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Economic Growth and Political Survival

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Using data for 160 countries for the period 1963-2001, this paper examines the short-run relationship between economic growth and changes in national leader. To address the potential endogeneity of economic growth, I use exogenous variation in commodity export prices, export partner incomes, precipitation, and temperature to instrument for a country's rate of economic growth. The results indicate that more rapid economic growth increases the short-run likelihood that national leaders will retain their positions. The findings are similar for both democracies and autocracies and indicate that faster economic growth reduces the likelihoods of both regular leader exits and irregular leader exits such as coups. The results also suggest that stronger economic growth reduces the likelihood that national leaders employ oppressive tactics against opponents.

Keywords: economic growth; politics; political survival; political change; leader turnover

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1 Introduction

Does a strong economy increase the likelihood that national leaders will remain in office? The impact of the state of the economy on political survival is a question of fundamental importance in political economy, but one for which existing evidence is incomplete. Prior studies generally identify a positive relationship between economic growth and the electoral success of incumbents in democracies (see, for example, Kramer 1971, Fair 1978, Tufte 1978, Hibbs et al. 1982, Markus 1988, Palmer and Whitten 1999, Lewis-Beck and Stegmaier 2000, Wolfers 2002, Brender and Drazen 2008, Leigh 2009). But many leaders lose their jobs outside of elections, and many countries do not have free and fair elections. Few studies examine the broad relationship between economic growth and political survival in both democracies and autocracies. In addition, prior studies on the effect of the economy on political outcomes generally ignore the potential endogeneity of economic growth.[1]

Leadership matters. National leaders have a significant influence over economic, social and political developments in their countries, and in some cases internationally, and commonly attempt to distinguish themselves from their predecessors (Jones and Olken 2005, 2009, Brender and Drazen 2009). Exits of individual national leaders are often associated with moments of substantive political change. Despite the widely-recognized importance of political leadership, how much more likely leaders are to lose their jobs as a result of a weakening economy is not clear. Whether the rate of economic growth systematically affects the abilities of individual leaders to succeed in their positions is of considerable consequence, and of interest to policy makers, domestic participants in the political process, outsiders who wish to encourage or discourage leadership transitions, and others. Whether economic growth

[1] One notable exception is Deaton and Miller (1995), who use a commodity price index to instrument for economic growth in a study on the determinants of political survival in sub-Saharan Africa.

has differing implications for democratic leaders or autocratic leaders, and whether certain modes of leader exit are more dependent on the state of the economy, are also of relevance to informing both policy and political theory.

A negative relationship between economic growth and national leader change for the world as a whole for the period 1963-2001 can be seen in Figure 1. There are three potential reasons for this negative relationship. First, economic growth may be important for political survival. Second, leadership stability may be important for economic growth. Finally, the negative correlation may be explained by other factors, such as common time effects or the timing of term limits.

This paper models the determinants of leader changes, defined broadly to cover all changes in primary national effective leader for any reason other than natural death or deposition by a foreign state.[2] An instrumental variables (IV) approach is adopted to identify an internally-valid estimate of the causal impact of economic growth on leader changes. Four instruments for economic growth are employed: variation in commodity export prices, export partner incomes, precipitation, and temperature. Estimations are carried out for a large country-level panel data set, and control for a host of variables that may directly affect leader exits and for country and year fixed effects. The results indicate that faster economic growth significantly improves the short-run political survival prospects of national leaders, and that the effect of economic growth on political survival is similar in both democracies and autocracies. As far as I am aware, this is the first study to provide robust evidence of a broad causal impact of

[2] Results are equivalent using a dependent variable that explicitly measures leader survival. I model exits to be consistent with the approach taken elsewhere in the literature (for instance, Deaton and Miller 1995).

economic growth on national leader political survival. The paper also provides evidence that national leaders are less likely to oppress political opposition when the economy is strong.

The remainder of this paper is organized as follows. Section 2 discusses theory and existing evidence on economic growth and leadership change. Sections 3 and 4 outline the empirical approach and discuss the data used in the study. Estimation results are presented in Section 5. The final section concludes.

2 Economic growth and short-term political survival prospects

There are a number of reasons why the political survival prospects of a national leader may be improved by a stronger economy – even if the stronger economy is the result of factors outside the leader's control (such as improvements in economic conditions in export markets). *Ex ante*, these reasons may apply to both democratic leaders and autocratic leaders.[3] First, members of the selectorate (those with an influence over the choice of national leader, including voters, cabinet members, the military, and others) may use the economic growth rate as a proxy for leader competence and be more likely to support the incumbent leader if the economy is growing quickly. They might be particularly likely to do so if they have imperfect information on the economy and/or the incumbent leader's performance (Alesina et al. 1997). Second, a stronger economy may make it easier for an incumbent leader to pursue their political agenda, provide goods and services to the public, meet their political promises,

[3] The selectorate theory of Bueno de Mesquita et al. (2003) implies that leaders of democracies are more vulnerable to economic slowdowns than leaders of autocracies because democratic leaders must work to maintain the support of larger "winning coalitions" (and maintaining this support is more difficult when the economy is weak). Whether the effect of growth on political survival differs for democracies and autocracies will be explored.

maintain or build patronage networks, and buy-off real and potential opposition. Further, a stronger economy may lead to an improvement in the national government's fiscal balance, which is often electorally popular (Brender and Drazen 2008). By increasing the opportunity cost of time, a rapidly growing economy may also reduce the ability of political opponents to drum up support for their cause. Conversely, an economic slowdown that reduces the opportunity cost of time (by increasing the numbers of the unemployed, for instance) may make it easier for oppositions to organize political resistance.

Counter arguments also exist. Olson (1963) and Huntington (1968, 1991) hold that stronger economic growth could increase inequality and strain the social fabric, potentially leading to political instability. Economic slowdowns may also favor the experience of the incumbent leader and lead to calls for political stability in the face of economic uncertainty. Or perhaps there is no systematic relationship between economic growth and leadership change. If members of the selectorate believe that national leaders have little impact on aggregate economic growth or if they are able to directly judge the leader's performance, their support for the leader may be unrelated to the national economic growth rate.

Complicating the situation, there is evidence that political factors affect the economy. Barro (1991), Barro and Lee (1994), Alesina et al. (1996), Brunetti (1997), and Przeworski et al. (2000), for instance, find that political instability (which is often related to leader exits) is harmful to the economy. Political instability may entail protests, high uncertainty, and low investment. In addition, leaders may attempt to influence the economy with the aim of improving their electoral prospects (see Drazen 2000 on the political business cycle). National leaders with falling popularity may seek to artificially stimulate the economy through government spending, for instance.

Further still, other variables may affect both political survival and the state of the economy. One of these variables is leader competence: there is evidence that leaders can have an impact on the health of the economy (Jones and Olken 2005), and voters, cabinet and others are likely to reward competent leadership. Other variables affecting both political survival and the state of the economy may include institutions, regime type, government policies, global events such as the end of the Cold War, and expectations concerning political stability.

Existing evidence generally indicates that faster economic growth improves political survival prospects. As discussed, there is substantial evidence that incumbents are more likely to win elections if the economy is strong. Studies such as those of Londregan et al. (1995), Carmignani (2002), Bueno de Mesquita et al. (2003), and Marinov (2005) report a negative relationship between economic growth and political exits more generally. Lindenberg (1990) and Remmer (1991) find that economic slowdowns undermine incumbent leaders in Central America. Li and Zhou (2005) conclude that economic growth is also important for the short-term job security of Chinese provincial leaders. Londregan and Poole (1990) present evidence that lower incomes facilitate coups, although find statistically insignificant evidence on whether the *t*-1 economic growth rate affects the likelihood of coups in year *t*. Bienen and van de Walle (1991, 1992) find no evidence for a global sample that a country's average economic growth rate increases leadership duration prospects, although do not look at whether the annual rate of economic growth affects short-term political survival prospects. Besley and Kudamatsu (2008) identify leadership turnover as a characteristic of successful autocracies, yet there is little evidence on whether the state of the economy is important to the timing of the political exits of autocrats.

The challenge in identifying the effect of the state of the economy on political survival is working out what causes what, but only a limited number of studies have adopted estimation techniques that address the potential endogeneity of economic growth. Alesina et al. (1996) use a simultaneous equation specification to model the relationship between economic growth and changes in national leaders. They find evidence that slow growth increases the likelihood of coups and no statistically significant evidence that the GDP growth rate affects other types of leadership change. But their practice of instrumenting economic growth with education is not convincing: education levels are slow moving, and may not be exogenous to political change. Deaton and Miller (1995) use a commodity price index to instrument for economic growth in Sub-Saharan African countries, and find a negative but statistically insignificant effect of economic growth on political exits. Wolfers (2002) investigates whether gubernatorial election results in the United States are affected by shocks to state economies from the national economy and from oil prices, and finds that positive economic shocks increase the likelihood of re-election. Brender and Drazen (2008) and Leigh (2009) examine the impact of (exogenous) changes in world economic activity on the results of national elections. Only the latter of these two studies finds that a faster-growing global economy aids national leader re-election prospects. In reduced-form estimations, Dell et al. (2008) find that temperature increases raise the likelihood of coups in poor countries.

In a related literature, Burke and Leigh (2010) use several IV approaches to investigate the impact of economic growth on the short-term likelihood of institutional change toward or away from democracy. They find evidence that adverse economic shocks from the weather trigger democratic change but no evidence that such shocks affect the likelihood of democratic reversals, and also no evidence that shocks to the economy from commodity export prices

affect the likelihoods of either democratic change or democratic reversals. The empirical approach adopted in this paper extends on that of Burke and Leigh.

3 Empirical approach

3.1 Estimation model

The model for estimation is of the form:

$$D_{c,t} = \alpha G_{c,t-1} + \mathbf{x}'_{c,t-j}\boldsymbol{\beta} + I_c + I_t + \varepsilon_{c,t} \qquad (1)$$

where the dependent variable is a dummy variable equal to 1 if the effective primary national leader at the start of year *t* exits office during year *t* (excluding exits due to natural death or deposition by another state), and 0 otherwise. This dependent variable covers exits of leaders brought about by election loss, resignation, loss of cabinet support, loss of the support of the legislature, sickness, coup, popular revolt, assassination, domestic armed rebellion, and other means.[4] $G_{c,t-1}$ is the real gross domestic product (GDP) per capita growth rate in year *t*-1 (growth in year *t*-1 is used to ensure it is prior to year-*t* leader exits). $\mathbf{x}'_{c,t-j}$ is a vector of time-varying control variables for year *t*-1 or *t*-2 (i.e. *j* = 1 or 2), I_c is a vector of country fixed effects, I_t is a vector of year fixed effects, and $\varepsilon_{c,t}$ is an error term, with $E(\varepsilon_{c,t}) = 0$.

[4] Leader exits in the estimation sample include: President George H.W. Bush (United States 1993, election loss), President Suharto (Indonesia 1998, resignation), Prime Minister Margaret Thatcher (United Kingdom 1990, loss of cabinet support), Prime Minister Michael Manley (Jamaica 1992, sickness), Prime Minister Chatichai Choonhavan (Thailand 1991, coup), Prime Minister Hendrik Frensch Verwoerd (South Africa 1966, assassination), Prime Minister Bartholomew Ulufa'alu (Solomon Islands 2000, removed by domestic rebel forces), and President Nicolae Ceaușescu (Romania 1989, removed by popular revolt).

Equation 1 is initially estimated using a fixed effects linear probability model (LPM), a fixed effects logit model, and a fixed effects Cox proportional hazard model. A probit model is not estimated because it is not suited to a fixed effects treatment (Greene 2000). The inclusion of country fixed effects is important because unobserved time-invariant factors, such as difficult-to-measure characteristics of the electoral system, may affect both political stability and economic growth. All estimates include year fixed effects. The set of controls is made up of variables that may affect the probability of political survival, including lagged values of log GDP per capita, the secondary school enrollment rate, the percentage of people aged 65 years and above, the tenure of the leader in power at the start of year *t* in years, the age of the leader in power at the start of year *t*, a dummy variable equal to 1 if the leader in power at the start of year *t* is female and 0 otherwise, a variable measuring the number of times the leader has previously held the office, a dummy variable equal to 1 for leaders who entered office in an "irregular" manner (e.g. via a coup) and 0 otherwise, a dummy variable equal to 1 for the years 1989-1992 for countries classified as transition economies by the Development Research Institute (DRI) and 0 otherwise, a dummy variable for countries that are classed as democracies at the end of year *t*, dummy variables for elections that affect the effective primary national leader, and a dummy variable for the year of a legal term limit.[5] The first three of these controls are measured at *t*-2 so that they are not affected by year *t*-1 growth, while the other controls are measured at *t*-1. Additional controls, such as party fixed effects,

[5] The inclusion of log GDP per capita$_{t-2}$ in the regressions raises the issue of the potential endogeneity of *t*-2 GDP, but has little impact on the estimated coefficient for the explanatory variable of primary interest, GDP per capita growth$_{t-1}$. I control for elections in years *t* and *t*-1 as, in some countries, leaders leave office in the calendar year after elections are held. The timing of elections may be endogenous, because in many countries the national leader and/or legislature can choose or influence the timing of elections, but the inclusion of the election dummies does not substantially affect estimated coefficients on GDP per capita growth$_{t-1}$.

are included in robustness checks. Estimated standard errors are robust to heteroscedasticity and are clustered at the country level to account for possible serial correlation.

3.2 Instrumenting for economic growth

Despite the lagging of growth, it is possible that it is endogenous to the system. Endogeneity may operate through a number of mechanisms. As discussed, political instability may be harmful for growth, as times of political instability may be characterized by uncertainty, the mobilization of protestors, low investment, and reduced tourism. Expectations of political change may also harm growth, and the competence of incumbent leaders and challengers may affect both current economic growth and the likelihood of leader change. The policies and actions of the incumbent government (and others) may also affect both the economy and the likelihood of the national leader remaining in office. Given the infeasibility of controlling for unobservable factors such as anticipation of upcoming leader change, leader competence, and all relevant policies, an IV approach is required to obtain a consistent estimate of the impact of economic growth on political survival, and to ensure that estimates represent causal impacts of growth on political survival, rather than simply correlation. The IV approach also allows potential attenuation bias arising from measurement error in national income data, for which there is significant evidence (Heston 1994), to be addressed.

Four strategies to instrument for economic growth are employed. The strategies involve using sources of variation in economic growth resulting from the international economy or the weather which in most cases are unlikely to be affected by political developments in any specific country. To my knowledge, the selected instruments have not previously been used in

a global study of political survival. I am unaware of any other instruments for economic growth of relevance to this paper that have been used elsewhere in the literature.[6]

The first IV strategy is to instrument for economic growth using changes in commodity export prices following Burke and Leigh (2010). Burke and Leigh construct a commodity export price index using country-specific commodity weights based on the share of each commodity in a country's (50-commodity) commodity export bundle in 1995.[7] These weights are held fixed over time and applied to deflated world price indices to produce a country-specific arithmetically weighted index of world commodity prices. The differenced log of the index is multiplied by the share of exports of the 50 commodities in GDP in 1995 to allow the effect of commodity price fluctuations on economic growth to be larger for countries that are more dependent on commodity exports. The most important commodities in the index in value terms are oil, fish, natural gas, aluminium, and coal.

The second IV strategy is to instrument for growth using a weighted export partner growth rate. This strategy follows evidence that economic growth is strongly affected by the rate of growth in export partner economies, even in estimations that control for distance-weighted and world GDP growth rates (Arora and Vamvakidis 2005). Similar IV approaches have been

[6] The terms of trade has been used to instrument for five-yearly changes in income (see e.g. Pritchett and Summers 1996). Terms of trade data are unavailable for the majority of country-years in the estimation sample.

[7] Using fixed weights ensures that the within-country variation of the instrument only reflects year-to-year changes in global commodity prices and is not affected by (potentially endogenous) reorientations of export quantities. A similar point applies to the time-invariant weights used in the construction of the other three instruments. The primary reason for using 1995 weights is that data for 1995 allow broad country coverage. Recent weights are also of greatest relevance for more recent years, which make up a disproportionate share of the sample. Robustness issues are explored in section 5.

used in different contexts by Acemoglu et al. (2008) and Brückner and Ciccone (2010). Weights are based on the share of each export market in a country's total exports in 1995, using data from the International Monetary Fund's Direction of Trade Statistics. The largest export market is most commonly the United States (23% of countries in the sample), Germany (14%), the United Kingdom (8%), Japan (7%), Russia (7%), France (6%), or Italy (5%). The weighted export partner growth rate is multiplied by the share of exports in GDP in 1995 to allow export partner growth to be of greater importance to economic growth in relatively more export-oriented economies.

The third IV strategy is to instrument for GDP growth using precipitation variation following Miguel et al. (2004) and Burke and Leigh (2010). I weight the country-average proportional change in precipitation with the 1995 share of the labor force in agriculture to allow the effect of temperature changes on economic growth to be larger for more agricultural countries.

The fourth IV strategy is to instrument for economic growth using temperature variation. Dell et al. (2008) and Burke and Leigh (2010) show that temperature variation is strongly correlated with economic growth at the country level. I instrument using the year-to-year change in country-average temperature in ºC and also the year-to-year change in country-average temperature in ºC interacted with a dummy variable for countries with an average temperature for the period 1960-1970 of less than 12ºC (to allow temperature variation to affect economic growth differently in cold countries).[8] These two temperature instruments are also multiplied by the share of the labor force in agriculture in 1995 to allow the effect of temperature changes on economic growth to be larger for more agricultural countries.

[8] The countries on either side of this cut-off are Azerbaijan (average 11.95ºC) and Spain (average 13.21ºC). Results are similar if alternative cut-off temperatures to divide warm and cold countries are used.

The use of the four IV strategies is appealing because the instruments provide sources of exogenous variation that are correlated with economic growth in different ways, allowing the estimation of IV regressions based on different local average treatment effects. Commodity export prices and the pace of economic growth in the economies of export partners are demand-side factors that are of primary relevance for export-oriented sectors, whereas precipitation and temperature variation are supply-side factors likely to be most strongly correlated with growth in agricultural output.[9] The strongest correlation between the instruments is that between the precipitation and temperature instruments, which have a correlation coefficient of -0.23. The commodity price instrument and the export partner growth instrument have a correlation of 0.07.

The instruments are not without limitation. While the weather and commodity prices may be of high relevance for economic growth in low-income economies and commodity-based economies, they are likely to be of less relevance for modern high-income economies. World commodity prices and export partner incomes may also not always be exogenous, as they might in some instances be affected by in-country political developments, particularly in countries that are important commodity exporters or have large economies. Nevertheless, similar results are obtained in estimations that exclude large commodity producers or large economies from the sample, as will be discussed. The exclusion restriction is that the instruments are orthogonal to the error term in Eq. 1, so that they are only correlated with leader exits via their impact on economic growth. One can imagine ways in which this assumption might be violated. For example, the weather may directly affect political rallies, or

[9] Precipitation is also important for other water-intensive activities, such as hydroelectricity generation. There is also evidence that higher temperatures reduce labor productivity and industrial output (Dell et al. 2008).

commodity prices may have a direct effect in the political sphere over and above their effect via output. Although the data suggest that the instruments operate via the growth channel in a quantitatively important manner, they do not allow the possibility that the instruments operate via alternate channels to be dismissed.[10] If the instruments do not in fact satisfy the exclusion restriction, the results nonetheless suggest a strong impact of international commodity prices and export partner growth rates on the timing of leader exits, which merits attention in future research.

The extent to which the IV results can be generalized relies on the assumption that the estimated local average treatment effects emerging from the IV specifications are representative of the overall average treatment effect of GDP growth on the likelihood of political survival (Dunning 2008). Despite the difficulty of generalizing IV estimates, the effects of growth shocks from the international economy and from the weather on the likelihood of national leader political survival are themselves of inherent interest – even if these effects may potentially differ from other partial effects such as the effect of policy-influenced growth.

4 Data

Effective primary national leader data are sourced from the Archigos dataset (Goemans et al. 2009) and GDP data are from the World Bank. The secondary school enrollment series is

[10] One way to investigate the direct impact of the instruments on protests is to estimate the reduced-form relationship between the instruments and anti-government protests of at least 100 people, as measured by Databanks International. I find no evidence that the set of instruments jointly affect the number of protests in year *t*-1 or year *t* in fixed effects specifications, with or without controlling for per capita GDP growth (see Web Appendix).

constructed using World Bank and DRI data. Precipitation and temperature data are sourced from Mitchell et al. (2004) and were constructed by geographically locating meteorological stations according to grids of 0.5º latitude and longitude, allocating grid boxes to countries, and calculating the mean of grid boxes for each country. A list of data sources and variable definitions is provided in the Appendix.

The weather data are available until 2000, limiting the estimation period to 1963-2001.[11] Saudi Arabia is excluded from the dataset given that it has a large influence over the price of oil (which is the most important commodity covered by the commodity price instrument). The estimation dataset consists of 4,742 observations for 39 years (1963-2001) and 160 countries. There is at least one leader exit (excluding natural deaths and foreign depositions of leaders) in 773 of these country years (16%). Leader changes are more common in democracies (which have a mean of three leader changes each decade) than autocracies (one change per decade). Summary statistics are presented in Table 1.

A negative association between economic growth and political exits is evident in Figure 2, which plots the average GDP per capita growth rate for countries in the estimation sample for the years adjacent to leader changes, demonstrating the average within-country variation of growth in the years before and after leader changes. A large reduction in GDP per capita growth in the year prior to leader changes and the year of leader changes can be seen: times of political change tend to be times of slow growth. As discussed, this may be because a slowing economy harms the political survival prospects of national leaders; and/or because leader

[11] Results are not sensitive to the end date: LPM, logit, hazard model, and IV results using the commodity price and export partner growth instruments are similar for a sample period that extends to 2004, the latest year for which the Archigos data are available.

change harms the economy; and/or because other factors affect both the economy and political survival. An IV approach is required to obtain a consistent estimate of the causal impact of economic growth on political survival.

5 Results

5.1 Fixed effects linear probability, logit, and Cox proportional hazard results

Fixed effects LPM results are presented in columns 1-2 of Table 2. The results indicate a negative impact of lagged GDP growth on the likelihood of leader exits. A one percentage point increase in the GDP per capita growth rate on average reduces the likelihood of an exit of the national leader in the next year by 0.3 percentage points, equal to a 1.7% reduction in the average likelihood of leader change in the subsequent 12 months. The result is statistically significant at the 1% level.

Fixed effects logit results are presented in columns 3-4 of Table 2. The logit estimation sample is by necessity limited to those countries experiencing variation in the dependent variable.[12] Estimated marginal effects from fixed effects logit models are biased in the presence of substantial heterogeneity across the fixed effect unit, and so the fixed effects logit results are presented as odds ratios. An odds ratio of 1 indicates that a conditional increase in the independent variable is not associated with any change in the dependent variable, while an odds ratio above (below) 1 indicates that an increase in the independent variable raises (lowers) the dependent variable. The odds ratio on GDP per capita growth is 0.97 in the logit

[12] 18 countries that experienced no change in national leader for reasons other than natural death or foreign deposition during the years in which that country is in the dataset are excluded from this estimation sample. Switzerland is also excluded, because each President of the Swiss Confederation serves for only one year.

estimates (significant at the 1% level), indicating that a percentage point increase in the growth rate lowers the probability of leader change by 3%. There is at least one leader exit in 16.8% of years in the logit sample so, at the mean, a 3% drop in the probability of leader change is equivalent to a 0.5 percentage point reduction (i.e. from 16.8% to 16.3%). This suggests that the logit estimates on the effect of growth on leader exits are slightly larger than the linear estimates. Estimated hazard ratios from the Cox proportional hazard model (columns 5-6 of Table 2) are similar to the odds ratios in the logit estimations.[13]

Results on the control variables in the fixed effects LPM, logit and hazard models indicate that a strong ageing effect exists: older leaders are statistically more likely to lose their jobs (even after controlling for tenure length). Leaders are more likely to remain in office if they have previously held (and lost) office. All else equal, leaders in Eastern European transition economies were more likely to lose office during the transition years of 1989-1992. Unsurprisingly, leaders are more likely to lose office subsequent to elections, and upon reaching their term limit. While the coefficient for the democracy dummy is statistically insignificant in the estimations with the full set of controls in Table 2, significant estimates for the democracy dummy are obtained in specifications that do not also control for elections and term limits, with the LPM estimate indicating that a switch to democracy increases the likelihood of a change in leader in any given year by around 9 percentage points (statistically significant at the 1% level). The results indicate that per capita GDP, the number of years the leader has been in office, whether the leader entered office legally or otherwise, and the gender of the national leader on average have no significant impact on the likelihood that national leaders will lose office.

