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Institutional Instability and Economic Growth Revisited

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Abstract

Over the past three decades, the New Institutional Economics have established that institutions significantly influence economics outcomes. However, the effect of institutional instability remains theoretically ambiguous: Instability can hamper the economy by increasing uncertainty and transaction costs. Yet, it can also benefit economic outcomes by enabling improvements in institutional quality, for example, via Hayekian experimentation. To date, only a few studies have examined the relationship between institutional instability and economic outcomes, yielding different conclusions about whether and when the positive or negative effects dominate. This thesis revisits this relationship, testing whether it follows an inverted-U-shape, with moderate levels of instability maximizing economic performance. Institutional instability was measured by calculating the multivariate dynamic complexity in the Varieties-of-Democracy project data that covers a broad range of political and legal institutions. Fixed-effects regressions using panel data from 116 countries between 1960 and 2019 indicated that institutional instability and economic growth were negatively associated, particularly in poorer countries. Conversely, the analysis did not provide support for an inverted-U-shaped relationship. Ultimately, the negative relationship was only significant when studying time periods of twenty but not of ten years, suggesting that the adverse effects of institutional instability on economic performance only predominate in the long term.

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1 Introduction

Ninety-nine percent of our human genetic information is identical (International Human Genome Sequencing Consortium, 2001). However, when human beings are to such a large degree similar, why do the populations of some states generate a GDP per capita that is multiple times higher than that in other states? The institutional view of economics suggests that this variation can largely be explained by differences in the collective structures and mechanisms that shape individual behavior and decision-making, thereby influencing productivity, innovation, and economic efficiency. Hence, given different institutional structures that govern their behavior, the same agents can either produce goods in a highly efficient, coordinated, and cooperative manner or abstain from productive activities, potentially engaging in conflict instead. Originating in the early 20th century (for a historical overview, see Rutherford, 2001), institutional economics has experienced a renaissance over the past three decades. Prominent publications by North (1990) and Acemoglu et al. (2001) introduced the notions that institutions existed to reduce the uncertainties arising from human interactions and that current institutional settings are historically contingent and persistent, with institutions established during the time of colonialism still influencing current inter-country economic differences.[1] As a result of these so-called New Institutional Economics (Williamson, 2000), it is now widely accepted in contemporary economics that institutions play a critical role in economic growth.[2]

Within institutional economics, two primary research lines seem to have emerged. The first (and more prominent) research line studies the effect of specific institutions on economic performance: for example, Acemoglu and Johnson (2005) argue that 'property rights institutions' that protect citizens against expropriation by the state create incentives for self-initiative and entrepreneurship, thereby enhancing growth rates, and Acemoglu et al. (2005) argue that strong

[1] Cf. Maseland (2018), who argues that the relevance of the colonial legacy to institutional quality and economic performance in African countries is rapidly disappearing nowadays.

[2] However, note that some authors posit that the role of institutions in economic growth is often overstated: for instance, Rodrik (2008) argues that different institutions work differently well across different countries, so that comparing the institutional development of different countries cannot reliably explain differences in economic performance, and Sachs (2003) argues that not institutions but geography is the primary determinant of economic performance.

parliaments have a similar function because they, for example, make it harder for special interest groups to gain undue influence.[3] The second, less popular, research line focuses on the role of institutional change: For instance, Greif and Laitin (2004) developed a theory of endogenous institutional change, which assumes that institutions continuously evolve along pre-determined paths due to the interaction of individuals with one another and their environment. Moreover, Acemoglu and Robertson (2012) argue that the failure of nations such as the Ottoman Empire resulted from institutional rigidity that rendered the institutional structure inefficient over time. These publications tentatively suggest that not only the ability of an institutional setting to enhance economic outcomes in the present but also its ability to adapt to changing circumstances in the future matters for economic performance in the long term.

Yet, the literature on the relationship between institutional instability and economic growth is sparse: To date, only Berggren et al. (2012) and Hartmann and Spruk (2021) explicitly address the effect of institutional instability. Yet, they come to different conclusions: While Berggren et al. (2012) argue that institutional instability enhances economic performance in richer but decreases it in poorer countries, Hartmann and Spruk's (2021) findings suggest that particularly de facto instability has a negative effect on economic outcomes that, however, only becomes evident in the long term. These differing results could be attributed to the different time periods analyzed by the two studies or by their different operationalizations of institutional instability: for instance, Hartmann and Spruk (2021) do not differentiate between poorer and richer countries, while Berggren et al. (2012) do not distinguish between de jure and de facto instability. Therefore, no clear evidence exists regarding the effect of institutional instability on economic performance, and the results appear to depend on the methods used. However, they cannot be attributed to any specific methodological aspect.

Consequently, this thesis re-examines the relationship between institutional instability and economic performance. It aims to integrate the differential findings of Berggren et al. (2012) and Hartmann and Spruk (2021) by investigating institutional instability in poorer and richer countries

[3] Cf. Ogilvie and Carus (2014), who criticize focusing on the effect of individual institutions. Instead, they argue that the impact of a particular institution is moderated by other institutions, so that an institutional system should study as a whole.

over extended time periods. Besides, it introduces a methodological innovation by assessing institutional instability through multivariate dynamic complexity in panel data on a country's institutional development. This approach covers back-and-forth changes in institutional development (e.g., increasing followed by decreasing democratization) better than the currently used coefficient of variation (CoV). Finally, this thesis tests for an inverse-U-shaped relationship between institutional instability and economic outcomes, an idea first speculated upon by Alesina et al. (1996) concerning the effect of political instability on economic growth.

In what follows, the next section describes the role of institutions in the economy as well as the potential positive and negative effects of institutional instability on economic outcomes, and how an inverse-U-shaped relationship could integrate these effects. The third section outlines the empirical strategy to assess the relationship between institutional instability and economic growth, and the fourth section reports the results. The fifth section provides additional tests concerning the stability of the results and reverse causality. Then, the sixth section discusses the findings in relation to the previous literature and points to some limitations of this thesis. Finally, the seventh section concludes.

2 Institutions, Institutional Instability, and Economic Growth

This section explores the relationship between institutional instability and economic growth. Ultimately, it will arrive at the hypothesis that this relationship follows an inverted-U shape: very low and very high levels of institutional instability are detrimental to economic growth, while a balanced level between rigidity and randomness is ideal. For this hypothesis to be valid, three conditions must be fulfilled:

(i) Institutional instability can hinder economic growth.

(ii) Institutional instability can benefit economic growth.

(iii) Both these negative and positive effects have declining marginal returns.

In what follows, the first part of this section introduces different perspectives on institutions and definitions of institutional instability. The second part aims to establish condition (i): primarily based on the literature on the functioning of institutions in the economy and society, it argues that institutional instability impedes this functioning and, therefore, decreases economic

performance. The third subsection strives to demonstrate that institutional instability can also positively affect economic performance by preventing institutional sclerosis and fostering adaption, thus establishing condition (ii). Finally, the fourth subsection argues that the positive effects are critical when instability is very low but decrease as instability decreases. Conversely, the negative effects increase with higher levels of instability, establishing condition (iii).

2.1 Institutions and Institutional Instability

This subsection will first discuss various perspectives on institutions, leading to multiple characterizations of their role in society and the economy. Next, building upon these perspectives, it will explore different possible definitions of institutional quality and how they result in different definitions of institutional instability.

In economics, institutions are often defined as 'humanly devised constraints that shape human interaction' or, more succinctly, 'the rules of the game' (North, 1992, p. 477). Their primary function is to make the behavior of others more predictable: Without any rules, rational and self-interested agents could breach contracts or claim other people's property to gain a personal advantage. In such an environment, making contracts, saving goods, or cooperating with strangers would be maladaptive without taking additional action to ensure that contracts will be enforced and personal property retained. Hence, without institutions, the members of a society have less trust in one another and face increased transaction costs. Conversely, good institutions enable cooperation, economic exchange, and productive behavior (Baumol, 1996).

An interesting alternative framework is the sociological perspective, which regards institutions as the established set of norms and structures that shape the behavior, interactions, and functioning of individuals within a society (Selznick, 1957). In other words, institutions provide meaning to actions, enabling communication between different actors and determining which behaviors are desirable and which are not (Hodgson, 2006). As major influences on individual choices and enablers of social interaction, institutions also affect economic outcomes: for example, when social norms incentivize the individual to work hard, stand out, and discover new ways of production, society as a whole may be more innovative and productive. Conversely, a society whose members are inclined towards conformity and tradition may experience lower

levels of innovation and productivity (e.g., Gorodnichenko & Roland, 2017). Hence, starting from different views on the function of institutions, the economic and the sociological perspectives focus on different kinds of institutions: The economic perspective emphasizes the role of formal institutions such as laws or economic regulations and their enforcement through the state. In contrast, the sociological perspective places greater weight on informal institutions, such as social norms and cognitions.

These different perspectives influence possible operationalizations of institutional quality, which is generally defined as the efficiency with which institutions perform their functions that enhance the economy (Alonso & Garcimartín, 2013): According to the economic view, institutional quality primarily relates to how well formal rules prevent unsocial behavior, and how well the state enforces them. Conversely, the sociological perspective focuses on the extent to which social norms incentivize self-initiative and innovativeness. Consequently, when describing institutional quality, researchers must determine which institutions are crucial for economic outcomes and, in turn, exclude those that do not have a meaningful impact.

This problem can be addressed either by highlighting the role of particular institutions or by assuming that the institutional system contributes as a whole to economic performance, where the effect of individual institutions is moderated by others. Regarding the first possibility, a prominent study by Acemoglu and Johnson (2005) identified property rights as essential drivers of entrepreneurship and innovation: these rights protect citizens against expropriation by the state, thereby encouraging self-initiative and hard work. Similarly, Acemoglu et al. (2005) argue that strong and diverse parliaments are related to increased economic performance because they hold the government accountable and are less susceptible to rent-seeking by special interest groups compared to one-person rule. Finally, Cooter and Schäfer (2011) claim that the existence of an effective legal system that ensures the enforcement of contracts and prevents corruption is a necessary condition for economic prosperity.[4] Consequently, one option to operationalize institutional quality is to examine the extent to which specific institutions, such as property rights or an effective legal system, are present. This approach is reflected in the frequent use of property

[4] Cf. Glaeser et al. (2004), who argue that economic growth can also occur in a weak institutional system.

rights (e.g., Besley, 1995; Rodrik et al., 2004) or corruption prevention (e.g., Bjørnskov, 2011) as proxies for institutional quality in the literature.

However, this operationalization approach to institutional quality faces fundamental criticism from Ogilvie and Carus (2014), who argue that individual institutions function within a larger institutional context. Therefore, their effect can vary depending on the broader institutional context in which they are embedded: for instance, property rights may only be effective given the co-existence of contracting institutions that facilitate good exchanges between ordinary people and support the development of credit and output markets. Consequently, only looking at a set of particular institutions may not reliably describe institutional quality, as changes in institutions not directly linked to economic performance can influence the impact of this set of institutions, given that institutions are interdependent. In this vein, Rodrik (2008) contends that no single institution or institutional setting universally maximizes economic performance. Instead, 'second-best institutions' tailored to the specific needs of a country often outperform general 'best practices.' From this perspective, institutional quality can only be assessed by studying the institutional system as a whole, and a measure of institutional quality should include multiple institutions simultaneously.[5]

This theoretical debate about the definition and operationalization of institutional quality is, in turn, crucial for the operationalization and measurement of institutional instability, which is generally defined as the instability of institutional quality (Berggren et al., 2012; Hartmann & Spruk, 2021): given the lack of consensus on whether institutional quality can be represented by a few selected institutions or must be assessed by examining the entire institutional system, a measure of institutional instability can either focus on changes in individual institutions or the whole institutional system. This thesis will adopt the latter approach, operationalizing institutional instability as instability within the institutional system as a whole, for the following two reasons:

[5] An example for such a measure may be the International Country Risk Guide (ICRG; The PRS Group, 2024, used by, for example, Berggren et al., 2012), which evaluates political, economic, and financial risks for various countries around the world. Assuming that institutional quality is determined by similar factors as such institutional risks (e.g., the reduction of uncertainty or the enhancement of cooperation), the ICRG can estimate the quality of the institutional system as a whole without reducing it to a few selected institutions.

(1) The current state of knowledge may not permit a confident decision about whether summarizing institutional quality with a limited number of institutions is feasible. In this case, using a measure that encompasses as many dimensions of the institutional system as possible may be a more conservative choice, as it likely reduces the extent of potential bias: When employing a multidimensional measure, possibly including institutions that could not be directly relevant to the economy can introduce noise, which makes the results less precise. However, assuming that these redundant institutions are, on average, not more or less unstable than those that are, in fact, relevant to the economy, their inclusion is unlikely to introduce systematic bias: this random noise should cancel out across different countries and time points. In turn, omitting institutions that are actually relevant can lead to omitted variable bias and inconsistent estimates (Wilms et al., 2021).

(2) Measuring institutional instability over time using a very limited number of variables is likely to characterize it as a phenomenon that is absent in most years but takes extremely high values at specific points in time. This is because changes in variables such as property rights are relatively rare. However, such a characterization may misrepresent the nature of institutional instability and change, which often occurs gradually, for instance, due to the reinterpretation of existing regulations or lobbying for changes in formal institutions (Lindner, 2003). In contrast, a variable based on a variety of institutions can still exhibit peaks during periods of high institutional instability but offer a more nuanced view when instability is low.

Before inquiring into the direction of the relationship between institutional instability and economic performance, it is worth discussing whether institutional instability, defined as variation in institutional quality, can independently induce changes in economic performance. Once more, two conceptualizations are possible: First, institutional instability may simply be a byproduct of changes in institutional quality. In this case, its relationship with economic performance is not causal but correlational, as both share institutional quality as a common determinant. Then, however, the scope of the present thesis would be mistaken: here, investigating the determinants of positive and negative trends in institutional quality would be

more warranted and explain why institutional instability and economic performance are positively (when institutions generally tend to change for the better) or negatively (when institutions generally tend to change for the worse) correlated.

Yet, second, the level of institutional instability may determine the extent to which changes in institutional quality can occur and potentially affect the likelihood of an increase or decrease in institutional quality of these changes. Then, a study about the effect of changes in institutional quality on economic performance also has to look at institutional instability. Consequently, by studying a presumed distinct effect of institutional instability on economic outcomes, this thesis is based on the assumption that institutional instability does not just reflect but also enables or even induces changes in institutional quality. Otherwise, studying the determinants of positive institutional change without specifically pertaining to instability may be more sensitive.

The following two subsections aim to establish this assumption while making a case for the coexistence of both positive and negative effects of institutional instability on economic performance. In short, they argue that (i) the stability of institutions depends on how well they perform their functions for the economy, which in turn determines their quality, (ii) the likelihood of improvements in institutional quality varies with the degree of institutional instability, and (iii) institutional instability creates distinct incentives, such as encouraging lobbying to change the institutional system rather than investing effort in productive activities. This, in turn, should bolster the assumption that institutional instability induces changes in institutional quality.

2.2 Negative Effects of Institutional Instability on Economic Performance

Building on the research regarding the role of institutions in society and the economy reviewed above and further literature on human decision-making and rent-seeking, this section argues that institutional instability negatively affects economic performance. Initially, note that the functions performed by institutions for the economy, such as constraining unsocial behavior and providing mutual understanding between agents, generally require a stable institutional setting: Even if the current institutional system effectively constrains unsocial behavior or facilitates social interaction, these functions become ineffective if they are not expected to persist, given that no rational agent will enter contracts that cannot be enforced or save resources that may be

expropriated in the future (Campos & Nugent, 2002). Conversely, suppose the current system does not prevent contract breaches or property theft but is expected to do so in the future: in that case, cooperation will only evolve once institutions protecting contract enforcement and property rights are established. Hence, institutions protecting individuals from betrayal and expropriation must persist over time for the institutional system to benefit the economy. In turn, any instability in these institutions will negatively impact economic performance. However, note that this argument applies primarily to countries with institutional systems that already include such protective measures and may not be relevant to countries with low institutional quality.

