DEPARTMENT OF COMPARATIVE POLITICS

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Crises to die for: a quantitative study of financial crises, political instability, and economic growth

MASTER THESIS

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Abstract

This thesis emphasizes the multidimensionality of political instability when examining whether financial crises may trigger political instability, and how financial crises and instability affect the growth rate of the economy. A total of 20 political instability indicators are used to make four indices of instability by means of Principal Component Analysis. These indices are thought to reflect different dimensions of political instability: *political violence, civil protest, regime change and government instability.*

I use data for a panel of 148 countries over 35 years to investigate the questions put forth. The chosen quantitative approach employs a panel data regression model that emphasizes differences within and between the units being studied.

Findings suggest that financial crises may trigger socio-political instability as measured by the indices of political violence and civil protest. I also uncover that political instability is highly contagious. Furthermore, financial crises have an expected negative effect on economic growth. The relationship between political instability and growth has been intensively discussed in the literature, and the many contradictory results have contributed to fueling this discussion. My findings of opposing effects confirm the appropriateness of modeling political instability as multidimensional. Only change *of* or *in* regimes affect the growth rate of the economy, but interestingly, government instability is *positive*, while regime changes are *negative* for growth.

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Bergen, May 2011
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1.0 Introduction

In time, every crisis ends. But no crisis, especially one of this severity, passes without leaving a legacy (Joseph Stiglitz 2010).

The quote above of course refers to the latest global financial crisis. After the U.S. subprime market exploded in 2007, the global economy was sent into recession. As financial contagion spread, output fell, unemployment rose, and governments stocked on debt to provide fiscal relief, many sceptics realized the true destructiveness of financial crises. The effect of financial crises on both the economy and the political environment is crucial to understand, particularly for policy makers trying to avoid new crashes. However, is the legacy that Stiglitz refers to the persistence of the financial shock on the real economy in post-crisis years? Or is it the political consequences of cleaning up the mess? And why have we not learned the legacies of previous financial crises? The global financial crises not only challenged certain truths about how the capitalist system works, it also produced a new wave of research on both the causes and consequences of financial crises. In 2008, Luc Laeven and Fabian Valencia published a new database on banking crises, which have been updated in 2010. This data provides new opportunities for studying the political and economic consequences of crises.

Last year, Zachary Davis and Thomas Carothers tried to evaluate some consequences of the latest financial crisis and the following economic downturn with respect to the effects on democracy and political stability. They comment that in more than 35% of the elections held in 2009, "frustrated citizens voted out incumbents […] including long-term ruling parties in Iceland, Japan and El Salvador." Although they do not claim that the relationship is a causal one, they find it likely that the crisis greatly contributed to popular discontent, referring to massive street protest and the following resignation of the prime minister in Latvia, and the public anger observed in Greece due to their fiscal challenges (Davis and Carothers 2010). When considering political instability and social unrest due to a crisis, there might be large differences, particularly between democracies and autocracies. However, Davis and Carothers comment that in democracies "anger has largely been channeled through the ballot-box." And although there were several democratic reversals in 2009 (for example in Honduras and Madagascar) nothing indicates economic distress as the main cause. The relative stability of all types of political regimes is found somewhat surprising to Davis and Carothers, but it may be that 2010 was too early for drawing conclusions.

This relative stability is also an argument for not focusing only on regime change, or the difference between the classic dichotomies democracy/autocracy, which may be limiting. Even in modern democracies, where government change is generally peaceful, political instability might still have important effects on the economic environment. Therefore, one may benefit by applying a wider lens on political turmoil. The Political Instability Index shows the level of threat posed to governments due to social protest (Economist Intelligence Unit 2010). Of the 165 countries evaluated in 2009/2010 nearly half are judged *high risk* or *very high risk*. Compared to the last publication in 2007, only two countries obtained a lower risk level, in twelve countries there was no change, and 151 countries are scored as having a higher risk of political instability.

There exists a large literature studying the economic consequences of financial crises (i.e. Cerra and Saxena 2008; Reinhart and Rogoff 2009; Reinhart and Reinhart 2010; Cavallo and Cavallo 2010). Not surprisingly, these studies mainly find financial crises to negatively affect economic growth, although some evidence also indicates that crises as a product of financial liberalization can be positive in the long-run (Rancière, Tornell and Westermann 2008). There is also a large literature that studies the economic consequences of political instability (i.e. Londregan and Poole 1990; Alesina, Özler, Roubini and Swagel 1996; Campos and Nugent 2002). Richard Jong-A-Pin (2009) argues that the conception of political instability as one- or two-dimensional is mistaken, political instability is multidimensional, and this may explain some of the contradictory findings in the instability-growth literature. Studies considering the political effects of financial crises are rarer. However, many studies in comparative politics have examined political consequences of economic crises (i.e. O'Donnell 1973; Gasiorowski 1995). More specifically, these studies focus on regime change and democratic breakdowns in periods of economic despair. This thesis connects three overlapping fields of research in its three main variables: financial crises, political instability and economic growth, and poses the following research question:

1.1 Can financial crises trigger political instability? What effects do political instability and financial crises have upon long-term economic growth?

The reason for studying economic growth is quite simple: *it matters*. High levels of income reflect high standards of living. And while one may argue that economic growth do not

automatically translate into welfare or higher quality of life, the standards of living, healthcare system, etc., observed in advanced rich countries are striking compared to the less-developed (Acemoglu 2009:7). This is also the reason why economists have been trying to identify what factors promotes growth, why the poor stay poor while the rich become richer, and why the prescribed medicine does not seem to work.

1.2 Goals of the thesis

This thesis has two main goals, reflected in the research question. The first analytical part of the thesis is *exploratory*. If political instability should be modeled as multidimensional, what determinants affect the different dimensions, and do financial crises trigger outbursts of violence, protest, or even changes *in* or *of* regimes? If the latter is established, how do we explain this relationship? I will argue that political instability is multidimensional, and much effort is put into modeling this concept and creating the measures reflecting different dimensions of political instability. A new contribution is also given through the efforts of trying to explain a possible framework for how crises create instability. The second part of this thesis is *confirmatory*. I review the literature both with regards to results and methods applied, to explain the variation in previous results. I introduce financial crises to the study of political instability and growth, and evaluate the appropriateness of modeling instability as multidimensional. A multidimensional operationalization may explain the varying results in the past, as indicators of instability have been rammed together in indices without taking dimensionality into account.

The thesis will focus on the three main variables of interest and the relationship between these. In addition to emphasizing the multidimensionality of political instability, this thesis will discuss the uncritical use of economic growth measures in the literature, and stress the importance of choosing a domestic price-adjusted measure of growth rates to avoid measurement bias. I also emphasize within- and between modeling of the relationships. This way of empirically testing growth hypotheses challenges the standard fixed effects techniques normally applied by econometricians in growth studies, and is also of substantial interest since one thereby isolates whether the estimated effects primarily vary within or between countries.

1.3 Short preview of central findings

I find clear indications that modeling political instability as multidimensional is appropriate. Following Sanders (1981) and Jong-A-Pin (2009), I make four indices of political instability using Principal Component Analysis, which reflect different dimensions of the phenomena: *political violence, civil protest, regime change* and *government instability*. I also find the methodological approach applied in this thesis to be beneficial. Modeling specific within- and between-effects have several benefits concerning efficiency, including constant variables, and treating endogeneity.

The findings of the analyses show that financial crises may trigger political instability, but that only some types of instability seem to be the product of crises. Crises can lead to socio-political unrest (political violence; civil protest), but no evidence is found that crises increase the occurrence of executive/regime instability (regime change; government instability). I also find that political instability is highly contagious. Events of political instability typically lead to the occurrence of other events of instability. The effect of financial crises on growth is found to be consistently negative, and the effect of political instability on growth is found to be contradictory depending on the dimension of instability. Regime change is negative for growth, while government instability is positive for growth. The latter result is also shown to be sensitive to the exclusion of Sub-Saharan African countries.

1.4 Structure of the thesis

The next chapter (2) presents the theoretical background, literature survey and a methodological review concerning previous studies of political instability and growth. I will start by defining and discussing different measures of financial crises in section 2.1. Following this, section 2.2 concerns political instability. Here, I define and discuss the development in studies of political instability from one- and two-dimensional, to a multidimensional view of political instability. Section 2.3 establishes the relationship between financial crises and political instability. Other possible determinants of political instability are discussed, and hypotheses of the expected effects are presented. Section 2.4 presents the relationship between financial crises and economic growth, and hypotheses of the expected effects are introduced. Section 2.5 concerns the relationship between political instability and growth. First, the empirical results from past studies are described. Second, the theoretical explanations for these observed correlations are presented, and the expected effect is

presented. Section (2.6) gives a methodological review of past studies of political instability and growth, and describes the problem faced when examining this relationship. The chapter summary (2.7) summarizes the main points.

Chapter 3 presents the methodology of the analyses. First, the benefits of panel data analysis are explained. The chapter continues by describing the difference of fixed- and random-effects, how some of the problems with random-effects models may be solved by applying within- and between-analysis, before I justify my choice of estimation technique. Following this is a short presentation of interaction effects, and some econometrical challenges and assumptions in panel data models.

Chapter 4 present the data and measurements applied in the analysis. Section 4.1 discusses the measure of economic growth. Section 4.2 presents the variables of political instability. I use 20 variables common in the literature to create four indices by means of principal component analysis. Section 4.3 describes the chosen measure of financial crises, which is the banking crises variable. The last section (4.4) shortly describes the control variables to be employed in both analyses.

Chapter 5 contains the analyses. Section 5.1 is the analysis of financial crises and political instability. Or more specifically, financial crises and political violence (5.1.1), civil protest (5.1.2), regime change (5.1.3) and government instability (5.1.4). Section 5.1.5 discusses the results. Section 5.2 present the result of the growth analysis and discuss the findings. Lastly, section 5.3 contains some sensitivity tests of the method applied and central findings.

Chapter 6 concludes, with a summary of results, contribution of the findings, and suggestions for further research.

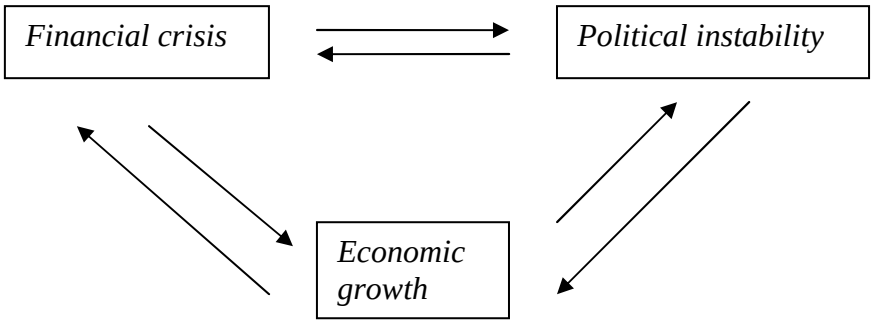
2.0 Theoretical Framework and Literature Survey

In this part I will establish and define the concepts of financial crisis and political instability. Also, it is necessary to ascertain how financial crisis may lead to political instability and how both instability and crises affect the prospects of long-term economic growth. The relationship between the political and economic environment is most likely endogenous. While financial crises affect growth directly, it also has political consequences that may influence growth further down the line. In addition, economic growth might impact both the political stability and the prospects of financial crisis in a given country. Furthermore, since the political environment critically affects economic variables, it is also possible that political instability may contribute to, or trigger, financial crises. This magnitude of possible reciprocity and simultaneity needs to be taken into account, to be able to properly specify, model and estimate the processes at work.

Relationship of interest:

Financial crisis → Political instability → Economic growth

Possible reciprocity, simultaneity, and feedback effects:



The first issue at hand is to define and discuss the concepts of financial crises and political instability. Following this, the relationship between financial crises and political instability is discussed, in addition to other determinants of political instability. This constitutes the theoretical basis for the first *exploratory* part of the thesis. Next, the connection between financial crises and growth, and political instability and growth is treated. This make up the theoretical basis for the second *confirmatory* part of the thesis. The last part of this chapter gives a methodological review mostly concerned with the many previous studies of political instability and growth.

2.1 What are financial crises?

Financial crises are a reoccurring and continuously surprising feature of the capitalist system. In fact, financial crises have become more common since World War II, firstly due to poor macroeconomic policies under the Bretton Woods regime, and secondly due to financial liberalization in the post-Bretton Woods regime (Knoop 2008: 213). Despite economists' increasingly advanced theories of both its origins and predictability, crises have appeared regularly, although not in a constant cyclical manner, over time. Reinhart and Rogoff (2008) comment that: "periods of high international capital mobility have repeatedly produced international banking crises, not only famously as they did in the 1990s, but historically." It is therefore central to understand the political and economical consequences of financial crises.

Definitions and indicators

There are many types of financial crises and they can be both damaging and contagious. When recession or depression follows, the effects of financial crisis on the real economy can be severe. The causes of previous financial crises are many: "unsustainable macroeconomic policies (…), excessive credit booms, large capital inflows, and balance sheet fragilities, combined with policy paralysis due to a variety of political and economic constraints" (Laeven and Valencia 2008:3). It is common to differentiate between *domestic* and *external* crisis origins. As examples of crises with external origins, Cavallo and Cavallo (2010:842) mention *current account reversals* defined as "a reduction in the current account deficit of a certain percentage of GDP in on year." The concept of "*sudden stops*" is defined as "an unexpected reduction in net capital inflows." Both these crisis can possibly also trigger a *currency crisis* (Frankel 2005). Such a crisis can be defined as a "nominal depreciation of the currency of at least 30 percent that is also at least a 10 percent increase in the rate of depreciation compared to the year before" (Laeven and Valencia 2008:6). Crises with domestic origins are exemplified by *inflationary crises* and *balance of payment crises* created by domestic fiscal imbalances (Cavallo and Cavallo 2010:842). *Debt crises*, on the other hand, can have both domestic and external origins. Manasse, Schimmenpfennig and Roubini (2003) defines countries as having debt crises if "it is classified as being in default by standards and poor's or if it receives a large non-concessional IMF loan defined as access in excess of 100% quota."

An important aspect of financial crises is that of contagion, which can be defined as "the process by which a shock in one part of the financial system spreads to other parts through a

series of 'linkages'" (Allen and Gale 2007). Some economic shocks are correlated across countries and would thus be felt by many countries, in addition, real shocks can spread through trade linkages and financial linkages (Knoop 2008:199). Because of market herding and self-fulfilling tendencies, the power of information and expectations are also central in understanding contagion. The feature of contagion has become a central characteristic of financial crises, especially of the post-1980 crises (Knoop 2008:198). Allen and Gale (2007:25) elaborate on contagion:

A fall in prices on one market may be interpreted as a negative signal about fundamentals. If these fundamentals are common to other markets, the expected returns and hence prices on those markets will also fall. Similarly, if one currency depreciates, other countries with common fundamentals may find that their currency also depreciates.

Typically, a crisis is measured by low values of some macroeconomic variable(s) relative to a level of reference. The problem using this approach is deciding how much deterioration constitutes a crisis (Drazen 2000: 449). Examples of this approach are inflation (high-inflation crisis) and growth in GDP per capita (negative growth), or debt-crisis as measured by the current-account deficit or total indebtedness. A second approach to measure financial crises is to make a crises-index like that of Reinhart and Reinhart (2010). The BCDI- index measures banking, currency, default and inflation crises, and weights the varieties of crises taking place in a given country in a given year against the country's share of world income (Reinhart and Reinhart 2010:5). Another possible way of studying financial crises, which capture a multitude of financial phenomena and the feature of contagion, is that of *banking crises* (Laeven and Valencia 2008). Knoop (2010:163) defines banking crisis as "a situation in which numerous banks fail simultaneously, leading to a significant reduction in bank credits as well as other forms of financial intermediation." Since the banking sector is highly vulnerable to a variety of factors and events, both domestic and external, this concept captures several relevant forms of financial distress. Laeven and Valencia (2008:5) defines a *systemic* banking crisis as occurring when "a country's corporate and financial sectors experience a large number of defaults and financial institutions and corporations face great difficulties repaying contracts on time." Because of its nature as an "incident", financial crises measured as banking crises escapes the problem of deciding a deterioration threshold in long time-series of some macroeconomic variable(s).

Knoop (2008:194) observe that financial crises have been twice as frequent in the period 1973-1997 compared to before 1913, and almost all of this increase is driven by the number of currency crises. However, when he compares the post-Bretton Woods period to the Bretton Woods period (1945-1971), it is discovered that the frequency of financial crises as currency crises have declined, while the number of banking crises have increased dramatically. These banking crises have also "become increasingly associated with currency crises" (Knoop 2008:195). Typically, the occurrence of concurrent currency and banking crises are referred to as *twin crises*. According to Knoop (2008), twin crises have become a distinct feature of financial crises. In the Bretton Woods era, financial crises were usually more predictable and explainable as they were associated with obvious bad macroeconomic policy.

The common feature across different types of financial crises that are relevant for this thesis consists of the fact that it has real economic consequences, may be contagious, and that it creates the need for political action. While the BCDI-index gives a measure of the severity and global importance of different crises, the banking crises indicator indicates the occurrence of crises and the duration. However, when creating an index, different time frames for the different measures may limit the sample period. Cavallo and Cavallo (2010:842) find that the banking crisis indicator is "more than twice more correlated" with other crisis variables than any other indicator. Based on these findings I choose to proxy financial crises based on the banking crisis variable. The choice of indicator and operationalization will be elaborated on further in section 4.3.

2.2 Political instability

Political instability as qualitative phenomena, are difficult to measure quantitatively and not easily defined. Political instability can be measured by both events and perceptions, the latter being least celebrated. The ambiguity about the meaning of this concept has led to application of a wide range of measures and an array of definitions. As we shall see, this has led to accusations of misspecification, errors of measurement, mistaken causal linkages, and problems of comparability. The goal of this section is to review the history of this concept and arrive at the dimensions of political instability which are relevant for the purpose of this thesis. With this in mind it is natural to focus on the discussion within the instability-growth literature.

Defining political instability

Is political instability simply the opposite of political stability? According to an early definition by Lipset (1960), a politically stable country had been a democracy or autocracy for at least 25 years (Miljkovic and Rimal 2008:2455). This definition would mean that political instability was just the non-persistency in form of government, no matter what type of rule. Sanders (1981:5) related political instability to legitimacy of the political system, and thus a political system could only be more or less stable compared to it or other systems. This also suggests that individuals can be dissatisfied, loose confidence in the political system and act on their discontent. The predominant view of political instability builds on both these definitions. Social unrest and civil disobedience may manifest itself through civil society, creating socio-political tension and a possible threat to political regimes. There is also another view, relating political instability to changes within the confines of institutional democracy, as different preferences produce changes in governments (Miljkovic and Rimal 2008:2455).

One- and two-dimensional studies

Browsing through the literature one will quickly establish that two common understandings of political instability are central. The first emphasizes *executive instability* and the second *social and political unrest*. In the first approach, political instability defined as executive instability is the "propensity to observe government changes" (Alesina and Perotti 1996:1205). Here, one differentiates between *constitutional* and *unconstitutional* government changes, that is, changes can take place within the law or outside, i.e. coups d'état. The second approach focuses on socio-political instability defined as phenomena of social unrest and political violence. This constitutes civil-society induced manifestations of political instability.

Alesina and Perotti's (1996) two dimensions of political instability:

> *Regime-related instability:* coups d'état, governmental crisis, purges, cabinet changes.
> *Instability induced by civil-society:* assassinations, general strikes, guerilla warfare, riots, revolutions, anti-governmental demonstrations.

Feng (2003:51-52) conceives political instability as changes of government. He emphasizes the difference between *irregular* and *regular* government change on the one hand, and *major* and *minor* government change on the other hand. One may argue that major and minor changes of government have different impact on growth, but the difference turn pale when

compared to irregular and regular changes. As Feng (2003:52) states: "It is certainly difficult to consider the power transfer from Prime Minister James Callaghan to Prime Minister Margaret Thatcher as having the same policy implications as that from President Salvador Allende to General Augusto Pinochet…" Even though both events should be classified as major government change, the qualitative difference is obvious.

Feng's (2003) conception of political instability as government change:

	Regular	*Irregular*
Minor change	Constitutional power transfer within the same party.	Irrelevant
Major change	Constitutional alternation in office. Callaghan/Thatcher.	Coup d'état Allende/Pinochet.

Multidimensional studies

According to Butkiewicz and Yanikkaya (2005) the most frequently used measures of political instability fall into three categories: government stability, social unrest/stability, and political violence. They argue that the diversity of measures and different subsets of these used in different studies makes the results non-comparable (Butkiewicz and Yanikkaya 2005:630). Nonetheless, some measures are more common than others, like revolutions, coups, and assassinations. In an attempt to organize a conceptually confused field, Butkiewicz and Yanikkaya (2005:633) categorize 17 measures of political instability into the above mentioned categories:

Government stability:	Social Stability:	Political violence:
Coups	External conflict risk	Political protests
Revolutions	Civil war risk	Assassinations
Cabinet changes	Political terrorism	Purges
Anti-government demonstrations	Racial and nationality tensions	Deaths from political violence
Government crisis		Riots
		General strikes
		War casualties
		War (on national territory)

At first glance, some of the measures found under political violence, could just as well have been categorized under social stability (i.e. strikes, riots, protests), and thereby leaves the question of whether such a categorization is appropriate. With the latter in mind, I will not

focus on this categorization, but it is included since it gives a good overview of different measures and the problem of categorizing indicators.

Jong-A-Pin (2009) examines the multidimensionality of political instability and arrives at four main dimensions: (1) politically motivated violence; (2) mass civil protest; (3) instability *within* the political regime; (4) and instability *of* the political regime. The author comments that previous studies of the effect of political instability on growth have mainly been one-dimensional, which may imply both errors of measurement and incorrect specifications of the causal linkage between instability and growth (Jong-A-Pin 2009:15). To arrive at these dimensions the author applies a factor analysis approach to 25 indicators of political instability.[1] This way, the categorization is also based on statistical techniques.

Sanders (1981) proposed similar dimensions: (1) violent challenges to regime or government, (2) peaceful challenges to either, (3) change in regime, and (4) change in government. The first two dimensions capture challenges to the regime, while the latter two make up actual changes of the regime or government. However, Jong-A-Pin (2009:26) do not fully agree with this set up because, as he states: "the third dimension [instability within the regime] clearly not only refers to actual changes, but also the potential for change as reflected by, i.e., the number of elections and the degree of fractionalization".

Sanders (1981) multidimensional framework of political instability:

(1) Violent challenges to regime or government.
(2) Peaceful challenges to regime or government.
(3) Change in regime.
(4) Change in government.

Jong-A-Pin's (2009) multidimensional framework of political instability:

(1) Politically motivated violence.
(2) Mass civil protest.
(3) Instability *within* the political regime.
(4) Instability *of* the political regime.

[1] Because of the mere quantity, all these are not listed here. See Jong-A-Pin (2009: 27).

Discussion

Although both Sanders (1981) and Jong-A-Pin (2009) emphasize four dimensions of political instability they still reflect the two basic elements. Politically motivated violence and mass civil protest reflect socio-political unrest or civil-society induced instability, while political instability within and of the regime reflect government and regime change and instability.

Socio-political unrest / civil-society induced instability:

- Politically motivated violence / violent challenges to regime or government.
- Mass civil protest / peaceful challenges to regime or government.

Regime change / executive instability (minor, major, regular, irregular):

- Instability *within* the political regime / change in government.
- Instability *of* the political regime / change in regime.

According to Carmignani (2003), the dimension of socio-political unrest may manifest itself through ethno-linguistic, religious, ideological and economic conflicts. Such high level of social unrest and conflict may disrupt market activities, directly affecting investment or growth for other reasons than the uncertainty associated with government turnover. Sources for government change, on the other hand, can result from interactions between represented interests in institutions and the electorate (Carmignani 2003). The probability of government change is usually related to economic, political, social and institutional variables. With a high propensity to executive changes comes political uncertainty and possibly threats to property rights (Alesina and Perotti 1996:1203).

When is what dimension relevant to include? Alesina and Perotti (1996) comment that this must depend on the specific issue under consideration. Studies of political instability and growth most commonly focus on only one dimension alone, for example coups d'état. A large literature investigate the effects of political instability induced by inequality on growth, these studies typically focus on socio-political unrest, as this is the dimension of instability linking inequality to growth (Alesina and Perotti 1996). It is of course central to avoid both errors of measurement and incorrect specification of the causal relationship. In many cases, it may be problematic to represent political instability through a single variable reflecting only one dimension of the phenomena. On the other hand, it is also problematic to include 25 measures of political instability as explanatory variables. To reflect several components of political

instability, many authors therefore use indices created by several indicators that proxy different phenomenon of instability. Blanco and Grier (2009:77) argue that principal component analysis (PCA) is an efficient way to capture the multidimensionality of political instability. Fosu (2001) tests different specifications of political instability on growth in an augmented production function framework. His results indicate that principal component indices provide no misspecification of the relationship between instability and growth. However, when political instability is measured by separate indicators, this yields poor fit, misspecification and underestimation of the relationship.

Table 1 gives an overview of the development in studies using political instability as main explanatory variable. In this table, one-dimensional studies refer to those in which indicators covering only *one dimension* of political instability are used. Studies said to cover *two dimensions* both include some indicator of socio-political unrest and regime instability. Those studies categorized as *multidimensional* makes the distinction even more explicit with subcategories for socio-political unrest and regime instability. These studies include many indicators of political instability and test both aggregate effects of many indicators, and individual effects of single indicators. Comparing different indices in the literature, Jong-A-Pin (2009:21) finds that the index applied by Barro (1991) and Perotti (1996) primarily reflects politically motivated violence, while that of Alesina et al. (1996) is the only one that is moderately related to three out of four dimensions.[2] None of the indices evaluated reflected instability within regimes well, and were only weakly related to instability of the regime.

Alesina and Perotti (1996:1206) suggest an identifying assumption for choosing whether to focus primarily on indicators of socio-political unrest or government change: "for *a given level of expected government turnover*, phenomena of social unrest do not have any direct impact on policy uncertainty, and therefore economic decisions" (italics in original). One argument for focusing on government change is therefore that the only policy changes that are relevant for economic decisions occur when government change. This assumption may be to strong. To capture the effect of financial crisis on political instability, firstly, and the effect of political instability on growth secondly, it is likely that only government change is to narrow a focus. In order to cover the important phenomena of political instability, it is necessary to include measures that reflect events of the two basic elements at a minimum.

[2] Alesina and Perotti (1996) apply the same indicators as Perotti (1996).

Table 1: The development in studies of political instability*

Author(s):	Indicator of political instability:	Dimensions of political instability:	Dependent variable:
Londregan and Poole (1990)	Government change (Pr. of Coup d'etat)	One-dimensional: government change	Growth and coups d'etat (simultaneous equations)
Barro (1991)	Revolutions, coups and political assassinations	Two-dimensional: government change and socio-political unrest	Growth, Investment/GDP.
Alesina and Perotti (1996)	Index (PCA): political assassinations, mass violence (deaths), coups (successful and unsuccessful), democracy.	Two-dimensional: government change and socio-political unrest/stability	Investment and political instability (simultaneous equations)
Alesina et al. (1996)	Government change (Pr. change in executive power: government change, major change, coup)	One-dimensional: government change	Government change and growth (simultaneous equations)
Ades and Chua (1997)	Index of domestic instability and regional instability (revolutions and coups).	One-dimensional: government change	Real GDP growth per capita
Feng (2001)	Political instability (standard deviation of political freedom). Political violence: measured by revolutions, coups, riots, strikes	Two-dimensional: government change and socio-political unrest/stability	Private investment
Feng (2003)	Government change (Pr. irregular government change)	One-dimensional: government change	Real GDP growth per capita.
Campos and Nugent (2003)	Index (PCA): political assassinations, revolutions and coups.	Two-dimensional: government change and socio-political unrest	Investment/GDP
Butkiewicz and Yanikkaya (2005)	17 measures of socio-political instability divided into three main groups: measures of government stability, indices of social stability, measures of political violence and war.	Multidimensional	Real GDP growth per capita.
Jong-A-Pin (2009)	Factor analysis of 25 indicators of political instability: Instability of regime, Mass civil protest, Within regime instability, Politically motivated violence.	Multidimensional	Real GDP growth per capita.

* The table is made by the author for the purpose of this thesis. Space limits the selection to some of the most central and widely sited.

As Jong-A-Pin (2009:15) suggest, it is ample evidence from political science that political instability is multidimensional, even though no consensus on the appropriate number of dimensions has been reached. I choose here to follow up on this research trend emphasizing the multidimensionality of political instability in the growth literature. With a multidimensional operationalization of political instability, and a quantitative model that allows for it, one would be able to differentiate between variations in political instability both within and between countries over time. My hope is that this will allow me to capture political events due to financial crises that are both constitutional and unconstitutional in nature, and different types of events that may have more or less severe consequences for policy and uncertainty affecting economic growth.

