ESSAYS ON POLITICAL ECONOMY

A thesis

submitted in fulfilment of the requirements for the degree of

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Thesis Declaration

This thesis contains no material which has been presented for the award of a degree or diploma in any university or equivalent institutions. To the best of my knowledge, it contains no material that has previously been written or published by another person, except where duly acknowledged in the text.

March 2013

Akhmad A. Susamto

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Abstract

This thesis consists of three self-contained essays which address three different issues with respect to the roles of democratic and non-democratic institutions in the economy.

The first essay titled, 'Democratisation, systems of government and public spending' investigates whether changes from non-democratic government systems to democracy bring about a significant effect on the size of general government consumption and public gross fixed capital formation relative to a country's economy. Based on unbalanced panel data for 177 countries over the period 1960–2008, the results provide evidence that the effect of democratisation on the size of general government consumption is not robustly significant and depends on the specifics of government systems that prevail before and after a political change. Further, the results provide evidence that only democratisation that originates from a military dictatorship and ends up with a parliamentary democracy has a robust and significant effect on general government consumption size. With respect to the size of public gross fixed capital formation, the results provide evidence that the effects of democratisation and systems of government are weak and not statistically significant.

The second essay titled 'Electoral budget cycles under non-democratic regimes' investigates the relationship between elections and central government budget balance in countries that are considered to be non-democratic. Using a sample consisting of unbalanced panel data from 29 countries between 1960 and 2006, the essay provides evidence that electoral budget cycles do exist under non-democratic regimes. The relationship between elections and central government budget balance is significant and robust to a number of variations in control variables, estimation models, sample selection criteria and designations of election-year dummy. The essay also provides evidence that the persistence of the relationship is driven by countries that are less distant from democracy (that is, shallow autocracies).

The third essay titled 'Food prices and political survival' investigates the relationship between food prices and the occurrence of national leader exits, particularly in food-net-importing countries. Using international food price and domestic consumption data to construct a country-specific food price index for 77 economies between 1961 and 2009, the essay provides evidence that food prices have a robust significant effect on political survival. The effect does not change with changes in the log of real GDP per capita, real GDP per capita growth rate and the state of democracy. However, once the joint-effect between food prices and the state of democracy is controlled, the effect of food prices on political survival is significant only under democracy and not under non-democracy.

Contents

List of Tables and Figures

List of Abbreviations

CIMMYT	Centro Internacional de Mejoramiento de Maíz y Trigo
DDR dataset	Democracy-Dictatorship Revisited dataset
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
IFS	International Financial Statistics
IMF	International Monetary Fund
NELDA	National Elections across Democracy and Autocracy
OECD	Organisation for Economic Co-operation and Development
PIV dataset	Polity IV dataset
PWT	Penn World Table
UN	United Nations
WDI	World Development Indicators

Chapter 1: Introduction

1.1 Background

Political economy as a sub-discipline of economics uses insights from economics and politics to analyse the interaction between political institutions, economic policies and economic outcomes.[1] The recent political economy literature draws on the traditions of its historical predecessors which include the Classical political economy, public choice school and Downsian model (Besley 2007) and has analysed various topics, ranging from the effects of constitutions (see, for example, Persson & Tabellini 2003, 2004; Blume et al. 2009; Voigt 1997, 2011) to the roles of colonial origins (Acemoglu, Johnson & Robinson 2001), cultures (Washington 2008; Guiso, Sapienza & Zingales 2009; Tabellini 2010) and foreign aid (Alesina & Dollar 2000; Kilby 2009; Rajan & Subramanian 2011) in economic development.

Despite major advance over the last two decades, there are a number of important issues that remain under-examined (see, for example, Persson & Tabellini 2000; Acemoglu 2005; Besley 2007; Voigt 2011). This thesis addresses three substantive issues with respect to the roles of democratic and non-democratic institutions in the economy. The first issue is the relationship between democratisation, systems of government and the size of public spending relative to a country's economy. The second issue is the existence of electoral budget cycles under non-democratic regimes. The third issue is the effect that food prices may have on political survival and how the state of democracy may influence such an effect.

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[1] Here, 'political economy' refers to the term as it is used by modern economists and not to the term as it is used by classical economists nor as it is used in other disciplines such as politics, sociology and anthropology. In a loose way, the term 'political economy' in this thesis heavily overlaps with the term 'political economics' (see Alt & Crystal 1983; Persson & Tabellini 2000) or can be rebranded as 'new political economy' (see Besley 2007).

1.2 Structure

The thesis is organised into five chapters, of which three are self-contained. In brief, the contents of Chapters 2–5 are as follows.

Chapter 2 examines the effects that democratisation and systems of government may have on the size public spending. Focusing on the within-country variation before and after a political reform, this chapter attempts to answer three questions: (1) Does democratisation have a significant effect on general government consumption and public gross fixed capital formation relative to a country's overall economy? (2) Does the effect differ with different systems of government prevailing before and after democratisation? (3) If yes, what government systems lead to the significant effect of democratisation on the size of public spending?

Chapter 3, titled 'Electoral budget cycles under non-democratic regimes', argues that, even under non-democratic regimes, political budget cycles can exist. This chapter is a response to the prevailing view in the literature that electoral budget cycles make sense only in democratic countries. To test the argument, the chapter makes use of a new measure of electoral competition from the National Elections across Democracy and Autocracy (NELDA) dataset (Hyde & Marinov 2012), and estimates the effect that competitive elections may have on central government budget balance.

Chapter 4, titled 'Food prices and political survival', examines the relationship between food prices and the survival of national leaders, particularly in food importing countries. The chapter uses international food price and domestic consumption data to compose a monthly country-specific food price index and estimates whether the index is systematically related to the occurrence of national leader exits.

Finally, Chapter 5 provides concluding remarks. It summarises the results obtained in the thesis and highlights what they might mean in terms of future research.

Chapter 2: Democratisation, Systems of Government and Public Spending

2.1 Introduction

Following an unprecedented wave of democratisation in the late 1980s and early 1990s, economists and political scientists have attempted to identify the effects that democratisation has on the economy (see, for example, Przeworski & Limongi 1993; Rodrik & Wacziarg 2005; Papaioannou & Siourounis 2008). In similar fashion, scholars have attempted to identify the effects of certain democratic institutions such as government systems (Persson & Tabellini 2004; Blume et al. 2009; Andersen 2011), electoral rules (Milesi-Ferretti, Perotti & Rostagno 2002; Persson, Roland & Tabellini 2007) and party attributes (Cusack 1997; Ferreira & Gyourko 2009) on government spending and taxation policies.

Despite the seemingly parallel trend, crossover between these two research streams remains small. There is hitherto very limited evidence of how democratisation affects government spending and taxation policies. Three recent studies (Mulligan, Gil & Sala-i-Martin 2004; Hausken, Martin & Plumper 2004; Deacon 2009) examined public policies including government spending under democracy and non-democracy. However, the analyses relied mostly on cross-sectional variation and therefore only indirectly addressed the effects of political changes.

The present chapter focuses on the within-country relationship between democratisation, systems of government and public spending. More explicitly, it investigates whether changes from non-democratic government systems to democracy bring about a statistically significant effect on the sizes of general government consumption and public gross fixed capital formation relative to a country's overall economy. It also investigates whether the effect that democratisation has on general government consumption and public gross fixed capital formation sizes differs with

different government systems prevailing before and after a political change, and if yes, what system of government leads to the significant effect and what system does not.

The present chapter is close in spirit to the work by Persson and Tabellini (2006), particularly their regression reported in Table 2 column 2. However, the present chapter covers non-democratic government systems in addition to democratic systems and examines the importance of these systems of government in directing the effect of democratisation.

The results provide evidence that democratisation does not by itself bring about a robust significant effect on the size of general government consumption relative to a country's overall economy. The co-efficients of the democracy dummy are mostly insignificant and subject to the inclusion of dummies specifying the systems of government that prevail before and after a political reform. The results further provide evidence that only democratisation that originates from a military dictatorship and ends up with a parliamentary democracy has a robust significant effect on general government consumption size. Democratisation that originates from a civil autocracy almost never has a significant effect on the size of general government consumption, regardless of the democratic system of government adopted. With respect to the size of public gross fixed capital formation, the results provide evidence that the effects of democratisation and systems of government tend to be much weaker and not statistcally significant.

Based on a sample consisting of unbalanced panel data from 177 countries between 1960 and 2008, the primary finding in this chapter is that democratisation does not by itself bring about a robust significant effect on the size of general government consumption relative to a country's overall economy. The importance of democratisation for general government consumption size is different with different government systems prevailing before and after a political reform. The other finding is that only democratisation that originates from a military dictatorship and ends up with a parliamentary democracy has a robust significant effect on the size of general government consumption. Democratisation that originates from a civil autocracy almost never has a significant effect on the size of general government consumption, regardless

of the democratic systems of government adopted. With respect to the size of public gross fixed capital formation, the finding is that the effects of democratisation and systems of government are weak and not statistically significant.

The remainder of this chapter proceeds as follows. Section 2.2 provides an overview of the relationship between democratisation, systems of government and the size of public spending, including a simple formal illustration of fiscal decisions under different democratic and non-democratic systems of government. Section 2.3 describes the empirical strategy and data used in the analysis. Section 2.4 discusses the results, while section 2.5 offers conclusions.

2.2 Theoretical Overview

There are at least two distinct lines of reasoning to explain the effect of democratisation on the size of public spending. The first is based on an assumption that democratic and non-democratic rulers have different sources of income. In McGuire and Olson (1996), non-democratic rulers earn income only from extracting budgetary surplus (that is, the remains of tax revenues that are not spent on public-good provision). Meanwhile, democratic rulers govern the economy in the interests of a majority that earns income from redistributing to itself as well as selling labour in the market. Therefore, in contrast to rulers in non-democratic countries, rulers in democratic economies face an incentive to maintain the market function by limiting tax-induced distortions and providing more public goods needed to support production. Thus, tax rate (and the size of government spending) will be smaller and public-good provision will be larger under democracy than non-democracy. In Niskanen (1997), democratic rulers govern the economy in the interests of median-income voters rather than the majority. However, the conclusion is the same. Democracy gives rise to a smaller rate of income tax (and a smaller size of government spending) and produces more public goods than non-democracy.

The second lines of reasoning to explain the effect of democratisation on the size of public spending is based on the standard political economic model of optimal income taxation (see, for example, Meltzer & Richard 1981). In Agell and Persson (2006), both

democratic and non-democratic rulers levy income tax from labour activity in the market. In contrast to democratic rulers, who set the tax rate and the level of public-good provision in a way that maximise the median voters' utility, non-democratic rulers exempt themselves from taxation and pocket budgetary surplus. Even so, as both democratic and non-democratic rulers face incentives to increase labour productivity in the market, it is in their best interests to follow the Samuelson (1954) condition for optimal level of public-good provision.

None of the above models provides an insight into how specific government systems prevailing before and after democratisation affect the size of public spending. Democracy and non-democracy are very broad concepts (see Persson & Tabellini 2006) and explaining the effect of democratisation based merely on the state of democracy might not be precise enough because the internal variations are large.

Democracy includes two pure systems of government: presidential and parliamentary. Regardless of disagreements over what precisely constitutes a democratic government system (Elgie 1998), the most salient feature that distinguishes a presidential from a parliamentary system is whether an executive head depends on the continued support of the parliament to survive (Strom 2000; Cheibub, Gandhi & Vreeland 2010). The president, which is the executive head in a presidential system, cannot be removed by members of the parliament during its constitutional term in office. By contrast, in a parliamentary democracy, the political fate of a prime minister is subject to retaining the confidence of a majority in the legislature.

Persson, Roland and Tabellini (2000) demonstrate how this feature brings about different sizes and compositions of government spending. Their argument centres on the idea that fiscal policy making is susceptible to the three-dimensional conflicts of interest that involve policy makers as the agents and voters as the principals. The policy outcome depends on the constitutional framework of who makes policy proposals, who can approve or amend them and who assigns the representatives that will eventually exercise the authority. Because presidential democracy implies a greater separation of power than parliamentary democracy and, at the same time, connotes less cohesion

among members of a governing coalition in the legislative, Persson, Roland and Tabellini (2000) predict that the former system results in a smaller government size than the latter.

Meanwhile, non-democracy groups together a number of government systems that democracy is not (Cheibub, Gandhi & Vreeland 2010). Political scientists have constructed various approaches to classifying non-democratic regimes, such as based on the degree of political competition (Levitsky & Way 2002; Schedler 2002), control over access to power and influence (Geddes 1999) and the manners in which dictators retain their power (Hadenius & Teorell 2007). More recently, Cheibub, Gandhi and Vreeland (2010) highlight another classification approach, which is based on the manners in which non-democratic rulers are removed from power. These authors divide non-democracy into monarchy, military dictatorship and civil autocracy.

Monarchs, military dictators and civil autocrats each have different sources of power and face different insurrection threats (Gandhi & Przeworski 2007). Monarchs inherit the throne. Besides threats from democratic activists, the insurrection threats they face emerge by and large from internal members of the royal family. Military dictators gain their power through a coup and are mostly threatened by other members of the military force. The probability of a military dictator being deposed by fellow military members is high, not only because of their direct access to the tools of violence, but also because of the hierarchical character of the military chain of command (Svolik 2009). Finally, civil autocrats do not inherit power nor do they have immediate ability to appeal to the armed forces. To support their regimes, civil autocrats need to create new organisations, such as parties, consultative councils or political bureaus. The possibility that civil autocrats may be ousted is high because they face threats from almost everyone—democratic activists, the armed forces and other leaders in the ruling party (Gandhi & Przeworski 2007).

To illustrate how these elemental incentives bring about different sizes of public spending, the following is a simple model of fiscal decisions under different systems of government adapted from McGuire and Olson (1996). Despite the same analytical

machinery, the line of reasoning here is different from that in the original model. First, it is assumed that not only democratic rulers but also non-democratic rulers earn market income in addition to controlling the fisc. McGuire and Olson (1996) might be correct when they presume that non-democratic rulers do not sell their labour in the market. However, it seems natural to say that these rulers own a large amount of capital that serves as input in the market. Indeed, the presence of non-democratic rulers in the *Forbes Magazine*'s list of richest people gives a strong indication that rulers hold a positive fraction of market income irrespective of the system of government under which they govern. Second, as both democratic and non-democratic rulers earn market income in addition to controlling the fisc, they all face an incentive to maintain the market function by limiting tax-induced distortions and providing the public goods needed to support market production. The central element that distinguishes fiscal policy under democratic and non-democratic systems of government is the market income with which the policy makers are concerned. It is assumed that the policy makers in each system take into account only the market income accruing to political actors relevant to their interest.

2.2.1 Presidential Democracy

Consider a president who makes fiscal decisions under presidential democracy. Given existing institutional constraints, the president seeks to maximise their own welfare and the welfare of their voters. Since support from the legislative is required to pass budget bills, the president needs to accommodate the interest of the majority in the legislature and take their welfare into account in a joint share of actual production in the economy. This joint share, S, is contingent not only upon the income that the president and their allies earn from selling factor inputs in the marketplace, but also upon the redistribution that they extract from the rest of society.

The formula for S is provided by

$$S = (\delta_1 + \delta_2 + \delta_3)F + [1 - (\delta_1 + \delta_2 + \delta_3)F]r; \delta_1 + \delta_2 + \delta_3 = 1 \qquad [2.1]$$

where $\delta_1 F$, $\delta_2 F$ and $\delta_3 F$ are the fractions of market income accruing to the president, the majority in the legislature and their voters respectively, $(1 - F)$ is the fraction of market income accruing to other individuals in the economy, and r is the gross income-tax rate. For simplicity, assume that parameter $0 < F < 1$ is exogenous.

In order to maximise S, the president chooses the tax rate, r, which is assumed to be constant, and the level of public-good provision, g, whose price per unit is assumed to be equal to 1. Equation [2.1] shows that a positive income-tax rate is essential for redistribution and, in turn, for the welfare of the president and their allies.

Nonetheless, when the tax is imposed, distortion occurs such that actual or realised gross output, $y(r)Y(g)$, is lower than potential gross output, $Y(g)$.[2] The amount of tax collected is, therefore, equal to $ry(r)Y(g)$ and pure inefficiency loss is equal to $[1 - y(r)]Y(g)$. As public-good provision is important for production, when the level of public-good provision changes, the level of output also changes such that $Y'(g) > 0$, $Y''(g) < 0$ and $Y(0) = 0$. In this situation, the president as a policy maker needs to decide how many resources to allocate to public-good provision and how many to devote to their own welfare and the welfare of their allies.

In short, the optimisation problem faced by the president is

$$\max_{r,g}(1 - r)\, y(r)(\delta_1 + \delta_2 + \delta_3)FY(g) + [ry(r)Y(g) - g];\ \delta_1 + \delta_2 + \delta_3 = 1 \quad [2.2]$$

The first term denotes market income that the president and their allies receive after tax and deadweight loss, while the second term reflects the surplus they transfer to themselves.

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[2] Following the original model in McGuire and Olson (1996), Y is labelled 'gross' because the cost of the resources that must be used to produce g has not been subtracted, and 'potential' product because it omits the losses from incentive-distorting taxation, including the taxation necessary to obtain the resources for producing g.

The first-order condition for the optimisation in equation [2.2] with respect to r is

$$(\delta_1 + \delta_2 + \delta_3)F[-y + (1 - r)y'] + (y + ry') = 0 \qquad [2.3]$$

and the optimal income-tax rate is

$$r^* = -\frac{y}{y'} - \frac{(\delta_1+\delta_2+\delta_3)F}{[1-(\delta_1+\delta_2+\delta_3)F]}; (\delta_1 + \delta_2 + \delta_3)F \neq 1 \qquad [2.4]$$

2.2.2 Parliamentary Democracy

Under parliamentary democracy, fiscal policy is made solely by the legislature. In contrast to the presidential system, the members of the parliament need only to maximise their own welfare and the welfare of their voters. For these policy makers, the joint share of actual production in the economy is

$$S = (\delta_2 + \delta_3)F + [1 - (\delta_2 + \delta_3)F]r; \delta_2 + \delta_3 = 1 \qquad [2.5]$$

where $\delta_2 F$ and $\delta_3 F$ are the fractions of market income accruing to the majority in the legislature and their voters respectively, $(1 - F)$ is the fraction of market income accruing to other individuals in the economy, and r is the gross income-tax rate. For simplicity, again assume that parameter $0 < F < 1$ is exogenous.

In order to maximise S, the majority in the legislature chooses the tax rate, r, and the level of public-good provision, g. The optimisation problem is therefore

$$\max_{r,g}(1 - r)\, y(r)(\delta_2 + \delta_3)FY(g) + [ry(r)Y(g) - g]; \delta_2 + \delta_3 = 1 \qquad [2.6]$$

The first-order conditions for the optimisation in equation [2.6] with respect to r is

$$(\delta_2 + \delta_3)F[-y + (1 - r)y'] + (y + ry') = 0 \qquad [2.7]$$

and the optimal income-tax rate is

$$r^* = -\frac{y}{y'} - \frac{(\delta_2+\delta_3)F}{[1-(\delta_2+\delta_3)F]}; (\delta_2 + \delta_3)F \neq 1 \qquad [2.8]$$

2.2.3 Non-democratic Systems

Under monarchy, military dictatorship and civil autocracy, the policy makers are independent of the voters. Policy makers in these systems of government therefore abandon voters' welfare and focus on maximising their own welfare and the welfare of close allies.

For policy makers under non-democracy, the joint share of actual production in the economy is

$$S = (\delta_1 + \delta_2)F + [1 - (\delta_1 + \delta_2)F]r; \delta_1 + \delta_2 = 1 \qquad [2.9]$$

where $\delta_1 F$ can be interpreted as the fraction of market income accruing to the monarchs, military dictators or civil autocracts, $\delta_2 F$ can be interpreted as the fraction of market income accruing to their close allies (instead of legislature majority), and $(1 - F)$ is the fraction of market income accruing to other individuals in the economy.

In order to maximise S, the policy makers under non-democracy chooses the tax rate, r, and the level of public-good provision, g, such that the optimisation problem is

$$\max_{r,g}(1 - r)\, y(r)(\delta_1 + \delta_2)FY(g) + [ry(r)Y(g) - g]; \delta_1 + \delta_2 = 1 \qquad [2.10]$$

The first-order condition for the optimisation in equation [2.10] with respect to r is

$$(\delta_1 + \delta_2)F[-y + (1 - r)y'] + (y + ry') = 0 \qquad [2.11]$$

and the optimal income-tax rate is

$$r^* = -\frac{y}{y'} - \frac{(\delta_1+\delta_2+\delta_3)F}{[1-(\delta_1+\delta_2)F]}; (\delta_1 + \delta_2)F \neq 1 \quad [2.12]$$

The difference between monarchy, military dictatorship and civil autocracy lies in the value of δ_2. As mentioned above, insurrection threats facing monarchs emerge largely internally, from members of royal family. Meanwhile, military dictators are threatened mostly by other members of the military force. Since civil autocrats do not inherit power nor do they have the immediate ability to appeal to the armed forces, they need to create new organisations as well as accommodating the interests of other parties because they face threats from almost everyone—democratic activists, the armed forces and other leaders in the ruling party. In this situation, it can be expected that the value of δ_2 refers to more political actors in civil autocracy and relatively fewer political actors in the monarchy and military dictatorships.

Overall, as the fraction of market income accruing to the policy maker and his allies might be random, empirical research is required to resolve whether the optimal tax rate and the size of government spending are higher or lower in democratic and non-democratic systems of government.

2.3 Empirical Estimation

The effect of democratisation and systems of government on the size of public spending is estimated based on the following equation

$$Y_{i,t} = \beta_0 + \beta_1 democ_{i,t-1} + \beta_2 gsystem_{i,t-1} + \beta_3 X_{i,t-1} + \beta_4 c_i + \beta_5 y_t + e_{i,t} \quad [2.13]$$

where $Y_{i,t}$ denotes the size of public spending relative to the economy in country i in year t, $X_{i,t-1}$ denotes a vector of time varying control variables that will be explained later, c_i and y_t denote a vector of country fixed effects and year fixed effects respectively, and $e_{i,t}$ denotes error terms.

The size of public spending as dependent variable is approximated either using the share of general government consumption in real GDP per capita or public gross fixed capital formation as a percentage of GDP. Data for the share of general government consumption in real GDP per capita, which include consumption by all levels of government (central, provincial and local levels), are taken from the Penn World Table (PWT) (see, Heston, Summers & Aten 2011). Data for the gross fixed capital formation of the public sector, which includes land improvements, fixed capital purchases and the construction of roads, railways, airports and the like, are calculated from total and private gross fixed capital formation data available in the World Development Indicators (World Bank 2011).

The key independent variable, $democ_{i,t-1}$, is a dummy taking the value 1 if a country is considered democratic and 0 otherwise. This refers to a minimalist, strictly procedural view of democracy and is taken from the Democracy-Dictatorship (DDR) dataset (see Cheibub, Gandhi & Vreeland 2010). To be considered democratic, a country must have had executive and legislative branches of government that were elected in multiparty elections. Besides, the country must also have experienced no incident such that the legislature was closed unconstitutionally in favour of the executives. If one of these criteria does not hold, the country is deemed to be non-democratic (Cheibub, Gandhi & Vreeland 2010). To discern actual reforms from political instabilities, the coding of the democracy dummy further imposes a condition of two-year stability. It means that democratisation that lasts for only one year is ignored, and rather than taking the value 1, the democracy dummy takes the value 0 over the period.

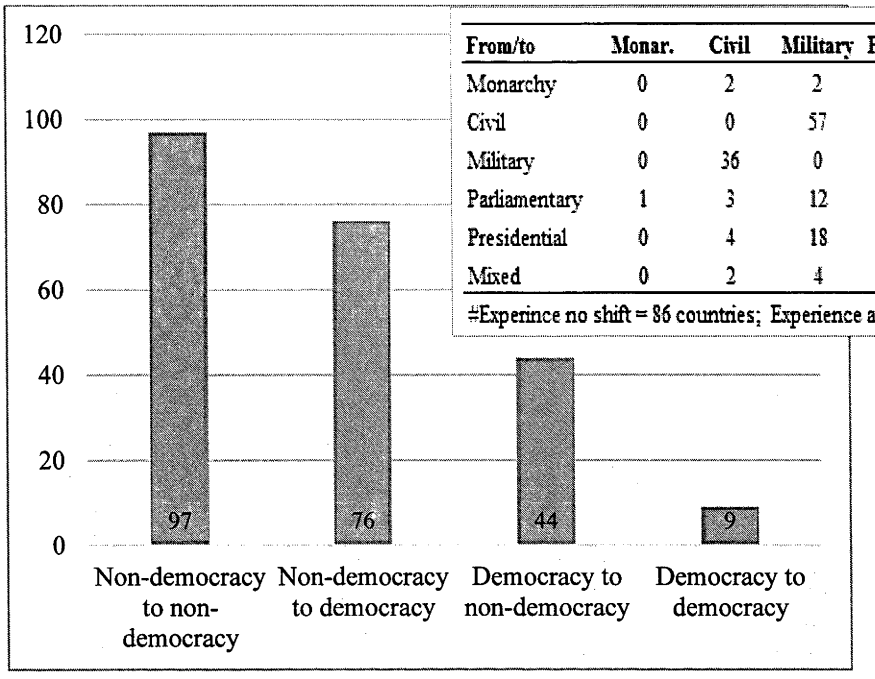
The other key independent variable, $gsystem_{i,t-1}$, represents a vector of dummies for the systems of government. These dummies are generated based on the six-fold regime classification provided in the DDR dataset. The dummy for an absolute monarchy takes the value 1 if a country is considered to be non-democratic and its effective leader is titled a king, a queen or their equivalents. The dummy for a military dictatorship takes the value 1 if a country is judged to be non-democratic and its effective leader is a military member by profession. The dummy for a civil autocracy is valued 1 if a

country is deemed to be non-democratic and its effective leader is neither a monarch nor a military dictator. Here, a retired member of the army, navy or air force is not attributed civil status because, as Cheibub, Gandhi and Vreeland (2010) argue that shedding military uniform does not necessarily indicate a change in leadership characters. With respect to democratic systems of government, dummies for mixed, presidential and parliamentary democracies are valued 1 if a country is judged to be democratic and adopts the corresponding system of government.

Finally, the control variables consist of the one year lag of log real GDP per capita, growth rate of real GDP per capita, trade openness, total population and age-dependency ratio. These variables may affect public spending as it is natural for policy makers to consider them when making fiscal policy (see, for example, Rodrik 1996; Alesina & Wacziarg 1998; Ram 2009). Data for real GDP per capita, the growth rate of real GDP per capita and trade openness all come from the PWT (see, Heston, Summers & Aten 2011), whereas data for total population and age-dependency ratio are from the United Nations (2011) (details of variable definitions and sources are provided in the Appendix 2.1).

Since the focus of analysis in this chapter is the within-country effects of democratisation and changes in government systems, parameters β_1 and β_2 can be seen as difference-in-difference estimators, where countries experiencing a change in government systems belong to the treatment group and those experiencing no change belong to the control group. Bertrand, Duflo and Mullainathan (2004) have shown that difference-in-difference estimators tend to aggravate the downward bias of positive residual autocorrelation in the standard errors. Therefore, to avoid the possible overestimation of *t-statistics* and significance levels, robust standard errors clustered at country level are used.

Figure 2.1 The Number of Shifts in Government Systems in Sample Countries over the Period of Analysis[3]



From/to	Monar.	Civil	Military	Parliam.	Presid.	Mixed
Monarchy	0	2	2	2	0	0
Civil	0	0	57	5	13	9
Military	0	36	0	9	28	10
Parliamentary	1	3	12	0	0	4
Presidential	0	4	18	0	0	1
Mixed	0	2	4	3	1	0

#Experince no shift = 86 countries; Experience at least a shift = 91 countries

Estimations cover unbalanced panel data from 177 countries for the period between 1960 and 2008. Sample selection is based on data availability and only countries with at least seven years of observations are included in the regressions. Figure 1 summarises the number of shifts in the state of democracy and systems of government that took place in the sample countries over the period of analysis.

[3] The names of the sample countries and the shifts that took place in each country are presented in the Supplementary Tables.

2.4 Results

Table 2.1 provides descriptive statistics. In Table 2.1a, the statistics of regressand and non-dummy regressors are cross-tabulated based on the state of democracy. In Table 2.1.b, the cross tabulation is based on the systems of government.

Table 2.1a Descriptive Statistics Based on the State of Democracy

	N obs.	Mean	Std dev.
General government consumption (% of RGDP per capita)			
- Full sample	6774	11.654	7.862
- Non-democracy	3773	11.132	6.654
- Democracy	3001	12.068	8.682
Public gross fixed capital formation (% of GDP)			
- Full sample	5554	14.912	9.454
- Non-democracy	2789	13.189	9.711
- Democracy	2765	16.650	8.854
Real GDP per capita growth rate (% per annum)			
- Full sample	6774	2.272	7.604
- Non-democracy	3773	2.519	5.015
- Democracy	3001	2.076	9.151
Log of real GDP per capita			
- Full sample	6774	8.250	1.290
- Non-democracy	3773	8.969	1.100
- Democracy	3001	7.678	1.135
Trade openness			
- Full sample	6774	69.609	47.985
- Non-democracy	3773	68.805	43.029
- Democracy	3001	70.249	51.586
Total population			
- Full sample	6774	31.466	113.913
- Non-democracy	3773	34.955	107.603
- Democracy	3001	28.691	118.633
Age dependency ratio			
- Full sample	6774	74.766	18.925
- Non-democracy	3773	64.982	16.779
- Democracy	3001	82.548	16.807

Table 2.1b Descriptive Statistics Based on the Systems of Government

	N obs.	Mean	Std dev.
General government consumption (% of RGDP per capita)			
- Absolute monarchy	503	10.603	6.086
- Civil autocracy	1956	12.512	9.503
- Military dictatorship	1314	11.969	8.174
- Mixed democracy	572	10.600	5.263
- Presidential democracy	910	10.298	8.415
- Parliamentary democracy	1519	11.832	5.802
Public gross fixed capital formation (% of GDP)			
- Absolute monarchy	362	15.968	10.664
- Civil autocracy	1362	13.170	10.462
- Military dictatorship	1065	12.268	8.064
- Mixed democracy	513	16.476	9.314
- Presidential democracy	869	13.759	8.821
- Parliamentary democracy	1385	18.519	8.185
Real GDP per capita growth rate (% per annum)			
- Absolute monarchy	503	2.413	7.593
- Civil autocracy	1956	2.143	9.714
- Military dictatorship	1314	1.847	8.828
- Mixed democracy	572	2.837	5.884
- Presidential democracy	910	1.858	4.729
- Parliamentary democracy	1519	2.795	4.786
Log of real GDP per capita			
- Absolute monarchy	503	8.664	1.417
- Civil autocracy	1956	7.570	1.041
- Military dictatorship	1314	7.460	0.935
- Mixed democracy	572	8.886	1.242
- Presidential democracy	910	8.542	0.963
- Parliamentary democracy	1519	9.526	1.030
Trade openness			
- Absolute monarchy	503	89.123	42.170
- Civil autocracy	1956	71.795	57.674
- Military dictatorship	1314	60.722	42.207
- Mixed democracy	572	66.617	30.660
- Presidential democracy	910	58.002	34.230
- Parliamentary democracy	1519	76.102	49.787
Total population			
- Absolute monarchy	503	6.761	9.673
- Civil autocracy	1956	39.278	161.492
- Military dictatorship	1314	21.327	34.042
- Mixed democracy	572	12.992	18.944
- Presidential democracy	910	33.657	62.155
- Parliamentary democracy	1519	44.003	142.018
Age dependency ratio			
- Absolute monarchy	503	75.903	20.060
- Civil autocracy	1956	81.736	17.218
- Military dictatorship	1314	86.300	13.574
- Mixed democracy	572	61.886	17.599
- Presidential democracy	910	72.379	16.692
- Parliamentary democracy	1519	61.716	15.032

2.4.1 The Basic Results

Tables 2.2a and 2.2b summarise the basic results. In Table 2.2a, the dependent variable is the share of general government consumption in real GDP per capita, whereas in Table 2.2b, the dependent variable is public gross fixed capital formation as a percentage of GDP.

In Table 2.2a, column 1 reports the result when a dummy for democracy is the only political variable included in the regression along with economic and demographic control variables, country dummies and year dummies. The coefficient of the democracy dummy, which reflects the effect of democratisation on the share of general government consumption in real GDP per capita, is not statistically significant at conventional levels.

Column 2 reports the results when dummies for a presidential and a mixed democracy are added to the regression as controls. The coefficient of the democracy dummy now becomes statistically significant as it reflects only the effect of democratisation that ends up with a parliamentary democracy. In column 3, the dummies for a presidential and a mixed democracy are excluded from the regression, while dummies for a civil autocracy and a military dictatorship are included instead. The coefficient of the democracy dummy, which reflects the effect of democratisation that originates from an absolute monarchy, is statistically significant. Together with the result in column 1, the results in columns 2 and 3 suggest that the effect of democratisation on the share of government consumption in real GDP per capita is subject to the specifics of government systems that prevail before and after a political change.[4]

To investigate the systems of government that lead to a significant effect of democratisation on the share of government consumption in real GDP per capita,

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[4] While results from several other regressions which include different sets of dummies for democratic and non-democratic government systems support this finding (for example, regressions which include dummies for a parliamentary democracies and a mixed democracies, or dummies for a parliamentary democracies and a presidential democracies, or dummies for an absolute monarchy and a military dictatorship), only the results of regressions as in columns 2-3 are reported, particularly for the reason of brevity and space limitation.

regressions in columns 4–12 include different sets of dummies for democratic and non-democratic government systems. In column 4, the dummies for a presidential democracy, a mixed democracy, a civil autocracy and a military dictatorship are included in the regression, restricting the coefficient of the democracy dummy to the effect of democratisation that originates from an absolute monarchy and ends up with a parliamentary democracy. The estimates in this column indicate that, holding other things constant, leaving an absolute monarchy for a parliamentary democracy leads to an approximately 3.03 percent increase in the share of government consumption in real GDP per capita. In columns 5, a dummy for parliamentary democracy instead of the dummy for a presidential democracy is included. The coefficient of the democracy, which reflects the effect of democratisation that starts from an absolute monarchy and culminates with a presidential democracy, is significant. New presidential democracies that were previously under an absolute monarchy raise government consumption by 2.04 percent of real GDP per capita.

