When The Future's Uncertain and the End is Near

Assessing the Impact of Oil Price Shocks on Regime Survival

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Abstract

This thesis will assess the impact of oil price shocks on regime survival. A large body of research into the inner workings of the «rentier states» finds oil dependency to cause political decay, low economic growth, and unstable regime configurations. Other studies find economic difficulties and crises to be a clear determinant for regime failure. The combined insights from these two fields of study suggest that oil price shocks should exert a negative effect on regime survival for oil producing regimes.

No studies to date have investigated this relationship. While the existing empirical literature on oil wealth and regime survival generally finds oil wealth to increase regime survival, none of these studies account for price shocks. The absence of this assessment has left a gap in the research literature, and this thesis will take the first steps in bridging this gap.

One of the reasons for this gap is the lack of sufficiently precise data. Since the oil price fluctuates from month to month, it would be difficult to observe the potential effects in observational data collected per year. By collecting and analyzing a new dataset, combining measures on political regimes with the monthly fluctuations of oil price, I am able to investigate this relationship with unprecedented resolution.

Using the statistical technique of survival analysis, I find oil price shocks to decrease regime survival for oil producing regimes. The results presented are consistent across several model specifications and robustness tests.

In addition to revealing several promising paths for further research on regime duration, the collected dataset will hopefully contribute to several other fields of study depending on data with higher resolution than ordinary observational datasets.

1 Introduction

The summer of 2014 saw a massive collapse in the oil market. The trading price of crude oil was cut in half in a matter of months, selling at $50 by January 2015. By 2016 the price reached its current nadir at $30, before stabilizing around $ 45 per barrel. This drop could have serious economic implications for oil producing countries, forcing them to balance their budgets through austerity measures, or run damaging deficits.

What will be the political consequences of this sudden price drop? While the research literature offers many brilliant insights on the economic determinants on regime survival, the field has yet to address the specific effects of oil price fluctuations for oil producers.

The literature identifies economic crises (Przeworski, 2000; Acemoglu and Robinson, 2001; Haggard and Kaufman, 1997; Tanneberg et al., 2013), changes in taxation and public spending (Morrison, 2015; Bates and Lien, 1985), and oil revenues (Karl, 1997; Smith, 2004; Ross, 2012; Wright et al., 2015; Ulfelder, 2007) as having substantial effects on regime durability. However, there have been no serious investigations into the effect of oil price fluctuations on regime stability. This thesis will provide the first step in bridging this gap.

The oil price makes for a reliable and innovative proxy for the short-term financial outlook of certain states, hopefully providing the opportunity to predict regime stability with higher certainty, while assessing the importance of price fluctuations on regime survival.

I hypothesize that sudden price drops creates widespread uncertainty about the future for oil producers, exerting pressure on the current balance of power. I will test this claim by analyzing a new dataset collected exclusively for this thesis. Here, I will perform survival analysis on the duration of institutional configurations in political regimes between 1960 and 2014.

The thesis will proceed as follows. The next section will elaborate on the relevance of this study, and state the research question. Section 3 and 4 will review the relevant research literature. In section 5, I present the theoretical framework, before explaining my argument in section 6. Section 7 will outline the statistical methodology and describe the data. In Section 8, I conduct and discuss the statistical analyses, before concluding and suggesting further research in Section 9.

2 Background and Motivation

2.1 Historical and Current Events

Price fluctuations in key resources have a history of manifesting into regime instability. One illustrative example stems form the later days of the Ancien Régime.

In the year 1774, the town of Beaumont-sur-Oise was witness to the first in a long series of riots. Located in the suburbs of Paris, the upheavals soon reached the inner city. As disorder spread, the authorities quickly deployed two armies, along with the cavalry and two detachments from the infantry, totaling to 25,000 troops. The incidents, which preluded the French Revolution, were to be known as the Flour Wars (Bouton, 1993).

Following a deregulation of the grain market, the price of flour soared. A population already bordering on subsistence – barely staying alive by the access to bread – could not handle this increase which left them starving. Riots ensued, triggered by an increase in flour prices (Bouton, 1993).