However, institutional instability may decrease economic performance independently of the current institutional setting's quality by increasing uncertainty. Generally, by constraining unsocial behavior and expropriation, and enabling communication, institutions make the behavior of other agents more predictable and reduce transaction costs. When the institutional setting changes, these capabilities can either be improved or deteriorated. Yet, given that agents tend to be risk-averse and assign greater weight to potentially adverse outcomes (Kahneman & Tversky, 1979), uncertainty about the future behavior of co-agents or contract enforcement may decrease economic performance, as individuals could abstain from cooperation, saving behavior, and investments.[6]

Finally, Grossman (1991) suggests that institutional instability leads to inefficiencies due to misaligned incentives: Rational agents focus on their own goals and will choose the most efficient means to attain them. Therefore, they may attempt to influence future institutional changes in their favor (Przeworski, 1991). Yet, this increased effort in lobbying and bargaining diverts resources away from socially beneficial activities, such as producing goods and services. Conversely, when institutions are stable, the incentives for lobbying are limited, and rational agents should devote more effort to productive activities. However, note that this negative effect

[6] Notice that this argument about risk-aversion typically pertains to the behavior of individual agents. On an organizational level, an interesting counterargument that has apparently not been considered in the literature on institutional instability so far is that firms may exhibit risk-seeking behavior, for example, if they expect state bailouts (Laffont & Tirole, 1993). In this case, particularly foreign firms may invest more in countries with high institutional instability. However, this argument appears less applicable to domestic firms, as the same institutions responsible for bailouts may also be subject to instability, and it primarily concerns major losses that threaten a firm's survival. Lastly, also note that economic theory generally assumes that firms are also risk-averse (e.g., Pratt, 1975).

may only occur (Hartmann & Spruk, 2021) or be more pronounced (Przeworski, 1991) when institutional instability is persistent. In this case, agents begin perceiving any new institutional setting as unstable and overturn to attempt them, leading to a reinforcing cycle of instability that continuously hampers economic performance.

Hence, in summary, good reason exists to believe that institutional instability negatively affects economic performance: It can destabilize well-functioning institutions, increase transaction costs and reduce cooperation by inducing uncertainty, and incentivize actors to allocate fewer resources to productive activities and more to lobbying and other efforts to change the institutional system. These arguments are mainly derived from the theoretical literature on the functioning of institutions and often highlight inefficiencies due to high transaction costs or a suboptimal resource allocation that could be avoided with stable institutions. Furthermore, the economic losses resulting from the self-reinforcement of institutional instability also indicate a dynamic negative effect of instability on economic performance.

2.3 Positive Effects of Institutional Instability on Economic Performance

Despite these adverse effects, institutional instability may also influence economic outcomes positively. First of all, note that instability within the current institutional system can not only lead to an increase in institutional quality but is a necessary condition for such an increase. Conversely, the same naturally holds for a decrease in institutional quality as well. However, institutional instability may result in positive economic outcomes if increases in institutional quality occur more frequently than decreases. This assumption is supported by mechanisms such as Hayekian experimentation (Hayek, 1973): According to Hayek, social phenomena, such as institutional arrangements, are best understood as complex adaptive systems composed of various parts (i.e., individual institutions) interacting with one another and their environment, including competing institutional arrangements (e.g., in foreign countries). Competition between these arrangements may trigger a discovery process where different ways of regulating social and economic affairs are tested concurrently, with the most effective ways ultimately being selected. Thus, innovations that may affect individual institutions and subsequent feedback loops that assess their impact on economic performance could enable societies to improve institutional quality incrementally,

provided that institutions are, to some degree, unstable.[7] Then, institutional instability will have a positive effect on economic performance.

The theory of Hayekian experimentation is supported by concrete examples of economic development in South Korea during the 20th century and China in the 21st century: According to Kong (2000), South Korea's transformation from an agricultural to an industrialized economy required substantial changes within its initially pre-industrial institutional framework. This need for reform was successfully addressed by deliberately inducing a certain degree of institutional instability through promoting local experimentation and incrementally implementing solutions that proved effective in practice. This approach enabled South Korea's economy to persist while facing both internal (e.g., labor unrest) and external challenges (e.g., competition with other emerging economies such as Japan). Similarly, China's shift from a planned economy to a modern market economy benefitted from decentralizing decision-making power, encouraging local experimentation, and scaling up successful solutions, which led to incremental change in the countries' institutions and governance (Jing, 2017). Thus, by maintaining a certain degree of institutional instability, China improved its institutional quality, which enabled high economic growth rates over decades. Although these cases cannot provide more than anecdotal evidence, they demonstrate that Hayek's principle of experimentation and incremental adaptation can be effective in practice, and that keeping institutions somewhat unstable can be a viable strategy to enhance economic performance.

Furthermore, theories about the nature of institutional change also support the notion that institutional instability tends to improve institutional quality: Besides identifying better institutional systems, institutional instability may, in many cases, improve and not worsen institutional quality, given that is most frequently occurs via unilateral re-interpretation of formal regulations that are not opposed by other parties: According to Lindner (2003), who, in turn builds

[7] For this argument to be valid, it is assumed that the primary goal of the competition is to maximize economic growth: only then, natural selection will choose institutional settings that enhance economic performance. This assumption seems to be fulfilled for the investigation period of this thesis (1960 to 2019), as governments worldwide prioritized economic growth during the second half of the 20th and the beginning of the 21st century (e.g., Sachs, 2005). Similarly, global surveys usually state that the public cares about economic development (Inglehart & Welzel, 2001).

on the theory of path dependence (North, 1990), institutions tend to develop along narrow paths that were set during historical caesuras. For instance, the differential colonial policies of Spain and Britain may have set Latin and North America on distinct paths, encouraging either mercantilism and trade restrictions or free trade and self-governance (North et al., 2000). In what followed, both institutional systems became very stable, and subsequent changes mostly refined the basic institutional framework rather than challenging it: in North America, institutional changes mostly reinforced free trade, and in Latin America, they reinforced trade barriers. Such rigidity is primarily due to so-called 'reinforcement mechanisms' that make the current institutional system resistant to change (Pierson, 2000): for example, the interdependence of many institutions makes changing one particular institution difficult, as side effects on the functioning of other institutions require further adjustments, making any institutional change a major endeavor.

Hence, given this rigidity, institutional change is mainly likely to occur through undisputed unilateral or joint reinterpretations of formal regulations (Lindner, 2003), which mostly happens when the change at hand benefits at least one group without significantly disadvantaging most others. Yet, in these instances, institutional change will probably increase rather than decrease economic outcomes, as groups that would see their productivity reduced are more likely to oppose rather than support or remain indifferent to the change, thwarting an undisputed unilateral or joint reinterpretation. Thus, besides Hayekian experimentation, Lindner's (2003) and Pierson's (2000) characterization of institutional change also suggests that a certain degree of instability can benefit economic performance, as it mainly manifests itself as Pareto-efficient improvement.

Finally, institutional instability may also contribute to economic performance by preventing 'institutional sclerosis' (Olson, 1982): When states experience extended periods without significant shocks disrupting their organization and institutions, they tend to accumulate an increasing number of so-called 'distributional coalitions'. These groups try to establish and later defend regulations that benefit themselves, regardless of the consequences for society at large. According to Olson (1982), these coalitions tend to be conservative in nature and promote institutional rigidity to maintain their benefits. Over time, the influence of such distributional

coalitions leads to a state of high institutional rigidity that is incapable of adapting to new circumstances.

Olson (1982) demonstrates his theory using three historical examples: First, he attributes the decline of the Roman Empire in the face of external pressure to, among other things, groups such as guilds and military factions that pursued their own interest at the expense of the common good. This led to a state of administrative corruption that rendered the Roman Empire too weak to maintain its existence. Second, according to Olson (1982), the medieval feudal system proved remarkably stable due to the relatively high power of local lords, which led to decentralized decision-making and made it difficult for distributional coalitions to gain traction. Furthermore, it created ample room for economic innovation and development. Finally, Olson (1982) points to the post-World War II period, claiming that countries like Germany and Japan were undergoing major rebuilding and, thereby, shed most of the existing distributional coalitions. This, in turn, laid the ground for their high growth rates afterwards.[8] In contrast, when such coalitions were re-built in Germany until the 2000s, Siebert (1997) posits that the German institutional system became too rigid, as groups such as local labor unions defended extensive labor market regulation and a generous welfare system that was built up in times of high economic growth rates but became too costly once the strong economic development declined, discouraging firms from hiring and imposing too high wages in particular regions. These examples illustrate that excessive institutional stability can hamper economic growth when the institutional system fails to adapt to current demands. Conversely, some degree of institutional instability can prevent institutional sclerosis and, thus, benefit economic growth.

2.4 Evidence on the Relationship Between Institutional Instability and Economic Performance

The previous two subsections showed that institutional instability can either enhance or diminish economic performance, depending on whether the positive or the negative effects are dominant. To date, two empirical studies have studied the relationship between institutional

[8] In turn, Siebert (1997) argues that by the 2000s, Germany's institutional system became too rigid due to re-established distributional coalitions, which caused a period of economic stagnation.

instability and economic outcomes, and may be able to answer the question of whether the positive or the negative effects are more important: First, Berggren et al. (2012) operationalized institutional instability as the variation in political, legal, and social risk scores for individual countries. The authors concluded that institutional instability promotes growth in wealthy countries but impedes it in poor ones. However, these findings were only significant in some model specifications, raising questions about the robustness of these conclusions. Second, Hartmann and Spruk (2021) examined changes in the political system (e.g., how participatory the executive branch in a particular country was), and found that the negative effects of institutional instability, on average, outweighed its potential benefits.

The differing results of these studies may be attributed to variations in their designs. Berggren et al. (2012) analyzed data from 1984 to 2004, considering five-year intervals, while Hartmann and Spruk (2021) utilized data spanning from 1820 to 2020, divided into ten-year periods. Hence, Hartmann and Spruk's (2021) study may assign greater weight to the long-term effect of institutional instability. Furthermore, Berggren et al. (2012) controlled for common growth factors such as investment and trade openness (following Barro, 1991), which are unavailable for pre-1960 years. Hartmann and Spruk (2021) tried to tackle this issue by accounting for population-related and geographic factors. Thus, the distinct methodologies of these studies come with their own potential limitations, such as the shorter timeframe of Berggren et al. (2012), which neglects long-term effects, or the lack of critical control variables in Hartmann and Spruk (2021), which could result in wrongly attributing effects caused by other factors to institutional instability.

Apart from these two studies on institutional instability, several related studies focus on the related construct of political instability, defined as the propensity for change in a country's government or political system (Feng, 1997). Most studies about the relationship between political instability and economic outcomes detect a negative association: for instance, Alesina et al. (1996) reached the conclusion that higher levels of political instability are associated with lower GDP levels per capita, which was reinstated by Aisen and Veiga (2013), who reported a negative effect of political instability on productivity levels. Yet, note that the operationalization of political instability in these studies mainly refers to periods of political unrest or the occurrence of coups d'état. This operationalization may overemphasize negative aspects of political

instability while neglecting potential positive effects, such as replacing inefficient governments or political structures. Indeed, such arguments are backed up by Feng (1997), who differentiated between different types of government change (e.g., regular government change and coups d'état) and concluded that instability involving drastic changes was indeed related to lower growth rates, while regular government change was related to increased growth rates afterwards.

Overall, the existing literature points to a non-trivial relationship between institutional or political instability and economic performance: The results by Berggren et al. (2012) state that instability is positively associated with growth, but only if it concerns a particular kind of institution (legal institutions) in prosperous countries (Berggren et al., 2012). Furthermore, the results by Feng (1997) support the idea that a moderate level of instability in political institutions can benefit growth, too. Conversely, according to Hartmann and Spruk (2021), institutional instability generally negatively affects economic outcomes. Still, note that their findings were obtained without controlling for factors such as openness to foreign trade or investments, which are important determinants of growth (Barro, 1991) and may also influence institutional development, particularly in the case of openness to foreign trade. Finally, high instability in political institutions is consistently linked to decreased economic performance (e.g., Aisen & Veiga, 2013; Alesina et al., 1996; Feng, 1997).

Together, these studies suggest that both the positive and negative effects of institutional instability on economic performance can be critical in different circumstances. However, they do not reveal at which points the positive or the negative effects dominate. Therefore, the remainder of this thesis proposes and tests a hypothesis that may reconcile this theoretical and empirical ambiguity: the relationship between institutional instability and economic performance follows an inverted-U shape. Such a shape suggests that the optimal level of instability for economic performance strikes a balance between excessive rigidity and instability.

2.5 Institutional Instability and Economic Performance: A Inverted-U-Shaped Relationship?

To establish the notion of an inverted-U relationship, this subsection argues that both positive and negative effects exhibit diminishing marginal returns. Consequently, positive effects dominate at low levels of institutional instability, while adverse effects dominate at high levels.

This means that when institutional instability is very low, economic performance benefits from an increase in instability. Conversely, when institutional instability is very high, economic performance improves as instability decreases.

Recall that institutional instability may decrease economic performance by undermining growth-enhancing institutions such as property rights, inducing uncertainty and higher transaction costs, and incentivizing resource allocation toward lobbying rather than productive purposes. The latter two effects appear to be subject to diminishing returns. Regarding uncertainty, the relationship between institutional instability and induced uncertainty does not follow a linear pattern, as far as the current theoretical and evidential stance about risk-aversion in human decision-making is concerned: According to prospect theory, people tend to overweight small risks and relatively underweight larger risks as the degree of risk or uncertainty increases (Kahneman & Tversky, 1979). Consequently, when institutional instability increases uncertainty, these increases are typically higher when the initial level of instability is low. Conversely, when the initial level of instability is high, the same increase in uncertainty has a much smaller impact.

Similarly, the positive effects of institutional instability on economic performance do also not require excessive levels of instability to manifest their growth-enhancing potential: On the contrary, particularly Hayekian experimentation may instead necessitate a modest level of change so that positive developments can be attributed to a particular difference or change within the institutional system. Strikingly, the case studies of South Korea (Kong, 2000) and China (Jing, 2017) attribute improvements in institutional quality to gradual and incremental change and not to a major upheaval in institutional development. Thus, the positive effects of systematic experimentation and institutional improvement may not increase linearly with instability. Instead, such benefits may diminish when instability becomes too high. This pattern may also apply to institutional changes commonly achieved through undisputed unilateral or joint reinterpretation of existing rules (Lindner, 2003; Pierson, 2000), as these changes are typically 'on-path' and align with broader trends in institutional development (such as strengthening of free trade in North America; North et al., 2000).

However, concerning the prevention of institutional sclerosis, it is questionable whether the marginal benefits decrease as institutional instability increases: On the one hand, Olson's (1982)

theory posits that distributional coalitions emerge when a state's political system or power structure remains stable for long periods. Then, even moderate levels of institutional instability may not suffice to prevent institutional sclerosis, leading to a scenario where the marginal benefits of preventing sclerosis increase rather than decrease with higher instability. On the other hand, studies on the long-term effects of major institutional change often indicate a detrimental impact on economic performance (e.g., Alesina et al., 1996; Feng, 1997), which contradicts Olson's (1982) theoretical argument. Additionally, theories on lobbying cycles suggest that lobbying power is challenged by reform-oriented groups when it becomes too dominant. These counter-groups provide a self-correction mechanism that does not necessarily depend on major political changes (e.g., McFarland, 1991). Hence, institutional sclerosis may not only be prevented by major upheavals but also by consistent instability that allows various groups to influence decision-making processes, reducing the power of distributional coalitions. Thus, regarding institutional sclerosis, the existence of decreasing marginal benefits appears theoretically more ambiguous than in the case of Hayekian experimentation.