The effect of democratisation that originates from an absolute monarchy and ends up with a mixed democracy is reported in column 6. The coefficient of the democracy dummy which represents this effect is significant. New mixed democracies that were previously under an absolute monarchy raise the share of government consumption in real GDP per capita by 3.74 percent.

Columns 7–9 report the results for democratisation that starts from a civil autocracy. The estimates in column 7 indicate that entering a parliamentary democracy from a civil autocracy leads to a 0.60 percent increase in government consumption as a share of real GDP per capita. In column 8, the estimates indicate that new presidential democracies which were previously under a civil autocracy reduce government consumption by 0.38 percent of real GDP per capita. In column 9, it is estimated that mixed democracies originating from a civil autocracy raise the share of government consumption in real GDP per capita by 1.32 percent. The fact that none of the coefficients of the democracy dummy are significant in these columns, however, implies that such estimates may arise simply by chance.

Table 2.2a The Effects of Democratisation and Systems of Government on General Government Consumption

	Full sample											
	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Democracy	0.799	1.248**	2.803***	3.026***	2.040**	3.744***	0.602	–0.384	1.320	1.454**	0.468	2.172**
	(0.521)	(0.503)	(0.743)	(0.836)	(1.022)	(1.143)	(0.602)	(0.814)	(0.997)	(0.580)	(0.858)	(1.007)
Absolute monarchy							–2.424***	–2.424***	–2.424***	–1.572*	–1.572*	–1.572*
							(0.736)	(0.736)	(0.736)	(0.821)	(0.821)	(0.821)
Civil autocracy			2.470***	2.424***	2.424***	2.424***				0.852*	0.852*	0.852*
			(0.710)	(0.736)	(0.736)	(0.736)				(0.492)	(0.492)	(0.492)
Military dictatorship			1.740**	1.572*	1.572*	1.572*	–0.852*	–0.852*	–0.852*			
			(0.814)	(0.821)	(0.821)	(0.821)	(0.492)	(0.492)	(0.492)			
Parliamentary democracy					0.986	–0.718		0.986	–0.718		0.986	–0.718
					(0.947)	(0.917)		(0.947)	(0.917)		(0.947)	(0.917)
Presidential democracy		–1.057		–0.986		–1.704	–0.986		–1.704	–0.986		–1.704
		(0.937)		(0.947)		(1.250)	(0.947)		(1.250)	(0.947)		(1.250)
Mixed democracy		0.429		0.718	1.704		0.718	1.704		0.718	1.704	
		(0.887)		(0.917)	(1.250)		(0.917)	(1.250)		(0.917)	(1.250)	
N observations	6,774	6,774	6,774	6,774	6,774	6,774	6,774	6,774	6,774	6,774	6,774	6,774
N countries	177	177	177	177	177	177	177	177	177	177	177	177
Within R-squared	0.056	0.060	0.061	0.066	0.066	0.066	0.066	0.066	0.066	0.066	0.066	0.066
Adj. R-squared	0.049	0.052	0.054	0.058	0.058	0.058	0.058	0.058	0.058	0.058	0.058	0.058

Note: The dependent variable is the share of general government consumption in real GDP per capita (Heston, Summers & Aten 2011). Each regression includes a constant, country dummies, year dummies, log of real GDP per capita, real GDP per capita growth rate, trade openness, total population, and age-dependency ratio. Except the constant, country dummies and year dummies, all other independent variables are lagged by one year. The democracy dummy refers to the DDR dataset (Cheibub, Gandhi & Vreeland 2010) with a two-year stability condition. Robust standard errors clustered at country level are in parentheses. ***, ** and * denote significance at the 1, 5 and 10 percent level respectively.

Table 2.2b The Effects of Democratisation and Systems of Government on Public Gross Fixed Capital Formation

	Full sample											
	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Democracy	–0.590	–1.753	1.910	1.146	4.089**	–0.432	–2.795	0.148	–4.373	–1.563	1.380	–3.141
	(0.904)	(1.646)	(1.884)	(2.010)	(2.059)	(3.468)	(1.808)	(1.018)	(3.241)	(1.679)	(0.873)	(2.745)
Absolute monarchy							–3.941**	–3.941**	–3.941**	–2.709	–2.709	–2.709
							(1.926)	(1.926)	(1.926)	(2.013)	(2.013)	(2.013)
Civil autocracy			3.441*	3.941**	3.941**	3.941**				1.232	1.232	1.232
			(1.834)	(1.926)	(1.926)	(1.926)				(1.047)	(1.047)	(1.047)
Military dictatorship			2.063	2.709	2.709	2.709	–1.232	–1.232	–1.232			
			(1.864)	(2.013)	(2.013)	(2.013)	(1.047)	(1.047)	(1.047)			
Parliamentary democracy					–2.943	1.578		–2.943	1.578		–2.943	1.578
					(1.782)	(3.059)		(1.782)	(3.059)		(1.782)	(3.059)
Presidential democracy		2.730		2.943		4.521	2.943		4.521	2.943		4.521
		(1.779)		(1.782)		(3.056)	(1.782)		(3.056)	(1.782)		(3.056)
Mixed democracy		–1.873		–1.578	–4.521		–1.578	–4.521		–1.578	–4.521	
		(3.072)		(3.059)	(3.056)		(3.059)	(3.056)		(3.059)	(3.056)	
N observations	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554
N countries	171	171	171	171	171	171	171	171	171	171	171	171
Within R-squared	0.170	0.179	0.174	0.182	0.182	0.182	0.182	0.182	0.182	0.182	0.182	0.182
Adj. R-squared	0.162	0.170	0.165	0.173	0.173	0.173	0.173	0.173	0.173	0.173	0.173	0.173

Note: The dependent variable is public gross fixed capital formation as a percentage of GDP. Each regression includes a constant, country dummies, year dummies, log of real GDP per capita, real GDP per capita growth rate, trade openness, total population, and age-dependency ratio. Except the constant, country dummies and year dummies, all other independent variables are lagged by one year. The democracy dummy refers to the DDR dataset (Cheibub, Gandhi & Vreeland 2010) with a two-year stability condition. Robust standard errors clustered at country level are in parentheses. ***, ** and * denote significance at the 1, 5 and 10 percent level respectively.

In column 10–12, the democratisation begins from a military dictatorship. The estimates in column 10 indicate that leaving a military dictatorship for a parliamentary democracy leads to a 1.45 percent increase in the share of government consumption in real GDP per capita. In column 11, the estimates indicate that new presidential democracies that were previously under a military dictatorship raise government consumption by 0.47 percent of real GDP per capita, while in column 12, it is estimated that mixed democracies originating from a military dictatorship raise the share of government consumption in real GDP per capita by 2.17 percent.

In Table 2.2b, column 1 again reports the result when a dummy for democracy is the only political variable included in the regression along with economic and demographic control variables, country dummies and year dummies. The coefficient of the democracy dummy, which reflects the effect of democratisation on the share of public gross fixed capital formation in GDP, is negative and not statistically significant at conventional levels. Column 2 reports the results when dummies for a presidential and a mixed democracy are added to the regression as controls. The coefficient of the democracy dummy remains negative and statistically insignificant even as it reflects only the effect of democratisation that ends up with a parliamentary democracy. In column 3, the coefficient of the democracy dummy, which reflects the effect of democratisation originating from an absolute monarchy, is positive but also not statistically significant.

To further investigate whether the effect of democratisation on the share of public gross fixed capital formation in GDP is subject to the specifics of government systems that prevail before and after a political change, regressions in columns 4–12 include different sets of dummies for democratic and non-democratic government systems. In columns 4–6, the democracy dummy reflects a shift that starts from an absolute monarchy to either a parliamentary, presidential or mixed democracy. In columns 7–9, the dummy reflects a shift that starts from a civil autocracy, whereas in 10–12, the dummy reflects a shift originating from a military dictatorship.

The results show that the coefficients of the democracy dummy happen to be negative or positive depending on the specifics of government systems that prevail before and after democratisasion. The coefficients of the democracy dummy are always negative for each shift that ends up with a mixed democracy, but by contrast, always positive for each shift that ends up with a presidential democracy.

The coefficients of the dummy for democracy are, however, mostly not significant except in column 5 where the coefficient of the democacy dummy is significant at the 5 percent level. The estimate in this column suggests that, holding other things constant, a shift from an absolute monarchy to a presidential democracy raises gross fixed capital formation of the public sector by 4.09 percent of GDP.

2.4.2 Results with a Five-year Democratic Stability Condition

Regressions in Tables 2.2a and 2.2b include a democracy dummy that is coded with a two-year stability condition. However, it could be argued that two years is too short for a country to accomplish a democratic reform. While there is no clear-cut argument for how many years the condition should be, some authors have imposed a five-year democratic stability condition in their analyses (Papaioannou & Siourounis 2008; Cervellati, Fortunato & Sunde 2011).

To ensure that the relationship between democratisation, system of government and the size of public spending is not subject to the stability condition enforced, regressions in Tables 2.3a and 2.3b impose such an alternative condition for the democracy dummy. Democratisation that lasts for four years or less is ignored, and rather than taking the value 1, the democracy dummy is given the value 0 over the period.

Table 2.3a The Effects of Democratisation and Systems of Government on General Government Consumption; Results with a Five-year Democratic Stability Condition

	Full sample											
	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Democracy	0.812	1.417***	2.852***	3.185***	1.973*	3.766***	0.811	–0.401	1.391	1.642***	0.430	2.223**
	(0.571)	(0.504)	(0.807)	(0.890)	(1.156)	(1.196)	(0.588)	(0.897)	(1.033)	(0.587)	(0.935)	(1.048)
Absolute monarchy							–2.374***	–2.374***	–2.374***	–1.543*	–1.543*	–1.543*
							(0.751)	(0.751)	(0.751)	(0.859)	(0.859)	(0.859)
Civil autocracy			2.478***	2.374***	2.374***	2.374***				0.831*	0.831*	0.831*
			(0.702)	(0.751)	(0.751)	(0.751)				(0.475)	(0.475)	(0.475)
Military dictatorship			1.757**	1.543*	1.543*	1.543*	–0.831*	–0.831*	–0.831*			
			(0.822)	(0.859)	(0.859)	(0.859)	(0.475)	(0.475)	(0.475)			
Parliamentary democracy					1.212	–0.580		1.212	–0.580		1.212	–0.580
					(1.012)	(0.936)		(1.012)	(0.936)		(1.012)	(0.936)
Presidential democracy		–1.285		–1.212		–1.792	–1.212		–1.792	–1.212		–1.792
		(0.998)		(1.012)		(1.328)	(1.012)		(1.328)	(1.012)		(1.328)
Mixed democracy		0.312		0.580	1.792		0.580	1.792		0.580	1.792	
		(0.908)		(0.936)	(1.328)		(0.936)	(1.328)		(0.936)	(1.328)	
N observations	6,774	6,774	6,774	6,774	6,774	6,774	6,774	6,774	6,774	6,774	6,774	6,774
N countries	177	177	177	177	177	177	177	177	177	177	177	177
Within R-squared	0.056	0.060	0.062	0.066	0.066	0.066	0.066	0.066	0.066	0.066	0.066	0.066
Adj. R-squared	0.049	0.0525	0.0538	0.0584	0.0584	0.0584	0.0584	0.0584	0.0584	0.0584	0.0584	0.0584

Note: The dependent variable is the share of general government consumption in real GDP per capita (Heston, Summers & Aten 2011). Each regression includes a constant, country dummies, year dummies, log of real GDP per capita, real GDP per capita growth rate, trade openness, total population, and age-dependency ratio. Except the constant, country dummies and year dummies, all other independent variables are lagged by one year. The democracy dummy refers to the DDR dataset (Cheibub, Gandhi & Vreeland 2010) with a five-year stability condition. Robust standard errors clustered at country level are in parentheses. ***, ** and * denote significance at the 1, 5 and 10 percent level respectively.

Table 2.3b The Effects of Democratisation and Systems of Government on Public Gross Fixed Capital Formation; Results with a Five-year Democratic Stability Condition

	Full sample											
	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Democracy	–0.599	–1.701	1.868	1.118	3.866*	–0.460	–2.619	0.129	–4.197	–1.488	1.260	–3.066
	(0.948)	(1.743)	(1.866)	(2.050)	(2.121)	(3.603)	(1.878)	(1.039)	(3.335)	(1.773)	(0.923)	(2.865)
Absolute monarchy							–3.737*	–3.737*	–3.737*	–2.606	–2.606	–2.606
							(2.004)	(2.004)	(2.004)	(2.066)	(2.066)	(2.066)
Civil autocracy			3.265*	3.737*	3.737*	3.737*				1.131	1.131	1.131
			(1.834)	(2.004)	(2.004)	(2.004)				(0.997)	(0.997)	(0.997)
Military dictatorship			2.035	2.606	2.606	2.606	–1.131	–1.131	–1.131			
			(1.858)	(2.066)	(2.066)	(2.066)	(0.997)	(0.997)	(0.997)			
Parliamentary democracy					–2.748	1.577		–2.748	1.577		–2.748	1.577
					(1.890)	(3.166)		(1.890)	(3.166)		(1.890)	(3.166)
Presidential democracy		2.538		2.748		4.325	2.748		4.325	2.748		4.325
		(1.887)		(1.890)		(3.195)	(1.890)		(3.195)	(1.890)		(3.195)
Mixed democracy		–1.826		–1.577	–4.325		–1.577	–4.325		–1.577	–4.325	
		(3.173)		(3.166)	(3.195)		(3.166)	(3.195)		(3.166)	(3.195)	
N observations	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554
N countries	171	171	171	171	171	171	171	171	171	171	171	171
Within R-squared	0.170	0.178	0.173	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180
Adj. R-squared	0.162	0.169	0.165	0.172	0.172	0.172	0.172	0.172	0.172	0.172	0.172	0.172

Note: The dependent variable is public gross fixed capital formation as a percentage of GDP. Each regression includes a constant, country dummies, year dummies, log of real GDP per capita, real GDP per capita growth rate, trade openness, total population, and age-dependency ratio. Except the constant, country dummies and year dummies, all other independent variables are lagged by one year. The democracy dummy refers to the DDR dataset (Cheibub, Gandhi & Vreeland 2010) with a five-year stability condition. Robust standard errors clustered at country level are in parentheses. ***, ** and * denote significance at the 1, 5 and 10 percent level respectively.

The results indicate that the effects of democratisation and systems of government are persistent. In Table 2.3a columns 1 where the dependent variable is the share of general government consumption in real GDP per capita, the coefficients of the democracy dummy remain insignificant. In columns 4–12 of the same table, the coefficients of the democracy dummy remain significant or insignificant conforming to the pattern in Table 2.2. In Table 2.3b where the dependent variable is public gross fixed capital formation as a percentage of GDP, the pattern of the effects that was present in Table 2.2b also remains in place. The coefficients of the democracy dummy are mostly not statistically significant, except in column 5.

2.4.3 Results with an Alternative Measure of Democracy

Measures of democracy are different one from another (Munck & Verkuilen 2002; Cheibub, Gandhi & Vreeland 2010). For example, in contrast to the DDR dataset which focuses on a minimalist, strictly procedural, view of democracy (Cheibub, Gandhi & Vreeland 2010), the Polity IV (PIV) dataset lays emphasis on the broad concept of institutionalised democracy (Marshall, Gurr & Jaggers 2010).

To test whether the effects of democratisation and systems of government on the size of public spending are subject to the measure of democracy used, regressions in Tables 2.4a and 2.4b include a dummy for democracy that refers to the PIV dataset instead of the DDR dataset. Following Persson and Tabellini (2006), a country is considered democratic if its *polity2* score in the PIV dataset is strictly positive and non-democratic if the *polity2* score is zero or negative. Nonetheless, as no ready classification of government systems is available in the PIV dataset, dummies for the systems of government still refer to the DDR dataset, taking into account discrepancies that exist in the democracy dummy.

Table 2.4a The Effects of Democratisation and Systems of Government on General Government Consumption; Results with an Alternative Measure of Democracy

	Full sample											
	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Democracy	0.446	1.169***	2.462***	2.891***	1.758**	3.986***	0.149	–0.984*	1.244	1.547***	0.414	2.642***
	(0.377)	(0.411)	(0.660)	(0.778)	(0.768)	(1.106)	(0.507)	(0.539)	(0.874)	(0.509)	(0.493)	(0.931)
Absolute monarchy							–2.742***	–2.742***	– 2.742***	–1.344*	–1.344*	–1.344*
							(0.657)	(0.657)	(0.657)	(0.805)	(0.805)	(0.805)
Civil autocracy			2.781***	2.742***	2.742***	2.742***				1.398**	1.398**	1.398**
			(0.598)	(0.657)	(0.657)	(0.657)				(0.545)	(0.545)	(0.545)
Military dictatorship			1.481*	1.344*	1.344*	1.344*	–1.398**	–1.398**	–1.398**			
			(0.758)	(0.805)	(0.805)	(0.805)	(0.545)	(0.545)	(0.545)			
Parliamentary democracy					1.133**	–1.095		1.133**	–1.095		1.133**	–1.095
					(0.556)	(0.793)		(0.556)	(0.793)		(0.556)	(0.793)
Presidential democracy		–1.332**		–1.133**		–2.228**	–1.133**		–2.228**	–1.133**		–2.228**
		(0.551)		(0.556)		(0.927)	(0.556)		(0.927)	(0.556)		(0.927)
Mixed democracy		0.660		1.095	2.228**		1.095	2.228**		1.095	2.228**	
		(0.765)		(0.793)	(0.927)		(0.793)	(0.927)		(0.793)	(0.927)	
N observations	6,124	6,124	6,124	6,124	6,124	6,124	6,124	6,124	6,124	6,124	6,124	6,124
N countries	159	159	159	159	159	159	159	159	159	159	159	159
Within R-squared	0.069	0.078	0.083	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094
Adj. R-squared	0.060	0.0695	0.0747	0.0850	0.0850	0.0850	0.0850	0.0850	0.0850	0.0850	0.0850	0.0850

Note: The dependent variable is the share of general government consumption in real GDP per capita (Heston, Summers & Aten 2011). Each regression includes a constant, country dummies, year dummies, log of real GDP per capita, real GDP per capita growth rate, trade openness, total population, and age-dependency ratio. Except the constant, country dummies and year dummies, all other independent variables are lagged by one year. The democracy dummy refers to the PIV dataset (Marshall, Gurr & Jaggers 2010), with a two-year stability condition. Robust standard errors clustered at country level are in parentheses. ***, ** and * denote significance at a 1, 5 and 10 percent level respectively.

Table 2.4b The Effects of Democratisation and Systems of Government on Public Gross Fixed Capital Formation; Results with an Alternative Measure of Democracy

	Full sample											
	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Democracy	–0.630	–1.246	1.998	1.357	3.081	–0.412	–2.307	–0.584	–4.076	–1.022	0.701	–2.792
	(0.735)	(1.550)	(1.683)	(1.874)	(1.904)	(3.339)	(1.723)	(0.776)	(3.132)	(1.582)	(0.749)	(2.725)
Absolute monarchy							–3.664*	–3.664*	–3.664*	–2.380	–2.380	–2.380
							(1.914)	(1.914)	(1.914)	(1.933)	(1.933)	(1.933)
Civil autocracy			3.458*	3.664*	3.664*	3.664*				1.285	1.285	1.285
			(1.761)	(1.914)	(1.914)	(1.914)				(0.988)	(0.988)	(0.988)
Military dictatorship			2.138	2.380	2.380	2.380	–1.285	–1.285	–1.285			
			(1.760)	(1.933)	(1.933)	(1.933)	(0.988)	(0.988)	(0.988)			
Parliamentary democracy					–1.723	1.769		–1.723	1.769		–1.723	1.769
					(1.620)	(2.909)		(1.620)	(2.909)		(1.620)	(2.909)
Presidential democracy		1.428		1.723		3.493	1.723		3.493	1.723		3.493
		(1.609)		(1.620)		(2.903)	(1.620)		(2.903)	(1.620)		(2.903)
Mixed democracy		–2.119		–1.769	–3.493		–1.769	–3.493		–1.769	–3.493	
		(2.949)		(2.909)	(2.903)		(2.909)	(2.903)		(2.909)	(2.903)	
N observations	5,041	5,041	5,041	5,041	5,041	5,041	5,041	5,041	5,041	5,041	5,041	5,041
N countries	153	153	153	153	153	153	153	153	153	153	153	153
Within R-squared	0.205	0.211	0.209	0.215	0.215	0.215	0.215	0.215	0.215	0.215	0.215	0.215
Adj. R-squared	0.197	0.202	0.200	0.206	0.206	0.206	0.206	0.206	0.206	0.206	0.206	0.206

Note: The dependent variable is public gross fixed capital formation as a percentage of GDP. Each regression includes a constant, country dummies, year dummies, log of real GDP per capita, real GDP per capita growth rate, trade openness, total population, and age-dependency ratio. Except the constant, country dummies and year dummies, all other independent variables are lagged by one year. The democracy dummy refers to the PIV dataset (Marshall, Gurr & Jaggers 2010), with a two-year stability condition. Robust standard errors clustered at country level are in parentheses. ***, ** and * denote significance at a 1, 5 and 10 percent level respectively.

The results reported in column 1 of Tables 2.4a and 2.4b affirm that the effect of democratisation on the share of general government consumption in real GDP per capita and the share of public gross fixed capital formation in GDP is not by itself statistically significant. The other results reported in Table 2.4a columns 4–12 also affirm that democratisation originating from an absolute monarchy significantly increases the share of general government consumption in real GDP per capita regardless of the democratic government system adopted, whereas democratisasion that originates from a military dictatorship significantly increases the share of general government consumption if only it ends up with a parliamentary or mixed democracy. In Table 2.4b columns 4–12, the results show that the coefficients of the democracy dummy are all not significant even though their signs remain consistent with the pattern in previous relevant tables.

2.4.4 Results with an Alternative Public-spending Proxy

Thus far, general government consumption as a proxy for the size of public spending is measured using the share of general government consumption in real GDP per capita. While this proxy taken from the Penn World Table (Heston, Summers & Aten 2011) has been widely used in economic literature, many studies instead employ the ratio of general government consumption to GDP which is taken from the World Development Indicators (World Bank 2011). To test whether the effects of democratisation and systems of government on the size of general government consumption are subject to the choice of proxy, regressions in Table 2.5 include the ratio of general government consumption to GDP as regressand.

Table 2.5 The Effects of Democratisation and Systems of Government on General Government Consumption; Results with an Alternative Government Consumption Proxy

	Full sample											
	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Democracy	1.344**	2.058*	–0.662	–0.162	–1.053	–1.984	1.541	0.650	–0.281	2.687**	1.796**	0.864
	(0.565)	(1.068)	(2.039)	(1.955)	(2.179)	(2.102)	(1.256)	(0.721)	(0.937)	(1.166)	(0.785)	(0.965)
Absolute monarchy							1.703	1.703	1.703	2.849	2.849	2.849
							(2.100)	(2.100)	(2.100)	(2.009)	(2.009)	(2.009)
Civil autocracy			–1.303	–1.703	–1.703	–1.703				1.146	1.146	1.146
			(2.091)	(2.100)	(2.100)	(2.100)				(0.810)	(0.810)	(0.810)
Military dictatorship			–2.481	–2.849	–2.849	–2.849	–1.146	–1.146	–1.146			
			(2.012)	(2.009)	(2.009)	(2.009)	(0.810)	(0.810)	(0.810)			
Parliamentary democracy					0.891	1.823		0.891	1.823		0.891	1.823
					(1.218)	(1.174)		(1.218)	(1.174)		(1.218)	(1.174)
Presidential democracy		–0.620		–0.891		0.932	–0.891		0.932	–0.891		0.932
		(1.159)		(1.218)		(0.987)	(1.218)		(0.987)	(1.218)		(0.987)
Mixed democracy		–1.779		–1.823	–0.932		–1.823	–0.932		–1.823	–0.932	
		(1.107)		(1.174)	(0.987)		(1.174)	(0.987)		(1.174)	(0.987)	
N observations	5,926	5,926	5,926	5,926	5,926	5,926	5,926	5,926	5,926	5,926	5,926	5,926
N countries	171	171	171	171	171	171	171	171	171	171	171	171
Within R-squared	0.112	0.114	0.117	0.119	0.119	0.119	0.119	0.119	0.119	0.119	0.119	0.119
Adj. R-squared	0.104	0.106	0.108	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110

Note: The dependent variable is the ratio of general government final consumption expenditure to GDP (World Bank 2011). Each regression includes a constant, country dummies, year dummies, log of real GDP per capita, real GDP per capita growth rate, trade openness, total population, and age-dependency ratio. Except the constant, country dummies and year dummies, all other independent variables are lagged by one year. The democracy dummy refers to the DDR dataset (Cheibub, Gandhi & Vreeland 2010) with a two-year stability condition. Robust standard errors clustered at country level are in parentheses. ***, ** and * denotes significance at the 1, 5 and 10 percent level respectively.

The result in column 1 shows that the coefficient of the dummy for democracy is statistically significant at the 5 percent level. Thus, different from previous results suggesting that democratisasion does not by itself significantly affect the size of general government consumption, the result in column 1 suggests that democratisasion has a significant effect on the ratio of general government consumption to GDP. Leaving non-democracy for democracy, in general, leads to a 1.34 percent increase in the ratio of general government consumption to GDP. Further results reported in the appendix, however, indicate that the relationship between democratisasion and the ratio of general government consumption to GDP is not robust and subject to the change in the measure of democracy.

The results in columns 4–12 show that the coefficients of the democracy dummy are mostly not significant, except in columns 10 and 11 where the coefficients of the dummy are statistically significant at the 5 percent level. The estimates in these columns indicate that, holding other things constant, leaving a military dictatorship for a parliamentary democracy raises the ratio of general government consumption to GDP by 2.69 percent, whereas leaving a military dictatorship for a presidential democracy increases the ratio of general government consumption to GDP by 1.80 percent.

Further results reported in the appendix show that only democratisation that originates from a military dictatorship and ends up with a parliamentary democracy has a robust and significant effect on the ratio of general government consumption to GDP. The effect of democratisation that originates from a military dictatorship and ends up with a presidential democracy becomes insignificant once the ratio of general government consumption to GDP is regressed using the PIV dataset as an alternative measure of democracy.

2.5 Conclusion

Exploiting time variation in countries that experienced changes in the state of democracy, this chapter examines the effects of democratisation and systems of government on the size of public spending. The results provide evidence that democratisation does not by itself bring about a robust significant effect on the size of general government consumption relative to a country's overall economy. The co-efficients of the democracy dummy are mostly insignificant and subject to the inclusion of dummies specifying the systems of government that prevail before and after a political reform. The results further provide evidence that only democratisation that originates from a military dictatorship and ends up with a parliamentary democracy has a robust significant effect on general government consumption size. Democratisation that originates from a civil autocracy almost never has a significant effect on the size of general government consumption, regardless of the democratic system of government adopted. With respect to the size of public gross fixed capital formation, the results provide evidence that the effects of democratisation and systems of government are weak and not statistically significant.

On the whole, the results in this chapter support the idea that democracy is a broad concept (Persson & Tabellini 2006). Predicting the impacts of democratisation based merely on the state of democracy risks a loss of explanatory power because internal variations within democracy and non-democracy are very large.

Further research is needed to determine whether government systems affect the composition of public spending. Countries under an absolute monarchy, a military dictatorship or a civil autocracy can have the same public spending size as those under a presidential or a parliamentary democracy, but be very different in the way they allocate it. The extent to which different countries under different government systems are able to efficiently use the spending is also worthy of future research.

Appendix 2.1

Table A2.1.1 Variable Definitions and Sources

The size of public spending (proxy "a")	- The share of general government consumption in purchasing-power-parity-converted GDP per capita at 2005 constant prices. - Taken from Heston, Summers and Aten (2011)
The size of public spending (proxy "b")	- Public gross fixed capital formation, i.e. investments that cover gross outlays by the public sector on additions to its fixed domestic assets. - Calculated using data from the World Development Indicators (World Bank 2011).
The size of public spending (alternative proxy "a")	- General government final consumption expenditure as a percentage of GDP. - Taken from the World Development Indicators (World Bank 2011).
Democracy dummy	- Binary variable: coded 1 if a country is considered to be democratic for at least two years; 0 otherwise. - To be considered democratic, a country must have had executive and legislative branches of government elected in multiparty elections. Besides, the country must have experienced no incident such that the legislature was closed unconstitutionally in favour of the executives. - Constructed using data from Cheibub, Gandhi and Vreeland (2010).
Democracy dummy (using an alternative measure of democracy)	- Binary variable: coded 1 if a country is considered to be democratic for at least two years; 0 otherwise. - To be considered democratic, a country must have a *polity2* score greater than zero in the Polity IV dataset. A country whose *polity2* score is zero or negative is judged to be non-democratic. - Constructed using data from Marshall, Gurr and Jaggers (2010).
Dummy for an absolute monarchy	- Binary variable: coded 1 if a country is judged to be non-democratic and its effective leader is titled a king, a queen or their equivalents; 0 otherwise. - Constructed using democracy data and the six-fold regime classification from Cheibub, Gandhi and Vreeland (2010).
Dummy for an absolute monarchy (using an alternative measure of democracy)	- Binary variable: coded 1 if a country is considered to be non-democratic and its effective leader is titled a king, a queen or their equivalents; 0 otherwise. - Constructed using democracy data from Marshall, Gurr and Jaggers (2010) and the six-fold regime classification from Cheibub, Gandhi and Vreeland (2010), taking into account discrepancies in the state of democracy.
Dummy for a military dictatorship	- Binary variable: coded 1 if a country is considered to be non-democratic and its effective leader is a military member by profession; 0 otherwise. - A retired member of the army, navy of the air-force remains treated as a military personal. - Constructed using data from Cheibub, Gandhi and Vreeland (2010).
Dummy for a military dictatorship (using an alternative measure of democracy)	- Binary variable: coded 1 if a country is considered to be non-democratic and its effective leader is a military member by profession; 0 otherwise. - A retired member of the army, navy of the air-force remains treated as a military personal. - Constructed using democracy data from Marshall, Gurr and Jaggers (2010) and the six-fold regime classification from Cheibub, Gandhi and Vreeland (2010), taking into account discrepancies in the state of democracy.

Table A2.1 Variable definitions and sources (*continued from previous page*)

Dummy for a civil autocracy	- Binary variable: coded 1 if a country is considered to be non-democratic and its effective leader is neither a monarch nor a military member by profession; 0 otherwise. - Constructed using democracy data and the six-fold regime classification from Cheibub, Gandhi and Vreeland (2010).
Dummy for a civil autocracy (using an alternative measure of democracy)	- Binary variable: coded 1 if a country is considered to be non-democratic and its effective leader is a military member by profession; 0 otherwise. - Constructed using democracy data from Marshall, Gurr and Jaggers (2010) and the six-fold regime classification from Cheibub, Gandhi and Vreeland (2010), taking into account discrepancies in the state of democracy.
Dummy for a parliamentary democracy	- Binary variable: coded 1 if a country is considered to be democratic for at least two years and has a parliamentary government that can be removed by the legislative; 0 otherwise. - Constructed using democracy data and the six-fold regime classification from Cheibub, Gandhi and Vreeland (2010).
Dummy for a parliamentary democracy (using an alternative measure of democracy)	- Binary variable: coded 1 if a country is considered to be democratic for at least two years and has a parliamentary government that can be removed by the legislative; 0 otherwise. - Constructed using democracy data from Marshall, Gurr and Jaggers (2010) and the six-fold regime classification from Cheibub, Gandhi and Vreeland (2010), taking into account discrepancies in the state of democracy.
Dummy for a presidential democracy	- Binary variable: coded 1 if a country is considered to be democratic for at least two years and has a non-parliamentary government that cannot be removed by the legislative; 0 otherwise. - Constructed using democracy data and the six-fold regime classification from Cheibub, Gandhi and Vreeland (2010).
Dummy for a presidential democracy (using an alternative measure of democracy)	- Binary variable: coded 1 if a country is considered to be democratic for at least two years and has a non-parliamentary government that cannot be removed by the legislative; 0 otherwise. - Constructed using democracy data from Marshall, Gurr and Jaggers (2010) and the six-fold regime classification from Cheibub, Gandhi and Vreeland (2010), taking into account discrepancies in the state of democracy.
Dummy for a mixed democracy	- Binary variable: coded 1 if a country is considered to be democratic for at least two years and has a parliamentary government with a head of state that is elected directly by the people; 0 otherwise. - Constructed using democracy data and the six-fold regime classification from Cheibub, Gandhi and Vreeland (2010).
Dummy for a mixed democracy (using an alternative measure of democracy)	- Binary variable: coded 1 if a country is considered to be democratic for at least two years and has a parliamentary government with a head of state that is elected directly by the people; 0 otherwise. - Constructed using democracy data from Marshall, Gurr and Jaggers (2010) and the six-fold regime classification from Cheibub, Gandhi and Vreeland (2010), taking into account discrepancies in the state of democracy.
Log of real GDP per capita	- Log of purchasing-power-parity-converted GDP per capita at 2005 constant prices. - Calculated using data from Heston, Summers and Aten (2011)
Real GDP per capita growth	- The annual growth rate of purchasing-power-parity-converted GDP per capita at 2005 constant prices. - Calculated using data from Heston, Summers and Aten (2011)

Table A2.1 Variable definitions and sources *(continued from previous page)*

Trade openness	- The values of export plus import as a percentage of GDP at 2005 constant prices. - Taken from Heston, Summers and Aten (2011).
Total population	- Total number of estimated population (in million people). - Calculated using data from the United Nation (2011a).
Age-dependency ratio.	- The ratio of population aged 0–14 and 65+ to 100 population aged 15–64. - Interpolated into yearly using data from the United Nation (2011b).