2.3 Financial crisis and political instability

Studies concerned with political consequences of economic crisis are a long-standing tradition in comparative politics. O'Donnell (1973) argued that democratic breakdowns in Brazil and Argentina were caused by economic crises, and occurred when powerful political actors believed the crises could not be resolved under "incorporating" regimes and therefore replaced them with "exclusionary" bureaucratic-authoritarian regimes (Gasiorowski 1995:883). Gasiorowski (1995:892) found strong support that economic crises trigger democratic breakdowns. Following this, Przeworski, Alvarez, Cheibub and Limongi (1996:42) conclude that: "The fragility of democracy at lower levels of development flows largely from its vulnerability in the face of economic crisis." In their seminal study, articulating a formal theory of political transitions, Acemoglu and Robinson (2001:939) emphasize that "regime changes are more likely during recessionary periods because costs of political turmoil, both to the rich and to the poor, are lower during such episodes." On the other hand, Haggard and Kaufman (1995:26) found that economic crises appeared to accelerate and possibly cause the collapse of authoritarian regimes in many countries, especially in Latin America. This part will not examine regime change or transitions in particular, but establish more specifically how financial crises may lead to political instability and what the determinants of political instability are.

Theory and empirics

Consider the following supposition to illustrate a situation where financial crisis operate as a critical juncture affecting political instability and growth. Alesina et al. (1996:191) suggest that the interaction between growth and political instability can lead to a vicious circle: for some exogenous reason (i.e. political conflict) the likelihood of a government collapsing increases. Investment and growth fall as a result of the shock leading to further uncertainty and increasing the likelihood of government collapse. Now, reverse the situation: an exogenous economic shock (i.e. a financial crisis) leads to a rapid fall in growth. The public holds the government responsible for the poor economic situation, thereby increasing tension, frustration and unrest. This increase in the probability of executive collapse creates uncertainty, slowing growth even more.

According to Bussière and Mulder (2000) the political setting prevailing at the time a crisis erupts is a central factor for determining the depth of the following recession. They estimate the effect of political instability on the severity of the economic crisis during the 1994 "Tequila crisis" and the 1997 Asian crisis. The findings indicate that "political instability does matter for countries with low reserves or weak fundamentals" (Bussière and Mulder 2000:326). The results from this study are relevant here since it implicates that in economically vulnerable countries, political instability may enhance the effects of a crisis, prolonging recession, and decreasing growth.

An illustrative example may contribute to understanding the possible connection between financial crises and political instability. In 1994, several major events caused political instability in Mexico. The Zapatistas staged an uprising in the southern state of Chiapas, and both the adoption of the North American Free Trade Agreement (NAFTA), and new market oriented policies led to mass protests (Blanco and Grier 2009:79). This may have contributed to the financial crisis that erupted the same year when investors came to be wary of investing in the region and risk premiums went up (Hufbauer and Schott 2005).[3] The following year, in 1995, Mexico experienced eight political assassinations, one incident of guerilla warfare, five anti-government demonstrations, and nine revolutionary events (Banks 2005).

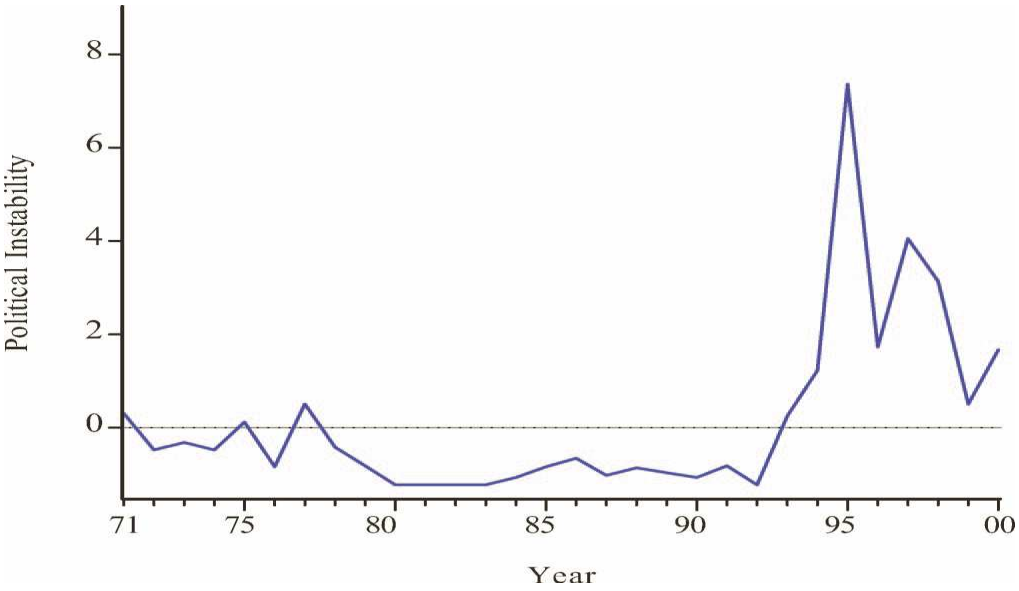
Blanco and Grier (2009:81) illustrate the magnitude of this politically turbulent period graphically, and conclude that their index of nine indicators of political instability captures the

[3] The "peso crisis" of late 1994 had negative economic effects for the southern cone of America (popularly known as the "tequila effect") and caused an economic crisis and recession in Mexico. The "peso crisis" as the name indicates, qualifies as a currency crisis.

magnitude of political instability in this example well. The case illustrate that financial crisis might contribute to political instability, especially in an already fragile situation, as Bussière and Mulders findings suggest. On the other hand, it shows that political instability can also contribute to creating periods of financial despair as investors flee markets and rating agencies dump their estimates of a countries public debt.

H1: Financial crises increase political instability.

Figure 1: The evolution of political instability in Mexico.



Source: Blanco and Grier (2009:81)

Determinants of political instability

Income

Blanco and Grier (2009:86) consider two reasons why poor economic performance are thought to cause political instability. First, low or falling income lower the opportunity cost of an individual to rise up, protest or revolt. Second, deprivation is increased as a result of poor economic conditions. This fuels political instability "as citizens perceive their government to be incompetent" (ibid). In this manner, financial crises can lead to political instability by lowering growth and worsening economic conditions. It has also been showed empirically that low income growth may feed instability (Annett 2000; Blomberg and Hess 2002).

H2: High income decreases political instability.

H2A: Financial crises decrease income, thereby increasing political instability.

Inflation

Inflation is a possible macroeconomic factor influencing the stability of regimes. In their study of inflation and political instability, Cukierman, Edwards and Tabellini (1992) find that high (or volatile) inflation can be destabilizing and that politically weak governments are more likely to resort to seignorage. Paldam (1987) demonstrated that in the period 1946-1983, almost no regime in Latin America survived an experience of hyperinflation.

H3: High inflation increases political instability.

Economic inequality

When social and economic inequality is large, financial crisis may exaggerate existing conflict lines as the poor becomes poorer and the rich needs protection to sustain production and growth. Where the poor bail-out the rich, we may see more political instability. If this is true then we could expect to see more instability due to crises of an economic nature in countries with an uneven distribution of income.

How do individuals react to socio-economic inequality? With high inequality and a polarized distribution of resources organized individuals will have incentives to pursue their interest outside the normal channels of both political representation and market activities (Perotti 1996:151). Individuals in unequal societies are therefore "more prone to engage in rent-seeking activities or other manifestations of socio-political instability, such as violent protests, assassinations, and coups" (ibid). Muller (1985:53) comment that: "It seems plausible to expect that in societies with high inequality, where the distribution or scope of discontent is presumably widespread, discontent is more likely to be mobilized somehow, than in societies with low inequality." Financial crises are likely to create discontent towards those that are rich on resources and potentially also with the government in office who "let it happen".

H4: High economic inequality increases political instability.

Trade

Donovan et al. (2005) argue that if trade openness increases growth then this may negatively affect political instability. Goldstone et al. (2005:26) observe that countries in the low

percentile of openness were found to have two/three times higher probability of political instability than those in the high percentile. However, in the wake of a financial crisis this effect may be more complicated. Open economies may be more vulnerable to economic shocks. If (global) trade declines, then export revenues and tax incomes may fall sharply. Gottschalk and Bolton (2009:1) commented on the effects of the recent financial crisis that developing countries recovered faster from the financial crises during the 1990s and early 2000s because they could export their way out of the crisis. However, due to the global nature of the recent financial crisis, this possibility was not as prominent. Not all financial crises are of a global nature, but it seems likely that crises with a regional scope also may have regional trade effects at a minimum.

H5: Trade openness decreases political instability.

Government spending and debt

Financial crises demand a governmental policy response. Government spending is therefore central to the political and economic outcome of a crisis. Annett (2000) find that government spending is associated with lower political instability, while an earlier study by Cuzan, Moussalli and Bundrick (1988) finds the opposite for Latin American countries. The effect of government spending due to a crisis will most likely depend on the institutional setting and how is it financed. With regard to this, Reinhart and Rogoff (2008:45) comment that "the true legacy of banking crises is higher public indebtedness—far over and beyond the direct headline costs of big bailout packages." Highly indebted countries have fewer fiscal maneuvering possibilities than countries with balanced budgets. A financial crisis may therefore require harder structural reform in highly indebted countries, which may be unpopular.

H6: Government spending decreases political instability.
H7: High indebtedness increases political instability.

Regime

According to Acemoglu, Johnson and Robinson (2003) underlying institutional problems are the main cause of poor economic performance. In crisis periods, bad political institutions may well be associated with distortionary policies. Cavallo and Cavallo (2010) focus on the institutional difference in democracies and autocracies in determining the economic

consequences of financial crises. During a crisis there is a re-shuffling of interest groups and a race to influence decision-makers. These different groups may promote myopic or good policies. Since democracies are inclusive by definition, they channel interests and unrest through participatory arrangements. In autocracies, however, rights and access to political institutions may be limited, leading unrest to manifest itself violently more easily if other expressions are restricted. Several studies find that democracy is an important factor for political stability (Feng 1997; Goldstone et al. 2004; Blanco and Grier 2009).

H8: Democratic institutions decrease political instability.

Regional instability

Ades and Chua (1997) show that political instability in neighboring countries has negative effects on economic performance due to disruption of trade flows and increased defense expenditure. Blanco and Grier (2009:84) suggest that political instability can be contagious since instability in neighboring countries may cause refugee floods, revolutionary groups, ideologies and guerilla armies to cross borders. Goldstone et al. (2004) find countries in unstable regions more likely to experience instability, while Blanco and Grier (2009:88) find no evidence of regional contagion in Latin America.

H9: Regional instability in neighboring countries increases political instability.

Social inequality

Socio-demographic conditions, such as racial and lingual characteristics, have been shown to have a positive effect on political instability (Blanco and Grier 2009:85). The basic intuition is that more fragmented or fractionalized countries are more prone to instability because socially unequal or divided countries are more likely to experience conflict between competing groups along latent ethnic, lingual and religious lines (Annett 2000). The most widely applied measure of fractionalization is ethnic and linguistic fractionalization.

H10: Social inequality increases political instability.

Other factors

Many other factors than the above mentioned are also discussed in the literature as risk factors for instability. Another regime-related factor is the durability of the regime, since duration

may have different effects on instability in different regimes. Factionalism has been argued to be negative for the stability. Where there are conflicts residing within the political parties, levels of instability have been found to be higher (Blanco and Grier 2009; Benton 2007). Some socio-demographic variables are also commonly included on regressions with political instability as the dependent variable, i.e. urbanization and economic discrimination (Blanco and Grier 2009).

2.4 Financial crises and growth

This part will discuss theory and empirical findings of how financial crises affect economic growth. Lastly, I present hypothesis based on the main arguments.

Theory

There are mainly two opposing views for whether economic crises are positive or negative for long-term growth. The first view emphasize that crisis are negative for growth, both in the short and long-run, because short run destabilizing effects of central macroeconomic variables has adverse effects on output volatility in the long run (Cavallo and Cavallo 2010:838). The second view upholds that crises are positive for long run growth, although they have negative immediate effects. The reasoning behind this argument is that crises allow important reforms and learning processes to take place (ibid). Drazen (2000) refers to this as the "crisis hypothesis". Some also argue that crises can be good if they are "side-effects of growth-enhancing policies such as financial liberalization" (Cavallo and Cavallo 2010:838).

Cavallo and Cavallo (2010) look at the role of political institutions in determining if crisis are good for long-term growth. In their view, crises are periods in time where important decisions are made. They constitute *critical junctures*. The impact on long-term growth could depend on both the type of political institutions and the kind of political compromise that the institutional set-up delivers. "Policy responses will be shaped by the incentives and constraints faced by the key political actors during the time of crisis" (Cavallo and Cavallo 2010:839). This is in line with the argument by Tommasi (2004) that the quality and effectiveness of policy reforms are conditioned by the overall institutional environment of the country. On one side, democracy might ensure inclusiveness and constraints on arbitrary decisions, but on the other side, democracies and public debate may prolong the decision-

making process leaving the crisis un-tackled for a longer period of time (Cavallo and Cavallo 2010:839). Autocracies, then, might be able to implement reform more rapidly. This, however, does not guarantee that the reforms are high-quality.

Empirical findings

What Cavallo and Cavallo (2010) find is that crises are always disruptive in the long-run. They do, however, also find that democratic institutions may mitigate the effects, while autocratic governments can greatly amplify the negative outcome of a crisis. This result leads them to warn that the common moral-hazard view, that countries should experience crises to learn from their mistakes, can be misleading if the institutional environment is ignored. Cerra and Saxena (2008) find that there are large persistent output losses associated with financial crises and some types of political crises. A contradictory finding is made by Rancière et al. (2008); they show that countries which have experienced financial crises have grown faster on average than countries with stable financial conditions. Their results indicate that systemic risk has a positive effect on growth, although it produces occasional financial crises. The finding also implies that financial liberalization strengthens financial development and leads to higher long-run growth (Rancière et al. 2008:403).

According to Reinhart and Rogoff (2009:466) there are three common characteristics in the aftermath of financial crises. First, asset markets and equity prices collapse, and real housing prices decline. Second, output and employment decline. Third, government debt explodes. The latter they find not to be primarily because of large bailout costs, but due to a collapse in tax revenues and ambitious countercyclical fiscal policies. Reinhart and Reinhart (2010:37) find that large destabilizing events (banking crises, currency crises, inflation crises, sovereign default and stock-market crashes) cause changes in key macroeconomic indicators well after the crisis-turmoil have passed. Their results suggest that: “Real per capita GDP growth rates are significantly lower during the decade following severe financial crises and the synchronous world-wide shocks” (Reinhart and Reinhart (2010:2). The first hypothesis is therefore:

H11: Financial crises decrease economic growth.

However, Rancière et al. 2008 findings indicate that financial liberalization may be better in the long run since it is growth-enhancing, although liberalized countries are more vulnerable to crises. And the moral hazard view emphasizes the positive learning process of crises episodes. Consequently, a contradictory hypothesis is proposed:

H11A: Financial crises have positive long-run effects on growth.

Cavallo and Cavallo's (2010) results suggest that democratic institutions perform better during crisis than autocratic. On the basis of this the following hypothesis is derived:

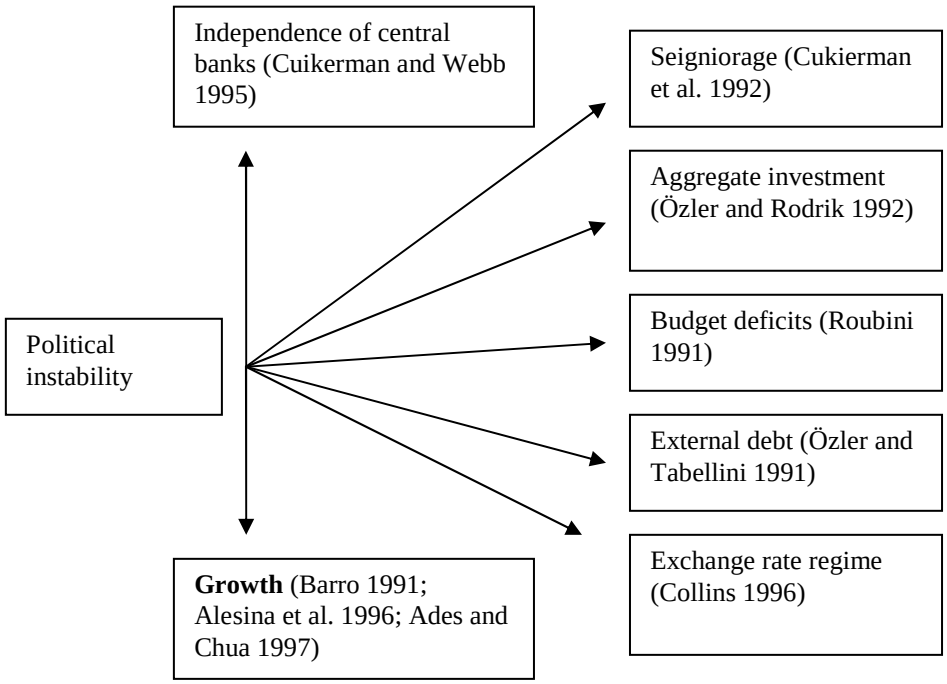
H12: A poor institutional environment amplifies the negative economic effects of financial crises on growth.

2.5 Political instability and growth

By way of introduction, a casual comparison may serve to illustrate the relationship between political instability and growth. From 1960 to 1998, Botswana's economy grew at 5.8 percent per year, while Zaire's economy grew at a negative rate of 2.9 percent (Feng 2003:28). Correspondingly, the political climate in Zaire during this period was very turbulent, counting eleven riots, eight government crises, one coup d'état, twelve revolutions, and at least three assassinations of central politicians. In the same period Botswana experienced one governmental crisis (Banks 1999 in Feng 2003:29). Whether this observed relationship is a general one has been studied intensively and is central to the goal of this thesis.

The example above connects two phenomena of great interest to both economist and political scientists. Campos and Nugent (2002) identifies several economic variables allegedly affected by political instability in the literature (Figure 2), one of which is growth. Levine and Renelt (1992) identified over 50 variables that have been found to be significantly correlated with growth. A decade later, Sala-I-Martin, Doppelhofer and Miller (2004) compiled a list of 67 variables, while Durlauf et al. (2004) listed an amazing 145 regressors. The complexity of the growth literature demands a complex theoretical basis and thorough investigation of the causal patters being studied. Here, I focus on those studies examining the relationship between political instability, growth and investment, and also draw upon this literature for identifying other mitigating factors of explanation.

Figure 2: Studies employing political instability as explanatory variable



One of the more accepted consensuses in the growth literature is that physical capital, human capital and technology constitute *proximate* causes of growth. Correlations from cross-country analysis show that these factors matter and by increasing them one should be able to increase growth. However, there are *fundamental* reasons why these proximate causes vary to a large degree across countries. These fundamental causes are central to understanding why some countries fail, like Zaire, or succeed, like Botswana, in stimulating the proximate factors leading to growth. According to Acemoglu (2009:20), the fundamentals concern "the roles of policies, institutions, culture, and exogenous environmental factors." Clearly, political instability is one such fundamental factor.

Previous studies

The relationship between political instability and growth has been thoroughly investigated and many empirical findings in the literature have been quite consistent: *political instability is detrimental for economic growth* (Barro 1991; Levine and Renelt 1992; Barro and Lee 1994; Mauro 1995; Alesina et al. 1996; Alesina and Perotti 1996; Perotti 1996; Ades and Chua

1997; Asteriou and Price 2001; Feng 2003). Other studies, however, do not find such evidence (Londregan and Poole 1990; Campos and Nugent 2002, 2003).

Campos and Nugent (2002:159) stress the two predominant views of political instability in the growth literature, where the first approach emphasize regular and irregular government changes and the second focus on unrest due to socio-political factors (revolutions, coups d'état, civil wars and political assassinations). According to Mankiw (1995:302), the latter view of political instability has proven to have a robust negative effect on growth in the literature. Persson and Tabellini (1999) concluded similarly that "more frequent regime changes, or political unrest and violence, is significantly and negatively correlated with growth in cross-country data".

Interestingly, two of the most sited studies in this field show opposite results applying the same method of analysis. Alesina et al. (1996) results show a high incidence of government collapses in countries with low growth. Londregan and Poole (1990), on the other hand, show that low economic growth increases political instability. They do not find evidence that instability reduce growth, which leads them to conclude that poverty spawns coups, but coups do not have economic effects. A common finding, however, is that political instability is persistent. Alesina et al. (1996:190) comment that recent government changes increases the probability of future collapses. Londregan and Poole (1990:152) more specifically states that coups have political aftereffects, dramatically increasing the likelihood of another coup for up to six years. Both these studies employ a simultaneous equations framework to explore the joint endogeneity of government change and growth. Unlike Londregan and Poole (1990), however, Alesina et al. (1996) do not focus solely on coups, but include a broader definition of government change. The latter study also control for a number of economic factors.

Several studies also show that political instability is negatively associated with investment rates (Barro 1991; Levine and Renelt 1992; Veneris and Gupta 1986). Levine and Renelt (1992:958) observe that "countries that experience a high number of revolutions and coups tend to be the same countries that invest less of their resources domestically than countries with stable political environments." Campos and Nugent (2003) found the quite opposite result: a robust positive relationship between socio-political instability and investment. When they examine the direct and indirect effect of socio-political instability on both investment and growth they find that the "direct (negative) effect of socio-political instability on growth

counterbalances the positive indirect effect of socio-political instability on growth (through investment)" (Campos and Nugent 2003:542). This is in line with the result from Campos and Nugent (2002) indicating no relationship between socio-political instability and long-term growth. Svensson (1998:1332) find that measures of political instability (executive instability and socio-political unrest) have no significant effect on investment when he controls for protection of property rights, proxied by the institutional quality. This leads him to suggest that the effect of political instability on investment runs through the quality of property rights.

Another directly related area of study has been that of income inequalities effect on growth or investment through their effect on political instability (Alesina and Perotti 1996; Perotti 1996; Persson and Tabellini 1994; Alesina and Rodrik 1994, 1993). By fueling social discontent and unrest, Alesina and Perotti (1996) find that income inequality increase the probability of coups, revolutions and mass violence thereby reducing growth. In other related lines of research, Özler and Tabellini (1991) find that higher political instability leads to increased external debt in developing countries; while Cukierman et al. (1992) show that more political instability correlates positively with inflation.

Feng (2003:321) critiques several studies for making no distinction between regime change and government change (see Alesina et al. 1996; Cukierman et al. 1992). The definitions which emphasize the multidimensionality of political instability makes this distinction clear (Sanders 1981, Jong-A-Pin 2010). According to Feng (2003:322), Sanders results imply that a study of political instability and growth will be theoretically meaningless and may lead to confusing results unless political instability is differentiated: "major political instability (such as a successful coup d'état) or minor political instability (such as a government change involving the same party) will have different consequences for growth."

Jong-A-Pin (2009:26) finds support for two of the earlier mentioned dimensions of political instability affecting economic growth. Instability *of* the political regime has a negative impact on economic growth. The instability *of* the political regime is in Jong-A-Pin's view the concept that comes closest when referring to the uncertainty of investors regarding property rights. The second finding is perhaps more surprising as more instability *within* the regime is found to be good for economic growth. Darby, Li and Muscatelli (2004) finds the opposing result, arguing that political instability within governments can reduce the probability of re-election, leading to lower public investment and therefore lower growth rates. This view

emphasizes *government myopia*, or short-sightedness that leads forward-looking governments away from long-term policies because of uncertain re-election prospects (Darby et al. 2004:154). In support of his finding, Jong-A-Pin refers to Besley, Persson and Sturm (2005) who argue that lack of political competition may stifle economic performance. More political competition within the regime is therefore good for economic growth as incompetent incumbents can be held accountable.

If financial crisis cause political instability within a regime, then this result might indicate that the long-term effect on growth due to crisis can be positive, lending support to the moral hazard hypothesis and the positive economic effects of forced reform. Remember Cavallo and Cavallo (2010) advised against this policy view as their study showed a consistent negative effect of crises on growth. Also, this result indicates that a multidimensional approach may be most suitable to explain the variation through which political instability affects growth. Because, it seems, there are different effects of the different dimensions of instability in different contexts.

Table 2 gives an extensive overview of the central empirical findings in the field. Of the 22 empirical studies surveyed, only nine display a consistent and significant negative effect on growth or investment. The other studies' findings are either insignificant, show ambiguous results, conflicting directions of the effect of political instability, or they actually display positive effects of instability on growth or investment. Interestingly, of the nine studies showing negative results, seven apply a cross-sectional framework and two are time-series. No study applying a panel data structure has found a consistent negative and significant effect of political instability on growth or investment. The methodological review (section 2.6) will discuss these features more specifically. Next, I describe the theoretical background of the relationship between political instability and growth.

Table 2: Literature survey: Political instability and growth

Author and year published:	Indicator of political instability:	Framework:	Key findings:
Londregan and Poole (1990)	Government change (Pr. of Coup d'etat)	Pooled Cross-Sectional Time-Series. Simultaneous equations (AGLS).	No effect of instability on growth. Low growth increase instability.
Barro (1991)	Revolutions, coups and political assassinations	Cross-section	Negative growth/investment effect.
Levine and Renelt (1992)	Index of revolutions and coups (Barro 1991).	Cross-section	No robust correleation with growth. Negative effect on investment/GDP.
Easterly and Rebelo (1993)	Assassinations and war casualties	Cross-section	No significant effect.
Barro and Lee (1994)	Dummy (war/wartime). Revolutions, assassinations and war casualties	Panel	Dummies: no significant effect. Other: negative effect on growth.
Mauro (1995)	Subjective index of political instability. Subjective index of bureaucratic instability (including political instability).	Cross-section	Negative effect of political instability and bureaucratic instability on growth. No significant effect on investment.
Alesina et al. 1996	Government change (Pr. change in executive power: government change, major change, coup)	Cross section. Simultaneous equations (AGLS).	Negative effect on growth
Alesina and Perotti (1996)	Index (PCA): political assassinations, mass violence (deaths), coups (successful and unsuccessful), democracy.	Cross-section, simultaneous equations	Negative investment effect
Perotti (1996)	Index (PCA): political assassinations, mass violence (deaths), coups (successful and unsuccessful), democracy dummy.	Cross-section	Negative effect on growth
Ades and Chua (1997)	Index of instability and regional instability (revolutions and coups).	Cross-section	Negative effect on growth
Benhabib-Spiegel (1997)	Major government change (Dummy for coup or major regular change in year t-4 to t).	Panel (GMM, FE)	No significant effect on growth. Political instability has a negative impact on investment in physical capital (fixed effects excluded)
Sala-i-Martin (1997)	War dummy, revolutions and coups. Political assassinations, ethno-linguistic fractionalisations.	Cross-section	Negative effect of war dummy, revolutions and coups. No significant effect of political assassinations and ethnic fractinalization.

Table 2 continued: Literature survey: Political instability and growth

Svensson (1998)	Pr. government change (regular, irregular, major). Polarization (proxied by socio-political unrest: assassinations, deaths from political violence, executions, dummy democracy)	Cross-section	No significant effect on investment when protection of property rights is controlled for. Negative effect on protection of property rights (proxied by instituional quality).
Asteriou and Price (2001)	Index (PCA) of political instability (terrorist incidents, strikes, elections, regime change, dummy Falkland's War and Gulf War)	Time-series (UK)	Negative effect on growth
Fosu (2001)	Index (PCA) of political instability (successful coups, abortive coups and reported coup plots)	Cross-section (Sub-Saharan Africa)	Positive effect of instability on growth. Interaction with physical capital yields negative effect.
Feng (2001)	Political instability (standard deviation of political freedom). Political violence: measured by revolutions, coups, riots, strikes	Cross-section	Negative effect of the variation in political freedom on private investment.
Campos and Nugent (2002)	"Severe index" (PCA): political assassinations, revolutions and coups. "Moderate index" (PCA): polity III indicators.	Panel. Granger causality. Anderson-Hisao-Arellano instrumental variable estimates.	No relationship between political instability and growth.
Fielding (2003)	Casualties due to Intifada (fatalities in Israel proper, West Bank and Gaza)	Time-series (Israel)	Negative impact on the rate of savings.
Feng (2003)	Government change (Pr. irregular government change)	Cross-section	Negative effect on growth
Campos and Nugent (2003)	Index (PCA): political assassinations, revolutions and coups.	Panel. Granger causality. Anderson-Hisao-Arellano instrumental variable estimates.	Positive effect of political instability on investment. No effect of investment on political instability.
Butkiewicz and Yanikkaya (2005)	17 measures of socio-political instability divided into three main groups: measures of government stability, indices of social stability, measures of political violence and war.	Cross-sections, 3SLS, SUR.	Government and social instability - typically insignificant. Political violence - significant negative effects.
Jong-A-Pin (2009)	FA: Instability of regime, Mass civil protest, Within regime instability, Politically motivated violence.	Dynamic panel, GMM, FE	Instability of regime negative. Instability within regime positive.