Finally, the idea of an inverted-U-shaped relationship between institutional instability and economic performance may reconcile some of the seemingly contradicting findings from previous studies: Recall that Berggren et al. (2012) reported a positive effect of institutional instability on economic performance in rich countries and a negative effect in poorer countries. Given that institutional instability was generally lower in poorer countries,[9] it may be possible that the rich countries experienced a level of instability where the positive effects dominated, while poorer countries experienced a level where the negative effects were more pronounced. Furthermore, the idea of an inverted-U-shaped relationship aligns with the finding by Feng (1997) that regular government change, which may represent a moderate level of instability, is related to increased growth, while irregular government change (e.g., coups d'état), which aligns with major institutional instability, is related to suboptimal outcomes, like the absence of government change, which could represent very low institutional instability. Still, note that the idea of an

[9] This invites concerns about reverse causality, which are addressed in the fifth section.

inverted-U-shaped relationship is challenged by the findings of Hartmann and Spruk (2021), who instead find a linear negative effect of institutional instability on economic performance.

Given that the existing studies about the relationship between institutional instability and economic performance did not test for an inverted-U-shaped relationship, the present thesis will perform this test. Its methodology is described in the next section.

3 Methods

This section describes the empirical strategy for studying the relationship between institutional instability and economic growth. The first subsection formulates five desiderata that a study about this relationship should fulfill. Then, the second subsection describes the operationalization and measurement of institutional instability, and the third subsection introduces the control variables and the dependent variable. Finally, the fourth subsection describes the statistical analyses.

3.1 Desiderata for an Investigation of the Relationship Between Institutional Instability and Economic Outcomes

According to Berggren et al. (2012), an empirical test of the relationship between institutional instability and economic growth should fulfill three conditions:

(i) Acknowledge the multidimensionality of institutional quality: Institutional quality encompasses multiple components, such as the rule of law, bureaucratic efficiency, and control of corruption, and may only be assessable based on the institutional system as a whole (see above). Therefore, Berggren et al. (2012) advocate for an operationalization that incorporates several of these dimensions.

(ii) Account for the trend in institutional quality: While an increase in institutional quality likely increases economic growth, it also necessarily induces institutional instability. In such cases, institutional instability results from a positive trend in institutional quality.[10] However, institutional instability can also occur independently of any general trend and

[10] A similar reasoning applies to a decrease in institutional quality.

be a distinct source of improvements or deteriorations of institutional quality (see above). An empirical study should, therefore, account for the general trend in institutional quality so that institutional instability caused by these trends is not wrongly identified as a distinct driver of economic outcomes.

(iii) Allow the effects of institutional instability to vary according to the wealth of different countries: The positive and negative effects of institutional instability on growth rates may vary as a function of a country's wealth. For instance, in poorer countries with lower institutional quality, institutional instability could induce positive change by destabilizing the current inefficient configuration. Conversely, in wealthier countries, this destabilization may affect a more efficient institutional setting, potentially reducing its quality. Therefore, estimating the relationship between institutional instability and economic growth separately for richer and poorer countries appears sensible.

The three conditions by Berggren et al. (2012) seem reasonable but not exhaustive: besides incorporating the multidimensionality of institutional instability, the role of trends, and the wealth of a country, an empirical strategy should also:

(iv) Include a sufficient time frame: As laid out above, the effects of institutional instability on economic growth may work on different time scales: On the one hand, particularly the negative effects (e.g., an increase in uncertainty after an institutional change) may manifest rather quickly and only be short-term in nature. On the other, positive effects (e.g., preventing institutional sclerosis or arriving at a more efficient configuration after Hayekian experimentation) may require a lag of several years for their impact on growth rates to become visible. Still, this also holds for potential negative effects due to persistent institutional instability. Hence, analyzing the effects of institutional instability on economic growth requires looking at a longer time frame.[11]

(v) Differentiate between linear and non-linear institutional change: Institutional instability can result not only from unidirectional changes but also from back-and-forth shifts. For example, although the institutional system of countries worldwide developed toward

[11] This requirement is not fulfilled by the study by Berggren et al. (2012), who only investigate five-year periods.

democratic ideas during the past 200 years, this process was not always linear. Instead, many countries showed large fluctuations in relatively short periods: For example, Germany introduced a democratic constitution in 1919, reverted to autocratic rule in the early 1930s, and became a totalitarian dictatorship in 1933. Between 1945 and 1949, it was governed by its liberators before returning to democratic rule, which continues to this day. A measure of institutional change should be capable of differentiating such back-and-forth from a linear development, and relate a back-and-forth to higher institutional instability.

In what follows, the empirical strategy of the present thesis will be presented and evaluated in accordance with these five desiderata.

3.2 Predictor of Interest: Institutional Instability

3.2.1 Data Source

To measure institutional instability, information from the Varieties of Democracy (V-Dem) dataset (v13; Coppedge et al., 2024) was utilized. The V-Dem dataset was designed to measure multiple aspects of democracy across countries worldwide. Yet, its 820 items do not only pertain to aspects commonly associated with democracy, such as electoral rights, separation of powers, or equality before the law but also address the overall functioning of the political system (e.g., corruption control, trust in the government) and the economy (e.g., property rights, freedom of the market). Thus, the V-Dem items cover a broad range of institutional features, spanning both de jure and de facto institutions. Particularly for the items concerning de facto institutions, which often are not purely descriptive (such as whether the head of state is directly elected), V-Dem relies on expert coding, typically involving between five and seven experts per country. All items are coded on an annual basis, dating back to 1789.

The 820 (low-level) items of the V-Dem dataset are summarized into 21 mid-level indices that measure, among other things, the degree to which the political system fulfills the ideals of electoral, liberal, and participatory democracy, the effectiveness of the legal system, and the prevalence of corruption. In turn, some of these 21 mid-level indices are aggregated into five high-level indices. All mid-level indices are scored on a scale from 0 to 1, with higher scores indicating

a greater presence of the corresponding attribute in a particular country. Detailed information about the items, mid-level indices, and the aggregation structure can be found in the V-Dem codebook (Coppedge, Gerring, Knutsen, Lindberg, Teorell, Marquardt, et al., 2024).

The present study used the mid-level indices to calculate institutional instability. This decision was made to avoid overstating the influence of the constitution compared to the political culture in a country: First, a high number of the V-Dem (low-level) items refers to specific properties of the constitution. In turn, the number of items about the political culture is lower, as they are rather general (e.g., the degree to which the press can report freely). Thus, formal institutions may receive undue weight when using the (low-level) items without an appropriate correction, potentially resulting in overlooking instability among informal institutions. Conversely, given that the mid-level indices rely on such a weighting scheme, using them avoids assigning too much weight to formal institutions. Second, and relatedly, the quantification of some constructs (e.g., the rule of law) relies on a higher number of items, while other constructs (e.g., participatory democracy) rely on relatively few items.[12] Consequently, if each item is assigned equal weight, constructs based on a higher number of items could be assigned undue weight. This issue is mitigated by using mid-level indices, which assign equal weight to each construct independently of the number of items it comprises.[13]

Altogether, this approach should satisfy Berggren et al.'s (2012) first desideratum, which refers to acknowledging the multidimensionality of the institutional system. The V-Dem data encompasses multiple institutions such as property rights, the rule of law, the functioning of the political and the legal system, and the prevalence of corruption, all of which have been identified as determinants of economic performance before (Acemoglu et al., 2001; Acemoglu & Johnson, 2005; Bjørnskov, 2011; Cooter & Schäfer, 2011; North, 1990; cf. Ogilvie & Carus, 2014).

[12] This problem was first recognized by Berggren et al. (2012), who suggested to use explanatory factor analysis to identify highly correlated items, and summarize them in a common dimension. Essentially, this thesis follows this suggestion when using the mid-level indices that summarize the (low-level) items on both theoretical and empirical grounds (Coppedge, Gerring, Knutsen, Lindberg, Teorell, Marquardt, et al., 2024).

[13] In turn, the mid-level indices were selected over high-level indices because the latter focus exclusively on the state and nature of a country's democracy and exclude some mid-level indices and low-level items relevant to institutional quality (e.g., the two low-level items for property rights for men and women, and the mid-level index for the rule of law).

Furthermore, it covers a broad range of aspects of the political system, particularly those related to democracy. On the one hand, given the debate about whether democratic institutions contribute to economic growth (for a summary of the theoretical debate, refer to Knutsen, 2012; for a meta-analysis of the empirical findings, see Doucouliagos & Ulubaşoğlu, 2008), including these aspects reduces the risk of omitted-variable bias by accounting for potentially relevant institutional features as well. Furthermore, including various democratic aspects aligns with the perspective that institutions are interdependent (i.e., a change in one institution can indirectly affect economic performance by altering the function of another institution; Ogilvie & Carus, 2014). However, the focus of the V-Dem data on democracy may impose a Western-style measurement concept on countries globally.[14]

3.2.2 Dynamic Complexity

As a measure of institutional instability, the present thesis calculated the multivariate dynamic complexity in the 21 V-Dem mid-level indices. Dynamic complexity is commonly defined as the degree to which a system is erratic and unpredictable (Sterman, 2000). In an institutional context, this means that dynamic complexity refers to the unpredictability of the development of the institutional system over time.

Dynamic complexity was initially introduced to the social sciences by Schiepek and Strunk (2010) as a measure to describe change over time that can handle nonlinearity and nonstationarity (unlike, for example, the CoV). The authors suggest to calculate dynamic complexity as the product of fluctuation intensity and distributional sensitivity[15]:

- Fluctuation intensity compares the actual degree of fluctuation in a (part of a) time series to the highest degree possible. Therefore, it first identifies the number of 'points

[14] This weakness is discussed in Section 6.2.

[15] Some authors suggest calculating dynamic complexity using entropy-based measures (e.g., Hsu et al., 2017). These measures quantify the unpredictability of a series as time progresses, based on patterns that emerge after initial data points have been observed: thus, a series that is initially very unpredictable can become more predictable once some values are known. However, to date, no commonly used technique for calculating entropy of multivariate time series seems to exist. Therefore, this thesis employs the product of fluctuation intensity and distributional sensitivity, a method previously utilized for multivariate time series (e.g., by Olthof & Hasselman, 2024).

of return' (i.e., a point where a change in direction). Then, it calculates the highest degree of fluctuation possible given the number of points of return. Finally, the actual degree of fluctuation is divided by the highest degree of fluctuation possible.[16]

- Distribution sensitivity measures the deviation of observed values from an ideal equal distribution over the theoretical range of the scale in a (part of a) time series. This is derived by first sorting all values in the time series (interval) of interest in ascending order. Then, the deviation of these sorted values from a hypothetical linear time series that starts at the theoretical minimum and ends at the theoretical maximum is calculated.[17]

Thus, while fluctuation intensity refers to the strength of back-and-forth movements in a time series, distribution sensitivity assesses how chaotically the values are distributed over the theoretical range of the measurement scale. For the calculation of dynamic complexity, both measures should be included, given the definition of dynamic complexity of unpredictability of a time series: hence, relying on only one measure is insufficient, as a time series with very high fluctuation intensity may still predictably fluctuate between the minimum and maximum values, while a time series with high distribution sensitivity could predictably cover the entire measurement range.

Dynamic complexity was calculated using the dc_win function from the casnet package (version 0.2.2; Hasselman, 2022) in R (version 4.3.3; R Core Team, 2024). For multivariate time series, such as the one constituted by the 21 mid-level indices, this function first calculates the dynamic complexity values for each individual time series. Then, it takes the average to estimate multivariate dynamic complexity. The interval for calculating fluctuation intensity and distributional sensitivity (i.e., the part of the time series considered for the calculation of the highest degree of fluctuation possible or an equal distribution of values) was set to ten years.

[16] For example, in Series 2 of Figure 1 (see two pages below), the highest fluctuation would occur if the series constantly alternates between 1 and 10 at each of the ten points of return (i.e., $(10 - 1) \cdot 9 = 81$, since the ten points of return are connected by nine lines). Yet, the actual degree, determined by the summed absolute differences between the return points, is only 45. Therefore, the fluctuation intensity of Series 2 is 45/81 = .556.

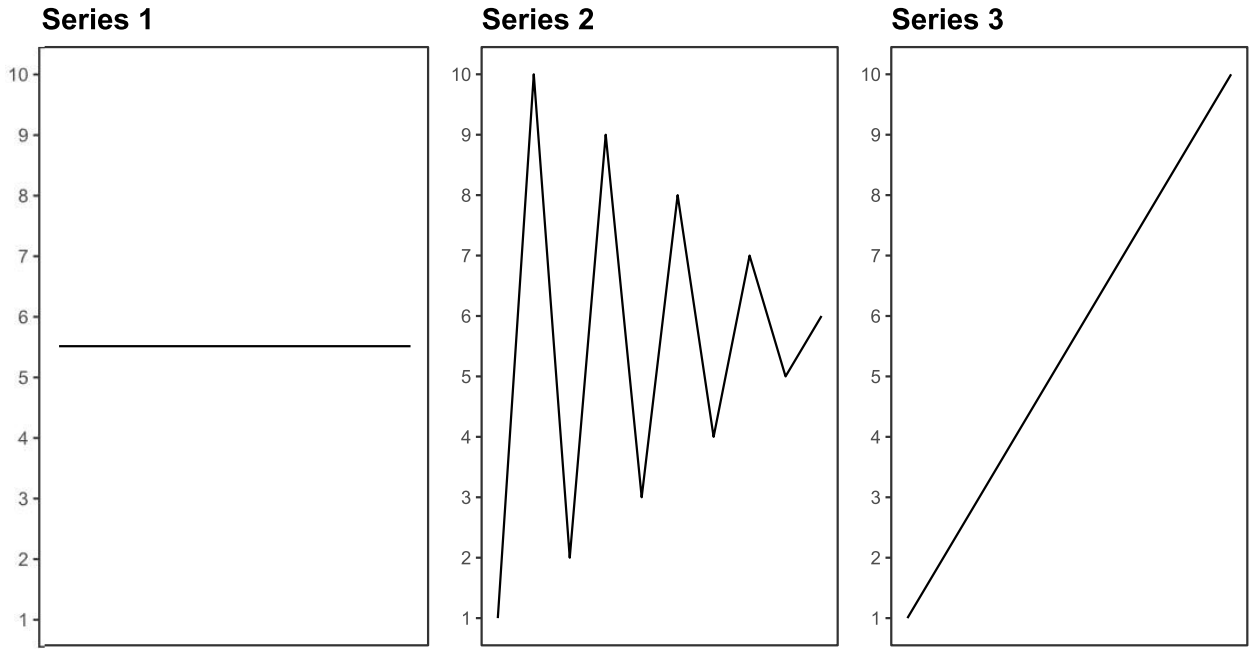
[17] In Figure 1, both Series 2 and 3 have a distribution sensitivity of 1, as they include all whole numbers between 1 and 10 exactly once.