Appendix 2.2

Table A2.2.1 The Effects of a Change in the Systems of Government when Estimated Directly; Comparable to the Results Reported in Tables 2.2a and 2.2b Columns 4–12

	Table 2.2a columns 4–12			Table 2.2b columns 4–12		
	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects
	[1]	[2]	[3]	[4]	[5]	[6]
Absolute monarchy		–2.424***	–1.572*		–3.941**	–2.709
		(0.736)	(0.821)		(1.926)	(2.013)
Civil autocracy	2.424***		0.852*	3.941**		1.232
	(0.736)		(0.492)	(1.926)		(1.047)
Military dictatorship	1.572*	–0.852*		2.709	–1.232	
	(0.821)	(0.492)		(2.013)	(1.047)	
Parliamentary democracy	3.026***	0.602	1.454**	1.146	–2.795	–1.563
	(0.836)	(0.602)	(0.580)	(2.010)	(1.808)	(1.679)
Presidential democracy	2.040**	–0.384	0.468	4.089**	0.148	1.380
	(1.022)	(0.814)	(0.858)	(2.059)	(1.018)	(0.873)
Mixed democracy	3.744***	1.320	2.172**	–0.432	–4.373	–3.141
	(1.143)	(0.997)	(1.007)	(3.468)	(3.241)	(2.745)
N observations	6,774	6,774	6,774	5,554	5,554	5,554
N countries	177	177	177	171	171	171
Within R-squared	0.066	0.066	0.066	0.182	0.182	0.182
Adj. R-squared	0.058	0.058	0.058	0.173	0.173	0.173

Note: In this table, the effects of leaving a non-democratic government system and entering a particular form of democracy on the size of public spending are estimated directly (rather than merely as controls to the effect of democratisation in general). The democracy dummy is left out, while all but one of the dummies for government systems are included in the regressions along with economic and demographic control variables, country dummies and year dummies. The results in columns 1–3 are comparable to that in Table 2.2a columns 4–12. The results in columns 4–6 are comparable to that in Table 2.2b columns 4–12.

Table A2.2.2 The Effects of a Change in the Systems of Government when Estimated Directly; Comparable to the Results Reported in Tables 2.3a and 2.3b Columns 4–12

	Table 2.3a columns 4–12			Table 2.3b columns 4–12		
	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects
	[1]	[2]	[3]	[4]	[5]	[6]
Absolute monarchy		–2.374***	–1.543*		–3.737*	–2.606
		(0.751)	(0.859)		(2.004)	(2.066)
Civil autocracy	2.374***		0.831*	3.737*		1.131
	(0.751)		(0.475)	(2.004)		(0.997)
Military dictatorship	1.543*	–0.831*		2.606	–1.131	
	(0.859)	(0.475)		(2.066)	(0.997)	
Parliamentary democracy	3.185***	0.811	1.642***	1.118	–2.619	–1.488
	(0.890)	(0.588)	(0.587)	(2.050)	(1.878)	(1.773)
Presidential democracy	1.973*	–0.401	0.430	3.866*	0.129	1.260
	(1.156)	(0.897)	(0.935)	(2.121)	(1.039)	(0.923)
Mixed democracy	3.766***	1.391	2.223**	–0.460	–4.197	–3.066
	(1.196)	(1.033)	(1.048)	(3.603)	(3.335)	(2.865)
N observations	6,774	6,774	6,774	5,554	5,554	5,554
N countries	177	177	177	171	171	171
Within R-squared	0.066	0.066	0.066	0.180	0.180	0.180
Adj. R-squared	0.0584	0.0584	0.0584	0.172	0.172	0.172

Note: In this table, the effects of leaving a non-democratic government system and entering a particular form of democracy on the size of public spending are estimated directly (rather than merely as controls to the effect of democratisation in general). The democracy dummy is left out, while all but one of the dummies for government systems are included in the regressions along with economic and demographic control variables, country dummies and year dummies. The results in columns 1–3 are comparable to that in Table 2.3a columns 4–12. The results in columns 4–6 are comparable to that in Table 2.3b columns 4–12.

Table A2.2.3 The Effects of a Change in the Systems of Government when Estimated Directly; Comparable to the Results Reported in Tables 2.4a and 2.4b Columns 4–12

	Table 2.4a columns 4–12			Table 2.4b columns 4–12		
	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects
	[1]	[2]	[3]	[4]	[5]	[6]
Absolute monarchy		–2.742***	–1.344*		–3.664*	–2.380
		(0.657)	(0.805)		(1.914)	(1.933)
Civil autocracy	2.742***		1.398**	3.664*		1.285
	(0.657)		(0.545)	(1.914)		(0.988)
Military dictatorship	1.344*	–1.398**		2.380	–1.285	
	(0.805)	(0.545)		(1.933)	(0.988)	
Parliamentary democracy	2.891***	0.149	1.547***	1.357	–2.307	–1.022
	(0.778)	(0.507)	(0.509)	(1.874)	(1.723)	(1.582)
Presidential democracy	1.758**	–0.984*	0.414	3.081	–0.584	0.701
	(0.768)	(0.539)	(0.493)	(1.904)	(0.776)	(0.749)
Mixed democracy	3.986***	1.244	2.642***	–0.412	–4.076	–2.792
	(1.106)	(0.874)	(0.931)	(3.339)	(3.132)	(2.725)
N observations	6,124	6,124	6,124	5,041	5,041	5,041
N countries	159	159	159	153	153	153
Within R-squared	0.094	0.094	0.094	0.215	0.215	0.215
Adj. R-squared	0.0850	0.0850	0.0850	0.206	0.206	0.206

Note: In this table, the effects of leaving a non-democratic government system and entering a particular form of democracy on the size of public spending are estimated directly (rather than merely as controls to the effect of democratisation in general). The democracy dummy is left out, while all but one of the dummies for government systems are included in the regressions along with economic and demographic control variables, country dummies and year dummies. The results in columns 1–3 are comparable to that in Table 2.4a columns 4–12. The results in columns 4–6 are comparable to that in Table 2.4b columns 4–12.

Table A2.2.4a Results for Table 2.2a with a One-million Population Threshold

	Full sample											
	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Democracy	1.060**	1.132**	3.026***	2.993***	2.865***	3.488***	0.557	0.429	1.052	1.231**	1.104	1.727*
	(0.518)	(0.527)	(0.865)	(0.924)	(0.998)	(1.222)	(0.639)	(0.756)	(1.042)	(0.589)	(0.784)	(1.032)
Absolute monarchy							–2.436***	–2.436***	–2.436***	–1.761**	–1.761**	–1.761**
							(0.804)	(0.804)	(0.804)	(0.854)	(0.854)	(0.854)
Civil autocracy			2.399***	2.436***	2.436***	2.436***				0.675	0.675	0.675
			(0.835)	(0.804)	(0.804)	(0.804)				(0.452)	(0.452)	(0.452)
Military dictatorship			1.761*	1.761**	1.761**	1.761**	–0.675	–0.675	–0.675			
			(0.898)	(0.854)	(0.854)	(0.854)	(0.452)	(0.452)	(0.452)			
Parliamentary democracy					0.128	–0.496		0.128	–0.496		0.128	–0.496
					(0.866)	(0.949)		(0.866)	(0.949)		(0.866)	(0.949)
Presidential democracy		–0.237		–0.128		–0.623	–0.128		–0.623	–0.128		–0.623
		(0.853)		(0.866)		(1.228)	(0.866)		(1.228)	(0.866)		(1.228)
Mixed democracy		0.242		0.496	0.623		0.496	0.623		0.496	0.623	
		(0.922)		(0.949)	(1.228)		(0.949)	(1.228)		(0.949)	(1.228)	
N observations	5,812	5,812	5,812	5,812	5,812	5,812	5,812	5,812	5,812	5,812	5,812	5,812
N countries	149	149	149	149	149	149	149	149	149	149	149	149
Within R-squared	0.063	0.064	0.069	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070
Adj. R-squared	0.0543	0.0544	0.0602	0.0607	0.0607	0.0607	0.0607	0.0607	0.0607	0.0607	0.0607	0.0607

Note: The dependent variable is the share of general government consumption in real GDP per capita (Heston, Summers & Aten 2011). Each regression includes a constant, country dummies, year dummies, log of real GDP per capita, real GDP per capita growth rate, trade openness, total population, and age-dependency ratio. Except the constant, country dummies and year dummies, all other independent variables are lagged by one year. The democracy dummy refers to the DDR dataset (Cheibub, Gandhi & Vreeland 2010) with a two-year stability condition. The sample is restricted to country with at least 1 million inhabitants in 2000. Robust standard errors clustered at country level are in parentheses. ***, ** and * denote significance at the 1, 5 and 10 percent level respectively.

Table A2.2.4b Results for Table 2.2b with a One-million Population Threshold

	Full sample											
	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Democracy	–0.166	–1.507	3.435**	2.442	5.851***	0.963	–2.626	0.782	–4.105	–1.542	1.867**	–3.021
	(0.943)	(1.854)	(1.566)	(1.714)	(1.813)	(3.405)	(2.057)	(1.080)	(3.415)	(1.869)	(0.905)	(2.841)
Absolute monarchy							–5.068***	–5.068***	–5.068***	–3.984**	–3.984**	–3.984**
							(1.633)	(1.633)	(1.633)	(1.717)	(1.717)	(1.717)
Civil autocracy			4.483***	5.068***	5.068***	5.068***				1.084	1.084	1.084
			(1.479)	(1.633)	(1.633)	(1.633)				(1.127)	(1.127)	(1.127)
Military dictatorship			3.259**	3.984**	3.984**	3.984**	–1.084	–1.084	–1.084			
			(1.509)	(1.717)	(1.717)	(1.717)	(1.127)	(1.127)	(1.127)			
Parliamentary democracy					–3.409*	1.479		–3.409*	1.479		–3.409*	1.479
					(2.015)	(3.206)		(2.015)	(3.206)		(2.015)	(3.206)
Presidential democracy		3.024		3.409*		4.887	3.409*		4.887	3.409*		4.887
		(2.011)		(2.015)		(3.195)	(2.015)		(3.195)	(2.015)		(3.195)
Mixed democracy		–1.916		–1.479	–4.887		–1.479	–4.887		–1.479	–4.887	
		(3.223)		(3.206)	(3.195)		(3.206)	(3.195)		(3.206)	(3.195)	
N observations	4,841	4,841	4,841	4,841	4,841	4,841	4,841	4,841	4,841	4,841	4,841	4,841
N countries	147	147	147	147	147	147	147	147	147	147	147	147
Within R-squared	0.203	0.214	0.207	0.219	0.219	0.219	0.219	0.219	0.219	0.219	0.219	0.219
Adj. R-squared	0.194	0.205	0.198	0.209	0.209	0.209	0.209	0.209	0.209	0.209	0.209	0.209

Note: The dependent variable is public gross fixed capital formation as a percentage of GDP. Each regression includes a constant, country dummies, year dummies, log of real GDP per capita, real GDP per capita growth rate, trade openness, total population, and age-dependency ratio. Except the constant, country dummies and year dummies, all other independent variables are lagged by one year. The democracy dummy refers to the DDR dataset (Cheibub, Gandhi & Vreeland 2010) with a two-year stability condition. The sample is restricted to country with at least 1 million inhabitants in 2000. Robust standard errors clustered at country level are in parentheses. ***, ** and * denote significance at the 1, 5 and 10 percent level respectively.

Table A2.2.5 Results for Table 2.5 with a Five-year Stability Condition

	Full sample											
	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Democracy	1.178**	2.119*	–0.779	–0.106	–1.359	–2.033	1.523	0.270	–0.404	2.821**	1.569*	0.895
	(0.596)	(1.129)	(2.034)	(1.993)	(2.057)	(2.119)	(1.306)	(0.726)	(0.992)	(1.225)	(0.795)	(1.014)
Absolute monarchy							1.629	1.629	1.629	2.928	2.928	2.928
							(2.133)	(2.133)	(2.133)	(1.987)	(1.987)	(1.987)
Civil autocracy			–1.190	–1.629	–1.629	–1.629				1.299	1.299	1.299
			(2.169)	(2.133)	(2.133)	(2.133)				(0.786)	(0.786)	(0.786)
Military dictatorship			–2.500	–2.928	–2.928	–2.928	–1.299	–1.299	–1.299			
			(2.047)	(1.987)	(1.987)	(1.987)	(0.786)	(0.786)	(0.786)			
Parliamentary democracy					1.253	1.926		1.253	1.926		1.253	1.926
					(1.253)	(1.218)		(1.253)	(1.218)		(1.253)	(1.218)
Presidential democracy		–0.984		–1.253		0.673	–1.253		0.673	–1.253		0.673
		(1.202)		(1.253)		(1.020)	(1.253)		(1.020)	(1.253)		(1.020)
Mixed democracy		–1.894		–1.926	–0.673		–1.926	–0.673		–1.926	–0.673	
		(1.148)		(1.218)	(1.020)		(1.218)	(1.020)		(1.218)	(1.020)	
N observations	5,926	5,926	5,926	5,926	5,926	5,926	5,926	5,926	5,926	5,926	5,926	5,926
N countries	171	171	171	171	171	171	171	171	171	171	171	171
Within R-squared	0.110	0.113	0.116	0.119	0.119	0.119	0.119	0.119	0.119	0.119	0.119	0.119
Adj. R-squared	0.102	0.104	0.108	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110

Note: The dependent variable is the ratio of general government final consumption expenditure to GDP (World Bank 2011). Each regression includes a constant, country dummies, year dummies, log of real GDP per capita, real GDP per capita growth rate, trade openness, total population, and age-dependency ratio. Except the constant, country dummies and year dummies, all other independent variables are lagged by one year. The democracy dummy refers to the DDR dataset (Cheibub, Gandhi & Vreeland 2010) with a five-year stability condition. Robust standard errors clustered at country level are in parentheses. ***, ** and * denotes significance at the 1, 5 and 10 percent level respectively.

Table A2.2.6 Results for Table 2.5 with an Alternative Measure of Democracy

	Full sample											
	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Democracy	0.840	2.296**	–0.678	0.267	–1.640	–1.261	1.448	–0.459	–0.080	3.004***	1.097	1.476
	(0.583)	(0.908)	(2.190)	(1.972)	(2.199)	(2.136)	(1.173)	(0.902)	(0.949)	(1.029)	(0.779)	(1.032)
Absolute monarchy							1.181	1.181	1.181	2.736	2.736	2.736
							(2.125)	(2.125)	(2.125)	(2.019)	(2.019)	(2.019)
Civil autocracy			–0.622	–1.181	–1.181	–1.181				1.555*	1.555*	1.555*
			(2.234)	(2.125)	(2.125)	(2.125)				(0.920)	(0.920)	(0.920)
Military dictatorship			–2.212	–2.736	–2.736	–2.736	–1.555*	–1.555*	–1.555*			
			(2.148)	(2.019)	(2.019)	(2.019)	(0.920)	(0.920)	(0.920)			
Parliamentary democracy					1.907*	1.528		1.907*	1.528		1.907*	1.528
					(1.117)	(1.095)		(1.117)	(1.095)		(1.117)	(1.095)
Presidential democracy		–1.845*		–1.907*		–0.379	–1.907*		–0.379	–1.907*		–0.379
		(1.047)		(1.117)		(1.040)	(1.117)		(1.040)	(1.117)		(1.040)
Mixed democracy		–1.669		–1.528	0.379		–1.528	0.379		–1.528	0.379	
		(1.011)		(1.095)	(1.040)		(1.095)	(1.040)		(1.095)	(1.040)	
N observations	5,437	5,437	5,437	5,437	5,437	5,437	5,437	5,437	5,437	5,437	5,437	5,437
N countries	154	154	154	154	154	154	154	154	154	154	154	154
Within R-squared	0.109	0.113	0.117	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122
Adj. R-squared	0.100	0.104	0.108	0.112	0.112	0.112	0.112	0.112	0.112	0.112	0.112	0.112

Note: The dependent variable is the ratio of general government final consumption expenditure to GDP (World Bank 2011). Each regression includes a constant, country dummies, year dummies, log of real GDP per capita, real GDP per capita growth rate, trade openness, total population, and age-dependency ratio. Except the constant, country dummies and year dummies, all other independent variables are lagged by one year. The democracy dummy refers to the PIV dataset (Marshall, Gurr & Jaggers 2010), with a two-year stability condition. Robust standard errors clustered at country level are in parentheses.***, ** and * denote significance at a 1, 5 and 10 percent level respectively.

Table A2.2.7 Results for Table 2.5 with a One-million Population Threshold

	Full sample											
	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Democracy	1.526**	2.483**	–0.167	0.488	–0.539	–1.975	2.007	0.980	–0.455	3.007***	1.979**	0.544
	(0.605)	(1.071)	(1.795)	(1.765)	(1.965)	(1.853)	(1.292)	(0.763)	(0.900)	(1.151)	(0.870)	(0.948)
Absolute monarchy							1.519	1.519	1.519	2.519	2.519	2.519
							(1.872)	(1.872)	(1.872)	(1.740)	(1.740)	(1.740)
Civil autocracy			–1.037	–1.519	–1.519	–1.519				1.000	1.000	1.000
			(1.843)	(1.872)	(1.872)	(1.872)				(0.861)	(0.861)	(0.861)
Military dictatorship			–2.092	–2.519	–2.519	–2.519	–1.000	–1.000	–1.000			
			(1.740)	(1.740)	(1.740)	(1.740)	(0.861)	(0.861)	(0.861)			
Parliamentary democracy					1.027	2.463**		1.027	2.463**		1.027	2.463**
					(1.238)	(1.145)		(1.238)	(1.145)		(1.238)	(1.145)
Presidential democracy		–0.803		–1.027		1.435	–1.027		1.435	–1.027		1.435
		(1.185)		(1.238)		(0.976)	(1.238)		(0.976)	(1.238)		(0.976)
Mixed democracy		–2.421**		–2.463**	–1.435		–2.463**	–1.435		–2.463**	–1.435	
		(1.078)		(1.145)	(0.976)		(1.145)	(0.976)		(1.145)	(0.976)	
N observations	5,189	5,189	5,189	5,189	5,189	5,189	5,189	5,189	5,189	5,189	5,189	5,189
N countries	146	146	146	146	146	146	146	146	146	146	146	146
Within R-squared	0.138	0.142	0.142	0.146	0.146	0.146	0.146	0.146	0.146	0.146	0.146	0.146
Adj. R-squared	0.129	0.133	0.132	0.137	0.137	0.137	0.137	0.137	0.137	0.137	0.137	0.137

Note: The dependent variable is the ratio of general government final consumption expenditure to GDP (World Bank 2011). Each regression includes a constant, country dummies, year dummies, log of real GDP per capita, real GDP per capita growth rate, trade openness, total population, and age-dependency ratio. Except the constant, country dummies and year dummies, all other independent variables are lagged by one year. The democracy dummy refers to the DDR dataset (Cheibub, Gandhi & Vreeland 2010) with a two-year stability condition. The sample is restricted to country with at least 1 million inhabitants in 2000. Robust standard errors clustered at country level are in parentheses. ***, ** and * denotes significance at the 1, 5 and 10 percent level respectively.

Chapter 3: Electoral Budget Cycles under Non-democratic Regimes

3.1 Introduction

The relationship between elections and macroeconomic dynamics has been subject to debate in economic literature. Following seminal contributions by Nordhaus (1975) and Tufte (1978), one strand of the large body of research on the political business cycle is the study of electoral budget cycles. Recently, several authors have confirmed the presence of politically driven budget cycles, not only in terms of total size (for example, Schuknecht 2000; Persson & Tabellini 2003; Shi & Svensson 2006), but also in terms of composition (Vergne 2009; Katsimi & Sarantides 2012; Drazen & Eslava 2010). However, it has been noted that politically driven budget cycles are the experiences of newly democratised countries and are not a phenomenon of old or established democracies (Brender & Drazen 2005).

Despite this advance, there has been hardly any cross-country study investigating the effect of elections on government budget under non-democratic regimes.[5] Previous literature (for example, Block 2003; Brender & Drazen 2005; Vergne 2009) argues that electoral budget cycles make sense only in democratic countries where electoral competition is present, and ignores the possibility that elections may have an effect on government budget in non-democratic countries. Implicit in the argument is that competitive elections are exclusive to democracy.

This chapter argues that, even under non-democratic regimes, political budget cycles can exist. Electoral competition is a concept narrower than democracy and the former may apply in the absence of the latter (Hyde & Marinov 2012). To the extent that elections are competitive, incumbents in non-democratic countries face a non-zero probability of loss and have incentives to distort the government budget. To test the

[5] Wright's (2011) manuscript is an exception. A limited number of single-country studies includes Gonzalez (2002a), Blaydes (2006) and Pepinsky (2007).

argument, this chapter makes use of the National Elections across Democracy and Autocracy (NELDA) dataset which covers a new measure of electoral competition, and estimates the effect of competitive elections on the central government budget balance in 29 non-democratic countries between 1960 and 2006.

This chapter is motivated by the fact that, in the last few decades, elections have spread to almost all countries in the world, including those commonly judged as non-democratic. Indeed, many rulers take up executive and legislative elections while at the same time resisting full democratisation, creating so-called 'hybrid regimes' (Collier & Levitsky 1997; Geddes 1999; Diamond 2002). Regardless of the reasons for such decisions,[6] it is natural to expect that the rulers of hybrid regimes would attempt to win any election and make efforts to maintain their power, including perhaps by manipulating the government budget.

The primary finding is that electoral budget cycles do exist under non-democratic regimes. The effect of elections on the share of central government budget balance in gross domestic product (GDP) is significant and robust to a number of variations in control variables, estimation models, sample selection criteria and designations of the election-year dummy. The other finding is that the persistence of budget cycles under non-democratic regimes is driven by the subsample of countries that are less distant from democracy (that is, shallow autocracies). The effect of elections on the share of central government budget balance in GDP is under no circumstances significant when the regression includes only the subsample of countries more distant from democracy (that is, deep autocracies).

The rest of this chapter proceeds as follows. Section 3.2 discusses theoretical constructs that underlie the relationship between elections and budget cycles under non-democracy. Section 3.3 describes estimation strategy and data. Section 3.4 provides the results and section 3.5 offers conclusions.

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[6] Political scientists have given different explanations about why autocratic rulers take up elections, such as to signal a regime's party strength, to identify the nature of a regime's support or to enjoy the fruits of domestic and international legitimacy (see, for example, Geddes 2005; Gandhi & Przeworski 2006). A complete discussion of this issue is beyond the scope of this chapter.

3.2 Theoretical Overview

In response to the occurrence of hybrid regimes, political scientists have proposed different categorisations for different levels of democracy. For example, Diamond (2002) lists countries in the world under one of six mutually exclusive political regimes in 2001, namely politically closed authoritarian (for example, Cuba, China), hegemonic electoral authoritarian (Republic of Congo, Kazakhstan), competitive authoritarian (Belarus, Haiti), ambiguous regimes (Guatemala, Mexico), electoral democracy (Brazil, Argentina) and liberal democracy (Australia, United States). Elections take place under all of these categories except the politically closed authoritarian.

Naturally, elections under hegemonic electoral authoritarian or competitive authoritarian are not the same as elections under electoral democracy or liberal democracy. Levitsky and Way (2002) consider hegemonic electoral authoritarian and competitive authoritarian as regimes in which elections play important roles in the acquisition of power, but do not appear to be fair enough to meet the minimum criteria for modern democracy. Elections under these two regimes are marked by the abuse of government resources, the prohibition of opposition media coverage, hassling of political opponents and, in some cases, falsification of the results of elections. Meanwhile, elections under electoral democracy or liberal democracy are open, free and fair, with appropriate protection of civil rights, including freedom of speech and freedom of the press. Even though violations occur at various times, they are not systematic enough to hamper political competition.

This does not mean that electoral budget cycles make no sense under non-democracy. First, as Hyde and Marinov (2012) emphasise, electoral competition is a concept narrower than democracy and the former may apply in the absence of the latter. For an election to be competitive, it requires that there are at least one opposition group to contest the incumbent; multiple political parties are technically and constitutionally legal; and the number of candidates competing for a slot exceeds the number of slots to be filled. To the extent that these requirements are met, the outcome of an election would be uncertain. Thus, even in non-democratic countries where the conditions are

harshly biased against opposition candidates, an incumbent faces a non-zero probability of losing office and has the incentive to distort the government budget.

Second, palpable electoral fraud or falsification of voting results, while technically possible, can be in contradiction to the raison d'être of taking up elections. This is true when leaders in non-democratic countries aspire to enjoy the fruits of domestic and international legitimacy (Joseph 1999; Schedler 2002) or to reduce the threat of revolution and other kinds of violent removal (Cox 2010). These leaders recognise that, rather than committing electoral fraud or falsifying voting results that potentially trigger popular grievances (Thompson & Kuntz 2006; Fearon 2011) and revolutions (for example, Tucker 2007; Kuntz & Thompson 2009), distorting the public budget prior to an election is a less risky means of maintaining political power.

Moreover, there should be more room for budget manipulation under non-democracy than under democracy. Less democracy implies not only greater incumbent power over fiscal policy, but also less transparency (Hollyer, Rosendorff & Vreeland 2011) and more asymmetric information. Evidence confirms that transparency matters for the presence of budget cycles. Using data from 19 Organisation for Economic Co-operation and Development (OECD) countries, Alt and Lassen (2006) report a persistent pattern of electoral budget cycles in countries with low transparency. The less transparent the public sector, the lower the likelihood that voters can observe the true budget conditions.

How asymmetric information induces electoral budget cycles is formally modelled in Rogoff and Sibert (1988) and Rogoff (1990). For these authors, electoral budget cycles can be construed as part of a signalling game where voters are concerned only with the competence (that is, the ability to deliver more public goods for the same level of taxes) of politicians. Politicians have perfect information about their own level of competence, while no voters are able to observe it. To signal their competence, incumbents cut taxes and raise governmentconsumption spending prior to an election and return them to normal after the election process has finished.

Gonzalez (2002b) extends Rogoff's (1990) model to explain the effects of the level of democracy on budget cycles. Progress in the level of democracy (that is, from totally authoritarian to full democracy) increases the possibility of enforcing electoral results. Consequently, the cost of political turnover decreases, enticing incumbents to manipulate the government budget prior to elections. By the same token, as the level of democracy progresses, the likelihood that voters perceive incumbents' true competence increases. Electoral budget cycles therefore occur at intermediate levels of democracy, where the cost of enforcing electoral results is low and the voters' chance to recognise the incumbents' competence is also relatively low.

To put this hypothesis in the context of the regime categorisation above, budget cycles are less likely to take place under the extreme categories of hegemonic electoral authoritarian and liberal democracy, but more likely to arise under the hybrid regimes of competitive authoritarian and electoral democracy. Under hegemonic electoral authoritarian, the cost of removing an incumbent is excessively high for the voters. Election results cannot be enforced and incumbents need not worry about the risk of being voted out. Consequently, there is little incentive to engage in costly manipulation and no budget cycles take place. Under more democratic regimes, political competition is higher and the cost of enforcing political turnover is lower. Incumbents are at risk of being voted out, especially when they are perceived to be of the low-competence type. Incumbents therefore have an incentive to signal their competence to the voters by manipulating the government budget during pre-election periods. Budget cycles shrink as the level of democracy increases because the more chances that voters have to discover an incumbent's true competence, the less space there is for budget manipulation.

3.3 Empirical Strategy

The basic regression equation in this chapter is provided by

$$Y_{i,t} = \beta_0 + \beta_1 Y_{i,t-1} + \beta_2 electyear_{i,t} + \beta_3 X_{i,t-1} + \beta_4 c_i + \beta_5 y_t + e_{i,t} \qquad [3.1]$$

where c_i denotes unobserved country fixed effects, y_t denotes year fixed effects and $e_{i,t}$ denotes error terms. The dependent variable, $Y_{i,t}$, is the central government budget balance as a percentage of GDP in country i in year t. It captures the dynamics of overall government budget size and is approximated using data from the International Financial Statistics (IFS) (see, IMF 2011). However, as the IFS data suffer from missing values, identically-defined budget balance data from the World Development Indicators (WDI) (see, World Bank 2011) are used to complement. Here, rather than arbitrarily filling in the missing values or replacing certain data points in the IFS data using information from the WDI, a more prudent approach is taken. That is, to use observations from the IFS as they are, or to replace them all with observations from the WDI.[7] For each country, the WDI become a choice only if observations from the IFS are totally missing or partially missing but consist of shorter observation years within the country's time series.

The key independent variable, $electyear_{i,t}$, is a dummy coded 1 for the years with a competitive election, and 0 otherwise. 'Competitive' means that the election meets the requirements of opposition presence, multiparty involvement and multicandidate appearance in the NELDA dataset (Hyde & Marinov 2012). Since the focus in this chapter is head-of-government elections, only executive elections are covered under a directly elected presidential system and only legislative elections are included under an indirectly elected presidential system or a parliamentary system. In countries with a mixed system of government, legislative elections are chosen if no presidential elections took place or if Cheibub, Gandhi and Vreeland (2010) call the effective head of government as a prime minister, an acting prime minister, a premier or a chancellor.

[7] This is particularly important because electoral budget cycle is all about year-to-year patterns. To fill in the missing values or to replace certain data points arbitrarily using observations from one data source or another may cause unintended subjectivity bias.

The control variables, $X_{i,t-1}$, consist of the lagged log real GDP per capita, annual growth rate of real GDP per capita, trade openness, total population and age-dependency ratio. Real GDP per capita and, in particular, its growth rate are considered as a natural smoother of budget balance.[8] Trade openness matters because it possibly affects the way governments manage the economy. The more open an economy, the less effective is the stabilisation function of surplus or deficit policy (Jensen & Jensen 1995). Total population and the age-dependency ratio may affect government revenue and government expenditure in opposite manners and are therefore likely to impact the budget balance. Data for real GDP per capita, the growth of real GDP per capita, and trade openness are all from the Penn World Table (PWT) (see, Heston, Summers & Aten 2011), while population and the age-dependency ratio data are from the United Nations (2011).

Including the lagged dependent variable as a regressor, on the one hand, exemplifies the common sense belief that the current government budget is affected by the previous budget. On the other hand, it causes endogeneity problems with respect to lagged control variables and unobserved country-specific characteristics and may result in biased coefficient estimates. To deal with this issue, regression coefficients in equation [3.1] are estimated using Arellano-Bond dynamic panel Generalised Method of Moments (GMM) estimators (Arellano & Bond 1991) in addition to fixed effects estimators.

Estimations are carried out for an unbalanced panel of non-democratic countries between 1960 and 2006. To be included in the estimation sample, a country must have a zero or negative *polity2* score in the PIV dataset (Marshall, Gurr & Jaggers 2010) and not be an absolute monarchy or a single-party communist country. The country must also have no less than seven years of observation in total (with each period of separated

[8] Here, the basic assumption is that log of real GDP per capita and real GDP per capita growth rate in the previous year affect current fiscal policy, although it is also likely that fiscal policy affects these variable in the first place (see, for example, Romero-Ávila & Strauch 2008; Afonso & Furceri 2010).

observations lasts for at least two years) and cover at least one election.[9] To allow analysis of electoral budget cycles under different levels of non-democracy, the full sample of non-democracies is partitioned into two subsamples.[10] Countries whose average *polity2* score exceeds –5 are deemed to be shallow autocracies, whereas those whose average *polity2* score is –5 or less are listed as deep autocracies. The descriptive statistics reported in Table 3.1 highlight the characteristics of the data covered.

Table 3.1 Descriptive Statistics

	N obs.	Mean	Std dev.
Budget balance (% of GDP in current prices)			
- Full sample	486	–1.903	4.199
- Shallow autocracies	236	–1.351	4.691
- Deep autocracies	250	–2.425	3.608
Real GDP per capita growth rate (% per annum)			
- Full sample	486	2.238	7.091
- Shallow autocracies	236	2.529	5.156
- Deep autocracies	250	1.963	8.527
Log of real GDP per capita			
- Full sample	486	7.691	1.125
- Shallow autocracies	236	7.967	1.181
- Deep autocracies	250	7.429	1.005
Trade openness (% of GDP at constant prices)			
- Full sample	486	81.200	79.485
- Shallow autocracies	236	104.116	101.129
- Deep autocracies	250	59.568	41.065
Total population (million people)			
- Full sample	486	20.174	32.650
- Shallow autocracies	236	14.046	17.826
- Deep autocracies	250	25.958	41.319
Age dependency ratio			
- Full sample	486	84.412	19.464
- Shallow autocracies	236	82.668	21.907
- Deep autocracies	250	86.059	16.713

[9] This requirement implies that the minimum time series length in dynamic Arellano-Bond GMM estimations is six years.