FE: Fixed Effects panel regression

PCA = Principal Component constructed indices.

FA = Indicators obtained by Factor Analysis of 25 PI variables

GMM = Generalized Method of Moments

AGLS = Amemiya Generalized Least Squares

3SLS = Three-Stage Least Squares

SUR = Seemingly Unrelated Regressions

The theory behind the correlation

There are many theoretical arguments for why political instability affects growth. Two of the most common in the literature argue that: (1) Political instability increases policy *uncertainty* affecting incentives of economic agents and therefore growth (Alesina et al 1996). (2) Political instability has adverse influences on *property rights* thereby affecting growth (Barro 1991). Ades and Chua (1997:280) emphasize a more direct and immediate effect of political instability. As a result of "major institutional disruptions and most civil wars" we see *emigration* of the most qualified labor force, and *destruction of infrastructure* necessary for production and trade. Another channel through which growth is affected by political instability is due to government *myopia*. Politicians in an instable regime may implement shortsighted policies that benefit themselves or certain groups.

According to Carmignani (2003:1), what is common for the two frequently applied dimensions of political instability is that all these possible events generate *uncertainty*. An event that causes uncertainty about the stability of institutions and policymakers will in turn create uncertainty regarding the future course of economic policies, the security of property rights, the productivity of capital inputs and financial flows. Private investors observing this uncertainty may change their incentives to invest. Through fueling social discontent and unrest, the probability of coups, revolutions and mass violence increase as a consequence of increased policy uncertainty and threats to property rights (Alesina and Perotti 1996). This has a negative effect on investment and growth.

Feng (2001) highlight a twofold effect as both consumers and investors react to a political unstable situation. "Economic growth is sustained through savings and investment. When a political regime is unstable, consumers decrease saving and increase consumption since their savings may become worthless" (Feng 2001:273). Investors in the same situation will decrease investment in fixed capital stocks and change their portfolios to more liquid and portable assets. This means that political instability decrease both the supply of investment capital by savers, and the demand for capital by investors. Political instability also has the potential effect of increasing unemployment thereby also reducing the pool of savings (ibid).

Because political instability creates uncertainty, the risk of capital loss increases. This can change the incentives to save and invest leading investors to become more reluctant towards economic initiatives. Feng (2003:21) remark that: "evaluating the political environment is an

essential part of an investor's reasoning process when he makes a decision regarding investment and consumption." The possibility of government change may lower conditions for investment no matter if it is a change toward a more investment friendly regime or the opposite. Feng (2003:24) explains this as a result of investors being *risk-averse*. Investors appreciate a consistent public policy. If a future change in government implies an improvement for investment conditions, investors hold investments until then. If the future change implies an increase in the cost of investment, investors also holds investments. This means that expectations of unrest and instability, not only actual change, can affect investor's decisions.

Property rights are enforced by the state through the legal system. Svensson (1998:1318) states that: "Poorly enforced property rights create a wedge between the marginal product of capital and the rate of return that can be privately appropriated by investors." If the enforcement of property rights determines incentives to invest, then investments in legal infrastructure are central for increasing investment and growth. Svensson (ibid) argue that political instability and polarization make low investment in legal infrastructure a rational choice for decision makers maximizing their individual welfare. The implication of this being that because governments in politically unstable environments tend to spend little on legal infrastructure, this results in lower domestic investment (Svensson 1998:1337).

Alesina and Perotti (1996:1214) argue that political instability affects growth through three main channels:

1. By increasing the level of taxation.
2. Because social unrest can disrupt productive activities thereby creating a fall in the productivity of labor and capital.
3. Through the fact that political instability increases uncertainty "inducing investors to postpone projects, invest abroad (…), or simply consume more."

If politicians become targets, due to social unrest, violence or increased probability of coups, then the *reputation mechanisms* that would normally prevent politicians from raising taxes, especially on capital, will no longer be present. Political instability can therefore change politicians' incentives to tax. Investors observing high political instability expect higher taxes and therefore hold investments (Alesina and Perotti 1996:1206). This is one form of

government *myopia* which can be induced by political instability. Carmignani (2003:2) also mention "increasing government consumption for compensational purposes, reducing investments in the legal system, delaying (…) structural reforms and reneging on previously made commitments" as possible myopic outcomes.

Campos and Nugent (2003) finds a positive long-run relationship between socio-political instability and investment. Some contributions from the investment literature gives a theoretical explanation for this result, highlighting irreversibility and the conditions under which uncertainty can have a positive effect on investment (Campos and Nugent 2003:533-534). Abel and Eberly (1999) investigate the effect of irreversibility and uncertainty on long-run investment. The logic of irreversibility and uncertainty can be explained in the following manner: If a firm anticipates that an investment will become irreversible in the future, they are more reluctant to invest today. This fear of the future being tied is called the *irreversibility constraint*. When investment is irreversible, "the optimal investment policy is to purchase capital only as needed to prevent the marginal revenue product of capital from rising above an optimally derived hurdle" (Abel and Eberly 1999:340). Irreversibility increases the hurdle for investments to be profitable. Since firms cannot disinvest when investment is irreversible, they apply a higher user cost of capital to current investments (Abel and Eberly 1999:364). The long-run investment effect of this, according to Abel and Eberly, is that "expected capital stock may be higher or lower under irreversibility than under reversibility" (ibid).

Three explanations for their result are suggested by Campos and Nugent (2003:533-534) in a situation where socio-political instability is causing uncertainty and the possibility of inability to disinvest:

i: *Uncertainty in the form of socio-political instability delays investment.*

ii: *Socio-political instability destroys at least partly the capital stock, causing a big increase in replacement investment.*

iii: *Socio-political instability causes changes in government and government policy that are beneficial in the long run.*

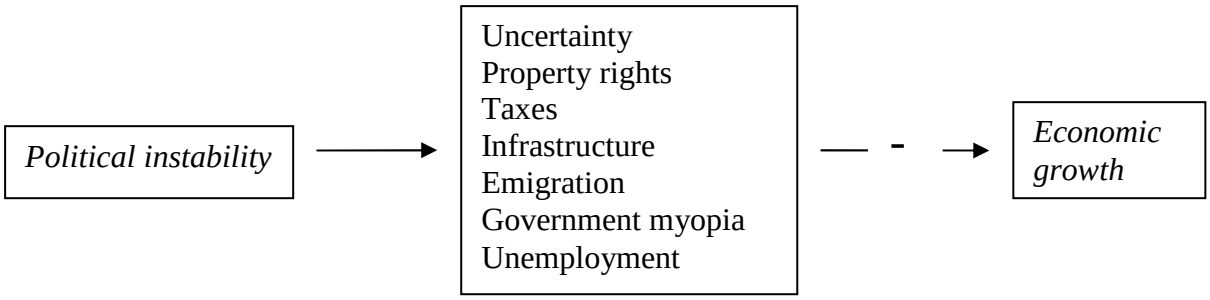
The possibility that political instability can have positive long-run effects on investments needs to be taken under consideration. Although, we remember that Campos and Nugent (2003) found the negative effects of instability on growth to be counterbalanced by the long-

run effects of investments. Therefore, what growth-pattern to expect under conditions of uncertainty is ambiguous at best.

Hypothesizing the effect of political instability on growth

According to Kong (2007), there has been little explanation in models of political instability and growth, on the underlying mechanisms of how these processes really affect the growth trajectory. He refers to the indexation procedures that are very often used as an "add-all-in-and-stir" recipe for explaining growth. Although Kong may be correct in his accusation of the lack of research on underlying mechanisms, the reason for "all-in" recipes in researching political instability is that anything less would not represent the many dimensions of the concept. On the other hand, specifically controlling for all these mechanisms in quantitative models would lead to very large models and probably many difficult issues with regard to all the data that would be necessary. The effect of political instability is therefore hypothesized to affect growth both directly and through different mechanisms:

Figure 3: The mechanisms of political instability and growth [4]



2.6 Methodological review

Several methodological approaches have been applied to study the effect of political instability on economic growth quantitatively. Table 2 also provides an overview of the methodological approaches used by studies in this field. We observe that cross-section studies have been most common, but that panel-studies and time-series are also applied. In addition, several authors use techniques and estimators to account for endogeneity, joint simultaneity

[4] The effect of political instability through uncertainty could be hypothesized to affect growth both negatively and *positively* through delayed investment, replacement investment and beneficial changes in policy, based on the explanation of Campos and Nugent (2003). For simplicity, and because investment is not my main variable of interest, I choose only the above mentioned approximation.

and to test the direction of causality (Granger-causality). The purpose of examining the past methodological approaches is to evaluate what model and estimation procedure is most appropriate.

The "stylized fact" status of the instability-growth relationship has increasingly come under critique (Campos and Nugent 2002; Carmignani 2003; De Haan 2007; Jong-A-Pin 2009). De Haan (2007) identifies several potential pitfalls: the outcome-sensitivity of the models to specification, sample heterogeneity, the problem of measuring political instability, and how to treat the time dimension. In short, the critiques are mostly methodological. The methodology applied in the studies that generated this "stylized fact" view of the relationship a decade ago was not adequate. The application of averaged cross-sections leaves limited room for the treatment of estimation bias due to parameter heterogeneity, omitted variables and the joint endogeneity of growth and instability (Carmignani 2003:23-24). Furthermore, the choice of regressors should be theory-driven, not inductively selected for the purpose of high statistical fitness as seem to be the case with many economic variables (Carmignani 2003:25; De Haan 2007:283). After surveying the literature on political instability and growth, Carmignani (2003:31) finds that the early contributions show evidence of a strong negative relationship between instability and growth. As we can see from Table 2, common for many of the early studies is that they do not tackle the problem of joint endogeneity explicitly, and among those who have, the results are not consistent.

Cross-section and panel modeling

Feng (2003:66) analyzes cross-section data instead of time-series data because of his focus on the secular trend of economic growth and not "dynamic change, transitional crises, or external shocks." This methodological approach uses cross-country data averaged over a long period of time and allows him to focus on the long-run trends of economic performance. One critique of the opposite, put forward by Barro (1997), states that in the short-run dynamic approach the relationship between growth and its determinants may well become poorly specified because of business cycles: "precise timing between growth and its determinants is not well specified at the high frequencies characteristics of 'business cycles'"(Barro 1997:15). An advantage of pure cross-sections is that averaging out variables minimizes the problem of missing observations, a predicament that is well known especially with respect to developing countries. However, in cross-section models the problem of parameter heterogeneity is likely to occur when a large number of countries with different social, political, cultural and

institutional structures are assumed to be identical (Carmignani 2003:23). Asteriou and Price (2001:384) comment that while cross-sections may offer consistent estimators for long-run growth effects, they fail to capture information of particular events and how they influence growth. Another problem with cross-section studies is omitting country-specific fixed effects, thereby boosting the effect of other explanatory variables acting as proxies for unobserved phenomena (Benhabib and Spiegel 1997:3). When included independent variables are correlated with excluded variables we get omitted variable bias with ordinary or generalized least squares estimation techniques. Testing if assumptions hold and whether or not bias is present is essential when applying quantitative techniques.

Panel analysis may better cope with some of the above mentioned problems. Using panel data we have the advantage of being able to control for unobserved heterogeneity. Since panel data employs both cross-section and time-series the total number of degrees of freedom increase compared to pure time-series and cross-sections. This presents possibilities for applying robust estimation techniques, including sub-samples or group dummies, thereby addressing i.e. parameter heterogeneity (Carmignani 2003:23). Feng (2003:67) argue that including time-series are advantageous when studying the dynamic change relationship between political and economic development. Panel models are also able to take this argument one step further. Dynamic panel models including a lagged dependent variable as a regressor may be better able to model the dynamics of change (see i.e Jong-A-Pin 2009; Benhabib and Spiegel 1997). This technique is especially suitable if we have a theoretical expectation that earlier values of the dependent variable have a direct causal effect on succeeding values. It seems likely that the growth in income in one period has consequences for investment decisions, distribution of expenditures, etc. in the period that follows. Therefore, economic growth in period *t* may have a causal effect on growth in period t_{+1}. The dynamic model also provides a solution to problems of autocorrelation, which is a common problem in time-series and panel structures, since temporal dependence is explained by the earlier values of the dependent variable (Finkel 2008:487). Islam (1995) reformulates the growth convergence equation of Mankiw, Romer and Weil (1992) into a dynamic panel data model with country specific effects. Taking the production function as the starting point he argues that it is only natural that the production function will differ across countries. An effect that cannot be adequately isolated using cross-section methodology. Islam (1995:1128) further argues that "From growth theory's point of view, the panel approach allows us to isolate the effect of "capital deepening" on the one hand and technological and institutional differences on the other, in the process of convergence."

Panel models are by no means the solution to all problems; they in fact create some new ones. Feng (2003:66) comment that the use of panel fixed effects estimation (within-country variation) also can be problematic if it is accomplished by first differentiating, due to potential loss of data. Another problem with a fixed effects panel model is that time-invariable factors are factored out of the equation, which makes us unable to include regressors that do not vary over time.

The problem of joint endogeneity

The relationship between political and economic development are complex. If political instability and economic growth are mutually related then results may be biased. This creates the methodological challenge of simultaneity. If poor growth can cause political instability this needs to be accounted for in the quantitative model. The substantive problem that creates the statistical dilemma is accurately described in Alesina and Perotti (1994:359) as a vicious circle trapping poor countries: "They are unstable because they do not manage to become rich, and they do not manage to become rich because they are politically unstable."

Some studies simply assume that political instability is an exogenous variable: "Political stability also reflect other, permanent, or slowly changing features of a political system. Political institutions, culture, tradition, underlying conflicts, cleavage of population into organized groups, and the extent of political participation and the involvement of the citizens are all semipermanent features of a country that affects its stability" (Cukierman et al. 1992:550). Miljkovic and Rimal (2007) dismiss most technical solutions and simply argue that their "array" of regression results will enable them to make credible conclusions without statistically controlling for simultaneous effects. Other studies more specifically treat the problem of simultaneity. Londregan and Poole (1990) and Alesina et al. (1996) adapt simultaneous equation models that allow both growth and political instability to be treated as endogenous variables. Londregan and Poole (1990) results indicate that the direction of causality runs from growth to coups, while Alesina et al. (1996) results suggest that the direction of causality runs from political instability to growth. These diverging outcomes have led later studies to focus more precisely on estimating the direction of causality and possible endogeneity.

Asteriou and Price (2001:390) perform Granger causality tests to determine the direction of causality in their study of the United Kingdom. They find that political instability mainly

affects growth, and not vice versa. Specifically, strikes, terrorist incidents and regime change causes growth, while growth only causes changes in regime. Campos and Nugent (2002) find no evidence that political instability Granger-causes economic growth, nor do they find evidence for the opposite direction of causality. However, their sensitivity analysis reveals a contemporaneous negative relationship and the Sub-Saharan sample are suggested to be the driving force causing this negative connection (Campos and Nugent 2002:158). In a subsequent study of the direction of causality between political instability and investment, Campos and Nugent (2003) find a robust positive causal relationship between instability and investment. Jong-A-Pin (2009:17) finds both a contemporaneous relation and a Granger causal relationship running from instability of the political regime to growth. He also finds some evidence of a two-way causality between growth and instability within countries, and that growth has a causal effect on political violence. These studies use a dynamic panel framework, in which they apply the concept of Granger causality (Granger 1987). Jong-A-Pin (2009:21) explains this approach as "evaluating the lagged impact of political instability on current values of economic growth, whilst controlling for the lagged effect of economic growth (and other explanatory variables)".

Other techniques are also commonly found. The instrumental variable approach uses a set of additional variables that are correlated with the endogenous explanatory variable to generate a transformed model that can be consistently estimated (Carmignani 2003:29). The instruments cannot, however, be correlated with the regressions error-term, and demands testing the instruments appropriateness. Finding good instruments is therefore a challenging task. As Durlauf et al. (2004:117) state: "the belief that it is easy to identify valid instrumental variables in the growth context is deeply mistaken." However, panel data may also simplify the search for instruments. Some panel estimation techniques apply lagged versions of the endogenous explanatory variable as instruments, thereby escaping the troublesome process of finding other instruments. Benhabib and Spiegel (1997) and Jong-A-Pin (2009) choose a generalized method of moment's framework where the potential endogeneity of political instability is instrumented by lagged variables of political instability. Less formal ways of modeling endogeneity are also applied. Giving explanatory variables that are thought to be endogenous a lag is a way of ensuring the direction of causality runs in the right direction (Feng 2003:68). However, this straightforward technique has the consequence of stealing degrees of freedom, and so do the approach using lagged explanatory variable as instrument. Yet another possibility is to use measures of explanatory variables at the start of the sample

period (Svensson 1998). For example, the institutional context at the beginning of the sample period could be used to explain the subsequent development in economic growth.

How important is the potential problem of endogeneity? If it is true that political instability lowers growth, but growth feeds back into instability, then the estimates will conflate the effects and results are inconsistent estimates of the causal effect (Durlauf et al. 2004:116). Many studies have explored this endogeneity without arriving at a consistent answer to the problem. According to Mankiw (1995) and Wacziarg (2002) it is necessary to accept that reliable causal statements in the growth literature are almost impossible to make. This, however, does not mean that simultaneity can be overlooked due to the statistical problem it creates. The question is rather *how* one chooses to address the problem.

Model specification

What is the proper model specification in growth studies? The neoclassical growth theories argue that the engine of growth is capital accumulation, while the endogenous growth theories emphasize human capital and differences in technology as the explanation of differences in growth convergence (Kong 2007:11). This has been further explored by the political economy literature emphasizing the effect of political and institutional variables in explaining cross-country variation in economic growth. Benhabib and Spiegel (1997:1) suggest that such ancillary variables influence growth primarily through their impact on factor accumulation. As mentioned earlier, the proximate causes of growth are influenced strongly by fundamental factors that differ widely across countries and possibly over time. Benhabib and Spiegel (1997) make as a starting point a "base-model" accounting for technological progress and factor accumulation. Then it is asked whether ancillary variables affect growth directly or through factor accumulation, and if these variables explain departures of growth from the base values. Jong-A-Pin's (2009) "baseline" model, for example, bases the selection of exploratory variables on the basic Solow framework. His vector of economic variables therefore consists of the initial investment/GDP ratio, the level of initial secondary school enrollment and the initial population growth. These approaches are very common and intuitively appealing. The inclusion of initial variable values has the purpose of testing the convergence hypothesis in economic growth theories. Jong-A-Pin then goes on to test the sensitivity of his baseline results by including a set of alternative variables indicated by the instability-growth literature to be of significance. In this thesis, both financial crises and political instability are hypothesized to be potential causes of departures from the growth base values. The

parsimonious economic model based on the central convergence hypothesis in the growth literature seems to be a natural starting point to study departures from growth curves. It makes the study comparable to other studies applying the same basic setup, and it is well founded in economic theory (for details, see i.e. Islam 1995; Durlauf et al. 2004).

Causality and context

As previously mentioned, there has been found diverging effects of different dimensions of political instability in different contexts. For example, Jong-A-Pin (2009) finds that instability *of* regimes are growth-negative, while instability *within* are growth-positive. Campos and Nugent (2003) find a long-term positive effect of instability on investment and a short-term negative effect. Butkiewicz and Yanikkaya's (2005) results show that measures of political violence typically are growth-negative, while government and social instability are insignificant. In addition, effects are found to be conditioned upon income-levels. Generally, results of quantitative approaches in the instability-growth literature have diverging results, possibly due to parameter heterogeneity, simultaneity, misspecification and errors of measurement. How do we establish causality in a field of study facing these challenges?

Falleti and Lynch (2009:1143) emphasize that causal explanations must be contextually bounded. To draw causation, one must understand the relationship between context and mechanisms. Measurements and indicators are observed within different contexts, which need to be accounted for. This relates to the problem of parameter heterogeneity in quantitative studies. If the units of analysis "are not equivalent in ways that are likely to be causally relevant" (Falleti and Lynch 2009:1144), then how do we produce valid causal inference? One development within quantitative approaches, emphasized by Falleti and Lynch (2009), are multilevel studies. These models examine units at two or more levels of society (Grønmo 2004:389). By using data from several levels we get a more nuanced picture of the phenomena we are studying. If we ask how the relationship on one level is conditioned by relations on another level, then the latter level thereby constitutes the contextual reference, or prerequisite conditions, for the first (ibid). It seems likely to assume a different impact of financial crises in developed and developing countries, both with regards to instability and growth. It would also be likely to expect the nature of phenomena of political instability to be different in democracies and autocracies, which in turn would affect the growth pattern, or the departure from the growth pattern, differently. Specifically, the role of institutions in comparative political economy is central to explain context. Solow (1986) makes the

observation that “more often than not we fail to take institutional differences seriously. One model is supposed to apply everywhere and always” (sited in Western 1998:1235). Such differences, or heterogeneity across countries, are often modeled simply by including control variables to “stratify the analysis to achieve causal comparability” (Falleti and Lynch 2009:1144), or by introducing interaction terms in regressions to make effects of one variable on the dependent conditional upon a third.

If it is necessary to *substantively* account for causal heterogeneity, Steenbergen and Jones (2002) recommend multilevel analysis as the preferred procedure. Given, of course, that multilevel data structures exist within the framework one is examining. On the other hand, if it is enough to *statistically* control for causal heterogeneity, then a panel framework may be satisfactory. The Least Square Dummy Variable or fixed effects approaches accomplish this by absorbing the contextual or subgroup differences. However, these models do not explain the difference, they only account for them. The interactive, random-error or random effects models are able to include subgroup predictors and thus to substantively account for causal heterogeneity. By using a random effects model it is also possible to separate effects within countries over time, from the average effect between countries. This possibility of explicitly modeling heterogeneity between countries is emphasized in the next section.

2.7 Chapter summary

Section 2.1 discussed financial crises. It was argued that the measure of banking crises is suitable since it captures both internal and external forms of financial distress. Cavallo and Cavallo (2010) also find this proxy of financial crises to correlate most with other crisis measures. Section 2.2 described a development from one- and two-dimensional, to a multidimensional view of political instability. Feng (2003) conceived political instability as merely government change, Alesina and Perotti (1996) emphasized both regime-related instability and instability induced by the civil-society, while Jong-A-Pin (2009) developed a multidimensional framework where political violence, mass civil protest, instability within regimes, and instability of regimes was found to be the central dimensions. Because of its nature as qualitative phenomena, political instability may be difficult to measure. Therefore, several authors employ factor analysis or principal component analysis to capture several relevant phenomena.

Section 2.3 presented the theoretical expectations and previous empirical findings on the determinants of political instability. I have hypothesized that financial crises, inflation, economic and social inequality, and regional instability to have a positive effect on political instability. Income growth, trade openness, government spending and democratic institutions are expected to have a negative effect on political instability. In addition, the effect of financial crises may be dependent on the level of income and therefore have a positive effect on political instability since financial crises are thought to lower income.

Section 2.4 discussed the connection between financial crises and economic growth. The central argument is that crises are destabilizing for central macroeconomic variables and therefore negative for growth. However, some argue that the long-term effect may be positive if crises comes as a product of financial liberalization, or because reform and learning-processes take place (Drazen 2000; Rancière et al. 2008). According to Cavallo and Cavallo (2010) financial crises are critical junctures and the long-term effect depends on the institutional set-up. Therefore, the last hypothesis states that a politically unstable environment may amplify the negative effects of crises on growth.

Section 2.5 identified the theoretical background for how political instability may affect growth, and gave a rigorous overview of the many contrasting findings. Political instability may increase uncertainty and have adverse influences on property rights (Barro 1991; Alesina et al. 1996). Furthermore, political instability may lead to emigration and destruction of infrastructure (Ades and Chua 1997). Myopic policies may also be the product of political instability, thereby increasing the level of taxation, or simply benefiting the sitting regime (Alesina and Perotti 1996). These are the main mechanisms through which political instability are thought to affect growth. On the other hand, Campos and Nugent (2003) also believe that delayed investment, replacement investment and changes in government or policies may explain their finding of a positive effect of instability on long-run growth and investment.

Section 2.6 gave a methodological review of past studies of instability and growth. Here, some pro's and con's regarding both cross-sections and panel data models were presented, it became clear that the joint endogeneity of instability and growth need to be treated to avoid simultaneity bias, and the part on causality and context suggested that panel data models may help us to control for causal heterogeneity.

3.0 Method

This thesis has two dependent variables. First, it will be examined if financial crises create political instability. Second, it will be examined how political instability affects economic growth in general and with financial crises entering as critical junctures. The method of choice for investigating both these relationships is panel data analysis. More specifically, I will apply the benefits of within- and between-analysis. Such models are often referred to as Random Coefficient Models or Mixed Models in the multilevel literature. The features of this method will be explained shortly. Thereafter, it is argued for the choice of estimation technique before some problems with longitudinal data, econometrical challenges, and assumptions in panel models are discussed.

3.1 Panel data models

Since panel data contains repeated observations on the same units, this allows for more complicated and realistic models than cross-sections or time-series (Verbeek 2008:355). In these analyses, the countries that are units of observations (i = 1, 2, 3…N) are followed over a period of years (t = 1, 2, 3, …T). The panel data structure gives several advantages. First of all, including a time dimension lets us estimate the impact of the variables at several points in time. This minimizes the risk that cause preceded effect, we can be surer that the variables are correlated at more than one random period in time, and therefore that the relationship is not spurious (Finkel 2001:476). A panel design does not only allow for comparison between, or across, systems over time, but also within one system over time. Furthermore, since N is multiplied by T we get a higher number of total observations, which is positive both in terms of degrees of freedom for modeling purposes, and the overall robustness of the research design. Data covering two dimensions, time and space, are more informative, have more variability and less collinearity among the included variables (Batalgi 2008:7). However, the major reason why many scientists apply panel data models is the possibility of controlling for *unobserved heterogeneity*. This point deserves a closer inspection and a general static panel data model can be used as a basis of explanation.

$$(1) \qquad Y_{it} = \beta_0 + \beta\, X'_{it} + \varepsilon_{it} \qquad\qquad \varepsilon_{it} = (\alpha_i + \mu_{it})$$

In equation (1), the dependent variable Y_{it} is explained by a vector X'_{it} of explanatory variables, β is the panel data estimator, ε_{it} contains a stochastic error term μ_{it} with normal properties, and a unit-specific unobserved effect α_i that is constant over time. When analyzing

panel data we cannot assume that the observations are independently distributed across time (Wooldridge 2009:445). The error term will vary over time and units capturing all unobservable factors that affect the dependent variable. Since the same units are observed repeatedly, it is an unrealistic assumption that the error terms in different periods are uncorrelated (Verbeek 2008:356). However, precisely since the unobserved factors are present over time, this variation can be estimated and exploited. One main difference between different panel data estimators is how this unit-specific unobserved effect is treated.

Fixed effects (FE) and random effects (RE)

One may obtain FE estimates (2) by including unit-specific intercept terms in the regression equation, and excluding the overall intercept. This is referred to as the Least Square Dummy Variable approach, where the intercepts capture all the factors that are unit-specific, or country-specific. We obtain the same results without having to include *N-1* numbers of dummy variables by calculating X'_{it} as deviations from individual means. This is often referred to as the within-estimator because the transformation of observations into deviation from individual means, leave the within-variation for every group of observations and excludes the constant unit-specific effect, as shown in (2.1) and (2.2). This becomes possible by exploiting the time variation in the variables. In RE models (3), the unit-specific effect α_i is included as a stochastic variable, assumed to be independently and identically distributed over units. This is often referred to as the error-components model since its error-term includes two variables.

(2) $$Y_{it} = \alpha_i + \beta X'_{it} + \mu_{it}$$

(2.1) $$\overline{Y}_{it} = \overline{\alpha}_i + \beta \overline{X}'_{it} + \overline{\mu}_{it}$$

$$(\alpha_i - \overline{\alpha}_i) = 0$$

(2.2) $$(Y_{it} - \overline{Y}_{it}) = \beta(X'_{it} - \overline{X}'_{it}) + (\mu_{it} - \overline{\mu}_{it})$$

(3) $$Y_{it} = \beta_0 + \beta X'_{it} + (\alpha_i + \mu_{it})$$

The main advantage of panel data involves reducing identification problems “in the presence of endogenous regressors or measurement error, robustness to omitted variables and the identification of individual dynamics” (Verbeek 2008:358). The unit-specific effect is often interpreted as representing omitted variables, and therefore panel data has the advantage of being able to statistically avoid omitted variable bias that may arise due to characteristics that

are specific for a particular unit or country in this case. This is a valued property since one important critique against quantitative models is that unit heterogeneity cannot be "assumed away", and may make results non-comparable across continents, regions or even countries. Petersen (2004:342) comments that the two estimators basically reports on two different aspects of the data. Where FE answers the research question with "within-individual changes", the RE approaches also utilizes "differences between individuals". So where FE use the time variation around the averages within every unit, RE combines the between and within variation. Since the RE estimator utilizes more variation than the FE estimator this is considered more efficient, on the other hand, the FE estimator is considered more robust to bias. Several also argue that the fixed vs. random debate should be softened when T is high, because as $T \rightarrow \infty$ the β_{RE} will converge towards β_{FE} (Veerbeek 2008:366-367; Petersen 2004:340). However, when T is small the differences may be substantial.

