with respect to the level of political stability, we calculate the partial derivative of e^* over d :

$$\frac{\partial e^*}{\partial d} = 2\left(\frac{1}{4-2d-\frac{2}{x}}\right)^2 \quad (7)$$

The result shows that when the ruling elite needs to make a trade-off between the leaders' economic competence and military competence, political stability (d) will favor more economically competent leaders. We derive the following hypothesis:

Hypothesis 1. When a successful coup is feasible, the ruling elite chooses the incumbent with regard to the level of political stability, i.e., as the level of political stability increases, it is more likely that the ruling elite selects a leader with higher economic competence and hence lower military competence.

3. Data and empirical model

3.1. Data

3.1.1. Political stability

To model a regime's vulnerability towards future coups, we construct a measure of political stability. According to Londregan and Poole (1990), coup attempts elevate the propensity of future coup attempts. Moreover, Finer (1976) suggests that the "political culture" of a country suffers serious erosion in the wake of a coup. Therefore, when a coup occurs, it is likely that more attempts follow (O'Kane, 1983). Therefore, we suggest a political stability measure that is equal to zero after a coup attempt and grows gradually as time passes by.⁹ To construct the measure, we use data from Marshall and Marshall (2014) on coup attempts for the period 1946 to 2013.¹⁰ They classify coup incidents as follows: (1) successful coups where the head of a government is replaced, (2) attempted but failed coups, (3) thwarted coups that were reported by government officials, and (4) alleged coup plots announced by government officials. To make sure that the proxy for political stability does not carry a reporting bias and captures the impact of having a coup at a greater scale, we only consider occurred coup attempts rather than plotted or alleged coup attempts.¹¹

⁶ When $d = 1$, the opposing elites will never mount a coup, as the expected utility of launching a coup attempt drops to 0. Hence, we focus on the case when $d < 1$.

⁷ If x is below $\frac{2}{3-2d}$, e^* will be above 1, making the optimal choice of the ruling elite is always to set e^* equal to 1.

⁸ $p > 0$ requires $\chi > 0$ and $s > 0$. When $d = 1$, having a successful coup attempt or having a coup attempt is impossible. This implies that the optimal choice of the ruling elites will always be $e^* = 1$ and the opposing faction will never mount a coup. Since $\chi > 0$ further requires $x > \frac{1}{2-d}$ and $\frac{2}{3-2d} > \frac{1}{2-d}$, the ruling elite will only make a tradeoff between e and m and choose $e^* = \frac{1}{4-2d-\frac{2}{x}}$ when $d < 1$ and $x > \frac{2}{3-2d}$. Since $x < 1$, the latter further requires that $d < \frac{1}{2}$.

⁹ Persson and Tabellini (2009) construct their measure of democratic capital in a similar way.

¹⁰ The data is obtained from <http://www.systemicpeace.org/inscr/inscr.htm>. Marshall and Marshall (2014) define a coup d'état as a forceful seizure of executive authority and office by a dissident/opposition faction within the country's ruling or political elites that results in a substantial change in the executive leadership and the policies of the prior regime (although not necessarily in the nature of regime authority or mode of governance). In order for a coup to be considered "successful" effective authority must be exercised by new executive for at least one month. Powell and Thyne (2011) define coups as "illegal and overt attempts by the military or other elites within the state apparatus to unseat the sitting executive," and successes as episodes in which the perpetrators control power for at least 7 days. Their dataset is used as a robustness check for Marshall and Marshall (2014). Results will be provided upon request.

¹¹ When including plotted and alleged coup attempts, our results remain the same. Results based on this definition are very similar and are available upon request.

The measure for political stability in year t , d_t , is constructed as follows:

$$d_t = \begin{cases} 1; & t < t_0 \\ 1 - \rho^{t-t_0}; & t \geq t_0 \end{cases} \quad (8)$$

where $\rho \in (0, 1)$, year t_0 is the year of the most recent coup attempt and year t is the year of observation. The difference (labeled: *Yrs from a Coup*) represents the time distance (in years) between the year of observation and the year of the coup attempt(s). At the year of the incident, d 's value drops to zero and after that grows back gradually at a diminishing growth rate. How fast d grows back depends on the value of ρ . The smaller the value of ρ , the faster d grows back to 1. In our baseline model ρ is set to 0.9, which implies that 10% of the level of political stability grows back after one year if there is no new coup attempt, 19% is restored after two years without incidents, etc. We use the lagged value of d in our regression analysis to avoid reverse causality. That is, insofar d is not exogenous, the lagged measure ensures that the impact goes from political stability to leader selection rather than the other way around.

To analyze the robustness of our results, we also report estimation results using alternative values of ρ (i.e., slower and faster rates of recovery), and also directly use *Yrs from a Coup* in our regressions. Furthermore, we also test our hypothesis using alternative proxies for political stability. That is, we use 1) the stability measure from the Database of Political Institutions (2013) (Beck et al., 2001, updated in Jan. 2013) which counts the percentage of veto players who drop from office in any given year, and (2) we construct an alternative d by using the irregular exits of leaders as identified by the Archigos 2.9 dataset.¹² Lastly, we also construct a measure capturing a different dimension of political (in)stability. That is, the occurrence of mass civil protest (Δ Mass), measured as the change in the number of mass movements in a country as reported by Banks and Wilson (2013).¹³ As this measure aims to capture a different dimension of political instability (see e.g. Jong-A-Pin, 2009), it serves to analyze the relevance of our hypothesis beyond the political (in)stability measures capturing the overthrow of a political regime.

3.1.2. Leaders

To identify the *de facto* rulers of each state, we use the Archigos 2.9 data set of Goemans et al. (2009). The data set contains information on the modes of entry and exit from office for each effective leader in every independent country. The effective leader is the individual who *de facto* exercises political power in the country, which can be a president, a king, a prime minister, etc. The Archigos 2.9 dataset provides information on 2098 leaders in 188 countries over the period 1875–2004. For our purpose, the dataset is updated to the year 2011 following Archigos' codebook.¹⁴ Moreover, we take Besley and Reynal-Querol (2011)'s approach and focus on the leaders with the most days in office in each year. Since the coup data of Marshall and Marshall (2014) is only available after 1946, our sample covers the period 1946–2011. Information on leader characteristics is taken from Ludwig (2002) and supplemented with data from other sources.¹⁵

As to economic competence, we follow Besley et al. (2011) and take educational attainment as a proxy for economic competence of the political leader. Economic competence is categorized as follows:¹⁶ 1) illiterate (no formal education); 2) literate (no formal education); 3) elementary/primary school education or tutors; 4) high/finishing/secondary/trade school; 5) special training (beyond high school, such as mechanical, nursing, art, music, or military training;¹⁷ 6) college-educated; 7) qualifications from a graduate or professional school (e.g. master's degree); and 8) doctorates (e.g. Ph.D.).