In 2015, the political implications of the falling oil prices were already visible in several countries.[1] Although these current events are too recent to manifest in observational data, they provide an intuitive idea of the hypothesized effects.

Oil producing regimes experience serious financial difficulties when the oil price falls. Many of these regimes are heavily reliant on the export revenue generated by oil, which often upholds the particular institutional arrangements created and shaped by oil revenue. When this income decreases, it will induce uncertainty about the future for all actors in the regime, possibly demanding austerity measures or the use national savings to balance state budgets.

Most oil producers, however, do not have large Sovereign Wealth Funds (SWF) like Saudi Arabia, Norway and the Emirates, which can be used to stabilize the situation. In fact, no oil producers outside the Arab peninsula[2] have SWFs amounting to more than $160 billion. Accounting for population, both inside and outside the Arabian Peninsula, these funds leave a rather low per capita figure.

In addition, all these SWFs are now shrinking rapidly. According to Russian finance minister Anton Siluanov, the Russian SWF will be depleted by the end of 2016.[3]

For these regimes, keeping a positive balance between income and expenditure demands higher oil prices. Almost all oil producers require a per-barrel price of at least $80 or above

[1] I refer to «oil» rather than «petroleum» for simplicity
[2] Except Norway
[3] Marketwatch, `http://on.mktw.net/1Gw9884`, accessed 01/04/16

to «break even». Qatar and Kuwait are the only countries which will manage at a price lower than $80.[4]

Disregarding SWFs, the International Monetary Fund (IMF) has already urged the Gulf-states to raise taxes in order to alleviate their losses, currently amounting to $340 billion in the region, in order to strengthen their fiscal framework.[5].

Several oil producing regimes have already experienced political unrest as an effect of the current oil price. Iraq is witnessing violent protests directed at a government failing to provide reliable electricity and standard care due to decreased oil revenue.[6] Further actions are difficult given the increased budget deficit currently amounting to $20 billion.[7]

In Africa, the government of Nigeria is unable to pay wages to civil servants and bureaucrats.[8] In Angola, the citizens must endure hardship as their currency plummets while the government implements drastic austerity measures.[9]

In the fragile democracy of Mozambique, the development of the Rovuma gas field was expected to attract investments amounting to $100 billion, more than six times its current GDP level (IMF, 2016). Coupled with the recent political instability, falling energy prices will add insult to injury possibly shifting its development path back against civil war.[10]

In Latin America, fears of instability and unrest are emerging. Ecuador, whose oil revenue has halved during the current oil crisis, sees large protests in the capital due to the the failed economic policies of the state. In several of these regimes, inflation is running out of control [11]

Venezuela, whose oil sales account for 95 % of their export, are arguably worst off. Decades of oil wealth allowed them to import food, medicine and other necessities without constructing own industries. Without oil revenue, the country is starving and without opportunities to turn the situation around. Per May 2016, Venezuela is on the brink of collapse and their future is highly uncertain.[12]

[4] Bloomberg, `http://bloom.bg/1QOi1Oa`, accessed 31/11/15
[5] Wall Street Journal, `http://on.wsj.com/1Xu4LOQ`, accessed 24/02/16
[6] New York Times, `http://nyti.ms/23C51Q4`, accessed 31/01/16
[7] Reuters, `http://reut.rs/1qkNBrx`, accessed 12/04/16
[8] Bloomberg, `http://bloom.bg/1fAML1R`, accessed 23/11/15
[9] Reuters, `http://reut.rs/1MrzE4o`, accessed 12/04/16
[10] World Politics Review, `http://goo.gl/7RLHVE`, accessed 04/05/16
[11] New York Times, `http://nyti.ms/1U3l0UU`, accessed 26/08/15
[12] New York Times, `http://nyti.ms/1slwG9w`, accessed 18/05/2016

2.2 Research question

Inspired by these events I formulated the following research question:
Do oil price shocks affect regime duration?