In panel models, the assumption that explanatory variables are not correlated with the error term must still be valid. So that Corr ($x_{it,}$ u_{it}) = 0, for all i, t. Furthermore, the unit-specific effects cannot be correlated with the explanatory variables: Corr ($x_{it,}$ α_i) = 0, for all i, t. Since the complete error term includes $\varepsilon_{it} = (\alpha_i + \mu_{it})$ OLS estimates will be consistent (with error in inference) as long as E (ε_{it}) = 0 and Corr ($x_{it,}$ ε_{it}) = 0, but if α_i or u_{it} is correlated with x_{it} results are also biased. This is solved by transforming the observations into deviations from individual means in the FE model.[5] The RE model includes this effect and therefore the assumption that Corr ($\alpha_{i,}$ x_{it}) = 0, must be satisfied. This strict assumption is normally tested with a Hausman test, where the null hypothesis is that α_i and x_{it} are uncorrelated (Hausman 1978). [6]

Corr ($\alpha_{i,}$ x_{it}) = 0	–	FE is consistent. RE is consistent and efficient.
Corr ($\alpha_{i,}$ x_{it}) ≠ 0	–	FE is consistent. RE is inconsistent (biased).

[5] $\hat{\beta}_{FE} = \frac{\sum_{i=1}^{N}\sum_{t=1}^{T}(x_{it}-\bar{x}_i)(y_{it}-\bar{y})}{\sum_{i=1}^{N}\sum_{t=1}^{T}(x_{it}-\bar{x}_i)^2}$, by inserting $\hat{\beta}_{FE}$ in $\tilde{\alpha}_i = \bar{y}_i - \hat{\beta}\bar{x}_i, \quad i = 1,\ldots,N$ we find α_i. We observe that the FE estimator removes the unit specific effects by subtracting by individuals and not the sample as β_{OLS} does.

[6] $H = (\hat{\beta}_{FE} - \hat{\beta}_{RE})'(\hat{Var}(\hat{\beta}_{FE}) - \hat{Var}(\hat{\beta}_{RE}))^{-1}(\hat{\beta}_{FE} - \hat{\beta}_{RE})$, H has chi square distribution with *k* degrees of freedom. Hausman basically test whether there is a significant difference between the FE and RE estimates. If so, the null hypothesis is unlikely to hold (Verbeek 2008:368). One important reason for such a difference is that α_i and x_{it} are correlated (Verbeek 2008:369).

Because the FE procedure consists of deviations from individual means, this also leads to elimination of all constant explanatory variables. This is straightforward to understand: since the variables do not vary over time within units, they have no deviation from their mean. From this follows another problem with FE models, that all between-variation is excluded. This means that although the relationship between y and x is estimated to be positive or negative within units, the effect between units may be the opposite (ecological fallacy). FE approaches may also have substantially larger standard errors than RE-estimates in many cases (Allison 2009:3). Especially when predictors have little variation over time, but large variation between units, the FE estimates will be imprecise. Therefore, it is also more likely to make type II errors (reporting no effect when there is an effect), when applying the FE estimator.

On the other hand, the RE estimator allows for the inclusion of time-constant explanatory variables since it also exploits the between-variation.[7] However, the inclusion of the unit-specific effects as stochastic variables assumes that they are indeed randomly drawn from a larger population. They are not "one of a kind", which is often the interpretation of country specific effects (Verbeek 2008:367). Allison (2009:23) comments that the choice between FE and RE is really a choice between bias and efficiency. RE gives more efficient estimates, but is biased if assumptions are wrong. FE is less prone to bias, but less efficient. However, this choice may not be an absolute, as is discussed in the next section.

Within- and between-analysis

When we estimate within-effects (FE), each unit serve as its own control, and thus all unit-specific explanatory variables are held constant. Once estimates also include between-effects (RE), we may have unit- or cluster-level omitted-variable bias, and therefore overestimate the true effect of the relationship (Rabe-Hesketh and Skrondal 2008:114). Since there are many potential gains by using RE models, it has been suggested potential solutions to the problem that the unit-specific effect may be correlated with explanatory variables and therefore the residual. Snijders and Bosker (1999:44) argue that by including the variables group means as

[7] Since RE estimates include α_i as a part of the error term, the composite error term $\varepsilon_{it} = (\alpha_i + \mu_{it})$ exhibit a special form of autocorrelation (Verbeek 2008:364). Consequently, OLS standard errors are incorrect, and therefore RE estimates are computed using the more efficient Generalized Least Squares estimator (GLS). It can be shown that RE estimates are a matrix weighted average of the between-groups and the FE-estimator: $\beta_{RE} = \beta_{between} + (1 - \Delta) + \beta_{FE}$, where $\Delta = \beta_{RE} - \beta_{FE} / \beta_{between} - \beta_{FE}$. For details, see Batalgi (2008:17-21) or Verbeek (2008: 364-367).

explanatory variable, as seen in equation (4), the correlation between the unit-specific effect and the explanatory variable is removed. Rabe-Hesketh and Skrondal (2008:115) argue similarly, that the assumption that within- and between-effects are identical may easily be relaxed by using a model such as (5). Verbeek (2008:359) also point to the fact that panel data have the benefit of providing internal instruments.

(4) $$Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 \overline{X}_i + \varepsilon_{it} \qquad \varepsilon_{it} = (\alpha_i + \mu_{it})$$

(5) $$Y_{it} = \beta_0 + \beta_1 (X_{it} - \overline{X}_i) + \beta_2 \overline{X}_i + \varepsilon_{it} \qquad \varepsilon_{it} = (\alpha_i + \mu_{it})$$

In (5), the deviation estimate of X_{it} from its unit-mean serve as an instrument variable for X_{it} since it is correlated with X_{it}, but uncorrelated with the residual (Rabe-Hesketh and Skrondal 2008:115).Within- and between-estimates are also of substantial interest. It is interesting to learn if the explanatory variables primarily vary within countries over time, between countries, or both within and between countries. For example, Jong-A-Pin (2009:20) revealed that his dimensions of political instability varied both within (over time) and between countries.

(4.1) $$Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 \overline{X}_i + \varepsilon_{it} \qquad \varepsilon_{it} = (\alpha_i + \mu_{it})$$

$$\downarrow \qquad \downarrow$$

$$Within-effect \quad Difference \; Within/Between$$

(5.1) $$Y_{it} = \beta_0 + \beta_1 (X_{it} - \overline{X}_i) + \beta_2 \overline{X}_i + \varepsilon_{it} \qquad \varepsilon_{it} = (\alpha_i + \mu_{it})$$

$$\downarrow \qquad \downarrow$$

$$Within-effect \qquad Between-effect$$

As shown in (4.1), the procedure suggested by Snijders and Bosker (1999) may be applied to identify the variables where the between-variation is significant. A significant difference within and between countries indicates that the effects should be modeled as in (5.1) in the final model. Addressing the problem highlighted by Mundlak (1978), this procedure can be applied to all explanatory variables. Thus one would ensure that estimation of *all* within-effects are consistent "because the deviations from the cluster means are uncorrelated with the cluster means themselves," uncorrelated with the between-covariates, and the unit-specific effect (Rabe-Hesketh and Skrondal 2008:119). Zorn (2001) advises that while modeling within- and between-effects separately might be informative, they serve merely as

illustrations if the data truly are clustered, because then each is underspecified without inclusion of the other.

Choosing estimation technique

Because of the potential gains by using an RE model, and the substantial interest in estimating within- and between-effects, this procedure is chosen to investigate the questions of interest. Applying the model in (5.1) allow inclusion of unit-constant explanatory variables that would otherwise have been excluded. However, the RE approach need some justification in the growth context.

Islam (1995:1138) argues that FE estimation is most suitable in growth regressions. Since the unit-specific effects are thought to consist of technological and institutional differences that are unobserved, it is precisely their correlation with economic growth that argues in favor of a panel model with fixed effects. Because the RE estimator relies on the assumption that these effects are uncorrelated with the exogenous variables in the model, which also correlates with growth, the assumption seem unreasonable. Bond, Hoeffler and Temple (2001) argue similarly, that since the level of efficiency is unobserved, this will correlate with the level of income producing biased estimates. So, one could argue that although the Hausman test should indicate that the RE approximation is valid, this should not be taken as evidence that it is substantially correct. On the other hand, the application of within- and between-variables will impose a within-effect on the estimates while allowing the most efficient estimator to be applied. The Hausman test can also be used to verify that the estimation using within- and between-variables have the desired effect by comparing the results to a test based on estimation with ordinary variables.

In section 2.5 it was argued that there are fundamental reasons why the proximate causes of growth vary between countries. A central goal of growth empirics is to explain the differences in these growth patterns *across countries*. What then, can we learn by studying growth within countries (FE-approaches), about the variation in the proximate causes across countries? Studying differences across countries by excluding the variation between countries may seem puzzling. Using the within- and between-analysis I hope to avoid the bias that normally lead econometricians to choose FE, while retaining the between-variation, which is of substantial interest in growth econometrics.

Interaction terms

To test hypothesis *H2A* and *H12*, I need to include interaction terms in the regressions. If the effect of a variable X_1 on Y is dependent on another variable X_2, we say that the effect of X_1 is conditional upon X_2. This effect can be modelled as in equation 6 (panel notation is dropped for simplicity):

(6) $$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 (X_1 * X_2) + \varepsilon$$

(7) $$Y = \beta_0 + \beta_1 \overline{X}_1 + \beta_2 \overline{X}_1 + \beta_3 \overline{X}_2 + \beta_4 \overline{X}_2 + \beta_5 (\overline{X}_1 * \overline{X}_2) + \beta_6 (\overline{X}_1 * \overline{X}_2) + \varepsilon$$

where : $\overline{X}$ = deviation, $\overline{X}$ = *mean*

Whether the effect of financial crises on political instability is contingent upon income, and whether the effect of financial crises on growth is conditional on the political environment, can be tested using a model such as (6). If Y is growth, X_1 financial crises ($\beta_1 < 0$) and X_2 is democracy ($\beta_2 > 0$), the interpretation of β_3 is that when $\beta_3 > 0$ the negative effect of financial crises on growth is lower for higher democracy scores. To avoid multicollinearity and to make the interpretation of the interaction term more meaningful, Wooldridge (2009:197) suggest centering the variables before making the interaction term. However, as I apply within- and between-analysis, this approach is not meaningful because the variables are already constructed as means and deviations. Therefore, I follow the procedure in (6) by modeling the interaction terms as seen in (7), but examine possible multicollinearity before including the interactions. Kromey and Foster-Johnsen (1998) have argued that in the end, it is the incapability of the data to distinguish sharply between autonomous effects and interplay effects of a variable that leads to high multicollinearity. Because of this, the advice of centering variables: “merely shunts the difficulties” (Pennings, Keman and Kleinnijenhuis 2006:166).

Problems with longitudinal data

According to Verbeek (2008), the drawbacks of using panel data are mainly practical. Panels require a lot of data and gathering it may be time consuming and costly. Furthermore, different time series from different sources may severely limit the sample period, or force the researcher to choose less favored indicators. Additionally, panel data sets often suffer from missing observations. An incomplete panel data set where i * t < I * T is called an unbalanced panel. Computationally it is unproblematic to estimate unbalanced panels and estimators

remain consistent if observations are *missing at random*, but if observations are missing systematically (i.e for a region, level of income etc.) this may lead to estimation bias. It is of course also substantially challenging to say whether one is measuring what is intended if data central to the analysis is missing. This lack of data may exist due to a variety of reasons. Low income countries can typically have missing data due to poor institutional set-ups and lack of routines for gathering statistical data. Furthermore, autocratic rulers may have incentives to hold back information or show results to be of a more favorable nature, thereby making the data less trustworthy. These questions must be dealt with in the process of choosing the most valid and reliable data available.

Econometrical challenges and assumptions in panel data models

Simultaneity

As emphasized in the methodological review, it is central to treat the endogeneity of political instability in the growth regression. This is also vital with respect to financial crises, when examining the determinants of political instability in the first analysis. Four potential solutions were evaluated. First, the analysis could have been performed as simultaneous equations, with growth and political instability as dependent variables and each others main explanatory variables, and financial crises as a common explanatory variable. Because of the operationalization of political instability into four dimensions (see section 4.2), this would be very complicated. A second alternative is to use external instruments, but taking the warning by Durlauf et al. (2004) about the difficulty of finding good instruments into account, this option is ruled out. As a third possibility, the opportunity of using internal instruments was evaluated. Jong-A-Pin (2009) employ the system-GMM estimator, as proposed by Arellano and Bover (1995) and Blundell and Bond (1998), where the endogenous explanatory variables are instrumented by up to t_{-2} lagged versions of themselves. Due to the unbalanced panel used in this thesis, and the large loss of data points this technique causes, it is dismissed (see section 4.0). The chosen technique is also the simplest. The endogenous variables will be lagged by one year, in order to ensure that the direction of causality run in the right direction. This alternative provides less loss in degrees of freedom than internal instruments, it is far simpler than finding external instruments, and more parsimonious than simultaneous equations.

Heterogeneity

Kong (2007:21) describes two types of heterogeneity, which commonly occurs in panel regressions. The first is heterogeneity across countries, or *parameter heterogeneity*, which occur because different countries are not expected to share common parameters. By including specific between-effects, this will specify what variables have significant variation between units. The second type is *heterogeneity over time within countries*, which reflects the episodic nature of growth. This is often overcome by averaging growth rates, and is also the approach chosen in this thesis (see section 4.1).

Homoskedasticity

To be homoskedastic, the regression disturbances should display the same variance across time and individuals (Batalgi 2008:87). As with pure cross-sections, this may be a problem with panel data since different cross-sectional units may be of varying size and therefore have different variation. If the residual variance is conditional/dependent upon the value of the explanatory variables, then the regression may be influenced by heteroskedasticity. Assuming homoskedasticity when heteroskedasticity is present gives consistent, but not efficient estimates, and the standard errors will be biased (ibid).

Assumption: Var $(\mu_i|X') = \text{Var}(\mu_i) = \sigma^2$, i = 1, 2, …, N.
Treatment: Robust estimation (Panel Corrected Standard Errors)

Panel heteroskedasticity

So called *panel heteroskedasticity* may occur if the residual variance across units over time varies because of characteristics unique to each unit (Worall 2008:234). When the residual variance is not constant over units, or groups of units, then the homoskedasticity assumption is violated in a particular manner (Baum 2006:150, 222). In addition, errors may be correlated between units at the same time, producing so called *contemporaneous correlation*.

Assumptions: Corr $(\mu_{it,}\, \mu_{is}) = 0$, $t \neq s$. Corr $(\mu_{it,}\, \mu_{js}) = 0$, $i \neq j$, for all t, s.
Treatment: Robust estimation (Panel Corrected Standard Errors)

Serial correlation

In economic time series, upward trending variables are very common. Serial correlation, or autocorrelation, arises because the disturbances capture such trends and become correlated across time. Also, unobservable effects affecting the dependent variable, that is captured by

the error term, may be persistent over time and thereby generate positive autocorrelation (Verbeek 2008:105). Assuming uncorrelated error terms when serial correlation is present gives consistent, but not efficient estimates, and the standard errors will be biased (Verbeek 2008:372). The most common form of serial correlation is a first order autoregressive structure (AR(1)) where μ_t correlates with, or is dependent on, μ_{t-1}. It is also possible to have serial correlation of a higher order (AR(2) etc.). It is possible to account for serial correlation by first-differencing the variables thereby accounting for the trend. Dynamic models are also able to account for serial correlation because the included lagged dependent variable now explains the temporal dependency (Finkel 2008:487; Worall 2008:238). Averaging variables over several periods also combats autocorrelation.

Assumption: Corr (μ_t, μ_s) = 0 for all $t \neq s$.
Treatment: Robust estimation (Panel Corrected Standard Errors) and averaged variables.

Stationarity

Variables like GDP growth may display strong non-stationarity (Batalgi 2008:274). A panel is stationary when the means, variance and auto-covariance remain constant across all time points at different lags (Worall 2008:238). In panels, the dependent variable y_{it} may be stationary for country one, but integrated of order one for country two. Such heterogeneity in cointegration properties may lead to problems (Verbeek 2008:389). A stationary process indicates that the variable is integrated of zero-order, noted as I(0).

Assumption: $X_t \sim I(0)$
Treatment: No treatment necessary. All variables were tested using Stata's command '*xtfisher*'. No non-stationary processes were detected, which is not surprising given that the data is averaged.

Multicollinearity

Multicollinearity is the phenomenon of highly correlated independent variables (Pennings et al. 2006:162). Presence of multicollinearity may inflate the standard errors of the regression. A simple correlation between suspected variables may reveal that they should not be included together on the right hand side of the regression equation. However, there is no definitely defined value of collinearity over which multicollinearity is a problem. Batalgi (2008:7) argue that this problem is smaller with panel data than with only time-series or cross-sections.

Although there is disagreement about the appropriateness of formally testing for multicollinearity, there exist tests for assessing individual coefficients. One of these is the Variance Inflation Factor (VIF), where the VIF-value is the factor by which the variation of the coefficient β_j is higher because X_j is not uncorrelated with other explanatory variables (Wooldridge 2009:99). A cutoff point is often set at VIF > 10 as indicating multicollinearity.

To test for multicollinearity between explanatory variables, suspected variables have been examined by simple correlations prior to the analysis. In addition, a VIF-test of the final models is performed using Stata's '*collin*' command. Results indicate no problems of multicollinearity and can be found in appendix table 5.

Normality

When testing statistic hypothesis it is normal to assume that the residuals have a normal distribution. If the residuals have a different distribution, inferences based on the expectations of a normal distribution may give rise to problems (Skog 2005:249). As the sample size grows, it converges toward the population value (Wooldridge 2009:172). Therefore, problems of non-normality are smaller with longitudinal data. *Outliers* are a potential problem for both the assumption of normality and homoskedasticity. One cause of outliers is that the relationship is not linear. Transforming the variables could treat this problem (Skog 2005:249). Another potential solution is dropping the units that lie far from the regression line. This, however, may be misleading, since these observations also represent reality (given that they are not the product of measurement error). To test for normality, a Shapiro and Wilk W-test is conducted using Stata's '*swilk*' command. This displays normal distribution. Results can be found in appendix table 6.

Linearity

The basic assumption of most regression models is linearity in parameters. Non-linearity may therefore lead to weak estimates of the true effect (Skog 2005:239). Estimating a linear relationship when it is in fact quadratic constitute a misspecification of the regression. On the other hand, if one searches for non-linearity by including quadratic terms for all variables, odds are some will be found. Answering the critique of Carmignani (2003) and De Haan (2007), these analyses only include variables (and specifications of these) based on the theoretical framework. In addition, logarithmic variables are used when appropriate.

3.2 Chapter summary

The method of choice in this thesis is panel data analysis. The research question will be examined by means of within- and between-analysis to explore the determinants of different dimensions of political instability, and the effect of political instability and financial crises on economic growth. Such analyses are of substantial interest as we can learn about the variation in the data both within countries over time and between units. Using the panel data structure to create internal instruments we can avoid the bias that normally leads econometricians to choose FE in growth regressions. The section on problems and assumptions in panel data models explained that endogenous variables will be lagged in the analysis to avoid simultaneity-bias. Robust standard errors will be computed to avoid problems of heteroskedasticity and serial-correlation, and tests revealed no problems of normality, stationarity or multicollinearity.

4.0 Data and Measurement

This section presents the data, measurement and operationalization of the variables used in the quantitative analysis. Pennings et al. (2006:62) describes the procedure of operationalization as the efforts put in to obtain an *operational definition* of the concepts of interest, in order to obtain a *valid* transformation that may be *reliably* measured. The two criteria of validity and reliability are used to judge the quality of the chosen measurements. Validity refers to the degree to which the measures meaningfully capture the concept or phenomena it purports to measure (Pennings et al. 2006:67; Adcock and Collier 2001:529). Reliability refers to the dependability, or trustworthiness, of the measurement. The reliability increases when measurements of the same phenomena with respect to the same units deliver consistent results over numerous collections of data (Pennings et al. 2006:67; Grønmo 2004:220). However, measuring the concept of interest consistently, but poorly, is of course uninteresting. Therefore, reliability cannot compensate for low validity. The process and reasoning surrounding data and operationalization of the three main variables of interest will be emphasized.

In what follows, I first describe the selection of the sample. Thereafter, the process of choosing and adjusting the three main variables are explained. Lastly, a section on controlling factors provides an overview of all the control variables to be employed in the analyses.

Selecting the sample

Organizing a large longitudinal data set is like solving a puzzle. Not only do the variables have to be valid and reliable measures, but the choice of data has to evaluate the available time period and missing observations to maximize the variation in the sample period that is chosen. The sample selection (countries and years) is therefore, inevitably, largely determined by the data availability. As a preventive measure against outlier problems all countries with less than ½ million inhabitants are excluded from the dataset. These countries have special characteristics, are not expected to lie on a regression line common to rich or developing countries, and should not be given much weight when attempting to generalize about larger countries (Durlauf et al. 2004:123). Historical (socialist) states are excluded. This leaves many countries with time series that start around 1990 and is the primary reason for the dataset being unbalanced.

What can be done about missing observations? Some countries are problematic in the sense that a history of political chaos means data is missing to a large degree. If countries have large amounts of missing data on the dependent variable then there is no variation left to explain. Several countries have been excluded for this reason.[8] Pennings et al. (2006:66) suggest *listwise deletion* as appropriate when units are missing values on one or more of the relevant variables, especially in studies where N is large and the unit of observation is not extremely important to the overall result. Techniques to deal with countries that have less systematically missing data are available. Imputation using other data sources to predict the missing data is one possibility. More common, perhaps, is using the mean value of the relevant indicator to impute the missing observations. However, this produces new challenges to defending the validity and reliability of the data, and is disregarded since those countries excluded have data missing to a large degree. Modifications made to the data are specified when the specific measure is described. The final dataset cover a time-series from 1975-2009, including 148 countries.[9]

4.1 Real GDP per capita growth

There are three potential sources for GDP levels and growth rates that are commonly used. The first is IMF's International Financial Statistics (IFS), the second is World Banks World Development Indicators (WDI), and the third is Penn World Tables (PWT). Several studies show that the choice of data source of growth rates may have consequences for results because of differences in data collection and in methods of adjustment for prices (Nuxoll 1994; Hanousek, Hajkova and Filer 2008). The IFS data are gathered regularly by the IMF from national statistical agencies, while the WDI data combines IFS data with additional data collected by the World Bank staff. Lastly, the PWT data are based on the WDI data and additional data for developing countries obtained from OECD (Hanousek et al. 2008:1189). The IFS data are reported using national price weights and indigenous inflation levels, whereas the PWT data are adjusted to international prices by setting relative domestic prices equal to a weighted average of relative prices for all countries (Hanousek et al. 2008:1190). The purpose of the latter is to achieve cross-sectional comparability. Although the PWT data are used in a majority of growth studies, the adjustments made to create cross-sectional comparability are problematic. Nuxoll (1994) comment that the use of international prices

[8] Countries that fall into this group are: Afghanistan, Bosnia Herzegovina, Bahrain, Cambodia, Eritrea, Iraq, Libya, Qatar, North Korea, Serbia, Somalia, Timor-Leste, Taiwan, Hong Kong SAR, Kosovo, Macao SAR, Suriname, Puerto Rico, West Bank and Gaza, Montenegro.
[9] A list of all countries is found in appendix table 4.

gives an upward bias in growth rates for high-income countries and a downward bias for low-income countries. This is often referred to as the "Gerschenkron effect".[10] Nuxoll (1994) therefore advises researchers to use data from PWT to measure initial income levels, but that real GDP growth rates should be collected from sources presenting data adjusted using domestic price weights. More specifically, Nuxoll (1994:1434) explains: "…using domestic prices to measure growth rates is more reliable, because those prices characterize the trade-offs faced by the decision-making agents, and hence they have a better foundation in the economic theory of index numbers." After comparing the three common measures, Hanousek et al. (2008:1192) comment that "growth rates appear to be sensitive to adjustments made to the basic data to achieve cross-country compatibility in income levels in a single year." For example, they find that PWT and IFS actually show opposite signs 14% of the time in the data they examine (ibid). The advice from Hanousek et al. (2008:1200) follows that of Nuxoll's, that researcher should: "avoid using data that have been adjusted to create comparability across countries for a particular year to calculate growth over time *within* a given country" (original italics).

With this argument in mind, Butkiewicz and Yanikkaya (2005) choose to use WDI data for real GDP per capita growth, and PWT data for initial income levels. Heston and Summers (1996) comment on the indifference of many scholars when told that using PWT data "the rates they obtained are *not* the same as the rates implied in the countries' own national accounts" was predictable: they disregarded it entirely. The attitude that "growth is growth" may prove to be misleading if different measures may actually change the results of the analysis, as shown by Hanousek et al. (2008). Not paying attention to the process by witch the data are generated can produce biased inference.

Choosing data

Four sources for growth and GDP data have been considered. The PWT data have been criticized and their latest time series ends in 2007, therefore it is disregarded for the growth series.[11] The time series from IMF starts in 1980 and would therefore limit the selection of time frame by five years. Data from United Nations Statistics Division (UNSD) and WDI cover the favored time frame 1975-2009. The preferred growth measure is therefore the

[10] This refers to the sensitivity on growth rates in choosing a base year for weighting prices. See Nuxoll (1994:1425).
[11] PWT 7.0 became available in May 2011, but was not available at the time when the dataset was created. However, the time-series is not the main reason for not choosing PWT-data.

World Bank's annual GDP per capita growth rate in constant local currency (World Bank 2010).

Adjusting the data

To proxy long-term development in economic growth it is common to average growth over several years. The most common is to use 5-year averages (Islam 1995; Durlauf et al. 2004; Jong-A-Pin 2009), but 10-year averages are also widely applied (Mankiw et al. 1992; Butkiewicz and Yanikkaya 2005). Averaging data obviously means less variation in the growth variable, however, it also smoothes out business cycles making it easier to identify permanent growth effects from short-term economic fluctuations. In addition, the problem of serial correlation is thought to be smaller than when annual data are applied (Islam 1995:1140). Most economic time series fluctuate around a (typically increasing) trend. These fluctuations create a lot of statistical "noise". When studying long-term growth it is explaining the trend, and changes in this trend that is of interest, not the fluctuations around the trend. One alternative to averaging economic variables is to use a time series filter to adjust for business cycles over time. The Hodrick-Prescott filter estimates and weighs a trend component and a cyclical component in long economic time series, which could be ideal to study a growth trend over time. However, the filter cannot capture structural change instantly, and uncertainty regarding the start and end-points in the time series makes it necessary to exclude some observations. Durlauf et al. (2004) also argue that the Hodrick-Prescott filter often is inappropriate in the context of developing countries where large output deviations are not uncommon. Therefore, the approach of averaging is chosen. I apply 5-year averages only if 3 out of 5 observations for the period are non-missing. This leaves every unit with a maximum of 7 periods (1975-79, 80-84, 85-89, 90-94, 95-99, 00-04, 05-09).

4.2 Political instability

Measuring political instability provides no easy choices for the researcher. As have become clear from the discussion in part two, using a single measure is not likely to capture the several ways in which instability might manifest itself. However, by applying different measurements separately or aggregated, the validity of the indicator may be increased. By using different measures common in the literature, the comparability of the study is also increased.

Choosing data

The chosen variables of political instability are all well established and commonly applied in previous studies. However, certain databases have not been updated in quite some time, whereas others have start years that do not fit the time-series of this thesis. Three conditions have been particularly evaluated in choosing the variables. *First*, I only choose variables that are annually observed (not counting missing data due to different reasons). This excludes variables with few and irregular data points, such as Easterly's (1999) "External conflict risk", "Racial and Nationality tensions", "Political terrorism", and "Civil war risk", applied by Butkiewicz and Yanikkaya (2005). *Second*, it is important to choose variables that are manifestations of political instability and not potential causes. This excludes the commonly used variable "Ethno-Linguistic Fractionalization", which have been argued to be a potential cause of instability. It also excludes subjective measures of political instability, since these indices are typically not event-based. *Third*, it is important not to choose variables that build on each other, thereby generating multicollinearity. This is the reason why the commonly used "Number of battle related deaths" and "Number of conflicts" from Gleditch, Wallensteen, Eriksson, Sollenberg and Strand (2002) are not included. To increase comparability to the newest studies I rather include "War" and "Minor Armed Conflict", which are based on the number of conflicts and deaths. All variables included are listed in the table on the next page. The quantity makes detailed discussion of each indicator outside the scope of this thesis, and I refer the interested reader to investigate the data sources directly. A few comments are nevertheless appropriate. In previous versions of the Armed Conflict Dataset, Gleditch et al. (2002) defined a variable for medium or intermediate conflicts defined as minor conflicts, but with total battle related deaths in the conflict succeeding 1000 over a period of more than one year. Here, the variable "Minor Armed Conflict" also represents these conflicts, although I do not distinguish them as an own category. Originally, the intention was to include the variable "Years of ruling party in office" from the Database of Political Institutions (Beck, Clarke, Groff, Keefer and Walsh 2001). However, this variable is coded with missing observations in the original data when: there are no parties; the chief executive is an independent; and when the party is in fact the army. This variable is therefore quite problematic with respect to missing observations. Such measurement error could also be correlated with the regime measures included, since the missing observations are all autocracies (except for Switzerland, which by definition have no chief executive). Because of this I choose to include "Years in office of chief executive" instead, which is also the variable that "Years of ruling party in office" build on.