The eight-way classification results in the variable *Edu Rank*. It contains discrete numbers ranging from 0 to 8. The eight-way classification is further transformed into a dummy variable (*Graduate*), which takes a value of 1 if a leader holds a master's degree or 0 otherwise, and a numerical variable (*Educ*), which takes discrete numbers from 0 to 3. *Educ* has a value of zero if the educational attainment is below college education, 1 if leaders have a college degree, 2 if leaders have a master degree, and 3 if leaders have a Ph.D. degree. The latter is used as our main dependent variable, whereas the others are used to analyze the robustness of our results.

We also construct a relative measure of education (*Edu Dist*), since a college graduate in a developing country like Chad (where the literacy rate is only about 35 percent) may be considered to be highly educated whereas in a developed country like Canada 50 percent of the population has a bachelor degree.¹⁸ The relative measure of educational attainment is developed to reflect the years of

¹² Exits are considered irregular when the leader was removed in contravention of explicit rules and established conventions. Most irregular removals from office are the result of a threat or the use of force domestically such as coups, (popular) revolts, and assassinations.

¹³ The measure is constructed using Bueno de Mesquita and Smith (2010)'s method. It uses 4 types of mass movements, i.e. riots, demonstrations, strikes and revolutions.

¹⁴ See Goemans et al. (2009) for details. In total, the updated dataset contains 2790 leaders.

¹⁵ The priority order for the source of the data collection is: 1) Ludwig (2002); 2) Encyclopedia Britannica; 3) *Keesing's world news archive*; 4) Series of *Who's Who* and *LexContent5* (provided by LexisNexis Academic search); 5) Biographies on government websites; 6) www.rulers.org; and 7) Wikipedia. We compared the data collected from the first six sources with Besley and Reynal-Querol (2011) and found that there are minor differences (the correlation is 0.93 for the period 1875–2004). Regarding the cases for which we had different entries, we double-checked the entries and use the value obtained from our exercise (i.e., the preferred first six sources). Ultimately, Besley and Reynal-Querol (2011) is used to fill in the gaps and replace the entries obtained from Wikipedia.

¹⁶ The same approach is used in Ludwig (2002), Besley and Reynal-Querol (2011) and Yu and Jong-A-Pin (2016).

¹⁷ Military training programs that do not end up with a bachelor degree fall in this category. These programs normally issue a certificate rather than a degree after completion. Military academy graduates are counted as college graduates.

¹⁸ <https://www.cia.gov/library/publications/the-world-factbook/fields/2103.html>

education received by the incumbent (*Edu Years*) in comparison to the years of education received by an average citizen in the country.¹⁹ The data on average years of schooling for population (ages above 15) is provided by Barro and Lee (2013). When using the absolute measures of educational attainment, it is used as a control variable for the human capital stock.

Yu and Jong-A-Pin (2016) argue that the military rank of a political leader can be considered as a proxy for military competence. Additionally, Jong-A-Pin and Yu (2010) show that coup attempts led by high-rank military officers are more likely to succeed. This can be either due to superb tactical skills possessed by high-ranked leaders, or due to the better ties they have with the military. Either way, leaders with higher military ranks are more able to prevent the overthrow of their regime. We proxy for a political leader's military competence level using his/her highest military rank achieved before office. As argued in Svolik (2012), combat or management skills used in military forces differ from those used in guerrilla and other types of forces. Therefore, the leaders' official military rank is more relevant to the competence in defending the regime. To make military ranks comparable across countries, we apply the NATO coding system to convert different ranks to a uniformed system. Our variable, *Nato Rank*, goes from 0 (civilian or ranks below OF-1, e.g. Lieutenant in the U.S.) to 10 (OF-10, e.g. Five-Star General in the U.S.).²⁰

Nato Rank is converted into several alternative proxies for military competence to probe the robustness of our results. That is, we construct a categorical variable (*Mil Rank*) and two dummy variables (*High – Rank* and *Mil*). *Mil Rank* takes a value of 0 if the incumbent is a civilian (with no prior military experience), 1 if the incumbent is a low-ranked officer (lower than NATO OF-4), 2 if the leader is a high-ranked officer (from OF-5 to OF-8), and 3 if the leader is a top-ranked officer (OF-9 or OF-10). The dummy variable, *High – Rank*, equals 1 if the leader is a high-ranked or top-ranked officer and 0 otherwise. It is created to test whether the impact of political stability is more relevant for high-rank military officers relative to low-rank military officers. The last proxy, *Mil*, is a dummy variable that equals 1 if the incumbent has no prior military experience and 0 otherwise.

To show the relationship between military ranks and coup attempts, Fig. 2 plots the number of coup attempts and the average coup success rate between leaders with high military ranks and those without high military ranks. The left panel shows that leaders with high military ranks are found in regimes with more coup attempts, while the right panel suggests that coup attempts have lower success rates when the incumbents have high military ranks. Both findings are statistically significant at the 5% significance level. The right panel supports the assumption that leaders' military competence prevents coup success. The left panel supports the view that leaders with high military ranks are more likely to be selected in unstable regimes.

In our theoretical model, economic competence is assumed to correlate negatively with military competence. To test the validity of this assumption, we show the relation between *Educ* and *Military Rank* (our main dependent variables) in Table 2 and calculate a Pearson test that rejects the null-hypothesis of independence (Pearson Chi2(9) = 152.91). Fig. 3 is a visualization of the relation between economic competence and military competence. From the left to the right, the bars illustrate leaders with educational attainment ranging from lower than college to doctorate. For each bar, the bottom presents leaders without a military background, whereas the top shows leaders who are generals. As leaders' educational attainment increases from under college to doctorate, the percentage of them being civilian increases from 57.2% to 93.2%. Meanwhile, the percentage of leaders being generals drop from 18.5% to 0.9%. The data suggests that there is indeed a negative association between a leaders' educational attainment and military attainment. The negative association may represent that leaders differ in their comparative advantages, or the fact that both competences (or networks) take time to develop, which makes a leader less likely to be qualified in both dimensions.