[10] Despite its appeal, Diamond's (2002) regime classification mentioned above cannot be used to divide the sample into subsamples because it covers the portrait only in 2001 only.

3.4 Estimation Results

3.4.1 The Basic Results

Table 3.2 columns 1–4 summarises the results for the full sample. In columns 1–2, estimations are based on a fixed effects model. Irrespective of whether economic and demographic control variables are excluded or included in the regression, the coefficients of the election-year dummy turn out to be negative and statistically significant at the 5 percent level. In columns 3–4, the Arellano-Bond dynamic panel GMM is used to estimate the parameters. The coefficients of the election-year dummy continue to be negative and statistically significant at the 5 percent level. These results suggest that electoral budget cycles do exist under non-democratic regimes. Holding other factors constant, the central government budget balance as a share of GDP is about 0.8 percent lower in election years than in non-election years.

Columns 5–8 of Table 3.2 summarise the results for shallow autocracies. Regardless of the estimation models used, the coefficients of the election-year dummy are always negative and statistically significant. Elections do induce a decrease in the GDP share of the central government budget balance with a magnitude of approximately 1.1–1.2 percent. Remarkably, the converse applies for deep autocracies. The results reported in columns 9–12 indicate that, although they have the same negative sign, the coefficients of the election-year dummy are never statistically significant at conventional levels. Thus, while electoral budget cycles are prevalent in shallow autocracies, they are not in deep autocracies.

Overall, the results in Table 3.2 indicate that shallow autocracies drive the relationship between elections and the share of the central government budget balance in GDP. Removing these countries from the larger sample renders the effect of elections on the GDP share of the central government budget balance statistically insignificant.

Table 3.2 The Effects of Elections on Budget Balance under Non-democratic Regimes

	Full sample				Shallow autocracies				Deep autocracies			
	Fixed effects[a]	Fixed effects[a]	Dynamic panel[b]	Dynamic panel[b]	Fixed effects[a]	Fixed effects[a]	Dynamic panel[b]	Dynamic panel[b]	Fixed effects[a]	Fixed effects[a]	Dynamic panel[b]	Dynamic panel[b]
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Election-year dummy	–0.764*	–0.790**	–0.747**	–0.800**	–1.078*	–1.215**	–1.087**	–1.191***	–0.340	–0.391	–0.323	–0.261
	(0.390)	(0.393)	(0.346)	(0.347)	(0.567)	(0.538)	(0.432)	(0.406)	(0.707)	(0.717)	(0.720)	(0.734)
RGDP per capita growth		0.000		0.008		0.081*		0.088**		0.012		0.006
		(0.022)		(0.028)		(0.042)		(0.040)		(0.026)		(0.029)
Log of RGDP per capita		0.311		–0.233		3.478		4.742		–1.951		–4.355***
		(1.119)		(1.268)		(2.723)		(2.886)		(1.977)		(1.663)
Trade openness		0.002		0.003		–0.006		–0.003		–0.017		–0.008
		(0.007)		(0.006)		(0.010)		(0.007)		(0.013)		(0.009)
Total population		0.009		0.082		0.311**		0.427*		–0.040		0.181*
		(0.054)		(0.071)		(0.133)		(0.220)		(0.087)		(0.106)
Age dependency ratio		–0.070**		–0.114***		–0.127**		–0.130***		–0.027		–0.045
		(0.032)		(0.025)		(0.054)		(0.019)		(0.055)		(0.041)
N observations	486	486	445	445	236	236	216	216	250	250	229	229
N countries	29	29	29	29	14	14	14	14	15	15	15	15
2nd order test[c]	.	.	0.401	0.407	.	.	0.518	0.684	.	.	0.775	0.801
Sargan test[d]	.	.	0.276	0.210	.	.	0.594	0.506	.	.	0.138	0.090
Adj. R^2	0.589	0.594	.	.	0.678	0.711	.	.	0.435	0.429	.	.

The dependent variable is the central government budget balance as a percentage of GDP. [a]Each regression includes a constant, one lag of the dependent variable, country dummies and year dummies. [b]Each regression is estimated using the one-step Arellano-Bond estimator and includes a constant and year dummies. Lagged log of real GDP per capita, trade openness, total population and age-dependency ratio are assumed to be strictly exogenous, while the lag of real GDP per capita growth rate is assumed to be predetermined. Robust standard errors are in parentheses. [c]*P-values*> 0.05 implies that the error term in the regression is not serially correlated. [d]*P-values*> 0.05 implies that the instruments are not correlated with the error term. ***, ** and * denote significance at 1, 5 and 10 percent levels respectively.

3.4.2 Results with More Stringent Criteria for Sample Selection

Previous estimations include every observation where a country is considered non-democratic (that is, it receives a zero or negative *polity2* score in the PIV dataset), regardless of whether the observation is part of a long non-democratic period or occurs in the midst of democratic periods that have been treated as missing. To ensure that the conclusions drawn are not driven by the inclusion of amid-democratic-observations, regressions in Table 3.3 add more criteria for sample selection. Observations that are interrupted by five or more missing years are excluded unless they constitute a period of at least four consecutive observations and one election. Five years represents the longest interval between two regular elections (for example, presidential elections in Mexico and the Philippines) and enforcing such criteria can help reduce potential bias related to interrupting democratic periods. Besides, to be included in the estimations, a country must have a minimum of seven years of observations and cover at least one election.

The results indicate that the pattern of the effect of elections on the central government budget balance as a share of GDP is persistent. In columns 1–2, where the sample includes all autocracies, the coefficients of the election-year dummy are always statistically significant. In columns 3–4, where only shallow autocracies are included in the sample, the coefficients of the election-year dummy are also significant. Finally, in columns 5–6, where only deep autocracies are covered in the sample, the coefficients of the election-year dummy are not significant.

Table 3.3 The Effects of Elections on Budget Balance under Non-democratic Regimes; Results with More Stringent Criteria for Sample Selection

	Full sample		Shallow autocracies		Deep autocracies	
	Fixed effects[a]	Dynamic panel[b]	Fixed effects[a]	Dynamic panel[b]	Fixed effects[a]	Dynamic panel[b]
	[1]	[2]	[3]	[4]	[5]	[6]
Election-year dummy[c]	–0.809**	–0.828**	–1.215**	–1.191***	–0.305	–0.217
	(0.390)	(0.356)	(0.538)	(0.406)	(0.725)	(0.743)
RGDP per capita growth	0.002	–0.003	0.081*	0.088**	–0.011	–0.005
	(0.024)	(0.030)	(0.042)	(0.040)	(0.026)	(0.030)
Log of RGDP per capita	–0.177	–0.278	3.478	4.742*	–2.490	–4.034**
	(1.153)	(1.201)	(2.723)	(2.886)	(1.911)	(1.816)
Trade openness	–0.002	–0.001	–0.006	–0.003	–0.019	–0.013*
	(0.006)	(0.005)	(0.010)	(0.007)	(0.012)	(0.007)
Total population	0.001	0.016	0.311**	0.427*	0.063	0.009
	(0.050)	(0.066)	(0.133)	(0.220)	(0.071)	(0.082)
Age dependency ratio	–0.110***	–0.130***	–0.127**	–0.130***	–0.125	–0.108*
	(0.035)	(0.026)	(0.054)	(0.019)	(0.076)	(0.057)
N observations	465	427	236	216	229	211
N countries	28	28	14	14	14	14
2nd order test[d]	.	0.392	.	0.684	.	0.933
Sargan test[e]	.	0.280	.	0.506	.	0.142
Adj. R-square	0.601	.	0.711	.	0.440	.

Note: The dependent variable is the central government budget balance as a percentage of GDP. [a]Each regression includes a constant, one lag of the dependent variable, country dummies and year dummies. [b]Each regression is estimated using the one-step Arellano-Bond estimator and includes a constant and year dummies. Lagged log of real GDP per capita, trade openness, total population and age-dependency ratio are assumed to be strictly exogenous, while the lag of real GDP per capita growth rate is assumed to be predetermined. Robust standard errors are in parentheses. [c]Election-year dummy takes the value 1 in the year of election no matter when in the year the election took place. [d]*P-values*> 0.05 implies that the error term in the regression is not serially correlated. [e]*P-values*> 0.05 implies that the instruments are not correlated with the error term. ***, ** and * denotes significance at the 1, 5 and 10 percent level respectively.

3.4.1 Results with an Alternative Designation of Election Year

Past studies have noticed that instead of capturing pre-electoral effect, the election-year dummy may for the most part capture the period after an election, especially when the election took place early in the year (Akhmedov & Zhuravskaya 2004). To test whether the effect of elections on the central government budget balance under non-democratic regimes is sensitive to such concern, regressions in Table 3.2 are repeated, but with an alternative designation for the election-year dummy. In Table 3.3, the binary variable for election years takes the value 1 in the year preceding an election if the election took place before July, and in the year of election if the election took place in July or later.

The results reported in Table 3.4 suggest no evidence for the concern described above. In columns 1–4, where the sample includes all autocracies or only shallow autocracies, the coefficients of the election-year dummy remain significant. Meanwhile, in columns 5–6, where only deep autocracies are covered in the sample, the converse remains true. Further tests using different months as a threshold for the election-year dummy indicate that the pattern of the relationship between elections and the GDP share of the central government budget balance is robust to the designation of the election-year dummy.

Table 3.4 The Effects of Elections on Budget Balance under Non-democratic Regimes; Results with an Alternative Designation of Election Year

	Full sample		Shallow autocracies		Deep autocracies	
	Fixed effects[a]	Dynamic panel[b]	Fixed effects[a]	Dynamic panel[b]	Fixed effects[a]	Dynamic panel[b]
	[1]	[2]	[3]	[4]	[5]	[6]
Election-year dummy[c]	–1.136**	–1.113***	–1.423**	–1.487***	–0.463	–0.009
	(0.450)	(0.366)	(0.555)	(0.355)	(0.790)	(0.584)
RGDP per capita growth	0.023	0.027	0.084**	0.092**	0.018	0.025
	(0.025)	(0.033)	(0.041)	(0.038)	(0.028)	(0.034)
Log of RGDP per capita	–0.017	–0.398	2.926	4.343	–1.990	–3.868**
	(1.074)	(1.198)	(2.789)	(2.868)	(1.858)	(1.674)
Trade openness	0.009	0.008	–0.006	–0.003	0.003	0.002
	(0.007)	(0.006)	(0.010)	(0.007)	(0.016)	(0.009)
Total population	0.006	0.077	0.285**	0.409*	0.011	0.161*
	(0.047)	(0.065)	(0.135)	(0.217)	(0.083)	(0.095)
Age dependency ratio	–0.073**	–0.117***	–0.135**	–0.136***	–0.028	–0.038
	(0.032)	(0.025)	(0.056)	(0.019)	(0.051)	(0.043)
N observations	507	463	236	216	271	247
N countries	31	31	14	14	17	17
2nd order test[d]	.	0.719	.	0.549	.	0.184
Sargan test[e]	.	0.250	.	0.592	.	0.160
Adj. R-square	0.584	.	0.715	.	0.396	.

Note: The dependent variable is the central government budget balance as a percentage of GDP. [a]Each regression includes a constant, one lag of the dependent variable, country dummies and year dummies. [b]Each regression is estimated using the one-step Arellano-Bond estimator and includes a constant and year dummies. Lagged log of real GDP per capita, trade openness, total population and age-dependency ratio are assumed to be strictly exogenous, while the lag of real GDP per capita growth rate is assumed to be predetermined. Robust standard errors are in parentheses. [c]Election-year dummy takes the value 1 in the preceding year if an election took place before July, and in the year of election if the election took place in July or later. [d]*P-values*> 0.05 implies that the error term in the regression is not serially correlated. [e]*P-values*> 0.05 implies that the instruments are not correlated with the error term. ***, ** and * denotes significance at the 1, 5 and 10 percent level respectively.

3.4.2 Further Results

3.4.2.1 Election Types and Government Systems

Elections in this chapter refer either to executive or legislative elections depending on whether a country adopts a presidential, parliamentary or mixed-government system. In this sense, the effect of elections on the central government budget balance as a percentage of GDP may be bound by the prevailing system of government (see, for example, Persson & Tabellini 2003).

Table 3.5 The Effects of Elections on Budget Balance under Non-democratic Regimes; Results for Executive versus Legislative Elections

	Full sample		Shallow autocracies		Deep autocracies	
	Fixed effects[a]	Dynamic panel[b]	Fixed effects[a]	Dynamic panel[b]	Fixed effects[a]	Dynamic panel[b]
	[1]	[2]	[3]	[4]	[5]	[6]
Execu elect year dummy[c]	–0.757*	–0.781*	–0.920	–0.944**	–0.534	–0.446
	(0.442)	(0.446)	(0.585)	(0.399)	(0.811)	(0.868)
Legis elect year dummy[c]	–0.895	–0.861**	–1.795	–1.680***	0.719	1.154
	(1.005)	(0.427)	(1.247)	(0.274)	(1.258)	(0.913)
RGDP per capita growth	0.001	0.008	0.082*	0.088**	–0.012	0.006
	(0.022)	(0.028)	(0.042)	(0.040)	(0.026)	(0.029)
Log of RGDP per capita	0.308	–0.237	3.376	4.639	–1.924	–4.318***
	(1.123)	(1.255)	(2.766)	(2.884)	(1.978)	(1.640)
Trade openness	0.002	0.003	–0.005	–0.003	–0.017	–0.009
	(0.007)	(0.006)	(0.010)	(0.007)	(0.013)	(0.009)
Total population	0.009	0.082	0.303**	0.419*	0.041	0.183*
	(0.054)	(0.071)	(0.137)	(0.220)	(0.087)	(0.106)
Age dependency ratio	–0.070**	–0.114***	–0.128**	–0.131***	–0.028	–0.045
	(0.033)	(0.026)	(0.055)	(0.019)	(0.056)	(0.041)
N observations	486	445	236	216	250	229
N countries	29	29	14	14	15	15
2nd order test[d]	.	0.407	.	0.647	.	0.812
Sargan test[e]	.	0.211	.	0.527	.	0.093
Adj. R-square	0.591	.	0.701	.	0.427	.

Note: The dependent variable is the central government budget balance as a percentage of GDP. [a]Each regression includes a constant, one lag of the dependent variable, country dummies and year dummies. [b]Each regression is estimated using the one-step Arellano-Bond estimator and includes a constant and year dummies. Lagged log of real GDP per capita, trade openness, total population and age-dependency ratio are assumed to be strictly exogenous, while the lag of real GDP per capita growth rate is assumed to be predetermined. Robust standard errors are in parentheses. [c]Election-year dummies take the value 1 in the year of election no matter when in the year the election took place. [d]*P-values*> 0.05 implies that the error term in the regression is not serially correlated. [e]*P-values*> 0.05 implies that the instruments are not correlated with the error term. ***, ** and * denotes significance at the 1, 5 and 10 percent level respectively.

To test whether the existence of electoral budget cycles under non-democratic regimes is subject to the types of election (and, less directly, to the systems of government), regressions in Table 3.5 split the election-year dummy into two separate dummies: executive and legislative election-year dummies. The results indicate that executive elections are more likely to have a significant effect on the central government budget balance as a percentage of GDP. The coefficients of executive elections are significant in columns 1–2 and 4, while the coefficients of legislative election-year dummies are significant only in columns 2 and 4. In columns 5–6, the coefficients of executive and legislative election-year dummies are, without exception, proved to be insignificant.

3.4.2.2 Predetermined Election Dates

Thus far, it is assumed that election dates are predetermined. However, sometimes an incumbent decides to delay an election or call for an early election. It is also likely that an election takes place extraordinarily beyond normal expectations.[11] The effect of elections on the share of the central government budget balance in GDP may be, therefore, conditional on whether the elections are predetermined or not.

To discern the effect of predetermined elections from the effect of other elections that are not exogenously fixed by law, regressions in Table 3.6 include two separated dummies—regular and irregular election-year dummies—instead of the single election-year dummy. Based on the NELDA dataset (Hyde & Marinov 2012), an election is coded regular if it was held according to its scheduled date and irregular if it was delayed, held earlier than its scheduled date, or extraordinary in that no political actors have shared expectations about when the election would be held.

[11] For example, no one had expected that Indonesia would have an election in 1999, at least until the end of May 1998 when President Soeharto stepped down.

Table 3.6 The Effects of Elections on Budget Balance under Non-democratic Regimes; Results for Regular versus Irregular Elections

	Full sample		Shallow autocracies		Deep autocracies	
	Fixed effects[a]	Dynamic panel[b]	Fixed effects[a]	Dynamic panel[b]	Fixed effects[a]	Dynamic panel[b]
	[1]	[2]	[3]	[4]	[5]	[6]
Regul elect year dummy[c]	–1.017**	–0.883**	–1.431**	–1.426**	–0.581	–0.060
	(0.467)	(0.394)	(0.655)	(0.573)	(0.896)	(0.715)
Irreg elect year dummy[c]	–0.372	–0.644	–0.676	–0.614	–0.143	–0.525
	(0.638)	(0.703)	(0.766)	(0.448)	(1.174)	(1.291)
RGDP per capita growth	0.002	0.008	0.084**	0.091**	0.011	0.005
	(0.023)	(0.028)	(0.042)	(0.039)	(0.026)	(0.029)
Log of RGDP per capita	0.292	–0.230	3.347	4.632	–1.957	–4.362***
	(1.121)	(1.277)	(2.763)	(2.919)	(1.987)	(1.665)
Trade openness	0.002	0.003	–0.006	–0.003	–0.016	–0.009
	(0.007)	(0.006)	(0.010)	(0.007)	(0.013)	(0.010)
Total population	0.009	0.082	0.300**	0.421*	–0.040	0.183*
	(0.054)	(0.071)	(0.137)	(0.218)	(0.088)	(0.107)
Age dependency ratio	–0.068**	–0.113***	–0.125**	–0.127***	–0.027	–0.045
	(0.032)	(0.025)	(0.053)	(0.018)	(0.056)	(0.041)
N observations	486	445	236	216	250	229
N countries	29	29	14	14	15	15
2nd order test[d]	.	0.407	.	0.711	.	0.755
Sargan test[e]	.	0.211	.	0.493	.	0.093
Adj. R-square	0.593	.	0.710	.	0.427	.

Note: The dependent variable is the central government budget balance as a percentage of GDP. [a]Each regression includes a constant, one lag of the dependent variable, country dummies and year dummies. [b]Each regression is estimated using the one-step Arellano-Bond estimator and includes a constant and year dummies. Lagged log of real GDP per capita, trade openness, total population and age dependency ratio are assumed to be strictly exogenous, while the lag of real GDP per capita growth rate is assumed to be predetermined. Robust standard errors are in parentheses. [c]Election-year dummies take the value 1 in the year of election no matter when in the year the election took place. [d]*P-values*> 0.05 implies that the error term in the regression is not serially correlated. [e]*P-values*> 0.05 implies that the instruments are not correlated with the error term. ***, ** and * denotes significance at the 1, 5 and 10 percent level respectively.

The results for regular elections suggest quite a similar pattern as the basic results in Table 3.2. In columns 1–4, where the sample includes all autocracies or only shallow autocracies, the coefficients of the regular election-year dummy are always significant at the 5 percent level. In columns 5–6, where the sample comprises only deep autocracies, the coefficients of the regular election-year dummy are not significant. By contrast, the results for irregular elections suggest a very different pattern. Irrespective of the countries included in the sample and the model used in the estimations, the coefficients of the irregular election-year dummy are never statistically significant.

This can be interpreted in one of two ways. First, in contrast to regular elections, which offer an incumbent with immense chances to manipulate the budget, irregular elections provide the incumbent with very limited time between when the election is called and when it is held. Second, in favourable moments, an incumbent deliberately chooses to delay elections or to call early elections even if it means that they have to waive budget manipulation. Thus, the delays of an election, or the calls for an early election, are seen as strategies substitutable with budget manipulation.

3.4.2.3 International Scrutiny

In their recent paper, Hyde and O'Mahony (2010) point out the importance of international scrutiny of budget balance. Monitoring by international observers increases the costs of committing electoral fraud and, hence, makes budget manipulation a more attractive option for an incumbent. By contrast, an engagement with the IMF reduces the chance of manipulating the budget. The IMF requires countries entering into its programmes to adopt sustainable macroeconomic policies, which in many cases implies a more disciplined fiscal policy and a cut in the budget deficit (Fischer 2004).

To test whether the relationship between elections and the GDP share of the central government budget balance is contingent upon the presence of international observers, in Table 3.7, the election-year dummy is split into two: observed and unobserved. Following Hyde (2006), an election is coded observed if at least one official delegation of foreign observers (friendly missions do not count) attended and directly monitored the election. Otherwise, the election is coded unobserved.

Table 3.7 The Effects of Elections on Budget Balance under Non-democratic Regimes; Results for Observed versus Unobserved Elections

	Full sample		Shallow autocracies		Deep autocracies	
	Fixed effects[a]	Dynamic panel[b]	Fixed effects[a]	Dynamic panel[b]	Fixed effects[a]	Dynamic panel[b]
	[1]	[2]	[3]	[4]	[5]	[6]
Obser elect year dummy[c]	–0.749	–0.919*	–1.105	–1.043***	–0.053	–0.023
	(0.524)	(0.547)	(0.692)	(0.399)	(0.897)	(0.901)
Unobs elect year dummy[c]	–0.831	–0.679**	–1.298*	–1.303**	–0.899	–0.644
	(0.550)	(0.326)	(0.770)	(0.511)	(0.938)	(0.779)
RGDP per capita growth	0.000	0.008	0.082**	0.089**	–0.012	0.006
	(0.022)	(0.028)	(0.042)	(0.038)	(0.026)	(0.029)
Log of RGDP per capita	0.309	–0.227	3.480	4.746	–2.029	–4.410***
	(1.123)	(1.261)	(2.724)	(2.887)	(1.992)	(1.671)
Trade openness	0.002	0.003	–0.006	–0.003	–0.009	–0.008
	(0.007)	(0.006)	(0.010)	(0.007)	(0.017)	(0.009)
Total population	0.009	0.082	0.310**	0.426*	0.042	0.182
	(0.054)	(0.071)	(0.134)	(0.221)	(0.088)	(0.107)
Age dependency ratio	–0.070**	–0.114***	–0.128**	–0.131***	–0.029	–0.044
	(0.031)	(0.025)	(0.055)	(0.018)	(0.055)	(0.041)
N observations	486	445	236	216	250	229
N countries	29	29	14	14	15	15
2nd order test[d]	.	0.406	.	0.685	.	0.795
Sargan test[e]	.	0.208	.	0.511	.	0.097
Adj. R-square	0.593	.	0.709	.	0.428	.

Note: The dependent variable is the central government budget balance as a percentage of GDP. [a]Each regression includes a constant, one lag of the dependent variable, country dummies and year dummies. [b]Each regression is estimated using the one-step Arellano-Bond estimator and includes a constant and year dummies. Lagged log of real GDP per capita, trade openness, total population and age-dependency ratio are assumed to be strictly exogenous, while the lag of real GDP per capita growth rate is assumed to be predetermined. Robust standard errors are in parentheses. [c]Election-year dummies take the value 1 in the year of election no matter when in the year the election took place. [d]*P-values*> 0.05 implies that the error term in the regression is not serially correlated. [e]*P-values*> 0.05 implies that the instruments are not correlated with the error term. ***, ** and * denote significance at a 1, 5 and 10 percent level.

Interestingly, the results are almost the opposite of Hyde and O'Mahony's (2010) prediction. Rather than observed elections, unobserved elections appear more likely to induce electoral budget cycles. The coefficients on unobserved elections are significant in columns 2–4, while the coefficients on observed elections are significant only in column 2 and 4, where the regressionsare estimated using the Arellano-Bond dynamic panel GMM.

Table 3.8 The Effects of Elections on Budget Balance under Non-democratic Regimes; Results for Elections with versus without IMF Programmes

	Full sample		Shallow autocracies		Deep autocracies	
	Fixed effects[a]	Dynamic panel[b]	Fixed effects[a]	Dynamic panel[b]	Fixed effects[a]	Dynamic panel[b]
	[1]	[2]	[3]	[4]	[5]	[6]
D. elect with the IMF[c]	–0.708	–0.996*	–1.421*	–1.361**	0.596	0.294
	(0.577)	(0.589)	(0.848)	(0.546)	(0.976)	(0.971)
D. elect without the IMF[c]	–0.975**	–0.845**	–1.311*	–1.343***	–1.399	–0.972
	(0.508)	(0.359)	(0.688)	(0.397)	(1.090)	(1.138)
RGDP per capita growth	0.001	0.008	0.083**	0.090**	0.010	0.006
	(0.022)	(0.027)	(0.041)	(0.038)	(0.026)	(0.029)
Log of RGDP per capita	0.305	–0.218	3.589	4.884*	–1.919	–4.277***
	(1.124)	(1.263)	(2.732)	(2.853)	(2.006)	(1.631)
Trade openness	0.002	0.003	–0.006	–0.003	–0.014	–0.007
	(0.007)	(0.006)	(0.010)	(0.007)	(0.013)	(0.010)
Total population	0.009	0.083	0.318**	0.437**	–0.037	0.177
	(0.054)	(0.072)	(0.135)	(0.220)	(0.088)	(0.109)
Age dependency ratio	–0.071**	–0.115***	–0.126**	–0.130***	–0.027	–0.044
	(0.033)	(0.025)	(0.054)	(0.018)	(0.056)	(0.041)
N observations	486	445	236	216	250	229
N countries	29	29	14	14	15	15
2nd order test[d]	.	0.406	.	0.699	.	0.912
Sargan test[e]	.	0.205	.	0.503	.	0.084
Adj. R-square	0.594	.	0.710	.	0.433	.

Note: The dependent variable is the central government budget balance as a percentage of GDP. [a]Each regression includes a constant, one lag of the dependent variable, country dummies and year dummies. [b]Each regression is estimated using the one-step Arellano-Bond estimator and includes a constant and year dummies. Lagged log of real GDP per capita, trade openness, total population and age-dependency ratio are assumed to be strictly exogenous, while the lag of real GDP per capita growth rate is assumed to be predetermined. Robust standard errors are in parentheses. [c]Election-year dummies take the value 1 in the year of election no matter when in the year the election took place. [d]*P-values*> 0.05 implies that the error term in the regression is not serially correlated. [e]*P-values*> 0.05 implies that the instruments are not correlated with the error term. ***, ** and * denote significance at a 1, 5 and 10 percent level.

In Table 3.8, the election-year dummy is split into two dummies: one for elections that take place concurrently with IMF programme participation and another for elections that are held without the concomitant presence of the IMF. The results for the sample including all autocracies or only shallow autocracies indicate that budget cycles exist even when elections are held concurrently with IMF programme participation. Meanwhile, the results for the sample including only deep autocracies indicate that electoral budget cycles are absent regardless of whether the elections take place with the concomitant presence of the IMF or not.

3.5 Conclusion

This chapter examines the relationship between elections and government budget balance under non-democratic regimes. The results provide evidence that electoral budget cycles exist under non-democratic regimes. The effect of elections on the GDP share of the central government budget balance is significant and robust to a number of variations in control variables, estimation models, sample selection criteria and designations of election-year dummy. The results also provide evidence that the persistence of budget cycles under non-democratic regimes is driven by the subsample of countries with less distance from democracy (shallow autocracies). The effect of elections on the share of the central government budget balance in GDP is under no circumstances significant when estimations include only the subsample of countries with greater distance from democracy (deep autocracies). Further, the results provide evidence that there tends to be no difference in the pattern of the effect of executive versus legislative elections, the effect of observed versus unobserved elections, and the effect of elections held with the concomitant presence of the IMF versus elections held without it. However, there exists a difference in the pattern of the effect of regular versus irregular elections.

Findings in this chapter, in combination with findings from earlier works that electoral budget cycles are driven by the experience of newly democratised countries (Brender & Drazen 2005), suggest that the relationship between electoral budget cycles and the level of democracy is hill-shaped. Electoral budget cycles are less likely to take place under the extreme regimes of deep autocracy and old democracy, but more likely to arise under shallow autocracy and new democracy. Further empirical study should examine this hypothesis more directly.

Appendix 3.1

Table A3.1.1 Variable Definitions and Sources

Government budget balance	- Central government budget balance as a percentage of total GDP at current prices. - Calculated using the items of cash surplus/deficit and total GDP at current prices in the International Financial Statistics(IMF 2011) or taken from the World Development Indicator (World Bank 2011).
Election-year dummy	- Binary variable: coded 1 for the years in which a competitive election took place; 0 otherwise. - Constructed using election data from Hyde and Marinov (2012) and the six-fold regime classification from Cheibub, Gandhi and Vreeland (2010). - Refer to executive elections for countries with a directly elected presidential system - Refer to legislative elections for countries with an indirectly elected presidential system, countries with a parliamentary system, or countries with mixed government system whose effective leader is a prime minister, a premier or a chancellor.
Executive election-year dummy	- Binary variable: coded 1 for the years in which a competitive presidential election took place; 0 otherwise. - Constructed using election data from Hyde and Marinov (2012) and the six-fold regime classification from Cheibub, Gandhi and Vreeland (2010).
Legislative election-year dummy	- Binary variable: coded 1 for the years in which a competitive parliamentary election took place; 0 otherwise. - Constructed using election data from Hyde and Marinov (2012) and the six-fold regime classification from Cheibub, Gandhi and Vreeland (2010).
Regular election-year dummy	- Binary variable: coded 1 for the years in which a competitive regular election took place; 0 otherwise. - Constructed using election data from Hyde and Marinov (2012) and the six-fold regime classification from Cheibub, Gandhi and Vreeland (2010).
Irregular election-year dummy	- Binary variable: coded 1 for the years in which a competitive irregular election took place; 0 otherwise. - Constructed using election data from Hyde and Marinov (2012) and the six-fold regime classification from Cheibub, Gandhi and Vreeland (2010).
Observed election-year dummy	- Binary variable: coded 1 for the years in which a competitive election took place and was attended by international observers; 0 otherwise. - Constructed using election data from Hyde and Marinov (2012), the six-fold regime classification from Cheibub, Gandhi and Vreeland (2010), and information from Hyde (2006).
Unobserved election-year dummy	- Binary variable: coded 1 for the years in which a competitive election took place and was not attended by international observers; 0 otherwise. - Constructed using election data from Hyde and Marinov (2012), the six-fold regime classification from Cheibub, Gandhi and Vreeland (2010), and information from Hyde (2006).

Table A3.1 Variable definitions and sources *(continued from previous page)*

Dummy for elections years with concurrent IMF programme	- Binary variable: coded 1 for the years in which a competitive election took place with concurrent IMF programme participation; 0 otherwise. - Constructed using election data from Hyde and Marinov (2012), the six-fold regime classification from Cheibub, Gandhi and Vreeland (2010), and information from Hyde (2006).
Dummy for elections years without concurrent IMF programme	- Binary variable: coded 1 for the years in which a competitive election took place without any concurrent IMF programme participation; 0 otherwise. - Constructed using election data from Hyde and Marinov (2012), the six-fold regime classification from Cheibub, Gandhi and Vreeland (2010), and information from Hyde (2006).
Log of real GDP per capita	- The log of purchasing-power-parity-converted GDP per capita at 2005 constant prices. - Calculated using data from Heston, Summers and Aten (2011)
Real GDP per capita growth	- The annual growth rate of purchasing-power-parity-converted GDP per capita at 2005 constant prices. - Calculated using data from Heston, Summers and Aten (2011)
Trade openness	- The values of export plus import as a percentage of GDP at 2005 constant prices. - Taken from Heston, Summers and Aten (2011).
Total population	- Total number of estimated population (in million people). - Calculated using data from the United Nation (2011a).
Age-dependency ratio.	- The ratio of population aged 0–14 and 65+ to 100 population aged 15–64. - Interpolated into yearly using data from the United Nation (2011b).

Appendix 3.2

Table A3.2.1 Results for Table 3.4 with More Stringent Criteria for Sample Selection

	Full sample		Shallow autocracies		Deep autocracies	
	Fixed effects[a]	Dynamic panel[b]	Fixed effects[a]	Dynamic panel[b]	Fixed effects[a]	Dynamic panel[b]
	[1]	[2]	[3]	[4]	[5]	[6]
Election-year dummy[c]	−1.208***	−1.189***	−1.423**	−1.487***	−0.544	−0.150
	(0.466)	(0.381)	(0.555)	(0.355)	(0.900)	(0.638)
RGDP per capita growth	0.024	0.023	0.084**	0.092**	0.016	0.017
	(0.027)	(0.035)	(0.041)	(0.038)	(0.028)	(0.037)
Log of RGDP per capita	−0.308	−0.372	2.926	4.343	−2.313	−3.193*
	(1.115)	(1.123)	(2.789)	(2.868)	(1.856)	(1.726)
Trade openness	0.005	0.006	−0.006	−0.003	−0.002	−0.001
	(0.007)	(0.006)	(0.010)	(0.007)	(0.017)	(0.012)
Total population	0.011	0.022	0.285**	0.409*	−0.084	0.026
	(0.050)	(0.062)	(0.135)	(0.217)	(0.076)	(0.086)
Age dependency ratio	−0.106***	−0.129***	−0.135**	−0.136***	−0.102	−0.078
	(0.034)	(0.024)	(0.056)	(0.019)	(0.068)	(0.051)
N observations	483	443	236	216	247	227
N countries	30	30	14	14	16	16
2nd order test[d]	.	0.715	.	0.549	.	0.153
Sargan test[e]	.	0.313	.	0.592	.	0.215
Adj. R-square	0.588	.	0.715	.	0.382	.