[13] Similar results are also obtained for the exponential, Weibull, or Gompertz survival models.

5.2 Instrumental variable results

Fixed effects LPM, logit, and hazard model results may suffer from bias due to the possible endogeneity of economic growth. In this section, the results from the IV specifications are presented. IV estimates are generated using the Fuller 1 estimator (Fuller 1977), which is a bias-corrected version of the limited information maximum likelihood estimator, and provides the most unbiased estimates for inference purposes when instruments are potentially weak (Stock et al. 2002, Hahn and Hausman 2003, Stock and Yogo 2005). (Two-stage least squares estimates are similar.) Partial *R*-squared and *F* statistics on the excluded instruments are presented. The *F* statistic on the excluded instruments is the Stock-Yogo weak instruments test statistic. 5% significance level critical values for Stock-Yogo tests of both 30% and 5% maximal Fuller relative bias are also shown. Additional lags (i.e. for year *t*-2) of all instruments are not statistically significant, and so are not included in the regressions. Because non-linear IV models can be unreliable (Angrist and Krueger 2001), IV results are presented for only a linear model. Tests of endogeneity and overidentification using the full set of instruments suggest that economic growth is not exogenous and provide no evidence that the null hypothesis that the instruments are valid can be rejected.

IV estimates of Eq. 1 without the time-varying country controls are shown in Table 3. IV estimates use each of the instruments separately (columns 3-6), and consider the instruments jointly (column 2). The instruments, when considered jointly, safely pass the Stock-Yogo test for weak instruments, and explain 2.3% of the variation in GDP per capita growth for the sample (after country and year fixed effects are controlled for). The coefficients on the instruments in the first-stage regressions are of the expected signs.

Using all of the instruments (column 2 of Table 3), an estimate of the impact of growth on leader change that is four times larger than the fixed effects LPM result (column 1 of Table 3) is obtained. The estimate indicates that an additional percentage point of per capita GDP growth reduces the likelihood of a change in national leader in the next year by 1.1 percentage points. This equals a 7% reduction in this likelihood, which is a large effect. The IV result implies that an additional percentage point of per capita GDP growth has a similar effect on the short-run likelihood of a change in national leader as having a leader who is three years younger.

The IV result on per capita GDP growth, significant at the 5% level, is driven primarily by the impact of fluctuations in commodity export prices and export partner growth rates. The estimated coefficients on growth using the commodity price variation and export partner growth instruments in columns 3-4 of Table 3 are both negative and statistically significant, indicating that the local average treatment effect of shocks from world commodity prices and from the economies of export markets on leader exits are similar. The similarity of the coefficient estimates instrumenting with either international commodity price movements or export partner growth rates provides reassurance against the concern that the results are a product of a violation of the exclusion restriction in either estimation. Estimates using the weather instruments (columns 5-6 of Table 3) suggest a negative effect of economic growth on leader exits, but one that is not statistically significant.

In Table 4, additional controls are added to the IV estimates. The results on the effect of growth on leader change are similar to those in Table 3, and results on the control variables are similar to those in the LPM specification. Subsequent tables will control for these

additional variables, but results for these variables will not be reported. (Result tables with the estimated coefficients for the controls are supplied in a Web Appendix.)

There are a number of potential reasons for why the IV estimates of the impact of per capita GDP growth on the likelihood of leader exits are larger (in absolute value terms) than the LPM estimates. One possibility is that the political implications of changes in export-sector growth rates are indeed particularly large, perhaps because political elites are disproportionately involved in export activities. A second is that leaders react to negative economic shocks via increased government spending, meaning that observed reductions in economic growth may be smaller than reductions in a "no fiscal response" world. Yet incumbent leaders may not be able to fully escape the adverse implications of the initial negative growth shock for their political survival prospects: they may be distracted from other priorities, for instance, or their position may be weakened by their government's worsened fiscal balance (Brender and Drazen 2008). If this is true, the estimate on exogenous components of economic growth (the IV estimates) should be expected to be larger in absolute magnitude than the estimate on observed economic growth (the LPM estimates). Another possibility is that the LPM estimates suffer from attenuation bias due to measurement error in the GDP data. A further possibility is that leaders in crisis put pressure on their statistical offices to inflate the growth figures (i.e. measurement error in economic data may be a function of political instability).

5.3 Robustness analysis

Many robustness checks were carried out on the results. Results tables for these robustness checks are available in the Web Appendix. The estimates for *t*-1 GDP per capita growth are similar and remain statistically significant in specifications that control for (country-specific)

party dummy variables. Estimates are also similar in specifications that control for leader dummies, although the *p*-values are pushed marginally outside the traditional significance levels once these leader dummies are included. (There are 856 leaders in office on a January 1 in the sample, and so specifications with leader dummies in addition to country and year fixed effects are very tightly constrained.) Results in the preferred specification (column 2 of Table 4) are robust to controlling for other variables such as the percentage of the population under 15 years of age, the urbanization rate, the infant mortality rate, the logged size of the population, exports as a share of GDP, the number of anti-government demonstrations (from Databanks International), the POLITY2 measure of democracy (Marshall et al. 2007), and dummies for the natural death of national leaders, leaders who were the first leaders of their country post-independence, internal armed conflicts (Gleditsch et al. 2002), and for countries subject to economic sanctions (Marinov 2005).

Similar results are obtained using aggregate rather than per capita GDP growth, or if GDP per capita growth data from Heston et al. (2006) are used. Estimates that omit any individual region are also similar. Coefficient estimates for additional lags of GDP per capita growth in the fixed effects LPM, logit, and hazard model estimations are negative but are small and generally statistically insignificant. Results on *t*-1 GDP per capita growth remain similar and statistically significant at the 1% level in these estimations with additional lags of GDP per capita growth.

Results are similar if a dependent variable measuring the number of changes in national leader in year *t* is used (instead of the dummy variable for leader change employed in the main specifications). Overall results are also not affected by using a dependent variable coded as

zero for instances of leader exit due to sickness, or if data on effective national leaders from Przeworski et al. (2000) or Databanks International are used to code the dependent variable.

As discussed, an issue of concern is the potential that the commodity price and export partner growth instruments may be affected by political developments in large countries or important commodity producers. Nevertheless, IV results are similar if the 20 largest economies (which together accounted for 85% of global GDP in 1995 in US dollar terms) are excluded from the sample. Results are also similar if members of the Organization of the Petroleum Exporting Countries are excluded or if exports of commodities for which a country contributed more than 15% of global exports in 1995 are excluded from that country's commodity export bundle.

To explore whether the IV results are sensitive to the choice of 1995 as the instrument weight year, I carried out additional IV regressions using an instrument weight year of 1975. The results are generally similar, although estimation sample sizes are smaller and estimated coefficients have lower statistical significance. The IV result using the 1975-weighted commodity export price instrument is very similar to that obtained in Table 4 and is statistically significant at the 5% level. The IV result using the 1975-weighted export partner growth instrument is also similar to that using 1995 weights, but is marginally outside the 10% significance level.[14] The IV results in Table 4 are similar in specifications in which the instruments are not interacted with the Ω, Ξ, and Φ terms listed in Table 1, although the first-stage identification is generally weaker.

[14] The significant IV result using the export partner growth instrument is not solely a product of using 1995 weights. A similar result is obtained using 2000 weights (see Web Appendix).

To allow for the possibility that the effect of economic growth on political survival depends on whether growth is positive or negative, I estimate the equation:

$$D_{c,t} = \alpha_0 \overline{G}_{c,t-1} + \alpha_1 \underline{G}_{c,t-1} + \mathbf{x}'_{c,t-j}\boldsymbol{\beta} + I_c + I_t + \varepsilon_{c,t} \qquad (2)$$

where $\overline{G}$ equals GDP growth per capita when this is non-negative (and 0 otherwise), and $\underline{G}$ equals GDP growth per capita when this is negative (and 0 otherwise). A test of $\alpha_0 = \alpha_1$ allows a check of whether the effect of declines in GDP per capita in reducing short-run political survival prospects is similar to the effect of increases in GDP per capita in improving short-run political survival prospects. Both the LPM and IV results for this specification provide no evidence of asymmetry in the effect of GDP growth on the likelihood of leader exits, although the IV specification is estimated with large standard errors (see the Web Appendix).

5.4 The role of institutions and development level

The importance of economic growth for the political survival prospects of national leaders may differ for countries with different types of governance institutions and/or countries at different levels of economic development. To examine the importance of institutions, I carry out separate estimations for sub-samples of countries classified as either democracies or autocracies at the end of year *t*-1 by Przeworski et al. (2000).[15] I also carry out separate estimations in which I split the full sample and the democracy and autocracy sub-samples into

[15] Przeworski et al. (2000) provide an elections-based measure that covers more country-years in the sample than other measures of democracy. If the POLITY2 variable is used to define institution type, IV results (for a smaller sample size) also indicate a statistically significant negative impact of growth on the likelihood of leader exits in autocracies only (see Web Appendix).

further sub-samples for countries with above-median and below-median average GDP per capita. The results are presented in Table 5.

The estimates in Table 5 indicate that the effect of economic growth on the national leader's short-run political survival prospects is similar in both democracies and autocracies (cf. Bueno de Mesquita et al. 2003). The IV result for autocracies is that an additional percentage point of GDP per capita growth reduces the likelihood of incumbent autocrats exiting office in the next year by 1.2 percentage points (significant at the 10% level). As far as I am aware, this is the first evidence on the importance of economic growth for the political survival of national leaders in autocratic countries. The IV estimate for democracies is slightly larger than that for autocracies, but is estimated less precisely. Tests of coefficient restrictions are unable to reject the hypothesis that the impact of growth on political survival in either democracies or autocracies is the same as that for the pooled global sample.

The IV results are also generally similar for similarly-sized sub-samples of low-income and high-income countries (both for the full sample and the democracy and autocracy sub-samples).[16] The instruments provide the strongest first-stage identification for low-income countries, and second-stage results are also statistically stronger for these countries. While the instruments are relatively weak for GDP growth in high-income countries, the second-stage estimates still point toward a negative impact of economic growth on the likelihood of leader exits in these countries (although these second-stage estimates for the high-income samples are not statistically significant). A test of parameter equality using the IV results is unable to

[16] The weather instruments are likely to be strongest for agricultural countries. The estimated impact of growth on political survival in specifications that use the weather variables to instrument for economic growth remain negative but statistically insignificant for a sub-sample of "more agricultural" countries (see Web Appendix).

distinguish between the impact of economic growth on political survival in low-income countries and the impact in high-income countries. The Table 5 results thus point toward economic growth being of similar importance for national leader political survival prospects in countries with different institutions (democracy/autocracy) and in countries that have reached different levels of economic development.

5.5 Economic growth and modes of leader exits

To explore what types of leader exits are affected most strongly by economic growth, I categorize leader exits by mode of exit using the EXIT variable in Archigos. Regular exits occur when a leader leaves office according to the prevailing rules, provisions, conventions and norms of the country, for reasons including loss of an election, end of term, voluntary retirement, losing cabinet support, losing the support of parliament, or ill health.[17] Irregular exits occur when a leader is removed from office in contravention of rules and conventions (for example, by coups, assassinations, military power struggles, or removal by domestic rebel forces or revolts). In 169 of the 773 years of leader exits, the first leader exit during the year was for irregular reasons. In the other 604 country-years in which there was a leader exit, the first leader exit during the year was for regular reasons. Fixed effects LPM, IV, and multinomial logit results for the two different modes of leader exit are presented in Table 6.[18]

The results for each of the specifications in Table 6 indicate that the impacts of economic growth on the probabilities of regular and irregular types of leader exits are similar. The IV results suggest that an additional percentage point of per capita GDP growth reduces the

[17] Leaders exiting due to ill health have been added to the Archigos coding of regular exits.

[18] Separate estimates for sub-samples of democracies and autocracies are presented in the Web Appendix.

likelihood of a regular leader exit in the next year by 0.9 percentage points (significant at the 10% level). The effect of growth on irregular leader exits is smaller: an additional percentage point of per capita GDP growth is estimated to reduce the likelihood of an irregular leader exit in the next year by 0.5 percentage points (also significant at the 10% level).

The finding that economic slowdowns increase the likelihood of regular leader exits is consistent with prior evidence on the importance of the economy for election results (although is a more general result as it covers non-election leader exits). That slow growth increases the likelihood of irregular leader exits such as exits via coups is consistent with the estimation results of Alesina et al. (1996), with the implications of the theoretical model of Gallego and Pitchik (2004), and with case study evidence for countries such as Brazil, Chile, and Ghana (where coups have tended to be precipitated by falls in prices for important commodity exports, such as the price of cocoa in the case of Ghana; see O'Kane 1987 for a discussion).

5.6 Leader reactions to growth shocks

National leaders differ substantially in their political longevity. Some autocratic leaders, such as President Mobutu Sese Seko in the former Zaire (in office 1965-1997), have stayed in power for long periods of time, despite poor economic records. One potential factor in explaining the longevity of these leaders is that they employ oppressive tactics to circumvent rising political opposition at times of weak economic growth. There is little evidence on whether national leaders are more likely to engage in crackdowns on opposition to their leadership when the economy is weak.[19]

[19] Henderson (1991) reports that stronger long-run economic growth reduces political repression, but does not look at the importance of the economic growth rate for political repression in the short term.

To explore the impact of growth on political oppression, I utilize data from Databanks International on "purges", defined as any systematic elimination by jailing or execution of political opposition within the ranks of the regime or the opposition. I regress this variable on economic growth and year dummy variables in the fixed effects LPM and IV model frameworks. For an additional robustness check on the main results on political survival, I do the same for the Databanks International variable "major government crises", defined as any rapidly developing situation that threatens to bring the downfall of the existing regime (excluding armed revolts). The Databanks International data are constructed primarily from reports in the *New York Times*. They may be subject to geographic and other biases, but provide the best available data coverage for these variables.

The results on the impact of economic growth on major government crises and purges are presented in Table 7.[20] The estimates in columns 1-4 provide support for the main findings in this paper: faster economic growth significantly reduces the likelihood of a major government crisis in the next year (columns 1-2) and in the same year (columns 3-4). The impact of economic growth on purges is explored in columns 5-8 of Table 7. The fixed effects LPM and IV results provide no statistically significant evidence that growth affects purges of opponents in the next calendar year (columns 5-6). But the same-year impact of growth on purges of those who oppose the national leader is statistically significant at the 10% level (columns 7-8). The IV estimate indicates that an additional percentage point of economic growth on average reduces the number of purges by 0.2, equal to a 35% reduction in the likelihood of a purge of the opposition. That leaders are more likely to employ oppressive tactics during times of weak

[20] Separate estimates for the democracy and autocracy sub-samples are presented in the Web Appendix. The point estimate for the same-year impact of GDP growth on purges is only statistically significant for autocracies.

growth may partly explain the ability of some leaders to retain office even during times of economic deterioration.

6 Conclusion

This paper explores whether a nation's rate of economic growth affects the short-run political survival prospects of that nation's leader. The identification strategy aims at producing an internally-valid estimate of the effect of economic growth on the likelihood of leader exits, and uses exogenous shocks from the global economy and the weather toward this end. The results provide evidence that faster economic growth increases the likelihood that national leaders will retain their positions. Shocks from the global economy (commodity prices and export partner incomes) have a particularly important effect on the ability of national leaders to retain their offices. While growth slowdowns do not invariably lead to leadership change, the findings suggest that national leaders are more likely to lose their jobs via both regular means and irregular means (e.g. coups) during hard economic times. That the state of the economy has a systematic effect on the likelihood of leader survival provides evidence of an economic political cycle (with causality from the economy to politics) that mirrors the much-researched political business cycle (which results from leaders' actions to manipulate the economic cycle to maximize their chances of retaining office).

Existing empirical evidence has typically related to the effect of economic growth on electoral support for incumbents. This paper provides evidence of a relationship between economic growth and political survival that extends beyond the ballot box. Of most interest is the finding that even leaders in autocratic countries are more likely to lose their positions when the national economy is growing slowly.

The magnitude of the estimated impact of GDP growth on political survival is large. The preferred IV estimate (column 2 of Table 4) indicates that a standard deviation increase in the rate of economic growth reduces the probability of leader change in the next year by 8 percentage points. This is equal to 52% of the underlying probability of leader change.

The results speak to the importance of economic fortunes for the political longevity of individual leaders. Shocks to the economy from commodity prices and external demand for exports are outside the control of individual leaders, but have a strong influence on the probability that they will keep their jobs. The evidence indicates that many national leaders who have served short terms may be able to cite bad luck. Similarly, many long-lasting leaders may have fortuitous economic times to thank. That economic luck has a strong effect on the job security of national leaders is consistent with evidence elsewhere on the importance of luck for outcomes as diverse as CEO remuneration (Bertrand and Mullainathan 2001) and the career success of cricketers (Aiyar and Ramcharan 2010).

The IV finding that stronger GDP growth caused by exogenous factors (e.g. increasing commodity prices) improves political survival prospects does not necessarily imply that stronger GDP growth caused by potentially endogenous factors (e.g. policies, leader competence) also improves political survival prospects. Unfortunately, I do not have an identification strategy to accurately estimate the effect of leader-affected changes in economic growth on the likelihood of that leader's political survival. Reason would suggest, however, that if at least some of the impact of a leader's actions on the economy is measurable by at least some members of the selectorate, the leader should be held more accountable for these outcomes than outcomes over which he/she has no control. If this is the case, the IV estimates

may represent lower-bound estimates of the impact of leader-affected economic growth on that leader's short-run political survival prospects.

A number of mechanisms via which a negative impact of economic growth on political survival may emerge were introduced. The findings here do not identify which of the mechanisms is of principal importance, although do suggest that leaders are particularly vulnerable to shocks to export sectors (which are likely to have a relatively high concentration of political elites). There remains scope for further research aimed at identifying the extent to which the effect of economic growth on political survival operates via intermediate variables such as unemployment, leader popularity, and the incomes of political elites.

The findings have important policy implications. They suggest that national leaders should not neglect the economy, for the sake of their own careers at least. Leaders in countries with flexible election terms would be well advised to time elections for when the economy is strong so as to maximise the likelihood of their re-election. The findings also highlight the incentive faced by national leaders to attempt to time the economic cycle so that the economy is strong when the next election is due (as canvassed extensively in the political business cycle literature). Another implication of the results is that government interventions to bolster economic growth, where effective, have positive externalities for the incumbent national leaders of trade-linked partners, including autocratic leaders. Finally, economic slowdowns place external actors in a unique position to influence political change. Crisis assistance conditioned on the benevolence of national leaders may be valuable in shoring up the positions of benevolent leaders during times of economic hardship, while ensuring that corrupt or autocratic leaders do not receive relief from domestic political pressures at the very moment when these pressures are building in strength.

Appendix

Exit of leader in year: Binary variable, =1 if there are one or more exits of the effective primary national leader during the year for reasons other than natural death or foreign deposition; 0 otherwise. Goemans et al. (2009).

GDP per capita growth: Annual percentage growth rate of GDP per capita based on constant local currency. World Bank World Development Indicators (available at http://go.worldbank.org/U0FSM7AQ40).

Log GDP per capita: Log GDP per capita based on constant 2000 US$ GDP. World Development Indicators.

Secondary enrollment rate (% gross): Number of pupils enrolled in secondary education, regardless of age, expressed as a percentage of the population in the theoretical age group for secondary education. Data from the World Bank's Education Statistics Version 5.3 (available at http://www.worldbank.org/education/edstats) and the DRI (available at http://dri.as.nyu.edu/object/dri.resources.growthdatabase). Data are interpolated (linear) and extrapolated (constant).

Population aged 65 years and above (%): Percentage of the total population aged 65 years or older. World Development Indicators.

Tenure of leader in power at start of year (years): Sum of 31 Decembers that the leader has been in office for during current tenure. Calculated for leader in office on 1 January using Goemans et al. (2009).

Age of leader in power at start of year (years): Calendar year minus birth year of leader in office on 1 January, calculated using Goemans et al. (2009).

Female leader dummy (leader in power at start of year): Binary variable, =1 if leader in office on 1 January is a female; 0 otherwise. Goemans et al. (2009).

Previous times in office (leader in power at start of year): Number of times the leader in office on 1 January has previously held (and lost) the position. Goemans et al. (2009).

Irregular entry to office dummy (leader in power at start of s): Binary variable, =1 if leader entered office via irregular means or was directly imposed by another state; 0 otherwise. Goemans et al. (2009).

Transition dummy: Binary variable, =1 for the years 1989-1992 for transition economies; 0 otherwise. DRI (available at http://dri.as.nyu.edu/object/dri.resources.growthdatabase).

Democracy dummy: Binary variable, =1 if country is classified as a democracy at year end; 0 otherwise. Przeworski et al. (2000). The lagged REG variable is unavailable for 1% of country-years in the sample. Countries are coded as autocracies for these years (an operation that does not affect the overall results).

Election dummy: Binary variable, =1 if an election affecting the effective national leader occurred during the year; 0 otherwise. Constructed using Goemans' Election Data (available at http://www.rochester.edu/college/faculty/hgoemans/data.htm) using the following operation on six binary variables: Presidential election(0,1)*Leader subject to presidential elections(0,1) + Parliamentary election(0,1)*Leader subject to parliamentary elections (0,1) + Presidential or

parliamentary election(0,1)*Assembly-elected president (0,1). Beck et al. (2001) and other sources used to allocate leaders to elections.

Term limit dummy: Binary variable, =1 if national leader left office due to legal requirement during year; 0 otherwise. Author construction. Does not include cases in which a national leader avoided or changed a pre-existing requirement to leave office.

Major government crises: Number of rapidly developing situations that threaten to bring the downfall of the existing regime (excluding situations of armed revolt). Databanks International (http://databanksinternational.com).

Purges: Number of instances of systematic elimination by jailing or execution of political opposition within the ranks of the regime or the opposition. Databanks International.

Labor force in agriculture in 1995 (%) [Φ]: Percentage of the labor force economically active in agriculture, hunting, forestry, or fishing in 1995. World Resources Institute (available at http://earthtrends.wri.org).

Commodity price instrument: Differenced logarithm of a country-specific commodity export price index for 50 commodities, using 1995 commodity export basket weights and interacted with the 1995 share of the exports of the 50 commodities in GDP. Burke and Leigh (2010).

Export partner growth instrument: Weighted average of export partners' GDP growth rates multiplied by the 1995 share of exports in GDP. Data for 1995 are used for export partner weights. Constructed using the World Development Indicators and the International Monetary Fund's Direction of Trade Statistics (available at www.imfstatistics.org/DOT). In the case of missing export partner GDP growth data, data from Heston et al. (2006) are used. If export

partner GDP data are still missing, the world GDP growth rate is used. Similar results are obtained using alternative approaches to dealing with missing export partner growth data. For five countries in the sample, data on the export share of GDP for 1995 are not available. Data available for the year closest to 1995 are used. For 3 countries (Belgium, Luxembourg, South Africa), data on exports by partner for 1995 are not available from the International Monetary Fund; data for 1998 are used. For six countries, data on exports by partner are not available for any year. For the four small members of the Southern Africa Customs Union, the export partner weight is set equal to 1 for South Africa and 0 for other partners. For Bhutan and Eritrea, the export weight is set equal to 1 for the largest export market as listed by the Central Intelligence Agency's World Factbook (available at https://www.cia.gov/library/publications/the-world-factbook/), and 0 for others. Results are similar if these countries are excluded from the estimations.