To answer this question, I will start by reviewing the literature related to this topic. This review will reveal that previous research do not take into account the effects of oil price when assessing regime survival. Given the current situation in many oil producing regimes, there is a need for updating and expanding this field of research.

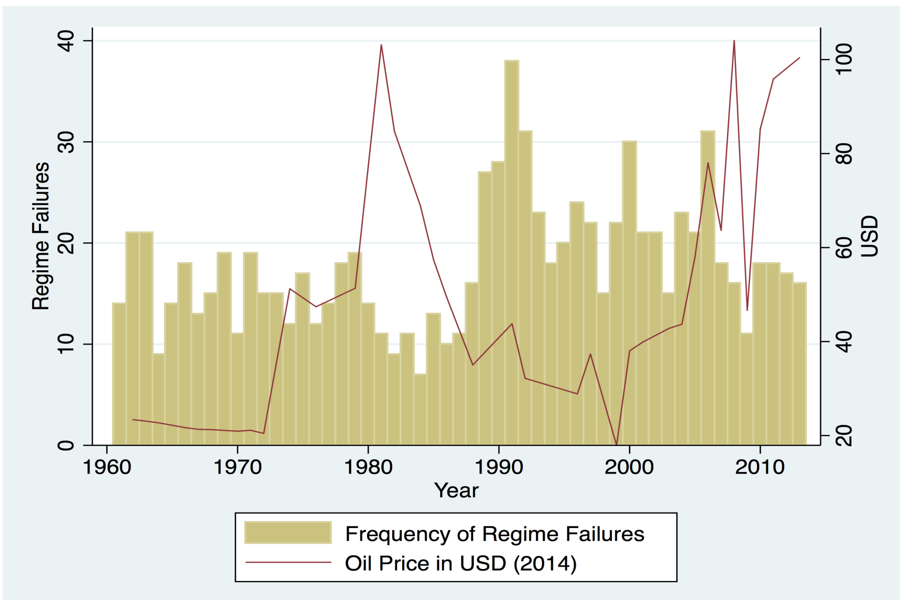


Figure 1: Number of regime changes and oil price between 1960 and 2014

3 The Pernicious Effects of Oil Revenue

3.1 Introduction

The rationale behind my focus on oil price shocks is grounded in a broad literature investigating the determinants for political regime change. These studies identify negative economic factors in general, and economic crises in particular, as maybe the greatest challenge to regime durability (See for example Przeworski (2000); Acemoglu and Robinson (2001); Haggard and Kaufman (1997); Gasiorowski (1995) provides an excellent summary of this literature).

Although these crises might occur for several reasons, the mere magnitude and value of oil production suggest that price shocks alone might induce serious economic changes, causing what Acemoglu & Robinson describe as «transitory shocks» leading to short-term fluctuations in *de facto* political power (Acemoglu and Robinson, 2006: 32). In these periods, unconsolidated non-democratic regimes are especially vulnerable. Following the literature on economic determinants for regime change, oil price shocks should have great impact on many oil producers.

The research on the «rentier states»[13] is more divided. Studies on political institutions in oil producing regimes suggest oil wealth as a destabilizing agent (Karl, 1997).

However, a large part of the empirical literature testing these hypotheses generally finds these «rentier states» to be remarkably stable (Smith, 2004; Ulfelder, 2007; Wright et al., 2015; Morrison, 2015). Michael Ross shows how oil wealth is conducive to autocracy and represents barriers for democratic transitions, but that these configurations, once in place, tend to be stable (Ross, 2012). These studies, however, do not account for oil price shocks.[14] This thesis will present the first step in bridging this gap.

3.2 The Initial Impact of Oil Revenue

The discovery of natural resources might turn out to be a curse rather than a blessing. This does not only apply to petroleum products, but might also be seen in regimes with other forms of resource wealth, like diamonds in Sierra Leone.

Still, of all natural resources, oil seems to do the greatest damage. With the oil boom of 1973, several states became wealthy practically from one day to the next in what was the largest transfer of wealth ever to happen short of wars. Many of them suffered serious financial difficulties and political deterioration in the following decades (Karl, 1997: xv).