3.2. Empirical model

We estimate a panel-fixed effects model with country clustered robust standard errors to measure the effect of political stability on leader selection. The model focuses on the determinants of educational and military attainment of the incumbent and has the following form:

$$e_{it} = \alpha + \mu_i + \mu_t + \beta d_{it-1} + \tau \mathbf{X}_{it-1} + \epsilon_{it} \quad (9)$$

$$m_{it} = \alpha + \mu_i + \mu_t + \beta d_{it-1} + \tau \mathbf{X}_{it-1} + \epsilon_{it} \quad (10)$$

where e_{it} (in the first model specification, Eq. (9)) is the educational attainment of the incumbent in country i in year t and m_{it} (in the second model specification, Eq. (10)) is the military attainment of the incumbent in country i in year t . It is important to note that t refers to the year that the leader came into office. Hence, every (s)elected leader appears only once in the sample. μ_i is a dummy variable for country i , μ_t is a dummy variable for year t , and $\mathbf{X}_{it-1}$ is a vector of control variables. In line with Besley and Reynal-Querol (2011), we include a measure for democracies (source: Polity IV dataset),²¹ and a measure for economic development, $\ln(\text{GDP per capita})$, measured as real GDP per capita in constant 2005 USD (source: Penn World Table 8.0, Feenstra et al., 2015). Furthermore, we control for the general level of education in a country (*Years of Education*) as measured by the average number of years of

¹⁹ To construct *Edu Years*, we use the mapping of Besley and Reynal-Querol (2011) and transform categories of educational attainment into number of years: 1) illiterate (no formal education) = 0 years; 2) literate (no formal education) = 2 years; 3) grade/elementary/primary school or tutors = 6 years; 4) high/finishing/secondary/trade school = 12 years (+6); 5) special training (beyond high school, such as mechanical, nursing, art, music or military training) = 16 (+4) years; 6) college = 16 (+4) years; 7) graduate or professional school (e.g. masters degree) = 18 years (+2); 8) doctorate (e.g. Ph.D.) = 20 years (+2). *Edu Dist* is the difference between *Edu Years* and the average years of school for population (ages 15+, provided by Barro and Lee, 2013)

²⁰ An overview of the NATO coding is reported in Table 1.

²¹ Our democracy measure is a dummy variable equal to 1 when the Polity score > 6 and 0 otherwise.

Fig. 2. Coup Success and Incumbents' Military Attainment (1946–2011) Note: The y-axis in the left panel shows the average number of coup attempts while the y-axis in the right panel shows the average coup success rate. In both panels, the left bar represents leaders without high military ranks while the right bar represents leaders with high military ranks. The 95% confidence intervals are shown by the vertical lines.

Fig. 3. Leaders' Education Attainment vs. Military Attainment (1946–2011).

Table 1
Ranks of NATO Army Officers.

NATO Code	UK	US	FR
OF-10	Field Marshal	General of the Army	Marechal de France
OF-9	General	General	General d'Armree
OF-8	Lieutenant- General	Lieutenant- General	General de Corps d'Armree
OF-7	Major-General	Major-General	General de Division
OF-6	Brigadier	Brigadier-General	General de Brigade
OF-5	Colonel	Colonel	Colonel
OF-4	Lieutenant-Colonel	Lieutenant-Colonel	Lieutenant-Colonel
OF-3	Major	Major	Commandant
OF-2	Captain	Captain	Capitaine
OF-1	Lieutenant	First Lieutenant	Lieutenant
	Second Lieutenant	Second Lieutenant	Sous-Lieutenant

Source: STANAG 2116 NATO chart. (http://en.wikipedia.org/wiki/Ranks_and_insignia_of_NATO_armies_officers)

education for the population aged above 15, which is provided by Barro and Lee (2013). Lastly, we control for the relative size of the military (*Military Size*), i.e., the ratio of military size over the population (source: Banks and Wilson, 2013), to control for a country's level of military presence. As discussed above, d_{it-1} is the level of political stability in country i and in year $t - 1$. The control variables and the measure for political stability are lagged to reflect the conditions facing the ruling faction when selecting the leader and to minimize potential endogeneity problems. A summary of descriptive statistics is included in Table 8.

To test our hypothesis, we focus on the coefficient β , which is the estimate of the impact of political stability on the choice of leaders' educational (or military attainment). It is expected to be positive when the dependent variable is educational attainment and negative when the dependent variable is military attainment.

4. Empirical results

Table 3 shows the impact of political stability on the educational attainment of the political leader. In column 1, we present the estimates when no other control variables (apart from the country and year fixed effects) are included in the model. We find that the estimated coefficient for political stability is positive meaning that more stable countries, indeed, select leaders with more economic competence. In columns 2 and 3 we add the control variables that are also included in the model of Besley and Reynal-Querol (2011) and variables that aim to capture the educational and military environment in which the political leader is selected. Given the inclusion of the country fixed effects, it is not surprising that the control variables do not add much explanatory power to the model. The estimated coefficient of political stability is somewhat affected by the inclusion of the control variables, notably in column 3. Yet, the estimated effect of political stability remains statistically significant throughout.

As some of the countries in the sample have experienced no coup d'états after the second World War, it may be possible that the ruling elites hardly have faced a trade-off between the leaders' military and economic competence since then and, therefore, these observation may add little information to the model. Therefore, we re-estimate the model, but drop the countries that have not had a coup d'état. The corresponding estimation results in column 4 are very similar to the ones reported earlier. In column 5, we also re-estimate the model but now drop the leaders that came to power because of the involvement of foreign countries. It may well be argued that domestic elites have no say when the leader is selected by a foreign (super)power. Dropping the cases of foreign imposition, however, also does not alter the main result: political stability is positively related to the selection of more economically competent political leaders.