Table 4.1: Variables of political instability: definitions and sources

Variable:	Definition:	Source:
Assassinations	Any politically motivated murder or attempted murder of a high government official or politician.	Banks (2010)
General Strikes	Any strike of 1,000 or more industrial or service workers that involves more than one employer and that is aimed at national government policies or authority.	Banks (2010)
Guerrilla Warfare	Any armed activity, sabotage, or bombings carried on by independent bands of citizens or irregular forces and aimed at the overthrow of the present regime.	Banks (2010)
Major Government Crises	Any rapidly developing situation that threatens to bring the downfall of a present regime - excluding situations of revolt aimed at such overthrow.	Banks (2010)
Purges	Any systematic elimination by jailing or execution of political opposition within the ranks of the regime or the opposition.	Banks (2010)
Riots	Any violent demonstration or clash of more than 100 citizens involving the use of physical force.	Banks (2010)
Revolutions	Any illegal or forced change in the top government elite, any attempt at such change, or any successful or unseccessful armed rebellion whose aim is independence from the central government.	Banks (2010)
Anti-government Demonstrations	Any peaceful public gathering of at least 100 people for the primary purpose of displaying or voiceing their opposition to government policies or authority.	Banks (2010)
Coups d'État	Number of extraconstitutional or forced changes in the top government elite and/or its effective control of the nation's power structure in a given year.	Banks (2010)
Major Constitutional Changes	The number of basic alterations in a state's constitutional structure, the extreme case being the adoption of a new constitution that significantly alters the perogatives of the various branches of government.	Banks (2010)
Major Cabinet Changes	The number of times in a year that a new premier is named and/or 50% of the cabinet posts are assumed by new ministers.	Banks (2010)
Changes in Effective Executive	The number of times in a year that effective control of executive power changes hands. The new executive being independent of the predecessor.	Banks (2010)
Legislative Elections	The number of elections held for the lower house of a national legislature in a given year	Banks (2010)
Fractionalization	The probability that to random picked deputies from the legislature will be from different parties.	Beck et al. (2001)
Polarization	Maximum polarization between the chief executive's party and the four principle parties of the legislature.	Beck et al. (2001)
Years of chief executive in office	Number of years the executive who formally (de jure) holds power have been in office.	Beck et al. (2001)
Number of veto players who drop from office	Percent of veto players who drop from the government in a year.	Beck et al. (2001)
War	Dummy variable. 1 when the number of battle related deaths > 1,000 per year in all internal and internationalized internal armed conflicts where one of the parties is the government. 0 otherwise.	Gleditch et al. (2002)
Minor Armed Conflict	Dummy variable. 1 when the number of battle related deaths fall between 25 and 999 per year in all internal and internationalized internal armed conflicts where one of the parties is the government. 0 otherwise.	Gleditch et al. (2002)
Regime Change	Dummy. "Durable" - number of years since most recent change of regime - is coded 1 when "Durable" value is 0, indicating that a new regime has started or that the state is in anarchy. 0 otherwise.	Marshall and Jaggers (2002)

Adjusting the data

Durlauf et al. (2004) argue that indicators of political instability are valid proxies only when averaged over a long time period. More specifically, they refer to the indices of Barro (1991) including political revolutions and coups. When binary indicators of political regime change are applied, they relate the probability of a power transfers to the political uncertainty that arises from this, which is hypothesized to affect growth. When the long-term growth rate are of interest, these variables should therefore be averaged over time so as not to only shed light on the direct impact of revolutions and coups (Durlauf et al. 2004: 98-99). In this thesis, it is not the likelihood of regime change per se that will be estimated, however, several arguments still favor averaging the variables. Principal Component Analysis requires that the variables are interval-level-data (as do regression analysis), if not; the extraction of linear combinations of the variables is pointless. This argues for averaging the variables prior to the PCA. Although the data do not contain categorical variables, some have values that range between 0 – 3, 4, or 5. In addition, averaging variables reduces outlier problems and help to fill in for randomly missing observations, which is particularly helpful since PCA cannot estimate components when the variables entering have missing observations. As with the growth variable, 5-year averages is applied. The data are not adjusted for population size. Alesina and Perotti (1996:1208) argue that events of political instability should be just as destructive in small-population countries as in large. An assassination of a central politician should have no lesser effect on the public in a country with ten million inhabitants, than in a country with one million.[12] Appendix table 1 shows descriptive statistics for all the original variables of political instability.

Operationalization

The findings of Jong-A-Pin's (2009) factor analysis give an indication of how variables of political instability can be categorized into four dimensions reflecting different aspects of political instability. One problem with principal component indices of political instability is that one looses the ability to estimate independent impacts of the different dimensions. This is also the reasoning that led Campos and Nugent (2002) into constructing two indices, one for "severe" measures and one for "moderate" measures of political instability. Here, I choose to make four separate indices of political instability, reflecting *political violence*, *civil protest*, *regime change*, and *government instability*. These indices reflect the dimensions emphasized

[12] On the other hand, if a variable like "Number of Battle Related Deaths" was included, this would be a *magnitude variable* that would argue in favor of population adjustment.

by both Jong-A-Pin (2009) and Sanders (1981). Although a common dimensional set-up is adopted, the variables included are not all identical to Jong-A-Pin (2009). Since the indices are to be used as dependent variables in the first analysis, and to avoid multicollinearity, it is not desirable to include variables in more than one index. Therefore, "Changes in effective executive" are included only in the index of regime change, whereas "Number of veto players who drop from office" are included only in the government instability index.[13]

Table 4.2: Operationalization of political instability

Social/civil-society unrest		Executive/regime instability	
Political violence	**Civil protest**	**Regime change**	**Government instability**
Assassinations	General Strikes	Coups d'État	Fractionalization
Guerilla warfare	Riots	Regime change	Polarization
Revolutions	Anti-government	Major government crises	Legislative elections
War	demonstrations	Changes in effective executive	Years of chief executive in office
Minor armed conflict		Major constitutional changes	Number of veto players
Purges		Major cabinet changes	who drop from office

Principal component analysis

The basic difference between factor analysis and principal component analysis (PCA) is that the latter is a data reduction method applied to extract as much variance as possible from a set of indicators, while the first is a model constructed to extract all the information that are common to all indicators from the variation that is unique to a single indicator. When factor analysis is applied, it is first and foremost to obtain values for the underlying factors, or dimensions, of the phenomena in question. The decision of the appropriate number of factors is based on statistical tests (i.e Cattell's scree test, Kaiser's criterion). As elaborated on in part two, Jong-A-Pin finds four factors that have large scores relative to the other factors and therefore explains a larger part of the variance contained in all indicators. Thereafter, the dimensions are named according to what incidents of political instability the variables with sufficiently high loadings refer to.

In choosing whether to perform an exploratory factor analysis or use PCA, Hair et al. (2006:117) suggest two criteria. First, what is the objective of the factor analysis; data reduction or identifying latent dimensions? Second, what prior knowledge do we have about the variables in question? The goal here is to create variables of political instability that reflects the multidimensionality of the concept (data reduction). Since several studies have

[13] Jong-A-Pin (2009) found these variables to load on both dimensions and therefore included them in two scores.

been performed that explore different variables of political instability, there are information available that allow inclusion of the relevant dimensions of the phenomena. Therefore, it is possible to create indices of political instability that reflects the multidimensionality of the concept by means of PCA, and using prior studies to identify essential variables of the different dimensions.

PCA reduces the number of variables in the analysis by estimating linear combinations of the included indicators with weights for the separate indicators so that the variation is maximized (Pennings et al. 2006:76). The first principal component extracted is the single best linear relationship between the variables and contain most of the variation in the original variables. The second component extracted is the second best relationship that is *orthogonal* of the first, which mean it must be derived from the remaining unique variation left after the first extraction (Hair et al. 2006:119). It this manner, *p* orthogonal principal components are derived from the *n* variables included. When the indicators are measured differently this may affect the result if the variables are not standardized to have a mean of 0 and standard deviation of 1. This would lead to the first principal component being "practically identical to the variable with the highest order of magnitude" (Alesina and Perotti 1996:1209). However, it is possible to run the analysis using the *correlation matrix* instead of the *covariance matrix*. This procedure returns the eigenvectors in *orthonormal* form (uncorrelated and normalized). The difference in results when using standardized variables and covariance matrix, or the correlation matrix, is miniscule. Since most studies in the literature follow the covariance procedure, I also choose this technique.

The aim of the PCA is not to discover the dimensionality of the concept. Variables included are already thought to be the primary variables available explaining that specific dimension of political instability. Therefore, following Alesina and Perotti (1996), Perotti (1996), Blanco and Grier (2009), and several others, I use the *first principal component* of the variables covering each dimension of political instability to create four indices. These indices should be expected to be moderately correlated with each other since they reflect different aspects of the same phenomena. Table 4.3 show descriptive statistics, loadings and the variance explained by the first principal component for the four indices. A simple correlation show that all indices are moderately correlated, the highest being political violence and regime change (0.30) and the lowest between political violence and government instability (0.026). From the table we observe that the index of government instability have more missing observations

than the other indices. The reason for this is that most variables in this index come from Beck et al. (2001). The variance explained by the first principal components is relatively high, especially the civil protest index.

Table 4.3: Indices of political instability

Descriptives, loadings and variance explained by first principal component

Political violence		**Civil protest**		**Regime change**		**Government instability**	
	Loadings		*Loadings*		*Loadings*		*Loadings*
Assassinations	0.376	General Strikes	0.5	Coups d'État	0.396	Fractionalization	0.515
Guerilla warfare	0.54	Riots	0.613	Regime change	0.414	Polarization	0.495
Revolutions	0.501	Anti-government demonstrations	0.611	Major government crises	0.349	Legislative elections	0.29
War	0.424			Changes in effective executive	0.406	Years of chief executive in office	-0.496
Minor armed conflict	0.335			Major constitutional changes	0.435		
Purges	0.148			Major cabinet changes	0.441	Number of veto players who drop from office	0.397
First component: 45,40 % N: 966		First component: 69,35 % N: 968		First component: 44,21% N: 961		First component: 43,52 % N: 796	
Mean	-0.003	Mean	-9.1E-09	Mean	0.0009	Mean	0.027
Std. Dev.	1.649	Std. Dev.	1.442	Std. Dev.	1.626	Std. Dev.	1.472
Min	-0.929	Min	-0.715	Min	-1.586	Min	-3.969
Max	13.585	Max	17.593	Max	8.972	Max	3.097

One argument against using indices is that they may complicate the theoretical interpretation (Hardy 1979:212). If the interest of the researcher is the specific quantifiable effect of i.e. coups on growth, then an index may not be the preferred choice. Since it is the effect of the dimensions of political instability that is of primary interest here, and not specific effects, it suffices to know the strength and direction of the relationship, and of course whether the effect is statistically significant.

4.3 Financial crises

The preferred proxy for financial crisis in this thesis is the banking crisis indicator. Previously mentioned reasons are high correlation with other crisis measures, the vulnerability of the banking sector to many types of domestic and external financial distress, and because of its nature as a quantitatively observable incident.

Banking crises

The database of Laeven and Valencia (2010) covers all systemic and borderline banking crises from 1970-2009. A banking crisis is systemic when "significant signs of financial

distress in the banking system (as indicated by significant bank runs, losses in the banking system, and bank liquidations)" is observed, in addition to "significant banking policy intervention measures in response to significant losses in the banking system" (Laeven and Valencia 2010:6).[14] The data provides start years, end years, and therefore duration of different systemic crises. The first year that both above mentioned criteria are met is the starting year of a crisis. The end year of a crisis is the year before real GDP growth and real credit growth have been positive for at least two consecutive years (Laeven and Valencia 2010:10). It is argued that this quantitative approach is a major improvement to earlier qualitative definitions, where systemic crises were those in which "a large fraction of banking system capital has been depleted" (Laeven and Valencia 2010:8).

Knoop (2008:171) comment that the method used to determine start and end of a banking crisis may have implications for the results of the analysis. By Laeven and Valencia's (2010) definition, in the case where growth is positive the two first years, the crisis starts and ends the same year. However, in the cases where this results in long crisis durations, growth may also be influenced by other shocks influencing economic performance (Laeven and Valencia 2010:10). Therefore, they truncate crisis duration to five years.

Adjusting the data

The indicator for banking crisis takes the value of 1 every year the country is experiencing a banking crisis. Countries not experiencing a systemic banking crisis get the value 0. Although the crisis indicator is truncated to five years, separate crisis as in Congo Dem. Rep. 1991-1994 and 1994-1998 will appear as one long crisis in the data. The possibility of using a binary indicator for the crisis variable has been weighted against the possibility of averaging out the variation over several years, as done by Cavallo and Cavallo (2010). They operationalize banking crisis as the "ratio of crisis years to total available years in the period, and range from 0-1." They average the variable over five-year periods so that a crisis that lasted two years gets a value of 0.4 for the period (Cavallo and Cavallo 2010:842). They argue that this incorporates the duration aspect of crises and avoids having to use a binary indicator which

[14] Policy intervention is "significant" when at least three out of the following six measures have been taken: extensive liquidity support , bank restructuring costs, significant bank nationalizations, significant guarantees put in place, significant asset purchases, deposits freezes and bank holidays (Laeven and Valencia 2010:7). A combination of less than three measures, but on a large scale is also deemed a sufficient condition for systemic crises (Laeven and Valencia 2010:8). Borderline cases are crisis that "almost meet our definition of a systemic crises" (Laeven and Valencia 2010:9). Typically, when two out of three measures have been taken.

would invalidate lagged instruments. Therefore, my choice is also to average the variable over 5 year periods as with the growth data and political instability indicators.

Description of the data

The data reveals 144 systemic or borderline systemic banking crises since 1970. These have occurred in 115 different countries. Excluding countries without data and limiting the time period to start in 1975, this leaves 138 crises in 108 different countries. See appendix table 3 for a complete overview. The first crisis incidents are found in the Central African Republic and Chile in 1976, whereas the last incidents are many and started with the 2007 US banking crisis. These crises are defined as ongoing by the definition of Laeven and Valencia (2010). Argentina has experienced the most banking crises (4) and also display the overall longest crises duration (totally 10 years of crisis). Although the data show that most banking crises have occurred in Europe, all continents are represented.

4.4 Control variables

This section elaborates on the choice of independent variables that will be employed in both analyses. The measures are common and most indicators will be used both analyses. All time varying control variables are treated as exogenous explanatory variables and averaged over 5-year periods, unless specified otherwise. Appendix table 2 provides descriptive statistics of each variable employed in the analysis.

* Variables specific for the growth regressions.

Income

To measure income I use the log of gross domestic product (GDP) per capita presented in real 2005 dollars. The data is gathered from USDA (2010), which derive their data from the latest edition of World Bank's World Development Indicators and fill in using other sources (Oxford Economic Forecasting, Global Insight, Project Link, International Monetary Fund's International Financial Statistics).[15]

Population growth *

[15] Remaining gaps in the data series is filled in by a process of interpolation, extrapolation, or back estimation (USDA 2010).

I use the annual population growth rate, which is derived from total midyear population including all residents (World Bank 2011).

Education *

I apply the log of primary and secondary school enrollment per capita from Banks (2010) to measure education.

Investment *

Investment is measured as the ratio of investment to GDP, and data is from PWT 6.3 (Heston et al. 2009). The investment share of real GDP per capita is in constant 2005 dollars, and the time period covered is 1975-2007. The reason for choosing PWT 6.3 over WDI Gross Capital Formation is the superior data coverage.[16] Comparability across countries is obtained by the percentage interpretation of the investment / GDP ratio.

Trade

The measure of trade openness is from the World Bank (2011) and defined as the sum of exports and imports of goods and services as a share of GDP. This provides a comparable measure of trade as percentage of GDP. The economic globalization measure of Dreher (2007) was considered, but this measure is chosen because it is so commonly applied in the literature, and therefore increases the comparability of the results.

Government spending

Government spending is measured by the government share of real GDP per capita from PWT 6.3 (Heston et al. 2009). This measure is also given in constant 2005 dollars and the time period covered is 1975-2007. Comparability across countries is obtained by the percentage interpretation of the government spending / GDP ratio.

Inflation

The rate of annual inflation in consumer prices is measured by the consumer price index, which reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services (World Bank 2011). This variable has several extreme values, i.e. Zimbabwe in 2007 where inflation was 24 411%. Negative values limit the possibility of

[16] This superior data coverage is obtained through a sophisticated method of extrapolations from successive benchmark studies of the World Bank's International Comparison Program.

taking the natural logarithm. Averaging the variable over five year periods limits these extreme values considerably, as seen in the table below. In addition, all values are multiplied with 0, 01 to narrow the extreme variation and prevent heteroscedasticity.

Variable	*Mean*	*Std. Dev.*	*Min*	*Max*
Inflation	*49.121*	*612.372*	*-100*	*24411.03*
Average Inflation	*56.384*	*417.547*	*-16.28*	*8603.276*
Adjusted inflation	*0.563*	*4.175*	*-0.162*	*86.032*

Regime

To measure the degree of institutionalized democracy or autocracy, the Polity IV indicator by Marshall and Jaggers (2002) is applied. The polity2 indicator is a combined indicator of institutionalized democracy and institutionalized autocracy ranging from -10 to 10, where 10 is full democracy and -10 is full autocracy. Institutionalized democracy is perceived by three essential elements: the presence of institutions and procedures through which citizens can express preferences, the existence of institutionalized constraints on executive power, and finally, the guarantee of civil liberties (Marshall, Gurr and Jaggers 2010:14). Institutionalized autocracy is perceived as systems where regularized political competition and freedoms are restricted, chief executives are chosen by selection within the political elite, and there are few institutional constraints on executive power (Marshall et al. 2010:15).

Political constraints *

As an alternative to the Polity IV measure, the Political Constraints Index III (POLCON) from Henisz (2000) is included, which he found to be a statistically and economically significant determinant of economic growth. This is also an alternative measure to the quality of government indicator by International Country Risk Guide, which is not included since it did not fit the preferred time period. The POLCON data is taken from the dataset of Teorell et al. (2010). POLCON refers to the feasibility of policy change, and the index ranges from 0 to 1, where a higher number indicates more political constraints and therefore less feasibility of a policy change. The index-composition is more specifically described by Teorell et al. (2010:108) as:

- *The number of independent branches of government with veto power over policy change* (more branches increasing constraint).
- *The extent of party alignment across branches of government* (decreasing constraint).

- *The extent of preference heterogeneity within each legislative branch (increasing constraint for aligned executives, decreasing it for opposed executives).*

The assumption made by Henisz (2000:5) is that the feasibility of policy change produces uncertainty and thereby lower levels of investment and growth.

Economic inequality

Economic inequality is measured by the Gini-index, which varies between 0 and 100, where a perfectly equal distribution of income is 0 and a perfectly unequal distribution is 100. This, however, is a theoretical variation, since 100 would indicate that one person or household acquired the society's total income, and 0 that everyone acquired an equal share of total income.

I use two sources for data on economic inequality. All Gini-data are based on an income concept and a survey. The World Income Inequality database, version WIID2c (UNU-WIDER 2008), have compiled a large dataset based on different sources, which for this reason also vary in their primary sources for income, population, and type of survey conducted. Because of this, a quality rating is assigned to each observation based on whether the concepts underlying the observations are known or not, the coverage of the income/consumption concept, and the survey quality (UNU-WIDER 2008:14-15). The quality rating ranges from 1 (highest reliability) to 4 (lowest reliability). The WIID2c data is gathered from Teorell et al. (2010). Many units have multiple observations for each year. In these cases, Teorell et al. (2010) include the mean of the highest quality observations. To supplement the WIID2c data, where the time-series end in 2006, I include the Gini measure from the World Bank (2011). This should be unproblematic since both are secondary sources, which are compilations of different primary data. In many cases the data also overlap, since the primary sources are the same.

Although having combined two sources of data, observations are very scarce, which leads to a very unbalanced panel and a significant loss of total observations (1734 of potentially 5180 is available before averaging into 7 periods). Therefore, I choose to use the constant average value for every unit to obtain stability. The negative consequence of this is the loss of variation in the variable, however, the loss of observations, and therefore weaker predictive capability, is seen as a greater evil. To avoid giving weight to observations with low reliability, the observations based on only one source with very poor rating are excluded before averaging.

Social inequality

Social inequality is measured by ethnic fractionalization (Alesina et al. 2003). This variable defines ethnicity as a combination of racial and linguistic characteristics. This measure use the same formula as the ethnolinguistic fractionalization (ELF) variable, computed as one minus the Herfindahl index of ethnolinguistic group shares, thereby showing the probability that two random individuals from the population belong to different groups (Alesina et al. 2003:158-159).[17] The ethnic composition of a society changes very slowly, and is therefore used as a constant measure.

Regional instability

Regional instability is understood as political instability in neighboring countries. This operationalization emphasizes the importance of geographical proximity (Ades and Chua 1997). Since it is most likely that visible events of political instability are those that may be contagious across borders, the index of government instability, or within-country instability, is not included to create the measure of regional instability. I use the five-year averaged index values of political violence, civil protest and regime change in *i* neighboring countries, divided by the number of neighboring countries *1/n*, to denote a country *j* amounts of regional instability in a given five-year period *t*.[18]

$$\text{REGINS}_{jt} = \frac{1}{n}\sum_{i=1}^{n} \text{Political violence}_{it} + \text{Civil protest}_{it} + \text{Regime change}_{it}$$

Excluded variables

Because of the large number of countries included in the analysis, some variables were dropped due to large amounts of missing observations. Most prominently this concerns the measures of *unemployment* and *government debt*, for which the data coverage in developing countries is especially poor. Inclusion of these variables would lead to an extreme drop in degrees of freedom and would negatively affect the overall results of the analysis. Since many countries have very few, or no observations at all on these variables, processes of

[17] FRACj = 1 - $\sum_{i=1}^{N} s^2 ij$, when s_{ij} is the share of group i (i = 1,…, N) in country j.

[18] The list of neighboring countries is found in the appendix table 3, and was created using CIA's World Factbook (2011).

extrapolation or back estimation is deemed infeasible. Using the variables as constant measures is also disregarded.

4.5 Chapter summary

This chapter has described the data, measurement, sources and operationalization of the variables which will be employed in the analyses. The dataset includes 148 countries over a period of 35 years (1975-2009). The data have been averaged into 7 five-year periods to treat the heterogeneity in growth rates, to obtain valid proxies for political instability, and to capture the duration aspect of banking crises. This leaves the dataset with a maximum N of 1036.

In section 4.1, it was argued that using a growth measure based on domestic inflation levels was most appropriate. Section 4.2 described the measures of political instability, the operationalization of political instability into four dimensions (political violence, civil protest, regime change, government instability), and the resulting indices based on the first principal components. Section 4.3 elaborated on the banking crisis indicator and gave a description of the data. Lastly, section 4.4 presented the control variables to be employed in both analyses.

5.0 Analyses [19]

This chapter presents the results of the two analyses. Empirical studies do not only have to consider methods and data, but also how one wants to structure the analysis. The structure of the analysis should depend on the purpose of the analysis, which may be quite different in different settings. One goal may be to explain the variation in the dependent variable as completely as possible, while another study may have as its primary goal to explore the effect of one particular variable (Skog 2004: 258-259). As previously mentioned, the first analysis in this thesis is *exploratory*. The dependent variables of political instability have been made for the purpose of this thesis to investigate the multidimensionality of the phenomena. The main interest is therefore to test previous theoretical determinants of political instability, and to investigate what effect financial crises have on the dependent variables. The second analysis is *confirmatory*. Durlauf et al. (2004:73) comment that the bulk of empirical growth studies explore potential determinants in search of the "true" growth model. These studies typically focus on a particular variable, try to uncover the heterogeneity in growth, or test potential nonlinearities. There exists a multitude of growth regressions and the primary purpose of performing such an analysis in this thesis is to test the appropriateness of modeling political instability as multidimensional.

5.1 Financial crises and political instability

The first question to be empirically tested is whether financial crises cause political instability. The following hypotheses were presented in section 2.3:

	Hypothesis	Expected effect on political instability
H1:	Financial crises	+
H2:	Income	-
H2A:	Financial crises * Income	+
H3:	Inflation	+
H4:	Economic inequality	+
H5:	Trade openness	-
H6:	Government spending	-
H7:	Government debt	(no data)
H8:	Regime (democratic)	-
H9:	Regional instability	+
H10:	Social inequality	+

[19] The estimation of all models is conducted using Stata's - *xtreg…,re* - command with the option – *vce(robust).* This provides GLS estimation with robust standard errors, correcting for disturbances not being identically distributed in the panel and serial correlation.

Practical approach

Since the operationalization of political instability led to four separate variables, I will perform four separate analyses in this first part. To increase the clarity and make the presentation easy to follow, I first perform the analysis of political violence, then civil protest etc. This way, one table represents the analysis of one dimension of political instability. I start each analysis by including the within- and between-effects of all time-varying control variables, and the unit-constant measures, to see what determinants are relevant for this particular dimension of instability. The second regression excludes the insignificant control variables and includes the main explanatory variable of interest: *financial crises,* and its interaction with the level of income. The third model introduces the other measures of instability as controls. These are expected to be the most powerful factors explaining other dimensions of political instability. The fourth and final model includes all significant control variables (only the relevant within- or between-effects), the crisis variables, and the variables of instability.

In this manner, the models will move from a special to a general model.[20] Verbeek (2008:59) warn that the danger of data mining is high when specification goes from simple to general. However, the relevance of all included variables in this analysis has been pre-specified. The purpose of this approach is to make the analysis clear and as parsimonious as possible although the analysis includes many variables. A second reason is to end up with robust final models that highlight what determinants are important for different types of political instability. This also mean that it is first and foremost the final results that are interesting to discuss, and not all preliminary analysis since both direction, strength and significance may change as unimportant variables are excluded and once new controls are introduced. When all the models are presented, I discuss the common findings in light of the research question, theory and previous findings.

Appropriateness of random effects

In all models, the null hypothesis of the Hausman specification test could not be rejected. Thus we conclude that there is no correlation between the unit-specific effects and the

[20] As Verbeek (2008:59-60) comment, most studies start "somewhere 'in the middle'" between the *special-to-general* and *general-to-specific* (LSE) approach, depending on the question of interest, data, space, etc. This is also true here.

explanatory variables. This was expected because of the introduction of specific within- and between-effects in the random effects models.

Issues regarding multicollinearity

Including an interaction term may lead to problems of multicollinearity. As can be seen from the table below, the correlation between the interaction term GDP*Crisis (between effect) and the Crisis variable (between effect) is almost perfect. Because of this, I choose not to include an interaction effect of the between-effect in the regressions.

	GDP*Crisis (W)	GDP*Crisis (B)
GDP*Crisis (B)	-0.1218	
Crisis (W)	-0.2075	-0.0000
Crisis (B)	-0.1441	**0.9699**
GDP (W)	-0.0848	-0.0000
GDP (B)	0.0744	0.1520

Because of the high correlation between Government Instability, Polity2 and POLCON, these measures are not included in the same regression as explanatory variables. This high correlation also suggests that the government instability index reflect the dichotomy democracy/autocracy. High values on the index are typically found for democracies, while autocracies score low values. Jong-A-Pin (2009:20) found a similar result for his "within" dimension of political instability, though potential problems due to this in the growth regressions were not discussed.

	Government Instability	Polity IV
Polity IV	0.7424	
POLCON	0.7299	0.8308

5.1.1 Financial crises and Political Violence

The first regression including all control variables show that the between-effect of trade openness is significant and negative as expected. The between-effect of government spending, on the other hand, shows a positive effect on political violence, this is contrary to the expectation. GDP per capita and regional instability is also significant at 10% and has the

expected effect. Inflation, polity, and social and economic inequality show no significant effect and are therefore dropped.