Note: The dependent variable is the central government budget balance as a percentage of GDP. [a]Each regression includes a constant, one lag of the dependent variable, country dummies and year dummies. [b]Each regression is estimated using the one-step Arellano-Bond estimator and includes a constant and year dummies. Lagged log of real GDP per capita, trade openness, total population and age-dependency ratio are assumed to be strictly exogenous, while the lag of real GDP per capita growth rate is assumed to be predetermined. Robust standard errors are in parentheses. [c]Election-year dummy takes the value 1 in the preceding year if an election took place before July, and in the year of election if the election took place in July or later. [d]*P-values*> 0.05 implies that the error term in the regression is not serially correlated. [e]*P-values*> 0.05 implies that the instruments are not correlated with the error term. ***, ** and * denotes significance at the 1, 5 and 10 percent level respectively.

Table A3.2.2 Results for Table 3.4 with April as a Threshold for the Election-year Dummy

	Full sample		Shallow autocracies		Deep autocracies	
	Fixed effects[a]	Dynamic panel[b]	Fixed effects[a]	Dynamic panel[b]	Fixed effects[a]	Dynamic panel[b]
	[1]	[2]	[3]	[4]	[5]	[6]
Election-year dummy[c]	–0.777**	–0.764**	–1.314**	–1.307***	–0.258	0.142
	(0.395)	(0.322)	(0.509)	(0.344)	(0.803)	(0.584)
RGDP per capita growth	0.020	0.027	0.085**	0.091**	0.012	0.024
	(0.024)	(0.032)	(0.041)	(0.040)	(0.027)	(0.034)
Log of RGDP per capita	0.055	–0.451	3.227	4.583	–2.114	–4.112**
	(1.080)	(1.267)	(2.753)	(2.886)	(1.923)	(1.699)
Trade openness	0.004	0.006	–0.006	–0.004	–0.009	–0.004
	(0.007)	(0.006)	(0.010)	(0.007)	(0.014)	(0.009)
Total population	–0.006	0.068	0.296**	0.416*	–0.006	0.163*
	(0.052)	(0.069)	(0.133)	(0.217)	(0.086)	(0.099)
Age dependency ratio	–0.082***	–0.122***	–0.133**	–0.132***	–0.047	–0.048
	(0.031)	(0.024)	(0.055)	(0.019)	(0.052)	(0.039)
N observations	523	477	236	216	287	261
N countries	32	32	14	14	18	18
2nd order test[d]	.	0.799	.	0.628	.	0.167
Sargan test[e]	.	0.219	.	0.539	.	0.136
Adj. R-square	0.584	.	0.713	.	0.412	.

Note: The dependent variable is the central government budget balance as a percentage of GDP. [a]Each regression includes a constant, one lag of the dependent variable, country dummies and year dummies. [b]Each regression is estimated using the one-step Arellano-Bond estimator and includes a constant and year dummies. Lagged log of real GDP per capita, trade openness, total population and age-dependency ratio are assumed to be strictly exogenous, while the lag of real GDP per capita growth rate is assumed to be predetermined. Robust standard errors are in parentheses. [c]Election-year dummy takes the value 1 in the preceding year if an election took place before April, and in the year of election if the election took place in April or later. [d]*P-values*> 0.05 implies that the error term in the regression is not serially correlated. [e]*P-values*> 0.05 implies that the instruments are not correlated with the error term. ***, ** and * denotes significance at the 1, 5 and 10 percent level respectively.

Table A3.2.3 Results for Table 3.4 with April as a Threshold for the Election-year Dummy and More Stringent Criteria for Sample Selection

	Full sample		Shallow autocracies		Deep autocracies	
	Fixed effects[a]	Dynamic panel[b]	Fixed effects[a]	Dynamic panel[b]	Fixed effects[a]	Dynamic panel[b]
	[1]	[2]	[3]	[4]	[5]	[6]
Election-year dummy[c]	–0.777**	–0.774**	–1.314**	–1.307***	–0.138	0.196
	(0.390)	(0.326)	(0.509)	(0.344)	(0.816)	(0.632)
RGDP per capita growth	0.022	0.024	0.085**	0.091**	0.012	0.016
	(0.026)	(0.035)	(0.041)	(0.040)	(0.027)	(0.035)
Log of RGDP per capita	–0.296	–0.454	3.227	4.583	–2.620	–3.517*
	(1.127)	(1.206)	(2.753)	(2.886)	(1.878)	(1.804)
Trade openness	0.001	0.004	–0.006	–0.004	–0.011	–0.006
	(0.007)	(0.006)	(0.010)	(0.007)	(0.015)	(0.011)
Total population	–0.006	0.006	0.296**	0.416*	–0.117	0.014
	(0.050)	(0.063)	(0.133)	(0.217)	(0.078)	(0.081)
Age dependency ratio	–0.117***	–0.135***	–0.133**	–0.132***	–0.129*	–0.090*
	(0.034)	(0.024)	(0.055)	(0.019)	(0.067)	(0.047)
N observations	499	457	236	216	263	241
N countries	31	31	14	14	17	17
2nd order test[d]	.	0.812	.	0.628	.	0.124
Sargan test[e]	.	0.281	.	0.539	.	0.203
Adj. R-square	0.589	.	0.713	.	0.414	.

The dependent variable is the central government budget balance as a percentage of GDP. [a]Each regression includes a constant, one lag of the dependent variable, country dummies and year dummies. [b]Each regression is estimated using the one-step Arellano-Bond estimator and includes a constant and year dummies. Lagged log of real GDP per capita, trade openness, total population and age-dependency ratio are assumed to be strictly exogenous, while the lag of real GDP per capita growth rate is assumed to be predetermined. Robust standard errors are in parentheses. [c]Election-year dummy takes the value 1 in the preceding year if an election took place before April, and in the year of election if the election took place in April or later. [d]*P-values*> 0.05 implies that the error term in the regression is not serially correlated. [e]*P-values*> 0.05 implies that the instruments are not correlated with the error term. ***, ** and * denotes significance at the 1, 5 and 10 percent level respectively.

Chapter 4: Food Prices and Political Survival

4.1 Introduction

The dramatic food price increases within the last few years have sparked protests in numerous countries. From Bangladesh to Ivory Coast, some of these protests have turned out to be violent political unrests, with many protesters killed, injured or detained (see, for example, Earth Policy Institute 2008). In Haiti, the Parliament dismissed Prime Minister Jacques Edouard Alexis (Delva & Loney 2008). In the Middle East and North Africa, the situations went more serious and resulted in the deposal of Tunisia's 23-year-long-standing President Zine El Abidine Ben Ali and Egypt's 29-year-long-ruling President Hosni Mubarak (Amara & Lowe 2011; Paul 2011; Evans-Pritchard 2011).

While no single cause can be easily pinpointed, such a phenomenon roughly depicts the important role that food prices have in affecting political survival. However, notwithstanding its intuitive appeal, there is hitherto no rigorous analysis on the relationship between variation in food prices and the occurrence of national leader exits. Several recent works have looked at the political consequences of food prices (Hendrix, Haggard & Magaloni 2009; Bellemare 2011; Arezki & Bruckner 2011), but they were limited to the incidence of anti-government demonstrations and riots and did not cover changes in national leaders. Meanwhile, most of the previous literature on the economic determinants of political survival has focused on macroeconomic factors such as inflation, unemployment and economic growth (for example, Warwick 1992; Palmer & Whitten 1999; Burke 2012). The only non-macroeconomic factor that has been linked to political survival is oil prices (see, Smith 2004; Cuaresma, Oberhofer & Raschky 2011).

This chapter is aimed at examining the impact of food prices on the survival of national leaders in democratic and non-democratic countries. It uses international food price and and domestic consumption data to compose a monthly country-specific food price index and estimates whether the index is systematically related to the occurrence of national leader exits. Estimations are carried out for a large panel data set of 77 food importing

countries over the period 1961–2009 and control for time-invariant country characteristics and global trends.

The primary finding is that food prices have a robust significant effect on political survival. The effect does not change with changes in the log of real gross domestic product (GDP) per capita or real GDP per capita growth rate. The effect also does not change with changes in the state of democracy. However, once the joint-effect between food prices and the state of democracy is controlled, the effect of food prices on political survival is significant only in democracies and not in non-democratic countries.

The rest of this chapter proceeds as follows. Section 4.2 provides an overview of how food prices may affect political survival. Section 4.3 describes the empirical strategy and data used in the analysis. Section 4.4 discusses the results. Section 4.5 offers conclusions.

4.2 Theoretical Overview

To get an intuition about the relationship between food prices and political survival, consider what happened in France between 1787 and 1789 (see, for example, Furet 1996; Rude & Kaye 2000; Neely 2008). Marked by severe weather (extremely cold winters, hot summers and heavy rains) and poor harvests, this country's relatively rich economy falls into deep crisis. On the one hand, many farmers and peasants experienced reductions in income.[12] On the other hand, the prices of food rose intensely. With an ongoing resentment at high taxes levied to upkeep royal family's lavish lifestyle and a growing sense of awareness of the degrading political orders in general, the increase of food prices was like a lit in a dry forest. It provoked people and generated wide bread protests and riots against King Louis XVI.

[12] As the quantity of food produced was very low, the farmers' gain from price hike is smaller than the income loss due to the decline in quantity sold.

On 5 October 1789, thousands of women marched to Versailles bringing with them a variety of small weapons like pitchforks, pikes and muskets and chanted, "Bread...! Bread...!" This march, which was a response to bread shortages and bread price increase in the marketplaces of Paris, turned to be momentous in escalating the struggle of the revolutionaries who were calling for reforms toward a constitutional monarchy. By the time it reached Versailles, the crowd circumvented the palace. In contrast to earlier revolutionary incidents that failed to coerce King Louis XVI to submit his power to the will of the people,[13] this incident dominated by women demanding bread happened to be successful. On the following day, the crowd forced the King and the Queen to move to Paris as a sign of good faith in addressing the harsh economy. King Louis XVI yet remained inept and was increasingly dismayed by the revolutionaries. In July 1790, a shift from an absolute to a constitutional monarchy took place, ending Louis XVI's authority as a national leader and marking the collapse of the Ancien regime that had ruled France for centuries.

Riots and revolutions are not the only channels through which food prices affect political survival. In democratic economies, citizens are free to express their disappointment, grievance and anger. Democracy also enables a change in the political leadership without massive harms or killings. This moderates the conflicts between citizens and the government and, instead of riots and revolutions, the effect of food prices on political survival is channeled through the regulated mechanisms of elections.

There are at least two reasons why food prices may affect election results and, hence, the political survival of incumbent leaders. First, as suggested by economic voting models, the state of the economy has significant impacts on electoral behavior (see, for example, Hibbs 2006; Lewis-Beck & Stegmaier 2007). Economic upsurges give an advantage to candidates from the incumbent party, whereas economic downturns increase the electoral chances of the opposition (Kramer 1971; Kiewiet & Udell 1998; Bartels & Zaller 2001; Hibbs 2000). Higher food prices imply not only a decrease in people's ability to buy food items, but also a decrease in the purchasing power of their

[13] Earlier revolutionary incidents include the Storming of the Bastille (14 July 1789), the Great Fear (17 July–5 August 1789), the August Decrees (4 August 1789) and the Declaration of the Rights of Man and of the Citizen (26 August 1789).

income in general. While it remains inconclusive whether the impacts of the state of the economy are due to voters' personal economic grievances or their appraisal of broader economic conditions (for example, Kinder & Kiewiet 1979; Grafstein 2009; Ansolabehere, Meredith & Snowberg 2011), the possible effect of food prices remains pertinent. This is because variation in food prices applies to everyone and no difference needs to take place between what an individual faces personally and what she sees in the economy.[14]

The second reason why food prices may affect the results of elections and the survival of incumbent leaders is that, even though voters are rational, imperfect information makes it difficult for them to know exactly the extent to which incumbent leaders are able to manage the economy (Alesina, Roubini & Cohen 1997; Duch & Stevenson 2008). Voters may therefore use variation in food prices as a proxy for leaders' competence.

Bueno de Mesquita et al. (2003) argue that leaders in democratic countries are more susceptible to economic slowdowns than their counterparts in non-democratic countries. Democratic leaders need to not only maintain the support of their inner circles, but larger constituents in the society. This is clearly harder to do under weak economic conditions. Nonetheless, it does not necessarily mean that the effect of food prices will be worse for democratic leaders than non-democratic leaders. The regulated elections under democracy, once again, moderate the relationship between citizens and the governments. Whether the effect that food prices have on political survival differs for rulers in democratic countries and non-democratic countries is an empirical matter.

[14] This is different for example from the case of unemployment in which an individual can be personally employed, but unhappy with the high unemployment rate in her country or vice versa.

4.3 Empirical Estimation

The effect of food prices on political survival is estimated based on the following regression equation

$$D_{i,t} = \beta_0 + \beta_1 ln(foodpindex)_{i,t-1} + \beta_2 X_{i,t-1} + \beta_3 c_i + \beta_4 y_t + e_{i,t} \quad [2.13]$$

where $X_{i,t-1}$ denotes a vector of control variables that will be described later, c_i denotes a vector of country dummies, y_t denotes a vector of year dummies, and $e_{i,t}$ denotes error terms. The dependent variable, $D_{i,t}$, is a dummy for leader exits taking the value 1 if there is a national leader exit in a country i during month t, and 0 otherwise. The dummy covers both regular and irregular exits, including those caused by sickness, resignation, the loss of legislature support, election loss and other incidents that contravene the constitution, conventions or norms in a country, such as a popular revolt, domestic armed rebellion, military coup d'état, and assassination. The dummy, however, excludes leader changes that are caused by natural death or deposition by another state. Data for the leader exit dummy rely primarily on information provided by Goemans, Gleditsch and Chiozza (2009), with minor revisions and more recent updates based on various sources.

The key independent variable is a monthly country-specific food price index. This index covers the prices of several food items weighted differently to capture the idea that different food items can have different impacts in different countries. Mathematically, the index is calculated according to the following arithmetic formula

$$foodpindex_{i,t} = \sum_{j=1}^{J} pindex_{j,t}^{w_{i,t}} \quad [4.2]$$

where $pindex_{j,t}^{w_{i,t}}$ denotes international price index for each single food item j in month t (with January 2010 as the base month) and

$$w_{i,j} = \frac{1}{T}\sum_{t=1}^{T}\left[(p_{j,t}c_{i,jt})/n_{i,t}\right] \quad [4.3]$$

denotes a time-invariant weighting factor, which is equal to the mean ratio of each food item consumption value, pc, to nominal GDP, n. The consumption value is obtained from multiplying an item's international price, p, and its domestic consumptions, c.

Here, the reason for using international prices rather than domestic prices and maintaining a constant rather than variable weighting factor is that domestic prices and domestic concumptions may be subject to internal socio-political dynamics. By using international prices and maintaining the weight constant, endogeneity problem between the food price index and political survival can be avoided.

There are two different practices on the number of items included in a food price index. Burke and Leigh (2010) use a large number of food items, while some other authors include only particular items in the index (Hendrix, Haggard & Magaloni 2009; Bellemare 2011; Arezki & Bruckner 2011). The advantage of including only particular items is that it is more convenience and allows for a more focused analysis on the impacts of major food items. However, it also has its caveats especially when the items included in the index are too restricted. The practice in Hendrix, Haggard and Magaloni (2009) is, perhaps, an example. In the paper analysing the political consequences of food prices, the three authors concentrate only on wheat prices, assuming that wheat prices are highly correlated with the prices of rice and maize. This is obviously unrealistic as the significance of wheat is different for different economies. Hence, in line with that in Arezki and Bruckner (2010), the index in equation [4.2] includes the three most consumed staples providing 60 percent of the human food energy intake, namely rice, wheat and maize (see, for example, Food and Agriculture Organization 1995; von Braun et al. 2010). The index in equation [4.2], yet excludes sugar and meat proposed by Arezki and Bruckner (2010) as there is no specific argument to select them over other food items.

Data for monthly rice and wheat prices are taken from the UNCTAD Commodity Statistics between 1961 and 2009 (United Nations 2011b), whereas monthly maize prices are from the webpage of CIMMYT International Maize and Wheat Improvement

Centre (CIMMYT 2011). In order to retain observations, six missing values in the case of rice prices are filled using linear interpolation. Data for domestic consumption of rice, wheat and maize are from the FAOSTAT's commodity balances (FAO 2011), while for nominal GDP are from the World Development Indicators (World Bank 2011).

The control variables consist of a dummy for whether a country is classed as a transition economy during 1989-1992, a dummy for whether a country is judged as democratic in the previous year, a dummy for whether a leader exit occurs within six months after an election,[15] a dummy for whether a leader exit is attributable to a constitutional term limit, the tenure of the leader at the start of a calendar month and the age of the leader at the start of a calendar year. Besides, the control variables also comprise the log of real GDP per capita and the growth rate of real GDP per capita (both are annual data and lagged by one year). Data for the transition economy dummy are from the Development Research Institute (2009) and for the democracy dummy are from the Polity IV dataset (Marshall, Gurr & Jaggers 2010). To be considered democratic, a country must have a *polity2* score greater than zero. A country whose *polity2* score is zero or negative is judged to be non-democratic. Data for the term limit dummy are mainly from Burke (2012), for leaders' tenure and age are mainly from Goemans, Gleditsch and Chiozza (2009) and for real GDP per capita and its annual growth rate are from the Penn World Table (PWT) (see, Heston, Summers & Aten 2011). Details on the above variables and their sources are provided in the Appendix 4.1.

The regression parameters are estimated using a linear probability model, a conditional logit model and a Cox proportional hazard model. Each of these models allows a fixed effects treatment, making it possible to control for unobservable country characteristics and heterogeneity across years. To account for heteroscedasticity and possible serial correlation, robust standard errors clustered at country level are used.

[15] This is to capture the idea that a swearing ceremony and inauguration of a newly elected leader usually takes place within a few months after the day on which an election was held.

Observations range from January 1961 to December 2009. Leaders that remain in power at the end of 2009 are considered to be right censored. Together with those who died in office of natural causes or those who ceased power due to deposition by another state, these leaders remaining in power at the end of 2009 are given the value 0 instead of 1 for the leader exit dummy.[16]

Sample selection is initially based on the availability of data. Information from the FAOSTAT's commodity balances are then used to calculate each country's average net-export of rice, wheat and maize over 1961-2009 (or over the period where appropriate data are available). By design, only countries whose average net-export is negative for the three selected food items (i.e. only importing countries) are covered in the sample.

4.4 Results

The descriptive statistics provided in Table 4.1 give insights about the characteristics of the data. The total number of observations is 34,976, which consists of 591 leaders from 77 countries.

Table 4.1 Descriptive Statistics

	N obs.	Mean	Std dev.
Food price index	34,976	59.280	24.098
Log of food price index	34,976	4.004	0.399
Δ Food price index	34,976	0.127	3.537
Log of RGDP per capita	34,495	8.043	1.207
RGDP per capita growth rate (rescaled into 1/100 percent)	34,495	0.022	0.068
Transition dummy	34,495	0.002	0.045
Democracy dummy	34,495	0.522	0.500
Post-election dummy	34,495	0.086	0.280
Term limit dummy	34,495	0.004	0.065
Tenure of leader at start of a calendar month (months)	34,495	0.821	0.908
Age of leader at start of a year (rescaled into 1/100 years)	34,495	0.563	0.110

[16] See Bueno de Mesqueta et al. (2003) for the issue of leaders who died of natural cause while in power.

4.4.1 The Basic Results

Table 4.2 columns 1–2 report the results from the linear probability model. In column 1, only the log of food price index is included in the regression along with country dummies and year dummies. In column 2, the regression also includes the log of real GDP per capita, real GDP per capita growth rate, a dummy for transition economy, democracy dummy, post-election dummy, constitutional term limit dummy, tenure of leader and age of leader. The effect that food prices have on political survival is positive and significant, particularly in column 2 where the effects of potential confounding factors are controlled. The estimates for the log of food price index indicate that, holding other things constant, a 1 percentage point increase in the food price index leads to an approximately 0.70 percent increase in the likelihood of a leader exit.

Columns 3–4 present the results from logit model as odds ratios. By definition, only countries with a within-sample variation in the dependent variable are covered in the sample. The effect of food prices on political survival is again significant especially when the regressions include control variables. The odds ratios corresponding to the log of food price index in column 4 indicate that, all else equal, a 1 percent increase in the food price index is associated with an increase in the odds ratios by 2.17 times.

Columns 5–6 report the results from the Cox proportional hazard model. The hazard ratios corresponding to the log of food price index are greater than 1 and statistically significant regardless of whether the regressions include control variables or not. Leaders who experience higher food prices during their time in power are shown to have a worse chance of survival than those experiencing lower food prices. The estimated values in column 6 indicate that a 1 percentage point increase in the food price index, on average, increases the hazard of exit by 1.96 times.

Table 4.2 The Effects of Food Prices on Political Survival

	Period: Jan 1961–Dec 2009					
	Linear prob.	Linear prob.	Logit	Logit	Cox prop. hazard	Cox prop. hazard
	[1]	[2]	[3]	[4]	[5]	[6]
Log of food price index	0.008	0.007*	1.846*	2.171*	1.957**	1.957**
	(0.005)	(0.004)	(0.672)	(0.015)	(0.618)	(0.618)
Log of RGDP per capita		0.001		1.341		1.281
		(0.003)		(0.459)		(0.383)
RGDP per capita growth		–0.025***		0.043***		0.086***
		(0.009)		(0.050)		(0.080)
Transition dummy		0.003		0.582		0.789
		(0.016)		(0.528)		(0.664)
Democracy dummy		–0.004*		0.688*		0.721*
		(0.002)		(0.146)		(0.142)
Post-election dummy		0.034***		6.243***		5.100***
		(0.004)		(0.935)		(1.211)
Term limit dummy		0.974***		+***		33.370***
		(0.006)		(+)		(9.602)
Tenure of leader		–0.000		1.136		
		(0.001)		(0.186)		
Age of leader		0.016		5.111		4.754**
		(0.012)		(5.990)		(3.765)
N observations	34,495	34,495	31,514	31,514	33,992	33,992
N countries	77	77	67	67	77	77
N leaders	582	582	567	567	571	571
N exits	466	466	466	466	457	457
R^2	0.002	0.314	0.014	0.336	.	.

Note: The dependent variable in columns 1–4 is a dummy for leader exits and in columns 5–6 is the duration to a leader exit. Each regression includes a constant, country dummies and year dummies. By definition, the logit model restricts the sample to countries experiencing within-sample variation in the dependent variable. The Cox proportional hazard model treats each leader-spell as an individual subject and only includes leaders in power at the start of the month. The reported values for linear probability model are coefficients, for logit model are odds ratios, and for the Cox proportional hazard model are hazard ratios. Robust standard errors clustered by country are in parentheses. The R^2in columns 1–2 refers to the within-R^2, whereas in columns 3–4 refers to the pseudo-R^2. *, **, *** denotes significance at the 1, 5 and 10 percent level respectively. +The estimated odds ratios for the leader term limit dummy in columns 4 are large, positive and statistically significant.

The results on control variables indicate that variation in the real GDP per capita growth rate is strongly associated with the occurrence of national leader exits. This confirms earlier findings reported in Burke (2012) that economic growth rate has a significant effect on the likelihood of leader exits. By contrast, the log of real GDP per capita does not seem to have any significant relationship with political survival. Irrespective of the estimation model used, the estimates for this variable are not statistically significant. Democracy in general reduces the likelihood of leader exits, but democratic institutions in the forms of elections and term-limit increase the likelihood of leader changes.

4.4.2 Results with the Data Limited to 1961–2004

Regressions in Table 4.2 cover the period January 1961 to December 2009. Different from the years between 1961 and 2004 for which national leader data from Goemans, Gleditsch and Chiozza (2009) are used, later years rely on an own data update based on various sources. To ensure that the conclusions drawn in this chapter are not simply driven by the appended data, regressions in Table 4.3 restrict the analysis to January 1961–December 2004.

Table 4.3 The Effects of Food Prices on Political Survival; Results with the Data Limited to 1961–2004

	Period: Jan 1961–Dec 2004					
	Linear prob.	Linear prob.	Logit	Logit	Cox prop. hazard	Cox prop. hazard
	[1]	[2]	[3]	[4]	[5]	[6]
Log of food price index	0.009*	0.008*	2.063*	2.551*	2.069*	1.996**
	(0.005)	(0.004)	(0.781)	(1.231)	(0.797)	(0.701)
Log of RGDP per capita		0.002		1.436		1.290
		(0.003)		(0.587)		(0.443)
RGDP per capita growth		–0.027***		0.042***		0.087**
		(0.010)		(0.050)		(0.085)
Transition dummy		0.001		0.523		0.676
		(0.158)		(0.506)		(0.614)
Democracy dummy		–0.003		0.747		0.751
		(0.002)		(0.175)		(0.156)
Post-election dummy		0.034***		6.347***		5.253***
		(0.004)		(0.889)		(1.316)
Term limit dummy		0.973***		+***		33.253***
		(0.007)		(+)		(10.290)
Tenure of leader		0.000		1.173		
		(0.001)		(0.191)		
Age of leader		0.015		4.957*		5.025**
		(0.013)		(6.227)		(4.100)
N observations	30,125	30,125	26,813	26,813	29,686	29,686
N countries	77	77	62	62	77	77
N leaders	518	518	497	497	508	508
N exits	406	406	406	406	398	398
R^2	0.002	0.303	0.017	0.330	.	.

Note: The dependent variable in columns 1–4 is a dummy for leader exits and in columns 5–6 is the duration to a leader exit. Each regression includes a constant, country dummies and year dummies. By definition, the logit model restricts the sample to countries experiencing within-sample variation in the dependent variable. The Cox proportional hazard model treats each leader-spell as an individual subject and only includes leaders in power at the start of the month. The reported values for linear probability model are coefficients, for logit model are odds ratios, and for the Cox proportional hazard model are hazard ratios. Robust standard errors clustered by country are in parentheses. The R^2 in columns 1–2 refers to the within-R^2, whereas in columns 3–4 refers to the pseudo-R^2. *, **, *** denotes significance at the 1, 5 and 10 percent level respectively. +The estimated odds ratios for the leader term limit dummy in columns 4 are large, positive and statistically significant.

The results suggest that the relationship between food prices and the occurrence of national leader exits is persistent. In columns 1–2, the coefficients of the log of food price index are positive and statistically significant even when no control variables are included in the regression. In columns 3–6, the odds ratios and the hazard ratios corresponding to the log of food price index are greater than 1 and significant regardless of whether the regressions control for the effects of potential confounding factors or not.

4.4.3 Results with Further Lagged Food Price Index

Intuitively, it is natural to expect that the effect of food prices on political survival takes place with some delays. While a priori there is no clear justification for how long the food price index should be lagged to best capture the delayed effect, regressions in previous tables employ a t–1 log of food price index. To test whether finding in Tables 4.2 would differ with different delayed effects, regressions in Table 4.4 include either a t–2 or a t–3 log of food price index as a regressor.

The results from regressions involving a t–2 log of food price index indicate a stronger relationship between food prices and political survival. Compared to the results reported in Table 4.2 columns 2, 4 and 6, the estimates for the log of food price index in Table 4.4 columns 1–3 are not only greater in magnitude, but also in statistical significance. In columns 4–6, the results from regressions involving a t–3 log of food price index indicate the persistence of the association between food prices and the occurrence of national leader exits, with a magnitude in-between those reported in Table 4.2 and in columns 1–3 of Table 4.4.

Table 4.4 The Effects of Food Prices on Political Survival; Results with Further Lagged Food Price Index

	Food price index: *t*–2			Food price index: *t*–3		
	Linear prob.	Logit	Cox prop. hazard	Linear prob.	Logit	Cox prop. hazard
	[1]	[2]	[3]	[4]	[5]	[6]
Log of food price index	0.011**	3.201**	2.493**	0.009**	2.637**	2.263**
	(0.005)	(1.785)	(0.908)	(0.005)	(1.380)	(0.821)
Log of RGDP per capita	0.001	1.310	1.252	0.001	1.310	1.255
	(0.003)	(0.445)	(0.372)	(0.003)	(0.445)	(0.372)
RGDP per capita growth	–0.025***	0.041***	0.085***	–0.025***	0.041***	0.083***
	(0.009)	(0.047)	(0.078)	(0.009)	(0.046)	(0.076)
Transition dummy	0.004	0.627	0.847	0.004	0.621	0.837
	(0.017)	(0.576)	(0.755)	(0.018)	(0.582)	(0.743)
Democracy dummy	–0.004**	0.663**	0.694**	–0.004**	0.657**	0.692**
	(0.002)	(0.136)	(0.126)	(0.002)	(0.134)	(0.125)
Post-election dummy	0.034***	6.198***	5.083***	0.034***	6.200***	5.032***
	(0.004)	(0.920)	(1.173)	(0.004)	(0.921)	(1.175)
Term limit dummy	0.975***	+***	34.135***	0.975***	+***	34.048***
	(0.006)	(+)	(9.680)	(0.006)	(+)	(9.669)
Tenure of leader	–0.000	1.138		–0.000	1.139	
	(0.001)	(0.187)		(0.001)	(0.189)	
Age of leader	0.017	5.770	5.221**	0.017	5.750	5.165**
	(0.012)	(6.720)	(4.032)	(0.012)	(6.696)	(1.175)
N observations	34,440	31,024	33,877	34,375	30,974	33,884
N countries	77	66	77	77	66	77
N leaders	578	561	568	578	561	568
N exits	463	463	454	463	463	454
R^2	0.316	0.340	.	0.316	0.339	.

Note: The dependent variable in columns 1–2 and 4–5 is a dummy for leader exits and in columns 3 and 6 is the duration to a leader exit. Each regression includes a constant, country dummies and year dummies. By definition, the logit model restricts the sample to countries experiencing within-sample variation in the dependent variable. The Cox proportional hazard model treats each leader-spell as an individual subject and only includes leaders in power at the start of the month. The reported values for linear probability model are coefficients, for logit model are odds ratios, and for the Cox proportional hazard model are hazard ratios. Robust standard errors clustered by country are in parentheses. The R^2 in columns 1 and 4 refers to the within-R^2, whereas in columns 2 and 5 refers to the pseudo-R^2. *, **, *** denotes significance at the 1, 5 and 10 percent level respectively. +The estimated odds ratios for the leader term limit dummy in columns 2 and 4 are large, positive and statistically significant.

4.4.4 The Roles of the State of Democracy

It has been argued that leaders in democratic countries are more susceptible to economic slowdowns than their counterparts in non-democratic countries (Bueno de Mesquita et al. 2003). Democratic leaders need not only to maintain the support of their inner circles, but also larger constituents in the society. This is harder to do under weak economic conditions.

Table 4.5 The Effects of Food Prices on Political Survival; Results with an Interaction Term between the Food Price Index and the Dummy for Democracy

	Interaction: Democracy dummy			Interaction: Non-democracy dummy		
	Linear prob.	Logit	Cox prop. hazard	Linear prob.	Logit	Cox prop. hazard
	[1]	[2]	[3]	[4]	[5]	[6]
Log of food price index	0.006	1.923	1.537	0.008	2.245*	2.034**
	(0.004)	(1.083)	(0.599)	(0.005)	(1.062)	(0.650)
Log of RGDP per capita	0.001	1.305	1.234	0.001	1.305	1.234
	(0.003)	(0.426)	(0.360)	(0.003)	(0.426)	(0.360)
RGDP per capita growth	–0.025***	0.045***	0.091**	–0.025***	0.045***	0.091**
	(0.009)	(0.052)	(0.085)	(0.009)	(0.052)	(0.085)
Transition dummy	0.003	0.581	0.792	0.003	0.581	0.792
	(0.016)	(0.528)	(0.669)	(0.016)	(0.528)	(0.669)
Democracy dummy	–0.011	0.374	0.240			
	(0.015)	(0.589)	(0.293)			
Non-democracy dummy				0.011	2.672	4.170
				(0.015)	(4.208)	(5.089)
Lfpindex*democracy	0.002	1.167	1.324			
	(0.004)	(0.454)	(0.395)			
Lfpindex*non-democracy				–0.002	0.857	0.756
				(0.004)	(0.333)	(0.226)
Post-election dummy	0.034***	6.242***	5.113***	0.034***	6.242***	5.113***
	(0.004)	(0.935)	(1.202)	(0.004)	(0.935)	(1.202)
Term limit dummy	0.974***	+***	33.481***	0.974***	+***	33.481***
	(0.006)	(+)	(9.620)	(0.006)	(+)	(9.620)
Tenure of leader	–0.000	1.139		–0.000	1.139	
	(0.001)	(0.187)		(0.001)	(0.187)	
Age of leader	0. 016	5.153	4.784**	0.016	5.153	4.784**
	(0.012)	(6.024)	(3.795)	(0.012)	(6.024)	(3.795)
N observations	34,495	31,514	33,992	34,495	31,514	33,992
N countries	77	67	77	77	67	77
N leaders	582	567	571	582	567	571
N exits	466	466	457	466	466	457
R^2	0.314	0.336	.	0.314	0.336	.

Note: The dependent variable in columns 1–2 and 4–5 is a dummy for leader exits and in columns 3 and 6 is the duration to a leader exit. Each regression includes a constant, country dummies and year dummies. By definition, the logit model restricts the sample to countries experiencing within-sample variation in the dependent variable. The Cox proportional hazard model treats each leader-spell as an individual subject and only includes leaders in power at the start of the month. The reported values for linear probability model are coefficients, for logit model are odds ratios, and for the Cox proportional hazard model are hazard ratios. Robust standard errors clustered by country are in parentheses. The R^2 in columns 1 and 4 refers to the within-R^2, whereas in columns 2 and 5 refers to the pseudo-R^2. *, **, *** denotes significance at the 1, 5 and 10 percent level respectively. +The estimated odds ratios for the leader term limit dummy in columns 2 and 4 are large, positive and statistically significant.