Oil producers often experience detrimental political development without the expected benefits for economic growth. While most developing countries since 1980 have seen steady development both economically and politically, this is only true for countries without oil. Rather, oil producers experienced lagging economic development and political decay in the same period (Ross, 2012). This is what is known as the «resource curse», or the «paradox of plenty» (Karl, 1997).

This curse, however, is a new phenomenon. Most oil-rich states experienced *higher* than average growth in the decades prior to the first oil boom of the 1970s, as well as in

[13] «Rentier states» are regimes that generate most of their income from oil rents. More on this in section below.

[14] Apart from Smith (2004), whose study will be addressed later

the period from 1990-2006 (Ross, 2012: 190,196). It was first after 1973 (where oil prices quadrupled in nominal terms (Karl, 1997: 119)) that oil producers experienced lagging growth.

On average, oil wealth has not been an economic curse. The mystery, Ross claims, is why they did not grow faster. What set the oil producers apart was not less economic growth, but high economic volatility.

This finds support in a study by Cavalcanti et al. (2014). Contrary to much of the earlier economic research on the «resource curse», they show that improvements in a country's commodity terms-of-trade (these improvements could be very large for oil exporting countries) significantly raise growth levels. However, the volatility in commodity terms-of-trade shows an equally significant negative effect on growth, leading them to conclude that it is the volatility - rather than abundance *per se* - which is the source of the «resource curse» (2014: 865 (Table 1)).

The same time-specific effect goes for the political development. Prior to the oil boom, there were no significant differences in regime type between oil producers and others. However, here there are clear evidence of oil producers remaining autocratic after discovering oil. Through the «third wave» of democratization, starting in the late 1970s, countries in every region of the world democratized, except for the oil producers (Ross, 2012: 63).

The correlation between oil and autocracy is also addressed by Haber and Menaldo (2011). By using fixed effects estimations to test the long-run relationship between resource dependency and regime type, they find no correlation between natural resources and authoritarianism in a sample of countries from 1800 to 2006. In a reassessment of this claim, Andersen and Ross (2014) agree with Haber & Menaldo in that the long term effects might be weak, but they still identify a pronounced resource curse in later years.

What, then, separates this latter period from earlier times? The literature identifies several factors which, taken together, give a credible explanation for these outcomes.

There were several events in the 1970s which enabled the resource curse. One of these events was that governments to a large degree captured oil production previously held by foreign firms. In 1950, the Seven Sisters[15] controlled 98 % of the production outside the US and the Communist bloc (Ross, 2012: 38). Through a wave of expropriations between 1970 and 1980, almost all oil producing developing regimes nationalized their oil production, raising their share of oil profits from 50 % in 1950 to 98 % by the end of the 1970s (2012: 39).

[15] A conglomerate which consisted of the seven largest multinational oil companies

Since oil production is a highly capital-intensive endeavor, discoveries of oil often demanded «outside help» in the early years of extraction. With privatized oil production, the regimes were left to negotiate tax-rates often leaving them with only a smaller part of the share. The nationalization of oil production allowed regimes to gain a much bigger share.

The most important single factor, however, was the total value of oil production. With the oil production nationalized, the scale of production combined with the increased oil price granted these regimes an unprecedented burst of revenues, which increased massively through the 1970s and early 1980s. In this period, the total revenue of Nigeria rose from $4.9 billion to $21.5 billion from 1969 to 1977 (Ross, 2012: 27), while in the period from 1970 to 1974, the government revenues of OPEC-countries on average increased elevenfold (1997: 3).

3.3 No Taxation and No Representation

The scale of oil revenues, combined with nationalization of the same wealth, had - and still has - a huge impact on government's funding, allowing them to turn away from taxation as the ordinary source of income. Ross shows that the tax income as percentage of government revenue is significantly lower for oil producers compared to others, especially in low-income countries (below $5000 GDP per capita) (Ross, 2012: 31).