Table 5.1 The effect of Financial Crises on Political Violence

Dependent variable:		Political Violence			
		1	2	3	**4**
Crisis (lagged)	W		0.485 (1.79)*	0.541 (1.94)*	**0.590 (2.15)****
	B		0.794 (0.45)	0.337 (0.17)	**0.367 (0.19)**
Civil Protest	W			0.089 (1.81)*	**0.097 (1.98)****
	B			0.306 (2.75)**	**0.325 (2.92)*****
Regime Change	W			0.225 (4.82)***	**0.235 (4.79)*****
	B			0.220 (2.45)**	**0.261 (3.14)*****
Government Instability	W			-0.019 (-0.33)	**-0.027 (-0.48)**
	B			-0.112 (-1.67)*	**-0.120 (-1.73)***
GDP per capita (log)	W	-0.437 (-1.75)*	-0.286 (-1.45)		
	B	-0.032 (-0.29)	-0.074 (-1.38)		
GDP * Crisis	W		-0.814 (-0.73)		
Trade (log)	W	-0.278 (-1.01)	-0.442 (-1.86)*	-0.382 (-1.80)*	**-0.432 (-1.96)***
	B	-0.885 (-3.75)***	-0.883 (-3.64)***	-0.597 (-2.07)**	**-0.626 (-2.15)****
Government spending	W	0.023 (1.17)	0.031 (2.24)**	0.042 (2.32)**	**0.042 (2.31)****
	B	0.021 (1.79)*	0.014 (1.16)	0.012 (1.03)	
Inflation	W	0.004 (0.24)			
	B	0.002 (0.05)			
Polity IV	W	-0.019 (-1.22)			
	B	0.015 (0.69)			
Regional instability	W	0.048 (1.89)*	0.043 (1.88)*	0.037 (1.63)	
	B	0.077 (1.02)	0.074 (1.31)	0.093 (1.59)	
Economic inequality	Z	0.019 (1.38)			
Social Inequality	Z	0.052 (0.12)			
Constant		2.583 (1.96)	3.813 (3.54)	2.156 (1.65)	**2.538 (1.94)**
Observations		736	898	743	**746**
Countries		130	147	144	**144**
R-squared (overall)		0.1479	0.1467	0.2201	**0.2042**
Hausman		Regression (4): Prob > chi2 = 0.3686			

Notes: Random effects GLS estimation. Robust z-statistics in parantheses.
B = between effect, W = within effect, Z = unit constant variables.
* significant at 10%, ** significant at 5%, *** significant at 1%

Regression 2 includes the effect of financial crises and an interaction term between crises and GDP per capita. The within-effect of financial crises on political violence is positive and significant at 10%. The expected effect of the interaction term is that: because financial crises may decrease income and therefore create tension, the positive effect of crises on political

instability is amplified. The effect of the interaction term shows the contrary. GDP per capita mitigates the positive effect of crises on political violence.

$$\frac{\partial\, Political\, Violence}{\partial\, Crises} = 0.485 - 0.814\,(GDP)$$

However, the interaction term is insignificant (both z-value and F-test).[21] The VIF-values in regression 2 do not indicate problems of multicollinearity (VIF GDP*Crisis = 1.09). It appears that the effect of financial crises on political violence is not conditional upon the level of income. We observe that the within-effect of trade openness also become significant when controlling for financial crises, as do the within-effect of government spending. The between-effect of government instability looses its significance.

The third regression introduces other types of political instability as controls. Since it is likely that instability spurs instability it is central to control for such events. We observe that this does not alter the results from regression 2 to a large degree. The effect of regional instability looses its significance. Civil protests and regime changes increase political violence, while government instability displays a negative effect on political violence. This between-effect is only weakly significant at 10%. Because of the centrality of these variables, they are all kept in the last regression.

In the final regression, regional instability and the between-effect of government spending is excluded. We see that financial crises significantly increase political violence within countries. Remember that political violence is measured as assassinations, guerilla warfare, revolutions, armed conflict, purges and war, meaning that financial crises may have very severe consequences. Trade openness significantly decreases political violence both within and between countries, while government spending increases political violence within countries. Civil protest and regime change increase political violence, and there is a weakly significant moderating effect of government instability between countries. Countries with higher mean government instability experience less political violence on average.

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[21] $F = \frac{(R_2^2 - R_1^2)/(k_2 - k_1)}{(1 - R_2^2)/(n - k_2 - 1)} = \frac{(0.1467 - 0.1462)/(11-10)}{(1-0.1467)/(898-11-1)} = 0.519$

$F_{0.05}(1,886) = 3.85 > 0.5191609$

$R_1^2 = result\ of\ regression\ 2\ without\ GDP*Crisis$

5.1.2 Financial crises and Civil Protest

In regression 1 we observe a negative between-effect of trade openness on civil protest. Regional instability significantly increases the amount of civil protest within countries, while the within-effect of income decreases civil protest. The insignificant variables are again dropped in the second regression and financial crises and its interaction with income is introduced.

Table 5.2 The effect of Financial Crises on Civil Protest

Dependent variable:		Civil Protest			
		1	2	3	**4**
Crisis (lagged)	W		0.608 (2.89)***	0.302 (1.48)	**0.359 (1.71)***
	B		0.247 (0.23)	-0.649 (-0.55)	**-0.721 (-0.63)**
Political Violence	W			0.104 (1.56)	**0.116 (1.73)***
	B			0.151 (1.70)*	**0.164 (1.90)***
Regime Change	W			0.191 (3.70)***	**0.208 (3.82)*****
	B			0.083 (1.00)	**0.059 (0.78)**
Government Instability	W			-0.142 (-2.42)**	**-0.149 (-2.53)****
	B			0.170 (2.06)**	**0.207 (3.35)*****
GDP per capita (log)	W	-0.637 (-1.79)*	-0.406 (-1.59)	-0.292 (-0.99)	
	B	-0.006 (-0.06)	0.104 (2.41)**	0.043 (0.75)	
GDP * Crisis	W		-0.087 (-0.07)		
Trade (log)	W	-0.188 (-0.50)	-0.125 (-0.58)	-0.094 (-0.30)	**-0.245 (-0.72)**
	B	-0.883 (-4.06)***	-0.732 (-3.27)***	-0.577 (-2.88)***	**-0.616 (-3.20)*****
Government spending	W	-0.009 (-0.61)			
	B	-0.004 (-0.52)			
Inflation	W	0.015 (1.39)			
	B	0.023 (0.83)			
Polity IV	W	-0.000 (-0.06)			
	B	0.028 (1.16)			
Regional instability	W	0.071 (2.29)**	0.065 (2.62)***	0.040 (1.57)	
	B	0.072 (1.58)	0.088 (2.81)***	0.049 (1.24)	
Economic inequality	Z	0.004 (0.37)			
Social Inequality	Z	-0.358 (-0.91)			
Constant		3.748 (2.08)	2.159 (2.00)	2.093 (1.83)	**2.615 (2.96)**
Observations		736	916	752	**755**
Countries		130	148	145	**145**
R-squared (overall)		0.1432	0.1250	0.1876	**0.1802**
Hausman		Regression (4): Prob > chi2 = 0.1766			

Notes: Random effects GLS estimation. Robust z-statistics in parantheses.
B = between effect, W = within effect, Z = unit constant variables.
* significant at 10%, ** significant at 5%, *** significant at 1%

Financial crises have a significant positive effect on civil protest. More surprisingly, the average level of income also affects civil protest positively between countries. The interaction effect again shows the opposite effect of what was expected.[22] The effect is also insignificant (both z-values and F-test).[23] The VIF-values in the second regression do not indicate problems of multicollinearity (VIF GDP*Crisis = 1.08). Trade keeps it significance, while the between-effect of regional instability becomes significant and positive.

When other sources of instability are controlled for in regression 3, the effects of income, crises and regional instability become insignificant. The effect of political violence is significant at 10% between countries, and regime changes within countries increase civil protest. The effect of government instability is interesting. The within-effect is negative while the between-effect is positive.

In the final model, the income variable and regional instability are dropped. The insignificant trade variable from regression 3 is kept. The reason for this is that excluding it led to a rejection of the Hausman test. It may be that that the unit-mean of trade correlates with other effects when the within-variation is not accounted for. Financial crises are significant only at 10%. The effect of trade openness is significantly negative between countries, and the between-effect of political violence also become significant at 10%. Regime changes within countries increase civil protest.

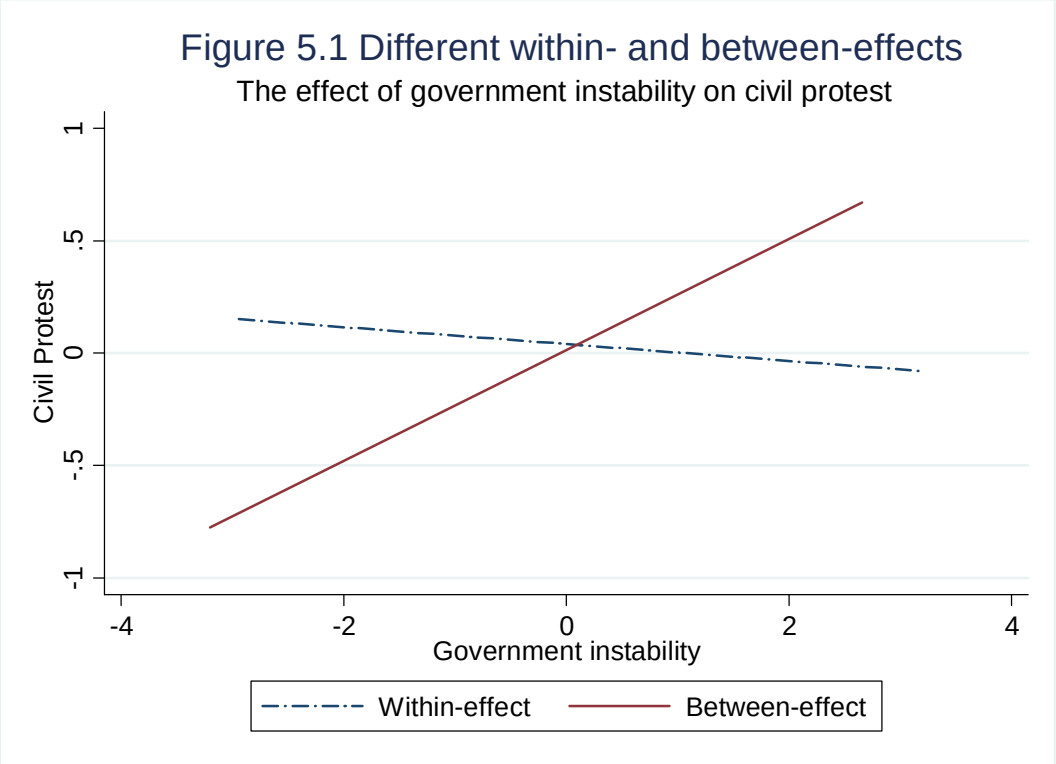
Table 5.3: Country ranking: Government instability index

No.	Country:	Government Instability (mean):
1	Ecuador	2.655
2	Sweden	2.414
3	Israel	2.410
4	Denmark	2.397
5	Norway	2.279
...		
141	Equatorial Guinea	-2.010
142	Saudi Arabia	-2.113
143	Gabon	-2.181
144	Cuba	-2.958
145	Oman	-3.198

[22] $\frac{\partial\ Civil\ \ \text{Pr}\ otest}{\partial\ Crises} = 0.608 - 0.087\ (GDP\ )$

[23] F = ((0.1250- 0.1250)/(9-8))/((1-0.1250)/(916-9-1)) = 0. $F_{0,05}$ (1, 906) = 3,85 > 0.

The effects of government instability keep its significance. Increasing government instability within countries has a negative effect on civil protest, while the effect between countries is positive. Since the measure of government instability is highly correlated with regime indicators, higher values of government instability are also found in more democratic countries. Table 5.3 ranks the countries with the top five and bottom five scores of government instability. Higher fractionalization and polarization, more elections and dropped veto players, and fewer years of chief executive in office, indicates more democratic changes. These events do not regularly occur in autocracies. Therefore, the democratic changes that are captured by the index of government instability most likely decrease the amount of general strikes, riots and demonstrations (captured by the civil protest index). However, between countries, higher mean values of government instability also have higher values of civil protest and therefore this effect is positive. This may be due to the fact that events of civil protest become rarer the more undemocratic a country is. The predicted different within- and between-effects are shown in figure 5.1 below. This effect would not have been revealed unless the model had specific within- and between-effects.



5.1.3 Financial crises and Regime Change

Table 5.4 The effect of Financial Crises on Regime Change

Dependent variable:		Regime Change			
		1	2	3	**4**
Crisis (lagged)	W		0.374 (1.23)	0.119 (0.34)	**0.179 (0.50)**
	B		1.067 (1.04)	-0.015 (-0.02)	**0.655 (0.57)**
Political Violence	W			0.241 (4.46)***	**0.255 (4.50)*** **
	B			0.079 (1.31)	**0.090 (1.60)**
Civil Protest	W			0.205 (2.31)**	**0.222 (2.39)** **
	B			0.018 (0.23)	**0.037 (0.47)**
Government Instability	W			0.431 (5.38)***	**0.424 (5.44)*** **
	B			0.342 (4.16)***	**0.325 (4.03)*** **
GDP per capita (log)	W	-0.433 (-1.70)*	-0.325 (-1.30)	-0.222 (-1.05)	
	B	-0.154 (-2.07)**	-0.088 (-1.86)*	-0.228 (-3.42)***	**-0.228 (-4.34)*** **
GDP * Crisis	W		-2.110 (-1.38)		
Trade (log)	W	-0.393 (-1.30)	-0.426 (-1.52)	-0.644 (-2.60)***	**-0.807 (-3.54)*** **
	B	-0.323 (-2.25)**	-0.341 (-2.37)**	-0.171 (-0.97)	
Government spending	W	0.006 (0.36)	0.012 (0.76)	-0.004 (-0.34)	
	B	0.016 (2.24)**	0.013 (1.89)*	0.015 (1.73)*	**0.015 (1.99)** **
Inflation	W	0.075 (4.37)***	0.074 (4.26)***	0.078 (3.88)***	**0.072 (3.87)*** **
	B	0.112 (2.17)**	0.102 (2.17)**	0.081 (1.28)	
Polity IV	W	0.004 (0.23)			
	B	0.024 (1.53)			
Regional instability	W	0.091 (2.32)**	0.078 (2.00)**	0.049 (1.27)	
	B	-0.003 (-0.08)	-0.001 (-0.05)	-0.046 (-1.11)	
Economic inequality	Z	-0.003 (-0.36)			
Social Inequality	Z	0.046 (0.12)			
Constant		2.239 (2.36)	1.689 (2.56)	2.105 (2.75)	**1.370 (2.94)**
Observations		731	780	658	**664**
Countries		130	139	136	**136**
R-squared (overall)		0.1180	0.1140	0.2842	**0.2599**
Hausman		Regression (4): Prob > chi2 = 0.4847			

Notes: Random effects GLS estimation. Robust z-statistics in parantheses.
B = between effect, W = within effect, Z = unit constant variables.
* significant at 10%, ** significant at 5%, *** significant at 1%

Regression 1 shows that the level of income decreases regime changes both within and between countries. Trade openness is significantly negative for regime change, while the between-effect of government spending, both effects of inflation, and the within-effect of regional instability lead to more regime changes. Polity is insignificant, as is economic and social inequality. These are dropped when estimating regression 2.

Including financial crises and its interaction with income show no significant effect on regime change (neither z-statistics nor F-test).[24] The direction of the interaction term is again the opposite of the expected effect.[25] The VIF-values in the second regression do not indicate problems of multicollinearity due to the interaction term (VIF GDP*Crisis = 1.07). The within-effect of income looses its significance and the between-effect drop in significance to 10%. The between-effect of government spending also drops in significance to 10%. All other results do not change their level of significance.

Regression 3 shows that when controlling for other dimensions of political instability several results change or become insignificant. The between-effect of income shows that the level of income varies negatively with regime changes. There are fewer regime changes in rich countries than in poor. The within-effect of trade becomes significantly negative, while the between-effect loses significance. Countries which become more open over time experience less regime changes. The between-effect of government spending indicates that regime changes are more common in countries where the government controls a larger part of total spending. Inflation within countries increases regime changes significantly.

The results from regression 3 stay the same in the final regression, although the insignificant effects are dropped. More political violence and more civil protests within countries increase regime changes significantly. Government instability both within and between countries also increase regime change. As higher values of government instability mean more democratic changes, these results are puzzling. One possible explanation may be that this effect shows the fragility of new democracies to regime changes. When regimes become more democratic over time, they experience more regime changes. This is part of the instable transition-part of making democracy work. The between-effect indicates that the occurrence of regime changes is higher in countries with high mean-values of government instability, than in countries with low mean-values.

[24] F= ((0.1140- 0.1119)/(13-12))/((1-0.1140)/(780-13-1)) = 1.81. $F_{0,05}(1, 766) = 3{,}85 > 1{,}81$.

[25] $\frac{\partial \text{ Re } gime\ Change}{\partial\ Crises} = 0.374 - 2.110\ (GDP)$

5.1.4 Financial crises and Government Instability

Table 5.5 The effect of Financial Crises on Government Instability

Dependent variable:		Government Instability			
		1	2	3	**4**
Crisis (lagged)	W		0.195 (1.07)	0.094 (0.51)	**0.093 (0.50)**
	B		1.781 (1.98)**	1.395 (1.73)*	**1.321 (1.61)**
Political Violence	W			0.036 (1.29)	**0.036 (1.29)**
	B			-0.052 (-1.27)	**-0.051 (-1.26)**
Civil Protest	W			-0.066 (-2.72)***	**-0.066 (-2.72)*****
	B			0.057 (1.14)	**0.056 (1.13)**
Regime Change	W			0.187 (6.85)***	**0.187 (6.86)*****
	B			0.335 (4.96)***	**0.329 (4.83)*****
GDP per capita (log)	W	-0.114 (-0.74)	-0.228 (-1.60)		
	B	0.046 (0.77)	0.003 (0.06)		
GDP * Crisis	W		-0.722 (-0.68)		
Trade (log)	W	0.012 (0.07)			
	B	-0.182 (-1.57)			
Government spending	W	0.010 (0.87)			
	B	0.000 (0.04)			
Inflation	W	-0.019 (-2.22)**	-0.013 (-1.88)*	-0.020 (-2.13)**	**-0.020 (-2.13)****
	B	0.019 (0.58)	0.004 (0.16)	-0.018 (-0.58)	
Polity IV	W	0.116 (6.55)***	0.118 (7.77)***	0.115 (8.00)***	**0.115 (8.02)*****
	B	0.137 (8.51)***	0.148 (9.82)***	0.143 (13.11)***	**0.143 (13.16)*****
Regional instability	W	0.009 (0.46)			
	B	0.042 (0.92)			
Economic inequality	Z	-0.007 (-0.94)			
Social Inequality	Z	-0.529 (-1.78)*	-0.679 (-2.86)***	-0.810 (-3.63)***	**-0.815 (-3.67)*****
Constant		0.729 (1.02)	-0.085 (-0.18)	0.059 (0.41)	**0.055 (0.39)**
Observations		622	678	678	**678**
Countries		128	135	135	**135**
R-squared (overall)		0.5181	0.5499	0.6095	**0.6085**
Hausman		Regression (4): Prob > chi2 = 0.6391			

Notes: Random effects GLS estimation. Robust z-statistics in parantheses.
B = between effect, W = within effect, Z = unit constant variables.
* significant at 10%, ** significant at 5%, *** significant at 1%

In regression 1, the within-effect of inflation and the within- and between-effect of Polity IV are significant. As expected, there is more government instability in democracies. The constant measure of social inequality is also significant at 10%. In regression 2, the between-effect of financial crises is significant and positive, while the interaction effect shows no significance (neither z-statistics nor F-test).[26] The direction of the effect is also in this model

[26] F = ((0.5499- 0.5498)/(10-9))/((1-0.5499)/(678-10-1)) = 0,148. $F_{0,05}(1, 667) = 3,85 > 0,148$.

the opposite of the expectation.[27] Financial crises do not have an effect on government instability that is conditional upon income. The VIF-values do not indicated problems of multicollinearity due to the interaction term (VIF GDP*Crisis = 1.07). The within-effect of inflation drops in significance to 10% and the significance of social inequality increase to 1%.

Regression 3 drops the income measure and the interaction term. Controlling for other dimensions of political instability does not change the significance of the other variables. Political violence is insignificant. Civil protest within countries significantly decreases government instability, indicating that less changes and instability of a democratic nature occur when civil protest increases. Regime change increases government instability both within countries over time, and between countries meaning that those countries with high mean values of regime change also are governmentally instable. Regime changes actually contribute to more changes of a democratic nature when controlling for democracy. The between-effect of financial crises loses its weak significance in the last regression when the insignificant between-effect of inflation is removed. Social inequality, defined as ethnic and linguistic fractionalization, significantly decrease government instability. Socially unequal countries experience less governmental instability and less democratic changes of government.

5.1.5 Discussion

The direct effect of financial crises significantly increases political violence within countries, and also civil protest within countries (at 10% significance). First, we might note that only socio-political instability seems to be the product of financial crises. It is the civil society that reacts to episodes of financial crises through protest or violence. Crises do not trigger regime changes or government instability. The fact that financial crises does *not* lead to instability within or changes of regimes is nonetheless a finding that is of interest. First of all, it may indicate that problems caused by crises are solved within the existing regime. Second, this result contradicts previous studies showing that regime changes are more common during crisis-periods (Gasiorowski 1995; Haggard and Kaufman 1995; Acemoglu and Robinson 2001).

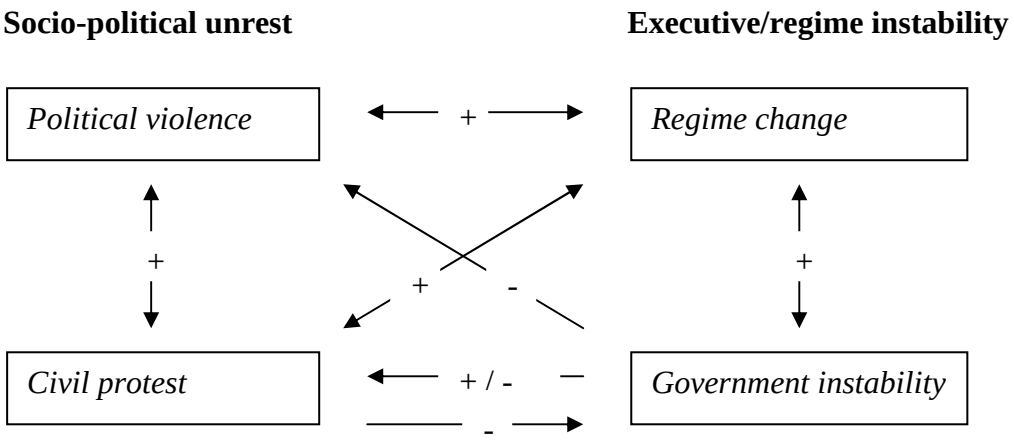
[27] $\frac{\partial\, GovernmentInstability}{\partial\, Crises} = 0.195 - 0.722\,(GDP)$

It does not seem to be an indirect effect of financial crises on political instability conditional upon a drop in income. The interaction effects are insignificant in all models. However, this result may stem from the fact that what is being investigated here is the long-term effect of financial crises. The effect of crises on political instability through income is likely to be short term. As a crisis hits, income drop and recession sets in, but over a five year period, this shock-effect has stabilized.

The most important determinants of political instability are other events of political instability. That events of political instability spur or trigger other events is not surprising. Both Alesina et al. (1996) and Londregan and Poole (1990) found political instability to be persistent over time. Civil protest and regime change significantly increase political violence. There is also more political violence in countries that have higher average values of civil protest and regime change. Countries that experience more governmental instability and democratic changes, on average have lower levels of political violence. Civil protest is significantly increased by regime changes within countries and political violence (significant at 10%). There is also more civil protest in countries where political violence is high. The contradictory effect of government instability on civil protest was discussed in section 5.1.2. Increasing government instability decrease civil protest within countries, but on average, countries with higher government instability (more changes of a democratic nature) experience more civil protest. Political violence, civil protest, and government instability all increase regime change within countries. The between-effect of government instability is also positive, demonstrating that more democratic changes occur in countries that experience regime changes. Civil protest significantly decreases government instability within countries, while regime changes increase government instability. It is interesting that the relationship between changes *of* the regime and changes *within* the regime is positive. Stable autocracies will by definition experience few regime changes and few democratic changes, however, just as events of civil protest become rarer the more undemocratic a country, the amount of democratic changes increase as an effect of changes in the regime.

Since all these results may be quite heavy to digest, the figure on the next page illustrate the significant findings of diffusion, or contagion, among the dimensions of political instability.

Figure 5.2: The contagiousness of political instability



The effect of regional instability disappears when we control for other dimensions of political instability in every analysis. Diffusion effects across borders are unimportant compared to instability in the country itself. This was also the finding of Blanco and Grier (2009).

The effect of income on instability is only found significant between countries with respect to regime changes. Countries with high average income experience less regime changes, which is in line with the expected effect. Increasing trade openness within countries has a significant negative effect on political violence and regime changes. Countries with higher average trade openness also experience less civil protest and political violence. All these findings are in line with previous results. For example, Goldstone et al. (2005) found the probability of political instability much higher in countries that traded less. Trade liberalization could therefore promote political stability.

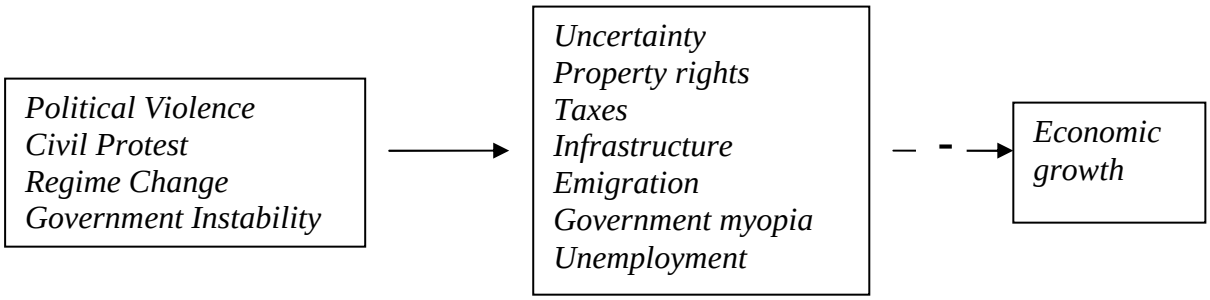
On the other hand, the findings on government spending were not expected. Higher government spending within countries increase political violence significantly, and government spending is on average higher in countries with more regime changes. This is similar with the results of Cuzan et al. (1988). Annett (2000) suggest that governments may use consumption expenditure to transfer resources to various groups, thereby reducing tensions and instability. Government spending may, however, also be used for myopic purposes by turning state funds into private funds, and therefore create more conflict and instability.

Inflation significantly increases regime changes and decreases government instability. This confirms the result of Cuikerman et al. (1992) that high inflation may be destabilizing. Gasiorowski (1995) also found high inflation, or inflationary crises, to be significantly related to regime changes. Increasing inflation is negative for government instability within regimes associated with democratic changes. Economic inequality is not found to affect political instability in these analyses. The difference in economic inequality between countries is not a significant determinant of political instability. Social inequality, however, as measured by the degree of ethnic and linguistic fractionalization, is a significant determinant of government instability. Countries that are more fragmented experience less democratic changes, but fragmentation and distinct ethnic groups are not a feature common for countries experiencing violent upheaval, protest or changes of the regime.

In contrast to Blanco and Grier (2009), who find that regime type is a significant determinant of political instability in Latin America, I do not find regime to be a significant determinant of political violence, civil protest nor regime change. On the other hand, democracy is a significant determinant of government instability, both within countries over time and between countries. This dimension of political instability was not represented in Blanco and Griers (2009) index of instability. As indicated earlier, this dimension of political instability is different, as it captures events and expectations of changes that are democratic in nature. Such instability need not be harmful, and possibly would it be more accurately described as some form of "democratic changes", which have been mentioned repeatedly. Furthermore, fractionalization and polarization are not events per se, but describe a situation that is present over a period, typically until the next election. If such measures are included in indices of instability, it is vital that one is aware of the type of instability that is captured, or else it might give a biased picture of the effect of/on political instability. This is also a clear argument for highlighting the multidimensionality of political instability.

5.2 Political instability and economic growth

We now turn to the second question to be empirically tested: how political instability affects economic growth. Specifying the hypothesized effect from figure 3, the following overview of the expected effects can be made:



The following hypothesis was also presented, regarding the relationship between financial crises and economic growth:

H11: *Financial crises decrease economic growth.*

H11A: *Financial crises have positive long-run effects on growth.*

H12: *A poor institutional environment amplifies the negative economic effects of financial crises on growth.*

The control variables included have not been emphasized in the theoretical part on growth. These variables are thoroughly described by the literature on growth and have been empirically tested numerous times. Space limits treatment of this in the confirmatory part of this thesis. I therefore advice the uninformed reader to consult this vast literature for the theoretical background of democracy and growth, inflation and growth, and so on.