Precipitation instrument: Change in precipitation from the previous year (%) multiplied by Φ. Precipitation data sourced from Mitchell et al. (2004).

Temperature instruments: (1) Change in temperature from previous year (ºC) multiplied by Φ; and (2) change in temperature from previous year (ºC) multiplied by Φ and by a dummy variable for countries with an average temperature for the period 1960-1970 of less than 12ºC. Temperature data sourced from Mitchell et al. (2004).

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References

Acemoglu, D., Johnson, S., Robinson, J. A., & Yared, P. (2008). Income and democracy. *American Economic Review, 98*(3), 808-842.

Aiyar, S., & Ramcharan, R. (2010). What can international cricket teach us about the role of luck in labor markets? IMF Working Paper WP/10/225.

Alesina, A., Özler, S., Roubini, N., & Swagel, P. (1996). Political instability and economic growth. *Journal of Economic Growth, 1*(2), 189-211.

Alesina, A., Roubini, N., & Cohen, G. D. (1997). *Political cycles and the macroeconomy*. Cambridge, MA: MIT Press.

Angrist, J. D., & Krueger, A. B. (2001). Instrumental variables and the search for identification: From supply and demand to natural experiments. *Journal of Economic Perspectives, 15*(4), 69-85.

Arora, V., & Vamvakidis, A. (2005). How much do trading partners matter for economic growth? *IMF Staff Papers, 52*(1), 24-40.

Barro, R. J. (1991). Economic growth in a cross section of countries. *Quarterly Journal of Economics, 106*(2), 407-443.

Barro, R. J., & Lee, J. W. (1994). Sources of economic growth. *Carnegie-Rochester Conference Series on Public Policy, 40,* 1-46.

Beck, T., Clarke, G., Groff, A., Keefer, P., & Walsh, P. (2001). New tools in comparative political economy: The database of political institutions. *World Bank Economic Review, 15*(1), 165-176.

Bertrand, M., & Mullainathan, S. (2001) Are CEOs rewarded for luck? The ones without principals are. *Quarterly Journal of Economics, 116*(3), 901-929.

Besley, T., & Kudamatsu, M. (2008). Making autocracy work. In E. Helpman (Ed.) *Institutions and economic performance* (pp. 452-510). Cambridge, MA: Harvard University Press.

Bienen, H., & van de Walle, N. (1991). *Of time and power: Leadership duration in the modern world*. Stanford, CA: Stanford University Press.

Bienen, H., & van de Walle, N. (1992). A proportional hazard model of leadership duration. *Journal of Politics, 54*(3), 685-717.

Brender, A. & Drazen, A. (2008). How do budget deficits and economic growth affect reelection prospects? Evidence from a large panel of countries. *American Economic Review 98*(5), 2203-2220.

Brender, A., & Drazen, A. (2009). Do leaders affect government spending priorities? NBER Working Paper 15368.

Brückner, M. & Ciccone, A. (2010). International commodity prices, growth and the outbreak of civil war in Sub-Saharan Africa. *Economic Journal, 120*(544), 519-534.

Brunetti, A. (1997). *Politics and economic growth: A cross-country data perspective*. Paris, France: Development Centre of the Organisation for Economic Co-operation and Development.

Bueno de Mesquita, B., Smith, A., Siverson, R. M., & Morrow, J. D. (2003). *The logic of political survival*. Cambridge, MA: MIT Press.

Burke, P. J., & Leigh, A. (2010). Do output contractions trigger democratic change? *American Economic Journal: Macroeconomics, 2*(4), 124-157.

Carmignani, F. (2002). New evidence on the politics and economics of multiparty cabinets duration. *Scottish Journal of Political Economy, 49*(3), 249-279.

Deaton, A. S., & Miller, R. I. (1995). International commodity prices, macroeconomic performance, and politics in sub-Saharan Africa. *Princeton Studies in International Finance, 79*.

Dell, M., Jones, B. F., & Olken, B. A. (2008). Climate change and economic growth: Evidence from the last half century. NBER Working Paper 14132.

Drazen, A. (2000). The political business cycle after 25 years. *NBER Macroeconomics Annual, 15*, 75-117.

Dunning, T. (2008). Model specification in instrumental-variables regression. *Political Analysis, 16*(3), 290-302.

Fair, R. C. (1978). The effect of economic events on votes for president. *Review of Economics and Statistics, 60*(2), 159-173.

Fuller, W. A. (1977). Some properties of a modification of the limited information estimator. *Econometrica, 45*(4), 939-953.

Gallego, M., & Pitchik, C. (2004). An economic theory of leadership turnover. *Journal of Public Economics, 88*(12), 2361-2382.

Gleditsch, N. P., Wallensteen, P., Eriksson, M., Sollenberg, M., & Strand, H. (2002). Armed conflict 1946–2001: A new dataset. *Journal of Peace Research, 39*(5), 615-637.

Goemans, H. E., Gleditsch, K. S., & Chiozza, G. (2009). Introducing Archigos: A data set of political leaders. *Journal of Peace Research, 46*(2), 269-283.

Greene, W. H. (2000). *Econometric analysis*. 4th ed. Upper Saddle River, NJ: Prentice Hall.

Hahn, J., & Hausman, J. (2003). Weak instruments: Diagnosis and cures in empirical econometrics. *American Economic Review, 93*(2), 118-125.

Henderson, C. W. (1991). Conditions affecting the use of political repression. *Journal of Conflict Resolution, 35*(1), 120-142.

Heston, A. (1994). A brief review of some problems in using national accounts data in level of output comparisons and growth studies. *Journal of Development Economics, 44*(1), 29-52.

Heston, A., Summers, R., & Aten, B. (2006). *Penn world table version 6.2*. University of Pennsylvania, PA: Center for International Comparisons of Production, Income and Prices.

Hibbs, D. A. Jr., Rivers, R. D., & Vasilatos, N. (1982). The dynamics of political support for American presidents among occupational and partisan groups. *American Journal of Political Science, 26*(2), 312-332.

Huntington, S. P. (1968). *Political order in changing societies*. New Haven, CT: Yale University Press.

Huntington, S. P. (1991). *The third wave: Democratization in the late twentieth century*. Norman, OK: University of Oklahoma Press.

Jones, B. F., & Olken, B. A. (2005). Do leaders matter? National leadership and growth since World War II. *Quarterly Journal of Economics, 120*(3), 835-864.

Jones, B. F., & Olken, B. A. (2009). Hit or miss? The effect of assassinations on institutions and war. *American Economic Journal: Macroeconomics, 1*(2), 55-87.

Kramer, G. H. (1971). Short-term fluctuations in U.S. voting behavior, 1896-1964. *American Political Science Review, 65*(1), 131-143.

Leigh, A. (2009). Does the world economy swing national elections? *Oxford Bulletin of Economics and Statistics, 71*(2), 163-181.

Lewis-Beck, M. S, & Stegmaier, M. (2000). Economic determinants of electoral outcomes. *Annual Review of Political Science, 3*, 183-219.

Li, H., & Zhou, L. A. (2005). Political turnover and economic performance: The incentive role of personnel control in China. *Journal of Public Economics, 89*(9-10), 1743-1762.

Lindenberg, M. (1990). World economic cycles and Central American political instability. *World Politics, 42*(3), 397-421.

Londregan, J, Bienen, H., & van de Walle, N. (1995). Ethnicity and leadership succession in Africa. *International Studies Quarterly, 39*(1), 1-25.

Londregan, J. B., & Poole, K. T. (1990). Poverty, the coup trap, and the seizure of executive power. *World Politics, 42*(2), 151-183.

Marinov, N. (2005). Do economic sanctions destabilize country leaders? *American Journal of Political Science, 49*(3), 564-576.

Markus, G. B. (1988). The impact of personal and national economic conditions on the presidential vote: A pooled cross-sectional analysis. *American Journal of Political Science, 32*(1), 137-154.

Marshall, M. G., Jaggers, K., & Gurr, T. R. (2007). Polity IV project: Political regime characteristics and transitions, 1800-2007. http://www.systemicpeace.org/polity/polity4.htm.

Miguel, E., Satyanath, S., & Sergenti, E. (2004). Economic shocks and civil conflict: An instrumental variables approach. *Journal of Political Economy, 112*(4), 725-753.

Mitchell, T. D., Carter, T. R., Jones, P. D., Hulme, M., & New, M. (2004). A comprehensive set of high-resolution grids of monthly climate for Europe and the globe: The observed record (1901-2000) and 16 scenarios (2001-2100). Tyndall Centre for Climate Change Research Working Paper 55.

O'Kane, R. H. T. (1987). *The likelihood of coups*. Aldershot, UK: Avebury.

Olson, M. Jr. (1963). Rapid growth as a destabilizing force. *Journal of Economic History, 23*(4), 529-552.

Palmer, H. D., & Whitten, G. D. (1999). The electoral impact of unexpected inflation and economic growth. *British Journal of Political Science, 29*(4), 623-639.

Pritchett, L., & Summers, L. H. (1996). Wealthier is healthier. *Journal of Human Resources, 31*(4), 841-868.

Przeworski, A., Alvarez, M. E., Cheibub, J. A., & Limongi, F. (2000). *Democracy and development: Political institutions and the well-being of the world, 1950-1990*. Cambridge, UK: Cambridge University Press.

Remmer, K. L. (1991). The political impact of economic crisis in Latin America in the 1980s. *American Political Science Review, 85*(3), 777-800.

Stock, J. H., Wright, J. H., & Yogo, M. (2002). A survey of weak instruments and weak identification in generalized method of moments. *Journal of Business and Economic Statistics, 20*(4), 518-529.

Stock, J. H., & Yogo, M. (2005). Testing for weak instruments in linear IV regression. In D.W.K. Andrews, & J.H. Stock (Eds.) *Identification and inference for econometric models: A festschrift in honor of Thomas Rothenberg* (pp. 80-108). Cambridge, UK: Cambridge University Press.

Tufte, E. R. (1978). *Political control of the economy*. Princeton, NJ: Princeton University Press.

Wolfers, J. (2002). Are voters rational? Evidence from gubernatorial elections. Stanford GSB Working Paper No. 1730.

Figures

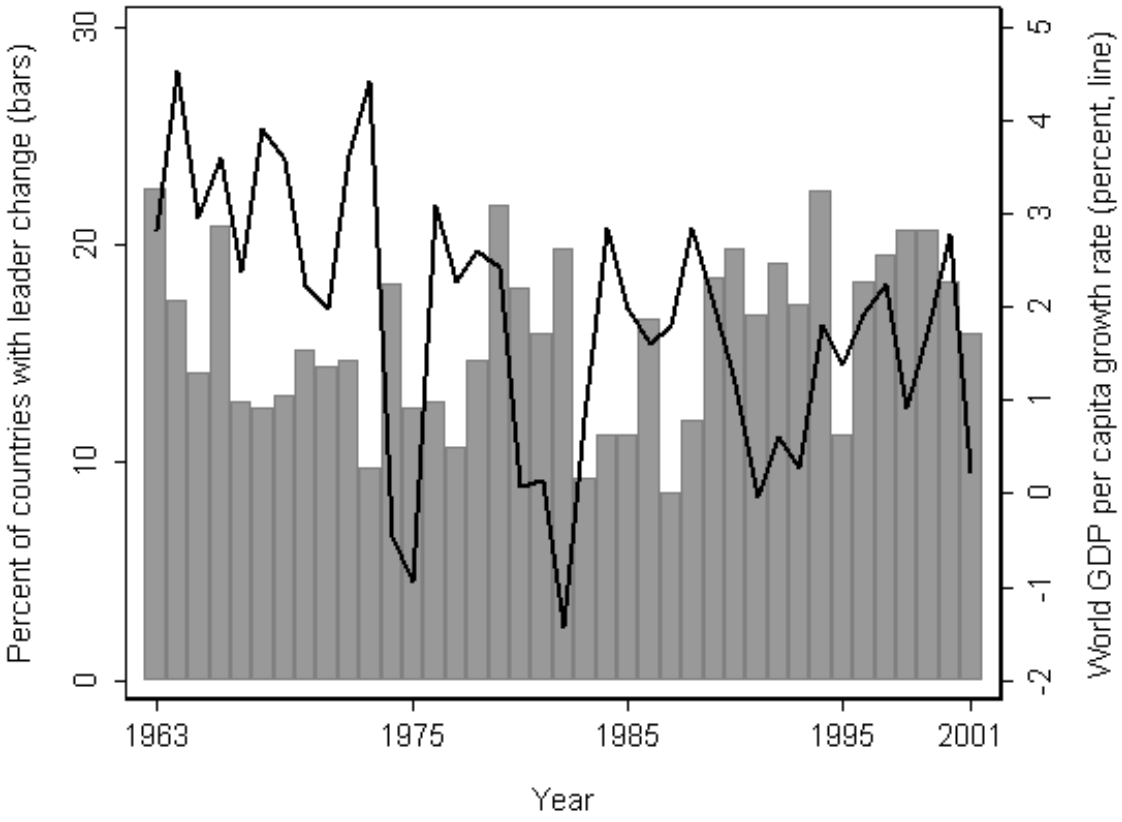

Fig. 1 World economic growth and leader change. Source: Goemans et al. (2009) and World Bank data

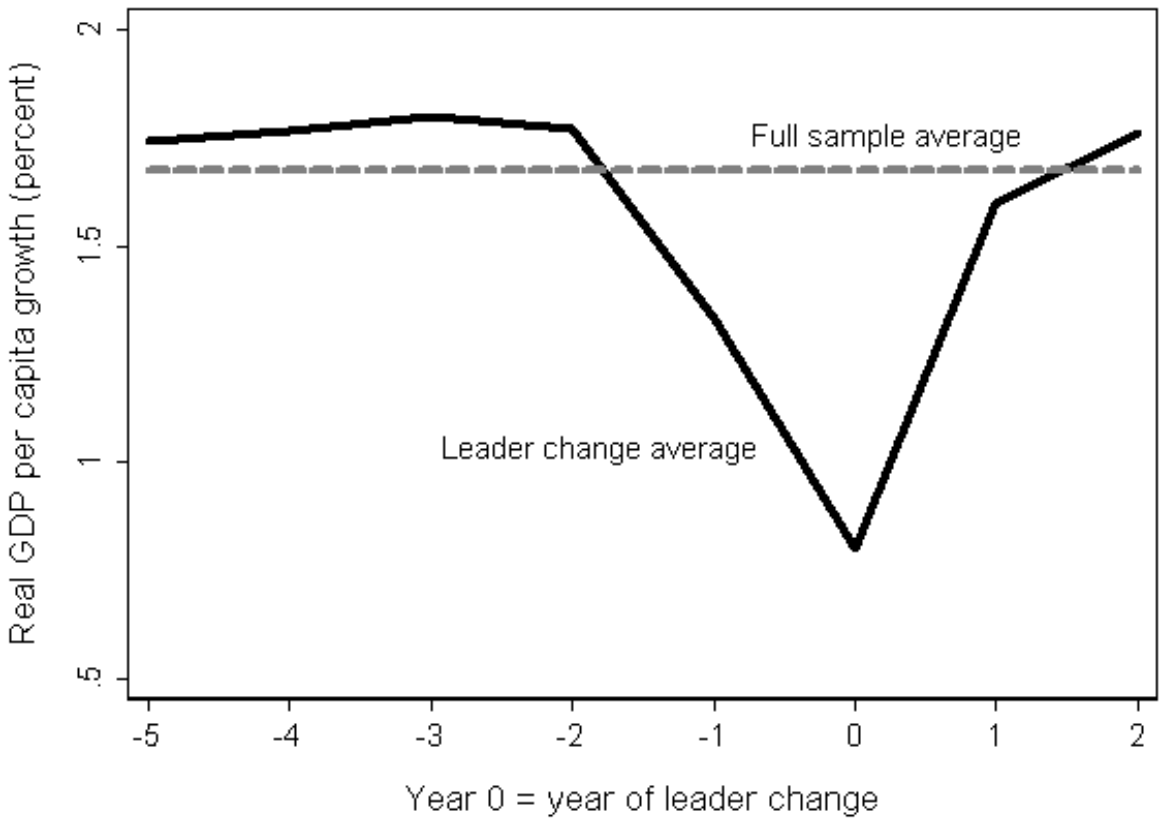

Fig. 2 GDP growth at times of leader change. Source: Goemans et al. (2009) and World Bank data. Five years of lagged data are not available for all leader changes in the estimation sample. The "full sample average" is for all country-years in the sample, and is independent of the x-axis

Tables

Table 1 Summary statistics

	Mean	(Standard deviation)
GDP per capita growth$_{t-1}$	1.67	(6.41)
GDP per capita$_{t-2}$ (2000 US$ '000)	5.06	(7.62)
Secondary enrollment rate$_{t-2}$ (% gross)	47.14	(32.47)
Population aged 65 years and above$_{t-2}$ (%)	5.85	(3.98)
Tenure of leader in power at start of year$_t$ (years)	7.18	(7.37)
Age of leader in power at start of year$_t$ (years)	56.46	(11.16)
Female leader dummy (leader in power at start of year *t*)	0.02	(0.15)
Previous times in office (leader in power at start of year *t*)	0.13	(0.41)
Irregular entry to office dummy (leader in power at start of year *t*)	0.24	(0.42)
Democracy dummy$_t$	0.45	(0.50)
Transition dummy$_t$	0.01	(0.08)
Election dummy$_t$	0.19	(0.39)
Term limit dummy$_t$	0.03	(0.17)
Major government crises$_t$ (number)	0.18	(0.53)
Purges$_t$ (number)	0.09	(0.66)
Commodity export bundle in GDP in 1995 (%) [Ω]	8.89	(11.29)
Exports in GDP in 1995 (%) [Ξ]	36.31	(25.18)
Labor force in agriculture in 1995 (%) [Φ]	36.30	(28.25)
Commodity price instrument$_{t-1}$ (without interacting with Ω) (%)	-0.01	(0.15)
Export partner growth instrument$_{t-1}$ (without interacting with Ξ)	3.60	(2.22)
Precipitation variation$_{t-1}$ (without interacting with Φ) (%)	2.16	(23.10)
Temperature variation$_{t-1}$ (without interacting with Φ) (^{o}C)	0.02	(0.52)
	Sum	
Years of at least one leader exit in country	773	
Countries	160	
Observations	4,742	

Data on major government crises and purges are available for 4,660 observations in the dataset.

Table 2 Fixed effects LPM, logit, and hazard model estimation results

Dependent variable: Exit of leader in year *t*

	(1)	(2)	(3)	(4)	(5)	(6)
Estimation	LPM		Logit		Cox proportional hazard model	
	Coefficients		Odds ratios		Hazard ratios	
GDP per capita growth$_{t-1}$	-0.003***	-0.003***	0.972***	0.966***	0.974***	0.979***
	(0.001)	(0.001)	(0.008)	(0.011)	(0.006)	(0.007)
Log GDP per capita$_{t-2}$		-0.009		0.853		0.963
		(0.037)		(0.368)		(0.289)
Tenure of leader in power at start of year$_t$ (years)		-0.002		0.991		1.546
		(0.001)		(0.015)		(0.744)
Age of leader in power at start of year$_t$ (years)		0.004***		1.040***		1.020***
		(0.001)		(0.009)		(0.005)
Female leader dummy (leader in power at start of year *t*)		-0.021		0.989		0.965
		(0.046)		(0.329)		(0.173)
Previous times in office (leader in power at start of year *t*)		-0.027*		0.805**		0.938
		(0.014)		(0.081)		(0.059)
Irregular entry to office dummy (leader in power at start of year *t*)		-0.004		0.925		0.945
		(0.020)		(0.191)		(0.129)
Transition dummy$_t$		0.191*		3.582*		1.992**
		(0.108)		(2.476)		(0.604)
Democracy dummy$_t$		0.024		1.079		1.092
		(0.028)		(0.286)		(0.176)
Election dummy$_t$		0.251***		6.605***		3.316***
		(0.022)		(0.901)		(0.339)
Election dummy$_{t-1}$		0.024*		1.253		1.212*
		(0.014)		(0.180)		(0.124)
Term limit dummy$_t$		0.739***		+		4.959***
		(0.032)		***		(0.899)
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.019	0.223	0.029	0.254	-	-
Observations	4,742	4,742	4,382	4,382	4,742	4,742
LPM estimate on GDP per capita growth$_{t-1}$ for logit sample	-	-	-0.003***	-0.003***	-	-
Years of at least one leader exit in country	773	773	734	734	773	773
Countries	160	160	141	141	160	160
Years: 1963-2001						

Robust standard errors clustered by country are in parentheses. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. The logit estimation sample is by necessity restricted to countries that experienced within-sample variation in the dependent variable. The estimated odds ratio for the term limit dummy in the logit specification is large, positive, and statistically significant at the 1% significance level. Estimates in columns 2, 4, and 6 control for the secondary school enrollment rate (% gross) and the share of the population aged 65 years and above in year *t*-2. The hazard model treats each leader-spell as an individual subject and only includes leaders in power at the start of the calendar year. The R^2 terms reflect the explanatory power of the time-varying explanatory variables and year dummies. The R^2 in columns 1-2 is the within-R^2. The R^2 in columns 3-4 is the pseudo-R^2. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table 3 IV estimation results

Dependent variable: Exit of leader in year *t*

	(1)	(2)	(3)	(4)	(5)	(6)
Estimation	LPM	IV (F1)	IV (F1)	IV (F1)	IV (F1)	IV (F1)
Instrument/s	None	All	Commodity price instrument$_{t-1}$	Export partner growth instrument$_{t-1}$	Precipitation instrument$_{t-1}$	Temperature instruments$_{t-1}$
GDP per capita growth$_{t-1}$	-0.003***	-0.011**	-0.024*	-0.012**	-0.005	-0.002
	(0.001)	(0.005)	(0.013)	(0.006)	(0.014)	(0.012)
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F statistic on excluded instruments	-	8.63	5.49	20.18	3.63	12.57
Stock-Yogo critical value	-	4.03/6.42	12.71/24.09	12.71/24.09	12.71/24.09	7.49/13.46
Partial R^2 on excluded instruments	-	0.023	0.002	0.018	0.002	0.004
Wooldridge endogeneity test *p*-value	-	0.06	0.09	0.05	0.90	0.94
Sargan overidentification test *p*-value	-	0.69	-	-	-	-
Observations	4,742	4,742	4,742	4,742	4,742	4,742
Years of at least one leader exit in country	773	773	773	773	773	773
Countries	160	160	160	160	160	160
Years: 1963-2001						

Robust standard errors clustered by country are in parentheses. Stock-Yogo critical values are the 5% significance level critical values for weak instruments tests based on, respectively, 30% and 5% maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. Results in column 1 are identical to those in column 1 of Table 2. The endogeneity and overidentification tests are for two-stage least squares estimates with robust but unclustered standard errors. F1 is Fuller 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table 4 IV estimation results with additional controls