Thus, observations from a given year were combined with the observations from the five preceding and the five subsequent years, with the earliest and latest observations receiving half the weight of the other observations. This choice was motivated by two reasons: First, simulations by Schiepek and Strunk (2010) indicate that this length is a good compromise between sensitivity to the nature of the time series at a particular point in time and robustness to outliers that might otherwise impose overly extreme values. Furthermore, a window length of ten has been shown to be highly correlated with more complex entropy measures, such as the Lyapunov exponent (Lyapunov, 1992), in longer time series.

Using a dynamic complexity approach to measure institutional instability represents a departure from the methodologies of Berggren et al. (2012) and Hartmann and Spruk (2021), who instead relied on the CoV. However, as a measure of instability, dynamic complexity may be superior to the CoV because it can differentiate between linear and non-linear institutional change (desideratum (v)): put another way, dynamic complexity is sensitive to back-and-forth movements in institutional development. This property is visualized in Figure 1: Here, Series 1 shows the trajectory of a measure that remains constant over time. Series 2 depicts a time series that initially fluctuates heavily between high and low values, with the fluctuations decreasing toward the end. Finally, Series 3 illustrates a constant decrease.

Figure 1

Comparison of the CoV and Dynamic Complexity



Note. Series 1 has a CoV and a dynamic complexity of 0. The CoV of series 2 and 3 is 0.550, while their dynamic complexity is 0.556 and 0.012, respectively.

While both the CoV and dynamic complexity for Series 1 are zero, they differ in their assessments of Series 2 and Series 3: The CoV does not detect any differences between the two series, as it only accounts for deviations from the mean value but neglects the temporal order of these deviations. Yet, this insensitivity to the temporal order seems counterintuitive, considering that institutional instability may be perceived as higher in a country where institutional quality fluctuates chaotically (as in Series 2) compared to a country where it consistently increases by the same margin (as in Series 3). In this context, recall desideratum (ii), which pertains to acknowledging the trend in the development of institutional quality: In Series 3, when accounting for the general trend (i.e., a consistent increase in institutional quality), hardly any instability remains. In contrast, Series 2, which does not exhibit a clear trend but rather a high degree of fluctuation, represents a scenario with drastic instability. This more intuitive characterization of Series 2 and Series 3 is captured by the dynamic complexity measure, which assigns a dramatically higher instability value to Series 2 as compared to Series 3, accounting for the back-and-forth in

institutional instability in Series 2. Thus, unlike the CoV, the dynamic complexity measure can differentiate between linear and non-linear institutional change, fulfilling desideratum (v).[18]

Appendix A presents the instability curves for the United States and Russia between 1900 and 2023 to demonstrate the validity of the dynamic complexity approach for quantifying institutional instability. Overall, the instability measure peaks during periods identified in the literature as times of unrest and takes lower values during calmer periods. This indicates good validity and justifies using the dynamic complexity measure in the subsequent analyses.

3.3 Dependent Variable and Control Variables

The dependent variable of the regression model was the yearly economic growth rate between 1960 and 2020. These rates were calculated using data from the Maddison Project Database 2023 (Bolt & van Zanden, 2024).

For the control variables, no consensus seems to exist to date concerning which factors to account for in growth regressions. On the one hand, a myriad of factors independently contribute to economic growth (Sala-i-Martin, 1997), and omitting these factors could lead to biased estimates of the explanatory power of the factors included in the model. On the other hand, several determinants of economic growth, such as education, income level, or current GDP, are correlated. Including all of these determinants may result in multicollinearity and optimization problems (e.g., Farrar & Glauber, 1967). Furthermore, controlling for irrelevant factors could lead to a violation of the assumption of exogeneity in linear regression models, potentially leading to increased standard errors and, consequently, a higher probability of false negatives (Woolridge, 2020).

This thesis tries to solve this dilemma by controlling for the predictors of growth identified by Barro (1991) for a set of 98 countries worldwide. This choice was motivated by three reasons: First, by solely including factors that were robustly found to be related to growth, the likelihood

[18] This property is not only theoretically but also practically relevant: for example, consider the development of Egypt during the 2010s, which transformed from the repressive rule of Hosni Mubarak to a short-lived democracy, and then back to a (military) dictatorship under President Sisi (Trager, 2016). Hence, back-and-forth movements in institutional development can happen in a limited period of time.

of violating the exogeneity assumption is reduced. Second, this limited set of control variables also reduces the likelihood of multicollinearity problems. Third, Barro's (1991) study also laid the groundwork for growth regressions in previous studies about institutional (Berggren et al., 2012) and political instability (Alesina et al., 1996). By using a similar set of control variables, the results of this thesis can be easier compared to the results of previous studies, as confounding influences from controlling for different variables are ruled out.

The control variables, their data sources, and the time frames for which the variables were available are displayed in Table B1. In summary, all regression models control for the initial GDP per capita, investment rates, openness, government shares, inflation, life expectancy, and labor force growth. Additionally, an additional term for education is included in a sensitivity analysis, which was initially excluded due to its high correlation with GDP and life expectancy. This procedure is similar to the one used by Berggren et al. (2012), and should facilitate a comparison of the results of this study and the present thesis. As a significant portion of the control variables is available only from 1960 to 2019, the investigation period is confined to these years.

In addition to these control variables, the regression models include three institutional variables. First, a term for institutional quality is included to account for the baseline state of institutions: given the importance of institutions for economic performance, failing to control for their influence could result in omitted variable bias and potentially biased results for the regression models. To measure institutional quality, the Comprehensive State Capacity Index, developed by O'Reilly and Murphy (2022), was used for three reasons: First, this index is calculated based on a state's capacity to provide public goods, maintain a rigorous and impartial public administration, deliver educational services to all citizens, uphold the rule of law, exercise authority over its territory, and sustain the quality of the fiscal system. These dimensions all appear relevant to economic growth, so the Comprehensive State Capacity Index likely reflects the contribution of institutions to economic performance (i.e., institutional quality). Second, data for the Comprehensive State Capacity Index are available for the entire investigation period from 1960 to 2019, which is not the case for most other indices of institutional quality.

Despite limiting the investigation period to the years between 1960 and 2019, the data still suffered from missing values: for the complete data set starting in 1960, the overall missingness

was 7.6% across all years and variables. Although this overall rate may seem relatively low, some individual countries had drastically higher rates of missing values for specific variables: for example, 14 countries had more than 30% missing values for investment, inflation, and government share. Such high levels of missingness undermine the validity of imputation, as too much information is absent to accurately estimate the missing values (Dong & Peng, 2013; Jakobsen et al., 2017; Madley-Dowd et al., 2019).

To tackle this issue of missing data, all regression models were run with two different data frames. The first data frame consisted of all complete cases (i.e., complete data for a particular country in a particular year) between 1960 and 2019, where imputation was not feasible due to the high missingness, while the second data frame only included the years between 1980 and 2019: as missing cases were more prevalent between 1960 and 1980 than during the subsequent years, no country misses more than 30% of the values of a particular variable in the data spanning the years since 1980, so imputation was possible when only using this period. For this data frame, missing values were imputed using the na.kalman function of the imputeTS package (version 3.3; Moritz & Gatscha, 2022) with the structTS argument. This function first specifies a structural model of the time series, incorporating factors such as baseline level, trends, and seasonal patterns. Then, it estimates the parameters for the missing values by maximizing the likelihood function given the observed data, and smooths these estimates to align with surrounding observations. This imputation procedure performed best compared to other multiple imputation procedures and delivers reliable estimates even in the presence of long-range dependency or non-normal distributions (Velicer & Colby, 2005).

3.4 Statistical Analysis

The empirical relationship between institutional instability and economic growth rates was modeled using panel regression models. Panel regression models can be divided into two different approaches: fixed-effects and random-effects models. While fixed-effects models assume that time-constant factors and regressors are correlated (e.g., that a country-specific effect like geography is correlated with, for instance, openness to foreign trade), random-effects models assume that such correlations do not exist. Given that this assumption of random-effects

models may likely be violated in the present regressions, this thesis employed fixed-effects panel regressions, including fixed effects for both time and countries (as recommended by Temple, 1999).

Fixed-effects models are particularly suitable for the regressions performed in this thesis because they account for time-constant unobserved heterogeneity between countries (e.g., different natural resource endowments that cause differences in growth rates between countries) and across different time periods (e.g., when a global economic shock affects growth rates during a specific period). Additionally, fixed-effects models are also robust against omitted-variable bias and mitigate concerns related to inter-country differences in growth regressions (Brüderl & Ludwig, 2015; Temple, 1999). Finally, choosing fixed-effects models (as compared to random-effects models) is also supported by Hausman tests (Hausman, 1978), which rejected the null hypothesis that time-constant factors and regressors are uncorrelated for every model ($p <$ .01 for all tests).

All regression models were estimated in R (version 4.3.3; R Core Team, 2024), using the plm package (version 2.6-4; Millo, 2017). Given the choice of fixed-effects models, regression models, as shown in Equation (1), were estimated:

$$Growth_{i,t} = \alpha + ß \times X_{i,t} + \gamma \times Qual_{i,t} + \delta \times Trend_{i,t} + \zeta \times Instab_{i,t} + \eta_i + \theta_t + \varepsilon_{i,t} \quad (1)$$

In this equation, α represents the constant term, and $ß$ denotes the vector of the non-institutional control variables described above for a particular country *i* at a particular time *t*. $Qual_{i,t}$ represents institutional quality, $Trend_{i,t}$ denotes the trend in institutional quality (i.e., how much institutional quality changed in the investigation period), and $Instab_{i,t}$ represents the level of institutional instability. η_i denotes the country-specific fixed effects, and ϑt the time-specific fixed effects. Finally, $\varepsilon_{i,t}$ represents the error term (i.e., the influences on growth rates that the other terms in the model cannot explain).

In the regressions reported in the next section, the investigation period was set to twenty years. This length was based on the findings of Hartmann and Spruk (2021), who showed that the effect of institutional instability on economic growth rates becomes larger with longer time periods and

is maximized when using a period of twenty years. Hence, this time interval may incorporate both the short-term and long-term effects of institutional instability. These twenty-year periods formed the individual observations to analyze the relationship between institutional instability and economic growth. Hence, the empirical strategy meets desideratum (iv), which emphasizes the necessity of examining the effect of institutional instability over a sufficiently long period to account for all long-term effects.

Finally, in light of desideratum (iii), which recommends analyzing the relationship between institutional instability and economic performance separately for richer and poorer countries, and considering the differential findings for these country groups by Berggren et al. (2012), the present thesis reports results not only for the entire sample but also stratified by country wealth. Hereby, poorer countries include those with a GDP per capita below the median in 1960 (for analyses spanning the years between 1960 and 2019) or below the median in 1980 (for analyses spanning the years between 1980 and 2019). Richer countries comprise all countries with a GDP per capita above the median.

4 Results

This section reports the results of the regressions of the association between institutional instability and economic growth rates. The first part presents the results for the whole sample. The second part describes the results stratified for poorer and richer countries.

4.1 Results for the Whole Sample of Countries

Table 1 displays the results for the entire sample of countries. Hereby, column (1) presents the results for the basic regression model with a linear but not a quadratic term for institutional instability. First, the direction of most control rates aligns with the results reported by Barro (1991): A higher investment rate (b = 0.069, SD = 0.034, p = .042) and a lower inflation rate (b = -0.003, SD = 0.001, p < .001) were significantly associated with higher growth rates. However, the relationship between growth rates and the log GDP per capita in 1960, openness to foreign trade, the government share in the economy, life expectancy, and labor force growth was not

significant.[19] Yet, the coefficients at least pointed in the same directions as those reported by Barro (1991).

[19] A likely explanation for the insignificance of these relationships in the present analysis is that these predictors could be correlated with one another and with institutional instability. Unfortunately, the plm package (version 2.6-4; Millo, 2017), which was used to conduct the fixed-effects regressions, currently does not offer a function to calculate the variance inflation factor, which would have allowed to assess the plausibility of this explanation by measuring the amount of multicollinearity (Marquardt, 1970).

Table 1

Regressions of Association Between Institutional Instability and Growth Rates of GDP per Capita

	Data since 1960				Data since 1980			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log GDP	-0.002	-0.002	-0.003	-0.003	-0.003	-0.004	-0.006	-0.006
Investment rate	0.069*	0.064+	0.071*	0.065+	0.060+	0.058+	0.061+	0.059+
Openness	0.002	0.000	0.000	-0.001	0.012	0.010	0.009	0.008
Government expenditures	-0.032	-0.044	-0.032	-0.048	-0.039	-0.044	-0.041	-0.045
Inflation	-0.003***	-0.003***	-0.003***	-0.003***	-0.003**	-0.003**	-0.003**	-0.003**
Life expectancy	-0.000	-0.000	-0.000	-0.001	0.000	0.000	0.000	0.000
Labor force growth	0.000	0.000	0.000	0.000	0.000	0.000	-0.000	0.000
Secondary schooling			0.000	0.000			0.000	0.000
Institutional quality	0.013***	0.013***	0.013***	0.012***	0.012***	0.011***	0.011***	0.011***
Institutional quality trend	0.004*	0.004*	0.004*	0.004*	0.005**	0.001***	0.006***	0.006***
Institutional instability	-2.295**	-6.256*	-2.400**	-6.224*	-2.164**	-5.111*	-2.317**	-5.035*
Institutional instability squared		481.081+		468.026+		352.156		326.72
Observations	201	201	201	201	219	219	219	219
Countries	102	102	102	102	116	116	116	116
R^2	.456	.475	.459	.476	.502	.512	.509	.518
F statistic	7.473***	7.226***	6.784***	6.583***	9.376***	8.784***	8.679***	8.147***
Hausman test	44.853***	47.293***	23.656***	38.326***	41.981***	44.833***	37.977***	40.109***

Note. Columns (1) and (5) present the results for the primary regression analyses for the data from 1960 to 2019 and 1980 to 2019, respectively. Columns (2) and (6) add a term for squared institutional instability. Columns (3), (4), (7), and (8) repeat these analyses, additionally controlling for education. +$p < .01$, *$p < .05$, **$p < .01$, ***$p < .001$

Regarding the institutional variables, higher institutional quality was significantly associated with higher growth rates (b = 0.013, SD = 0.003, p < .001). Similarly, a positive trend in institutional quality (i.e., an increase in institutional quality during the twenty-year period) was related to higher growth rates (b = 0.004, SD = 0.001, p = .024). Finally, a higher level of institutional instability was significantly associated with lower growth rates (b = -2.295, SD = 0.858, p = .009). Specifically, the model predicted that an increase in institutional instability of one standard deviation is related to a decrease in annual growth rates of 0.6%.

Overall, the model indicated that institutional instability has a meaningful and significant negative effect on economic growth. This result also holds true after controlling for education in column (3), performing the same analysis on imputed data for the years from 1980 to in column (5), and when using data for the years from 1980 to 2019 and controlling for education in column (7).

Compared to the model presented in column (1), the model reported in column (2) did not only test for a linear but also for a quadratic relationship between institutional instability and economic growth rates. Again, a higher investment rate was marginally significantly related to higher growth rates (b = 0.064, SD = 0.033, p = .058), while a higher inflation rate was associated with decreased growth (b = -0.003, SD = 0.001, p < .001). The log GDP per capita in 1960, the share of imports and exports and of government expenditures in the GDP, life expectancy, and labor force growth rates were not significantly related to growth rates. Nevertheless, their coefficients pointed in the expected directions (i.e., they were in line with the results by Barro, 1991).

Notwithstanding the inclusion of the squared term for institutional instability, institutional quality remained a significant predictor of growth rates (b = 0.013, SD = 0.003, p < .001). The same held true for the trend in institutional quality (b = 0.004, SD = 0.002, p = 0.015). A higher level of institutional instability (not squared) was still significantly related to decreased growth rates (b = -6.257, SD = 2.426, p = .012). Ultimately, the squared term of institutional instability was marginally significant (b = 481.081, SD = 275.886, p = .085). However, the positive coefficient points to a U-shaped rather than an inverse-U-shaped relationship.