Practical approach

I follow most growth studies in building the empirical growth model. First, I estimate the basic Solow framework including the variables of political instability. Second, I add financial crises to the regression. None of the variables in this basic set-up are removed if found insignificant, due to their centrality. The third regression includes a number of economic control variables and regression four controls for other political and social factors. These are kept if significant. The results of the first four regressions are found in table 5.6 below. In

table 5.7, regression 5-7 test hypothesis H12 by including the regime and institutional measures Polity IV and POLCON, and an interaction term between POLCON and the crisis variable. The final model (8) includes the significant results.

5.2.1 The effect of political instability on growth

Table: 5.6 **The effect of political instability on growth**

Dependent variable: Real GDP per capita growth

		1	2	3	4
GDP per capita (log)	W	0.430 (0.63)	0.449 (0.68)	-0.796 (-1.36)	-1.193 (-2.05)**
	B	-0.093 (-0.56)	-0.095 (-0.59)	-0.306 (-2.20)**	-0.432 (-3.10)***
Investment	W	0.137 (2.68)***	0.133 (2.61)***	0.119 (2.07)**	0.047 (1.59)
	B	0.031 (1.15)	0.025 (0.93)	0.041 (1.61)	0.042 (1.62)
Education (log)	W	1.376 (1.91)*	1.148 (1.64)	-0.017 (-0.02)	-0.091 (-0.11)
	B	0.907 (1.56)	0.800 (1.42)	0.347 (0.70)	0.579 (1.11)
Population growth	W	0.091 (0.21)	0.063 (0.15)	-0.086 (-0.21)	0.072 (0.19)
	B	-0.788 (-3.93)***	-0.830 (-4.01)***	-1.059 (-5.04)***	-0.850 (-3.66)***
Political Violence (t-1)	W	-0.146 (-1.30)	-0.136 (-1.26)	0.095 (1.16)	0.030 (0.42)
	B	0.147 (1.52)	0.177 (2.03)**	0.115 (1.33)	0.111 (1.22)
Civil Protest (t-1)	W	0.013 (0.15)	0.042 (0.50)	-0.005 (-0.06)	-0.042 (-0.52)
	B	0.047 (0.24)	0.032 (0.17)	0.109 (0.63)	0.018 (-0.13)
Regime Change (t-1)	W	-0.628 (-5.94)***	-0.577 (-5.70)***	-0.517 (-5.32)***	-0.541 (-5.59)***
	B	-0.326 (-1.23)	-0.286 (-1.13)	-0.377 (-1.47)	-0.416 (-1.69)*
Gov. Instability (t-1)	W	0.915 (5.02)***	0.895 (5.17)***	0.426 (2.98)***	0.436 (3.32)***
	B	-0.277 (-1.50)	-0.199 (-1.08)	-0.338 (-1.69)*	-0.161 (-1.06)
Crisis	W		-2.77 (-3.69)***	-2.412 (-4.67)***	-2.475 (-4.84)***
	B		-5.294 (-2.67)***	-4.654 (-2.64)***	-3.797 (-2.51)**
Trade (log)	W			2.046 (3.07)***	1.846 (3.02)***
	B			0.224 (0.61)	
Government spending	W			-0.195 (-3.52)***	-0.181 (-3.43)***
	B			0.039 (2.10)**	0.044 (2.38)**
Inflation	W			-0.100 (-5.73)***	-0.098 (-6.27)***
	B			-0.216 (-2.14)**	-0.150 (-1.54)
Regional instability	W				-0.048 (-1.04)
	B				0.242 (2.54)**
Economic inequality	Z				-0.052 (-2.39)**
Social Inequality	Z				-0.583 (-0.80)
Constant		-3.530 (-0.80)	-2.090 (-0.49)	1.601 (0.40)	3.013 (0.81)
Observations		787	787	691	658
Countries		144	144	136	129
R-squared (overall)		0.1928	0.2190	0.3106	0.3579

Notes: Random effects GLS estimation. Robust z-statistics in parantheses.
B = between effect, W = within effect, Z = unit constant variables.
* significant at 10%, ** significant at 5%, *** significant at 1%

To ensure that causality runs in the right direction, the variables of political instability are lagged by one year. The banking crises variable is not lagged, as it is quite likely that financial crises have an immediate effect on the economy. Remember that due to potential multicollinearity, government instability, Polity and POLCON are not included together.

Starting with the primary variables of interest, we observe that the effect of regime change on economic growth is negative in all specifications. On the contrary, government instability is positive for growth in all specifications. These are the same results as Jong-A-Pin (2009). However, I find the government instability variable to be consistently positive in all specifications, while Jong-A-Pin's "within" results were sensitive to the exclusion of certain controlling factors. Butkiewicz and Yanikkaya (2005) also find that government (in)stability variables may display positive effects on growth. This also indicates higher growth rates in democracies since it is democracies that experience different types of democratic changes captured by the government instability variable. Darby et al. (2004) argued that political instability within governments could reduce the probability of re-election, leading to lower public investment and therefore lower growth rates. This view of *government myopia* creating short-sightedness is not found here. More political competition within the regime is good for economic growth, as indicated by Besley et al. (2005).

The results of Jong-A-Pin (2009) are also confirmed, with respect to political violence and civil protest. These dimensions of political instability do not appear to affect growth significantly. Jong-A-Pin finds that negative growth has a causal effect on political violence when examining reverse direction of causality, which may be the reason for this insignificant result. It is changes *within* the regime or *of* the regime that affect the growth rate of the economy. The argument of Alesina and Perotti (1996), that the only policy changes that are relevant for economic decisions occur when government change, are therefore confirmed. These results indicate that the "add-all-inn-and-stir" recipe for political instability, as Kong (2007) warns about, is not appropriate, and could give a wrong impression of the relationship between political instability and growth. Feng (2003:322) also argued that minor and major political instability would have different consequences for growth and that if Sanders' (1981) results were correct, studies of political instability and growth would be theoretically meaningless and lead to confusing results unless political instability is differentiated.

Table: 5.7 **The effect of political instability on growth (continued)**

Dependent variable: Real GDP per capita growth

		5	6	7	8
GDP per capita (log)	W	-1.021 (-1.92)*	-1.041 (-1.94)*	-1.051 (-1.96)*	**-1.064 (-1.86)***
	B	-0.288 (-1.67)*	-0.320 (-1.73)*	-0.309 (-1.71)	**-0.419 (-2.54)****
Investment	W	0.049 (1.47)	0.052 (1.58)	0.052 (1.59)	**0.049 (1.66)***
	B	0.040 (1.63)	0.041 (1.64)	0.040 (1.65)*	**0.048 (1.83)***
Education (log)	W	0.179 (0.27)	0.000 (-0.00)	0.013 (0.02)	**-0.061 (-0.08)**
	B	1.012 (1.95)*	1.091 (2.07)**	1.034 (1.96)*	**0.547 (1.07)**
Population growth	W	0.123 (0.32)	0.116 (0.30)	0.108 (0.28)	**0.043 (0.11)**
	B	-0.783 (-3.35)***	-0.709 (-3.12)***	-0.687 (-3.04)***	**-0.826 (-3.51)*****
Political Violence (t-1)	W	0.082 (0.93)	0.077 (0.88)	0.077 (0.88)	**0.028 (0.41)**
	B	0.078 (0.89)	0.082 (0.95)	0.085 (0.98)	**0.118 (1.32)**
Civil Protest (t-1)	W	-0.112 (-1.20)	-0.114 (-1.22)	-0.113 (-1.20)	**-0.043 (-0.54)**
	B	0.011 (0.07)	-0.015 (-0.10)	0.014 (-0.10)	**0.023 (-0.16)**
Regime Change (t-1)	W	-0.462 (-5.22)***	-0.435 (-4.86)***	-0.436 (-4.86)***	**-0.557 (-5.89)*****
	B	-0.475 (-1.98)**	-0.487 (-2.00)**	-0.455 (-1.90)*	**-0.483 (-1.93)***
Gov. Instability (t-1)	W				**0.454 (3.39)*****
	B				**-0.104 (-0.66)**
Crisis	W	-2.597 (-5.31)***	-2.630 (-5.45)***	-2.628 (-5.47)***	**-2.529 (-4.94)*****
	B	-3.340 (-2.25)**	-3.326 (-2.26)**	-7.795 (-2.14)**	**-4.445 (-2.90)*****
Trade (log)	W	1.973 (3.38)***	1.932 (3.37)***	1.930 (3.35)***	**1.860 (3.08)*****
	B				
Government spending	W	-0.125 (-2.67)***	-0.123 (-2.63)***	-0.122 (-2.61)***	**-0.176 (-3.38)*****
	B	0.047 (3.09)***	0.047 (3.13)***	0.046 (2.99)***	**0.044 (2.53)****
Inflation	W	-0.128 (-4.98)***	-0.125 (-4.96)***	-0.126 (-4.97)***	**-0.089 (-4.84)*****
	B				
Regional instability	W				
	B	0.274 (3.16)***	0.273 (3.04)***	0.263 (2.98)***	**0.260 (2.74)*****
Polity IV	W	0.052 (1.83)*			
	B	-0.057 (-1.38)			
POLCON	W		2.438 (3.11)***	2.409 (3.17)***	
	B		-1.265 (-0.92)	-2.523 (-1.54)	
Crisis * POLCON	W			1.112 (0.30)	
	B			17.602 (1.53)	
Economic inequality	Z	-0.065 (-3.49)***	-0.067 (-3.52)***	-0.065 (-3.40)***	**-0.063 (-3.18)*****
Constant		-0.863 (-0.24)	-1.079 (-0.30)	-0.488 (-0.13)	**3.486 (0.97)**
Observations		731	736	736	**664**
Countries		130	131	131	**130**
R-squared (overall)		0.3166	0.3187	0.3218	**0.3504**
Hausman		Regression (8): chi2(12) = 13.09 Prob>chi2 = 0.3625			

Notes: Random effects GLS estimation. Robust z-statistics in parantheses.
B = between effect, W = within effect, Z = unit constant variables.
* significant at 10%, ** significant at 5%, *** significant at 1%

Financial crises significantly decrease growth in the long-run. This effect is also significant between countries, meaning that countries that experience more crises on average also have lower growth rates. This result confirm the findings of Cavallo and Cavallo (2010), who warn

that the common moral-hazard view, that countries should experience crises to learn from their mistakes, can be misleading if the institutional environment is ignored. This finding also contradicts the results of Rancière et al. (2008), that countries which have experienced financial crises have grown faster on average than countries with stable financial conditions. It seems that financial liberalization does not necessarily strengthen financial development and lead to higher long-run growth if a consequence of liberalization is more financial crises.

In table 5.7, regressions 5 – 7 test the hypothesis that the effect of financial crises is contingent upon the institutional environment. In regression 5, the Polity variable is significantly positive (at 10%) within countries. Strengthening democratic institutions therefore have a positive effect on economic growth. Regression 6 shows that more political constraints have a positive effect on economic growth. More independent branches of government, less party alignment across branches, and more preference heterogeneity in legislative branches are good for economic growth. Henisz (2000) argued that this would lower the feasibility of policy change and therefore provide more certainty and a positive environment for growth. A high POLCON score consequently mean more constraints on sudden changes in policies.

Since the POLCON variable show highest significance, I use this to test hypothesis H12 and create the interaction term with financial crises in regression (7). The within-effect of the interaction term has the expected direction, which means that the negative effect of financial crises on economic growth is moderated by more political constraints.

$$Within-effect: \frac{\partial\, Growth}{\partial\, Crises} = -2.628 + 1.112\,(POLCON)$$

The between-effect of POLCON is negative, indicating lower average growth rates in countries with higher average level of political constraints. However, the interaction term of the between-effect is also positive, implying the same result.

$$Between-effect: \frac{\partial\, Growth}{\partial\, Crises} = -7.795 + 17.602\,(POLCON)$$

As opposed to Cavallo and Cavallo (2010) who find this interaction to significantly reduce the negative effect of crises, I find no significant relationships (z-statistics and F-test).[28] The VIF-value of the interactions is 5.30 (between-effect) and 1.04 (within-effect), which is higher than the other variables, but should not cause serious problems of multicollinearity. Because of the insignificance of the interaction terms, I do not explore the characteristics of these effects further.

The final regression (8) includes the government instability variable and excludes POLCON due to possible multicollinearity. All significant control variables are also included in the final model. The negative effect of GDP per capita is in growth regressions interpreted as a confirmation of the convergence hypothesis. As the level of income increases, the growth rate converges to a lower stabile pace. This is shown to be significant both over time within countries, and between countries, as countries with a high level of income have a lower average growth rate. The initial positive within-effect of investment looses its significance when we control for other economic, social and political determinants of growth. In the final regression, the effects of investment are significant at 10%. Investment is on average higher in countries with higher growth rates, and increasing investment may increase growth.

Something that FE regressions would fail to capture is the significant between-effect of population growth. Countries that have high average population growth experience lower economic growth per capita. Trade openness is a robust positive determinant of economic growth within countries. The effect of government spending, however, is more peculiar. The within-effect is significantly negative for growth, while the between-effect is positive. Countries that have increased their government spending over time also have decreased their growth rates. One explanation of this could be that countries that become richer, and converge towards a lower growth rate, also increase their government spending as their welfare states expand. However, the countries that have high average government spending also have high growth rates, possibly reflecting the rich/poor dichotomy. Not surprisingly, inflation within countries is negative for economic growth. This result is also robust to different specifications. Ades and Chua (1997) found that regional instability had a strong negative effect on economic performance. This result is confirmed here, and the effect is shown to be geographical. What affects growth is not the change in regional instability over time, but the

[28] F = ((0.3218- 0.3187)/(26-24))/((1-0.3218)/(736-26-1)) = 1.620. $F_{0,05}$ (2, 709) = 3,00 > 1,620.

average amount of political instability in the region. Countries confined to unstable regions of the world have lower average economic growth. Lastly, economic inequality is found to be negative for economic growth. Countries with higher inequality have lower average growth rates. This confirms the results of Perotti (1996) among others.

Appropriateness of random effects

In the final model (8), the null hypothesis of the Hausman specification test could not be rejected. Therefore, we again conclude that there is no correlation between the unit-specific effects and the explanatory variables. This indicates that it is possible to include between-variation in growth studies without leaving the estimates biased. To verify that the estimation using within- and between-variables have the desired effect, regression (8) was estimated with ordinary variables and a Hausman test was performed on the FE and RE estimates. The results was *chi2(13) = 69.43, Prob>chi2 = 0.0000*, and a rejection of the null hypothesis. The conclusion is therefore that the within- and between-variables have the desired effect.

5.3 Answering a possible criticism [29]

It may be argued that estimating separate within- and between-effects is not always appropriate. Rabe-Hesketh and Skrondal (2008:121) argue that an advantage of setting these effects equal (including the original variable) is that the effect will be more precisely estimated because the RE-estimator weighs the within- and between-variation optimally. This would be appropriate when there are no significant differences of the within- and between-effects. As a test of robustness, the variables in regression (8) were tested for significant differences and the original variables were included when no significant differences could be found. The specific within- and between-effects already revealed are not tested as it is assumed that the relevant effects of these variables have already been found. The results are presented in table 5.8 and 5.9.

[29] The corresponding tests for analysis 5.1 can be found in appendix table 7 and 8.

Table 5.8:
Testing within- and between differences

Variable		Z-value
GDP per capita (log)	W - B	-1.13
Investment	W - B	0.03
Education (log)	W - B	-0.66
Population growth	W - B	1.81*
Political Violence (t-1)	W - B	-0.83
Civil Protest (t-1)	W - B	-0.14
Regime Change (t-1)	W - B	-0.31
Gov. Instability (t-1)	W - B	2.65***
Crisis	W - B	1.15
Government spending	W - B	-4.31***

Test: -lincom-
* 10%, ** 5%, *** 1%
Note: A significant finding mean that the within- and between-effect have different impacts on growth.

Table 5.9 Sensitivity analysis

Dependent variable: Real GDP per capita growth			
GDP per capita (log)	O	-0.486	(-3.11)***
Investment	O	0.051	(2.21)**
Education (log)	O	0.337	(0.69)
Population growth	W	0.049	(0.13)
	B	-0.861	(-3.79)***
Political Violence (t-1)	O	0.069	(1.19)
Civil Protest (t-1)	O	-0.023	(-0.29)
Regime Change (t-1)	O	-0.553	(-5.71)***
Gov. Instability (t-1)	W	0.448	(3.36)***
	B	-0.073	(-0.50)
Crisis	O	-2.65	(-5.60)***
Trade (log)	W	1.62	(3.03)***
Government spending	W	-0.17	(-3.19)***
	B	0.045	(2.70)***
Inflation	W	-0.085	(-4.40)***
Regional instability	B	0.264	(2.77)***
Economic inequality	Z	-0.061	(-3.13)***
Constant		5.341	(1.47)
Observations		664	
Countries		130	
Hausman		Prob>chi2 = 0.2739	

Random effects GLS estimation. Robust z-statistics.
W = within effect, B = between effect
Z = unit constant variables, O = original variable.
* 10%, ** 5%, *** 1%

Results suggest that if we follow the advice of Rabe-Hesketh and Skrondal (2008), only population growth, government instability and government spending should be modeled with specific within- and between- effects. These variables also display opposite signs on their effects. Estimating regression (8) with the structure suggested by the test-results does not change the results to a large degree. GDP per capita and investment increase their significance, as do the between-effect of government spending. The Hausman test reveals that this approach also is valid and that there is no correlation between the unit-specific effects and the explanatory variables.

5.3.1 Additional sensitivity tests

Outliers

Dropping all countries with under one million inhabitants does not change the results in any of the analyses (unreported). Testing this group of countries is important for the same reasons that led to the exclusion of countries with under ½ million inhabitants. Such countries are often thought to have special characteristics.

Campos and Nugent (2002) argued that their findings were driven by the set of Sub-Saharan African (SSA) countries in their sample. Jong-A-Pin (2009) did not find that excluding different regions had an effect on his main findings. As a robustness check, results of the growth regression were estimated after excluding the SSA countries.

Table: 5.10 Final growth regression excluding SSA

Dependent variable: Real GDP per capita growth

Political Violence (t-1)	W	0.088	(1.22)
	B	0.069	(0.60)
Civil Protest (t-1)	W	-0.051	(-0.59)
	B	-0.060	(-0.33)
Regime Change (t-1)	W	-0.433	(-3.77)***
	B	-0.095	(-0.37)
Gov. Instability (t-1)	W	0.124	(1.08)
	B	-0.176	(-0.97)
Crisis	W	-2.471	(-4.03)***
	B	-2.423	(-1.36)
Constant		0.043	(0.01)
Observations		480	
Countries		92	

* Only effects of the main variables of interest is presented.
** Specification is the same as in table 5.7 regression 8.

Most importantly, we see that when excluding SSA, the positive effect of government instability on growth disappears. SSA countries are a driving force of negative values on the government instability index. Excluding SSA increases the sample-mean of the government instability index from 0.02 to 0.43.

Non-linearity

Barro (1994) and Carmignani (2003) argue that the effect of democracy on growth may be non-linear. I find no significant non-linear effects of including a quadratic term of the within- and between effect of Polity IV in regression 5 table 5.7 (unreported).

6.0 Conclusion

This section will repeat the most important findings and answer the research question. I start by identifying some common findings which I regard as relevant also outside the specific topics considered in the analyses performed here. Thereafter, the specific findings of the two analyses are treated, and support for the hypotheses are evaluated. Following this, I answer the research question specifically. Lastly, the contribution of this thesis is summed up, and some thoughts for future research are given.

Common findings

First of all, I find clear indications that modeling political instability as multidimensional is appropriate. As the first analysis reveals, different determinants are important for the distinct dimensions of political instability, and one type of instability may influence the other dimensions differently. In the growth context, a multidimensional approach exposes that some dimensions are unimportant (political violence and civil protest), while other dimensions have contradictory effects on growth (regime change and government instability). Capturing the effect, and especially the much discussed causal effect, of political instability therefore seems futile if one does not make a clear distinction between the different dimensions of political instability.

Second, the approach of modeling specific within- and between-effects is beneficial. This allows the more efficient random effects estimator to be applied, one may include constant explanatory variables in the analyses, and the findings of differing within- and between-effects are of considerable theoretical interest to the researcher. The situations where the within- and between-effects had opposite signs would have led to ecological fallacy if a fixed effects approach were used and it would lead to biased estimates using normal variables within a random effects framework.

Financial crises and political instability

Table 6.1 presents the results of the first analysis and the effects of the different dimensions of political instability. I find support for four of the hypotheses (H1, H2, H3, and H5). Financial crises and inflation are found to increase political instability as expected, while income and trade decrease political instability. Financial crises trigger or contribute to socio-political unrest measured by indices of political violence and civil protest. There are found no evidence that crises trigger changes *in* or *of* regimes. The effect of government spending is found to be

the opposite of what was expected. Increasing government spending significantly increase political instability (political violence and regime change).

Table 6.1 Results of analysis 1: answering the hypothesis.

Hypothesis		Result of analysis				Support
		Political violence	Civil protest	Regime change	Gov. Ins.	
H1:	Financial crises	+	+			supported
H2:	Income			-		supported
H2A:	Financial crises * Income					no support
H3:	Inflation			+	-	supported
H4:	Economic inequality					no support
H5:	Trade openness	-	-	-		supported
H6:	Government spending	+		+		no support
H7:	Government debt					no data
H8:	Regime (democratic)				+	no support
H9:	Regional instability					no support
H10:	Social inequality				-	no support
Persistancy/diffusion of instability.						
	Political violence		+	+		
	Civil protest	+		+	-	
	Regime change	+	+		+	
	Government instability	-	- / +	+		

* Insignificant findings are left blank

All of the findings regarding the government instability variable were found to contradict the expected effects. The reason is that this variable captures events of democratic change that normally occur in democracies. Therefore, this index is found to be highly correlated with regime measures, and also display a contradictory interpretation from the other indices of instability. More government instability is "better" in the sense that this reflects the normal procedures of a democratic state (more elections, fractionalization, polarization, dropped veto players and fewer years in office of chief executive). However, since the effects are nonetheless found to contradict my hypothesized effects, this is what the table display.

The analyses of the different dimensions of political instability have shown the persistency and diffusion of instability. The results indicate that political instability is a main cause of political instability. Or put another way: *political instability is contagious*. Events of political violence may lead to protests or regime changes. Protest may feed violent acts and lead to changes in and of regimes, while changes of regimes are important events which affect all other dimensions of instability. With respect to government instability, the effect on the other

dimensions suggests that the nature of this variable is somewhat different. More changes of a democratic nature moderate political violence and civil protest, although countries with a high average amount of democratic changes experience more protest than countries which experience few changes. Government instability is also shown to increase the amount of regime changes.

Financial crises and growth

I find strong evidence that financial crises are detrimental to economic growth. The hypothesized positive long-run effect of crises on growth is not supported. Nor is the hypothesis that a poor institutional environment amplifies the negative economic effects of crises.

Table 6.2: Financial crises and growth: answering the hypotheses.

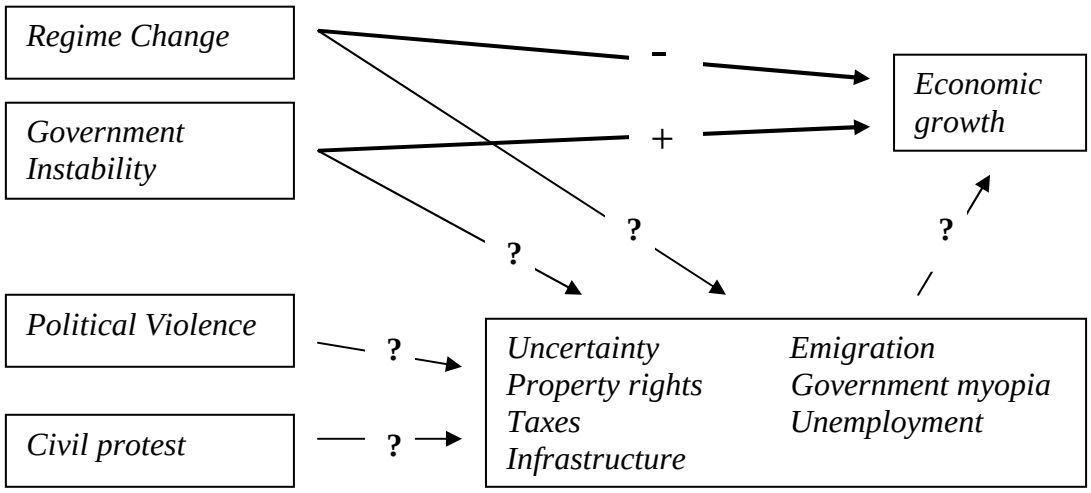
Hypothesis:		Support
H11:	*Financial crises decrease economic growth.*	supported
H11A:	*Financial crises have positive long-run effects on growth.*	no support
H12:	*A poor institutional environment amplifies the negative economic effects of financial crises on growth.*	no support

Political instability and growth

I find that socio-political unrest has no effect on the growth rate of the economy, whereas changes *of* the regime significantly lower growth in the long-run, and changes *in* the regime is positive for growth in the long-run. SSA countries are shown to be the driving force behind the latter result because of their generally low values of government instability, meaning that few changes of a democratic nature occur in this region.

It was hypothesized that political instability affected growth negatively through several mechanisms. These mechanisms have not been tested specifically and the relationships revealed may therefore be both direct effects and indirect effects on growth. The analyses conducted in this thesis can only conclude that there at least is a direct effect of political instability on growth. Figure 6.1 display the discovered effects and the hypothesized indirect connections.

Figure 6.1 Direct and indirect effects of political instability on growth



Answering the research question

After having summed up the findings and evaluated support for the hypotheses, we can answer the research question specifically.

Can financial crises trigger political instability? What effects do political instability and financial crises have upon long-term economic growth?

The findings suggest that financial crises *can* trigger political instability. However, only socio-political unrest seems to be the product of financial crises. As Davis and Carothers (2010) indicated, the financial crisis of 2008 may greatly have contributed to popular discontent. However, contrary to their observation that frustrations have mostly been peaceful, my findings suggest that *historically* this may not be the case. One clear indication is that more political violence is a product of crises. Davis and Carothers also commented that nothing indicated the latest crisis as a main cause of democratic reversals. More generally, I discover that crises do not lead to regime changes - constitutional or unconstitutional - which may well indicate that the political turmoil and economic frustrations due to crises are absorbed by the existing regimes.

The results show unambiguously that financial crises are negative for economic growth in the long-run. The implication of this finding is that the common moral-hazard view might be dangerous. Countries should not experience crises to learn important lessons and implement reform, thereby increasing growth in the future. If countries should experience crises, it is only to learn to avoid them in the future.

Political instability may affect long-term growth both negatively and positively depending on the nature of the events of instability. Alesina and Perotti (1996) argued that social unrest might not have an impact on policy uncertainty, and therefore economic decisions, in the same way as executive instability may have. This argument is confirmed. It is only changes *of* regimes or changes *within* regimes that have consequences for the growth rate. This does not mean that social unrest cannot have an effect on economic decisions given a higher level of *expected government turnover*.

While regime change was found to decrease growth, government instability is positive for growth. Butkiewicz and Yanikkaya (2005) also found positive and ambiguous relationships between variables of government (in)stability and growth, and Jong-A-Pin's (2009) within-dimension of instability showed positive effects on growth. While Butkiewicz and Yanikkaya (2005) found their results to be driven by "good-democracy" countries, I found that excluding SSA countries removed the positive effect of government instability on growth. The reason being that this region is a driving force for both low-growth and low-index values. The political and typically democratic changes captured by the government instability index could perhaps just as well be called *government stability*, *constitutional changes* (Alesina and Perotti 1996), or *regular changes* (Feng 2003). Butkiewicz and Yanikkaya (2005) site Duff's and McCamant's (1968:1125) conception of a politically stabile system as "one which can manage to change within its structures." Thus, more changes of a democratic nature are beneficial for growth. As Jong-A-Pin (2009) comment, the within-dimension not only refers to actual changes in governments, but also the potential for change. This relates to expectations, which are central in understanding actor's economic decisions. Changes which can be expected and are considered regular have a positive effect on growth. Changes which are unexpected and irregular have a negative effect on growth.

Contribution of the thesis

I have followed a new research trend in emphasizing the multidimensionality of political instability. In section 2.2, I described the common view of political instability as socio-political unrest or civil-society induced unrest on the one hand, and executive instability on the other hand. This was further developed into four dimensions of political instability where political violence and civil protest constitute socio-political unrest, and regime change and government instability represent executive/regime instability. In the first part of the thesis, I have explored new ground when trying to estimate the effect of financial crises on these dimensions of political instability. There are indeed political consequences of financial crises and they may be severe. Because this is an explorative study it is tempting to call these results tentative findings. As I will suggest in the last section, more theoretical work and empirical studies are needed to draw more certain conclusions. Blanco and Grier (2009) argue that to change the long history of political instability in Latin America, understanding its reasons is central. More generally, one may state that it is vital to understand the determinants of political instability to promote political stability. The results from exploring the different dimensions of instability here suggest that policymakers may promote political stability by promoting trade openness, increasing income, and ensuring stabile fiscal conditions.