In Table 4, we show the same model specifications, but now use our measure for military attainment as the dependent variable. In line with our hypothesis, we find that political stability negatively affects the level of military attainment of the chosen leader. That is, the higher the level of political stability, the lower the military attainment of the political leader. Or more interestingly, the higher the level of political instability, the higher the military attainment of the selected political leader. As can be seen in Table 4, in all model specifications is the coefficient for political stability estimated with a negative coefficient and statistically significant.

5. Robustness analysis

In Table 5, we report the estimation results of our robustness analysis.²² The upper part shows the estimates for education, while the lower part shows the estimates for military ranks.

We first focus on the robustness of our political stability measure. Column 1 assumes a faster rate of recovery (i.e. $\rho = 0.75$) for the measure of political stability than the rate used in the main results. Column 2 uses a slower recovery rate (i.e. $\rho = 0.95$). To further analyze whether the results are not driven by the chosen value of the recovery rate, we include the number of years away from the

²² The results of Table 5 are robust to the inclusion of additional controls (i.e., *YearsofEducation* and *Military Size*) and will be provided upon request.

Table 2

Cross table for education and military attainment.

Military Rank	Educ	0	1	2	3	Total
0	Freq.	181	428	326	219	1159
	Percent	57.2	66.9	88.4	93.2	73.9
1	Freq.	49	69	18	10	146
	Percent	15.1	10.8	4.9	4.3	9.3
2	Freq.	30	55	11	4	100
	Percent	9.2	8.6	3.0	1.7	9.3
3	Freq.	60	88	14	2	164
	Percent	18.5	13.8	3.8	0.9	10.5
Total	Freq.	325	640	369	235	1569

Pearson chi2(9) = 152.9142 Pr = 0.000

Note: *Educ* has a value of zero if the educational attainment is below college education, 1 if leaders have a college degree, 2 if leaders have a master degree, and 3 if leaders have a Ph.D. degree. *Mil Rank* takes a value of 0 if the incumbent is a civilian (with no prior military experience), 1 if the incumbent is a low-ranked officer (lower than NATO OF-4), 2 if the leader is a middle-ranked officer (from OF-5 to OF-8), and 3 if the leader is a high-ranked officer (OF-9 or OF-10).

Table 3

Political Stability and Leader's Educational Attainment.

Dep var = Educ Rank	(1)	(2)	(3)	(4)	(5)
Political Stability	0.25** (0.10)	0.28** (0.11)	0.61*** (0.18)	0.66*** (0.19)	0.62*** (0.18)
Democracy		0.21** (0.09)	0.05 (0.15)	0.13 (0.18)	0.05 (0.15)
Ln(GDP per capita)		0.03 (0.12)	0.24 (0.29)	-0.04 (0.33)	0.25 (0.29)
Years of Education			0.04 (0.11)	-0.07 (0.14)	0.04 (0.11)
Military Size			0.00** (0.00)	0.01** (0.00)	0.00** (0.00)
Observations	1401	1169	454	279	452
R-squared	0.158	0.154	0.138	0.189	0.139
Adj. Rsq	0.117	0.106	0.062	0.064	0.062

Note: All regressions contain country and time fixed effects. Robust standard errors are in parentheses and are clustered at the country level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 4

Political Stability and Leader's Military Attainment.

Dep var = Military Rank	(1)	(2)	(3)	(4)	(5)
Political Stability	-0.40*** (0.13)	-0.33** (0.14)	-0.59*** (0.21)	-0.61*** (0.21)	-0.66*** (0.21)
Democracy		-0.41*** (0.10)	-0.45** (0.22)	-0.45** (0.22)	-0.34 (0.28)
Ln(GDP per capita)		0.18 (0.14)	0.41 (0.38)	0.35 (0.37)	0.77 (0.60)
Years of Education			-0.17 (0.18)	-0.18 (0.18)	-0.16 (0.28)
Military Size			0.00 (0.00)	0.00 (0.00)	0.00 (0.01)
Observations	1544	1282	509	507	303
R-squared	0.118	0.152	0.121	0.120	0.173
Adj. Rsq	0.079	0.108	0.052	0.051	0.057

Note: All regressions contain country and time fixed effects. Robust standard errors are in parentheses and are clustered at the country level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5
Different Measures for Political Stability .

Dep var = Educ Rank	(1)	(2)	(3)	(4)	(5)	(6)
Democracy	0.21** (0.09)	0.22** (0.09)	0.26*** (0.09)	0.22** (0.09)	0.47*** (0.12)	0.24** (0.09)
Ln(GDP per capita)	0.05 (0.12)	0.02 (0.12)	0.02 (0.12)	0.06 (0.12)	-0.02 (0.18)	0.03 (0.13)
Political Stability ($\rho=0.75$)	0.22** (0.10)					
Political Stability ($\rho=0.95$)		0.33*** (0.12)				
Yrs from a Coup			0.00* (0.00)			
Political Stability ($\rho=0.9$, Archigos)				0.21* (0.11)		
Government Instability (DPI 2013)					0.00 (0.00)	
Δ Mass						-0.01 (0.04)
Observations	1169	1169	1169	1169	766	1101
R-squared	0.153	0.155	0.151	0.152	0.130	0.148
Adj. Rsq	0.105	0.107	0.103	0.104	0.086	0.097
Dep var = Military Rank	(1)	(2)	(3)	(4)	(5)	(6)
Democracy	-0.39*** (0.09)	-0.43*** (0.10)	-0.47*** (0.10)	-0.41*** (0.10)	-0.35*** (0.11)	-0.47*** (0.10)
Ln(GDP per capita)	0.17 (0.14)	0.19 (0.14)	0.18 (0.15)	0.16 (0.14)	0.36 (0.23)	0.19 (0.14)
Political Stability ($\rho=0.75$)	-0.40*** (0.13)					
Political Stability ($\rho=0.95$)		-0.28* (0.14)				
Yrs from a Coup			-0.00 (0.00)			
Political Stability ($\rho=0.9$, Archigos)				-0.31** (0.13)		
Government Instability (DPI 2013)					0.00 (0.00)	
Δ Mass						0.02 (0.04)
Observations	1282	1282	1282	1282	832	1210
R-squared	0.158	0.149	0.146	0.153	0.134	0.158
Adj. Rsq	0.114	0.105	0.102	0.109	0.094	0.112

Note: All regressions contain country and time fixed effects. Robust standard errors are in parentheses and are clustered at the country level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 6
Different Measures for Educational and Military Attainment .