Dependent variable: Exit of leader in year *t*

	(1)	(2)	(3)	(4)	(5)	(6)
Estimation	LPM	IV (F1)	IV (F1)	IV (F1)	IV (F1)	IV (F1)
Instrument/s	None	All	Commodity price instrument$_{t-1}$	Export partner growth instrument$_{t-1}$	Precipitation instrument$_{t-1}$	Temperature instruments$_{t-1}$
GDP per capita growth$_{t-1}$	-0.003***	-0.013**	-0.020*	-0.013*	-0.007	-0.009
	(0.001)	(0.006)	(0.011)	(0.007)	(0.012)	(0.012)
Log GDP per capita$_{t-2}$	-0.009	-0.051	-0.079	-0.052	-0.028	-0.033
	(0.037)	(0.045)	(0.059)	(0.050)	(0.062)	(0.059)
Tenure of leader in power at start of year$_t$ (years)	-0.002	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
Age of leader in power at start of year$_t$ (years)	0.004***	0.004***	0.005***	0.004***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female leader dummy (leader in power at start of year *t*)	-0.021	-0.019	-0.018	-0.019	-0.020	-0.020
	(0.046)	(0.047)	(0.048)	(0.047)	(0.046)	(0.047)
Previous times in office (leader in power at start of year *t*)	-0.027*	-0.031**	-0.034**	-0.031**	-0.029*	-0.029*
	(0.014)	(0.015)	(0.016)	(0.015)	(0.015)	(0.015)
Irregular entry to office dummy (leader in power at start of year *t*)	-0.004	-0.020	-0.030	-0.020	-0.011	-0.013
	(0.020)	(0.023)	(0.028)	(0.024)	(0.026)	(0.027)
Transition dummy$_t$	0.191*	0.167	0.152	0.167	0.180	0.177
	(0.108)	(0.109)	(0.114)	(0.109)	(0.111)	(0.112)
Democracy dummy$_t$	0.024	0.019	0.015	0.018	0.022	0.021
	(0.028)	(0.030)	(0.031)	(0.030)	(0.029)	(0.030)
Election dummy$_t$	0.251***	0.248***	0.246***	0.248***	0.250***	0.249***
	(0.022)	(0.022)	(0.023)	(0.022)	(0.022)	(0.022)
Election dummy$_{t-1}$	0.024*	0.024*	0.024*	0.024*	0.024*	0.024*
	(0.014)	(0.014)	(0.014)	(0.014)	(0.013)	(0.013)
Term limit dummy$_t$	0.739***	0.733***	0.729***	0.733***	0.736***	0.735***
	(0.032)	(0.034)	(0.037)	(0.034)	(0.032)	(0.033)
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F statistic on excluded instruments	-	7.51	7.08	14.86	3.65	11.83
Stock-Yogo critical value	-	4.03/6.42	12.71/24.09	12.71/24.09	12.71/24.09	7.49/13.46
Partial R^2 on excluded instruments	-	0.018	0.002	0.012	0.002	0.004
Wooldridge endogeneity test *p*-value	-	0.04	0.13	0.05	0.75	0.62
Sargan overidentification test *p*-value	-	0.84	-	-	-	-
Observations	4,742	4,742	4,742	4,742	4,742	4,742
Years of at least one leader exit in country	773	773	773	773	773	773
Countries	160	160	160	160	160	160
Years: 1963-2001						

Robust standard errors clustered by country are in parentheses. Stock-Yogo critical values are the 5% significance level critical values for weak instruments tests based on, respectively, 30% and 5% maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. Estimates control for the secondary school enrollment rate (% gross) and the share of the population aged 65 years and above in year *t*-2. Results in column 1 are identical to those in column 2 of Table 2. The endogeneity and overidentification tests are for two-stage least squares estimates with robust but unclustered standard errors. F1 is Fuller 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table 5 Economic growth and leader change by institution type and income level

Dependent variable: Exit of leader in year *t*

	(1)	(2)	(3)	(4)	(5)	(6)
Estimation	LPM	IV (F1)	LPM	IV (F1)	LPM	IV (F1)
Instruments	None	All	None	All	None	All
Sample	All		Low mean GDP per capita countries		High mean GDP per capita countries	
Panel A: All countries						
GDP per capita growth$_{t-1}$	-0.003***	-0.013**	-0.005***	-0.013**	-0.000	-0.017
	(0.001)	(0.006)	(0.001)	(0.006)	(0.001)	(0.012)
F statistic on excluded instruments	-	7.51	-	7.08	-	1.50
Partial R^2 on excluded instruments	-	0.018	-	0.030	-	0.008
p-value: test of equality with corresponding coefficient in column 3-4	-	-	-	-	0.00	0.88
Observations	4,742	4,742	2,394	2,394	2,348	2,348
Years of at least one leader exit in country	773	773	323	323	450	450
Countries	160	160	84	84	76	76
Panel B: Democracies						
GDP per capita growth$_{t-1}$	-0.002	-0.013	-0.002	-0.010	0.000	-0.030
	(0.002)	(0.011)	(0.003)	(0.013)	(0.003)	(0.032)
F statistic on excluded instruments	-	2.95	-	3.03	-	3.76
Partial R^2 on excluded instruments	-	0.033	-	0.040	-	0.013
Observations	2,100	2,100	1,050	1,050	1,050	1,050
Years of at least one leader exit in country	508	508	251	251	257	257
Countries	100	100	69	69	31	31
Panel C: Autocracies						
GDP per capita growth$_{t-1}$	-0.002**	-0.012*	-0.005***	-0.013*	-0.000	-0.014
	(0.001)	(0.006)	(0.001)	(0.007)	(0.001)	(0.009)
F statistic on excluded instruments	-	5.26	-	4.33	-	3.08
Partial R^2 on excluded instruments	-	0.014	-	0.026	-	0.012
p-value: test of equality with corresponding coefficient in Panel B	0.79	0.91	0.32	0.80	0.88	0.56
Observations	2,635	2,635	1,318	1,318	1,317	1,317
Years of at least one leader exit in country	264	264	128	128	136	136
Countries	116	116	53	53	63	63
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Stock-Yogo critical value: 4.03/6.42						
Years: 1963-2001						

Robust standard errors clustered by country are in parentheses. Przeworski et al. (2000) is used to classify countries into democracies and autocracies at the end of year *t*-1. Low mean GDP per capita countries are those with a panel sample average *t*-2 GDP per capita equal to the median of country panel sample averages or below; high mean GDP per capita countries are others. The set of instruments includes the commodity price instrument$_{t-1}$, export partner growth instrument$_{t-1}$, precipitation instrument$_{t-1}$, and temperature instruments$_{t-1}$. All estimates control for the full set of variables included in Table 4: log GDP per capita$_{t-2}$, the tenure of leader in power at start of year$_t$ (years), age of leader in power at start of year$_t$ (years), the female leader dummy (leader in power at start of year *t*), the number of times the leader in power at the start of year *t* has previously served in office, the irregular entry to office dummy (leader in power at start of year *t*), transition dummy$_t$, democracy dummy$_t$, election dummy$_{t,\ t-1}$, term limit dummy$_t$, and the secondary school enrollment rate (percent gross) and percent of the population aged 65 years and above in year *t*-2. Results with the estimated coefficients for these control variables are provided in the Web Appendix. Stock-Yogo critical values are the 5 percent significance level critical values for weak instruments tests based on, respectively, 30 percent and 5 percent maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. IV tests of parameter restrictions are for two-stage least squares estimates. Results in columns 1-2 of Panel A are identical to estimates in columns 1-2 of Table 4. Singletons are omitted. F1 is Fuller 1. * Significant at 10 percent. ** Significant at 5 percent. *** Significant at 1 percent.

Table 6 Impact of economic growth on different modes of leader exits

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable: First exit of leader in year *t* is due to …	Regular leader exit			Irregular leader exit (e.g. coups, assassinations, revolts)		
Estimation	LPM	IV (F1)	Multinomial logit (relative risk ratios)	LPM	IV (F1)	Multinomial logit (relative risk ratios)
Instrument/s	None	All	None	None	All	None
GDP per capita growth$_{t-1}$	-0.001	-0.009	0.958	-0.001	-0.005	0.960
	(0.001)**	(0.005)*	(0.015)***	(0.001)**	(0.003)*	(0.015)***
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F statistic on excluded instruments	-	7.51	-	-	7.51	-
Stock-Yogo critical value	-	4.03/6.42	-	-	4.03/6.42	-
Partial R^2 on excluded instruments	-	0.018	-	-	0.018	-
p-value: test of equality with corresponding coefficient for regular leader exits	-	-	-	0.81	0.47	0.93
Observations	4,742	4,742	4,742	4,742	4,742	4,742
Observations for which dependent variable equals 1	604	604	604	169	169	169
Countries	160	160	160	160	160	160
Years: 1963-2001						

Robust standard errors clustered by country are in parentheses. The set of instruments includes the commodity price instrument$_{t-1}$, export partner growth instrument$_{t-1}$, precipitation instrument$_{t-1}$, and temperature instruments$_{t-1}$. Estimates control for the set of variables included in Table 4: log GDP per capita$_{t-2}$, the tenure of leader in power at start of year$_t$ (years), age of leader in power at start of year$_t$ (years), the female leader dummy (leader in power at start of year *t*), the number of times the leader in power at the start of year *t* has previously served in office, the irregular entry to office dummy (leader in power at start of year *t*), transition dummy$_t$, democracy dummy$_t$, election dummy$_{t, t-1}$, term limit dummy$_t$, and the secondary school enrollment rate (% gross) and share of the population aged 65 years and above in year *t*-2. The multinomial logit estimation excludes the term limit dummy control so as to achieve convergence. Results with the estimated coefficients for the control variables are provided in the Web Appendix. Stock-Yogo critical values are the 5% significance level critical values for weak instruments tests based on, respectively, 30% and 5% maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. IV test of parameter restrictions is for two-stage least squares estimates. The multinomial logit estimates in columns 3 and 6 are from the one estimation. Regular leader exits occur when a leader leaves office according to the prevailing rules, provisions, conventions and norms of the country, for reasons including loss of an election, end of term, voluntary retirement, losing cabinet support, losing the support of parliament, or ill health. Irregular leader exits occur when a leader is removed from office in contravention of rules and conventions (for example, by coups, assassinations, military power struggles, or removal by domestic rebel forces or popular revolts). Dependent variables are for the first leader exit in the calendar year for reasons other than natural death or foreign deposition. F1 is Fuller 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table 7 Economic growth, government crises, and purges

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable (Number of…)	Major government crises$_t$		Major government crises$_{t-1}$		Purges$_t$		Purges$_{t-1}$	
Estimation	LPM	IV (F1)	LPM	IV (F1)	LPM	IV (F1)	LPM	IV (F1)
Excluded instrument/s	None	All	None	All	None	All	None	All
GDP per capita growth$_{t-1}$	-0.005***	-0.013*	-0.011***	-0.012*	0.000	-0.010	-0.003*	-0.020*
	(0.001)	(0.007)	(0.002)	(0.006)	(0.001)	(0.010)	(0.002)	(0.011)
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F statistic on excluded instruments	-	7.68	-	8.73	-	7.68	-	8.73
Stock-Yogo critical value	-	4.03/6.42	-	4.03/6.42	-	4.03/6.42	-	4.03/6.42
Partial R^2 on excluded instruments	-	0.020	-	0.022	-	0.020	-	0.022
Observations	4,660	4,660	4,624	4,624	4,660	4,660	4,624	4,624
Observations for which dependent variable >0	631	631	631	631	251	251	268	268
Countries	160	160	160	160	160	160	160	160
Years: 1963-2001								

Robust standard errors clustered by country are in parentheses. The set of instruments includes the commodity price instrument$_{t-1}$, export partner growth instrument$_{t-1}$, precipitation instrument$_{t-1,}$ and temperature instruments$_{t-1}$. All estimates control for the full set of variables included in Table 4: log GDP per capita$_{t-2}$, the tenure of leader in power at start of year$_t$ (years), age of leader in power at start of year$_t$ (years), the female leader dummy (leader in power at start of year *t*), the number of times the leader in power at the start of year *t* has previously served in office, the irregular entry to office dummy (leader in power at start of year *t*), transition dummy$_t$, democracy dummy$_t$, election dummy$_{t, t-1}$, term limit dummy$_t$, and the secondary school enrollment rate (% gross) and share of the population aged 65 years and above in year *t*-2. Results with the estimated coefficients for the control variables are provided in the Web Appendix. Stock-Yogo critical values are the 5% significance level critical values for weak instruments tests based on, respectively, 30% and 5% maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. A major government crisis is any rapidly developing situation that threatens to bring the downfall of the existing regime (excluding situations of armed revolt). A purge is any systematic elimination by jailing or execution of political opposition within the ranks of the regime or the opposition. F1 is Fuller 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Web Appendix

Economic Growth and Political Survival

Paul J. Burke

This Web Appendix presents additional empirical results for the paper "Economic Growth and Political Survival". The following results tables are presented:

Table WA1 Results controlling for party dummies and leader dummies

Dependent variable: Exit of leader in year *t*

	(1)	(2)	(3)	(4)	(5)	(6)
Specification	Base specification		Party dummies		Leader dummies	
Estimation	LPM	IV (F1)	LPM	IV (F1)	LPM	IV (F1)
Instrument/s	None	All	None	All	None	All
GDP per capita growth$_{t-1}$	-0.003***	-0.013**	-0.002**	-0.011*	-0.001	-0.008
	(0.001)	(0.006)	(0.001)	(0.006)	(0.001)	(0.006)
Log GDP per capita$_{t-2}$	-0.009	-0.051	-0.028	-0.072*	-0.029	-0.091
	(0.037)	(0.045)	(0.036)	(0.043)	(0.044)	(0.064)
Tenure of leader in power at start of year$_t$ (years)	-0.002	-0.001	0.002	0.002	0.004	0.004
	(0.001)	(0.001)	(0.002)	(0.002)	(0.005)	(0.005)
Age of leader in power at start of year$_t$ (years)	0.004***	0.004***	0.004***	0.004***	0.024***	0.048*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.027)
Female leader dummy (leader in power at start of year *t*)	-0.021	-0.019	-0.054	-0.050	-	-
	(0.046)	(0.047)	(0.072)	(0.069)	-	-
Previous times in office (leader in power at start of year *t*)	-0.027*	-0.031**	-0.015	-0.015	-0.121*	-0.124**
	(0.014)	(0.015)	(0.021)	(0.020)	(0.064)	(0.059)
Irregular entry to office dummy (leader in power at start of year *t*)	-0.004	-0.020	-0.120**	-0.142***	-0.008	-0.013
	(0.020)	(0.023)	(0.049)	(0.047)	(0.083)	(0.076)
Transition dummy$_t$	0.191*	0.167	0.195	0.206	0.085	0.116
	(0.108)	(0.109)	(0.138)	(0.115)	(0.115)	(0.105)
Democracy dummy$_t$	0.024	0.019	0.064	0.067*	0.038	0.042
	(0.028)	(0.030)	(0.039)	(0.039)	(0.051)	(0.048)
Election dummy$_t$	0.251***	0.248***	0.238***	0.235***	0.204***	0.203***
	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.021)
Election dummy$_{t-1}$	0.024*	0.024*	0.019	0.018	0.002	0.002
	(0.014)	(0.014)	(0.012)	(0.012)	(0.012)	(0.011)
Term limit dummy$_t$	0.739***	0.733***	0.773***	0.769***	0.814***	0.809***
	(0.032)	(0.034)	(0.027)	(0.027)	(0.033)	(0.031)
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Party dummy variables	No	No	Yes	Yes	No	No
Leader dummy variables	No	No	No	No	Yes	Yes
F statistic on excluded instruments	-	7.51	-	6.00	-	5.78
Stock-Yogo critical value	-	4.03/6.42	-	4.03/6.42	-	4.03/6.42
Partial R^2 on excluded instruments	-	0.018	-	0.016	-	0.019
Observations	4,742	4,742	4,742	4,742	4,742	4,742
Years of at least one leader exit in country	773	773	773	773	773	773
Countries	160	160	160	160	160	160
Years: 1963-2001						

Robust standard errors clustered by country are in parentheses. Stock-Yogo critical values are the 5% significance level critical values for weak instruments tests based on, respectively, 30% and 5% maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. Estimates control for the secondary school enrollment rate (% gross) and the share of the population aged 65 years and above in year *t*-2. Results in columns 1-2 are identical to those in columns 1-2 of Table 4. Party dummies are country-specific dummies for the party of the leader in office at the start of year *t* (variable constructed by author using Beck et al. 2001 and other sources). Leaders not affiliated with parties are treated as independents. Leader dummies are leader-specific and not leader spell-specific. F1 is Fuller 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table WA2 Results with additional controls

Dependent variable: Exit of leader in year *t*

	(1)	(2)		(1)	(2)
Estimation	LPM	IV (F1)		LPM	IV (F1)
Instrument/s	None	All		None	All
Variables used in Table 4 of main manuscript			*Additional variables*		
GDP per capita growth$_{t-1}$	-0.002*	-0.013**	Share of the population aged under 15 years$_{t-2}$ (%)	0.001	-0.002
	(0.001)	(0.006)		(0.003)	(0.004)
Log GDP per capita$_{t-2}$	0.043	-0.035	Urbanization rate$_{t-2}$ (%)	-0.002	-0.002
	(0.035)	(0.053)		(0.002)	(0.002)
Tenure of leader in power at start of year$_t$ (years)	-0.001	-0.000	Infant mortality rate$_{t-2}$ (%)	-0.000	-0.001
	(0.001)	(0.001)		(0.001)	(0.001)
Age of leader in power at start of year$_t$ (years)	0.004***	0.004***	Population$_{t-2}$ (million)	0.004	-0.081
	(0.001)	(0.001)		(0.101)	(0.113)
Female leader dummy (leader in power at start of year *t*)	-0.016	-0.016	Exports as a share of GDP$_{t-2}$ (%)	-0.000	0.001
	(0.046)	(0.047)		(0.001)	(0.001)
Previous times in office (leader in power at start of year *t*)	-0.032*	-0.035**	Number of anti-government demonstrations$_{t-1}$	0.005	0.004
	(0.017)	(0.017)		(0.004)	(0.003)
Irregular entry to office dummy (leader in power at start of year *t*)	-0.002	-0.015	POLITY2$_t$	0.004*	0.002
	(0.023)	(0.023)		(0.002)	(0.002)
Transition dummy$_t$	0.297*	0.238	Natural death of national leader in power at start year *t* dummy$_t$	0.030	0.028
	(0.158)	(0.183)		(0.059)	(0.058)
Election dummy$_t$	0.244***	0.240***	First-leader of independent country dummy (leader in power at start of year *t*)	-0.047	-0.057
	(0.023)	(0.023)		(0.035)	(0.035)
Election dummy$_{t-1}$	0.023	0.021	Internal armed conflict dummy$_{t-1}$	0.048**	0.029
	(0.014)	(0.015)		(0.022)	(0.023)
Term limit dummy$_t$	0.749***	0.753***	Economic sanctions dummy$_{t-1}$	0.017	0.004
	(0.030)	(0.032)		(0.019)	(0.020)
Secondary school enrollment rate (% gross)$_{t-2}$	-0.001	-0.002*			
	(0.001)	(0.001)			
Share of the population aged 65 years and above$_{t-2}$ (%)	0.020	0.019			
	(0.020)	(0.019)			
Country and year fixed effects	Yes	Yes			
F statistic on excluded instruments	-	8.78			
Stock-Yogo critical value	-	4.03/6.42			
Partial R^2 on excluded instruments	-	0.027			
Observations	4,154	4,154			
Years of at least one leader exit in country	687	687			
Countries	147	147			
Years: 1963-2001					

Robust standard errors clustered by country are in parentheses. Stock-Yogo critical values are the 5% significance level critical values for weak instruments tests based on, respectively, 30% and 5% maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. F1 is Fuller 1. The democracy dummy is not included because the POLITY2 measure is included instead. The infant mortality rate is interpolated (linear) and extrapolated (constant). Sources for additional variables: the first 5 variables in the right-hand column are from the World Development Indicators. Anti-government demonstrations are from Databanks International. POLITY2 data are from Marshall et al. (2007). The death and first leader variables are constructed using the Archigos dataset. Internal armed conflicts are from Gleditsch et al. (2002) and include internationalized internal armed conflicts. Economic sanctions data are from Marinov (2005). The sample is smaller than the full sample (4,742) due to missing observations for the set of controls. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table WA3 Results using alternative measures of GDP growth

Dependent variable: Exit of leader in year *t*

	(1)	(2)	(3)	(4)	(5)	(6)
Estimation	LPM	IV (F1)	LPM	IV (F1)	LPM	IV (F1)
Instrument/s	None	All	None	All	None	All
GDP per capita growth$_{t-1}$	-0.003***	-0.013**				
	(0.001)	(0.006)				
GDP growth$_{t-1}$			-0.003***	-0.013**		
			(0.001)	(0.006)		
Penn World Table GDP per capita growth$_{t-1}$					-0.002***	-0.011^
					(0.001)	(0.007)
Log GDP per capita$_{t-2}$	-0.009	-0.051	-0.009	-0.049		
	(0.037)	(0.045)	(0.037)	(0.047)		
Log Penn World Table GDP per capita$_{t-2}$					-0.015	-0.067
					(0.038)	(0.057)
Tenure of leader in power at start of year$_t$ (years)	-0.002	-0.001	-0.002	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age of leader in power at start of year$_t$ (years)	0.004***	0.004***	0.004***	0.004***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female leader dummy (leader in power at start of year *t*)	-0.021	-0.019	-0.021	-0.018	-0.025	-0.027
	(0.046)	(0.047)	(0.046)	(0.047)	(0.046)	(0.047)
Previous times in office (leader in power at start of year *t*)	-0.027*	-0.031**	-0.027*	-0.031**	-0.025*	-0.031**
	(0.014)	(0.015)	(0.014)	(0.015)	(0.014)	(0.015)
Irregular entry to office dummy (leader in power at start of year *t*)	-0.004	-0.020	-0.005	-0.021	-0.008	-0.013
	(0.020)	(0.023)	(0.020)	(0.023)	(0.021)	(0.022)
Transition dummy$_t$	0.191*	0.167	0.191*	0.171	0.315***	0.218**
	(0.108)	(0.109)	(0.108)	(0.108)	(0.055)	(0.098)
Democracy dummy$_t$	0.024	0.019	0.024	0.017	0.005	0.000
	(0.028)	(0.030)	(0.028)	(0.030)	(0.027)	(0.028)
Election dummy$_t$	0.251***	0.248***	0.251***	0.248***	0.254***	0.252***
	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.023)
Election dummy$_{t-1}$	0.024*	0.024*	0.024*	0.025*	0.024*	0.028**
	(0.014)	(0.014)	(0.013)	(0.014)	(0.014)	(0.014)
Term limit dummy$_t$	0.739***	0.733***	0.739***	0.733***	0.740***	0.738***
	(0.032)	(0.034)	(0.032)	(0.034)	(0.032)	(0.033)
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F statistic on excluded instruments	-	7.51	-	7.07	-	4.07
Stock-Yogo critical value	-	4.03/6.42	-	4.03/6.42	-	4.03/6.42
Partial R^2 on excluded instruments	-	0.018	-	0.016	-	0.008
Observations	4,742	4,742	4,742	4,742	4,483	4,483
Years of at least one leader exit in country	773	773	773	773	744	744
Countries	160	160	160	160	157	157
Years: 1963-2001						

Robust standard errors clustered by country are in parentheses. Stock-Yogo critical values are the 5% significance level critical values for weak instruments tests based on, respectively, 30% and 5% maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. Estimates control for the secondary school enrollment rate (% gross) and the share of the population aged 65 years and above in year *t*-2. Results in columns 1-2 are identical to those in columns 1-2 of Table 4. F1 is Fuller 1. The Penn World Table data measure growth in GDP per capita (2000 international $ chain series) and do not cover all country-years in the full sample. * Significant at 10%. ** Significant at 5%. *** Significant at 1%. (^): This coefficient on the GDP per capita growth term is statistically significant at the 10% level in a specification using only the external economy instruments (and not the weather instruments).