The second confirmatory analysis has tested the appropriateness of modeling political instability as multidimensional when estimating its impact on growth. This way of operationalizing political instability reveals contradictory effects of different dimensions. Although this does not mean that the four dimensions emphasized here are the true, or the only, dimensions of political instability, it does indicate that a multidimensional view is appropriate and that not realizing this may lead to bias. I have also challenged the standard fixed effect approach in growth econometrics by estimating random effects models with separated within- and between-effects. This technique treats endogeneity and provides internal instruments that give unbiased estimates. It has also revealed that there are significant within-unit and between-unit differences of some dimensions of political instability, which is a new contribution to the instability-growth literature.

Moderations and suggestions for further research

Some moderations are also in order. First, I will not claim that the results found in this thesis establish causality; they do, however, indicate systematic relationships between the estimated variables. As Mankiw (1995) and Wacziarg (2002) argue, reliable causal statements are

almost impossible to make. Second, the excluded variables for which there were no data may constitute omitted variables without which the analyses give a biased picture of the true relationships. Third, as Carmignani (2003) comments, political instability may influence many dimensions of the economy other than economic growth, thereby leaving several explanatory variables endogenous. Fourth, as Jong-A-Pin (2009) also remarks, it is difficult to address the effect of missing observations on the estimates. Lastly, the choice of 5-year averages may lead to an unnecessary limitation of variation, especially in the analysis of crises and instability, where there are no a priori reason to suspect heterogeneity of the same nature as growth variables express.

The connection between financial crises and political instability should be explored further. As a start, some of the mentioned crisis-indicators from section 2.1 could be tested to see if the relationships revealed hold for different measures of crises, and possibly if other types of financial/economic crises display effects on different dimensions of instability. Second, the short term shock-effect of crises can be tested. This may better reveal the immediate consequences of financial crises on the political environment. Third, the theoretical basis of the crisis-instability relationship should be further developed, and specific tests of how crises affect instability through other factors (i.e. trade, debt, government spending) can be explored.

Both unemployment and government debt could not be included in these analyses because of missing data. By accepting a smaller sample it may be possible to include such variables in the future, thereby allowing tests of these relationships in the context of financial crises, political instability and growth. Further sensitivity analyses should also be conducted, to see what regions are the driving forces behind the results. This would also reveal possible parameter heterogeneity. Also, the possibility of reverse causality of the crises-instability relationship ought to be investigated.

The mechanisms through which political instability affect growth have been sporadically examined in the past (i.e. Svensson 1998 on property rights; Asteriou and Price 2005 on uncertainty). In my view, one important direction for further research on instability and growth will be to examine these mechanisms in connection with a multidimensional set-up for political instability. This way we may learn more specifically how the relationship between institutions and the different dimensions of political instability are connected, and which of these channels are important in the growth context.

Since the results of the government instability dimension, or within-instability, showed unexpected effects, this dimension deserves closer inspection. The findings of this thesis may seem to indicate that there exists “good” instability and “bad” instability. A goal for future research should be to dissect what mechanisms of government instability are growth-positive. A starting point could be the variables from which the index applied here was made.

7.0 Literature

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8.0 APPENDIX

8.1 Appendix table 1: Original averaged variables of political instability

Variable	Obs	Mean	Std. Dev.	Min	Max
Assassinations	968	0.227	0.749	0	10.2
Strikes	968	0.138	0.343	0	2.6
Guerilla warfare	968	0.133	0.316	0	2.6
Government crises	968	0.139	0.272	0	1.8
Purges	968	0.032	0.124	0	1.4
Riots	968	0.358	1.042	0	17.6
Revolutions	968	0.192	0.356	0	2.8
Anti Gov. Dem.	968	0.582	1.171	0	11.2
Coups	964	0.022	0.081	0	0.6
Constitutional Crises	964	0.084	0.161	0	1.2
Cabinet change	964	0.471	0.365	0	2.6
Executive change	964	0.178	0.235	0	2
Elections	964	0.217	0.151	0	0.8
Years in office	973	7.435	7.289	1	44
Fractionalization	850	0.472	0.289	0	0.9953628
Dropped veto p.	961	0.113	0.124	0	0.8
Polarization	922	0.370	0.690	0	2
Regime change	967	0.091	0.194	0	1
Minor conflict	976	0.123	0.264	0	1
War	976	0.052	0.183	0	1

8.2 Appendix table 2: Descriptive statistics for all other variables (averaged):

Variable	Obs	Mean	Std. Dev.	Min	Max
Banking crises	1036	0.075	0.191	0	1
GDP pc growth %	941	1.573	4.142	-28.982	31.298
GDP pc	1036	6797.808	10913.55	32.405	66591.09
- logged	1036	7.666	1.585	3.478	11.106
Investment/GDP	957	19.929	11.289	-0.772	68.891
Gov.share/GDP	957	18.627	9.402	3.377	65.737
Pop.growth %	1035	1.731	1.424	-8.144	14.33
Education pc	962	1840.308	565.532	259.4	4316.333
- logged	962	7.459	0.369	5.558	8.370
Trade openness	925	71.604	37.921	0.67	338.902
- logged	925	4.126	0.577	-0.400	5.825
Inflation (adj)	825	0.563	4.175	-0.162	86.032
Gini	966	41.067	10.097	23.625	73.9
Ethnic fractionalization	1029	0.455	0.253	0	0.930
Polity2	956	1.423	7.161	-10	10
Polcon3	969	0.230	0.212	0	0.725
Regional instability	1018	0.469	2.873	-3.223	19.721

* Descriptive statistics for the indices of political instability are found in section 4.2.

8.3 Appendix table 3: Occurrence of banking crises (1970-2009).

Country	Start	End	Country	Start	End	Country	Start	End	Country	Start	End
Albania	1994	1994	Congo, Rep	1992	1994	Kazakhstan*	2008	...	Romania	1990	1992
Algeria	1990	1994	Costa Rica	1987	1991	Kenya	1985	1985	Russia	1998	1998
Argentina	1980	1982	Costa Rica	1994	1995	Kenya	1992	1994	Russia*	2008	...
Argentina	1989	1991	Croatia	1998	1999	Korea	1997	1998	**São Tomé & P.**	**1992**	**1992**
Argentina*	1995	1995	Czech Republic*	1996	2000	Kuwait	1982	1985	Senegal	1988	1991
Argentina	2001	2003	Denmark	2008	...	Kyrgyz Rep	1995	1999	Sierra Leone	1990	1994
Armenia	1994	1994	Djibouti	1991	1995	Latvia*	1995	1996	Slovak Rep	1998	2002
Austria	2008	...	Dominican Rep	2003	2004	Latvia	2008	...	Slovenia	1992	1992
Azerbaijan	1995	1995	Ecuador	1982	1986	Lebanon	1990	1993	Slovenia*	2008	...
Bangladesh	1987	1987	Ecuador	1998	2002	Liberia	1991	1995	Spain	1977	1981
Belarus	1995	1995	Egypt	1980	1980	Lithuania	1995	1996	Spain*	2008	...
Belgium	2008	...	El Salvador	1989	1990	**Luxembourg**	**2008**	**...**	Sri Lanka	1989	1991
Benin	1988	1992	Equatorial Guinea	1983	1983	**Macedonia**	**1993**	**1995**	Swaziland	1995	1999
Bolivia	1986	1986	**Eritrea**	**1993**	**1993**	Madagascar	1988	1988	Sweden	1991	1995
Bolivia	1994	1994	Estonia	1992	1994	Malaysia	1997	1999	Sweden*	2008	...
Bosnia and Herz.	**1992**	**1996**	Finland	1991	1995	Mali	1987	1991	Switzerland*	2008	...
Brazil*	1990	1994	France*	2008	...	Mauritania	1984	1984	Tanzania	1987	1988
Brazil	1994	1998	Georgia	1991	1995	Mexico	1981	1985	Thailand	1983	1983
Bulgaria	1996	1997	Germany	2008	...	Mexico	1994	1996	Thailand	1997	2000
Burkina Faso	1990	1994	Ghana	1982	1983	Mongolia	2008	...	Togo	1993	1994
Burundi	1994	1998	Greece*	2008	...	Morocco	1980	1984	Tunisia	1991	1991
Cameroon	1987	1991	Guinea	1985	1985	Mozambique	1987	1991	Turkey	1982	1984
Cameroon	1995	1997	Guinea	1993	1993	Nepal	1988	1988	Turkey	2000	2001
Cape Verde	1993	1993	Guinea-Bissau	1995	1998	Netherlands	2008	...	Uganda	1994	1994
Central African Rep	1976	1976	Guyana	1993	1993	Nicaragua	1990	1993	Ukraine	1998	1999
Central African Rep	1995	1996	Haiti	1994	1998	Nicaragua	2000	2001	Ukraine	2008	...
Chad	1983	1983	Hungary	1991	1995	Niger	1983	1985	United Kingdom	2007	...
Chad	1992	1996	Hungary*	2008	...	Nigeria	1991	1995	United States*	1988	1988
Chile	1976	1976	**Iceland**	**2008**	**...**	Norway	1991	1993	United States	2007	...
Chile	1981	1985	India	1993	1993	Panama	1988	1989	Uruguay	1981	1985
China, Mainland	1998	1998	Indonesia	1997	2001	Paraguay	1995	1995	Uruguay	2002	2005
Colombia	1982	1982	Ireland	2008	...	Peru	1983	1983	Venezuela	1994	1998
Colombia	1998	2000	Israel	1977	1977	Philippines	1983	1986	Vietnam	1997	1997
Congo, Dem Rep	1983	1983	Jamaica	1996	1998	Philippines*	1997	2001	Yemen	1996	1996
Congo, Dem Rep	1991	1994	Japan	1997	2001	Poland	1992	1994	Zambia	1995	1998
Congo, Dem Rep	1994	1998	Jordan	1989	1991	Portugal*	2008	...	Zimbabwe	1995	1999

Source: Laeven and Valencia (2010).
* Borderline systemic banking crises.
Countries in **bold** are not included in the dataset

8.4 Appendix table 4: List of countries and neighboring countries.

Country	Bordering countries (only those included in data)
Albania	Macedonia, Greece
Algeria	Morocco, Mali, Tunisia, Niger, Mauritiania
Angola	Congo, dem rep, Zambia, Namibia, Congo rep.
Argentina	Chile, Paraguay, Brazil, Bolivia, Uruguay
Armenia	Turkey, Georgia, Azerbaijan, Iran
Australia	New Zealand, Indonesia, Papa New Guinea
Austria	Germany, Italy, Swittzerland, Hungary, Slovenia, Czech republic, Slovakia
Azerbaijan	Russia, Armenia, Georgia, Iran, Turkey
Bangladesh	India, Burma
Belarus	Russia, Ukraine, Poland, Latvia, Lithuania
Belgium	France, Netherlands, Germany,
Benin	Nigeria, Togo, Burkina Faso, Niger
Bhutan	India, China
Bolivia	Brazil, Peru, Chile, Argentina, Paraguay
Botswana	South Africa, Zimbabwe, Namibia
Brazil	Bolivia, Venezuela, Columbia, Peru, Paraguay, Argentina, Uruguay
Bulgaria	Romania, Macedonia, Turkey, Greece
Burkina Faso	Mali, Niger, Cote d'ivor, Ghana, Benin, Togo
Myanmar (Burma)	Thailand, India, Laos, Bangladesh, China
Burundi	Tanzania, Rwanda, Congo, dem rep
Cameroon	Nigeria, Chad, Central African Republic, Congo, rep, Gabon
Canada	United States
Cape Verde Islands	Senegal
Central African Rep	Congo, dem rep, Chad, Sudan, cameroon, Congo rep
Chad	Sudan, Central African republic, Niger, Cameroon, nigeria
Chile	Argentina, Bolivia, Peru
China	Russia, Mongolia, Kazakhstan, Pakistan, Kyrgyzstan, Tajikistan, India Nepal, Bhutan, Myanmar, Laos, Vietnam
Colombia	Peru, Venezuela, Brazil, Ecuador, Panama
Comoros Islands	Madagascar, Mozambique
Congo, Dem. Rep.	Congo, rep, Angola, Zambia, Central African Republic Uganda, Sudan, Burundi, Rwanda
Congo, Rep.	Congo dem rep, Gabon, Cameroon, Cenral African Republic, Angola
Costa Rica	Panama
Cote D'Ivoire	Liberia, Ghana, Guniea, Burkina Faso, Mali
Croatia	Hungary, Slovenia
Cuba	Haiti, Jamaica
Cyprus	Turkey, Syria, Lebanon
Czech Republic	Germany, Poland, Slovakia, Austria
Denmark	Germany
Djibouti	Ethiopia
Dominican Republic	Haiti
Ecuador	Peru, Columbia
Egypt	Sudan, Israel
El Salvador	Honduras, Guatemala
Equatorial Guinea	Cameroon, Gabon
Estonia	Latvia, Russia
Ethiopia	Sudan, Kenya
Fiji	Papa new guinea, Australia, New Zealand
Finland	Norway, Sweden Russia
France	Spain, Belgium, Switzerland, Italy, Germany,
Gabon	Congo rep, Cameroon
Gambia	Senegal

Georgia	Russia, Armenia, Turkey, Azerbaijan
Germany	Austria, Netherlands, France, Switzerland, Belguim
	Denmark, Czech republic, Poland
Ghana	Togo, Cote d'ivory, Burkina Faso
Greece	Turkey, Bulgaria, Albania, Macedonia
Guatemala	Mexico, Honduras, El Salvador
Guinea	Mali, Sierra Leone, Cote d'ivory, Liberia, Senegal, Guniea Bissau
Guinea Bissau	Guinea, Senegal
Guyana	Brazil, Venezuela
Haiti	Dominican rep
Honduras	Nicaragua, El salvador, Guatemala
Hungary	Slovenia, Austria, Slovakia, Ukraine, Romania, Croatia
India	Bangladesh, China, Pakistan, Nepal, Myanmar, Bhutan
Indonesia	Malaysia, Papa new guinea
Iran	Pakistan, Turkey, Armenia, Azerbaijan, Turkmenistan
Ireland	United Kingdom
Israel	Egypt, Jordan, Syria, Lebanon
Italy	Switzerland, France, Austria, Slovenia
Jamaica	Haiti, Cuba
Japan	Korea rep
Jordan	Saudi Arabia, Syria, Israel
Kazakhstan	Russia, China, Kyrgyzstan, Turkmenistan, Uzbekistan
Kenya	Uganda, Ethipoia, Tanzania, Sudan
Kuwait	Saudi Arabia
Kyrgyzstan	Kazakhstan, China, Tajikistan, Uzbekistan
Laos	Myanmar, China, Vietnam, Thailand
Latvia	Estonia, Lithuania, Russia, Belarus
Lebanon	Israel, Syria
Lesotho	South Africa
Liberia	Guniea, Sierra Leone, Cote d'ivory
Lithuania	Russia, Belarus, Latvia
Macedonia	Bulgaria, Greece, Albania
Madagascar	Mauritius, Mosambique
Malawi	Mosambique, Zambia, Tanzania
Malaysia	Indonesia, Thailand, Singapore
Mali	Mauritiania, Algeria, Burkina Faso, Guniea, Niger, Cote'divor, Senegal
Mauritania	Mali, Senegal, Algeria
Mauritius	Madagascar
Mexico	United states, Guatemala
Moldova	Romania, Ukraine
Mongolia	China, Russia
Morocco	Algeria
Mozambique	Malawi, Zimbabwe, Tanzania, South Africa, Zambia, Swaziland
Namibia	South Africa, Botswana, Angola, Zambia
Nepal	India, China
Netherlands	Belgium, Germany
New Zealand	Australia, Fiji
Nicaragua	Honduras, Costa Rica
Niger	Nigeria, Chad, Algeria, Mali, Burkina Faso, Benin,
Nigeria	Cameroon, Niger, Benin, Chad
Norway	Sweden, Finland, Russia
Oman	Saudi Arabia, UAE, Yemen
Pakistan	India, Iran, China,
Panama	Costa Rica, Columbia
Papua New Guinea	Indonesia
Paraguay	Argentina, Brazil, Bolivia
Peru	Columbia, Brazil, Ecuador, Bolivia, Chile
Philippines	Indonesia, Vietnam

Poland	Russia, Germany, Czech rep, Slovakia, Belarus, Lithuania, Ukraine
Portugal	Spain
Romania	Moldova, Ukraine, Hungary, Bulgaria
Russia	Azerbaijan, Belarus, China, Estonia, Finland, Georgia, Kazakhstan Latvia, Lithuania, Mongolia, Poland, Ukraine
Rwanda	Burundi, Congo dem rep, Tanzania, Uganda
Saudi Arabia	Yemen, Jordan, Oman, United Arab Emirates, Kuwait,
Senegal	Mauritiania, Gambia, Mali, Guinea, Guinea-Bissau
Sierra Leone	Guinea, Liberia
Singapore	Malaysia
Slovakia	Czech rep, Poland, Hungary, Austria, Ukraine
Slovenia	Italy, Austria, Hungary, Croatia
South Africa	Botswana, Namibia, Lesotho, Mosambique, Swaziland, Zimbabwe
South Korea	Japan, China
Spain	Portugal, France
Sri Lanka	India
Sudan	Ethiopia, Chad, Egypt, Central African Republic, Congo, dem rep, Uganda, Kenya
Swaziland	South Africa, Mosambique
Sweden	Norway, Finland
Switzerland	Italy, France, Germany, Austria
Syria	Turkey, Jordan, Israel, Lebanon
Tajikistan	China, Kyrgyzstan, Uzbekistan
Tanzania	Kenya, Mosambique, Malawi, Burundi, Uganda, Zambia, Rwanda
Thailand	Malaysia, Myanmar, Laos
Togo	Ghana, Benin, Burkina Faso
Trinidad and Tobago	Venezuela
Tunisia	Algeria
Turkey	Syria, Greece, Iran, Bulgaria, Georgia, Armenia
Turkmenistan	Kazakhstan, Uzbekistan, Iran
Uganda	Kenya, Congo dem rep, Sudan, Tanzania, Rwanda
Ukraine	Russia, Moldova, Belarus, Poland, Slovakia, Hungary, Romania
United Arab Emirates	Oman, Saudi Arabia
United Kingdom	Ireland
United States	Mexico, Canada
Uruguay	Brazil, Argentina
Uzbekistan	Kazakhstan, Turkmenistan, Kyrgyzstan, Tajikstan
Venezuela	Brazil, Columbia, Guyana
Vietnam	China, Laos
Yemen	Saudi Arabia, Oman
Zambia	Congo dem rep, Angola, Malawi, Zimbabwe, Mosambique, Tanzania, Namibia
Zimbabwe	Mosambique, Botswana, Zambia, South Africa

Total: 148 countries

8.5 Appendix table 5: Collinearity diagnostics

Collinearity Diagnostics using - collin -						
Final regression:		Political violence	Civil protest	Regime change	Government Ins.	Economic growth
Variables		VIF	VIF	VIF	VIF	VIF
GDP per capita	W					1.32
	B			1.79		3.63
Investment	W					1.23
	B					2.1
Education	W					1.11
	B					1.5
Population growth	W					1.11
	B					2.89
Political Violence	W		1.15	1.11	1.13	1.19
	B		1.27	1.37	1.22	1.38
Civil Protest	W	1.1		1.09	1.1	1.15
	B	1.35		1.41	1.26	1.4
Regime Change	W	1.23	1.25		1.2	1.4
	B	1.18	1.17		1.16	1.46
Government Ins.	W	1.14	1.12	1.04		1.22
	B	1.21	1.08	1.65		2.22
Crisis	W	1.03	1.03	1.05	1.02	1.06
	B	1.13	1.1	1.17	1.05	1.07
Trade	W	1.07	1.08	1.23		1.31
	B	1.39	1.26			
Government spending	W	1.11				1.16
	B			1.19		1.2
Inflation	W			1.1	1.02	1.08
	B					
Regional instability	W					
	B					1.25
Polity IV	W				1.01	
	B				1.22	
Economic inequality	Z					2.15
Social Inequality	Z				1.21	

8.6 Appendix table 6: Shapiro and Wilk W-test for normal data

The Stata command -*swilk*- can be applied when we have: $4 \leq n \leq 2000$ observations. Significant results indicate normality.

Political violence (final regression (4))

Variable	Obs	W	V	z	Prob>z
Political violence	966	0.760	146.363	12.330	0.00000
Crises W	1036	0.799	130.494	12.081	0.00000
Crises B	1036	0.945	35.396	8.845	0.00000
Trade W	925	0.935	38.033	8.982	0.00000
Trade B	1036	0.952	30.630	8.486	0.00000
Gov.spending W	957	0.921	47.489	9.543	0.00000
Civil protest W	968	0.675	198.698	13.087	0.00000
Civil protest B	1036	0.698	196.271	13.093	0.00000
Regime change W	961	0.917	50.105	9.677	0.00000
Regime change B	1036	0.919	52.337	9.815	0.00000
Gov.instability W	796	0.991	4.111	3.468	0.00026
Gov.instability B	1015	0.985	9.188	5.496	0.00000

Civil protest (final regression (4))

Variable	Obs	W	V	z	Prob>z
Civil protest	968	0.61188	237.640	13.530	0.00000
Crises W	1036	0.79965	130.494	12.081	0.00000
Crises B	1036	0.94566	35.396	8.845	0.00000
Trade W	925	0.93526	38.033	8.982	0.00000
Trade B	1036	0.95297	30.630	8.486	0.00000
Political violence W	966	0.82046	109.723	11.618	0.00000
Political violence B	1036	0.74639	165.185	12.665	0.00000
Regime change W	961	0.91762	50.105	9.677	0.00000
Regime change B	1036	0.91965	52.337	9.815	0.00000
Gov.instability W	796	0.99198	4.111	3.468	0.00026
Gov.instability B	1015	0.98563	9.188	5.496	0.00000

Regime change (final regression (4))

Variable	Obs	W	V	z	Prob>z
Regime change	961	0.82349	107.362	11.561	0.00000
Crises W	1036	0.79965	130.494	12.081	0.00000
Crises B	1036	0.94566	35.396	8.845	0.00000
GDP per capita B	1036	0.97257	17.865	7.149	0.00000
Trade W	925	0.93526	38.033	8.982	0.00000
Gov.spending B	1029	0.89498	67.980	10.461	0.00000
Inflation W	825	0.18965	428.996	14.892	0.00000
Political violence W	966	0.82046	109.723	11.618	0.00000
Political violence B	1036	0.74639	165.185	12.665	0.00000
Civil protest W	968	0.67548	198.698	13.087	0.00000
Civil protest B	1036	0.69867	196.271	13.093	0.00000
Gov.instability W	796	0.99198	4.111	3.468	0.00026
Gov.instability B	1015	0.98563	9.188	5.496	0.00000

Government instability (final regression (4))

Variable	Obs	W	V	z	Prob>z
Gov.instability	796	0.98346	8.479	5.244	0.00000

Crises W	1036	0.79965	130.494	12.081	0.00000
Crises B	1036	0.94566	35.396	8.845	0.00000
Inflation W	825	0.18965	428.996	14.892	0.00000
Polity W	956	0.95718	25.924	8.046	0.00000
Polity B	1029	0.96754	21.013	7.550	0.00000
Civil protest W	968	0.67548	198.698	13.087	0.00000
Civil protest B	1036	0.69867	196.271	13.093	0.00000
Regime change W	961	0.91762	50.105	9.677	0.00000
Regime change B	1036	0.91965	52.337	9.815	0.00000
Social inequality Z	1029	0.96234	24.378	7.918	0.00000

Final growth regression (8)

Variable	Obs	W	V	z	Prob>z
Growth	941	0.86483	80.655	10.845	0.00000
GDP per capita W	1036	0.96788	20.921	7.541	0.00000
GDP per capita B	1036	0.97257	17.865	7.149	0.00000
Investment W	957	0.95088	29.761	8.388	0.00000
Investment B	1029	0.96720	21.231	7.575	0.00000
Education W	962	0.92141	47.846	9.564	0.00000
Education B	1029	0.93251	43.688	9.365	0.00000
Popultaion growth W	1035	0.74661	164.895	12.661	0.00000
Popultaion growth B	1036	0.95114	31.825	8.581	0.00000
Political violence W	966	0.82047	109.718	11.618	0.00000
Political violence B	1036	0.74829	163.947	12.647	0.00000
Civil protest W	966	0.70238	181.886	12.868	0.00000
Civil protest B	1036	0.70583	191.604	13.033	0.00000
Regime change W	959	0.91035	54.429	9.881	0.00000
Regime change B	1036	0.91519	55.239	9.949	0.00000
Gov.instability W	832	0.99409	3.150	2.820	0.00240
Gov.instability B	1022	0.98825	7.561	5.014	0.00000
Crises W	1036	0.76444	153.431	12.482	0.00000
Crises B	1036	0.96326	23.928	7.874	0.00000
Trade W	925	0.93526	38.033	8.982	0.00000
Gov.spending W	957	0.92163	47.489	9.543	0.00000
Gov.spending B	1029	0.89498	67.980	10.461	0.00000
Inflation W	825	0.18965	428.996	14.892	0.00000
Regional instability B	1036	0.92161	51.060	9.754	0.00000
Economic Inequality Z	966	0.96766	19.764	7.379	0.00000

8.7 Appendix table 7: Testing for significant within- and between differences.

Testing within- and between-differences

Political violence (final regression)

Variable		Z-value
Crisis (lagged)	W - B	0.12
Civil Protest	W - B	-1.90*
Regime Change	W - B	-0.30
Government Instability	W - B	1.02
Trade (log)	W - B	0.53

Civil protest (final regression)

Variable		Z-value
Crisis (lagged)	W - B	1.00
Political violence	W - B	-0.61
Regime Change	W - B	1.64
Government Instability	W - B	-4.00***
Trade (log)	W - B	1.22

Regime change (final regression)

Variable		Z-value
Crisis (lagged)	W - B	-0.43
Political violence	W - B	2.62***
Civil Protest	W - B	2.14**
Government Instability	W - B	1.00

Government instability (final regression)

Variable		Z-value
Crisis (lagged)	W - B	-1.51
Political violence	W - B	1.75*
Civil Protest	W - B	-2.04**
Regime Change	W - B	-1.96*
Polity IV	W - B	-1.63

Test: -lincom-
* 10%, ** 5%, *** 1%
Note: A significant finding mean that the within- and between-effect have different impacts on the dependent variable.

8.8 Appendix table 8: Re-estimating the final regressions in analysis 5.1.

Sensitivity analysis: including original variables

Dependent variable:	Political violence		Civil Protest		Regime Change		Gov.Ins	
Crisis (lagged)	O	0.584 (2.05)**	O	**0.270 (1.15)**	O	0.212 (0.59)	O	0.145 (0.76)
Civil Protest	W	0.093 (1.91)*			W	0.220 (2.38)**	W	-0.064 (-2.60)***
	B	0.331 (3.46)***			B	0.022 (0.29)	B	0.077 (1.43)
Regime Change	O	0.240 (5.30)***	O	0.174 (3.65)***			W	0.185 (6.60)***
							B	0.348 (4.99)***
Government Instability	O	**-0.055 (-1.18)**	W	-0.127 (-2.21)***	O	0.388 (6.23)***		
			B	0.178 (3.12)***				
Political violence			O	0.139 (2.20)**	W	0.256 (4.60)***	W	0.038 (1.37)
					B	0.091 (1.57)	B	-0.057 (-1.38)
GDP per capita (log)								
					B	-0.253 (-5.16)***		
Trade (log)	O	-0.506 (-2.98)***	O	-0.469 (-2.21)**	W	-0.793 (-3.47)***		
Government spending	W	0.042 (2.34)**						
					B	0.015 (1.95)*		
Inflation					W	0.071 (3.99)***	W	-0.020 (-2.10)**
Polity IV							O	0.126 (12.73)***
Social Inequality							Z	-0.953 (-4.01)***
Constant		2.022 (2.70)		1.937 (2.11)		1.592 (3.58)		0.233 (1.68)
Observations		746		755		664		678
Countries		144		145		136		135
Hausman		0.6151		0.0192		0.4203		0.2062

Notes: Random effects GLS estimation. Robust z-statistics in parantheses.
B = between effect, W = within effect, Z = unit constant variables, O = original variable.
* significant at 10%, ** significant at 5%, *** significant at 1%

Comments:

- Only two results change: government instability becomes insignificant in the political violence regression, and crises become insignificant in the civil protest analysis. Both were significant only at 10% in the main analysis.
- The regression of civil protest does not satisfy the Hausman test. This was also a problem in the original analysis when the effect of trade was not separated. This may indicate that this constitutes an endogenous variable in this context and that to avoid bias its effects should be differentiated. Since estimates are biased, I do not give this result much weight.