To test whether the state of democracy moderates the effect that food prices have on political survival, regressions in Table 4.5 include an interaction term between the log of food price index and the dummy for democracy or non-democracy. The non-democracy dummy is similar to democracy dummy, but reversely coded (it takes the value 1 if the democracy dummy is equal to 0, and takes the value 0 otherwise) for the sake of convenience in reporting the regression results. With the presence of the interaction term, the estimates for the log of food price index in columns 1–3 reflect the effect of food prices on political survival under non-democracy, while in columns 4–6 reflect the effect under democracy.[17]

The results reported in columns 1 and 4 indicate that the coefficients of the interaction term between the log of food price index and the dummy for democracy or non-democracy are not statistically significant. In columns 2–3 and 4–6, the ratios of odds and the ratios of hazard that correspond to the interaction term are also not statistically significant, asserting that the effect of food prices on political survival does not change with a change in the state of democracy.

However, the overall results in Table 4.5 indicate that the effect of food prices on political survival is likely only significant in democracies and not in non-democratic countries. The estimates for the log of food price index are significant in columns 5 and 6 where they reflect the effect of food prices on political survival under democracy, but not significant in columns 1–3 where they reflect the effect under non-democracy.

Thus, even though the marginal effect that food prices have on political survival is not significantly different in democratic and non-democratic countries, but at a given food prices, the likelihood of the occurrence of national leader exits is higher under democracy than under non-democracy. This is in line with the idea that leaders in democratic countries are more susceptible to economic slowdowns than their counterparts in non-democratic countries (Bueno de Mesquita et al. 2003).

[17] Further results from regressions covering an interaction term between the log of food price index and the dummies for democratic or non-democratic government systems are provided in the appendix

4.4.5 The Roles of Per Capita Income Level

Variation in food prices may affect people in low-income, middle-income and high-income countries differently. For example, higher staple prices may severely hamper the ability of people in low-income countries to meet their basic needs, but cause no serious problem for people in high-income countries. Thus, even though the relationship between real GDP per capita and the occurrence of national leader exits has been shown to be insignificant, it is likely that per capita income level plays a role in moderating the effect of food prices on political survival.

To test whether the proposition is true, regressions in Table 4.6 columns 1–3 include an interaction term between the log of food price index and the log of real GDP per capita. The results provide only a weak support for the importance of real GDP per capita in affecting the relationship between food prices and political survival. The estimates for the interaction term are significant only in column 3 where the regression parameters are estimated using the Cox proportional hazard model, and not significant in columns 1–2 where the parameters are estimated using the linear probability model or the logit model.

4.4.6 The Roles of Economic Growth Rate

Thus far, real GDP per capita growth rate has been shown to be an important variable whose effect on political survival is continuously significant. To test whether the effect of real GDP per capita growth rate affects the relationship between food prices and political survival, regressions in Table 4.6 columns 4–6 include an interaction term between the log of food price index and the growth rate of real GDP per capita.

The results give no evidence that the effect of food prices on political survival changes with a change in real GDP per capita growth rate. In column 4, the coefficient of the interaction term between the log of food price index and the annual growth rate of real GDP per capita are not statistically significant. In columns 5–6, the ratios of odds and the ratios of hazard that correspond to the interaction term are also not significant.

Table 4.6 The Effects of Food Prices on Political Survival; Results with an Interaction Term between the Food Price Index and Economic Control Variables

	Interaction: Log of RGDP per capita			Interaction: RGDP per capita growth		
	Linear prob.	Logit	Cox prop. hazard	Linear prob.	Logit	Cox prop. hazard
	[1]	[2]	[3]	[4]	[5]	[6]
Log of food price index	–0.015	0.297	0.200	0.007*	2.341**	2.035**
	(0.017)	(0.412)	(0.215)	(0.004)	(1.055)	(0.646)
Log of RGDP per capita	–0.010	0.486	0.438	0.001	1.409	1.304
	(0.008)	(0.312)	(0.224)	(0.003)	(0.486)	(0.393)
Lfpindex*Log RGDP pc	0.003	1.250	1.279*			
	(0.002)	(0.177)	(0.138)			
RGDP per capita growth	–0.025***	0.048***	0.093***	0.013	+	58.885
	(0.009)	(0.055)	(0.087)	(0.106)	(+)	(535.9)
Lfpindex*RGDP pc grow				–0.009	0.041	0.188
				(0.026)	(0.103)	(0.432)
Transition dummy	0.003	0.565	0.755	0.003	0.498	0.734
	(0.016)	(0.521)	(0.649)	(0.016)	(0.460)	(0.635)
Democracy dummy	–0.004*	0.701*	0.749	–0.004**	0.682*	0.719*
	(0.002)	(0.150)	(0.148)	(0.002)	(0.144)	(0.141)
Post-election dummy	0.034***	6.259***	5.160***	0.034***	6.304***	5.120***
	(0.004)	(0.935)	(1.196)	(0.004)	(0.941)	(1.220)
Term limit dummy	0.974***	+***	33.756***	0.974***	+***	33.107***
	(0.006)	(+)	(9.734)	(0.006)	(+)	(9.611)
Tenure of leader	0.000	1.152		–0.000	1.132	
	(0.001)	(0.188)		(0.001)	(0.184)	
Age of leader	0.017	5.684	5.419**	0.016	5.043	4.739**
	(0.012)	(6.747)	(4.319)	(0.012)	(5.889)	(3.745)
N observations	34,495	31,514	33,992	34,495	31,514	33,992
N countries	77	67	77	77	67	77
N leaders	582	567	571	582	567	571
N exits	466	466	457	466	466	457
R^2	0.314	0.337	.	0.314	0.336	.

Note: The dependent variable in columns 1–2 and 4–5 is a dummy for leader exits and in columns 3 and 6 is the duration to a leader exit. Each regression includes a constant, country dummies and year dummies. By definition, the logit model restricts the sample to countries experiencing within-sample variation in the dependent variable. The Cox proportional hazard model treats each leader-spell as an individual subject and only includes leaders in power at the start of the month. The reported values for linear probability model are coefficients, for logit model are odds ratios, and for the Cox proportional hazard model are hazard ratios. Robust standard errors clustered by country are in parentheses. The R^2 in columns 1 and 4 refers to the within-R^2, whereas in columns 2 and 5 refers to the pseudo-R^2. *, **, *** denotes significance at the 1, 5 and 10 percent level respectively. +The estimated odds ratios for the leader term limit dummy in columns 2 and 4 are large, positive and statistically significant. The estimated odds ratio for the real GDP per capita growth rate in column 4 is large and positive, but not statistically significant.

4.4.7 The Effects of Changes in Food Prices

In all regressions above, the effect that food prices have on political survival is estimated using the price level. While it has been shown that the effect of the food price level is significant, one might be curious about the relationship between food price changes and the occurrence of national leader exits.

Table 4.7 The Effects of Changes in Food Prices on Political Survival

	Period: Jan 1961–Dec 2009			Period: Jan 1961–Dec 2004		
	Linear prob.	Logit	Cox prop. hazard	Linear prob.	Logit	Cox prop. hazard
	[1]	[2]	[3]	[4]	[5]	[6]
Δ Food price index	–0.000	0.999	1.004	–0.000	0.985	0.989
	(0.000)	(0.016)	(0.013)	(0.000)	(0.026)	(0.021)
Log of RGDP per capita	0.001	1.357	1.283	0.002	1.447	1.283
	(0.003)	(0.463)	(0.386)	(0.003)	(0.588)	(0.444)
RGDP per capita growth	–0.025***	0.043***	0.083***	–0.027***	0.041***	0.082**
	(0.009)	(0.050)	(0.077)	(0.010)	(0.049)	(0.080)
Transition dummy	0.003	0.548	0.752	0.001	0.485	0.647
	(0.016)	(0.497)	(0.632)	(0.016)	(0.468)	(0.585)
Democracy dummy	–0.004**	0.668*	0.701*	–0.003	0.726	0.736
	(0.002)	(0.141)	(0.138)	(0.002)	(0.170)	(0.153)
Post-election dummy	0.034***	6.243***	5.125***	0.034***	6.319***	5.274***
	(0.004)	(0.936)	(1.214)	(0.005)	(0.885)	(1.313)
Term limit dummy	0.974***	+***	33.106***	0.973***	+***	33.316***
	(0.006)	(+)	(9.643)	(0.007)	(+)	(10.51)
Tenure of leader	–0.000	1.132		0.000	1.167	
	(0.001)	(0.186)		(0.001)	(0.190)	
Age of leader	0.016	5.031	4.697*	0.015	4.876	4.986**
	(0.012)	(5.900)	(3.739)	(0.013)	(6.111)	(4.064)
N observations	34,495	31,514	33,992	30,125	26,813	29,686
N countries	77	67	77	77	62	77
N leaders	582	567	571	518	497	508
N exits	466	466	457	406	406	398
R^2	0.314	0.335	.	0.303	0.329	.

Note: The dependent variable in columns 1–2 and 4–5 is a dummy for leader exits and in columns 3 and 6 is the duration to a leader exit. Each regression includes a constant, country dummies and year dummies. By definition, the logit model restricts the sample to countries experiencing within-sample variation in the dependent variable. The Cox proportional hazard model treats each leader-spell as an individual subject and only includes leaders in power at the start of the month. The reported values for linear probability model are coefficients, for logit model are odds ratios, and for the Cox proportional hazard model are hazard ratios. Robust standard errors clustered by country are in parentheses. The R^2 in columns 1 and 4 refers to the within-R^2, whereas in columns 2 and 5 refers to the pseudo-R^2. *, **, *** denotes significance at the 1, 5 and 10 percent level respectively. +The estimated odds ratios for the leader term limit dummy in columns 2 and 4 are large, positive and statistically significant.

To test whether changes in food prices have a systematic effect on political survival, regressions in Table 4.7 include 1-month lag of changes in food price index instead of the *t*-1 log of food price index as a regressor. The results indicate that the effect of changes in food prices is not significant. Irrespective of the estimation model used and the period of analysis covered (January 1961–December 2009 or January 1961–December 2004), the estimates for changes in food price index are never statistically significant at conventional levels.

This finding is remarkable as recently Arezki and Bruckner (2011) report that changes in food prices significantly deteriorate political institutions and increase the likelihood of civil conflicts, including anti-government demonstrations and riots. One possible explanation for these seemingly conflicting findings is that differences in the empirical design, sample and control variables have driven the results. The other possible explanation is that political survival differs from civil conflicts. On the one hand, the occurrence of civil conflicts does not necessarily lead to a national leader exit. On the other hand, the occurrence of civil conflict is not required for the occurrence of a national leader exit.

4.5 Conclusion

This chapter examines the relationship between food prices and political survival in food net-importing countries. It uses international food price and domestic consumption data to compose a monthly country-specific food price index that is independent of domestic political dynamics and estimates how such an index affects the occurrence of leader exits.

The results provide evidence that variation in food prices are systematically related to the occurrence of national leader exits. The effect of food prices on political survival does not change with changes in the log of real GDP per capita, real GDP per capita growth rate and the state of democracy. However, once the joint-effect between food prices and the state of democracy is controlled, the effect of food prices on political survival is significant only in democracies and not in non-democratic countries. Thus,

while the marginal effect that food prices have on political survival in democratic and non-democratic countries is not significantly different, at a given food prices, the likelihood of the occurrence of national leader exits is higher under democracy than under non-democracy.

Further research is needed to examine the effect of food prices on political survival in net-exporting countries. While intuitively the effect for these countries would be different from the one found in this chapter, another challenge is to estimate the relationship between food prices and political survival in countries that were net-exporting for one commodity and, at the same time, net-importing for other food items.

These findings accentuate the importance of taking food prices into account in public policy making. Leaders in both developed and developing economies are cautioned that increases in international food prices do threaten their survival. It is, thus, in their interest to cooperate and promote global food security and to prevent international food price hikes. What kind of actions that should be taken and who should be involved are nevertheless beyond this paper.

Appendix 4.1

Table A4.1 Variable Definitions and Sources

Dummy for leader exits	- Binary variable: coded 1 if there is a national leader exit in a country during the reference month; 0 otherwise. - Covers exits caused by sickness, resignation, the loss of legislature support, election loss and various incidents that contravene the constitution, conventions or norms in a country, such as a popular revolt, domestic rebellion, military coup d'état, and assassination. - Excludes leader changes that are caused by natural death or deposition by another state. - Constructed using data from Goemans, Gleditsch and Chiozza (2009) with minor revisions and own update for the period 2005-2009.
Log of food price index	- The log-transformed food price index. The food price index is an arithmetic mean of rice price index, wheat price index and maize price index (January 2010 is the base month). The weights of rice, wheat and maize in each country are based on the average ratios of their internationally valued domestic consumption to nominal GDP. - Rice price: Monthly average of nominal price quotes (US$/metric ton) for Thai rice, white milled, 5% broken, FOB Bangkok 1961–2009 (United Nations 2011b). Six missing values are filled using linear interpolation. - Wheat price: Monthly average of nominal price quotes (US$/metric ton) for US wheat, n° 2 hard red winter (ordinary), FOB Gulf 1961–2009 (United Nations 2011b). - Monthly average farm price (US$/metric ton) for maize 1961–2009 (Cimmyt 2011). - Rice domestic consumption: the total amount of rice (metric tons) available as human food including any commodity derived during the reference year, 1961–2009 (FAO 2011). - Wheat domestic consumption: the total amount of wheat (metric tons) available as human food including any commodity derived during the reference year, 1961–2009 (FAO 2011). - Maize domestic consumption: the total amount of maize (metric tons) available as human food including any commodity derived during the reference year, 1961–2009 (FAO 2011). - GDP at current prices (World Bank 2011)
Log of real GDP per capita	- The log of purchasing power parity (PPP) converted GDP per capita at 2005 constant prices. - Calculated using data from Heston, Summers and Aten (2011)
Real GDP per capita growth	- The annual growth rate of purchasing power parity (PPP) converted GDP per capita at 2005 constant prices. - Rescaled into 1/100 percent. - Calculated using data from Heston, Summers and Aten (2011)
Transition dummy	- Binary variable: coded 1 if a country is classed as a transition economy during 1989-1992; 0 otherwise. - Taken from Development Research Institute (2009).
Democracy dummy	- Binary variable: coded 1 if a country is considered to be democratic; 0 otherwise. - To be considered democratic, a country must have a polity2 score greater than zero in the Polity IV dataset. A country whose polity2 score is zero or negative is judged to be non-democratic. - Constructed using data from Marshall, Gurr and Jaggers (2010).

Table A4.1 Variable definitions and sources *(continued from previous page)*

Dummy for an absolute monarchy	- Binary variable: coded 1 if a country is judged to be non-democratic and its effective leader is titled a king, a queen or their equivalents; 0 otherwise. - Own coding based on information from Marshall, Gurr and Jaggers (2010) and Cheibub, Gandhi and Vreeland (2010), taking into account discrepancies in the state of democracy.
Dummy for a military dictatorship	- Binary variable: coded 1 if a country is considered to be non-democratic and its effective leader is a military member by profession; 0 otherwise. - A retired member of the army, navy of the air-force remains treated as a military personal. - Own coding based on information from Marshall, Gurr and Jaggers (2010) and Cheibub, Gandhi and Vreeland (2010), taking into account discrepancies in the state of democracy.
Dummy for a civil autocracy	- Binary variable: coded 1 if a country is considered to be non-democratic and its effective leader is a military member by profession; 0 otherwise. - Own coding based on information from Marshall, Gurr and Jaggers (2010) and Cheibub, Gandhi and Vreeland (2010), taking into account discrepancies in the state of democracy.
Dummy for a parliamentary democracy	- Binary variable: coded 1 if a country is considered to be democratic for at least two years and has a parliamentary government that can be removed by the legislative; 0 otherwise. - Own coding based on information from Marshall, Gurr and Jaggers (2010) and Cheibub, Gandhi and Vreeland (2010), taking into account discrepancies in the state of democracy.
Dummy for a presidential democracy	- Binary variable: coded 1 if a country is considered to be democratic for at least two years and has a non-parliamentary government that cannot be removed by the legislative; 0 otherwise. - Own coding based on information from Marshall, Gurr and Jaggers (2010) and Cheibub, Gandhi and Vreeland (2010), taking into account discrepancies in the state of democracy.
Dummy for a mixed democracy	- Binary variable: coded 1 if a country is considered to be democratic for at least two years and has a parliamentary government with a head of state that is elected directly by the people; 0 otherwise. - Own coding based on information from Marshall, Gurr and Jaggers (2010) and Cheibub, Gandhi and Vreeland (2010), taking into account discrepancies in the state of democracy.
Post-election dummy	- Binary variable: coded 1 if a leader exit occurs within six months after an election; 0 otherwise. - Constructed using election data from Hyde and Marinov (2012) and systems of government data from Burke (2012).
Term limit dummy	- Binary variable: coded 1 if a leader exit is attributable to a constitutional term limit; 0 otherwise. - Primarily based on Burke (2012), with own update for the period 2007–2009.
Tenure of leader	- The number of month-ends that a leader has passed while in power. - Constructed using data from Goemans, Gleditsch and Chiozza (2009) with minor revisions and own update for the period 2005-2009.
Age of leader	- The number of 31 December that a leader has passed from the birthday. Rescaled into 1/100 year. - Constructed using data from Goemans, Gleditsch and Chiozza (2009) with minor revisions and own update for the period 2005-2009.

Appendix 4.2

Table A4.2.1 Results with an Interaction Term between the Food Price Index and the Dummy for Monarchy

	Interaction: Democracy dummy			Interaction: Non-democracy dummy		
	Linear prob.	Logit	Cox prop. hazard	Linear prob.	Logit	Cox prop. hazard
	[1]	[2]	[3]	[4]	[5]	[6]
Log of food price index	0.007*	2.377*	2.098**	0.009**	22.206***	8.576**
	(0.004)	(1.062)	(0.648)	(0.005)	(1.062)	(7.218)
Log of RGDP per capita	0.001	1.319	1.280	0.001	1.319	1.280
	(0.003)	(0.458)	(0.393)	(0.003)	(0.426)	(0.393)
RGDP per capita growth	–0.026***	0.038***	0.077***	–0.026***	0.037***	0.077***
	(0.009)	(0.044)	(0.072)	(0.009)	(0.052)	(0.072)
Transition dummy	0.003	0.539	0.764	0.003	0.539	0.764
	(0.015)	(0.486)	(0.641)	(0.016)	(0.528)	(0.641)
Monarchy dummy	0.001	0.001***	0.011			
	(0.014)	(0.001)	(0.026)			
Non-monarchy dummy				-0.001		87.303
					1511.171***	
				(0.015)	(4.208)	(203.895)
Lfpindex*monarchy	0.002	9.339***	4.086			
	(0.003)	(5.248)	(2.561)			
Lfpindex*non-monarchy				–0.002	0.107***	0.244
				(0.004)	(0.333)	(0.171)
Post-election dummy	0.338***	6.267***	5.136***	0.034***	6.266***	5.136***
	(0.004)	(0.941)	(1.235)	(0.004)	(0.935)	(1.235)
Term limit dummy	0.974***	+***	31.708***	0.974***	+***	31.708***
	(0.006)	(+)	(9.147)	(0.006)	(+)	(9.417)
Tenure of leader	0.001	1.187		0.000	1.186	
	(0.001)	(0.191)		(0.001)	(0.187)	
Age of leader	0. 010	3.326	3.474	0.014	3.326	3.474
	(0.012)	(4.011)	(2.747)	(0.012)	(6.024)	(2.747)
N observations	34,495	31,514	33,992	34,495	31,514	33,992
N countries	77	67	77	77	67	77
N leaders	582	567	571	582	567	571
N exits	466	466	457	466	466	457
R^2	0.314	0.336	.	0.314	0.336	.

Note: The dependent variable in columns 1–2 and 4–5 is a dummy for leader exits and in columns 3 and 6 is the duration to a leader exit. Each regression includes a constant, country dummies and year dummies. By definition, the logit model restricts the sample to countries experiencing within-sample variation in the dependent variable. The Cox proportional hazard model treats each leader-spell as an individual subject and only includes leaders in power at the start of the month. The reported values for linear probability model are coefficients, for logit model are odds ratios, and for the Cox proportional hazard model are hazard ratios. Robust standard errors clustered by country are in parentheses. The R^2 in columns 1 and 4 refers to the within-R^2, whereas in columns 2 and 5 refers to the pseudo-R^2. *, **, *** denotes significance at the 1, 5 and 10 percent level respectively. +The estimated odds ratios for the leader term limit dummy in columns 2 and 4 are large, positive and statistically significant.

Table A4.2.2 Results with an Interaction Term between the Food Price Index and the Dummy for Civil Autocracy

	Interaction: Democracy dummy			Interaction: Non-democracy dummy		
	Linear prob.	Logit	Cox prop. hazard	Linear prob.	Logit	Cox prop. hazard
	[1]	[2]	[3]	[4]	[5]	[6]
Log of food price index	0.006	2.034	1.946**	0.009**	2.714	1.923
	(0.004)	(0.936)	(0.619)	(0.005)	(1.704)	(0.938)
Log of RGDP per capita	0.001	1.279	1.191	0.001	1.279	1.191
	(0.003)	(0.421)	(0.358)	(0.002)	(0.421)	(0.358)
RGDP per capita growth	–0.025***	0.044***	0.090***	–0.024***	0.044***	0.090***
	(0.008)	(0.048)	(0.083)	(0.008)	(0.048)	(0.082)
Transition dummy	0.004	0.543	0.739	0.004	0.543	0.739
	(0.015)	(0.490)	(0.617)	(0.015)	(0.490)	(0.617)
Civil autocracy dummy	–0.007	0.596	1.900			
	(0.016)	(0.938)	(2.628)			
Non-civil aut. dummy				0.007	1.676	0.526
				(0.016)	(2.636)	(0.727)
Lfpindex*civil autocracy	0.003	1.334	0.987			
	(0.004)	(0.523)	(0.332)			
Lfpindex*non-civil aut.				–0.003	0.749	1.012
				(0.004)	(0.294)	(0.340)
Post-election dummy	0.034***	6.135***	4.999***	0.033***	6.135***	4.999***
	(0.004)	(0.921)	(1.203)	(0.004)	(0.921)	(1.203)
Term limit dummy	0.974***	+***	33.223***	0.974***	+***	33.223***
	(0.006)	(+)	(9.644)	(0.006)	(+)	(9.644)
Tenure of leader	0.000	1.162		0.000	1.162	
	(0.001)	(0.182)		(0.001)	(0.182)	
Age of leader	0. 013	3.994	3.938**	0.013	3.994	3.938*
	(0.011)	(4.524)	(2.945)	(0.011)	(4.524)	(2.94)
N observations	34,495	31,514	33,992	34,495	31,514	33,992
N countries	77	67	77	77	67	77
N leaders	582	567	571	582	567	571
N exits	466	466	457	466	466	457
R^2	0.314	0.337	.	0.314	0.337	.

Note: The dependent variable in columns 1–2 and 4–5 is a dummy for leader exits and in columns 3 and 6 is the duration to a leader exit. Each regression includes a constant, country dummies and year dummies. By definition, the logit model restricts the sample to countries experiencing within-sample variation in the dependent variable. The Cox proportional hazard model treats each leader-spell as an individual subject and only includes leaders in power at the start of the month. The reported values for linear probability model are coefficients, for logit model are odds ratios, and for the Cox proportional hazard model are hazard ratios. Robust standard errors clustered by country are in parentheses. The R^2 in columns 1 and 4 refers to the within-R^2, whereas in columns 2 and 5 refers to the pseudo-R^2. *, **, *** denotes significance at the 1, 5 and 10 percent level respectively. +The estimated odds ratios for the leader term limit dummy in columns 2 and 4 are large, positive and statistically significant.

Table A4.2.3 Results with an Interaction Term between the Food Price Index and the Dummy for Military Dictatorship

	Interaction: Democracy dummy			Interaction: Non-democracy dummy		
	Linear prob.	Logit	Cox prop. hazard	Linear prob.	Logit	Cox prop. hazard
	[1]	[2]	[3]	[4]	[5]	[6]
Log of food price index	0.007*	2.441**	2.150**	0.005	1.864	1.696
	(0.004)	(1.083)	(0.686)	(0.005)	(1.241)	(0.811)
Log of RGDP per capita	0.001	1.361	1.311	0.001	1.361	1.311
	(0.003)	(0.426)	(0.401)	(0.003)	(0.468)	(0.401)
RGDP per capita growth	–0.025***	0.040***	0.081***	–0.025***	0.040***	0.081***
	(0.008)	(0.052)	(0.076)	(0.008)	(0.047)	(0.076)
Transition dummy	0.003	0.534	0.761	0.003	0.534	0.761
	(0.015)	(0.528)	(0.640)	(0.015)	(0.485)	(0.640)
Military dictat. dummy	0.010	2.827	2.444			
	(0.016)	(0.589)	(4.020)			
Non-military d. dummy				–0.011	0.353	0.049
				(0.016)	(0.700)	(0.672)
Lfpindex*military dictat.	–0.002	0.763	0.788			
	(0.004)	(0.454)	(0.343)			
Lfpindex*non-military d.				0.002	1.309	1.267
				(0.004)	(0.674)	(0.552)
Post-election dummy	0.033***	6.229***	5.092***	0.034***	6.229***	5.092***
	(0.004)	(0.935)	(1.223)	(0.004)	(0.936)	(1.223)
Term limit dummy	0.973***	+***	31.840***	0.974***	+***	31.84***
	(0.006)	(+)	(9.180)	(0.006)	(+)	(9.180)
Tenure of leader	0.000	1.199		0.000	1.199	
	(0.001)	(0.187)		(0.001)	(0.197)	
Age of leader	0. 012	3.940	3.827*	0.012	3.940	4.827*
	(0.010)	(6.024)	(3.030)	(0.010)	(4.498)	(3.030)
N observations	34,495	31,514	33,992	34,495	31,514	33,992
N countries	77	67	77	77	67	77
N leaders	582	567	571	582	567	571
N exits	466	466	457	466	466	457
R^2	0.314	0.336	.	0.314	0.336	.

Note: The dependent variable in columns 1–2 and 4–5 is a dummy for leader exits and in columns 3 and 6 is the duration to a leader exit. Each regression includes a constant, country dummies and year dummies. By definition, the logit model restricts the sample to countries experiencing within-sample variation in the dependent variable. The Cox proportional hazard model treats each leader-spell as an individual subject and only includes leaders in power at the start of the month. The reported values for linear probability model are coefficients, for logit model are odds ratios, and for the Cox proportional hazard model are hazard ratios. Robust standard errors clustered by country are in parentheses. The R^2 in columns 1 and 4 refers to the within-R^2, whereas in columns 2 and 5 refers to the pseudo-R^2. *, **, *** denotes significance at the 1, 5 and 10 percent level respectively. +The estimated odds ratios for the leader term limit dummy in columns 2 and 4 are large, positive and statistically significant.

Table A4.2.4 Results with an Interaction Term between the Food Price Index and the Dummy for Parliamentary Democracy

	Interaction: Democracy dummy			Interaction: Non-democracy dummy		
	Linear prob.	Logit	Cox prop. hazard	Linear prob.	Logit	Cox prop. hazard
	[1]	[2]	[3]	[4]	[5]	[6]
Log of food price index	0.006*	2.253*	1.831*	0.038	1.189	1.832*
	(0.004)	(0.968)	(0.565)	(0.005)	(0.911)	(0.659)
Log of RGDP per capita	0.002	1.111	1.144	0.002	1.111	1.144
	(0.002)	(0.352)	(0.303)	(0.002)	(0.352)	(0.303)
RGDP per capita growth	–0.024***	0.048***	0.090**	–0.025***	0.048***	0.090**
	(0.008)	(0.055)	(0.085)	(0.008)	(0.055)	(0.085)
Transition dummy	0.004	0.566	0.777	0.004	0.566	0.777
	(0.016)	(0.554)	(0.701)	(0.016)	(0.554)	(0.701)
Parliamentary d. dummy	0.003	5.055	0.460			
	(0.015)	(11.747)	(0.535)			
Non-parliam. d. dummy				–0.003	0.197	2.169
				(0.015)	(0.549)	(2.521)
Lfpindex*parliamentary	–0.003	0.527	1.000			
	(0.003)	(0.302)	(0.289)			
Lfpindex*non-parliam. d.				0.003	1.895	0.999
				(0.004)	(1.087)	(0.288)
Post-election dummy	0.033***	6.319***	5.132***	0.033***	6.319***	5.132***
	(0.004)	(0.941)	(1.211)	(0.004)	(0941)	(1.211)
Term limit dummy	0.974***	+***	34.872***	0.974***	+***	34.872***
	(0.006)	(+)	(10.406)	(0.006)	(+)	(10.406)
Tenure of leader	–0.000	1.023		–0.000	1.023	
	(0.001)	(0.185)		(0.001)	(0.185)	
Age of leader	0. 021*	9.110*	6.857**	0.021*	9.110*	6.857**
	(0.012)	(11.538)	(5.555)	(0.012)	(11.538)	(5.555)
N observations	34,495	31,514	33,992	34,495	31,514	33,992
N countries	77	67	77	77	67	77
N leaders	582	567	571	582	567	571
N exits	466	466	457	466	466	457
R^2	0.314	0.336	.	0.314	0.336	.

Note: The dependent variable in columns 1–2 and 4–5 is a dummy for leader exits and in columns 3 and 6 is the duration to a leader exit. Each regression includes a constant, country dummies and year dummies. By definition, the logit model restricts the sample to countries experiencing within-sample variation in the dependent variable. The Cox proportional hazard model treats each leader-spell as an individual subject and only includes leaders in power at the start of the month. The reported values for linear probability model are coefficients, for logit model are odds ratios, and for the Cox proportional hazard model are hazard ratios. Robust standard errors clustered by country are in parentheses. The R^2 in columns 1 and 4 refers to the within-R^2, whereas in columns 2 and 5 refers to the pseudo-R^2. *, **, *** denotes significance at the 1, 5 and 10 percent level respectively. +The estimated odds ratios for the leader term limit dummy in columns 2 and 4 are large, positive and statistically significant.

Table A4.2.5 Results with an Interaction Term between the Food Price Index and the Dummy for Presidential Democracy

	Interaction: Democracy dummy			Interaction: Non-democracy dummy		
	Linear prob.	Logit	Cox prop. hazard	Linear prob.	Logit	Cox prop. hazard
	[1]	[2]	[3]	[4]	[5]	[6]
Log of food price index	0.006	1.970	2.059**	0.009	2.275**	2.270**
	(0.004)	(1.126)	(0.702)	(0.006)	(1.239)	(0.796)
Log of RGDP per capita	0.001	1.240	1.254	0.001	1.240	1.254
	(0.002)	(0.416)	(0.369)	(0.002)	(0.416)	(0.369)
RGDP per capita growth	–0.025***	0.040***	0.077***	–0.025***	0.040***	0.077***
	(0.008)	(0.047)	(0.070)	(0.008)	(0.047)	(0.070)
Transition dummy	0.003	0.535	0.769	0.003	0.535	0.769
	(0.016)	(0.502)	(0.670)	(0.015)	(0.502)	(0.670)
Presidential d. dummy	–0.006	0.344	0.951			
	(0.026)	(0.617)	(1.260)			
Non-presid. d. dummy				0.006	2.898	1.050
				(0.026)	(5.187)	(1.392)
Lfpindex*presidential d.	0.002	1.397	1.102			
	(0.006)	(0.589)	(0.349)			
Lfpindex*non-presid. d.				–0.002	0.715	0.907
				(0.006)	(0.301)	(0.287)
Post-election dummy	0.034***	6.253***	5.106***	0.033***	6.253***	5.106***
	(0.004)	(0.934)	(1.226)	(0.004)	(0.934)	(1.226)
Term limit dummy	0.973***	+***	31.810***	0.974***	+***	31.810***
	(0.006)	(+)	(9.135)	(0.006)	(+)	(9.135)
Tenure of leader	0.000	1.1917		0.000	1.197	
	(0.001)	(0.194)		(0.001)	(0.194)	
Age of leader	0. 012	4.210	3.901*	0.012	4.210	3.901*
	(0.011)	(4.842)	(3.056)	(0.011)	(4.842)	(3.056)
N observations	34,495	31,514	33,992	34,495	31,514	33,992
N countries	77	67	77	77	67	77
N leaders	582	567	571	582	567	571
N exits	466	466	457	466	466	457
R^2	0.314	0.336	.	0.314	0.336	.

Note: The dependent variable in columns 1–2 and 4–5 is a dummy for leader exits and in columns 3 and 6 is the duration to a leader exit. Each regression includes a constant, country dummies and year dummies. By definition, the logit model restricts the sample to countries experiencing within-sample variation in the dependent variable. The Cox proportional hazard model treats each leader-spell as an individual subject and only includes leaders in power at the start of the month. The reported values for linear probability model are coefficients, for logit model are odds ratios, and for the Cox proportional hazard model are hazard ratios. Robust standard errors clustered by country are in parentheses. The R^2 in columns 1 and 4 refers to the within-R^2, whereas in columns 2 and 5 refers to the pseudo-R^2. *, **, *** denotes significance at the 1, 5 and 10 percent level respectively. +The estimated odds ratios for the leader term limit dummy in columns 2 and 4 are large, positive and statistically significant.