Table WA4 Results with omitted regions

Dependent variable: Exit of leader in year *t*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Excluded region	None	East Asia and the Pacific	East Europe and Central Asia	Middle East and North Africa	South Asia	Western Europe	North America	Sub-Saharan Africa	Latin America and Caribbean
Estimation	IV (F1)	IV (F1)	IV (F1)	IV (F1)	IV (F1)	IV (F1)	IV (F1)	IV (F1)	IV (F1)
Instrument/s	All	All	All	All	All	All	All	All	All
GDP per capita growth$_{t-1}$	-0.013**	-0.016**	-0.010 (^)	-0.013**	-0.015**	-0.014**	-0.013**	-0.011*	-0.011**
	(0.006)	(0.007)	(0.008)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)
Log GDP per capita$_{t-2}$	-0.051	-0.085	-0.032	-0.038	-0.071	-0.057	-0.050	0.006	-0.063
	(0.045)	(0.057)	(0.045)	(0.050)	(0.047)	(0.047)	(0.045)	(0.043)	(0.045)
Tenure of leader in power at start of year$_t$ (years)	-0.001	-0.001	-0.002	-0.002	-0.000	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Age of leader in power at start of year$_t$ (years)	0.004***	0.004***	0.004***	0.005***	0.004***	0.004***	0.004***	0.005***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female leader dummy (leader in power at start of year *t*)	-0.019	-0.024	-0.017	-0.010	0.014	0.013	-0.020	-0.032	-0.063
	(0.047)	(0.053)	(0.048)	(0.049)	(0.057)	(0.059)	(0.047)	(0.044)	(0.046)
Previous times in office (leader in power at start of year *t*)	-0.031**	-0.029*	-0.029*	-0.040***	-0.035**	-0.035**	-0.032**	-0.016	-0.022
	(0.015)	(0.016)	(0.016)	(0.014)	(0.015)	(0.018)	(0.015)	(0.015)	(0.016)
Irregular entry to office dummy (leader in power at start of year *t*)	-0.020	-0.014	-0.018	-0.014	-0.025	-0.019	-0.020	-0.003	-0.042
	(0.023)	(0.025)	(0.024)	(0.022)	(0.024)	(0.023)	(0.023)	(0.031)	(0.026)
Transition dummy$_t$	0.167	0.166	-	0.163	0.175	0.171	0.167	0.139	0.193*
	(0.109)	(0.111)	-	(0.109)	(0.111)	(0.110)	(0.109)	(0.107)	(0.107)
Democracy dummy$_t$	0.019	0.018	0.003	0.014	0.008	0.018	0.017	0.006	0.083**
	(0.030)	(0.033)	(0.029)	(0.030)	(0.031)	(0.031)	(0.030)	(0.033)	(0.038)
Election dummy$_t$	0.248***	0.259***	0.241***	0.259***	0.239***	0.226***	0.250***	0.282***	0.237***
	(0.022)	(0.024)	(0.024)	(0.023)	(0.023)	(0.024)	(0.022)	(0.025)	(0.025)
Election dummy$_{t-1}$	0.024*	0.019	0.023	0.033**	0.027**	0.023	0.020	0.044***	0.008
	(0.014)	(0.015)	(0.014)	(0.014)	(0.014)	(0.015)	(0.013)	(0.016)	(0.014)
Term limit dummy$_t$	0.733***	0.719***	0.748***	0.726***	0.741***	0.747***	0.728***	0.712***	0.758***
	(0.034)	(0.037)	(0.033)	(0.035)	(0.034)	(0.034)	(0.036)	(0.036)	(0.064)
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F statistic on excluded instruments	7.51	5.99	6.16	8.62	6.88	7.09	7.45	4.98	7.99
Stock-Yogo critical value: 4.03/6.42									
Partial R^2 on excluded instruments	0.018	0.015	0.008	0.025	0.017	0.018	0.018	0.026	0.021
Observations	4,742	4,197	4,404	4,291	4,533	4,105	4,669	3,350	3,762
Years of at least one leader exit in country	773	685	699	744	725	605	760	637	579
Countries	160	142	133	145	153	143	158	115	134
Years: 1963-2001									

Robust standard errors clustered by country are in parentheses. Stock-Yogo critical values are the 5% significance level critical values for weak instruments tests based on, respectively, 30% and 5% maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. Estimates control for the secondary school enrollment rate (% gross) and the share of the population aged 65 years and above in year *t*-2. Results in column 1 are identical to those in column 2 of Table 4. F1 is Fuller 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%. (^): This coefficient on the GDP per capita growth term is statistically significant at the 10% level in a specification using only the external economy instruments (and not the weather instruments).

Table WA5 Results with additional lags of GDP per capita growth

Dependent variable: Exit of leader in year *t*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Estimation	LPM (columns 1-4)				Logit (columns 5-8)				Cox proportional hazard model (columns 9-12)			
	Coefficients				Odds ratios				Hazard ratios			
GDP per capita growth$_{t-1}$	-0.003***	-0.002***	-0.003***	-0.002***	0.967***	0.968***	0.965***	0.967***	0.979***	0.983***	0.981***	0.983**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.010)	(0.010)	(0.010)	(0.011)	(0.007)	(0.006)	(0.007)	(0.007)
GDP per capita growth$_{t-2}$		-0.001	-0.000	-0.000		0.995	0.998	1.001		0.988*	0.990*	0.993
		(0.001)	(0.001)	(0.001)		(0.010)	(0.011)	(0.011)		(0.006)	(0.006)	(0.008)
GDP per capita growth$_{t-3}$			-0.001*	-0.001*			0.982*	0.981*			0.989	0.987*
			(0.001)	(0.001)			(0.010)	(0.011)			(0.007)	(0.007)
GDP per capita growth$_{t-4}$				-0.001				0.988				0.997
				(0.001)				(0.010)				(0.008)
Tenure of leader in power at start of year$_t$ (years)	-0.002	-0.002	-0.001	-0.001	0.991	0.991	0.996	1.000	1.539	1.569	1.588	1.456
	(0.001)	(0.001)	(0.001)	(0.001)	(0.011)	(0.011)	(0.012)	(0.012)	(0.737)	(0.761)	(0.788)	(0.693)
Age of leader in power at start of year$_t$ (years)	0.004***	0.004***	0.004***	0.004***	1.040***	1.040***	1.041***	1.038***	1.020***	1.021***	1.020***	1.019***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.007)	(0.007)	(0.007)	(0.007)	(0.005)	(0.005)	(0.005)	(0.005)
Female leader dummy (leader in power at start of year *t*)	-0.020	-0.020	-0.015	-0.012	1.000	1.003	1.035	1.052	0.968	0.975	0.997	1.006
	(0.046)	(0.047)	(0.048)	(0.046)	(0.315)	(0.316)	(0.330)	(0.337)	(0.172)	(0.176)	(0.181)	(0.179)
Previous times in office (leader in power at start of year *t*)	-0.027*	-0.027*	-0.033**	-0.029*	0.804*	0.804*	0.785**	0.809*	0.937	0.936	0.919	0.931
	(0.014)	(0.014)	(0.015)	(0.015)	(0.090)	(0.090)	(0.092)	(0.095)	(0.059)	(0.060)	(0.063)	(0.065)
Irregular entry to office dummy (leader in power at start of year *t*)	-0.004	-0.004	-0.000	-0.005	0.932	0.931	0.981	0.949	0.947	0.947	0.994	0.981
	(0.020)	(0.020)	(0.021)	(0.023)	(0.163)	(0.163)	(0.177)	(0.176)	(0.129)	(0.130)	(0.145)	(0.152)
Transition dummy$_t$	0.188*	0.189*	0.176	0.210*	3.373**	3.412**	3.139**	3.672**	1.970**	2.037**	1.932**	2.073**
	(0.107)	(0.107)	(0.111)	(0.117)	(1.818)	(1.841)	(1.773)	(2.139)	(0.590)	(0.606)	(0.601)	(0.651)
Democracy dummy$_t$	0.024	0.024	0.029	0.029	1.084	1.081	1.146	1.150	1.092	1.091	1.131	1.136
	(0.028)	(0.028)	(0.028)	(0.028)	(0.209)	(0.208)	(0.227)	(0.231)	(0.176)	(0.174)	(0.182)	(0.183)
Election dummy$_t$	0.251***	0.251***	0.252***	0.254***	6.584***	6.584***	6.766***	6.813***	3.314***	3.323***	3.363***	3.384***
	(0.022)	(0.022)	(0.022)	(0.022)	(0.754)	(0.754)	(0.795)	(0.815)	(0.340)	(0.339)	(0.338)	(0.345)
Election dummy$_{t-1}$	0.024*	0.024*	0.025*	0.026*	1.248	1.248	1.259*	1.274*	1.211*	1.213*	1.230**	1.241**
	(0.014)	(0.014)	(0.013)	(0.014)	(0.169)	(0.169)	(0.174)	(0.179)	(0.125)	(0.125)	(0.128)	(0.132)
Term limit dummy$_t$	0.739***	0.739***	0.741***	0.744***	+	+	+	+	4.964***	4.942***	5.219***	5.267***
	(0.032)	(0.032)	(0.033)	(0.034)	***	***	***	***	(0.901)	(0.897)	(0.998)	(0.984)
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.223	0.223	0.227	0.227	0.254	0.254	0.260	0.260	-	-	-	-
Observations	4,742	4,742	4,605	4,464	4,382	4,382	4,256	4,063	4,742	4,742	4,605	4,464
Years of at least one leader exit of country	773	773	746	725	734	734	704	685	773	773	746	725
Countries	160	160	160	160	141	141	140	135	160	160	160	160
Years: 1963-2001												

Robust standard errors clustered by country are in parentheses. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. The logit estimation sample is by necessity restricted to countries that experienced within-sample variation in the dependent variable. The estimated odds ratio for the term limit dummy in the logit specification is large, positive, and statistically significant at the 1% significance level. Estimates control for the secondary school enrollment rate (% gross) and the share of the population aged 65 years and above in year *t*-2. Log GDP per capita$_{t-2}$ is not included because of the inclusion of additional lags of GDP per capita growth. The hazard model treats each leader-spell as an individual subject and only includes leaders in power at the start of the calendar year. The R^2 terms reflect the explanatory power of the time-varying explanatory variables and year dummies. The R^2 in columns 1-4 is the within-R^2. The R^2 in columns 5-8 is the pseudo-R^2. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table WA6 Results with alternative dependent variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent variable	Primary dependent variable i.e. dummy for exit of national leader in year *t*		Total number of changes in effective national leader in year *t*		Primary dependent variable excluding leader exits due to sickness		Exit of leader in year *t* using Przeworski et al. (2000) data		Exit of leader in year *t* using Databanks International data	
Estimation	LPM	IV (F1)	LPM	IV (F1)	LPM	IV (F1)	LPM	IV (F1)	LPM	IV (F1)
Instrument/s	None	All	None	All	None	All	None	All	None	All
GDP per capita growth$_{t-1}$	-0.003***	-0.013**	-0.002**	-0.017**	-0.003***	-0.013**	-0.003***	-0.012**	-0.003***	-0.012**
	(0.001)	(0.006)	(0.001)	(0.008)	(0.001)	(0.006)	(0.001)	(0.006)	(0.001)	(0.006)
Log GDP per capita$_{t-2}$	-0.009	-0.051	0.008	-0.054	-0.005	-0.045	-0.025	-0.066	-0.032	-0.065
	(0.037)	(0.045)	(0.042)	(0.058)	(0.038)	(0.046)	(0.041)	(0.049)	(0.037)	(0.045)
Tenure of leader in power at start of year$_t$ (years)	-0.002	-0.001	-0.000	-0.000	-0.002	-0.001	-0.002	-0.002	0.001	0.001
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age of leader in power at start of year$_t$ (years)	0.004***	0.004***	0.004***	0.005***	0.004***	0.004***	0.004***	0.004***	0.003***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female leader dummy (leader in power at start of year *t*)	-0.021	-0.019	-0.007	-0.005	-0.032	-0.031	-0.024	-0.022	-0.019	-0.018
	(0.046)	(0.047)	(0.064)	(0.066)	(0.044)	(0.045)	(0.045)	(0.045)	(0.050)	(0.051)
Previous times in office (leader in power at start of year *t*)	-0.027*	-0.031**	-0.039	-0.045*	-0.032**	-0.036**	-0.029*	-0.033**	-0.027*	-0.030**
	(0.014)	(0.015)	(0.025)	(0.025)	(0.014)	(0.014)	(0.015)	(0.016)	(0.015)	(0.015)
Irregular entry to office dummy (leader in power at start of year *t*)	-0.004	-0.020	0.024	0.002	-0.005	-0.020	0.002	-0.013	-0.005	-0.016
	(0.020)	(0.023)	(0.032)	(0.035)	(0.021)	(0.023)	(0.022)	(0.025)	(0.026)	(0.027)
Transition dummy$_t$	0.191*	0.167	0.363**	0.329*	0.190*	0.168	0.159	0.138	0.113	0.094
	(0.108)	(0.109)	(0.181)	(0.190)	(0.108)	(0.109)	(0.109)	(0.111)	(0.074)	(0.076)
Democracy dummy$_t$	0.024	0.019	0.028	0.020	0.021	0.016	0.105***	0.098***	0.006	0.000
	(0.028)	(0.030)	(0.038)	(0.041)	(0.028)	(0.030)	(0.032)	(0.033)	(0.029)	(0.030)
Election dummy$_t$	0.251***	0.248***	0.326***	0.322***	0.252***	0.250***	0.221***	0.218***	0.250***	0.248***
	(0.022)	(0.022)	(0.031)	(0.031)	(0.022)	(0.022)	(0.023)	(0.023)	(0.023)	(0.023)
Election dummy$_{t-1}$	0.024*	0.024*	0.049**	0.049**	0.027**	0.027**	0.027*	0.027*	0.035**	0.035**
	(0.014)	(0.014)	(0.019)	(0.019)	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
Term limit dummy$_t$	0.739***	0.733***	0.675***	0.667***	0.738***	0.732***	0.683***	0.678***	0.601***	0.597***
	(0.032)	(0.034)	(0.045)	(0.047)	(0.032)	(0.034)	(0.043)	(0.044)	(0.049)	(0.049)
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F statistic on excluded instruments	-	7.51	-	7.51	-	7.51	-	7.46	-	8.11
Stock-Yogo critical value	-	4.03/6.42	-	4.03/6.42	-	4.03/6.42	-	4.03/6.42	-	4.03/6.42
Partial R^2 on excluded instruments	-	0.018	-	0.018	-	0.018	-	0.017	-	0.020
Observations	4,742	4,742	4,742	4,742	4,742	4,742	4,704	4,704	4,709	4,709
Years for which dependent variable >0	773	773	778	778	763	763	811	811	802	802
Countries	160	160	160	160	160	160	160	160	160	160
Years: 1963-2001										

Robust standard errors clustered by country are in parentheses. Stock-Yogo critical values are the 5% significance level critical values for weak instruments tests based on, respectively, 30% and 5% maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. Estimates control for the secondary school enrollment rate (% gross) and the share of the population aged 65 years and above in year *t*-2. F1 is Fuller 1. Results in columns 1-2 are the same as those in columns 1-2 of Table 4. Occasionally, a change in national leader occurs in the year subsequent to an exit of a national leader (i.e. the new leader enters on 1 January). The Przeworski et al. (2000) dummy variable is constructed using the EHEADS and EDEATH variables, and excludes instances of exits due to leader deaths. The Databanks International dummy variable is constructed using the Polit12 variable. The Przeworski et al. (2000) and Databanks International data do not cover all country-years in the sample. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table WA7 Results excluding important countries/commodities

Dependent variable: Exit of leader in year *t*

	(1)	(2)	(3)	(4)	(5)
Specification	Full sample	Excluding 20 largest economies	Excluding OPEC	Excluding commodities from commodity bundle if >15% of world exports	
Estimation	IV (F1)	IV (F1)	IV (F1)	IV (F1)	IV (F1)
Instrument/s	All	All	All	All	Commodity price instrument$_{t-1}$
GDP per capita growth$_{t-1}$	-0.013**	-0.014**	-0.012**	-0.013**	-0.022*
	(0.006)	(0.006)	(0.005)	(0.006)	(0.012)
Log GDP per capita$_{t-2}$	-0.051	-0.061	-0.046	-0.052	-0.086
	(0.045)	(0.050)	(0.049)	(0.046)	(0.063)
Tenure of leader in power at start of year$_t$ (years)	-0.001	-0.001	-0.002	-0.001	-0.001
	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)
Age of leader in power at start of year$_t$ (years)	0.004***	0.004***	0.005***	0.004***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female leader dummy (leader in power at start of year *t*)	-0.019	0.035	-0.021	-0.019	-0.018
	(0.047)	(0.051)	(0.047)	(0.047)	(0.049)
Previous times in office (leader in power at start of year *t*)	-0.031**	-0.036*	-0.038**	-0.031**	-0.034**
	(0.015)	(0.018)	(0.016)	(0.015)	(0.016)
Irregular entry to office dummy (leader in power at start of year *t*)	-0.020	-0.014	-0.015	-0.020	-0.032
	(0.023)	(0.024)	(0.023)	(0.023)	(0.029)
Transition dummy$_t$	0.167	0.170	0.163	0.167	0.148
	(0.109)	(0.114)	(0.109)	(0.109)	(0.115)
Democracy dummy$_t$	0.019	0.023	0.029	0.019	0.014
	(0.030)	(0.031)	(0.030)	(0.030)	(0.031)
Election dummy$_t$	0.248***	0.255***	0.252***	0.248***	0.246***
	(0.022)	(0.024)	(0.023)	(0.022)	(0.023)
Election dummy$_{t-1}$	0.024*	0.025*	0.028**	0.024*	0.024*
	(0.014)	(0.015)	(0.014)	(0.014)	(0.014)
Term limit dummy$_t$	0.733***	0.714***	0.719***	0.733***	0.728***
	(0.034)	(0.039)	(0.031)	(0.034)	(0.037)
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes
F statistic on excluded instruments	7.51	7.20	7.48	7.42	5.90
Stock-Yogo critical value	4.03/6.42	4.03/6.42	4.03/6.42	4.03/6.42	12.71/24.09
Partial R^2 on excluded instruments	0.018	0.017	0.023	0.017	0.002
Observations	4,742	4,015	4,456	4,742	4,742
Years of at least one leader exit in country	773	574	734	773	773
Countries	160	140	151	160	160
Years: 1963-2001					

Robust standard errors clustered by country are in parentheses. Stock-Yogo critical values are the 5% significance level critical values for weak instruments tests based on, respectively, 30% and 5% maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. Estimates control for the secondary school enrollment rate (% gross) and the share of the population aged 65 years and above in year *t*-2. Results in column 1 are identical to those in column 2 of Table 4. F1 is Fuller 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table WA8 Results using alternative instrument weight years

Dependent variable: Exit of leader in year *t*

	(1)	(2)	(3)	(4)	(5)
Estimation	IV (F1)	IV (F1)	IV (F1)	IV (F1)	IV (F1)
Instrument weight year	1975	1975	1975	1975	2000
Instrument/s	Commodity price instrument$_{t-1}$	Export partner growth instrument$_{t-1}$	Precipitation instrument$_{t-1}$	Temperature instruments$_{t-1}$	Export partner growth instrument$_{t-1}$
GDP per capita growth$_{t-1}$	-0.022**	-0.012	-0.003	-0.003	-0.018*
	(0.010)	(0.008)	(0.015)	(0.012)	(0.010)
Log GDP per capita$_{t-2}$	-0.070	-0.045	-0.010	-0.009	-0.069
	(0.054)	(0.057)	(0.058)	(0.050)	(0.059)
Tenure of leader in power at start of year$_t$ (years)	-0.001	-0.001	-0.002	-0.002	-0.001
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Age of leader in power at start of year$_t$ (years)	0.004***	0.004***	0.004***	0.004***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female leader dummy (leader in power at start of year *t*)	-0.016	-0.025	-0.020	-0.020	-0.019
	(0.049)	(0.047)	(0.046)	(0.047)	(0.048)
Previous times in office (leader in power at start of year *t*)	-0.032**	-0.033**	-0.026*	-0.026*	-0.033**
	(0.016)	(0.015)	(0.014)	(0.014)	(0.016)
Irregular entry to office dummy (leader in power at start of year *t*)	-0.042	-0.020	-0.008	-0.007	-0.026
	(0.028)	(0.024)	(0.029)	(0.025)	(0.028)
Transition dummy$_t$	0.206	0.313***	0.325**	0.328**	0.157
	(0.174)	(0.058)	(0.156)	(0.149)	(0.113)
Democracy dummy$_t$	0.005	-0.003	0.020	0.020	0.016
	(0.032)	(0.029)	(0.029)	(0.029)	(0.031)
Election dummy$_t$	0.236***	0.247***	0.246***	0.246***	0.247***
	(0.025)	(0.025)	(0.023)	(0.023)	(0.023)
Election dummy$_{t-1}$	0.019	0.021	0.022	0.022	0.024*
	(0.015)	(0.014)	(0.014)	(0.014)	(0.014)
Term limit dummy$_t$	0.751***	0.745***	0.744***	0.743***	0.730***
	(0.036)	(0.035)	(0.033)	(0.032)	(0.036)
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes
F statistic on excluded instruments	2.19	14.16	3.18	12.46	7.54
Stock-Yogo critical value	12.71/24.09	12.71/24.09	12.71/24.09	7.49/13.46	12.71/24.09
Partial R^2 on excluded instruments	0.002	0.004	0.002	0.005	0.008
Observations	4,450	4,010	4,533	4,533	4,742
Years of at least one leader exit in country	729	676	739	739	773
Countries	135	115	138	138	160
Years: 1963-2001					

Robust standard errors clustered by country are in parentheses. Stock-Yogo critical values are the 5% significance level critical values for weak instruments tests based on, respectively, 30% and 5% maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. Estimates control for the secondary school enrollment rate (% gross) and the share of the population aged 65 years and above in year *t*-2. F1 is Fuller 1. Estimation samples are less than the full sample size (4,742) because of missing data on 1975 weights. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table WA9 Results without Ω, Ξ, Φ interactions

Dependent variable: Exit of leader in year *t*

	(1)	(2)	(3)	(4)	(5)
Estimation	IV (F1)	IV (F1)	IV (F1)	IV (F1)	IV (F1)
Instrument/s	All (uninteracted) instruments	Uninteracted commodity price instrument$_{t-1}$	Uninteracted export partner growth instrument$_{t-1}$	Uninteracted precipitation instrument$_{t-1}$	Uninteracted temperature instruments$_{t-1}$
GDP per capita growth$_{t-1}$	-0.013**	-0.032	-0.011**	0.005	-0.025*
	(0.005)	(0.024)	(0.005)	(0.023)	(0.015)
Log GDP per capita$_{t-2}$	-0.052	-0.125	-0.043	0.022	-0.097
	(0.045)	(0.112)	(0.045)	(0.098)	(0.072)
Tenure of leader in power at start of year$_t$ (years)	-0.001	-0.001	-0.001	-0.002	-0.001
	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)
Age of leader in power at start of year$_t$ (years)	0.004***	0.005***	0.004***	0.004***	0.005***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
Female leader dummy (leader in power at start of year *t*)	-0.019	-0.016	-0.020	-0.022	-0.017
	(0.047)	(0.051)	(0.047)	(0.046)	(0.049)
Previous times in office (leader in power at start of year *t*)	-0.031**	-0.038*	-0.030**	-0.024	-0.035**
	(0.015)	(0.020)	(0.015)	(0.016)	(0.017)
Irregular entry to office dummy (leader in power at start of year *t*)	-0.020	-0.047	-0.017	0.007	-0.036
	(0.022)	(0.047)	(0.022)	(0.040)	(0.033)
Transition dummy$_t$	0.167	0.126	0.172	0.208*	0.142
	(0.109)	(0.130)	(0.108)	(0.120)	(0.121)
Democracy dummy$_t$	0.018	0.009	0.020	0.028	0.013
	(0.030)	(0.037)	(0.029)	(0.029)	(0.033)
Election dummy$_t$	0.248***	0.243***	0.249***	0.253***	0.245***
	(0.022)	(0.026)	(0.022)	(0.023)	(0.023)
Election dummy$_{t-1}$	0.024*	0.025	0.024*	0.024*	0.024*
	(0.014)	(0.015)	(0.013)	(0.014)	(0.014)
Term limit dummy$_t$	0.733***	0.723***	0.734***	0.743***	0.727***
	(0.035)	(0.042)	(0.034)	(0.032)	(0.040)
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes
F statistic on excluded instruments	6.87	1.81	22.27	0.87	7.74
Stock-Yogo critical value	4.03/6.42	12.71/24.09	12.71/24.09	12.71/24.09	7.49/13.46
Partial R^2 on excluded instruments	0.022	0.001	0.019	0.000	0.003
Observations	4,742	4,742	4,742	4,742	4,742
Years of at least one leader exit in country	773	773	773	773	773
Countries	160	160	160	160	160
Years: 1963-2001					