Dep var =	(1) Edu Rank	(2) Edu Years	(3) Edu Dist(BL)	(4) Graduate	(5) Mil	(6) High-rank	(7) Nato Rank
Political Stability	0.21 (0.18)	0.21 (0.49)	0.34 (0.47)	0.15*** (0.05)	-0.14*** (0.05)	-0.14** (0.05)	-1.00** (0.43)
Democracy	0.14 (0.13)	0.08 (0.33)	-0.01 (0.37)	0.15*** (0.06)	-0.14*** (0.05)	-0.13*** (0.04)	-1.21*** (0.30)
Ln(GDP per capita)	0.04 (0.19)	0.08 (0.51)	0.05 (0.59)	0.01 (0.05)	0.11** (0.06)	0.06 (0.05)	0.51 (0.45)
Observations	1169	1169	1053	1169	1282	1282	1282
R-squared	0.135	0.122	0.097	0.163	0.132	0.143	0.148
Adj. Rsq	0.086	0.072	0.040	0.116	0.087	0.098	0.104

Note: All regressions contain country and time fixed effects. Robust standard errors are in parentheses and are clustered at the country level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

most recent coup attempt in column 3.²³ The estimation results for the political stability variable of both regression models remain largely unchanged. Only when we use the number of years after a coup attempt (i.e., a naive linear measure), the estimated coefficient in the military attainment regression falls short of the 10% significance level. In column 4, the political stability measure is constructed by combining a country's past experiences of coups, revolutions, civil wars, etc. These past experiences are derived from the irregular entries of leaders identified by Archigos 2.9 (starting in 1946 and extended to 2011). The results have the expected signs in both tables and are significant at less than the 10% significance level. Columns 5 and 6 contain the political stability measures that are more broadly defined and focus on political (in)stability beyond leadership changes. Here, we find that both measures are insignificant at the conventional significance levels. On the one hand, as suggested, this may be due to the fact that these stability measures capture a different dimension of political stability. It, however, may also be due to the fact that the sample is somewhat different from the baseline results, especially in the case of column 5.

Different proxies for educational attainment and military attainment are used as dependent variables in Table 6.²⁴

The first four columns contain estimates for the four different measures on educational attainment. They are 1) *Edu Rank*, which contains discrete numbers ranging from 0 (illiterate) to 8 (doctorate); 2) *Edu Yrs*, which converts *Edu Rank* to years of education with the maximum being Ph.D. = 20 years; and 3) *Edu Dist(BL)*, which is the difference between *Edu Yrs* and the population's average years of education; and 4) *Graduate*, which is a dummy that equals to 1 if the leader has (at least) a master's degree and 0 otherwise. In all cases, the estimated coefficient for political stability is positive, but not significant. However, when we estimate the same models, but include our control variables (and therefore smaller sample size), we do find a significant effect for all used education measures (see Table A.1 of the Appendix). When *Graduate* is used as the dependent variable, the coefficient for political stability is significant at the 1 percent level (with and without control variables) suggesting that the impact of political stability on leader's educational attainment may be stronger at a higher educational level.

In columns 5–7, we use different measures for military attainment as the dependent variable. First, the dummy variable capturing whether the leader served in the military, *Mil*, is used. In column 6, we use a dummy variable equal to 1 if the political leader is a high-ranked officer (i.e., colonel and up) and 0 otherwise. Lastly, in column 7, the dependent variable *Nato Rank* is used, which ranges from 0 for civilians to 10 for generals. The coefficients for political stability are negative and significant at less than 5 percent level. Based on the results in Table 5 and 6, it can be concluded that our main finding is not sensitive to how political stability, educational attainment and military attainment are measured.

6. Political leaders and economic growth

In our analyses thus far, we showed that political stability increases the likelihood of having a more educated leader (and leaders with less military experience). In this section, we focus on the connection between political leader characteristics and economic growth and (re-)examine whether a leader's contribution to economic performance depends on his educational/military attainment.

Fig. 4 shows the average economic growth rate for different types of leaders and their corresponding 95% confidence intervals. In the left panel, the average economic growth rate of leaders without a graduate degree is compared to the average economic growth rate of those with a graduate degree. As the figure shows, master graduates (low-ranked officers) perform economically better than non-graduates (high-ranked officers), but the confidence intervals between the respective categories overlap. Furthermore, it can be seen that, especially for high-ranked officers, there is quite some variation in growth performance. To obtain more conclusive evidence, we follow the approach of Jones and Olken (2005) to analyze the connection between educational/military attainment and economic growth.

That is, to show a causal relationship between leaders' educational/military attainment and economic growth, we examine random leadership transitions due to natural death. The basic idea in Jones and Olken (2005) is to compare growth rates before each random exit with growth rates after a random exit and test whether they differ significantly. To do so, we average the annual growth rate over the 5 years before the death of the leader (PRE period) and the 5 years after the death (POST period). The subindex z represents a particular random transition.

$$\overline{PRE_z} = 1/T \sum_t Y_{zt}^{PRE} \quad (11)$$

$$\overline{POST_z} = 1/T \sum_t Y_{zt}^{POST} \quad (12)$$

Under the null hypothesis that leaders do not have any effect on growth, it follows that

$$\overline{POST_z} - \overline{PRE_z} \sim N[0, 2\sigma_{\epsilon z}^2/T] \quad (13)$$

where the variance $\sigma_{\epsilon z}^2$ is country specific. To apply this econometric test, we estimate the following model:

$$Growth_{izt} = \mu_i + \mu_t + \lambda_z^{PRE} PRE_{zt} + \lambda_z^{POST} POST_{zt} + \epsilon_{izt} \quad (14)$$

²³ For countries without a coup in the beginning of the sample, the value is (arbitrarily) set to 199. Naturally, this or any other arbitrarily high number does not affect our results.

²⁴ The results of Table 6 are robust to the inclusion of additional controls (i.e., *Years of Education* and *Military Size*) and will be provided upon request.