Table A4.2.6 Results with an Interaction Term between the Food Price Index and the Dummy for Mixed Democracy

	Interaction: Democracy dummy			Interaction: Non-democracy dummy		
	Linear prob. [1]	Logit [2]	Cox prop. hazard [3]	Linear prob. [4]	Logit [5]	Cox prop. hazard [6]
Log of food price index	0.006	2.240*	2.056**	0.038	26.510***	16.928***
	(0.004)	(1.013)	(0.645)	(0.246)	(14.824)	(10.07)
Log of RGDP per capita	0.001	1.373	1.318	0.001	1.373	1.318
	(0.002)	(0.479)	(0.409)	(0.002)	(0.479)	(0.409)
RGDP per capita growth	–0.026***	0.035***	0.074***	–0.026***	0.035***	0.074***
	(0.008)	(0.041)	(0.068)	(0.008)	(0.041)	(0.068)
Transition dummy	0.003	0.527	0.758	0.003	0.527	0.758
	(0.015)	(0.479)	(0.640)	(0.015)	(0.479)	(0.640)
Mixed democ. dummy	–0.115	119.062	0.001***			
	(0.087)	(281.057)	(0.002)			
Non-mixed d. dummy				0.015	0.008**	1123.334***
				(0.087)	(0.019)	(2722.723)
Lfpindex*mixed democ.	0.031		8.232***			
		11.830***				
	(0.024)	(4.553)	(4.086)			
Lfpindex*non-mixed d.				–0.031	0.084***	0.121***
				(0.024)	(0.032)	(0.060)
Post-election dummy	0.033***	6.271***	5.131***	0.034***	6.271***	5.131***
	(0.043)	(0.946)	(1.240)	(0.004)	(0.946)	(1.240)
Term limit dummy	0.974***	+***	32.104***	0.974***	+***	32.104***
	(0.006)	(+)	(9.359)	(0.006)	(+)	(9.359)
Tenure of leader	0.000	1.196		0.000	1.196	
	(0.001)	(0.191)		(0.001)	(0.191)	
Age of leader	0. 011	3.900	3.858*	0.011	3.900	3.858*
	(0.011)	(4.511)	(2.990)	(0.011)	(4.511)	(2.990)
N observations	34,495	31,514	33,992	34,495	31,514	33,992
N countries	77	67	77	77	67	77
N leaders	582	567	571	582	567	571
N exits	466	466	457	466	466	457
R^2	0.314	0.336	.	0.314	0.336	.

Note: The dependent variable in columns 1–2 and 4–5 is a dummy for leader exits and in columns 3 and 6 is the duration to a leader exit. Each regression includes a constant, country dummies and year dummies. By definition, the logit model restricts the sample to countries experiencing within-sample variation in the dependent variable. The Cox proportional hazard model treats each leader-spell as an individual subject and only includes leaders in power at the start of the month. The reported values for linear probability model are coefficients, for logit model are odds ratios, and for the Cox proportional hazard model are hazard ratios. Robust standard errors clustered by country are in parentheses. The R^2 in columns 1 and 4 refers to the within-R^2, whereas in columns 2 and 5 refers to the pseudo-R^2. *, **, *** denotes significance at the 1, 5 and 10 percent level respectively. +The estimated odds ratios for the leader term limit dummy in columns 2 and 4 are large, positive and statistically significant.

Chapter 5: Concluding Remarks

This thesis has addressed three substantive issues with respect to the roles of democratic and non-democratic institutions in the economy. The first is the relationship between democratisation, systems of government and the size of public spending. The second is the existence of electoral budget cycles under non-democratic regimes. The third is the effect that food prices have on political survival and how the state of democracy influences such an effect.

From the results in Chapter 2, it can be concluded that the effect of democratisation on the size of general government consumption is not by itself robustly significant. The importance of the relationship between democratisation and general government consumption size is subject to the systems of government prevailing before and after a political reform, and only democratisation that originates from a military dictatorship and ends up with a parliamentary democracy has a robust significant relationship with the share of general government consumption in a country's overall economy. With regard to gross public gross fixed capital formation, it can be concluded that the effects of democratisation and systems of government are weak and not statistically significant

Findings in Chapter 2 leave a natural direction for further research. That is, to determine whether systems of government affect how public spending is allocated. Governments led by a an absolute monarch, a military dictator or a civil autocrat may spend the same amount of consumption expenditure as those lead by a president or a prime minister, but be very different in the way they allocate it. The extent to which different types of governments are able to effectively use the spending is also worthy of future research.

From the results in Chapter 3, the conclusion is that electoral budget cycles do exist under non-democratic regimes. The effect of elections on the GDP share of the central government budget balance is significant and robust to a number of variations in control variables, estimation models, sample selection criteria and designations of the election-year dummy. The other conclusion is that the persistence of budget cycles under non-

democratic regimes is driven by the subsample of countries with less distance from democracy (shallow autocracies). The effect of elections on the share of the central government budget balance in GDP is under no circumstances significant when the regression includes only the subsample of countries with greater distance from democracy (deep autocracies).

This finding underscores the importance of providing a more complete picture of the effect of elections on government budget balance. Rather than limiting themselves to the studies in democratic countries, economists need to pay more attention on the cases under non-democratic regimes and seriously examine the relationship between the level of democracy and politically driven budget cycles.

Finally, from Chapter 4 it can be concluded that the effect of food prices on political survival is significant and robust. The relationship between food prices and the occurrence of national leader exits does not change with changes in the log of real gross domestic product (GDP) per capita or the real GDP per capita growth rate. The relationship also does not change with changes in the state of democracy. However, once the joint-effect between food prices and the state of democracy is controlled, the relationship between food prices and the occurrence of national leader exits is significant only in democracies and not in non-democratic countries.

Chapter 4 is an early study on the importance of food prices on political survival. Future research should investigate the effect of food prices on political survival in countries that are food net-exporting. While it is intuitive to expect that the effect for net-exporting countries would be different from the effect found in this chapter, another challenge is to estimate the relationship between food prices and political survival in countries that were net-exporting for one or two commodities and, at the same time, net-importing for other food items.

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Supplementary Tables

Table S.1 List of Countries, States of Democracy and Systems of Government as Estimated in Table 2.2

	States of democracy	Systems of government
Afghanistan	1972–2008 Non-democracy	1972–1973 Monarchy
		1974–2008 Civil autocracy
Albania	1972–1991 Non-democracy	1972–1985 Military dictatorship
		1986–1991 Civil autocracy
	1992–2008 Democracy	1992–2008 Parliamentary democracy
Algeria	1963–2008 Non-democracy	1963–1965 Civil autocracy
		1966–1999 Military dictatorship
		2000–2008 Civil autocracy
Angola	1976–2008 Non-democracy	1976–2008 Civil autocracy
Argentina	1960–1962 Democracy	1960–1962 Presidential democracy
	1963–1963 Non-democracy	1963–1963 Military dictatorship
	1964–1966 Democracy	1964–1966 Presidential democracy
	1967–1973 Non-democracy	1967–1973 Military dictatorship
	1974–1976 Democracy	1974–1976 Presidential democracy
	1977–1983 Non-democracy	1977–1983 Military dictatorship
	1984–2008 Democracy	1984–2008 Presidential democracy
Armenia	1995–2008 Democracy	1995–2008 Mixed democracy
Australia	1960–2008 Democracy	1960–2008 Parliamentary democracy
Austria	1960–2008 Democracy	1960–2008 Mixed democracy
Azerbaijan	1995–2008 Non-democracy	1995–2008 Civil autocracy
Bahamas	1974–2008 Democracy	1974–2008 Parliamentary democracy
Bahrain	1972–2008 Non-democracy	1972–2008 Monarchy
Bangladesh	1972–1986 Non-democracy	1972–1977 Civil autocracy
		1978–1981 Military dictatorship
		1982–1982 Civil autocracy
		1983–1986 Military dictatorship
	1987–2007 Democracy	1987–1991 Mixed democracy
		1992–2007 Parliamentary democracy
	2008–2008 Non-democracy	2008–2008 Military dictatorship
Barbados	1967–2008 Democracy	1967–2008 Parliamentary democracy
Belarus	1996–2008 Non-democracy	1996–2008 Civil autocracy
Belgium	1960–2008 Democracy	1960–2008 Parliamentary democracy
Belize	1982–2008 Democracy	1982–2008 Parliamentary democracy
Benin	1961–1991 Non-democracy	1961–1963 Civil autocracy
		1964–1970 Military dictatorship
		1971–1972 Civil autocracy
		1973–1991 Military dictatorship
	1992–2008 Democracy	1992–2008 Presidential democracy
Bhutan	1972–2007 Non-democracy	1972–2007 Monarchy
	2008–2008 Democracy	2008–2008 Parliamentary democracy
Bolivia	1960–1982 Non-democracy	1960–1964 Civil autocracy
		1965–1979 Military dictatorship
		1980–1980 Civil autocracy
		1981–1982 Military dictatorship
	1983–2008 Democracy	1983–2008 Presidential democracy
Bosnia-Herzegovina	1992–2008 Non-democracy	1992–2008 Civil autocracy
Botswana	1967–2008 Non-democracy	1967–2008 Civil autocracy
Brazil	1960–1964 Democracy	1960–1961 Presidential democracy
		1962–1963 Mixed democracy
		1964–1964 Presidential democracy
	1965–1985 Non-democracy	1965–1985 Military dictatorship
	1986–2008 Democracy	1986–2008 Presidential democracy

Table S.1 List of countries, states of democracy and ... *(continued from previous page)*

Brunei Darussalam	1985–2008 Non-democracy	1985–2008 Monarchy
Bulgaria	1972–1990 Non-democracy	1972–1990 Civil autocracy
	1991–2008 Democracy	1991–2008 Mixed democracy
Burkina Faso	1961–2008 Non-democracy	1961–1966 Civil autocracy
		1967–2008 Military dictatorship
Burundi	1963–1993 Non-democracy	1963–1966 Monarchy
		1967–1993 Military dictatorship
	1994–1996 Democracy	1994–1996 Presidential democracy
	1997–2005 Non-democracy	1997–2003 Military dictatorship
		2004–2005 Civil autocracy
	2006–2008 Democracy	2006–2008 Presidential democracy
Cambodia	1972–2008 Non-democracy	1972–1975 Military dictatorship
		1976–1979 Civil autocracy
		1980–1991 Military dictatorship
		1992–2008 Civil autocracy
Cameroon	1962–2008 Non-democracy	1962–2008 Civil autocracy
Canada	1960–2008 Democracy	1960–2008 Parliamentary democracy
Cape Verde	1976–1990 Non-democracy	1976–1990 Civil autocracy
	1991–2008 Democracy	1991–2008 Mixed democracy
Central African Republic	1962–1993 Non-democracy	1962–1966 Civil autocracy
		1967–1979 Military dictatorship
		1980–1981 Civil autocracy
		1982–1993 Military dictatorship
	1994–2003 Democracy	1994–2003 Mixed democracy
	2004–2008 Non-democracy	2004–2008 Military dictatorship
Chad	1962–2008 Non-democracy	1962–1975 Civil autocracy
		1976–1979 Military dictatorship
		1980–1990 Civil autocracy
		1991–2008 Military dictatorship
Chile	1960–1973 Democracy	1960–1973 Presidential democracy
	1974–1990 Non-democracy	1974–1990 Military dictatorship
	1991–2008 Democracy	1991–2008 Presidential democracy
China	1960–2008 Non-democracy	1960–2008 Civil autocracy
Colombia	1960–2008 Democracy	1960–2008 Presidential democracy
Comoros	1976–1990 Non-democracy	1976–1990 Civil autocracy
	1991–1995 Democracy	1991–1995 Mixed democracy
	1996–2004 Non-democracy	1996–1999 Civil autocracy
		2000–2004 Military dictatorship
	2005–2008 Democracy	2005–2008 Presidential democracy
Congo, Republic of	1962–1963 Democracy	1962–1963 Presidential democracy
	1964–1992 Non-democracy	1964–1968 Civil autocracy
		1969–1992 Military dictatorship
	1993–1997 Democracy	1993–1997 Mixed democracy
	1998–2008 Non-democracy	1998–2008 Military dictatorship
Costa Rica	1960–2008 Democracy	1960–2008 Presidential democracy
Cote d'Ivoire	1962–2008 Non-democracy	1962–1999 Civil autocracy
		2000–2000 Military dictatorship
		2001–2008 Civil autocracy
Croatia	1992–2008 Democracy	1992–2008 Mixed democracy
Cuba	1972–2008 Non-democracy	1972–2006 Civil autocracy
		2007–2008 Military dictatorship
Cyprus	1961–1983 Non-democracy	1961–1983 Civil autocracy
	1984–2008 Democracy	1984–2008 Presidential democracy
Czech Republic	1994–2008 Democracy	1994–2008 Parliamentary democracy
Democratic Republic of the Congo	1961–2008 Non-democracy	1961–1965 Civil autocracy
		1966–1997 Military dictatorship
		1998–2008 Civil autocracy

Table S.1 List of countries, states of democracy and ... *(continued from previous page)*

Denmark	1960–2008 Democracy	1960–2008 Parliamentary democracy
Djibouti	1978–2008 Non-democracy	1978–2008 Civil autocracy
Dominican Republic	1960–1966 Non-democracy	1960–1961 Military dictatorship
		1962–1963 Civil autocracy
		1964–1965 Military dictatorship
		1966–1966 Civil autocracy
	1967–2008 Democracy	1967–2008 Presidential democracy
Ecuador	1960–1963 Democracy	1960–1963 Presidential democracy
	1964–1979 Non-democracy	1964–1966 Military dictatorship
		1967–1972 Civil autocracy
		1973–1979 Military dictatorship
	1980–2000 Democracy	1980–2000 Presidential democracy
	2001–2002 Non-democracy	2001–2002 Civil autocracy
	2003–2008 Democracy	2003–2008 Presidential democracy
Egypt	1960–2008 Non-democracy	1960–2008 Military dictatorship
El Salvador	1960–1984 Non-democracy	1960–1980 Military dictatorship
		1981–1982 Civil autocracy
		1983–1984 Military dictatorship
	1985–2008 Democracy	1985–2008 Presidential democracy
Equatorial Guinea	1969–2008 Non-democracy	1969–1979 Civil autocracy
		1980–2008 Military dictatorship
Eritrea	1994–2008 Non-democracy	1994–2008 Civil autocracy
Estonia	1992–2008 Democracy	1992–2008 Parliamentary democracy
Ethiopia	1995–2008 Non-democracy	1995–2008 Civil autocracy
Ethiopia	1960–1992 Non-democracy	1960–1974 Monarchy
		1975–1991 Military dictatorship
		1992–1992 Civil autocracy
Fiji	1971–1992 Non-democracy	1971–1987 Civil autocracy
		1988–1992 Military dictatorship
	1993–2000 Democracy	1993–2000 Parliamentary democracy
	2001–2008 Non-democracy	2001–2001 Military dictatorship
		2002–2006 Civil autocracy
		2007–2008 Military dictatorship
Finland	1960–2008 Democracy	1960–2008 Mixed democracy
France	1960–2008 Democracy	1960–1965 Parliamentary democracy
		1966–2008 Mixed democracy
Gabon	1962–2008 Non-democracy	1962–2008 Civil autocracy
Gambia	1966–2008 Non-democracy	1966–1994 Civil autocracy
		1995–2008 Military dictatorship
Georgia	1995–2004 Non-democracy	1995–2004 Civil autocracy
	2005–2008 Democracy	2005–2008 Mixed democracy
Germany	1992–2008 Democracy	1992–2008 Parliamentary democracy
Germany, West	1972–1989 Democracy	1972–1989 Parliamentary democracy
Ghana	1960–1969 Non-democracy	1960–1966 Civil autocracy
		1967–1969 Military dictatorship
	1970–1972 Democracy	1970–1972 Parliamentary democracy
	1973–1979 Non-democracy	1973–1979 Military dictatorship
	1980–1981 Democracy	1980–1981 Presidential democracy
	1982–1993 Non-democracy	1982–1993 Military dictatorship
	1994–2008 Democracy	1994–2008 Presidential democracy
Greece	1960–1967 Democracy	1960–1967 Parliamentary democracy
	1968–1974 Non-democracy	1968–1974 Military dictatorship
	1975–2008 Democracy	1975–2008 Parliamentary democracy
Grenada	1975–1979 Democracy	1975–1979 Parliamentary democracy
	1980–1984 Non-democracy	1980–1984 Civil autocracy
	1985–2008 Democracy	1985–2008 Parliamentary democracy

Table S.1 List of countries, states of democracy and ... *(continued from previous page)*

Guatemala	1960–1963 Democracy	1960–1963 Presidential democracy
	1964–1966 Non-democracy	1964–1966 Military dictatorship
	1967–1982 Democracy	1967–1982 Presidential democracy
	1983–1986 Non-democracy	1983–1986 Military dictatorship
	1987–2008 Democracy	1987–2008 Presidential democracy
Guinea	1961–2008 Non-democracy	1961–1984 Civil autocracy
		1985–2008 Military dictatorship
Guinea–Bissau	1975–2000 Non-democracy	1975–1980 Civil autocracy
		1981–2000 Military dictatorship
	2001–2003 Democracy	2001–2003 Mixed democracy
	2004–2004 Non-democracy	2004–2004 Civil autocracy
	2005–2008 Democracy	2005–2008 Mixed democracy
Guyana	1972–2008 Non-democracy	1972–2008 Civil autocracy
Haiti	1962–2008 Non-democracy	1962–1986 Civil autocracy
		1987–1990 Military dictatorship
		1991–2008 Civil autocracy
Honduras	1960–1963 Democracy	1960–1963 Presidential democracy
	1964–1982 Non-democracy	1964–1971 Military dictatorship
		1972–1972 Civil autocracy
		1973–1982 Military dictatorship
	1983–2008 Democracy	1983–2008 Presidential democracy
Hungary	1972–1990 Non-democracy	1972–1990 Civil autocracy
	1991–2008 Democracy	1991–2008 Parliamentary democracy
Iceland	1960–2008 Democracy	1960–2008 Mixed democracy
India	1960–2008 Democracy	1960–2008 Parliamentary democracy
Indonesia	1962–1999 Non-democracy	1962–1966 Civil autocracy
		1967–1999 Military dictatorship
	2000–2008 Democracy	2000–2008 Presidential democracy
Iran	1960–2008 Non-democracy	1960–1979 Monarchy
		1980–2008 Civil autocracy
Iraq	1972–2008 Non-democracy	1972–1979 Military dictatorship
		1980–2003 Civil autocracy
		2004–2008 Military dictatorship
Ireland	1960–2008 Democracy	1960–2008 Mixed democracy
Israel	1960–2008 Democracy	1960–2008 Parliamentary democracy
Italy	1960–2008 Democracy	1960–2008 Parliamentary democracy
Jamaica	1963–2008 Democracy	1963–2008 Parliamentary democracy
Japan	1960–2008 Democracy	1960–2008 Parliamentary democracy
Jordan	1960–2008 Non-democracy	1960–2008 Monarchy
Kazakhstan	1995–2008 Non-democracy	1995–2008 Civil autocracy
Kenya	1964–1998 Non-democracy	1964–1998 Civil autocracy
	1999–2008 Democracy	1999–2008 Presidential democracy
Kuwait	1988–2008 Non-democracy	1988–2008 Monarchy
Kyrgyzstan	1995–2005 Non-democracy	1995–2005 Civil autocracy
	2006–2008 Democracy	2006–2008 Mixed democracy
Laos	1972–2008 Non-democracy	1972–1992 Civil autocracy
		1993–2008 Military dictatorship
Latvia	1995–2008 Democracy	1995–2008 Parliamentary democracy
Lebanon	1972–1975 Democracy	1972–1975 Parliamentary democracy
	1976–2008 Non-democracy	1976–1988 Civil autocracy
		1989–1989 Military dictatorship
		1990–1998 Civil autocracy
		1999–2007 Military dictatorship
		2008–2008 Civil autocracy
Lesotho	1967–2008 Non-democracy	1967–1986 Civil autocracy
		1987–1993 Military dictatorship
		1994–2008 Civil autocracy

Table S.1 List of countries, states of democracy and ... *(continued from previous page)*

Liberia	1972–2006 Non-democracy	1972–1980 Civil autocracy
		1981–1990 Military dictatorship
		1991–2006 Civil autocracy
	2007–2008 Democracy	2007–2008 Presidential democracy
Libya	1988–2008 Non-democracy	1988–2008 Military dictatorship
Lithuania	1995–2008 Democracy	1995–2008 Mixed democracy
Luxembourg	1960–2008 Democracy	1960–2008 Parliamentary democracy
Macedonia	1992–2008 Democracy	1992–2008 Mixed democracy
Madagascar	1962–1993 Non-democracy	1962–1972 Civil autocracy
		1973–1993 Military dictatorship
	1994–2008 Democracy	1994–2008 Mixed democracy
Malawi	1965–1994 Non-democracy	1965–1994 Civil autocracy
	1995–2008 Democracy	1995–2008 Presidential democracy
Malaysia	1960–2008 Non-democracy	1960–2008 Civil autocracy
Maldives	1972–2008 Non-democracy	1972–2008 Civil autocracy
Mali	1962–1992 Non-democracy	1962–1968 Civil autocracy
		1969–1992 Military dictatorship
	1993–2008 Democracy	1993–2008 Mixed democracy
Malta	1972–2008 Democracy	1972–2008 Parliamentary democracy
Mauritania	1962–2008 Non-democracy	1962–1978 Civil autocracy
		1979–2007 Military dictatorship
		2008–2008 Civil autocracy
Mauritius	1969–2008 Democracy	1969–2008 Parliamentary democracy
Mexico	1960–2000 Non-democracy	1960–2000 Civil autocracy
	2001–2008 Democracy	2001–2008 Presidential democracy
Micronesia, Fed. States	1992–2008 Democracy	1992–2008 Presidential democracy
Moldova	1994–2008 Democracy	1994–1997 Parliamentary democracy
		1998–2000 Mixed democracy
		2001–2008 Parliamentary democracy
Mongolia	1972–1990 Non-democracy	1972–1990 Civil autocracy
	1991–2008 Democracy	1991–1992 Parliamentary democracy
		1993–2008 Mixed democracy
Morocco	1960–2008 Non-democracy	1960–2008 Monarchy
Mozambique	1976–2008 Non-democracy	1976–2008 Civil autocracy
Namibia	1991–2008 Non-democracy	1991–2008 Civil autocracy
Nepal	1962–1990 Non-democracy	1962–1990 Monarchy
	1991–2002 Democracy	1991–2002 Parliamentary democracy
	2003–2008 Non-democracy	2003–2008 Monarchy
Netherlands	1960–2008 Democracy	1960–2008 Parliamentary democracy
New Zealand	1960–2008 Democracy	1960–2008 Parliamentary democracy
Nicaragua	1960–1984 Non-democracy	1960–1967 Civil autocracy
		1968–1979 Military dictatorship
		1980–1984 Civil autocracy
	1985–2008 Democracy	1985–2008 Presidential democracy
Niger	1962–1993 Non-democracy	1962–1974 Civil autocracy
		1975–1993 Military dictatorship
	1994–1996 Democracy	1994–1996 Mixed democracy
	1997–2000 Non-democracy	1997–2000 Military dictatorship
	2001–2008 Democracy	2001–2008 Mixed democracy
Nigeria	1961–1966 Democracy	1961–1966 Parliamentary democracy
	1967–1979 Non-democracy	1967–1979 Military dictatorship
	1980–1983 Democracy	1980–1983 Presidential democracy
	1984–1999 Non-democracy	1984–1999 Military dictatorship
	2000–2008 Democracy	2000–2008 Presidential democracy
Norway	1960–2008 Democracy	1960–2008 Parliamentary democracy
Oman	1972–2008 Non-democracy	1972–2008 Monarchy

Table S.1 List of countries, states of democracy and ... *(continued from previous page)*

Pakistan	1974–1977 Democracy	1974–1977 Mixed democracy
	1978–1988 Non-democracy	1978–1988 Military dictatorship
	1989–1999 Democracy	1989–1999 Parliamentary democracy
	2000–2008 Non-democracy	2000–2008 Military dictatorship
Pakistan	1960–1971 Non-democracy	1960–1971 Military dictatorship
Panama	1960–1968 Democracy	1960–1968 Presidential democracy
	1969–1989 Non-democracy	1969–1989 Military dictatorship
	1990–2008 Democracy	1990–2008 Presidential democracy
Papua New Guinea	1976–2008 Democracy	1976–2008 Parliamentary democracy
Paraguay	1960–1989 Non-democracy	1960–1989 Military dictatorship
	1990–2008 Democracy	1990–2008 Presidential democracy
Peru	1960–1962 Democracy	1960–1962 Presidential democracy
	1963–1963 Non-democracy	1963–1963 Military dictatorship
	1964–1968 Democracy	1964–1968 Presidential democracy
	1969–1980 Non-democracy	1969–1980 Military dictatorship
	1981–1990 Democracy	1981–1990 Presidential democracy
	1991–2001 Non-democracy	1991–2001 Civil autocracy
	2002–2008 Democracy	2002–2008 Presidential democracy
Philippines	1960–1965 Democracy	1960–1965 Presidential democracy
	1966–1986 Non-democracy	1966–1986 Civil autocracy
	1987–2008 Democracy	1987–2008 Presidential democracy
Poland	1972–1989 Non-democracy	1972–1981 Civil autocracy
		1982–1989 Military dictatorship
	1990–2008 Democracy	1990–2008 Mixed democracy
Portugal	1960–1976 Non-democracy	1960–1974 Civil autocracy
		1975–1976 Military dictatorship
	1977–2008 Democracy	1977–2008 Mixed democracy
Qatar	1988–2008 Non-democracy	1988–2008 Monarchy
Romania	1962–1990 Non-democracy	1962–1990 Civil autocracy
	1991–2008 Democracy	1991–2008 Mixed democracy
Russian Federation	1992–2008 Non-democracy	1992–2008 Civil autocracy
Rwanda	1963–2008 Non-democracy	1963–1973 Civil autocracy
		1974–2008 Military dictatorship
Samoa	1972–2008 Non-democracy	1972–2008 Monarchy
Sao Tome-Principe	1976–1991 Non-democracy	1976–1991 Civil autocracy
	1992–2008 Democracy	1992–2008 Mixed democracy
Saudi Arabia	1988–2008 Non-democracy	1988–2008 Monarchy
Senegal	1962–2000 Non-democracy	1962–2000 Civil autocracy
	2001–2008 Democracy	2001–2008 Mixed democracy
Sierra Leone	1963–1967 Democracy	1963–1967 Parliamentary democracy
	1968–1998 Non-democracy	1968–1968 Military dictatorship
		1969–1985 Civil autocracy
		1986–1996 Military dictatorship
		1997–1997 Civil autocracy
		1998–1998 Military dictatorship
	1999–2008 Democracy	1999–2008 Presidential democracy
Singapore	1966–2008 Non-democracy	1966–2004 Civil autocracy
		2005–2008 Military dictatorship
Slovakia	1994–2008 Democracy	1994–1999 Parliamentary democracy
		2000–2008 Mixed democracy
Slovenia	1992–2008 Democracy	1992–2003 Mixed democracy
		2004–2008 Parliamentary democracy
Solomon Islands	1979–2008 Democracy	1979–2008 Parliamentary democracy
Somalia	1972–2008 Non-democracy	1972–1991 Military dictatorship
		1992–2008 Civil autocracy
South Africa	1960–2008 Non-democracy	1960–2008 Civil autocracy

Table S.1 List of countries, states of democracy and ... *(continued from previous page)*

South Korea	1960–1988 Non-democracy	1960–1961 Civil autocracy
		1962–1988 Military dictatorship
	1989–2008 Democracy	1989–2008 Presidential democracy
Spain	1960–1977 Non-democracy	1960–1975 Military dictatorship
		1976–1977 Civil autocracy
	1978–2008 Democracy	1978–2008 Parliamentary democracy
Sri Lanka	1960–1977 Democracy	1960–1977 Parliamentary democracy
	1978–1989 Non-democracy	1978–1989 Civil autocracy
	1990–2008 Democracy	1990–2008 Presidential democracy
St. Lucia	1980–2008 Democracy	1980–2008 Parliamentary democracy
St. Vincent-		
the Grenadines	1980–2008 Democracy	1980–2008 Parliamentary democracy
Sudan	1972–1986 Non-democracy	1972–1986 Military dictatorship
	1987–1989 Democracy	1987–1989 Parliamentary democracy
	1990–2008 Non-democracy	1990–2008 Military dictatorship
Suriname	1976–1980 Democracy	1976–1980 Parliamentary democracy
	1981–1988 Non-democracy	1981–1988 Military dictatorship
	1989–1990 Democracy	1989–1990 Presidential democracy
	1991–1991 Non-democracy	1991–1991 Military dictatorship
	1992–2008 Democracy	1992–2008 Presidential democracy
Swaziland	1972–2008 Non-democracy	1972–2008 Monarchy
Sweden	1960–2008 Democracy	1960–2008 Parliamentary democracy
Switzerland	1960–2008 Democracy	1960–2008 Presidential democracy
Syria	1962–2008 Non-democracy	1962–1963 Civil autocracy
		1964–2008 Military dictatorship
Tajikistan	1995–2008 Non-democracy	1995–2008 Civil autocracy
Tanzania	1962–2008 Non-democracy	1962–2005 Civil autocracy
		2006–2008 Military dictatorship
Thailand	1960–1979 Non-democracy	1960–1973 Military dictatorship
		1974–1976 Civil autocracy
		1977–1979 Military dictatorship
	1980–1991 Democracy	1980–1991 Parliamentary democracy
	1992–1992 Non-democracy	1992–1992 Military dictatorship
	1993–2006 Democracy	1993–2006 Parliamentary democracy
	2007–2008 Non-democracy	2007–2008 Military dictatorship
Togo	1962–2008 Non-democracy	1962–1967 Civil autocracy
		1968–2005 Military dictatorship
		2006–2008 Civil autocracy
Tonga	1972–2008 Non-democracy	1972–2008 Monarchy
Trinidad & Tobago	1963–2008 Democracy	1963–2008 Parliamentary democracy
Tunisia	1963–2008 Non-democracy	1963–1987 Civil autocracy
		1988–2008 Military dictatorship
Turkey	1960–1961 Non-democracy	1960–1960 Civil autocracy
		1961–1961 Military dictatorship
	1962–1980 Democracy	1962–1980 Parliamentary democracy
	1981–1983 Non-democracy	1981–1983 Military dictatorship
	1984–2008 Democracy	1984–2008 Parliamentary democracy
Turkmenistan	1995–2008 Non-democracy	1995–2008 Civil autocracy
Uganda	1963–1980 Non-democracy	1963–1971 Civil autocracy
		1972–1979 Military dictatorship
		1980–1980 Civil autocracy
	1981–1985 Democracy	1981–1985 Presidential democracy
	1986–2008 Non-democracy	1986–1986 Military dictatorship
		1987–2008 Civil autocracy
Ukraine	1995–2008 Democracy	1995–2008 Mixed democracy
United Arab Emirates	1988–2008 Non-democracy	1988–2008 Monarchy
United Kingdom	1960–2008 Democracy	1960–2008 Parliamentary democracy

Table S.1 List of countries, states of democracy and ... *(continued from previous page)*

United States of America	1960–2008 Democracy	1960–2008 Presidential democracy
Uruguay	1960–1973 Democracy	1960–1973 Presidential democracy
	1974–1985 Non-democracy	1974–1985 Military dictatorship
	1986–2008 Democracy	1986–2008 Presidential democracy
Uzbekistan	1992–2008 Non-democracy	1992–2008 Civil autocracy
Vanuatu	1981–2008 Democracy	1981–2008 Parliamentary democracy
Venezuela	1960–2008 Democracy	1960–2008 Presidential democracy
Viet Nam	1977–2008 Non-democracy	1977–1997 Civil autocracy
		1998–2001 Military dictatorship
		2002–2008 Civil autocracy
Yemen	1991–2008 Non-democracy	1991–2008 Military dictatorship
Zambia	1965–2008 Non-democracy	1965–2008 Civil autocracy
Zimbabwe	1966–2008 Non-democracy	1966–2008 Civil autocracy

Note: Ethiopia for the period 1960–1992 includes Eritrea, which gained its independence in 1993. Pakistan for the period 1960–1971 includes Bangladesh, which gained its independence in 1972.

Table S.2 List of Countries and Election-years as Estimated in Table 2.1

	Years covered	Election-year dummy = 1
Algeria†	1995–2003	1995; 1999
Belarus	1999–2006	2001; 2006
Burkina Faso†	1974–1976; 1980–2005	1998; 2005
Burundi	1968–2001	1993
Congo, Republic of	1997–2005	2002
Croatia†	1992–1998	1992; 1993; 1995; 1997
Dominican Republic†	1963–1977	1966; 1970; 1974
Ecuador†	1961–1967; 1970–1978	1978
Egypt	1991–1997; 2003–2006	2005
Guatemala†	1960–1965; 1974–1983	1974; 1978; 1982
Haiti	1968–1987; 2000–2004	1987; 2000
Honduras†	1966–1979	1971
Indonesia	1992–1998	1992; 1997
Iran	1979–1996; 2004–2006	2005
Kazakhstan	1998–2006	1999; 2005
Kenya	1971–2001	1992; 1997
Kyrgyzstan†	1994–2004	1995; 2000
Mexico†	1981–1993	1982; 1988
Pakistan	1999–2006	2002
Panama	1968–1981; 1984–1985	1968; 1984
Paraguay	1978–1988	1978; 1983; 1988
Rwanda	1969–2004	2003
Singapore†	1965–1967; 1970–2006	1972; 1976; 1980; 1984; 1988; 1991; 1997; 2001; 2006
South Korea	1961–1962; 1972–1986	1981
Tanzania†	1969–2005	1995; 2000; 2005
Tunisia†	1991–2006	1999; 2004
Uganda†	2000–2006	2006
Yemen†	1991–1999	1999
Zimbabwe	1991–1997	1996

Note: This list will slightly change once more stringent criteria for sample selection are imposed (as in Table 3.1) or an alternative designation of election-year dummy is used (as in Table 4.1). †denotes countries that belong to shallow autocracies.