Robust standard errors clustered by country are in parentheses. Stock-Yogo critical values are the 5% significance level critical values for weak instruments tests based on, respectively, 30% and 5% maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. Estimates control for the secondary school enrollment rate (% gross) and the share of the population aged 65 years and above in year *t*-2. F1 is Fuller 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table WA10 Potentially asymmetric growth effects specification

Dependent variable: Exit of leader in year *t*

	(1)	(2)
Estimation	LPM	IV (F1)
Instrument/s	None	All
GDP per capita growth$_{t-1}$ when non-negative (0 otherwise)	-0.002*	-0.003
	(0.001)	(0.030)
GDP per capita growth$_{t-1}$ when negative (0 otherwise)	-0.004**	-0.019
	(0.002)	(0.021)
Log GDP per capita$_{t-2}$	-0.007	-0.025
	(0.035)	(0.078)
Tenure of leader in power at start of year$_t$ (years)	-0.002	-0.001
	(0.001)	(0.001)
Age of leader in power at start of year$_t$ (years)	0.004***	0.004***
	(0.001)	(0.001)
Female leader dummy (leader in power at start of year *t*)	-0.020	-0.016
	(0.046)	(0.048)
Previous times in office (leader in power at start of year *t*)	-0.027*	-0.029*
	(0.014)	(0.015)
Irregular entry to office dummy (leader in power at start of year *t*)	-0.004	-0.014
	(0.020)	(0.025)
Transition dummy$_t$	0.189*	0.163
	(0.108)	(0.110)
Democracy dummy$_t$	0.024	0.022
	(0.028)	(0.029)
Election dummy$_t$	0.251***	0.248***
	(0.022)	(0.022)
Election dummy$_{t-1}$	0.024*	0.024*
	(0.014)	(0.014)
Term limit dummy$_t$	0.739***	0.741***
	(0.032)	(0.038)
Country and year fixed effects	Yes	Yes
F statistic on excluded instruments	-	1.04
Stock-Yogo critical value	-	4.44/7.16
p-value: test of equality of two growth terms	0.25	0.74
Observations	4,742	4,742
Years of at least one leader exit in country	773	773
Countries	160	160
Years: 1963-2001		

Robust standard errors clustered by country are in parentheses. Stock-Yogo critical values are the 5% significance level critical values for weak instruments tests based on, respectively, 30% and 5% maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. Estimates control for the secondary school enrollment rate (% gross) and the share of the population aged 65 years and above in year *t*-2. The IV estimate specifies both growth terms as endogenous explanatory variables. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table WA11 Reduced-form relationships between instruments and protests

	(1)	(2)	(3)	(4)
Dependent variable	Number of anti-government demonstrations$_{t-1}$		Number of anti-government demonstrations$_{t}$	
Estimation	LPM	LPM	LPM	LPM
Commodity price instrument$_{t-1}$	0.489	0.646	0.609*	0.623*
	(0.477)	(0.504)	(0.336)	(0.327)
Export partner growth instrument$_{t-1}$	-0.012	0.006	0.023	0.025
	(0.031)	(0.031)	(0.032)	(0.032)
Precipitation instrument$_{t-1}$	0.003	0.003*	-0.003	-0.003
	(0.002)	(0.002)	(0.002)	(0.002)
Temperature instruments$_{t-1}$	0.013	-0.020	-0.125	-0.128
	(0.095)	(0.095)	(0.092)	(0.090)
Temperature instruments$_{t-1}$*Cold dummy	-0.084	-0.024	0.340	0.345
	(0.386)	(0.374)	(0.511)	(0.508)
GDP per capita growth$_{t-1}$		-0.018***		-0.002
		(0.006)		(0.004)
Log GDP per capita$_{t-2}$	0.133	0.063	0.048	0.042
	(0.184)	(0.179)	(0.180)	(0.178)
Tenure of leader in power at start of year$_t$ (years)	-0.017**	-0.017**	0.000	0.000
	(0.007)	(0.007)	(0.008)	(0.008)
Age of leader in power at start of year$_t$ (years)	0.006	0.007	-0.000	-0.000
	(0.005)	(0.005)	(0.005)	(0.005)
Female leader dummy (leader in power at start of year *t*)	0.263	0.266	0.389**	0.390**
	(0.250)	(0.251)	(0.189)	(0.189)
Previous times in office (leader in power at start of year *t*)	0.010	0.002	0.114	0.114
	(0.072)	(0.073)	(0.079)	(0.079)
Irregular entry to office dummy (leader in power at start of year *t*)	0.062	0.038	-0.096	-0.098
	(0.127)	(0.126)	(0.124)	(0.122)
Transition dummy$_t$	1.606***	1.495***	1.658***	1.653***
	(0.348)	(0.319)	(0.476)	(0.476)
Democracy dummy$_t$	0.081	0.067	-0.219	-0.220
	(0.189)	(0.188)	(0.209)	(0.208)
Election dummy$_t$	0.157*	0.152*	0.111**	0.110**
	(0.089)	(0.089)	(0.054)	(0.054)
Election dummy$_{t-1}$	0.092*	0.090*	-0.021	-0.021
	(0.048)	(0.047)	(0.068)	(0.068)
Term limit dummy$_t$	-0.506*	-0.516*	-0.428**	-0.429**
	(0.298)	(0.300)	(0.186)	(0.186)
Country and year fixed effects	Yes	Yes	Yes	Yes
R^2	0.031	0.033	0.030	0.030
p-value for *F*-test on set of five instruments	0.54	0.45	0.25	0.19
Observations	4,624	4,624	4,660	4,660
Number of occasions dependent variable >1	1,010	1,010	1,017	1,017
Countries	160	160	160	160
Years: 1963-2001				

Robust standard errors clustered by country are in parentheses. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. All instruments have been divided by 100 so that coefficient estimates are observable in reported estimates to 3 decimal places. Estimates control for the secondary school enrollment rate (% gross) and the share of the population aged 65 years and above in year *t*-2. Anti-government demonstrations are from Databanks International. The R^2 terms reflect the explanatory power of the time-varying explanatory variables and year dummies. The within-R^2 is reported. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table WA12 IV results using weather instruments for "more agricultural" countries

Dependent variable: Exit of leader in year *t*

	(1)	(2)	(3)
Sample	"More agricultural" countries		
Estimation	IV (F1)	IV (F1)	IV (F1)
Instrument/s	All three weather instruments$_{t-1}$	Precipitation instrument$_{t-1}$	Temperature instruments$_{t-1}$
GDP per capita growth$_{t-1}$	-0.009	-0.013	-0.005
	(0.011)	(0.013)	(0.014)
Log GDP per capita$_{t-2}$	-0.060	-0.074	-0.048
	(0.064)	(0.072)	(0.068)
Tenure of leader in power at start of year$_t$ (years)	-0.003*	-0.003	-0.003*
	(0.002)	(0.002)	(0.002)
Age of leader in power at start of year$_t$ (years)	0.004***	0.005***	0.004***
	(0.001)	(0.002)	(0.001)
Female leader dummy (leader in power at start of year *t*)	0.014	0.013	0.014
	(0.073)	(0.074)	(0.073)
Previous times in office (leader in power at start of year *t*)	-0.048**	-0.050**	-0.045*
	(0.023)	(0.024)	(0.024)
Irregular entry to office dummy (leader in power at start of year *t*)	-0.020	-0.024	-0.015
	(0.027)	(0.028)	(0.029)
Transition dummy$_t$	-0.091	-0.138	-0.050
	(0.116)	(0.154)	(0.147)
Democracy dummy$_t$	0.024	0.023	0.024
	(0.041)	(0.041)	(0.041)
Election dummy$_t$	0.206***	0.204***	0.208***
	(0.031)	(0.032)	(0.031)
Election dummy$_{t-1}$	0.009	0.009	0.009
	(0.021)	(0.021)	(0.021)
Term limit dummy$_t$	0.688***	0.686***	0.690***
	(0.046)	(0.047)	(0.046)
Country and year fixed effects	Yes	Yes	Yes
F statistic on excluded instruments	4.33	2.77	5.62
Stock-Yogo critical value	5.60/9.61	12.71/24.09	7.49/13.46
Partial R^2 on excluded instruments	0.004	0.002	0.003
Observations	2,355	2,355	2,355
Years of at least one leader exit in country	329	329	329
Countries	74	74	74
Years: 1963-2001			

Robust standard errors clustered by country are in parentheses. More agricultural countries are those with a panel sample average agricultural share of the labor force exceeding the median of country panel sample averages. Stock-Yogo critical values are the 5% significance level critical values for weak instruments tests based on, respectively, 30% and 5% maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. Estimates control for the secondary school enrollment rate (% gross) and the share of the population aged 65 years and above in year *t*-2. F1 is Fuller 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table WA13 Table 5 results using Polity IV to divide democracies and autocracies

Panel A

Dependent variable: Exit of leader in year *t*

	(1)	(2)	(3)	(4)	(5)	(6)
Estimation	LPM	IV (F1)	LPM	IV (F1)	LPM	IV (F1)
Instruments	None	All	None	All	None	All
Sample	All		Low mean GDP per capita countries		High mean GDP per capita countries	
Panel A: All countries						
GDP per capita growth$_{t-1}$	-0.002**	-0.013**	-0.004***	-0.012*	-0.000	-0.018
	(0.001)	(0.006)	(0.001)	(0.006)	(0.001)	(0.015)
Log GDP per capita$_{t-2}$	-0.010	-0.051	-0.036	-0.065	0.017	-0.065
	(0.038)	(0.048)	(0.062)	(0.071)	(0.027)	(0.076)
Tenure of leader in power at start of year$_t$ (years)	-0.001	-0.001	-0.003	-0.003	0.001	0.002
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Age of leader in power at start of year$_t$ (years)	0.004***	0.004***	0.004**	0.004***	0.003***	0.004***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
Female leader dummy (leader in power at start of year *t*)	-0.019	-0.017	-0.006	-0.006	-0.057	-0.051
	(0.046)	(0.047)	(0.068)	(0.067)	(0.053)	(0.051)
Previous times in office (leader in power at start of year *t*)	-0.031**	-0.034**	-0.041	-0.047	-0.025	-0.028
	(0.015)	(0.015)	(0.031)	(0.032)	(0.016)	(0.017)
Irregular entry to office dummy (leader in power at start of year *t*)	0.004	-0.014	-0.006	-0.015	0.005	-0.057
	(0.021)	(0.024)	(0.027)	(0.028)	(0.032)	(0.067)
Transition dummy$_t$	0.295***	0.261**	0.271*	0.254	0.390***	0.318**
	(0.106)	(0.115)	(0.164)	(0.177)	(0.111)	(0.133)
POLITY2$_t$	0.003	0.002	0.006	0.005	0.001	-0.002
	(0.002)	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)
Election dummy$_t$	0.241***	0.237***	0.222***	0.220***	0.258***	0.248***
	(0.022)	(0.023)	(0.031)	(0.031)	(0.030)	(0.032)
Election dummy$_{t-1}$	0.023	0.023	0.016	0.017	0.032*	0.029
	(0.014)	(0.014)	(0.022)	(0.022)	(0.018)	(0.019)
Term limit dummy$_t$	0.743***	0.747***	0.666***	0.663***	0.748***	0.758***
	(0.033)	(0.034)	(0.069)	(0.070)	(0.037)	(0.040)
F statistic on excluded instruments	-	7.38	-	5.80	-	1.32
Partial R^2 on excluded instruments	-	0.019	-	0.030	-	0.008
p-value: test of equality with corresponding coefficient in column 3-4	-	-	-	-	0.01	0.78
Observations	4,385	4,385	2,200	2,200	2,185	2,185
Years of at least one leader exit in country	727	727	289	289	438	438
Countries	148	148	78	78	70	70
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Stock-Yogo critical value: 4.03/6.42						
Years: 1963-2001						

Robust standard errors clustered by country are in parentheses. Polity IV data are used to classify countries into democracies and autocracies at the end of year *t*-1 using the rule: Democracy: POLITY2>0; Autocracy: POLITY2<1. The estimations control for the POLITY2 score instead of the Przeworski et al. (2000) democracy dummy. Low mean GDP per capita countries are those with a panel sample average *t*-2 GDP per capita equal to the median of country panel sample averages or below; high mean GDP per capita countries are others. The set of instruments includes the commodity price instrument$_{t-1}$, export partner growth instrument$_{t-1}$, precipitation instrument$_{t-1}$, and temperature instruments$_{t-1}$. Stock-Yogo critical values are the 5 percent significance level critical values for weak instruments tests based on, respectively, 30 percent and 5 percent maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. The IV test of parameter restrictions is for two-stage least squares estimates. Singletons are omitted. F1 is Fuller 1. Estimates control for the secondary school enrollment rate (% gross) and the share of the population aged 65 years and above in year *t*-2. The sample size is less than the full sample size (4,742) due to missing POLITY2 data. * Significant at 10 percent. ** Significant at 5 percent. *** Significant at 1 percent.

Panel B

Dependent variable: Exit of leader in year *t*

	(1)	(2)	(3)	(4)	(5)	(6)
Estimation	LPM	IV (F1)	LPM	IV (F1)	LPM	IV (F1)
Instruments	None	All	None	All	None	All
Sample	All		Low mean GDP per capita countries		High mean GDP per capita countries	
Panel B: Democracies						
GDP per capita growth$_{t-1}$	-0.003	0.002	-0.002	0.008	-0.006*	-0.033
	(0.002)	(0.009)	(0.002)	(0.009)	(0.003)	(0.023)
Log GDP per capita$_{t-2}$	0.026	0.049	-0.016	0.042	0.038	-0.083
	(0.054)	(0.067)	(0.065)	(0.071)	(0.118)	(0.144)
Tenure of leader in power at start of year$_t$ (years)	0.004	0.004	0.005	0.006	0.004	0.006
	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
Age of leader in power at start of year$_t$ (years)	0.004***	0.003***	0.003**	0.003*	0.004*	0.004
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Female leader dummy (leader in power at start of year *t*)	-0.014	-0.014	0.029	0.031	-0.079	-0.059
	(0.049)	(0.048)	(0.070)	(0.066)	(0.053)	(0.051)
Previous times in office (leader in power at start of year *t*)	-0.025	-0.023	-0.015	-0.007	-0.031	-0.024
	(0.016)	(0.016)	(0.023)	(0.023)	(0.021)	(0.021)
Irregular entry to office dummy (leader in power at start of year *t*)	-0.024	-0.022	-0.008	-0.014	-0.165	-0.332*
	(0.049)	(0.047)	(0.045)	(0.045)	(0.157)	(0.193)
Transition dummy$_t$	0.180	0.212	0.250	0.282*	0.134	-0.022
	(0.127)	(0.135)	(0.181)	(0.169)	(0.121)	(0.186)
POLITY2$_t$	-0.024***	-0.024***	-0.024***	-0.024***	-0.034**	-0.036**
	(0.005)	(0.005)	(0.006)	(0.006)	(0.015)	(0.016)
Election dummy$_t$	0.292***	0.293***	0.294***	0.296***	0.293***	0.295***
	(0.028)	(0.028)	(0.042)	(0.040)	(0.038)	(0.038)
Election dummy$_{t-1}$	0.047***	0.048***	0.052**	0.053**	0.035	0.035
	(0.016)	(0.016)	(0.024)	(0.024)	(0.024)	(0.025)
Term limit dummy$_t$	0.744***	0.744***	0.712***	0.713***	0.842***	0.840***
	(0.041)	(0.039)	(0.056)	(0.052)	(0.060)	(0.066)
F statistic on excluded instruments	-	4.08	-	3.44	-	2.75
Partial R^2 on excluded instruments	-	0.050	-	0.041	-	0.043
Observations	2,142	2,142	1,097	1,097	1,045	1,045
Years of at least one leader exit in country	495	495	227	227	268	268
Countries	106	106	70	70	36	36
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Stock-Yogo critical value: 4.03/6.42						
Years: 1963-2001						

Robust standard errors clustered by country are in parentheses. Polity IV data are used to classify countries into democracies and autocracies at the end of year *t*-1 using the rule: Democracy: POLITY2>0; Autocracy: POLITY2<1. The estimations control for the POLITY2 score instead of the Przeworski et al. (2000) democracy dummy. Low mean GDP per capita countries are those with a panel sample average *t*-2 GDP per capita equal to the median of country panel sample averages or below; high mean GDP per capita countries are others. The set of instruments includes the commodity price instrument$_{t-1}$, export partner growth instrument$_{t-1}$, precipitation instrument$_{t-1}$, and temperature instruments$_{t-1}$. Stock-Yogo critical values are the 5 percent significance level critical values for weak instruments tests based on, respectively, 30 percent and 5 percent maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. Singletons are omitted. F1 is Fuller 1. Estimates control for the secondary school enrollment rate (% gross) and the share of the population aged 65 years and above in year *t*-2. * Significant at 10 percent. ** Significant at 5 percent. *** Significant at 1 percent.

Panel C

Dependent variable: Exit of leader in year *t*

	(1)	(2)	(3)	(4)	(5)	(6)
Estimation	LPM	IV (F1)	LPM	IV (F1)	LPM	IV (F1)
Instruments	None	All	None	All	None	All
Sample	All		Low mean GDP per capita countries		High mean GDP per capita countries	
Panel C: Autocracies						
GDP per capita growth$_{t-1}$	-0.002*	-0.015**	-0.004***	-0.016*	0.001	-0.019
	(0.001)	(0.008)	(0.001)	(0.008)	(0.001)	(0.012)
Log GDP per capita$_{t-2}$	-0.036	-0.106*	-0.088	-0.138*	-0.009	-0.120
	(0.039)	(0.057)	(0.056)	(0.072)	(0.037)	(0.085)
Tenure of leader in power at start of year$_t$ (years)	-0.000	0.000	-0.000	-0.001	0.000	0.002
	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)
Age of leader in power at start of year$_t$ (years)	0.003**	0.004**	0.004	0.004**	0.002	0.003
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Female leader dummy (leader in power at start of year *t*)	0.620***	0.553***	0.662***	0.611***	0.547***	0.449***
	(0.082)	(0.095)	(0.097)	(0.108)	(0.079)	(0.106)
Previous times in office (leader in power at start of year *t*)	-0.052	-0.059	-0.162***	-0.185***	-0.002	0.004
	(0.038)	(0.039)	(0.050)	(0.047)	(0.037)	(0.043)
Irregular entry to office dummy (leader in power at start of year *t*)	-0.040	-0.071**	-0.068*	-0.083**	-0.007	-0.072
	(0.024)	(0.030)	(0.036)	(0.040)	(0.038)	(0.050)
Transition dummy$_t$	0.310**	0.330**	0.401	0.412	0.290	0.328*
	(0.147)	(0.154)	(0.275)	(0.281)	(0.178)	(0.189)
POLITY2$_t$	0.034***	0.031***	0.039***	0.036***	0.033***	0.028***
	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.006)
Election dummy$_t$	0.088***	0.084***	0.078***	0.079***	0.109***	0.091**
	(0.024)	(0.025)	(0.030)	(0.029)	(0.036)	(0.043)
Election dummy$_{t-1}$	-0.010	-0.005	-0.021	-0.016	-0.001	0.004
	(0.016)	(0.018)	(0.019)	(0.023)	(0.024)	(0.026)
Term limit dummy$_t$	0.797***	0.809***	0.866***	0.879***	0.782***	0.807***
	(0.045)	(0.047)	(0.040)	(0.054)	(0.047)	(0.052)
F statistic on excluded instruments	-	4.72	-	4.41	-	1.52
Partial R^2 on excluded instruments	-	0.013	-	0.018	-	0.011
p-value: test of equality with corresponding coefficient in Panel B	0.74	0.11	0.36	0.03	0.04	0.57
Observations	2,234	2,234	1,133	1,133	1,101	1,101
Years of at least one leader exit in country	228	228	110	110	118	118
Countries	101	101	48	48	53	53
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Stock-Yogo critical value: 4.03/6.42						
Years: 1963-2001						

Robust standard errors clustered by country are in parentheses. Polity IV data are used to classify countries into democracies and autocracies at the end of year *t*-1 using the rule: Democracy: POLITY2>0; Autocracy: POLITY2<1. The estimations control for the POLITY2 score instead of the Przeworski et al. (2000) democracy dummy. Low mean GDP per capita countries are those with a panel sample average *t*-2 GDP per capita equal to the median of country panel sample averages or below; high mean GDP per capita countries are others. The set of instruments includes the commodity price instrument$_{t-1}$, export partner growth instrument$_{t-1}$, precipitation instrument$_{t-1}$, and temperature instruments$_{t-1}$. Stock-Yogo critical values are the 5 percent significance level critical values for weak instruments tests based on, respectively, 30 percent and 5 percent maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. IV tests of parameter restrictions are for two-stage least squares estimates. Singletons are omitted. F1 is Fuller 1. Estimates control for the secondary school enrollment rate (% gross) and the share of the population aged 65 years and above in year *t*-2. * Significant at 10 percent. ** Significant at 5 percent. *** Significant at 1 percent.