The main results of the model with the squared term remained unchanged when additionally controlling for education: a higher level of institutional instability was still associated with lower

growth rates, and the squared term remained marginally significant, potentially indicating a U-shaped relationship. However, when using the data from 1980 to 2019, the squared term for institutional instability became insignificant. Despite this, the models consistently pointed to a significant negative effect of institutional instability on economic growth. Thus, in total, the results provide ample support for a negative relationship between institutional instability and economic growth. Furthermore, some findings do not preclude the possibility of a quadratic yet U-shaped relationship, but this relationship is not reliably detected.

4.2 Results Stratified for Poorer and Richer Countries

While the results reported in the previous subsection pertain to the entire sample of countries, this subsection provides the results for the subsample of poorer and more prosperous countries. The first part concerns the poorer countries, and the second part is about the richer countries.

4.2.1 Poorer Countries

The left half of Table 2 reports the results for the subsample of poorer countries. Column (1) presents the results for the model based on data from 1960 to 2019 that did not yet include a squared term for institutional instability. As in the main analyses, a higher investment level was positively related to economic growth (b = 0.110, SD = 0.049, p = .031). Conversely, a higher level of inflation was associated with decreased growth levels (b = -0.004, SD = 0.001, p = .005). The log of GDP per capita in 1960, the share of imports and exports in total GDP, the share of government expenditures, life expectancy, and labor force growth were not significantly associated with growth rates.

Table 2

Regressions of Association Between Institutional Instability and Growth Rates of GDP per Capita for Poorer and Richer Countries

	Poorer countries				Richer countries			
	Data since 1960		Data since 1980		Data since 1960		Data since 1980	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log GDP	-0.002	-0.002	-0.003	-0.003	0.005	0.010	-0.007	-0.008
Investment rate	0.110*	0.102*	0.092+	0.087+	-0.014	-0.015	0.013	0.008
Openness	0.003	-0.002	0.005	-0.002	0.010	0.008	0.021+	0.020+
Government expenditures	0.029	0.012	-0.011	-0.019	-0.050	-0.067	-0.037	-0.047
Inflation	-0.003**	-0.004**	-0.003**	-0.004**	-0.004*	-0.004**	-0.002	-0.003+
Life expectancy	0.001	0.000	0.000	0.000	-0.002*	-0.003*	-0.001	-0.001
Labor force growth	0.000	0.000	0.000	0.000	-0.034	0.004	-0.036	-0.037
Institutional quality	0.011*	0.011**	0.012**	0.012**	0.018**	0.013+	0.015**	0.014*
Institutional quality trend	0.004*	0.005*	0.005*	0.005*	-0.000	0.000	0.006*	0.007*
Institutional instability	-2.232+	-6.349+	-2.042+	-6.595*	-1.560	-7.499+	-1.778	-5.048
Institutional instability squared		454.869		494.567		710.927		385.935
Observations	92	92	105	105	111	111	112	112
Countries	48	48	57	57	55	55	57	57
R^2	.642	.660	.650	.673	.402	.435	.400	.413
F statistic	6.096***	5.825***	7.072***	6.918***	3.090**	3.152**	3.006**	2.812**
Hausman test	14.797***	19.658***	26.675**	29.517**	51.120***	65.009***	33.113***	42.565***

Note. Columns (1) to (4) present the results for the subsample of richer countries, and columns (5) to (8) for the poorer countries. The first two columns, respectively ((1) and (2), and (5) and (6)), rely on data from 1960 to 2019 (complete cases only). The latter two columns, respectively ((3) and (4), and (7) and (8)), rely on data from 1980 to 2019 (partially imputed). Columns (1), (3), (5), and (7) provide estimations for a linear effect of institutional instability, while columns (2), (4), (6), and (8) additionally include a quadratic term. +$p < .01$, *$p < .05$, **$p < .01$, ***$p < .001$

With respect to the institutional predictors, a higher level of institutional quality was related to higher growth rates (b = 0.011, SD = 0.004, p = .013). The same held true for a positive trend in the development of institutional quality (b = 0.004, SD = 0.002, p = .037). Finally, a higher level of institutional instability was marginally significantly related to decreased growth rates (b = -2.232, SD = 1.180, p = .067). The coefficient here indicated that an increase in institutional instability by one standard deviation was related to a 0.6% decrease in annual growth rates. Hence, in total, the results for the poorer half of the countries were similar to the results for the entire sample.

A squared term for institutional instability was added in column (2) of Table 2. This additional term did, however, not change the significance levels of the control or institutional variables: A higher level of institutional quality (b = 0.011, SD = 0.004, p = .009) and an increase in institutional quality during the twenty-year period (b = 0.005, SD = 0.002, p = .025) was still associated with higher growth. Conversely, an increase in institutional instability remained marginally significantly related to decreased growth rates (b = -6.349, SD = 3.319, p = .064). These results for the institutional predictors were essentially reinstated when using data spanning the years from 1980 to 2019. Thus, overall, the regressions indicate that, for poorer countries, institutional instability is negatively related to economic growth. Moreover, they do not support a quadratic relationship.

4.2.2 Richer Countries

The right half of Table 2 pertains to the richer countries. Column (5) shows the results for the regression model without a squared term, using data from 1960 onwards. Regarding the control variables, a lower inflation rate (b = -0.003, SD = 0.002, p = .024) and a lower life expectancy (b = -0.002, SD = 0.001, p = .046) were related to higher growth rates. Conversely, the log GDP in 1960, investment levels, openness to foreign trade, government involvement in the economy, and labor force growth were not significantly associated with growth rates.

Regarding the institutional predictors, higher institutional quality (b = 0.018, SD = 0.006, p = .006) was associated with higher growth rates. Yet, in turn, neither a positive trend in institutional development nor institutional instability were significantly associated with growth rates.

When adding a squared term for institutional instability, the results for the control variables did not meaningfully change. Yet, an increase in institutional quality was now only marginally

significantly associated with higher growth rates (*b* = 0.013, *SD* = 0.007, *p* = .063). In turn, higher levels of institutional instability (non-squared) were marginally significantly associated with decreased growth rates (*b* = -7.496, *SD* = 3.87, *p* = .059), while the squared term for institutional instability was insignificant. Finally, when using data from 1980 to 2019, the linear and squared terms for institutional instability were insignificant. Thus, the regression analyses did not support the existence of an effect of institutional instability on economic growth in wealthier countries.

5 Robustness Tests

The results reported in the previous section provide tentative evidence for a negative relationship between institutional instability and economic growth rates, particularly among poorer countries. Furthermore, they reject the notion of an inverse-U-shaped relationship. Before discussing these findings, this section reports additional tests to assess the robustness of the results.

5.1 Shorter Time Periods

The results from the previous section align with those of Hartmann and Spruk (2021), who identified a negative relationship between institutional instability and economic growth. However, the results of this thesis do not fully align with the findings by Berggren et al. (2012), who found a positive relationship among richer countries and a negative relationship among poorer countries. A possible explanation may be that the long-term negative effects of institutional instability (e.g., instability becoming persistent and preventing the creation of a functioning institutional system) outweigh the long-term positive effects (e.g., finding more efficient institutional configurations). Then, the differences between the results by Hartmann and Spruk (2021) and of the present study compared to the results by Berggren et al. (2012) could be due to the longer time period analyzed (twenty vs. five years). Such speculations are also supported by the finding of Hartmann and Spruk (2021) that the negative effects of institutional instability intensify over longer time periods. Therefore, this subsection re-examines the previous section's analyses but uses shorter periods (ten years instead of twenty years).

5.1.1 Whole Sample

Table C1 reports the results for the whole sample. When using the data since 1960, institutional quality remained a highly significant predictor of economic growth (e.g., analysis without a squared term and without a control term for education reported in column (1): b = 0.014, SD = 0.004, p < .001), independent of the model specification. Contrarily, neither the trend in the development of institutional quality nor institutional instability were significantly associated with economic growth. When including a squared term for institutional instability, none of these results changed meaningfully, and the squared term remained insignificant. Finally, the results were also not critically altered by including an additional control term for education.

When using the data since 1980, institutional quality remained a highly significant predictor of economic growth rates (e.g., the analysis without a squared term and without a control term for education reported in column (5): b = 0.010, SD = 0.002, p < .001), with higher institutional quality being related to higher growth rates. Yet, unlike the findings based on the data since 1960, a positive trend in institutional development was significantly associated with increased growth rates (b = 0.006, SD = 0.002, p = .003). Finally, a higher level of institutional instability was marginally significantly related to lower growth rates (b = -0.809, SD = 0.469, p = .086). This marginally significant association remained after including an additional control variable for education. However, when adding the squared term for institutional instability, this (non-squared) term turned non-significant. The squared term was not significantly related to growth rates either.

Hence, the findings did not indicate a robust relationship between institutional instability and economic growth rates when considering shorter time intervals. This contrasts with the results from the twenty-year intervals, which suggested a robust negative relationship. These findings reinstate Hartmann and Spruk's (2021) argument that the full negative effects of institutional instability become more apparent over longer periods. In turn, when the negative effects only predominate in the long term, this may also explain why Berggren et al. (2012), who examined five-year periods, did not consistently find a negative effect of institutional instability on economic growth.

5.1.2 Poorer Countries

Table C2 displays the results for ten-year intervals stratified by poorer and richer countries. The first four columns pertain to the poorer countries. According to the analysis without a squared term for instability based on data since 1960, higher institutional quality was associated with higher growth rates (e.g., the model without a squared term: b = 0.013, SD = 0.005, p = .009). However, neither the trend in institutional quality over time nor institutional instability (linear or squared) were significantly related to growth rates. These findings did not meaningfully change when using data from 1980 to 2019. Thus, overall, the results that were based on ten-year intervals did not provide evidence for a negative effect of institutional instability on growth rates, unlike the results that were based on twenty-year intervals.

5.1.3 Richer Countries

Ultimately, the right half of Table C2 displays the results for the subsample of richer countries. Once again, a higher level of institutional quality was related to higher growth rates (e.g., the analysis based on the data since 1960 without a squared term displayed in column (5): b = 0.012, SD = 0.006, p = .044). Yet, neither the trend in the development of institutional quality nor institutional instability were significantly associated with growth rates. Furthermore, when adding a squared term of institutional instability, this term was not significantly related to economic growth rates as well. These results did not meaningfully change when using the data from 1980 to 2019. Thus, the analyses do not indicate any significant relationship between institutional instability and economic growth among richer countries.

5.2 Reverse Causality

As noted in most previous studies about the effect of institutional (Berggren et al., 2012; Hartmann & Spruk, 2021) and political (Aisen & Veiga, 2013; Alesina et al., 1996; de Haan, 2007; Feng, 1997) instability on economic outcomes, a major concern in such analyses is reverse causality: It seems well possible that not only institutional instability affects economic outcomes but also that economic outcomes affect institutional instability. For example, a period marked by

weak economic performance could destabilize the institutional system and benefit groups that advocate for radical change. Conversely, economic prosperity may stabilize the current institutional system (Alesina et al., 1996). Critically, such reverse causality could bias the estimates reported above: for example, if higher growth rates reduce institutional instability, the observed relationship may appear stronger than it actually is.

A lagged-variables approach, as employed by Berggren et al. (2012), was used to test for reverse causality. This approach involves additionally controlling for lagged growth rates in the regressions reported above and assessing whether this inclusion changes the coefficients and significance of the institutional instability variable. Specifically, suppose that the effects of the institutional instability variable are 'picked up' by the lagged growth variable: in this case, economic growth probably influences institutional, given that the effect of institutional instability on current economic performance is, in turn, dependent on past economic performance.

Therefore, the regressions above were repeated but now included lagged growth rates from ten years before.[20] The results are presented in Table C3. First, past growth rates were a highly significant predictor of present growth rates (e.g., the model using data since 1960 and not including a squared term for institutional instability reported in column (1): $b = 0.393$, $SD = 0.089$, $p < .001$). This finding occurred independently of the model specification and the data used. Institutional instability, on the one hand, was rendered insignificant when additionally controlling for lagged growth in the models without the squared term. This result held true for both the data since 1960 and since 1980. Yet, when including the squared term, institutional instability was significantly negatively related to economic growth (e.g., the model using data since 1960 reported in column (2): $b = -7.235$, $SD = 2.132$, $p = .001$).

In total, these results provide tentative evidence in favor of reverse causality: the models without the squared term for institutional instability suggest that a large part of the presumed effects of institutional instability could also be ascribed to past economic growth, which points towards reverse causality. Yet, when including the squared term, institutional instability remains

[20] The time of ten years was chosen because it, on the one hand, may be a reasonable estimate for how long it takes economic outcomes to influence institutional instability, but avoid excessive correlation with current growth rates (which would be the case for a time of, for example, two years).

a (highly) significant predictor of economic growth. However, given that the squared term was not robustly associated with growth rates in the previous analysis, the results from the model without it may be considered the primary reference. Thus, in total, it is likely that the estimates report in the fourth section did not reflect the genuine effect of institutional instability on economic performance but are also, in part, constituted by a previous impact of economic performance on institutional instability.

6 Discussion

This thesis revisited the relationship between institutional instability and economic outcomes. The primary aim was to test for an inverted-U-shaped effect of instability on economic growth. Institutional instability was measured with the multivariate dynamic complexity among 21 indices from the V-Dem data (Coppedge et al., 2024). This dataset encompasses information on political systems, power structures, and state functioning across various countries.

Fixed-effects panel regressions revealed a significant negative relationship between institutional instability and economic growth. Data from poorer countries primarily drove this relationship, and it did not hold true when examining a subsample of wealthier countries. Moreover, the data did not support the hypothesis of an inverted-U-shaped relationship between institutional instability and economic growth: instead, some analyses suggested a marginally significant U-shaped association, indicating that very low and very high levels of institutional instability may be most beneficial for economic growth.

Ultimately, robustness tests revealed that the negative relationship between institutional instability and economic growth rates was significant only over twenty-year periods but not ten-year periods. This non-significance over ten-year periods suggests that the negative effects of institutional instability primarily manifest in the long term. Additionally, the effect of institutional instability was not robust when previous growth rates were included as a determinant in the regression model. Consequently, past economic performance could also explain some variance initially attributed to institutional instability. This indicates that economic performance may impact institutional instability (and not only the other way around).

In what follows, the first subsection tries to integrate the sometimes differing results of this thesis, and relates them to previous research. The second subsection points to the limitations of the present thesis and offers recommendations for future research.

6.1 Relation to Previous Literature

The primary hypothesis of this thesis posited that the relationship between institutional instability and economic performance follows an inverted-U-shape, with very low and very high levels of institutional instability hindering economic performance. This was not at all supported by the data: in most cases, the squared term for institutional instability was insignificant, and when it was marginally significant, its positive coefficient pointed to a U-shaped and not an inverted-U-shaped relationship.