Morrison (2015 shows how the effect of non-tax revenues in general issues a strong and significant impact on both levels of taxation and government spending. Through statistical analyses, he finds that one unit change in the level of non-tax revenue per capita decreases tax revenue per capita by almost -0.5, indicating a strong shift in the tax rate in oil endowed countries. With spending, the coefficient is 0.8, indicating the massive increase of government expenditure (Morrison, 2015: 53).

This movement away from taxes as the main source of income is detrimental to the relationship between citizens and the government in the long run, causing what is typically referred to as a «rentier state». With bursts of oil revenue, the extractive capacity of states (ie. ability to efficiently collect taxes from their citizens) tends to wither (Morrison, 2015: 48). The rents become the new main source of income.

Without the need to tax, Ross argues, the need for representation in order to grant citizens political power is no longer present (2012: 66. When the government is in a position to grant every wish, they do not need to be held accountable for the allocation of what used to be scarce resources. The interactions between the government and its citizens thus tend weaken with increased oil revenue (Smith, 2004: 233). This depletion of authority eventually turns the government from an extractive state into a distributive one, in which it loses both authority and jurisdiction (Karl, 1997: 58-64), and the source of information generated by the tax bureaucracy (Smith, 2004: 233).

It is, however, easy to understand why it is done. As Ross argues, the possibilities offered by oil revenue allow for sustained government spending, leading to regime survival where others would collapse (Ross, 2012: 69). This also makes for increased political popularity, and many studies have shown that state expenditure is boosted and/or taxes cut before elections (Ross (2012: 66), for empirical evidence from Venezuela see Karl (1997: 179-181)). Morrison finds that increases in non-tax revenue have positive effects on the durability of both regimes and autocratic leaders (Morrison, 2015).

Other studies have also shown that tax increases presuppose concessions in policies and/or political power, ie. that taxation leads to representation (Bates and Lien, 1985: 59), especially if they do not receive commensurate benefits (Ross, 2004: 247). This also holds true for democracies. In a study by Jones and Williams (2008, in Ross (2012: 67)) they find that US voters tend to favor governments which increase the tax-to-benefit ratio. Rentier states are thus hypothesized to either remain autocratic, or become more so.

Cutting taxes, however, is far from the only expense for the typical oil producer. The immediate effect of the windfall of oil revenue in the 1970s was an exceptional increase in government expenditure allowed by the new wealth (Karl, 1997: 25). Oil producers embarked on expensive state-financed industrial projects, subsidized consumer goods, increased employment through public jobs, in addition to tax cuts (1997: 27). These policies are often very popular, but extremely expensive.

Oil rents often ends up funding a disproportionately large part of state budgets in oil producing countries (Ross, 2012: 31). In 1980, major oil exporters had a ratio of oil exports to total exports that was far higher than other primary non-oil commodity exporters (82.5 % vs. 50.7 %) (Karl, 1997: 47). In total, this makes both for a serious dependency on future oil revenues, and potentially deteriorating political capacities.

3.4 The Political Effects of Oil

The proposed political implications of these changes have been granted must attention, and there are several thoughtful explanations to be found in the literature. Ross (2012) develops a simple, informal model where a ruler whose goal is to stay in power uses the fiscal power to gather political support. To do this, he must at the same time pay political supporters, pay the military (as shown by Wright et al. (2015)), while keeping taxes low and supply public goods to the citizens. Should he not maintain a critical amount of support, he will be replaced. In a democracy replacement happens through elections, but in dictatorships it could be through popular rebellion or military coups (Ross, 2012: 68).

Without the extra income granted from external resources - such as oil rents - the leader must rely on the strength of the economy to maintain support. With declining income, he can only maintain the same level of expenses through budget deficits, which is a short term solution. In a country with oil production, leaders will be able to spend more than they collect from the citizens due to the amount of non-tax revenue. This allow leaders of oil producing countries to maintain the same level of support for longer periods of time (Ross, 2012: 68).