Table WA14 Table 5 results with estimated coefficients for controls

Panel A

Dependent variable: Exit of leader in year *t*

	(1)	(2)	(3)	(4)	(5)	(6)
Estimation	LPM	IV (F1)	LPM	IV (F1)	LPM	IV (F1)
Instruments	None	All	None	All	None	All
Sample	All		Low mean GDP per capita countries		High mean GDP per capita countries	
Panel A: All countries						
GDP per capita growth$_{t-1}$	-0.003***	-0.013**	-0.005***	-0.013**	-0.000	-0.017
	(0.001)	(0.006)	(0.001)	(0.006)	(0.001)	(0.012)
Log GDP per capita$_{t-2}$	-0.009	-0.051	-0.034	-0.066	0.017	-0.053
	(0.037)	(0.045)	(0.062)	(0.070)	(0.027)	(0.062)
Tenure of leader in power at start of year$_t$ (years)	-0.002	-0.001	-0.002	-0.002	0.000	0.000
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Age of leader in power at start of year$_t$ (years)	0.004***	0.004***	0.004***	0.004***	0.004***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female leader dummy (leader in power at start of year *t*)	-0.021	-0.019	-0.000	-0.002	-0.062	-0.053
	(0.046)	(0.047)	(0.071)	(0.072)	(0.055)	(0.055)
Previous times in office (leader in power at start of year *t*)	-0.027*	-0.031**	-0.042	-0.047	-0.016	-0.022
	(0.014)	(0.015)	(0.029)	(0.029)	(0.015)	(0.016)
Irregular entry to office dummy (leader in power at start of year *t*)	-0.004	-0.020	-0.006	-0.014	-0.015	-0.065
	(0.020)	(0.023)	(0.026)	(0.027)	(0.031)	(0.054)
Transition dummy$_t$	0.191*	0.167	0.159	0.165	0.293**	0.212
	(0.108)	(0.109)	(0.123)	(0.130)	(0.149)	(0.159)
Democracy dummy$_t$	0.024	0.019	0.038	0.036	0.004	-0.014
	(0.028)	(0.030)	(0.042)	(0.042)	(0.039)	(0.046)
Election dummy$_t$	0.251***	0.248***	0.215***	0.213***	0.282***	0.278***
	(0.022)	(0.022)	(0.029)	(0.029)	(0.031)	(0.032)
Election dummy$_{t-1}$	0.024*	0.024*	0.013	0.012	0.037**	0.036**
	(0.014)	(0.014)	(0.021)	(0.021)	(0.017)	(0.018)
Term limit dummy$_t$	0.739***	0.733***	0.691***	0.671***	0.737***	0.740***
	(0.032)	(0.034)	(0.049)	(0.056)	(0.041)	(0.043)
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F statistic on excluded instruments	-	7.51	-	7.08	-	1.50
Partial R^2 on excluded instruments	-	0.018	-	0.030	-	0.008
p-value: test of equality with corresponding coefficient in column 3-4	-	-	-	-	0.00	0.88
Observations	4,742	4,742	2,394	2,394	2,348	2,348
Years of at least one leader exit in country	773	773	323	323	450	450
Countries	160	160	84	84	76	76
Stock-Yogo critical value: 4.03/6.42						
Years: 1963-2001						

Robust standard errors clustered by country are in parentheses. Przeworski et al. (2000) is used to classify countries into democracies and autocracies at the end of year *t*-1. Low mean GDP per capita countries are those with a panel sample average *t*-2 GDP per capita equal to the median of country panel sample averages or below; high mean GDP per capita countries are others. The set of instruments includes the commodity price instrument$_{t-1}$, export partner growth instrument$_{t-1}$, precipitation instrument$_{t-1}$, and temperature instruments$_{t-1}$. Estimates control for the secondary school enrollment rate (percent gross) and percent of the population aged 65 years and above in year *t*-2. Stock-Yogo critical values are the 5 percent significance level critical values for weak instruments tests based on, respectively, 30 percent and 5 percent maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. IV tests of parameter restrictions are for two-stage least squares estimates. Results in columns 1-2 of Panel A are identical to estimates in columns 1-2 of Table 4. Singletons are omitted. F1 is Fuller 1. * Significant at 10 percent. ** Significant at 5 percent. *** Significant at 1 percent.

Panel B

Dependent variable: Exit of leader in year *t*

	(1)	(2)	(3)	(4)	(5)	(6)
Estimation	LPM	IV (F1)	LPM	IV (F1)	LPM	IV (F1)
Instruments	None	All	None	All	None	All
Sample	All		Low mean GDP per capita countries		High mean GDP per capita countries	
Panel B: Democracies						
GDP per capita growth$_{t-1}$	-0.002	-0.013	-0.002	-0.010	0.000	-0.030
	(0.002)	(0.011)	(0.003)	(0.013)	(0.003)	(0.032)
Log GDP per capita$_{t-2}$	0.100*	0.034	0.126	0.065	0.044	-0.072
	(0.056)	(0.090)	(0.079)	(0.124)	(0.098)	(0.133)
Tenure of leader in power at start of year$_t$ (years)	0.008***	0.008***	0.012**	0.012**	0.006	0.007
	(0.003)	(0.003)	(0.005)	(0.005)	(0.004)	(0.004)
Age of leader in power at start of year$_t$ (years)	0.004***	0.004***	0.004***	0.004***	0.005**	0.004*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Female leader dummy (leader in power at start of year *t*)	-0.077	-0.076	-0.058	-0.061	-0.108**	-0.086*
	(0.048)	(0.049)	(0.070)	(0.070)	(0.055)	(0.050)
Previous times in office (leader in power at start of year *t*)	-0.028*	-0.029*	-0.050**	-0.053***	-0.010	-0.005
	(0.016)	(0.016)	(0.020)	(0.020)	(0.022)	(0.021)
Irregular entry to office dummy (leader in power at start of year *t*)	0.050	0.036	0.040	0.032	-	-
	(0.039)	(0.039)	(0.040)	(0.040)	-	-
Transition dummy$_t$	0.134	0.076	0.082	0.078	-	-
	(0.158)	(0.164)	(0.165)	(0.165)	-	-
Democracy dummy$_t$	-0.711***	-0.695***	-0.700***	-0.681***	-0.965***	-1.078***
	(0.056)	(0.059)	(0.055)	(0.059)	(0.055)	(0.129)
Election dummy$_t$	0.322***	0.323***	0.360***	0.362***	0.294***	0.297***
	(0.029)	(0.029)	(0.039)	(0.038)	(0.040)	(0.042)
Election dummy$_{t-1}$	0.049***	0.049***	0.047**	0.046**	0.045*	0.046*
	(0.016)	(0.016)	(0.022)	(0.021)	(0.024)	(0.026)
Term limit dummy$_t$	0.687***	0.684***	0.615***	0.612***	0.824***	0.828***
	(0.045)	(0.046)	(0.057)	(0.056)	(0.060)	(0.063)
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F statistic on excluded instruments	-	2.95	-	3.03	-	3.76
Partial R^2 on excluded instruments	-	0.033	-	0.040	-	0.013
Observations	2,100	2,100	1,050	1,050	1,050	1,050
Years of at least one leader exit in country	508	508	251	251	257	257
Countries	100	100	69	69	31	31
Stock-Yogo critical value: 4.03/6.42						
Years: 1963-2001						

Robust standard errors clustered by country are in parentheses. Przeworski et al. (2000) is used to classify countries into democracies and autocracies at the end of year *t*-1. Low mean GDP per capita countries are those with a panel sample average *t*-2 GDP per capita equal to the median of country panel sample averages or below; high mean GDP per capita countries are others. The set of instruments includes the commodity price instrument$_{t-1}$, export partner growth instrument$_{t-1}$, precipitation instrument$_{t-1}$, and temperature instruments$_{t-1}$. Estimates control for the secondary school enrollment rate (percent gross) and percent of the population aged 65 years and above in year *t*-2. Stock-Yogo critical values are the 5 percent significance level critical values for weak instruments tests based on, respectively, 30 percent and 5 percent maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. Singletons are omitted. F1 is Fuller 1. * Significant at 10 percent. ** Significant at 5 percent. *** Significant at 1 percent.

Panel C

Dependent variable: Exit of leader in year *t*

	(1)	(2)	(3)	(4)	(5)	(6)
Estimation	LPM	IV (F1)	LPM	IV (F1)	LPM	IV (F1)
Instruments	None	All	None	All	None	All
Sample	All		Low mean GDP per capita countries		High mean GDP per capita countries	
Panel C: Autocracies						
GDP per capita growth$_{t-1}$	-0.002**	-0.012*	-0.005***	-0.013*	-0.000	-0.014
	(0.001)	(0.006)	(0.001)	(0.007)	(0.001)	(0.009)
Log GDP per capita$_{t-2}$	-0.056	-0.101**	-0.121**	-0.154**	-0.003	-0.070
	(0.036)	(0.046)	(0.054)	(0.062)	(0.026)	(0.050)
Tenure of leader in power at start of year$_t$ (years)	-0.001	-0.001	-0.002	-0.002	-0.001	0.000
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)
Age of leader in power at start of year$_t$ (years)	0.004***	0.005***	0.005***	0.005***	0.003**	0.004**
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)
Female leader dummy (leader in power at start of year *t*)	0.788***	0.756***	0.697***	0.679***	-	-
	(0.091)	(0.103)	(0.132)	(0.141)	-	-
Previous times in office (leader in power at start of year *t*)	-0.032	-0.046*	-0.122***	-0.140***	0.002	-0.019
	(0.024)	(0.026)	(0.044)	(0.039)	(0.029)	(0.035)
Irregular entry to office dummy (leader in power at start of year *t*)	-0.035	-0.052**	-0.048*	-0.056*	-0.023	-0.066
	(0.024)	(0.025)	(0.029)	(0.031)	(0.042)	(0.041)
Transition dummy$_t$	0.342***	0.347***	0.430**	0.466**	0.328**	0.303**
	(0.111)	(0.115)	(0.214)	(0.208)	(0.139)	(0.152)
Democracy dummy$_t$	0.521***	0.501***	0.532***	0.514***	0.510***	0.491***
	(0.051)	(0.055)	(0.078)	(0.077)	(0.072)	(0.075)
Election dummy$_t$	0.079***	0.075***	0.076***	0.076***	0.093***	0.080**
	(0.021)	(0.021)	(0.028)	(0.027)	(0.030)	(0.031)
Election dummy$_{t-1}$	-0.005	-0.002	-0.020	-0.018	0.012	0.015
	(0.016)	(0.017)	(0.023)	(0.024)	(0.022)	(0.023)
Term limit dummy$_t$	0.738***	0.721***	0.686***	0.685***	0.744***	0.720***
	(0.056)	(0.067)	(0.176)	(0.177)	(0.054)	(0.075)
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F statistic on excluded instruments	-	5.26	-	4.33	-	3.08
Partial R^2 on excluded instruments	-	0.014	-	0.026	-	0.012
p-value: test of equality with corresponding coefficient in Panel B	0.79	0.91	0.32	0.80	0.88	0.56
Observations	2,635	2,635	1,318	1,318	1,317	1,317
Years of at least one leader exit in country	264	264	128	128	136	136
Countries	116	116	53	53	63	63
Stock-Yogo critical value: 4.03/6.42						
Years: 1963-2001						

Robust standard errors clustered by country are in parentheses. Przeworski et al. (2000) is used to classify countries into democracies and autocracies at the end of year *t*-1. Low mean GDP per capita countries are those with a panel sample average *t*-2 GDP per capita equal to the median of country panel sample averages or below; high mean GDP per capita countries are others. The set of instruments includes the commodity price instrument$_{t-1}$, export partner growth instrument$_{t-1}$, precipitation instrument$_{t-1}$, and temperature instruments$_{t-1}$. Estimates control for the secondary school enrollment rate (percent gross) and percent of the population aged 65 years and above in year *t*-2. Stock-Yogo critical values are the 5 percent significance level critical values for weak instruments tests based on, respectively, 30 percent and 5 percent maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. IV tests of parameter restrictions are for two-stage least squares estimates. Singletons are omitted. F1 is Fuller 1. * Significant at 10 percent. ** Significant at 5 percent. *** Significant at 1 percent.

Table WA15 Table 6 results with estimated coefficients for controls

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable: First exit of leader in year *t* is due to …	Regular leader exit			Irregular leader exit (e.g. coups, assassinations, revolts)		
Estimation	LPM	IV (F1)	Multinomial logit (relative risk ratios)	LPM	IV (F1)	Multinomial logit (relative risk ratios)
Instrument/s	None	All	None	None	All	None
GDP per capita growth$_{t-1}$	-0.001**	-0.009*	0.958***	-0.001**	-0.005*	0.960***
	(0.001)	(0.005)	(0.015)	(0.001)	(0.960)	(0.015)
Log GDP per capita$_{t-2}$	-0.011	-0.040	0.715	0.002	-0.013	1.143
	(0.036)	(0.043)	(0.483)	(0.014)	(0.017)	(0.561)
Tenure of leader in power at start of year$_t$ (years)	-0.001	-0.001	1.018	-0.001	-0.000	0.994
	(0.001)	(0.001)	(0.020)	(0.001)	(0.001)	(0.026)
Age of leader in power at start of year$_t$ (years)	0.003***	0.003***	1.045***	0.001*	0.001**	1.037**
	(0.001)	(0.001)	(0.009)	(0.001)	(0.001)	(0.017)
Female leader dummy (leader in power at start of year *t*)	-0.045	-0.044	0.895	0.024	0.024	2.534*
	(0.047)	(0.048)	(0.342)	(0.024)	(0.023)	(1.297)
Previous times in office (leader in power at start of year *t*)	-0.024**	-0.027**	0.741**	-0.002	-0.004	0.783
	(0.011)	(0.011)	(0.091)	(0.008)	(0.008)	(0.158)
Irregular entry to office dummy (leader in power at start of year *t*)	0.047***	0.037**	1.468	-0.052***	-0.057***	0.347***
	(0.015)	(0.018)	(0.422)	(0.018)	(0.017)	(0.107)
Transition dummy$_t$	0.094	0.078	2.839	0.096*	0.088	334.236***
	(0.099)	(0.099)	(2.612)	(0.056)	(0.057)	(731.028)
Democracy dummy$_t$	0.131***	0.127***	5.167***	-0.107***	-0.109***	0.079***
	(0.025)	(0.026)	(2.079)	(0.021)	(0.021)	(0.040)
Election dummy$_t$	0.243***	0.241***	15.198***	0.008	0.007	1.725**
	(0.021)	(0.021)	(2.959)	(0.008)	(0.008)	(0.446)
Election dummy$_{t-1}$	0.026**	0.026**	2.137***	-0.001	-0.001	0.807
	(0.011)	(0.011)	(0.455)	(0.006)	(0.006)	(0.223)
Term limit dummy$_t$	0.768***	0.764***	-	-0.030**	-0.032**	-
	(0.028)	(0.029)	-	(0.012)	(0.013)	-
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F statistic on excluded instruments	-	7.51	-	-	7.51	-
Stock-Yogo critical value	-	4.03/6.42	-	-	4.03/6.42	-
Partial R^2 on excluded instruments	-	0.018	-	-	0.018	-
p-value: test of equality with corresponding coefficient for regular leader exits	-	-	-	0.81	0.47	0.93
Observations	4,742	4,742	4,742	4,742	4,742	4,742
Observations for which dependent variable equals 1	604	604	604	169	169	169
Countries	160	160	160	160	160	160
Years: 1963-2001						

Robust standard errors clustered by country are in parentheses. The set of instruments includes the commodity price instrument$_{t-1}$, export partner growth instrument$_{t-1}$, precipitation instrument$_{t-1}$, and temperature instruments$_{t-1}$. Estimates control for the secondary school enrollment rate (% gross) and share of the population aged 65 years and above in year *t*-2. The multinomial logit estimation excludes the term limit dummy control so as to achieve convergence. Stock-Yogo critical values are the 5% significance level critical values for weak instruments tests based on, respectively, 30% and 5% maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. IV test of parameter restrictions is for two-stage least squares estimates. The multinomial logit estimates in columns 3 and 6 are from the one estimation. Regular leader exits occur when a leader leaves office according to the prevailing rules, provisions, conventions and norms of the country, for reasons including loss of an election, end of term, voluntary retirement, losing cabinet support, losing the support of parliament, or ill health. Irregular leader exits occur when a leader is removed from office in contravention of rules and conventions (for example, by coups, assassinations, military power struggles, or removal by domestic rebel forces or popular revolts). Dependent variables are for the first leader exit in the calendar year for reasons other than natural death or foreign deposition. F1 is Fuller 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table WA16 Table 6 results for democracy and autocracy sub-samples

Democracies

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable: First exit of leader in year *t* is due to …	Regular leader exit			Irregular leader exit (e.g. coups, assassinations, revolts)		
Estimation	LPM	IV (F1)	Multinomial logit (relative risk ratios)	LPM	IV (F1)	Multinomial logit (relative risk ratios)
Instrument/s	None	All	None	None	All	None
GDP per capita growth$_{t-1}$	-0.003	-0.016	0.980	0.001*	0.002	0.942
	(0.002)	(0.011)	(0.016)	(0.001)	(0.003)	(0.045)
Log GDP per capita$_{t-2}$	0.080	0.007	1.861	0.020	0.027	1.467
	(0.054)	(0.086)	(1.002)	(0.023)	(0.028)	(2.871)
Tenure of leader in power at start of year$_t$ (years)	0.008***	0.008***	1.166***	-0.000	-0.000	1.085
	(0.003)	(0.003)	(0.047)	(0.000)	(0.000)	(0.085)
Age of leader in power at start of year$_t$ (years)	0.004***	0.004***	1.033***	0.000	0.000	1.033
	(0.001)	(0.001)	(0.008)	(0.000)	(0.000)	(0.027)
Female leader dummy (leader in power at start of year *t*)	-0.083*	-0.082	0.520*	0.006	0.006	1.191
	(0.050)	(0.051)	(0.190)	(0.023)	(0.023)	(1.450)
Previous times in office (leader in power at start of year *t*)	-0.025*	-0.026*	0.821*	-0.003	-0.003	1.075
	(0.015)	(0.015)	(0.087)	(0.007)	(0.007)	(0.348)
Irregular entry to office dummy (leader in power at start of year *t*)	0.071**	0.056	1.762**	-0.021	-0.019	0.045**
	(0.036)	(0.041)	(0.476)	(0.026)	(0.025)	(0.061)
Transition dummy$_t$	0.114	0.051	3.222	0.020*	0.026	1.790
	(0.156)	(0.162)	(3.289)	(0.011)	(0.019)	(2.540)
Democracy dummy$_t$	0.055	0.072	-	-0.766***	-0.768***	-
	(0.064)	(0.066)	-	(0.066)	(0.066)	-
Election dummy$_t$	0.334***	0.336***	-	-0.012**	-0.012**	-
	(0.029)	(0.029)	-	(0.006)	(0.006)	-
Election dummy$_{t-1}$	0.051***	0.051***	-	-0.002	-0.002	-
	(0.016)	(0.016)	-	(0.006)	(0.006)	-
Term limit dummy$_t$	0.708***	0.705***	-	-0.021	-0.021	-
	(0.044)	(0.045)	-	(0.015)	(0.015)	-
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F statistic on excluded instruments	-	2.95	-	-	2.95	-
Stock-Yogo critical value	-	4.03/6.42	-	-	4.03/6.42	-
Partial R^2 on excluded instruments	-	0.033	-	-	0.033	-
p-value: test of equality with corresponding coefficient for regular leader exits	-	-	-	0.03	0.11	0.42
Observations	2,100	2,100	2,100	2,100	2,100	2,100
Observations for which dependent variable equals 1	465	465	465	43	43	43
Countries	100	100	100	100	100	100
Years: 1963-2001						

Robust standard errors clustered by country are in parentheses. Przeworski et al. (2000) is used to classify countries into democracies and autocracies at the end of year *t*-1. The set of instruments includes the commodity price instrument$_{t-1}$, export partner growth instrument$_{t-1}$, precipitation instrument$_{t-1}$, and temperature instruments$_{t-1}$. Estimates control for the secondary school enrollment rate (% gross) and share of the population aged 65 years and above in year *t*-2. The multinomial logit estimation excludes the democracy, election, and term limit dummies so as to achieve convergence. Stock-Yogo critical values are the 5% significance level critical values for weak instruments tests based on, respectively, 30% and 5% maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. IV test of parameter restrictions is for two-stage least squares estimates. The multinomial logit estimates in columns 3 and 6 are from the one estimation. Regular leader exits occur when a leader leaves office according to the prevailing rules, provisions, conventions and norms of the country, for reasons including loss of an election, end of term, voluntary retirement, losing cabinet support, losing the support of parliament, or ill health. Irregular leader exits occur when a leader is removed from office in contravention of rules and conventions (for example, by coups, assassinations, military power struggles, or removal by domestic rebel forces or popular revolts). Dependent variables are for the first leader exit in the calendar year for reasons other than natural death or foreign deposition. F1 is Fuller 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Autocracies

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable: First exit of leader in year *t* is due to …	Regular leader exit			Irregular leader exit (e.g. coups, assassinations, revolts)		
Estimation	LPM	IV (F1)	Multinomial logit (relative risk ratios)	LPM	IV (F1)	Multinomial logit (relative risk ratios)
Instrument/s	None	All	None	None	All	None
GDP per capita growth$_{t-1}$	-0.001	-0.005	0.960*	-0.001**	-0.007	0.957**
	(0.001)	(0.004)	(0.022)	(0.001)	(0.004)	(0.018)
Log GDP per capita$_{t-2}$	-0.037	-0.058	0.089***	-0.019	-0.044*	0.551
	(0.033)	(0.037)	(0.069)	(0.017)	(0.023)	(0.365)
Tenure of leader in power at start of year$_t$ (years)	-0.002*	-0.002*	0.956	0.001	0.001	1.022
	(0.001)	(0.001)	(0.035)	(0.001)	(0.001)	(0.028)
Age of leader in power at start of year$_t$ (years)	0.003***	0.003***	1.125**	0.002	0.002*	1.045*
	(0.001)	(0.001)	(0.053)	(0.001)	(0.001)	(0.028)
Female leader dummy (leader in power at start of year *t*)	0.853***	0.838***	+	-0.066**	-0.083**	0.592
	(0.087)	(0.092)	***	(0.031)	(0.033)	(0.464)
Previous times in office (leader in power at start of year *t*)	-0.027**	-0.033**	0.295***	-0.006	-0.013	0.666
	(0.013)	(0.016)	(0.135)	(0.023)	(0.023)	(0.209)
Irregular entry to office dummy (leader in power at start of year *t*)	-0.009	-0.017	0.690	-0.026	-0.035*	0.516*
	(0.012)	(0.014)	(0.347)	(0.020)	(0.020)	(0.191)
Transition dummy$_t$	0.184*	0.187*	+	0.158*	0.161*	+
	(0.108)	(0.109)	***	(0.092)	(0.090)	***
Democracy dummy$_t$	0.519***	0.510***	206.472***	0.001	-0.009	9.127***
	(0.058)	(0.058)	(212.091)	(0.036)	(0.035)	(7.004)
Election dummy$_t$	0.074***	0.073***	11.324***	0.005	0.002	1.399
	(0.018)	(0.018)	(5.328)	(0.013)	(0.013)	(0.430)
Election dummy$_{t-1}$	0.003	0.005	1.335	-0.008	-0.007	0.735
	(0.011)	(0.011)	(0.696)	(0.012)	(0.012)	(0.256)
Term limit dummy$_t$	0.784***	0.776***	+	-0.047**	-0.056*	0.769
	(0.048)	(0.051)	***	(0.018)	(0.029)	(1.178)
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F statistic on excluded instruments	-	5.26	-	-	5.26	-
Stock-Yogo critical value	-	4.03/6.42	-	-	4.03/6.42	-
Partial R^2 on excluded instruments	-	0.014	-	-	0.014	-
p-value: test of equality with corresponding coefficient for regular leader exits	-	-	-	0.57	0.74	0.91
Observations	2,635	2,635	2,635	2,635	2,635	2,635
Observations for which dependent variable equals 1	139	139	139	125	125	125
Countries	116	116	116	116	116	116
Years: 1963-2001						