The (marginal) significance of a U-shaped relationship in some instances raises the question of whether the relationship between institutional instability and economic growth may indeed follow a U-shape: very low and very high levels of institutional instability foster growth, and levels in between are rather detrimental. On the one hand, this notion could be supported by the reduction in uncertainty and transaction costs associated with very low instability and by Olson's (1982) argument that major upheavals in a country's political institutions can prevent institutional sclerosis. On the other hand, the second section already showed that the current theoretical stance rather suggests that the marginal benefits of institutional instability decrease when institutional instability increases. Furthermore, Olson's (1982) argument pertains to short periods of high institutional instability and not to persistent institutional instability. Finally, the evidence from studies about political instability and economic growth that specifically looked at the effect of major upheavals in the political institutions also points to a negative relationship (Alesina et al., 1996). Thus, given that the U-shaped relationship was either only marginally significant or not significant and that such a relationship seems theoretically implausible, it is likely that the observed U-shaped relationship is a statistical anomaly.[21]

[21] Refer also to the literature that shows that multiple testing increases the likelihood of false positives (e.g., Gelman & Loken, 2013, or, for an extreme example, Simmons et al., 2011). Hence, such positive results in some of the regressions could be caused by the high number of different regression analyses performed.

Instead, the results of this thesis rather point to a (linear) negative effect of institutional instability on economic outcomes, as discussed below. This aligns well with the findings by Hartmann and Spruk (2021), who also detected a negative relationship between institutional instability and economic growth over the long but not in the short term. Hence, the positive and negative effects of institutional instability may balance each other in the short term, and the negative effects only prevail in the long term. It is questionable whether the theoretical framework outlined in the section can fully account for this conclusion: Particularly the positive effects, such as the improvement of institutions via Hayekian experimentation or the prevention of institutional sclerosis, are expected to manifest in the long term, while the negative effects (e.g., higher transaction costs and inefficient resource allocation to lobbying purposes) rather concern the short term. To explain why the negative effects dominate in the long term, Hartmann and Spruk (2021) argue that institutional instability may, if it becomes persistent, incentivize actors to try shaping the institutional system in their favor rather than allocating resources to productive purposes. Yet, this mechanism alone must be very potent to dominate the potential possible effects.

Besides replicating the finding of a negative effect of institutional instability that prevails in the long term, this thesis slightly extends the research by Hartmann and Spruk (2021) by demonstrating that this effect is only present in poorer and not in richer countries. This, in turn, relates well to the result by Berggren et al. (2012) that institutional instability has a negative effect on economic outcomes in poorer countries. However, Berggren et al.'s (2012) other primary conclusion that institutional instability influences economic performance positively in richer countries was not replicated in the present thesis, independent of whether ten-year or twenty-year periods were analyzed. This appears surprising, given that this thesis and Berggren et al. (2012) studied the same constructs, used the same control variables, and did not dramatically differ in the time frames studied.[22] Three explanations for this difference are possible:

(i) The analyses of the present thesis and of Berggren et al. (2012) are not comparable, for instance, because they refer to different constructs.

[22] The present thesis covers a period from 1960 to 2019, while Berggren et al. (2012) analyze data from 1984 to 2004.

(ii) The null findings reported in the present thesis are false negatives.

(iii) The positive findings reported by Berggren et al. (2012) are false positives.

Regarding (i), the similarities pointed out above exclude only the measurement of institutional instability: while Berggren et al. (2012) use the CoV in the ICRG, this thesis calculates the dynamic complexity of the V-Dem data. The key distinction between these datasets is that the ICRG, which assesses entrepreneurial risk globally to inform investment decisions, focuses more on de facto institutions. In contrast, the V-Dem data encompasses both de facto and de jure institutions. Despite this differential focus, it is unlikely that this caused the observed discrepancies in results, given that Hartmann and Spruk (2021) also found that instability in de facto institutions has a more pronounced negative effect on economic outcomes than instability in de jure institutions.

This, in turn, suggests that either explanation (ii) or (iii) holds true. Hereby, explanation (iii), which posits that the findings reported by Berggren et al. (2012) are false positives, appears more likely for two reasons: First, Berggren et al.'s (2012) finding of a positive relationship between institutional instability and economic performance in rich countries contradicts not only the results of this thesis but also of almost all previous research works about institutional (Hartmann & Spruk, 2021) and political (e.g., Aisen & Veiga, 2013; Alesina et al., 1996) instability, which also point to a negative relationship. Although these previous studies do not analyze the effect of institutional or political instability on economic growth specifically for richer countries, the actual existence of a positive relationship among richer countries makes it less likely to find a negative effect for countries worldwide that is significant at the 1% confidence level (Alesina et al., 1996; Hartmann & Spruk, 2021). Second, the majority of significant results from the 38 individual regression models reported by Berggren et al. (2012; Tables A4 to A9) are only significant in some of the regressions and, in these cases, solely at the 10% or 5% but not at the 1% or 0.1% levels. This distribution of *p*-values is unlikely, given a true positive effect (Simonsohn et al., 2014). Therefore, it seems more plausible that Berggren et al.'s (2012) findings of a positive effect of institutional instability on economic performance are false positives rather than the absence of such a relationship in this thesis is a false negative finding.

Finally, an interpretation of the present thesis's results must consider the potential reverse causality: The robustness test indicated that the relationship between institutional instability and

economic growth rates becomes insignificant when a term for previous growth rates is included. Hence, the variance in growth rates that was initially attributed to institutional instability could at least in part be explained by previous economic performance as well, indicating that previous economic performance may influence subsequent institutional instability. Although these results were rendered insignificant after including a quadratic term for institutional instability, including this term appears not warranted, given that this thesis did not point to a quadratic relationship. Hence, the findings from the models without such a term, which pointed to reverse causality, may be of greater importance.

On the one hand, the existence of a reverse effect has intuitive appeal: for example, periods with low economic growth could induce institutional instability. Previous studies that conducted similar tests did not find evidence of reverse causality for institutional (Berggren et al., 2012; Hartmann & Spruk, 2021) or political instability (Alesina et al., 1996; Feng, 1997). It appears unlikely that all these studies would produce false negatives. Assuming that no compelling reasons exist for why economic growth rates should induce instability in the institutions covered by the V-Dem data but not in the institutions covered by the ICRG or the data sources used by the other studies, it is possible that the reverse causality detected in this thesis is a false positive. Given this co-existence of good reasons for why or why not economic performance influences institutional instability, it is, all in all, impossible to make any confident conclusion about whether and to which degree the results of the present study suffer from reverse causality.

In summary, the evidence from previous studies and this thesis suggests that institutional instability negatively affects economic outcomes. This effect, however, manifests mainly in the long term. Furthermore, it seems to be more pronounced in poorer countries, whereas institutional instability does not significantly impact economic outcomes in wealthier countries. Conversely, the data strongly rejects the hypothesis of an inverse-U-shaped relationship. Finally, note that it cannot be ruled out that this thesis's results were at least partly constituted by a reverse effect of economic performance on institutional instability.

6.2 Limitations and Suggestions for Future Research

The present thesis introduced a novel procedure to quantify institutional instability and provided new evidence about its relationship with economic outcomes, most importantly by testing for an inverse-U-shaped association (which was absent). However, the results should be interpreted with a grain of salt, given three main limitations: First, the robustness tests indicated the existence of reverse causality. Second, the V-Dem data, which was used to calculate the dynamic complexity measure, primarily focuses on Western-style institutions, which could result in biased estimates for institutional instability for countries outside the Western hemisphere. Third, it is dubious to which degree the results of this thesis can be generalized to individual countries or used for practical recommendations.

6.2.1 Problems Related to the Data Source

Regarding the second limitation, recall first that the variables included in the V-Dem dataset comprise a broad range of political, legal, and social institutions, which justified its use in the present thesis. However, it is far from being a perfect information source: As the name of the V-Dem dataset suggests, its primary focus is to assess the state of democracy in countries worldwide. Consequently, it describes institutions based on Western liberal democratic ideals. This perspective may, however, not fully capture the nature and functioning of institutions in non-Western societies. Therefore, the variables in the V-Dem dataset may not be able to adequately describe institutional systems in countries outside the Western hemisphere (Wiarda, 1981).

This issue also affects the assessment of institutional instability and could lead both to an overestimation and an underestimation of actual instability: For example, the V-Dem dataset includes a variable that tracks the availability of alternative information sources in a country. This variable may be important in European or North American contexts, where a diverse media landscape is considered essential for the functioning of the political system (e.g., Griffen, 2020). In contrast, in Southeast Asian countries, where news consumption is generally lower and more reliant on informal networks (Jiang & Zhang, 2021), this variable may be less important, so a change in it would indicate the presence of institutional instability that, in fact, does not really exist, leading to an overestimation. In turn, when mainly focusing on variables pertaining to

democracy, not all aspects of non-democratic institutional systems may be covered, and changes in those aspects not covered could be overlooked. This potential problem may, for instance, also have caused the presumed absence of instability in the Soviet Union during most of its existence, according to the measure used in this thesis (although institutional instability may have been low in the Soviet Union so that these values could be valid; see Appendix A).

Besides, many indicators may suffer from a baseline problem, meaning that the same absolute deviance in an indicator may be related to higher or lower instability in practice, depending on the baseline or whether the change concerns an increase or decrease. As an example, consider the indicator that codes whether the election loser accepts the results. The dynamic complexity measure will detect the same level of institutional instability in a country where election losers start accepting results as in a country where they start denying their defeat. However, in practice, the instability induced may be higher in the latter case. For instance, Donald Trump's refusal to accept his defeat in the 2020 U.S. election was widely perceived as a sign of institutional change (e.g., Jacobson, 2021). In contrast, John Dramani Mahama's acceptance of his defeat in the 2016 elections in Ghana likely contributed to institutional stability (Bob-Milliar & Paller, 2018) but will be interpreted as an increase in institutional instability by the dynamic complexity indicator, given that previous election losers did not accept the results, so the value of the corresponding item changed. Therefore, the same absolute change in a variable can differentially impact institutional instability in reality, depending on whether it is an increase or a decrease and what the baseline level was.

In summary, although the V-Dem dataset has some commendable features, particularly its detailed coverage of various institutions, it also suffers from ethnocentric bias and potential nonlinearity in the association between item scales and the actual degree of institutional instability induced by changes in item values. An interesting alternative may be the ICRG (The PRS Group, 2024), which was used by Berggren et al. (2012), and assesses the political, legal, and financial risks faced by companies seeking to invest in a country. Thus, unlike the V-Dem data, the ICRG does not focus on a particular form of government but rather on constructs related to institutional instability. Furthermore, the ICRG strongly pertains to de facto institutions, which may be more important for economic outcomes than de jure institutions (Hartmann & Spruk,

2021). Hence, future studies may benefit from using the ICRG data, ideally in combination with the V-Dem data, given that the differential focus of these two datasets makes them good complements. However, notice that the ICRG data is not freely available.[23]

6.2.2 Generalizability Problems

Apart from the data-related shortcomings, the generalizability and practical relevance of the present thesis's results may also be questionable: Recall that the primary findings of this thesis were that institutional instability exerts a negative effect on economic performance, particularly in poorer countries, and that this negative effect is more pronounced the long term. Hence, should poorer countries try to keep their institutions as stable as possible to foster economic growth?

Several factors should be considered: First, the case studies of China's and South Korea's economic development since the 1950s show that institutional instability can, under specific circumstances, still foster economic growth (Jing, 2017; Kong, 2000). Thus, the negative relationship between institutional instability and economic outcomes is not generalizable to every individual case. Second, these case studies suggest that the concept of institutional instability may be too broad to assess its effects on economic outcomes comprehensively. For instance, in South Korea and China, instability was deliberately induced to identify better institutional configurations and was therefore 'planned.' Conversely, institutional instability can also be 'unplanned,' such as when a rebel group successfully stages a coup d'état. Combining these different types of instability into one construct may obscure the potentially distinct effects of 'planned' and 'unplanned' instability. This notion is also supported by the finding of Feng (1997), who studied the economic consequences of political instability and demonstrated that regular government change (e.g., the election of a new government followed by a smooth transition of

[23] Although it posed a problem for this thesis project that the ICRG data is not freely available, the lack of public access at least opens the possibility for preregistering future studies on institutional instability and economic growth (i.e., specifying and publicly reporting the planned analyses before obtaining the data and analyzing it). This practice may be beneficial, given that the various possible operationalizations of institutions and institutional instability and analysis strategies leave a lot of 'researchers degrees of freedom,' which increases the risk that significant findings are overrepresented in the literature (e.g., Wicherts et al., 2016).

power) affects the economy positively, while irregular government change (e.g., a coup d'état) has a negative effect. Thus, research on the association between institutional instability and economic outcomes may benefit from developing a qualitative classification of different kinds of instability and testing their distinct effects on economic performance.

Finally, the theoretical discussion in the second section demonstrated that institutional instability can exert a wide range of both positive and negative effects on economic outcomes. This wide range of possible effects not only makes it challenging to formulate a directional hypothesis regarding the general relationship between instability and economic performance but also indicates that this relationship can vary considerably in individual countries, depending on which effects are dominant.

Hence, all in all, the notion that a 'best-practice' institutional setting may not universally maximize economic performance but that individual countries require tailored solutions (Rodrik, 2008) may also apply to institutional instability: thus, the effect of institutional instability on the economy could be largely determined by country-specific factors, and the generally observed negative effect may not generalize to a substantial number of individual cases. The wide range of possible positive and negative effects of instability on the economy also supports this viewpoint. To arrive at more specific predictions, a first step may be to introduce a qualitative classification of different types of instability, such as 'planned' instability, which involves testing various institutional configurations and their economic functions, and 'unplanned' instability, which arises from political conflicts or crises.

Finally, a minor recommendation for future studies could be reconsidering the statistical paradigm employed. Currently, the vast majority of studies on institutional instability and economic performance rely on null hypothesis significance testing. This approach naturally leads to strong claims, such as that institutional instability enhances economic performance in richer countries (Berggren et al., 2012) or reduces it in poorer countries (Hartmann & Spruk, 2021). However, such claims do not adequately reflect the current uncertainty surrounding the strength and significance of instability's effect on the economy, and their strength becomes counterproductive once they contradict each other.

Thus, relying on a frequentist rather than a deterministic analysis paradigm that strictly accepts or rejects a hypothesis may be more appropriate. Future research could, therefore, adopt a Bayesian approach that quantifies the evidence for or against a hypothesis on a continuous scale and indicates the confidence level with which an effect of institutional instability on economic performance can be assumed (Gelman et al., 2013). Furthermore, evidence from previous studies can be incorporated when using Bayes Factors and calculating them with informative priors. This may be helpful given the considerable number of existing studies about the effect of institutional or political instability on the economy. Hence, altogether, Bayesian approaches may avoid some of the current confusion caused by contradicting statements of null hypothesis significance tests and allow for introducing the current knowledge about the effect of institutional instability on economic performance to further analyses of this effect.

7 Conclusion

To date, only a few studies have explored the effect of institutional instability on economic performance, yielding different conclusions about whether and when this effect is positive or negative. This thesis revisited the relationship between institutional instability and economic growth, testing whether it follows an inverted U relationship. The results pointed to a negative association between instability in growth, particularly among poorer countries, and provided no support for the hypothesized inverted-U shape. Furthermore, the findings suggested that the negative effects of institutional instability only predominate in the long term. Still, future research may explore to which degree this finding is generalizable across individual countries and qualitatively differentiate between different types of instability (e.g., 'planned' instability as part of reform agendas vs. 'unplanned instability' due to major institutional or political upheavals). Only with such a nuanced understanding can such theoretical knowledge provide reliable guidance for policymakers about the potentials and risks of institutional instability for economic development.

References

Acemoglu, D., & Johnson, S. (2005). Unbundling institutions. *Journal of Political Economy*, *113*(5), 949–995. https://doi.org/10.1086/432166

Acemoglu, D., Johnson, S., & Robinson, J. A. (2001). The colonial origins of comparative development: An empirical investigation. *American Economic Review*, *91*(5), 1369–1401. https://doi.org/10.1257/aer.91.5.1369

Acemoglu, D., Johnson, S., & Robinson, J. A. (2005). Institutions as a fundamental cause of long-run growth. In P. Aghion & S. N. Durlauf (Eds.), *Handbook of Economic Growth* (Issue SUPPL. PART A, pp. 385–472). Elsevier. https://doi.org/10.1016/S1574-0684(05)01006-3

Acemoglu, D., & Robertson, S. (2012). *Why nations fail: The origins of power, prosperity, and property*. Crown Business.