Fig. 4. Leaders' Characteristics and Economic Growth (1946–2011) Note: The y-axis in both panels shows the average annual growth rate (%) in GDP per capita (PWT, 2013). In both panels, the left bar represents leaders without a graduate degree (or a high military rank) while the right bar represents leaders with a graduate degree (or a high military rank). The vertical lines show the 95% confidence intervals.

where the dependent variable is the annual growth rate of GDP per capita obtained from the Penn World Table 8.0. PRE_z and $POST_z$ are two sets of dummies that indicate the 5 years prior to leader z 's random transition and the 5 years afterwards. Note that these two sets of dummies are defined so that the actual year of the leader's death is not included. Using this strategy helps to exclude immediate turbulence caused by the leader transition itself (see also Jones and Olken, 2005). After obtaining separate coefficients for λ_z^{PRE} and λ_z^{POST} for each random transition z , we calculate the Wald test statistic based on the null hypothesis listed in Eq (13):

$$W = \frac{1}{N_z} \sum_{z=1}^{N_z} \frac{POST_z - PRE_z}{2\sigma_{\epsilon}^2/T} \quad (15)$$

where $N_z = \sum_{l=1}^L (l = z)$. Under the null hypothesis, the product $N_z \times W$ follows a $\chi_{N_z}^2$ distribution. By conducting this test on random exits of leaders with a graduate degree or a high military rank, we examine whether leaders' educational attainment and military attainment matter for economic growth. The results are shown in Table 7.

We first compare economic growth in the 5-year period prior to the transition year with growth in the 5-year period after the transition year. Then, we shift the $POST$ dummies forward 1 and 2 years later in time to make sure the results are not simply caused by temporary changes during the transition period. In other words, we redo the analyses by further excluding the subsequent year

Table 7
Leaders and Growth: Random Exit.

Treatment Timings	Nr of Leaders	J Statistics	Wald P-Value	Mean(POST-PRE)
t	18	1.824	0.018	−0.98**
t + 1	18	2.699	0.000	−1.76***
t + 2	18	2.528	0.000	−1.78***
Highrank				
Treatment Timings	Nr of Leaders	J Statistics	Wald P-Value	Mean(POST-PRE)
t	17	0.797	0.698	−0.30
t + 1	17	0.925	0.544	0.55
t + 2	16	0.864	0.611	0.26

Note: J statistic is computed while correcting for region-specific heteroskedasticity and a region-specific AR(1) autocorrelation.

Table 8
Summary of statistics.

Variables	Obs	Mean	S.D.	Min	Max	Source	Definition
Graduate	8946	0.31	0.46	0	1	Various sources	A dummy variable that equals 1 if the leader has a graduate degree or above and 0 otherwise.
High-Rank	9195	0.22	0.41	0	1	Various sources	A dummy variable that equals 1 if the leader has a military rank degree or above and 0 otherwise.
Educ	8946	1.15	0.98	0	3	Various sources	It takes discrete numbers from 0 (below college) to 3 (doctorate)
Edu Rank	8946	5.77	1.55	1	8	Various sources	It contains discrete numbers ranging from 0 (illiterate) to 8 (doctorate)
Edu Yrs	8946	15.12	4.26	0	20	Various sources	It contains discrete numbers ranging from 0 years (illiterate) to 20 years (Ph.D.)
Edu Dist(BL)	7355	9.89	4.57	-6.80	19.64	Various sources	The difference between Edu Yrs and the average years of schooling for the population ages 15+
Military	9195	0.32	0.47	0	1	Various sources	A dummy variable that equals 1 if the leader has served in the military and 0 otherwise.
Mil Rank	9195	0.67	1.09	0	3	Various sources	It takes a value of 0 (civilian) to 3 (top-rank officer; OF-9 or OF-10).
Nato Rank	9195	1.89	3.48	0	10	Various sources	It takes a value of 0 (civilian or ranks below OF-1) to 10 (OF-10)
Democracy	8610	0.42	7.49	-10	10	Polity IV (2013)	Polity2 score
Ln(GDP pc)	7652	8.27	1.30	5.08	11.82	Penn World Table 7.1	Real GDP per capita (constant 2005 USD) in log
Political Stability ($\rho = 0.9$)	9195	0.87	0.26	0	1	Marshall and Marshall (2014)	A measure ranges from 0 (low stability) to 1 (high stability), constructed by the author.
Political Stability ($\rho = 0.75$)	9195	0.78	0.32	0	1	Marshall and Marshall (2014)	A measure ranges from 0 (low stability) to 1 (high stability), constructed by the author.
Political Stability ($\rho = 0.95$)	9195	0.70	0.37	0	1	Marshall and Marshall (2014)	A measure ranges from 0 (low stability) to 1 (high stability), constructed by the author.
Yrs from a Coup	9195	126.94	111.44	0	265	Marshall and Marshall (2014)	Number of years away from a coup.
Political Stability ($\rho = 0.9$)	9195	0.80	0.30	0	1	Archigos 2.9 (updated)	A measure ranges from 0 (low stability) to 1 (high stability), constructed by the author.
Government Instability	5641	-16.54	127.91	-999	1	DPI(2013)	It counts the percentage of veto players who drop from the government in any given
Government Stability	3645	7.66	2.19	1.00	12.00	ICRG(2013)	The government stability measure has a value ranging from 0 to 12: 12 points equates to very low risk and a score of 0 points to very high risk.
δ Mass	8184	0.00	0.64	-3.59	4.23	Databanks	The change in mass movement from the previous year.
Tenure	9195	6.76	7.71	0	48	Archigos 2.9 (updated)	Years in office for a leader's single term
Sum(Tenure)	9195	12.83	11.28	0	48	Archigos 2.9 (updated)	Total years in office
Years of Education	7509	5.45	3.07	0.02	13.09	Barro and Lee (2013)	Years of schooling (age above 15)
Foreign Imposition	9195	0.02	0.12	0	1	Archigos 2.9 (updated)	A dummy variable that equals 1 if the leader enters office through irregular means and 0 otherwise
Irregular Entry	9195	0.20	0.40	0	1	Archigos 2.9 (updated)	A dummy variable that equals 1 if the leader is imposed by a foreign state and 0 otherwise
Avg. Growth	7483	1.97	3.45	-38.42	64.20	Penn World Table 7.1	Average GDP per capita growth (annual %) over a leader's tenure
Growth	7483	1.95	6.97	-103.30	76.74	Penn World Table 7.1	GDP per capita growth (annual %)
Military Size	3601	68.05	76.32	0	507	Databanks (2010)	Size of Military/Population

Table A.1
Appendix Different Measures for Educational and Military Attainment.