Table S.3 List of Countries and Leaders as Estimated in Table 4.2

	Periods	Name of the leader
Albania	Jan 1984–Apr 1985	Hoxha
	May 1985–Apr 1992	Alia
	May 1992–Jul 1997	Berisha
	Aug 1997–Oct 1998	Fatos Nano
	Nov 1998–Oct 1999	Majko
	Nov 1999–Feb 2002	Meta
	Mar 2002–Jul 2002	Majko
	Aug 2002–Sep 2005	Fatos Nano
	Oct 2005–Dec 2009	Sali Berisha
Algeria	Aug 1962–Sep 1962	Ben Khedda
	Oct 1962–Jun 1965	Bella
	Jul 1965–Dec 1978	Boumedienne
	Jan 1979–Feb 1979	Bitat
	Mar 1979–Jan 1992	Benjedid
	Feb 1992–Jul 1992	Boudiaf
	Aug 1992–Jan 1994	Kafi
	Feb 1994–Apr 1999	Zeroual
	May 1999–Dec 2009	Bouteflika
Angola	Jan 1985–Dec 2009	Dos Santos
Bangladesh	May 1971–Jan 1972	Syed Nazrul Islam
	Feb 1972–Aug 1975	Sheikh Mujib Rahman
	Sep 1975–Nov 1975	Moshtaque Ahmed
	Dec 1975–May 1981	Ziaur Rahman
	Jun 1981–Mar 1982	Sattar
	Apr 1982–Dec 1990	Ershad
	Jan 1991–Mar 1991	Ahmed
	Apr 1991–Mar 1996	Khaleda Zia
	Apr 1996–Jun 1996	Mohammad Habibur Rahman
	Jul 1996–Jul 2001	Hasina Wazed
	Aug 2001–Oct 2001	Latifur Rahman
	Nov 2001–Oct 2006	Khaleda Zia
	Nov 2006–Jan 2007	Iajuddin Ahmed
	Feb 2007–Jan 2009	Fakhruddin Ahmed
	Feb 2009–Dec 2009	Sheikh Hasina Wajed
Belarus	Jan 1998–Dec 2009	Lukashenko
Belgium	Jan 2000–Mar 2008	Verhofstadt
	Apr 2008–Dec 2008	Yves Leterme
	Jan 2009–Nov 2009	Herman Van Rompuy
	Dec 2009–Dec 2009	Yves Leterme
Benin	Jan 1961–Oct 1963	Maga
	Nov 1963–Jan 1964	Soglo
	Feb 1964–Nov 1965	Apithy
	Dec 1965–Dec 1965	Congacou
	Jan 1966–Dec 1967	Soglo
	Jan 1968–Aug 1968	Alley
	Sep 1968–Dec 1969	Zinsou
	Jan 1970–May 1970	Paul-Emile de Souza
	Jun 1970–Apr 1972	Maga
	May 1972–Oct 1972	Ahomadegbe
	Nov 1972–Apr 1991	Kerekou
	May 1991–Apr 1996	Soglo, C
	May 1996–Apr 2006	Kerekou
	May 2006–Dec 2009	Yayi Boni

Table S.3 List of countries and leaders ... *(continued from previous page)*

Bosnia and Herzegovina	Jan 1994–Oct 1998	Izetbegovic
	Nov 1998–Jun 1999	Radisic
	Jul 1999–Feb 2000	Jelavic
	Mar 2000–Oct 2000	Izetbegovic
	Nov 2000–Jun 2001	Radisic
	Jul 2001–Feb 2002	Krizanovic
	Mar 2002–Oct 2002	Belkic
	Nov 2002–Apr 2003	Sarovic
	May 2003–Jun 2003	Borislav Paravac
	Jul 2003–Feb 2004	Dragan Covic
	Mar 2004–Oct 2004	Sulejman Tihic
	Nov 2004–Dec 2009	Borislav Paravac
Botswana	Oct 1966–Jul 1980	Khama
	Aug 1980–Mar 1998	Masire
	Apr 1998–Apr 2008	Mogae
	May 2008–Dec 2009	Ian Khama
Burkina Faso	Jan 1961–Jan 1966	Yameogo
	Feb 1966–Jan 1971	Lamizana
	Feb 1971–Feb 1974	Gerard Kango Ouedraogo
	Mar 1974–Nov 1980	Lamizana
	Dec 1980–Nov 1982	Zerbo
	Dec 1982–Aug 1983	J. P. Ouedraogo
	Sep 1983–Oct 1987	Sankara
	Nov 1987–Dec 2009	Campaore
Burundi	Aug 1962–Jul 1966	Mwambutsa
	Aug 1966–Nov 1966	Ntare
	Dec 1966–Nov 1976	Micombero
	Dec 1976–Sep 1987	Bagaza
	Oct 1987–Jul 1993	Buyoya
	Aug 1993–Oct 1993	Ndadaye
	Nov 1993–Feb 1994	Kinigi
	Mar 1994–Apr 1994	Ntarymira
	May 1994–Jul 1996	Ntibantunganya
	Aug 1996–Apr 2003	Buyoya
	May 2003–Aug 2005	Ndayizeye
	Sep 2005–Dec 2009	Pierre Nkurunziza
Cameroon	Jan 1961–Nov 1982	Ahidjo
	Dec 1982–Dec 2009	Biya
Cape Verde	Jan 1980–Apr 1991	Pires
	May 1991–Jul 2000	Veiga
	Aug 2000–Feb 2001	do Rosario
	Mar 2001–Dec 2009	Neves
Central African Republic	Jan 1961–Jan 1966	Dacko
	Feb 1966–Sep 1979	Bokassa
	Oct 1979–Sep 1981	Dacko
	Oct 1981–Oct 1993	Kolingba
	Nov 1993–Mar 2003	Patasse
	Apr 2003–Dec 2009	Francois Bozize
Chile	Jan 1961–Nov 1964	Alessandri Rodriguez
	Dec 1964–Nov 1970	Frei Montalva
	Dec 1970–Sep 1973	Allende
	Oct 1973–Mar 1990	Pinochet
	Apr 1990–Mar 1994	Aylwin
	Apr 1994–Mar 2000	Frei Ruiz-Tagle
	Apr 2000–Mar 2006	Ricardo Lagos Escobar
	Apr 2006–Dec 2009	Michelle Bachelet

Table S.3 List of countries and leaders ... (*continued from previous page*)

Colombia	Jan 1961–Aug 1962	Lleras Camargo
	Sep 1962–Aug 1966	Guillermo-Leon
	Sep 1966–Aug 1970	Lleras Restropo
	Sep 1970–Aug 1974	Pastrana Borrero
	Sep 1974–Aug 1978	Lopez Michelsen
	Sep 1978–Aug 1982	Turbay
	Sep 1982–Aug 1986	Betancur
	Sep 1986–Aug 1990	Vargas
	Sep 1990–Aug 1994	Trujillo
	Sep 1994–Aug 1998	Pizano
	Sep 1998–Aug 2002	Arango
	Sep 2002–Dec 2009	Alvaro Uribe Velez
Costa Rica	Jan 1961–May 1962	Echandi Jimenez
	Jun 1962–May 1966	Orlich
	Jun 1966–May 1970	Trejos
	Jun 1970–May 1974	Figueres Ferrer
	Jun 1974–May 1978	Quiros, Daniel
	Jun 1978–May 1982	Carazo Odio
	Jun 1982–May 1986	Monge Alverez
	Jun 1986–May 1990	Arias
	Jun 1990–May 1994	Calderon Fournier
	Jun 1994–May 1998	Figueres Olsen
	Jun 1998–May 2002	Rodriguez Echeverria
	Jun 2002–May 2006	de la Espriella
	Jun 2006–Dec 2009	Óscar Arias Sánchez
Cote d'Ivoire	Jan 1961–Dec 1993	Houphouet-Boigny
	Jan 1994–Dec 1999	Konan Bedie
	Jan 2000–Oct 2000	Guei
	Nov 2000–Dec 2009	Laurent Gbagbo
Cyprus	Jan 1988–Feb 1988	Kyprianou
	Mar 1988–Feb 1993	Vassiliou
	Mar 1993–Feb 2003	Clerides
	Mar 2003–Feb 2008	Tassos Nikolaou Papadopoulos
	Mar 2008–Dec 2009	Dimitris Christofias
Dominican Republic	Jan 1961–May 1961	Rafel Trujillo
	Jun 1961–Jan 1962	Balaguer
	Feb 1962–Feb 1963	Filiberto Bonnelly
	Mar 1963–Sep 1963	Bosch
	Oct 1963–Dec 1963	de los Santos
	Jan 1964–Apr 1965	Cabral
	May 1965–May 1965	Bartolome Benoit
	Jun 1965–Sep 1965	Berreras
	Oct 1965–Jul 1966	Godoy
	Aug 1966–Jul 1978	Balaguer
	Aug 1978–Jul 1982	Guzman Fernandez
	Aug 1982–Aug 1982	Majluta Azar
	Sep 1982–Aug 1986	Blanco
	Sep 1986–Aug 1996	Balaguer
	Sep 1996–Aug 2000	Fernandez Reyna
	Sep 2000–Aug 2004	Hipolito Mejia
	Sep 2004–Dec 2009	Fernandez Reyna
El Salvador	Jan 1961–Jan 1961	Castillo
	Feb 1961–Jan 1962	Portillo
	Feb 1962–Jul 1962	Rodolfo Cordon
	Aug 1962–Jul 1967	Rivera
	Aug 1967–Jul 1972	Sanchez Hernandez
	Aug 1972–Jul 1977	Molina

Table S.3 List of countries and leaders ... (*continued from previous page*)

El Salvador	Aug 1977–Oct 1979	Romero Mena
	Nov 1979–Dec 1980	Majano Ramos
	Jan 1981–May 1982	Duarte
	Jun 1982–Jun 1984	Magana Borjo
	Jul 1984–Jun 1989	Duarte
	Jul 1989–Jun 1994	Cristiani
	Jul 1994–Jun 1999	Calderon Sol
	Jul 1999–Jun 2004	Flores
	Jul 2004–Jun 2009	Saca González
	Jul 2009–Dec 2009	Mauricio Funes
Estonia	Jan 1995–Apr 1995	Tarand
	May 1995–Mar 1997	Vahi
	Apr 1997–Mar 1999	Siimann
	Apr 1999–Jan 2002	Laar
	Feb 2002–Apr 2003	Kallas
	May 2003–Apr 2005	Parts
	May 2005–Dec 2009	Andrus Ansip
Ethiopia	Jan 1981–May 1991	Mengistu Marriam
	Jun 1991–Dec 2009	Meles Zenawi
Fiji	Nov 1970–Apr 1987	Mara
	May 1987–May 1987	Bavadra
	Jun 1987–Dec 1987	Rabuka
	Jan 1988–Jun 1992	Mara
	Jul 1992–May 1999	Rabuka
	Jun 1999–May 2000	Chaudhry
	Jun 2000–Jul 2000	Bainimarama
	Aug 2000–Dec 2006	Laisenia Qarase
	Jan 2007–Jan 2007	Jona Senilagakali
	Feb 2007–Dec 2009	Voreqe Bainimarama
Gambia, The	Jan 1966–Jul 1994	Jawara
	Aug 1994–Dec 2009	Jammeh
Georgia	Jan 1992–Jan 1992	Gamsakhurdia
	Feb 1992–Mar 1992	Ioseliani
	Apr 1992–Nov 2003	Shevardnadze
	Dec 2003–Jan 2004	Burdjanadze
	Feb 2004–Nov 2007	Saakashvili
	Dec 2007–Jan 2008	Nino Burjanadze
	Feb 2008–Dec 2009	Mikheil Saakashvili
Ghana	Jan 1961–Feb 1966	Nkrumah
	Mar 1966–Apr 1969	Ankrah
	May 1969–Sep 1969	Afrifa
	Oct 1969–Jan 1972	Busia
	Feb 1972–Jul 1978	Acheampong
	Aug 1978–Jun 1979	Akuffo
	Jul 1979–Sep 1979	Rawlings
	Oct 1979–Dec 1981	Limann
	Jan 1982–Jan 2001	Rawlings
	Feb 2001–Jan 2009	John Agyekum Kufuor
	Feb 2009–Dec 2009	John Atta Mills
Guatemala	Jan 1961–Mar 1963	Ydigoras Fuente
	Apr 1963–Jul 1966	Peralta Azurdia
	Aug 1966–Jul 1970	Mendez Montenegro
	Aug 1970–Jul 1974	Arana Osorio
	Aug 1974–Jul 1978	Laugerud Garcia

Table S.3 List of countries and leaders ... (*continued from previous page*)

Guatemala	Aug 1978–Mar 1982	Lucas Garcia
	Apr 1982–Aug 1983	Rios Montt
	Sep 1983–Jan 1986	Mejia Victores
	Feb 1986–Jan 1991	Cerezo
	Feb 1991–May 1993	Serrano Elias
	Jun 1993–Jun 1993	Espina Salguero
	Jul 1993–Jan 1996	Leon Carpio
	Feb 1996–Jan 2000	Arzu Yrigoyen
	Feb 2000–Jan 2004	Alfonso Portillo Cabrera
	Feb 2004–Jan 2008	Berger Perdomo
	Feb 2008–Dec 2009	Álvaro Colom Caballeros
Guinea	Jan 1986–Dec 2008	Conte
	Jan 2009–Dec 2009	Moussa Dadis Camara
Guinea-Bissau	Oct 1974–Nov 1980	Cabral
	Dec 1980–May 1999	Vieira
	Jun 1999–Feb 2000	Sanha
	Mar 2000–Sep 2003	Kumba Iala
	Oct 2003–Oct 2005	Henrique Pereira Rosa
	Nov 2005–Mar 2009	Vieira
	Apr 2009–Sep 2009	Raimundo Pereira
	Oct 2009–Dec 2009	Sanha
Haiti	Jan 1991–Feb 1991	Pascal-Troillet
	Mar 1991–Sep 1991	Aristide
	Oct 1991–Feb 1994	Cedras
	Mar 1994–Feb 1996	Aristide
	Mar 1996–Feb 2001	Preval
	Mar 2001–Feb 2004	Aristide
	Mar 2004–May 2006	Boniface Alexandre
	Jun 2006–Dec 2009	Rene Preval
Honduras	Jan 1961–Oct 1963	Villeda Morales
	Nov 1963–Jun 1971	Lopez Arellano
	Jul 1971–Dec 1972	Cruz
	Jan 1973–Apr 1975	Lopez Arellano
	May 1975–Aug 1978	Castro
	Sep 1978–Jan 1982	Paz Garcia
	Feb 1982–Jan 1986	Suazo Cordova
	Feb 1986–Jan 1990	Azcona Hoyo
	Feb 1990–Jan 1994	Callejas
	Feb 1994–Jan 1998	Reina
	Feb 1998–Jan 2002	Flores Facusse
	Feb 2002–Jan 2006	Ricardo Maduro
	Feb 2006–Jun 2009	Manuel Zelaya
	Jul 2009–Dec 2009	Roberto Micheletti
Indonesia	Jan 1967–May 1998	Suharto
	Jun 1998–Oct 1999	Habibie
	Nov 1999–Jul 2001	Wahid
	Aug 2001–Oct 2004	Megawati Sukarnoputri
	Nov 2004–Dec 2009	Bambang Yudhoyono
Iran	Jan 1965–Feb 1979	Mohammad Reza
	Mar 1979–Jun 1989	Ayatollah Khomeini
	Jul 1989–Aug 1989	Khamenei
	Sep 1989–Aug 1997	Rafsanjani
	Sep 1997–Aug 2005	Khatami
	Sep 2005–Dec 2009	Mahmoud Ahmadinejad

Table S.3 List of countries and leaders ... (*continued from previous page*)

Ireland	Jan 1961–Nov 1966	LeMass
	Dec 1966–Mar 1973	Lynch
	Apr 1973–Jul 1977	Cosgrave, L.
	Aug 1977–Dec 1979	Lynch
	Jan 1980–Jun 1981	Haughey
	Jul 1981–Mar 1982	Fitzgerald
	Apr 1982–Dec 1982	Haughey
	Jan 1983–Mar 1987	Fitzgerald
	Apr 1987–Feb 1992	Haughey
	Mar 1992–Dec 1994	Reynolds
	Jan 1995–Jun 1997	Bruton
	Jul 1997–May 2008	Ahern
	Jun 2008–Dec 2009	Cowen
Israel	Jan 1961–Jun 1963	Ben Gurion
	Jul 1963–Feb 1969	Eshkol
	Mar 1969–Mar 1969	Allon
	Apr 1969–Jun 1974	Meir
	Jul 1974–Apr 1977	Rabin
	May 1977–Jun 1977	Peres
	Jul 1977–Oct 1983	Begin
	Nov 1983–Sep 1984	Shamir
	Oct 1984–Oct 1986	Peres
	Nov 1986–Jul 1992	Shamir
	Aug 1992–Nov 1995	Rabin
	Dec 1995–Jun 1996	Peres
	Jul 1996–Jul 1999	Netanyahu
	Aug 1999–Mar 2001	Barak
	Apr 2001–Jan 2006	Ariel Sharon
	Feb 2006–Mar 2009	Ehud Olmert
	Apr 2009–Dec 2009	Netanyahu
Jamaica	Sep 1962–Feb 1967	Bustamante
	Mar 1967–Apr 1967	Sangster
	May 1967–Mar 1972	Shearer
	Apr 1972–Nov 1980	Manley
	Dec 1980–Feb 1989	Seaga
	Mar 1989–Mar 1992	Manley
	Apr 1992–Mar 2006	Patterson
	Apr 2006–Sep 2007	Portia Simpson Miller
	Oct 2007–Dec 2009	Bruce Golding
Japan	Jan 1961–Nov 1964	Ikeda
	Dec 1964–Jul 1972	Sato
	Aug 1972–Dec 1974	Tanaka
	Jan 1975–Dec 1976	Miki
	Jan 1977–Dec 1978	Fukuda
	Jan 1979–Jun 1980	Ohira
	Jul 1980–Jul 1980	Ito
	Aug 1980–Nov 1982	Suzuki
	Dec 1982–Nov 1987	Nakasone
	Dec 1987–Jun 1989	Takeshita
	Jul 1989–Aug 1989	Uno
	Sep 1989–Nov 1991	Kaifu
	Dec 1991–Aug 1993	Miyazawa
	Sep 1993–Apr 1994	Hosokawa
	May 1994–Jun 1994	Hata
	Jul 1994–Jan 1996	Murayama
	Feb 1996–Jul 1998	Hashimoto

Table S.3 List of countries and leaders ... (*continued from previous page*)

Japan	Aug 1998–Apr 2000	Obuchi
	May 2000–Apr 2001	Yoshiro Mori
	May 2001–Sep 2006	Junichiro Koizumi
	Oct 2006–Sep 2007	Shinzo Abe
	Oct 2007–Sep 2008	Yasuo Fukuda
	Oct 2008–Sep 2009	Taro Aso
	Oct 2009–Dec 2009	Yukio Hatoyama
Jordan	Jan 1983–Feb 1999	Hussein Ibn Talal El-Hashim
	Mar 1999–Dec 2009	Abdullah Ibn Hussein El-Hashimi
Kenya	Jan 1964–Aug 1978	Kenyatta
	Sep 1978–Dec 2002	Moi
	Jan 2003–Dec 2009	Mwai Kibaki
Korea, Republic of	Jan 1961–May 1961	Myun Chang
	Jun 1961–Jul 1961	Chang Do Yong
	Aug 1961–Oct 1979	Hee Park
	Nov 1979–Aug 1980	Choi Kuy Hay
	Sep 1980–Feb 1988	Chun Doo Hwan
	Mar 1988–Feb 1993	Roh Tae Woo
	Mar 1993–Feb 1998	Kim Young Sam
	Mar 1998–Feb 2003	Kim Dae Jung
	Mar 2003–Feb 2008	Roh Moo Hyun
	Mar 2008–Dec 2009	Lee Myung Bak
Kuwait	Jan 1988–Dec 2009	Jabir As-Sabah
Kyrgyzstan	Jan 1999–Mar 2005	Akayev
	Apr 2005–Dec 2009	Kurmanbek Bakiyev
Lebanon	Jan 1997–Nov 1998	Elias Hrawi
	Dec 1998–Nov 2007	Emile Lahoud
	Dec 2007–May 2008	Fouad Siniora
	Jun 2008–Dec 2009	Michel Suleiman
Libya	Jan 1990–Dec 2009	Qaddafi
Malaysia	Jan 1961–Sep 1970	Rahman
	Oct 1970–Jan 1976	Razak
	Feb 1976–Jul 1981	Hussein Bin Onn
	Aug 1981–Oct 2003	Mahatir Bin Mohammad
	Nov 2003–Apr 2009	Ahmad Badawi
	May 2009–Dec 2009	Najib Tun Razak
Mali	Jan 1967–Nov 1968	Keita
	Dec 1968–Mar 1991	Traore
	Apr 1991–Jun 1992	Amadou Toure
	Jul 1992–Jun 2002	Konare
	Jul 2002–Dec 2009	Amadou Toure
Mauritius	Jan 1976–Jun 1982	Ramgoolam
	Jul 1982–Dec 1995	Anerood Jugnauth
	Jan 1996–Sep 2000	Ramgoolam N.
	Oct 2000–Sep 2003	Anerood Jugnauth
	Oct 2003–Jul 2005	Paul Berenger
	Aug 2005–Dec 2009	Navin Ramgoolam
Mexico	Jan 1961–Dec 1964	Lopez Mateos
	Jan 1965–Dec 1970	Diaz Ordaz
	Jan 1971–Dec 1976	Echeverria Alvarez
	Jan 1977–Dec 1982	Lopez Portillo
	Jan 1983–Dec 1988	de La Madrid
	Jan 1989–Dec 1994	Salinas
	Jan 1995–Dec 2000	Zedillo
	Jan 2001–Dec 2006	Vicente Fox Quesada
	Jan 2007–Dec 2009	Felipe Calderón

Table S.3 List of countries and leaders ... (*continued from previous page*)

Morocco	Jan 1961–Feb 1961	Mohammed V
	Mar 1961–Jul 1999	Hassan II
	Aug 1999–Dec 2009	Muhammad VI
Mozambique	Jan 1980–Nov 1986	Machel
	Dec 1986–Feb 2005	Chissano
	Mar 2005–Dec 2009	Guebuza
Namibia	Apr 1990–Mar 2005	Nujoma
	Apr 2005–Dec 2009	Hifikepunye Pohamba
Netherlands	Jan 1961–Jul 1963	de Quay
	Aug 1963–Apr 1965	Marijnen
	May 1965–Nov 1966	Cals
	Dec 1966–Apr 1967	Zijlstra
	May 1967–Jul 1971	De Jong
	Aug 1971–May 1973	Biesheuvel
	Jun 1973–Dec 1977	den Uyl
	Jan 1978–Nov 1982	van Agt
	Dec 1982–Aug 1994	Lubbers
	Sep 1994–Jul 2002	Kok
	Aug 2002–Dec 2009	Jan Peter Balkenende
Nicaragua	Jan 1961–May 1963	Luis Somoza Debayle
	Jun 1963–Aug 1966	Shick Gutierrez
	Sep 1966–May 1967	Guerrero Gutierrez
	Jun 1967–Jul 1979	Anastasio Somoza Debayle
	Aug 1979–Apr 1990	Daniel Ortega
	May 1990–Jan 1997	Violeta Chamorro
	Feb 1997–Jan 2002	Aleman
	Feb 2002–Jan 2007	Enrique Bolanos
	Feb 2007–Dec 2009	Daniel Ortega
Niger	Jan 1961–Apr 1974	Diori
	May 1974–Nov 1987	Kountche
	Dec 1987–Apr 1993	Seibou
	May 1993–Jan 1996	Ousmane
	Feb 1996–Apr 1999	Mainassara
	May 1999–Dec 1999	Wanke
	Jan 2000–Dec 2009	Mamadou
Nigeria	Jan 1961–Jan 1966	Balewa
	Feb 1966–Jul 1966	Ironsi
	Aug 1966–Jul 1975	Gowon
	Aug 1975–Feb 1976	Ramat Mohammed
	Mar 1976–Oct 1979	Obasanjo
	Nov 1979–Dec 1983	Shagari
	Jan 1984–Aug 1985	Buhari
	Sep 1985–Aug 1993	Babangida
	Sep 1993–Nov 1993	Shonekan
	Dec 1993–Jun 1998	Abacha
	Jul 1998–May 1999	Abubakar
	Jun 1999–May 2007	Obasanjo
	Jun 2007–Dec 2009	Umaru Musa Yar'Adua
Norway	Jan 1961–Aug 1963	Gerhardsen
	Sep 1963–Sep 1963	Lyng
	Oct 1963–Oct 1965	Gerhardsen
	Nov 1965–Mar 1971	Borten
	Apr 1971–Oct 1972	Bratteli
	Nov 1972–Oct 1973	Korvald
	Nov 1973–Jan 1976	Bratteli
	Feb 1976–Feb 1981	Nordli

Table S.3 List of countries and leaders ... (*continued from previous page*)

Norway	Mar 1981–Oct 1981	Brundtland
	Nov 1981–May 1986	Willoch
	Jun 1986–Oct 1989	Brundtland
	Nov 1989–Nov 1990	Syse
	Dec 1990–Dec 2009	Brundtland
Panama	Jan 1961–Oct 1964	Chiari, Roberto
	Nov 1964–Oct 1968	Robles
	Nov 1968–Jul 1981	Torrijos Herrera
	Aug 1981–Mar 1982	Florez Aguilar
	Apr 1982–Aug 1983	Dario Paredes
	Sep 1983–Dec 1989	Noriega
	Jan 1990–Sep 1994	Endara
	Oct 1994–Sep 1999	Balladares
	Oct 1999–Sep 2004	Mireya Moscoso
	Oct 2004–Jul 2009	Martin Torrijos
	Aug 2009–Dec 2009	Ricardo Martinelli
Peru	Jan 1980–Jul 1980	Morales Bermudez
	Aug 1980–Jul 1985	Belaunde
	Aug 1985–Jul 1990	Garcia Perez
	Aug 1990–Nov 2000	Fujimori
	Dec 2000–Jul 2001	Valentin Paniagua
	Aug 2001–Jul 2006	Alejandro Toledo
	Aug 2006–Dec 2009	Alan García
Philippines	Jan 1961–Nov 1961	Garcia
	Dec 1961–Dec 1965	Macapagal
	Jan 1966–Feb 1986	Marcos
	Mar 1986–Jun 1992	Aquino
	Jul 1992–Jun 1998	Ramos
	Jul 1998–Jan 2001	Estrada
	Feb 2001–Dec 2009	Gloria Macapagal-Arroyo
Portugal	Jan 1961–Sep 1968	Salazar
	Oct 1968–Apr 1974	Caetano
	May 1974–Sep 1974	Spinola
	Oct 1974–Jul 1976	Costa Gomes
	Aug 1976–Mar 1986	Eanes
	Apr 1986–Mar 1996	Soares
	Apr 1996–Mar 2006	Sampaio
	Apr 2006–Dec 2009	Aníbal Cavaco Silva
Rwanda	Nov 1961–Jul 1973	Kayibanda
	Aug 1973–Apr 1994	Habyarimana
	May 1994–Jul 1994	Sindikubwabo
	Aug 1994–Dec 2009	Paul Kagame
Senegal	Jan 1961–Jan 1981	Senghor
	Feb 1981–Apr 2000	Diouf
	May 2000–Dec 2009	Abdoulaye Wade
Slovenia	Jan 1992–May 1992	Peterle
	Jun 1992–May 2000	Drnovsek
	Jun 2000–Nov 2000	Bajuk
	Dec 2000–Dec 2002	Drnovsek
	Jan 2003–Nov 2004	Anton Rop
	Dec 2004–Nov 2008	Janez Jansa
	Dec 2008–Dec 2009	Borut Pahor
Sri Lanka	Jan 1961–Mar 1965	Bandaranaike, S
	Apr 1965–May 1970	Senanayake, Dudley
	Jun 1970–Jan 1977	Bandaranaike, S
	Feb 1977–Jan 1989	Jayewardene
	Feb 1989–May 1993	Premadasa

Table S.3 List of countries and leaders ... (*continued from previous page*)

Sri Lanka	Jun 1993–Nov 1994	Wijetunge
	Dec 1994–Nov 2005	Kumaratunga
	Dec 2005–Dec 2009	Mahinda Rajapakse
Sudan	Jan 1961–Nov 1964	Abboud
	Dec 1964–Jun 1965	al-Khalifa
	Jul 1965–Jul 1966	Maghoub
	Aug 1966–May 1967	Mahdi
	Jun 1967–May 1969	Maghoub
	Jun 1969–Jul 1971	Nimeiri
	Aug 1971–Apr 1985	Nimeiri
	May 1985–May 1986	Abdul Rahman Swaredahab
	Jun 1986–Jun 1989	Al-Mirghani
	Jul 1989–Dec 2009	Al-Bashir
Swaziland	Oct 1968–Aug 1982	Subhuza II
	Sep 1982–Aug 1983	Dzeliwe Shongwe
	Sep 1983–Apr 1986	Ntombe Thwala
	May 1986–Dec 2009	Mswati
Switzerland	Jan 1961–Dec 1961	Friedrich
	Jan 1962–Dec 1962	Chaudet
	Jan 1963–Dec 1963	Spuhler
	Jan 1964–Dec 1964	von Moos
	Jan 1965–Dec 1965	Tschudi
	Jan 1966–Dec 1966	Schaffner
	Jan 1967–Dec 1967	Bonvin
	Jan 1968–Dec 1968	Spuhler
	Jan 1969–Dec 1979	von Moos
	Jan 1980–Dec 1980	Chevallaz
	Jan 1981–Dec 1981	Furgler
	Jan 1982–Dec 1982	Honegger
	Jan 1983–Dec 1983	Aubert
	Jan 1984–Dec 1984	Schlumpf
	Jan 1985–Dec 1985	Furgler
	Jan 1986–Dec 1986	Egli
	Jan 1987–Dec 1987	Aubert
	Jan 1988–Dec 1988	Stich
	Jan 1989–Dec 1989	Delamuraz
	Jan 1990–Dec 1990	Koller
	Jan 1991–Dec 1991	Cotti
	Jan 1992–Dec 1992	Felber
	Jan 1993–Dec 1993	Ogi
	Jan 1994–Dec 1994	Stich
	Jan 1995–Dec 1995	Villiger
	Jan 1996–Dec 1996	Delamuraz
	Jan 1997–Dec 1997	Koller
	Jan 1998–Dec 1998	Cotti
	Jan 1999–Dec 1999	Dreifuss
	Jan 2000–Dec 2000	Ogi
	Jan 2001–Dec 2001	Leuenberger
	Jan 2002–Dec 2002	Villiger
	Jan 2003–Dec 2003	Pascal Couchepin
	Jan 2004–Dec 2004	Joseph Deiss
	Jan 2005–Dec 2005	Samuel Schmid
	Jan 2006–Dec 2006	Moritz Leuenberger
	Jan 2007–Dec 2007	Micheline Calmy-Rey
	Jan 2008–Dec 2008	Pascal Couchepin
	Jan 2009–Dec 2009	Hans-Rudolf Merz

Table S.3 List of countries and leaders ... (*continued from previous page*)

Syria	Jan 1966–Feb 1966	Al-Hafiz
	Mar 1966–Jun 2000	El-Atassi, N.
	Jul 2000–Dec 2009	Bashar al-Assad
Tanzania	Jan 1988–Nov 1995	Mwinyi
	Dec 1995–Dec 2005	Mkapa
	Jan 2006–Dec 2009	Kikwete
Togo	Jan 1961–Jan 1963	Olympio
	Feb 1963–Jan 1967	Grunitzky
	Feb 1967–Apr 1967	Dadjo
	May 1967–Feb 2005	Eyadema
	Mar 2005–May 2005	Abass Bonfoh
	Jun 2005–Dec 2009	Faure Gnassingbé
Trinidad &Tobago	Sep 1962–Mar 1981	Williams
	Apr 1981–Dec 1986	Chambers
	Jan 1987–Dec 1991	Robinson
	Jan 1992–Nov 1995	Manning
	Dec 1995–Dec 2001	Panday
	Jan 2002–Dec 2009	Manning
United Arab Emirates	Jan 1975–Dec 2009	An-Nahayan
United Kingdom	Jan 1961–Oct 1963	MacMillan
	Nov 1963–Oct 1964	Douglas-Home
	Nov 1964–Jun 1970	Wilson
	Jul 1970–Mar 1974	Heath
	Apr 1974–Apr 1976	Wilson
	May 1976–May 1979	Callaghan
	Jun 1979–Nov 1990	Thatcher
	Dec 1990–May 1997	Major
	Jun 1997–Jun 2007	Blair
	Jul 2007–Dec 2009	Gordon Brown
Uzbekistan	Jan 1992–Dec 2009	Karimov
Yemen	Jan 1990–Dec 2009	Saleh al-Hashidi
Zambia	Nov 1964–Nov 1991	Kaunda
	Dec 1991–Jan 2002	Chiluba
	Feb 2002–Jun 2008	Levy Mwanawasa
	Jul 2008–Dec 2009	Rupiah Banda