Aisen, A., & Veiga, F. J. (2013). How does political instability affect economic growth? *European Journal of Political Economy*, *29*, 151–167. https://doi.org/10.1016/J.EJPOLECO.2012.11.001

Alesina, A., Özler, S., Roubini, N., & Swagel, P. (1996). Political instability and economic growth. *Journal of Economic Growth*, *1*(2), 189–211. https://doi.org/10.1007/BF00138862

Alonso, J. A., & Garcimartín, C. (2013). The determinants of institutional quality. More on the debate. *Journal of International Development*, *25*(2), 206–226. https://doi.org/10.1002/jid.1710

Andrews, K. T., & Gaby, S. (2015). Local protest and federal policy: The impact of the civil rights movement on the 1964 Civil Rights Act. *Sociological Forum*, *30*(S1), 509–527. https://doi.org/10.1111/socf.12175

Barro, R. J. (1991). Economic growth in a cross section of countries. *The Quarterly Journal of Economics*, *106*(2), 407. https://doi.org/10.2307/2937943

Barro, R. J., & Lee, J. W. (2013). A new data set of educational attainment in the world, 1950–2010. *Journal of Development Economics*, *104*, 184–198. https://doi.org/10.1016/J.JDEVECO.2012.10.001

Baumol, W. J. (1996). Entrepreneurship: Productive, unproductive, and destructive. *Journal of Business Venturing*, *11*(1), 3–22. https://doi.org/10.1016/0883-9026(94)00014-X

Berggren, N., Bergh, A., & Bjørnskov, C. (2012). The growth effects of institutional instability. *Journal of Institutional Economics*, *8*(2), 187–224. https://doi.org/10.1017/S1744137411000488

Besley, T. (1995). Property rights and investment incentives: Theory and evidence from Ghana. *Journal of Political Economy*, *103*(5), 903–937. https://doi.org/10.1086/262008

Bjørnskov, C. (2011). Combating corruption: On the interplay between institutional quality and social trust. *The Journal of Law and Economics*, *54*(1), 135–159. https://doi.org/10.1086/652421

Bob-Milliar, G. M., & Paller, J. W. (2018). Democratic ruptures and electoral outcomes in Africa: Ghana's 2016 election. *Africa Spectrum*, *53*(1), 5–35. https://doi.org/10.1177/000203971805300102

Bolt, J., & van Zanden, J. L. (2024). Maddison-style estimates of the evolution of the world economy: A new 2023 update. *Journal of Economic Surveys*, 1–41. https://doi.org/10.1111/joes.12618

Brown, A. (1997). *The Gorbachev factor*. Oxford University Press. https://doi.org/10.1093/0192880527.001.0001

Brüderl, J., & Ludwig, V. (2015). Fixed-effects panel regression. In H. Best & C. Wolf (Eds.), *The SAGE handbook of regression analysis and causal inference* (pp. 327–357). Sage.

Campos, N. F., & Nugent, J. B. (2002). Who is afraid of political instability? *Journal of Development Economics*, *67*(1), 157–172. https://doi.org/10.1016/S0304-3878(01)00181-X

Cooter, R. D., & Schäfer, H. B. (2011). *Solomon's knot: How law can end the poverty of nations*. Princeton University Press.

Coppedge, M., Gerring, J., Knutsen, C. H., Lindberg, S. I., Teorell, J., Altman, D., Bernhard, M., Cornell, A., Fish, M. S., Gastaldi, L., Gjerløw, H., Glynn, A., God, A. G., Grahn, S., Hicken, A., Kinzelbach, K., Krusell, J., Marquardt, K. L., McMann, K., … Ziblatt, D. (2024). *V-Dem dataset v14*.

Coppedge, M., Gerring, J., Knutsen, C. H., Lindberg, S. I., Teorell, J., Marquardt, K. L., Medzihorsky, J., Natsika, N., Pemstein, D., Fox, L., Gastaldi, L., Good God, A., Grahn, S., Pernes, J., Rydén,

O., Römer, J. von, Tzelgov, E., Wang, Y.-T., & Wilson, S. (2024). *Structure of V-Dem indices, components, and indicators*.

de Haan, J. (2007). Political institutions and economic growth reconsidered. *Public Choice*, *131*(3–4), 281–292. https://doi.org/10.1007/s11127-007-9172-y

Doucouliagos, H., & Ulubaşoğlu, M. A. (2008). Democracy and economic growth: A meta-analysis. *American Journal of Political Science*, *52*(1), 61–83. https://doi.org/10.1111/J.1540-5907.2007.00299.X

Farrar, D. E., & Glauber, R. R. (1967). Multicollinearity in regression analysis: The problem revisited. *The Review of Economics and Statistics*, *49*(1), 92–107. https://doi.org/10.2307/1937887

Feenstra, R. C., Inklaar, R., & Timmer, M. P. (2015). The next generation of the Penn World Table. *American Economic Review*, *105*(10), 3150–3182. https://doi.org/10.1257/aer.20130954

Feng, Y. (1997). Democracy, political stability and economic growth. *British Journal of Political Science*, *27*(3), S0007123497000197. https://doi.org/10.1017/S0007123497000197

Gelman, A., Carlin, J. B., Stern, H. S., Dunson, D. B., Vehtari, A., & Rubin, D. B. (2013). *Bayesian data analysis* (3rd ed.). Chapman & Hall.

Gelman, A., & Loken, E. (2013). *The garden of forking paths: Why multiple comparisons can be a problem, even when there is no "fishing expedition" or "p-hacking" and the research hypothesis was posited ahead of time*. https://stat.columbia.edu/~gelman/research/unpublished/forking.pdf

Glaeser, E. L., La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (2004). Do institutions cause growth? *Journal of Economic Growth*, *9*(3), 271–303. https://doi.org/10.1023/B:JOEG.0000038933.16398.ed

Gorodnichenko, Y., & Roland, G. (2017). Culture, institutions, and the wealth of nations. *The Review of Economics and Statistics*, *99*(3), 402–416. https://doi.org/10.1162/REST_a_00599

Greif, A., & Laitin, D. D. (2004). A theory of endogenous institutional change. *American Political Science Review*, *98*(4), 633–652. https://doi.org/10.1017/S0003055404041395

Griffen, S. (2020). Hungary: A lesson in media control. *British Journalism Review*, *31*(1), 57–62. https://doi.org/10.1177/0956474820910071

Grossman, H. (1991). A general equilibrium model of insurrections. *American Economic Review*, 912–921.

Hartmann, S., & Spruk, R. (2021). Long-term effects of institutional instability. *Empirical Economics*, *61*(4), 2073–2112. https://doi.org/10.1007/S00181-020-01934-Z/TABLES/8

Hasselman, F. (2022). *casnet: A toolbox for studying Complex Adaptive Systems and NETworks* (0.2.2). https://github.com/FredHasselman/casnet

Hayek, F. A. (1973). *Law, liberty, and legislation: Rules and order* (Vol. 1). University of Chicago Press.

Hodgson, G. M. (2006). What are institutions? *Journal of Economic Issues*, *40*(1), 1–25. https://doi.org/10.1080/00213624.2006.11506879

Inglehart, R., & Welzel, C. (2001). *Modernization, cultural change, and democracy*. Cambridge University Press. https://doi.org/10.1017/CBO9780511790881

International Human Genome Sequencing Consortium. (2001). Initial sequencing and analysis of the human genome. *Nature*, *409*(6822), 860–921. https://doi.org/10.1038/35057062

International Labour Organization. (2024). *ILOSTAT database*. https://ilostat.ilo.org/data

Jacobson, G. C. (2021). The presidential and congressional elections of 2020: A national referendum on the Trump Presidency. *Political Science Quarterly*, *136*(1), 11–45. https://doi.org/10.1002/polq.13133

Jiang, A., & Zhang, T. H. (2021). Political freedom, news consumption, and patterns of political trust: evidence from East and Southeast Asia, 2001-2016. *Political Science*, *73*(3), 250–269. https://doi.org/10.1080/00323187.2021.1968767

Jing, Y. (2017). The transformation of Chinese governance: Pragmatism and incremental adaption. *Governance*, *30*(1), 37–43. https://onlinelibrary.wiley.com/doi/full/10.1111/gove.12231

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, *47*(2), 263. https://doi.org/10.2307/1914185

Knutsen, C. H. (2012). Democracy and economic growth: A survey of arguments and results. *International Area Studies Review*, *15*(4), 393–415. https://doi.org/10.1177/2233865912455268

Kong, T. Y. (2000). *The politics of economic reform in South Korea: A fragile miracle*. Routledge.

Laffont, J.-J., & Tirole, J. (1993). *A theory of incentives in procurement and regulation*. MIT Press.

Lepore, J. (2008). *These truths: A history of the United States*. W. W. Norton.

Lindner, J. (2003). Institutional stability and change: two sides of the same coin. *Journal of European Public Policy*, *10*(6), 912–935. https://doi.org/10.1080/1350176032000148360

Lovell, S. (2009). *The Soviet Union: A very short introduction*. Oxford University Press. https://doi.org/10.1093/ACTRADE/9780199238484.001.0001

Lyapunov, A. M. (1992). The general problem of the stability of motion. *International Journal of Control*, *55*(3), 531–534. https://doi.org/10.1080/00207179208934253

Marquardt, D. W. (1970). Generalized inverses, ridge regression, biased linear estimation, and nonlinear estimation. *Technometrics*, *12*(3), 591–612. https://doi.org/10.1080/00401706.1970.10488699

Maseland, R. (2018). Is colonialism history? The declining impact of colonial legacies on African institutional and economic development. *Journal of Institutional Economics*, *14*(2), 259–287. https://doi.org/10.1017/S1744137417000315

McFarland, A. S. (1991). Interest groups and political time: Cycles in America. *British Journal of Political Science*, *21*(3), 257–284. https://doi.org/10.1017/S0007123400006165

Millo, G. (2017). Robust standard error estimators for panel models: A unifying approach. *Journal of Statistical Software*, *82*(3). https://doi.org/10.18637/jss.v082.i03

Moritz, S., & Gatscha, S. (2022). *imputeTS: Time series missing value imputation* (Version 3.3). https://cran.r-project.org/web/packages/imputeTS/imputeTS.pdf

Neutatz, D. (2014). Taking stock of the Khrushchev Era. In *De-Stalinization reconsidered: Persistence and change in the Soviet Union* (pp. 251–261). Campus.

North, D. (1990). *Institutions, institutional change and economic performance*. Cambridge University Press.

North, D. (1992). Institutions, ideology, and economic performance. *Cato*, *11*, 477–496.

North, D. C., Summerhill, W., & Weingast, B. R. (2000). Order, disorder, and economic change: Latin America versus North America. In B. Bueno de Mesquita & H. L. Root (Eds.), *Governing for prosperity* (pp. 17–58). Yale University Press.

Ogilvie, S., & Carus, A. W. (2014). Institutions and economic growth in historical perspective. In P. Aghion & S. N. Durlauf (Eds.), *Handbook of Economic Growth* (Vol. 2, pp. 403–513). Elsevier.

Olson, M. (1982). *The rise and decline of nations: Economic growth, stagflation, and social rigidities*. Yale University Press.

Olthof, M., & Hasselman, F. (2024). *Dynamic complexity as an early-warning indicator for clinical change*. https://fredhasselman.com/casnet/articles/dynamiccomplexity.html

O'Reilly, C., & Murphy, R. H. (2022). An index measuring state capacity, 1789–2018. *Economica*, *89*(355), 713–745. https://doi.org/10.1111/ecca.12411

Pierson, P. (2000). Increasing returns, path dependence, and the study of politics. *American Political Science Review*, *94*(2), 251–267. https://doi.org/10.2307/2586011

Pratt, J. W. (1975). Risk aversion in the small and in the large. In *Stochastic optimization models in finance* (pp. 115–130). Elsevier. https://doi.org/10.1016/B978-0-12-780850-5.50017-4

Przeworski, A. (1991). *Democracy and the market*. Cambridge University Press. https://doi.org/10.1017/CBO9781139172493

R Core Team. (2024). *R: A language and environment for statistical computing* (Version 4.3.3). https://www.r-project.org/

Roach, K. (2011). *The 9/11 effect*. Cambridge University Press. https://doi.org/10.1017/CBO9781139003537

Rodrik, D. (2008). Second-best institutions. *American Economic Review*, *98*(2), 100–104. https://doi.org/10.1257/AER.98.2.100

Rodrik, D., Subramanian, A., & Trebbi, F. (2004). Institutions rule: The primacy of institutions over geography and integration in economic development. *Journal of Economic Growth*, *9*(2), 131–165. https://doi.org/10.1023/B:JOEG.0000031425.72248.85

Rutherford, M. (2001). Institutional economics: Then and now. *Journal of Economic Perspectives*, *15*(3), 173–194. https://doi.org/10.1257/jep.15.3.173

Sachs, J. (2003). *Institutions don't rule: Direct effects of geography on per capita income*. https://doi.org/10.3386/w9490

Sachs, J. (2005). *The end of poverty: Economic possibilities for our time*. Penguin Press.

Sala-i-Martin, X. X. (1997). I just ran two million regressions. *The American Economic Review*, *87*(2), 178–183.

Schiepek, G., & Strunk, G. (2010). The identification of critical fluctuations and phase transitions in short term and coarse-grained time series: A method for the real-time monitoring of human change processes. *Biological Cybernetics*, *102*(3), 197–207. https://doi.org/10.1007/s00422-009-0362-1

Selznick, P. (1957). *Leadership in administration: A sociological interpretation*. Harper & Row.

Siebert, H. (1997). Labor market rigidities: At the root of unemployment in Europe. *Journal of Economic Perspectives*, *11*(3), 37–54. https://doi.org/10.1257/jep.11.3.37

Simmons, J. P., Nelson, L. D., & Simonsohn, U. (2011). False-positive psychology. *Psychological Science*, *22*(11), 1359–1366. https://doi.org/10.1177/0956797611417632

Simonsohn, U., Nelson, L. D., & Simmons, J. P. (2014). P-curve: A key to the file-drawer. *Journal of Experimental Psychology: General*, *143*(2), 534–547. https://doi.org/10.1037/a0033242

Sterman, J. (2000). *Business dynamics: Systems thinking and modeling for a complex world*. McGraw Hill.

Temple, J. (1999). The new growth evidence. *Journal of Economic Literature*, *37*(1), 112–156. https://doi.org/10.1257/jel.37.1.112

The PRS Group. (2024). *International Country Risk Guide*. https://www.prsgroup.com/explore-our-products/icrg/

Trager, E. (2016). *Arab fall: how the Muslim Brotherhood won and lost Egypt in 891 days*. Georgetown University Press.