Dep var =	(1) Edu Rank	(2) Edu Years	(3) Edu Dist(BL)	(4) Graduate	(5) Mil	(6) High-rank	(7) Nato Rank
Political Stability	0.85*** (0.26)	1.97*** (0.64)	1.97*** (0.64)	0.27*** (0.08)	−0.25*** (0.08)	−0.20** (0.09)	−1.69** (0.67)
Democracy	−0.07 (0.18)	−0.20 (0.40)	−0.21 (0.40)	0.11 (0.09)	−0.19** (0.08)	−0.16* (0.09)	−1.30* (0.73)
ln(GDP per capita)	0.30 (0.44)	0.65 (1.02)	0.70 (1.02)	0.06 (0.11)	0.28 (0.17)	0.12 (0.13)	1.52 (1.16)
Years of Education	−0.04 (0.17)	−0.17 (0.43)	−1.10** (0.44)	0.03 (0.05)	−0.07 (0.07)	−0.05 (0.06)	−0.37 (0.54)
Military Size	0.00* (0.00)	0.01* (0.00)	0.01* (0.00)	0.00*** (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Observations	454	454	454	454	509	509	509
R-squared	0.132	0.131	0.130	0.133	0.118	0.112	0.119
Adj. Rsq	0.054	0.054	0.052	0.056	0.049	0.043	0.050

Note: All regressions contain country and time fixed effects. Robust standard errors are in parentheses and are clustered at the country level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

and then the subsequent two years of a leader's death from the analysis.

Our results confirm the finding of Besley et al. (2011) that a leader's educational attainment positively contributes to economic growth. A random exit of a highly educated leader yields an average reduction in annual growth of 1 to 1.8 percent over the following 5 years. The effect of leaders' education on growth is significant at less than 5 percent. Meanwhile, there is no (or a slight) increase in economic growth after the death of a leader with a high military rank. Although the increase is insignificant, the results suggest that, in comparison to a highly educated leader, leaders with high military ranks perform poorly in the dimension of promoting economic prosperity.

It should be noted, however, that these results are most likely to be a conservative estimate of the true relevance of leader education for economic growth as the current analysis does not take into account who the successor is and what his educational (and military) attainment is, because such a refinement would leave us with too few observations to analyze.

7. Conclusion

We have studied the relation between political leader selection and political instability. Using a simple theoretical model, we have examined the incentives of the ruling elite when choosing the political leader. Our model describes the trade-off between a military competent leader that will secure the position of the political elite in the short-run and an economically competent leader that is potentially able to bring economic growth in the longer run. The model focuses on the pivotal role of political (in)stability and has led to the testable hypothesis that the degree of political (in)stability is a key determinant for the trade-off between economic competence and military competence. The theoretical prediction is supported using a dataset that includes 1569 national leaders from 177 countries over the period 1946–2011. In a subsequent analysis, we also focused on leader characteristics and economic growth. We were able to confirm the findings of Besley et al. (2011) regarding economic competence and economic growth. In addition, new results regarding military competence and economic growth suggest that there is hardly any relation between the two.

As such, this paper provides another channel why political (in)stability is a determinant of economic growth: in a politically stable environment, economically competent political leaders are more likely to be selected in office and increase the likelihood of economic growth. In addition, our results also provide a rationale for the so-called coup trap: in a politically unstable environment, leaders will be selected that will only protect the interests of the ruling elite, which may trigger the incentives of the opposition to mount another coup.

No doubt, our study also has its limitations. That is, we have limited ourselves to study one specific aspect of political instability, which is the occurrence of coup d'états. As Jong-A-Pin (2009) shows, political instability has different dimensions and, hence, the findings reported in this paper can be only attributed to one of these dimensions. Whether the effect can be extended to other types of political instability needs to be investigated further in future research. Finally, an aspect that would deserve more attention in future research is the relation between leader characteristics and economic growth. As the sample of political leaders with specific personal characteristics regarding military and educational attainment is (still) very small, the estimates reported in this paper have relatively large confidence intervals. As time will pass by, we will be able to estimate the impact of leader characteristics on (changes in) economic growth rates more precisely.

Appendix A

A1. The negative association between economic competence (e) and military competence (m)

In Section 2, m and e are assumed to have a perfect negative association, i.e., $E(m) = 1 - e$. Here we assume that the negative

association between m and e is not perfect, i.e. $E(m) = 1 - \alpha e$, where α ($\alpha \in [0, 1]$) is a known constant and indicates the correlation between e and m .²⁵ This implies the following changes to the coup success rate (s), the probability of a coup attempt (χ), the probability of having a successful coup attempt (p), and hence the expected utility of the ruling elite:

$$\begin{aligned} s &= \alpha e(1 - d) \\ \chi &= 1 - \frac{1 - x}{(1 - d)\alpha} \\ p &= (\alpha + 1 - \alpha d - \frac{1}{x})e \\ EU^R &= (1 - p)ex \\ &= ex - (\alpha + 1 - \alpha d - \frac{1}{x})xe^2 \end{aligned}$$

When a sufficient share of the rents has to go to the ruling elite, political stability is not too high, and α is not so low that $x > \frac{1}{\frac{1}{2} + (1 - d)\alpha}$, the optimal choice of the ruling faction is to set e to $e^* = \frac{1}{2(\alpha + 1 - \alpha d - \frac{1}{x})}$.²⁶ We calculate the partial derivative of e^* over d to show how the optimal choice of a leader evolves along the level of political stability:

$$\frac{\partial e^*}{\partial d} = \alpha \frac{1}{4(\alpha + 1 - \alpha d - \frac{1}{x})^2} \quad (16)$$

Since $\frac{\partial e^*}{\partial d}$ is strictly positive, we confirm the finding in Section 2 that when a coup success is possible, a leader's optimal economic competence level increases with the level of political stability while the reverse holds for a leader's optimal military competence level.