Robust standard errors clustered by country are in parentheses. Przeworski et al. (2000) is used to classify countries into democracies and autocracies at the end of year *t*-1. The set of instruments includes the commodity price instrument$_{t-1}$, export partner growth instrument$_{t-1}$, precipitation instrument$_{t-1}$, and temperature instruments$_{t-1}$. Estimates control for the secondary school enrollment rate (% gross) and share of the population aged 65 years and above in year *t*-2. Stock-Yogo critical values are the 5% significance level critical values for weak instruments tests based on, respectively, 30% and 5% maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. IV test of parameter restrictions is for two-stage least squares estimates. The multinomial logit estimates in columns 3 and 6 are from the one estimation. Regular leader exits occur when a leader leaves office according to the prevailing rules, provisions, conventions and norms of the country, for reasons including loss of an election, end of term, voluntary retirement, losing cabinet support, losing the support of parliament, or ill health. Irregular leader exits occur when a leader is removed from office in contravention of rules and conventions (for example, by coups, assassinations, military power struggles, or removal by domestic rebel forces or popular revolts). Dependent variables are for the first leader exit in the calendar year for reasons other than natural death or foreign deposition. F1 is Fuller 1.+: very large and positive. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table WA17 Table 7 results with estimated coefficients for controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable (Number of…)	Major government crises$_t$		Major government crises$_{t-1}$		Purges$_t$		Purges$_{t-1}$	
Estimation	LPM	IV (F1)	LPM	IV (F1)	LPM	IV (F1)	LPM	IV (F1)
Excluded instrument/s	None	All	None	All	None	All	None	All
GDP per capita growth$_{t-1}$	-0.005***	-0.013*	-0.011***	-0.012*	0.000	-0.010	-0.003*	-0.020*
	(0.001)	(0.007)	(0.002)	(0.006)	(0.001)	(0.010)	(0.002)	(0.011)
Log GDP per capita$_{t-2}$	0.007	-0.024	-0.040	-0.047	-0.086	-0.127	-0.063	-0.137
	(0.039)	(0.044)	(0.039)	(0.047)	(0.070)	(0.106)	(0.053)	(0.090)
Tenure of leader in power at start of year$_t$ (years)	-0.004*	-0.004*	-0.008***	-0.008***	-0.002	-0.002	-0.005	-0.005
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
Age of leader in power at start of year$_t$ (years)	0.002	0.002*	0.001	0.001	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Female leader dummy (leader in power at start of year *t*)	0.014	0.016	-0.054	-0.054	-0.011	-0.009	0.011	0.013
	(0.091)	(0.091)	(0.083)	(0.083)	(0.041)	(0.042)	(0.047)	(0.045)
Previous times in office (leader in power at start of year *t*)	0.005	0.002	-0.006	-0.007	-0.032**	-0.036**	-0.038**	-0.046**
	(0.024)	(0.024)	(0.021)	(0.021)	(0.015)	(0.017)	(0.017)	(0.020)
Irregular entry to office dummy (leader in power at start of year *t*)	-0.019	-0.029	0.025	0.023	0.051	0.037	0.184**	0.160**
	(0.036)	(0.034)	(0.041)	(0.043)	(0.044)	(0.051)	(0.088)	(0.078)
Transition dummy$_t$	0.032	0.002	0.059	0.049	0.309**	0.269**	0.390**	0.283
	(0.103)	(0.108)	(0.063)	(0.079)	(0.121)	(0.125)	(0.176)	(0.208)
Democracy dummy$_t$	0.036	0.031	0.031	0.030	-0.233**	-0.240**	-0.163**	-0.176**
	(0.035)	(0.035)	(0.032)	(0.031)	(0.105)	(0.111)	(0.073)	(0.080)
Election dummy$_t$	0.042*	0.040	0.033	0.033	-0.029**	-0.032**	0.004	-0.001
	(0.025)	(0.024)	(0.022)	(0.022)	(0.014)	(0.015)	(0.017)	(0.017)
Election dummy$_{t-1}$	-0.004	-0.004	0.046**	0.046**	-0.007	-0.007	-0.025*	-0.026*
	(0.019)	(0.019)	(0.023)	(0.023)	(0.017)	(0.017)	(0.014)	(0.015)
Term limit dummy$_t$	-0.071	-0.074	-0.034	-0.035	0.034	0.029	-0.011	-0.020
	(0.073)	(0.073)	(0.063)	(0.063)	(0.040)	(0.038)	(0.033)	(0.037)
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F statistic on excluded instruments	-	7.68	-	8.73	-	7.68	-	8.73
Stock-Yogo critical value	-	4.03/6.42	-	4.03/6.42	-	4.03/6.42	-	4.03/6.42
Partial R^2 on excluded instruments	-	0.020	-	0.022	-	0.020	-	0.022
Observations	4,660	4,660	4,624	4,624	4,660	4,660	4,624	4,624
Observations for which dependent variable >0	631	631	631	631	251	251	268	268
Countries	160	160	160	160	160	160	160	160
Years: 1963-2001								

Robust standard errors clustered by country are in parentheses. The set of instruments includes the commodity price instrument$_{t-1}$, export partner growth instrument$_{t-1}$, precipitation instrument$_{t-1,}$ and temperature instruments$_{t-1}$. Estimates control for the secondary school enrollment rate (% gross) and share of the population aged 65 years and above in year *t*-2. Stock-Yogo critical values are the 5% significance level critical values for weak instruments tests based on, respectively, 30% and 5% maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. A major government crisis is any rapidly developing situation that threatens to bring the downfall of the existing regime (excluding situations of armed revolt). A purge is any systematic elimination by jailing or execution of political opposition within the ranks of the regime or the opposition. F1 is Fuller 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table WA18 Table 7 results for democracy and autocracy sub-samples

Democracies

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable (Number of…)	Major government crises$_t$		Major government crises$_{t-1}$		Purges$_t$		Purges$_{t-1}$	
Estimation	LPM	IV (F1)	LPM	IV (F1)	LPM	IV (F1)	LPM	IV (F1)
Excluded instrument/s	None	All	None	All	None	All	None	All
GDP per capita growth$_{t-1}$	-0.002	-0.023	-0.011***	-0.041	-0.002	-0.012**	-0.001	-0.007
	(0.003)	(0.019)	(0.003)	(0.026)	(0.002)	(0.006)	(0.001)	(0.007)
Log GDP per capita$_{t-2}$	0.084	-0.045	-0.031	-0.229	-0.053	-0.120*	0.057	0.015
	(0.114)	(0.170)	(0.109)	(0.212)	(0.053)	(0.063)	(0.054)	(0.067)
Tenure of leader in power at start of year$_t$ (years)	-0.010**	-0.009**	-0.016***	-0.016***	-0.002	-0.001	-0.000	-0.000
	(0.005)	(0.004)	(0.006)	(0.006)	(0.001)	(0.001)	(0.002)	(0.002)
Age of leader in power at start of year$_t$ (years)	0.004**	0.005**	0.003	0.003	0.000	0.000	-0.000	-0.000
	(0.002)	(0.002)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)
Female leader dummy (leader in power at start of year *t*)	-0.013	-0.010	-0.098	-0.095	-0.015	-0.014	0.032	0.032
	(0.095)	(0.098)	(0.091)	(0.097)	(0.018)	(0.020)	(0.026)	(0.025)
Previous times in office (leader in power at start of year *t*)	-0.035	-0.036	-0.026	-0.028	0.003	0.002	0.015	0.014
	(0.030)	(0.030)	(0.030)	(0.029)	(0.021)	(0.021)	(0.024)	(0.024)
Irregular entry to office dummy (leader in power at start of year *t*)	0.283	0.265	0.481***	0.459***	0.126	0.117	0.035	0.030
	(0.172)	(0.177)	(0.163)	(0.174)	(0.087)	(0.085)	(0.044)	(0.044)
Transition dummy$_t$	-0.141	-0.235	0.141	-0.048	-0.007	-0.055	0.450***	0.409***
	(0.173)	(0.173)	(0.129)	(0.224)	(0.032)	(0.052)	(0.039)	(0.063)
Democracy dummy$_t$	-0.371***	-0.349***	-0.518***	-0.482***	-0.470***	-0.459***	0.021	0.028
	(0.117)	(0.123)	(0.132)	(0.132)	(0.134)	(0.131)	(0.052)	(0.051)
Election dummy$_t$	0.047	0.049	0.017	0.020	-0.005	-0.003	0.006	0.007
	(0.043)	(0.042)	(0.033)	(0.033)	(0.012)	(0.012)	(0.010)	(0.009)
Election dummy$_{t-1}$	0.002	0.002	0.041	0.042	-0.003	-0.002	0.014	0.014
	(0.029)	(0.029)	(0.036)	(0.036)	(0.010)	(0.010)	(0.012)	(0.011)
Term limit dummy$_t$	-0.084	-0.089	-0.013	-0.020	-0.005	-0.008	-0.001	-0.003
	(0.084)	(0.084)	(0.087)	(0.084)	(0.024)	(0.024)	(0.021)	(0.022)
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F statistic on excluded instruments	-	2.94	-	3.02	-	2.94	-	3.02
Stock-Yogo critical value	-	4.03/6.42	-	4.03/6.42	-	4.03/6.42	-	4.03/6.42
Partial R^2 on excluded instruments	-	0.034	-	0.034	-	0.034	-	0.034
Observations	2,089	2,089	2,078	2,078	2,089	2,089	2,078	2,078
Observations for which dependent variable >0	390	390	383	383	40	40	46	46
Countries	100	100	100	100	100	100	100	100
Years: 1963-2001								

Robust standard errors clustered by country are in parentheses. Przeworski et al. (2000) is used to classify countries into democracies and autocracies at the end of year *t*-1. The set of instruments includes the commodity price instrument$_{t-1}$, export partner growth instrument$_{t-1}$, precipitation instrument$_{t-1,}$ and temperature instruments$_{t-1}$. Estimates control for the secondary school enrollment rate (% gross) and share of the population aged 65 years and above in year *t*-2. Stock-Yogo critical values are the 5% significance level critical values for weak instruments tests based on, respectively, 30% and 5% maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. A major government crisis is any rapidly developing situation that threatens to bring the downfall of the existing regime (excluding situations of armed revolt). A purge is any systematic elimination by jailing or execution of political opposition within the ranks of the regime or the opposition. F1 is Fuller 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Autocracies

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable (Number of…)	Major government crises$_t$		Major government crises$_{t-1}$		Purges$_t$		Purges$_{t-1}$	
Estimation	LPM	IV (F1)	LPM	IV (F1)	LPM	IV (F1)	LPM	IV (F1)
Excluded instrument/s	None	All	None	All	None	All	None	All
GDP per capita growth$_{t-1}$	-0.005***	-0.006	-0.010***	-0.004	0.000	0.007	-0.004**	-0.024**
	(0.001)	(0.007)	(0.002)	(0.009)	(0.002)	(0.010)	(0.002)	(0.012)
Log GDP per capita$_{t-2}$	-0.062	-0.066	-0.087**	-0.061	-0.059	-0.027	-0.027	-0.120
	(0.038)	(0.046)	(0.040)	(0.059)	(0.068)	(0.092)	(0.044)	(0.080)
Tenure of leader in power at start of year$_t$ (years)	-0.002	-0.002	-0.006***	-0.006***	0.002	0.002	-0.004*	-0.004*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Age of leader in power at start of year$_t$ (years)	0.001	0.001	-0.001	-0.001	-0.001	-0.002	-0.001	0.000
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)
Female leader dummy (leader in power at start of year *t*)	-0.352***	-0.354***	0.145	0.163	-0.121	-0.098	-0.128**	-0.195**
	(0.115)	(0.113)	(0.445)	(0.428)	(0.096)	(0.114)	(0.050)	(0.082)
Previous times in office (leader in power at start of year *t*)	0.045	0.044	0.016	0.024	-0.061	-0.051	-0.082**	-0.110**
	(0.047)	(0.044)	(0.041)	(0.042)	(0.047)	(0.049)	(0.039)	(0.044)
Irregular entry to office dummy (leader in power at start of year *t*)	0.003	0.002	-0.001	0.008	-0.008	0.004	0.152	0.118
	(0.037)	(0.036)	(0.055)	(0.061)	(0.071)	(0.078)	(0.112)	(0.109)
Transition dummy$_t$	0.221*	0.220*	0.009	0.032	0.432**	0.445**	0.246	0.162
	(0.119)	(0.117)	(0.130)	(0.130)	(0.191)	(0.186)	(0.247)	(0.280)
Democracy dummy$_t$	0.070	0.068	0.346***	0.357***	0.017	0.033	0.052	0.011
	(0.059)	(0.059)	(0.113)	(0.111)	(0.072)	(0.079)	(0.126)	(0.130)
Election dummy$_t$	0.021	0.021	0.001	0.003	-0.072***	-0.069***	0.005	-0.002
	(0.025)	(0.025)	(0.025)	(0.024)	(0.024)	(0.025)	(0.032)	(0.031)
Election dummy$_{t-1}$	-0.011	-0.011	0.029	0.028	0.002	-0.000	-0.060**	-0.056**
	(0.021)	(0.020)	(0.025)	(0.025)	(0.031)	(0.032)	(0.027)	(0.027)
Term limit dummy$_t$	-0.102*	-0.103*	-0.100	-0.090	0.075	0.088	-0.090	-0.126
	(0.056)	(0.057)	(0.076)	(0.072)	(0.069)	(0.076)	(0.068)	(0.099)
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F statistic on excluded instruments	-	4.87	-	5.57	-	4.87	-	5.57
Stock-Yogo critical value	-	4.03/6.42	-	4.03/6.42	-	4.03/6.42	-	4.03/6.42
Partial R^2 on excluded instruments	-	0.016	-	0.017	-	0.016	-	0.017
Observations	2,564	2,564	2,541	2,541	2,564	2,564	2,541	2,541
Observations for which dependent variable >0	241	241	246	246	211	211	222	222
Countries	113	113	113	113	113	113	113	113
Years: 1963-2001								

Robust standard errors clustered by country are in parentheses. Przeworski et al. (2000) is used to classify countries into democracies and autocracies at the end of year *t*-1. The set of instruments includes the commodity price instrument$_{t-1}$, export partner growth instrument$_{t-1}$, precipitation instrument$_{t-1,}$ and temperature instruments$_{t-1}$. Estimates control for the secondary school enrollment rate (% gross) and share of the population aged 65 years and above in year *t*-2. Stock-Yogo critical values are the 5% significance level critical values for weak instruments tests based on, respectively, 30% and 5% maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. A major government crisis is any rapidly developing situation that threatens to bring the downfall of the existing regime (excluding situations of armed revolt). A purge is any systematic elimination by jailing or execution of political opposition within the ranks of the regime or the opposition. F1 is Fuller 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table WA19 Results for estimation period 1963-2004

Dependent variable: Exit of leader in year *t*

	(1)	(2)	(3)
Estimation	LPM	IV (F1)	IV (F1)
Instrument/s	None	Commodity price instrument$_{t-1}$	Export partner growth instrument$_{t-1}$
GDP per capita growth$_{t-1}$	-0.002***	-0.025*	-0.008*
	(0.001)	(0.014)	(0.005)
Country and year fixed effects	Yes	Yes	Yes
F statistic on excluded instruments	-	5.38	25.25
Stock-Yogo critical value	-	12.71/24.09	12.71/24.09
Partial R^2 on excluded instruments	-	0.002	0.026
Observations	5,217	5,217	5,217
Years of at least one leader exit in country	847	847	847
Countries	160	160	160
Years: 1963-2004			

Robust standard errors clustered by country are in parentheses. Stock-Yogo critical values are the 5% significance level critical values for weak instruments tests based on, respectively, 30% and 5% maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. Weather data and data for some controls are not available for the additional years in this extended sample, and so results using the weather instruments and for the time-varying country controls are not presented. F1 is Fuller 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table WA20 Results for exponential, Weibull, and Gompertz survival models

Dependent variable: Exit of leader in year *t*

	(1)	(2)	(3)	(4)
Estimation	Cox proportional hazard model	Exponential survival model	Weibull survival model	Gompertz survival model
			Hazard ratios	
GDP per capita growth$_{t-1}$	0.979***	0.980***	0.970***	0.976***
	(0.007)	(0.007)	(0.010)	(0.006)
Log GDP per capita$_{t-2}$	0.963	0.978	1.188	
	(0.289)	(0.315)	(0.480)	
Tenure of leader in power at start of year$_t$ (years)	1.546	1.000	0.819***	
	(0.744)	(0.011)	(0.032)	
Age of leader in power at start of year$_t$ (years)	1.020***	1.021***	1.026***	
	(0.005)	(0.005)	(0.007)	
Female leader dummy (leader in power at start of year *t*)	0.965	0.973	0.885	
	(0.173)	(0.180)	(0.228)	
Previous times in office (leader in power at start of year *t*)	0.938	0.924	0.879	
	(0.059)	(0.061)	(0.074)	
Irregular entry to office dummy (leader in power at start of year *t*)	0.945	0.935	0.965	
	(0.129)	(0.132)	(0.161)	
Transition dummy$_t$	1.992**	2.021**	2.818**	
	(0.604)	(0.607)	(1.309)	
Democracy dummy$_t$	1.092	1.075	1.090	
	(0.176)	(0.180)	(0.218)	
Election dummy$_t$	3.316***	3.298***	3.253***	
	(0.339)	(0.338)	(0.279)	
Election dummy$_{t-1}$	1.212*	1.290***	1.748***	
	(0.124)	(0.121)	(0.193)	
Term limit dummy$_t$	4.959***	4.927***	2.970***	
	(0.899)	(0.874)	(0.584)	
Country and year fixed effects	Yes	Yes	Yes	Yes
Observations	4,742	4,742	4,742	4,742
Years of at least one leader exit in country	773	773	773	773
Countries	160	160	160	160
Years: 1963-2001				

Robust standard errors clustered by country are in parentheses. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. Estimates control for the secondary school enrollment rate (% gross) and the share of the population aged 65 years and above in year *t*-2. The hazard model treats each leader-spell as an individual subject and only includes leaders in power at the start of the calendar year. The results in column 1 are the same as that in column 6 of Table 2. The time-varying controls were excluded from the Gompertz estimation to achieve convergence. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table WA21 Results excluding the election and term limit variables

(This table is presented to demonstrate that the democracy dummy is statistically significant in regressions that do not also control for key features of democracies i.e. elections and term limits.)

Dependent variable: Exit of leader in year *t*

	(1)	(2)	(3)	(4)	(5)	(6)
Estimation	LPM	IV (F1)	IV (F1)	IV (F1)	IV (F1)	IV (F1)
Instrument/s	None	All	Commodity price instrument$_{t-1}$	Export partner growth instrument$_{t-1}$	Precipitation instrument$_{t-1}$	Temperature instruments$_{t-1}$
GDP per capita growth$_{t-1}$	-0.003***	-0.013**	-0.021*	-0.015*	-0.005	-0.001
	(0.001)	(0.006)	(0.011)	(0.008)	(0.014)	(0.012)
Log GDP per capita$_{t-2}$	-0.002	-0.041	-0.074	-0.051	-0.010	0.007
	(0.038)	(0.048)	(0.063)	(0.053)	(0.068)	(0.061)
Tenure of leader in power at start of year$_t$ (years)	-0.000	0.000	0.000	0.000	0.000	-0.000
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
Age of leader in power at start of year$_t$ (years)	0.004***	0.005***	0.005***	0.005***	0.005***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female leader dummy (leader in power at start of year *t*)	-0.033	-0.031	-0.030	-0.031	-0.033	-0.033
	(0.046)	(0.047)	(0.048)	(0.047)	(0.046)	(0.046)
Previous times in office (leader in power at start of year *t*)	-0.036***	-0.040***	-0.043***	-0.041***	-0.037***	-0.036**
	(0.014)	(0.014)	(0.016)	(0.014)	(0.014)	(0.014)
Irregular entry to office dummy (leader in power at start of year *t*)	-0.009	-0.023	-0.035	-0.027	-0.012	-0.006
	(0.021)	(0.024)	(0.029)	(0.026)	(0.028)	(0.026)
Transition dummy$_t$	0.275**	0.252**	0.234**	0.247**	0.270**	0.280**
	(0.110)	(0.112)	(0.118)	(0.114)	(0.113)	(0.112)
Democracy dummy$_t$	0.092***	0.086***	0.081***	0.085***	0.090***	0.093***
	(0.027)	(0.029)	(0.030)	(0.030)	(0.027)	(0.027)
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F statistic on excluded instruments	-	7.52	7.07	14.96	3.61	11.80
Stock-Yogo critical value	-	4.03/6.42	12.71/24.09	12.71/24.09	12.71/24.09	7.49/13.46
Partial R^2 on excluded instruments	-	0.018	0.002	0.012	0.002	0.004
Observations	4,742	4,742	4,742	4,742	4,742	4,742
Years of at least one leader exit in country	773	773	773	773	773	773
Countries	160	160	160	160	160	160
Years: 1963-2001						

Robust standard errors clustered by country are in parentheses. Stock-Yogo critical values are the 5% significance level critical values for weak instruments tests based on, respectively, 30% and 5% maximal Fuller relative bias. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. Estimates control for the secondary school enrollment rate (% gross) and the share of the population aged 65 years and above in year *t*-2. F1 is Fuller 1. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table WA22 IV results using two-stage least squares estimation

(This table is presented to show that results are similar in estimates using the two-stage least squares IV estimator instead of the Fuller 1 estimator.)

Dependent variable: Exit of leader in year *t*

	(1)	(2)	(3)	(4)	(5)	(6)
Estimation	LPM	IV (2SLS)	IV (2SLS)	IV (2SLS)	IV (2SLS)	IV (2SLS)
Instrument/s	None	All	Commodity price instrument$_{t-1}$	Export partner growth instrument$_{t-1}$	Precipitation instrument$_{t-1}$	Temperature instruments$_{t-1}$
GDP per capita growth$_{t-1}$	-0.003***	-0.013**	-0.022*	-0.014*	-0.008	-0.009
	(0.001)	(0.006)	(0.012)	(0.007)	(0.014)	(0.012)
Log GDP per capita$_{t-2}$	-0.009	-0.051	-0.087	-0.053	-0.030	-0.033
	(0.037)	(0.045)	(0.065)	(0.050)	(0.066)	(0.059)
Tenure of leader in power at start of year$_t$ (years)	-0.002	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
Age of leader in power at start of year$_t$ (years)	0.004***	0.004***	0.005***	0.004***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female leader dummy (leader in power at start of year *t*)	-0.021	-0.019	-0.018	-0.019	-0.020	-0.020
	(0.046)	(0.047)	(0.049)	(0.047)	(0.047)	(0.047)
Previous times in office (leader in power at start of year *t*)	-0.027*	-0.031**	-0.034**	-0.031**	-0.029*	-0.029*
	(0.014)	(0.015)	(0.016)	(0.015)	(0.015)	(0.015)
Irregular entry to office dummy (leader in power at start of year *t*)	-0.004	-0.020	-0.033	-0.020	-0.012	-0.013
	(0.020)	(0.023)	(0.030)	(0.024)	(0.028)	(0.026)
Transition dummy$_t$	0.191*	0.167	0.147	0.166	0.179	0.177
	(0.108)	(0.109)	(0.116)	(0.110)	(0.111)	(0.112)
Democracy dummy$_t$	0.024	0.019	0.014	0.018	0.021	0.021
	(0.028)	(0.030)	(0.032)	(0.030)	(0.029)	(0.030)
Election dummy$_t$	0.251***	0.248***	0.246***	0.248***	0.249***	0.249***
	(0.022)	(0.022)	(0.024)	(0.022)	(0.022)	(0.022)
Election dummy$_{t-1}$	0.024*	0.024*	0.024*	0.024*	0.024*	0.024*
	(0.014)	(0.014)	(0.014)	(0.014)	(0.013)	(0.013)
Term limit dummy$_t$	0.739***	0.733***	0.728***	0.733***	0.736***	0.735***
	(0.032)	(0.034)	(0.038)	(0.035)	(0.032)	(0.033)
Country and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F statistic on excluded instruments	-	7.51	7.08	14.86	3.65	11.83
Stock-Yogo critical value	-	8.84/26.87	5.53/16.38	5.53/16.38	5.53/16.38	7.25/19.93
Partial R^2 on excluded instruments	-	0.018	0.002	0.012	0.002	0.004
Observations	4,742	4,742	4,742	4,742	4,742	4,742
Years of at least one leader exit in country	773	773	773	773	773	773
Countries	160	160	160	160	160	160
Years: 1963-2001						

Robust standard errors clustered by country are in parentheses. Stock-Yogo critical values are the 5% significance level critical values for weak instruments tests based on, respectively, 25% and 10% maximal IV size. The null of weak instruments is rejected if the *F* statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. GDP per capita growth is scaled so that one percentage point of growth is 1, not 0.01. Estimates control for the secondary school enrollment rate (% gross) and the share of the population aged 65 years and above in year *t*-2. 2SLS is two-stage least-squares. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

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