Velicer, W. F., & Colby, S. M. (2005). A comparison of missing-data procedures for Arima time-series analysis. *Educational and Psychological Measurement*, *65*(4), 596–615. https://doi.org/10.1177/0013164404272502

Wiarda, H. J. (1981). The ethnocentrism of the social science: Implications for research and policy. *The Review of Politics*, *43*(2), 163–197. https://doi.org/10.1017/S0034670500029715

Wicherts, J. M., Veldkamp, C. L. S., Augusteijn, H. E. M., Bakker, M., van Aert, R. C. M., & van Assen, M. A. L. M. (2016). Degrees of freedom in planning, running, analyzing, and reporting

psychological studies: A checklist to avoid p-hacking. *Frontiers in Psychology*, *7*. https://doi.org/10.3389/fpsyg.2016.01832

Williamson, O. E. (2000). The New Institutional Economics: Taking stock, looking ahead. *Journal of Economic Literature*, *38*(3), 595–613. https://doi.org/10.1257/jel.38.3.595

Wilms, R., Mäthner, E., Winnen, L., & Lanwehr, R. (2021). Omitted variable bias: A threat to estimating causal relationships. *Methods in Psychology*, *5*, 100075. https://doi.org/10.1016/j.metip.2021.100075

Woolridge, J. M. (2020). *Introductory econometrics: A modern approach* (7th ed.). Cengage Learning.

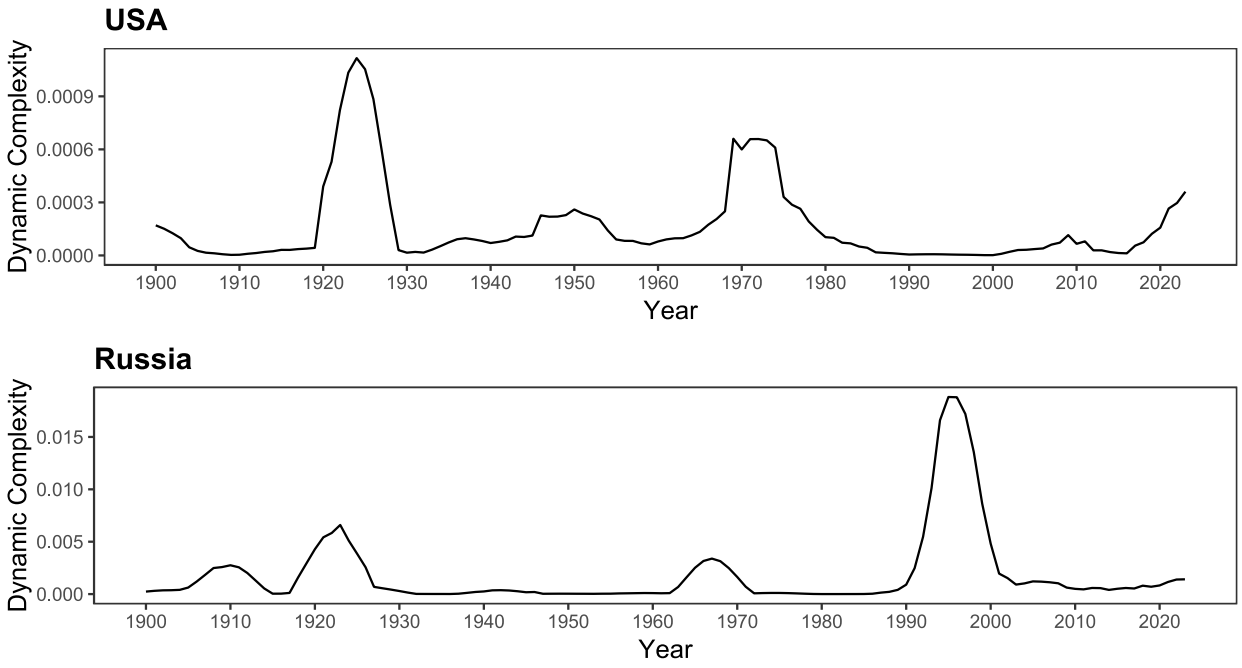
World Bank. (2024). *World Development Indicators*. https://databank.worldbank.org/source/world-development-indicators

Appendix A: Institutional Instability in the United States and Russia Between 1900 and 2023

To demonstrate the validity of the dynamic complexity measure for quantifying institutional instability, this section presents the evolution of dynamic complexity in the United States and Russia from 1900 to 2023. Figure A1 illustrates these changes over time.

Figure A1

Dynamic Complexity in the United States and Russia Since 1900



Initially, the plots show that the dynamic complexity measurement technique used in this thesis conceptualizes institutional instability and change as a gradual phenomenon: when institutional instability increases, this increase always spans multiple years, which neglects a conceptualization of institutional instability as a short-term phenomenon. This is due to the smoothing of the institutional instability values of multiple years (for details, refer to the third section). This conceptualization is a departure from previous studies: for example, Figure 2 in the study by

Hartmann and Spruk (2021), which presents their quantification of institutional instability in different countries over time, more resembles a 'spike function' that usually remains at zero but exhibits spikes during five-year intervals in which any institutional change occurs. However, such a spike-based conceptualization of institutional instability seems problematic, given that institutional changes usually occur gradually and over extended time periods (Lindner, 2003). The approach in this thesis avoids these issues by employing a smoothing procedure.

Regarding the specific cases of the United States and Russia, note, first of all, the difference in scale on the y-axes of the two plots: the highest level of dynamic complexity in Russia (during the dissolution of the Soviet Union in the 1990s) is about 20 times as high as the highest level of dynamic complexity in the United States (during the 1920s and since 2020). This difference makes sense, given that the dissolution of the Soviet Union was a substantial historical event, marked by a transition from a planned to a market economy and from an authoritarian communist regime to a republic. In contrast, the United States has not experienced such a fundamental reordering of its economic and political systems during the past 125 years.

Furthermore, the individual peaks in dynamic complexity for the two countries align with respective periods of unrest: In the United States, dynamic complexity peaked during the 1920s, when women's suffrage was introduced, immigration was heavily restricted, and the prohibition of alcohol led to the emergence of criminal organizations such as the Italian Mafia. Furthermore, dynamic complexity was elevated around 1950, when the United States joined the United Nations, which marked the end of their previous isolationistic foreign policy, and implemented stringent anti-communist legislation. Around 1970, dynamic complexity peaked again, a period marked by the Vietnam War, stagflation, and the first Oil Crisis (Lepore, 2008). Finally, institutional instability has been elevated during the past years, which were characterized by the election and deselection of Donald Trump between 2016 and 2020, as well as the COVID-19 pandemic in 2020 and 2021 (Jacobson, 2021).

For Russia, the plot indicates four periods of increased dynamic complexity: The first period was initiated by the Russian Revolution of 1905, which resulted in the establishment of a parliament alongside the tsar's rule and the coexistence of multiple political parties. Dynamic complexity peaked again with the Russian Revolution of 1917 and remained elevated during the Russian Civil

War. It decreased to a moderate level around 1930, when the Bolsheviks consolidated their power and reformed Russia (and various neighboring states) into the communist Soviet Union. After that, during the communist rule, dynamic complexity remains close to zero, except for the latter half of the 1960s. This period was marked by the impeachment of Nikita Khrushchev, a brief period of collective leadership, and economic reforms that reduced the degree of centralization in economic planning and introduced market-economy-style metrics such as profitability (Lovell, 2009). Finally, as mentioned above, dynamic complexity reached an extraordinarily high level during the dissolution of the Soviet Union in the 1990s.

Hence, all in all, the dynamic complexity measure is elevated during significant historical events or periods of unrest. Yet, this may not be sufficient to prove its validity: for example, American observers who associate the Great Depression and the civil rights movement during the 1960s (e.g., Andrews & Gaby, 2015) or the September 11 attacks (e.g., Roach, 2011) with institutional instability may not fully support this measure, as dynamic complexity is relatively low during or right after these events. For Russia, similar arguments may apply: for instance, dynamic complexity remains relatively low after the death of Stalin and the following De-Stalinization, when political repression was alleviated (Neutatz, 2014), and during the 1980, when communism was modernized during perestroika (Brown, 1997). Consequently, the dynamic complexity measure is challenging to verify or falsify, given that the importance of single events for the development of the United States and Russia can be interpreted in various ways. Still, the peaks during periods related to major shifts in American and Russian politics and society suggest that the dynamic complexity measure has good validity. Therefore, to conclude, while the dynamic complexity indicator for institutional instability provides reasonable estimates, it may not necessarily capture all significant events. Nevertheless, its assessment of institutional instability in the United States and Russia from 1900 to 2023 warrants its use in the statistical analysis.

Appendix B: Operationalization of and Data Sources for the Control Variables

Table B1

Operationalization of and Data Sources for the Control Variables

	Operationalization	Source	Availability
Growth rate	Yearly growth in GDP per capita	Maddison Project Database 2023 (Bolt & van Zanden, 2024)	Yearly data from 1500 to 2022 (most countries start later)
GDP per capita	Log GDP per capita	Maddison Project Database 2023 (Bolt & van Zanden, 2024)	Yearly data from 1500 to 2022 (most countries start later)
Investment	Share of investments of the GDP	Penn World Tables 10.01 (Feenstra et al., 2015)	Yearly data from 1950 to 2019
Openness	Share of exports and imports of the GDP	Penn World Tables 10.01 (Feenstra et al., 2015)	Yearly data from 1950 to 2019
Government shares	Share of government expenditures of the GDP	Penn World Tables 10.01 (Feenstra et al., 2015)	Yearly data from 1950 to 2019
Inflation	Annual inflation rate	World Development Indicators (World Bank, 2024)	Yearly data from 1960 to 2023
Life expectancy	Life expectancy at birth	World Development Indicators (World Bank, 2024)	Yearly data from 1960 to 2023
Labor force growth	Growth in labor force	World Development Indicators (World Bank, 2024), ILOSTAT (International Labour Organization, 2024)	World Development Indicators: yearly data from 1960 to 2023 ILOSTAT: yearly data from 1948 to 2009 (most countries start later / end earlier)
Education	Share of individuals aged 25 and above who completed secondary school	Barro and Lee (2013)	Data from 1950 to 2015 in five-year intervals

Institutional quality	O'Reilly & Murphy Comprehensive State Capacity Index	O'Reilly & Murphy (2022)	Yearly data from 1789 to 2021 (most countries start later)

Note. As the education data was only available in five-year intervals, the values for the intervening years were imputed using interpolation. For example, the value for 1953 was derived from the values for 1950 and 1955, weighted by 0.4 and 0.6, respectively.

Appendix C: Results of the Robustness Tests

Table C1

Regressions of Association Between Institutional Instability and Growth Rates of GDP per Capita, Using Ten-Year Periods

	Data since 1960				Data since 1980			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log GDP	-0.014*	-0.014*	-0.014*	-0.014*	-0.006	-0.006	-0.007	-0.007
Investment rate	0.068*	0.070*	0.068*	0.070*	0.019	0.019	0.021	0.022
Openness	0.006	0.001	0.007	0.007	0.019**	0.019*	0.018*	0.018*
Government expenditures	0.007	0.007	0.007	0.008	-0.014	-0.014	-0.013	-0.013
Inflation	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***
Life expectancy	0.000	0.000	0.000	0.000	0.001+	0.001+	0.001	0.001
Labor force growth	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Secondary schooling			-0.000	-0.000			0.000	0.000
Institutional quality	0.014***	0.014***	0.014***	0.014***	0.010***	0.010***	0.010***	0.010***
Institutional quality trend	0.004	0.004	0.004	0.004	0.001**	0.006**	0.001**	0.007**
Institutional instability	-0.765	-1.686	-0.765	-1.687	-0.809+	-0.342	-0.880+	-0.451
Institutional instability squared		81.250		81.413		-40.656		-37.154
Observations	321	321	321	321	421	421	421	421
Countries	102	102	102	102	116	116	116	116
R^2	.211	.211	.211	.213	.226	.226	.229	.229
F statistic	5.583***	5.091***	5.052***	4.646***	8.591***	7.780***	7.234***	7.234***
Hausman test	40.288***	41.087***	38.293***	39.322***	38.319***	38.285***	34.091***	34.048***

Note. Columns (1) and (5) present the results for the primary regression analyses for the data from 1960 to 2019 and 1980 to 2019, respectively. Columns (2) and (6) add a term for squared institutional instability. Columns (3), (4), (7), and (8) repeat these analyses, additionally controlling for education. +$p < .01$, *$p < .05$, **$p < .01$, ***$p < .001$

Table C2

Regressions of Association Between Institutional Instability and Growth Rates of GDP per Capita for Poorer and Richer Countries, Using Ten-Year Periods

	Poorer countries				Richer countries			
	Data since 1960		Data since 1980		Data since 1960		Data since 1980	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log GDP	-0.022*	-0.022*	-0.005	-0.005	0.005	0.005	-0.002	-0.002
Investment rate	0.081+	0.082+	0.018	0.018	0.051	0.052	0.025	0.027
Openness	0.030	0.031	0.022	0.022	0.007	0.007	0.016+	0.016+
Government expenditures	0.080	0.79	0.003	0.003	0.063	0.066	0.085+	0.080+
Inflation	-0.002**	-0.002**	-0.002**	-0.002*	-0.005**	-0.005**	-0.003*	-0.003*
Life expectancy	0.001*	0.001+	0.001*	0.001*	-0.003*	-0.003*	-0.001	-0.001
Labor force growth	0.000	0.000	0.000	0.000	0.336+	0.336+	-0.040**	-0.037*
Institutional quality	0.013**	0.013*	0.007+	0.007+	0.012*	0.012+	0.011**	0.012**
Institutional quality trend	0.005	0.005	0.006+	0.006+	0.000	0.001	0.008*	0.008*
Institutional instability	0.269	-0.787	-0.646	-0.596	-0.435	-1.171	-1.146	0.822

Institutional instability squared		93.998		-4.429		64.299		-164.45
Observations	146	146	200	200	178	178	221	221
Countries	48	48	57	57	55	55	57	57
R^2	.332	.333	.228	.226	.228	.228	.226	.229
F statistic	4.366***	3.957***	3.932***	3.548***	3.832***	3.548***	4.491***	4.140***
Hausman test	28.691***	32.064***	12.807***	14.601***	284.336***	39.412***	30.856***	30.856***

Note. Columns (1) to (4) present the results for the subsample of richer countries, columns (5) to (8) for the poorer countries. The first two columns, respectively ((1) and (2), and (5) and (6)), rely on data from 1960 to 2019 (complete cases only). The latter two columns, respectively ((3) and (4), and (7) and (8)), rely on data from 1980 to 2019 (partially imputed). Columns (1), (3), (5), and (7) provide estimations for a linear effect of institutional instability, while columns (2), (4), (6), and (8) additionally include a quadratic term. +$p < .01$, *$p < .05$, **$p < .01$, ***$p < .001$

Table C3

Regressions of Association Between Institutional Instability and Growth Rates of GDP per Capita Lagged by Ten Years

	Data since 1960		Data since 1980	
	(1)	(2)	(3)	(4)
Log GDP	-0.012+	-0.014*	-0.012*	-0.015**
Investment rate	0.057+	0.046	0.059*	0.054+
Openness	0.006	0.005	0.013	0.010
Government expenditures	0.004	-0.010	-0.003	-0.006
Inflation	-0.002**	-0.003***	-0.002**	-0.003***
Life expectancy	0.001	0.000	0.000	0.001
Labor force growth	-0.000	-0.000	0.000	0.000
Lagged growth	0.393***	0.461***	0.327***	0.403***
Institutional quality	0.013***	0.012***	0.012***	0.011***
Institutional quality trend	0.002	0.002	0.004**	0.005**
Institutional instability	-0.881	-7.235**	-0.814	-6.982***
Institutional instability squared		801.758**		772.007**
Observations	204	201	204	204
Countries	102	102	102	102
R^2	.554	.602	.592	.634
F statistic	9.946***	10.949***	12.007***	13.103***
Hausman test	56.956***	61.518***	89.958***	121.002***

+$p < .01$, *$p < .05$, **$p < .01$, ***$p < .001$