A2. Regime types

Here the basic model is extended by introducing different sizes of the ruling elite and the opposing elite to show how regime types influence the impact of political stability on leader selection. Normalizing the size of the opposing elite to be 1, the size of the ruling elite is assumed to be w .²⁷ Here w represents de facto democracy level of the regime (Acemoglu and Robinson, 2006). Since rents need to be evenly distributed among the ruling elite, the expected utility of the ruling elite in the beginning of period t becomes:

$$EU^R = (1 - p)e \frac{x}{w} \quad (17)$$

Since other equations (i.e. s , χ and p) remain the same, Eq (17) can be extended as follows:

$$\max_e EU^R(e) = e \frac{x}{w} - (2x - dx - 1) \frac{e^2}{w} \quad (18)$$

It is found that the ruling elite's optimal choice of e equals $e^* = \frac{1}{4 - 2d - \frac{2}{x}}$ under the same condition as depicted in Section 2. As the condition and the expression for e^* remain the same as in Section 2, the main result of Section 2 does not change when allowing for different sizes of the ruling elite and the opposing elite.

A3. Two-period model

When extending the one-period model to a two-period model, the ruling elite in each period will maximize their payoffs by selecting the optimal incumbent for each period (which is the sub-game perfect equilibrium). In Section 2, it is shown that the optimal choice of economic competence in period t is $e_t^* = \frac{1}{2(2 - d - \frac{1}{x})}$.²⁸ Here we derive the value of e_{t+1}^* , i.e. the optimal economic competence level of the incumbent in period $t + 1$. We show that the absence of a coup attempt in period t moves the ruling elite to select a more educated leader with less military experience in period $t + 1$, while the opposite happens if a coup attempt occurs in period t .

As shown in Eq (8), when observing d_t in the beginning of period t , d_{t+1} equals $1 - \rho(1 - d_t)$ without a coup attempt and 0 otherwise. This means that in period $t + 1$, the coup success rate (s_{t+1}), the probability of a coup attempt (χ_{t+1}), the probability of having a successful coup attempt (p_{t+1}), and the expected utility of the ruling elite are as follows in the absence of a coup in period t :

²⁵ Similar to Section 2, the candidate's true military competence equals $m = 1 - \alpha e + \epsilon$ where ϵ follows a normal distribution $N(0, 1)$.

²⁶ For the ruling elite to make a tradeoff between e and m , it requires a coup success to be possible (i.e., p_t is positive), which implies $x > \frac{1}{1 + (1 - d)\alpha}$. Since $e \in [0, 1]$, to make sure that $e^* \in [0, 1]$ further requires $x > \frac{1}{\frac{1}{2} + (1 - d)\alpha}$.

²⁷ When interpreting these parameters according to the selectorate theory of Bueno de Mesquita et al. (2003), ruling elites correspond to the winning coalition while opposing elites are the selectorate members who are not in the winning coalition.

²⁸ Time subscript t is added in this section to indicate the results in period t , which have been shown in Section 2.

$$\begin{aligned}
s_{t+1} &= e_{t+1}(1 - d_t)\rho \\
\chi_{t+1} &= 1 - \frac{1 - x}{(1 - d_t)\rho x} \\
p_{t+1} &= (\rho(1 - d_t) - \frac{1 - x}{x})e_{t+1} \\
E_{t+1}^R U &= e_{t+1}x - (\rho(1 - d_t)x - 1 + x)e_{t+1}^2
\end{aligned}$$

To maximize EU_{t+1}^R , the optimal choice of the ruling elite would be $e_{t+1}^* = \frac{1}{2(1 + \rho(1 - d_t) - \frac{1}{x})}$ when $x > \frac{1}{\frac{1}{2} + \rho(1 - d_t)}$. Since $(1 - d_t)(1 - \rho) > 0$, we know that e_{t+1}^* is strictly higher than e_t^* . Therefore, we show that the absence of a coup attempt for one period moves the ruling elite to select a more educated leader with less military experience.

If a coup attempt occurred in period t , d_{t+1} drops to zero. Despite the result of the coup attempt in period t , the ruling faction in period $t + 1$ deals with the following factors:

$$\begin{aligned}
s_{t+1} &= e_{t+1} \\
\chi_{t+1} &= 2 - \frac{1}{x} \\
p_{t+1} &= (2 - \frac{1}{x})e_{t+1} \\
E_{t+1}^R U &= e_{t+1}x - (2x - 1)e_{t+1}^2
\end{aligned}$$

Since $x > \frac{1}{2}$, the optimal choice of the sitting ruling elite is $e_{t+1}^* = \frac{1}{2(2 - \frac{1}{x})}$. Since $d \in (0, 1)$, $e_{t+1}^* < e_t^*$. Therefore, a coup attempt in period t will drive the ruling elite to select a less economic competent leader.

A4. Assumptions about coup success

We relax the assumption on coup success rate in Section 2. Specifically, instead of assuming $s = e(1 - d)$, we let

$$s = s(e, d),$$

where $s_e > 0$, $s_d < 0$, $s_{ee} \geq 0$, $s_{ed} \geq 0$. Here $s(e, d)$ is a convex function of the incumbent's economic competence e , which implies that coup success rate will increasingly increase as e increases. This also implies that coup failure rate, which is $1 - s(e, d) = 1 - s(1 - m, d)$, is a concave function of the incumbent's military competence (m) that decreasingly increases as m increases.

It follows that the probability of a successful coup, p , can be written as

$$p(e, d) = s(e, d) - \frac{1 - x}{x}e.$$

Then,

$$\begin{aligned}
p_e &= s_e - \frac{1 - x}{x} \\
p_d &= s_d \\
p_{ed} &= s_{ed}.
\end{aligned}$$

Therefore, $p_e > 0$ when $s_e > \frac{1 - x}{x}$; $p_d < 0$, and $p_{ed} \geq 0$.

The optimization problem remains the same as before—ruling elite maximizes the expected utility by choosing the incumbent's economic competence e :

$$\max_e EU^R(e) = [1 - p(e, d)]ex$$

The optimality condition is

$$1 - p(e, d) = p_e e \quad (19)$$

Note when $x > \frac{1}{s_e(0, d) + 1}$, the LHS of (19) is decreasing in e and increasing in d , while the RHS is increasing in e and non-decreasing in d . Therefore, given d , there is a unique solution of e when x is above a threshold. Moreover, the higher d is, the higher is the equilibrium level of e . In other words, the ruling elite would select economically more competent leaders when political stability is higher.

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