This relies on some problematic assumptions, some of which Ross discusses. If we assume that citizens in non-oil producing countries care about how the government spend the collected tax revenue, and thus would want to hold them accountable, why should not citizens in oil-rich states not care about the use of oil revenues in the same way? As shown by Herb ([1991] cited by Ross (2012)), the citizens of the Gulf states view the oil reserves as *their* property, and that few are particularly grateful for receiving something they see as rightfully theirs.

Ross explains this by referring to the «secrecy» surrounding oil revenues; it is easy for governments to conceal the true size of oil income(Ross, 2012: 20). Thus, citizens know the state receives some income, but not how much. Should they think that the government withholds larger parts of the revenue, Ross claims, they will protest (Ross, 2012: 71). Democratic change, he claims, might thus come from greater transparency, generating the first spark.

The probability of successful popular revolutions, however, often hinges on the part played by the security apparatus. Ross cites Snyder (1992) who points out that the unity and loyalty of the military is essential for democratic uprisings to succeed. Because of the mere size of oil revenue, this alone might block democratic transitions. When a leadership directly control the flow of benefits to the military, the military stays loyal.

Ross' informal model finds support in the data. Authoritarian states *without* oil income were on average almost twice as likely to democratize between 1960 and 2006. Again this difference is largest between high and low-income countries. There is also a difference when separating the data before and after 1980. Before 1980 there were no difference at all in the likelihood of regime transition. After this, the democratization rate of non-oil producers almost tripled, while the rate for oil producers remained the same (Ross, 2012:

75).

Oil rich autocratic regimes seem to be more resilient to regime change, according to the empirical literature (Smith, 2004, 2015; Wright et al., 2015; Ulfelder, 2007).

Ross argue that this is partly due to the higher spending-to-revenue ratio made possible by oil revenues, but that the bad quality of data obfuscates the claim. However, there are reports of countries with high oil revenues buying popular support in times of crises (Wright et al. (2015), for more empirical evidence see Karl (1997)). Ross points to the response of several oil producers to the popular uprisings of 2011, where almost every oil rich Middle Eastern state granted generous subsidies and goods in order to calm the protesters (Ross, 2012: 78).

Ross do not raise the question of why the military does not topple the oil-rich regime in the first place, which leaves a gap in his explanation. This point is addressed by Acemoglu & Robinson (2006), who argue that the military and the elites always take the future into account. In the midst of social turbulence, the military (or other politically powerful actors) might stage a coup because they are uncertain about the future redistribution of resources (2006: 30). On the other hand, if the military receives benefits in an oil-rich regime, they must discount the value of a coup by the uncertainty that follows. It is far from certain that a general may seize power without any repercussions. In addition, even the general needs the loyalty of the soldiers.

Apart from the lacking perspectives on uncertainty, the greatest shortcoming in Ross' explanation is the highly static component of his argument. Oil revenue, it seems, do not induce changes in the political regime other than allowing leaders to sit for as long as the resources keep flowing. Ross traces the particular development of oil producers to the inherent qualities of oil as commodity. It is its «scale, source, secrecy and stability» that explains the behavior of rentier states (Ross, 2012: 10). If the revenue dries up, the leadership will be ousted. Thus, oil revenue is only thought to be «extra income» without leading to any deeper changes in the underlying institutional framework.

3.5 Dynamic Effects of Oil Revenue

As Karl (1997) argues, the type of revenue a state collects and how it puts it to use define its nature (1997: 13). Dependence on particular export commodities shapes the institutions of the state and the framework for decision-making (1997: 7). Oil wealth in particular, because of its scale, has the potential to seriously alter societies.

While Ross agrees that oil wealth damages institutions by making governments less effective and more shortsighted through revenue volatility (2012: 208), he questions the impact of oil revenue on institutions in general, claiming that we should have observed a negative correlation between «government quality» in oil producing states. Government efficiency and their ability to control corruption are here held up as the only [sic] possible measures of institutions, and he finds no evidence pointing towards this correlation (Ross, 2012: 212).

Ross' informal model, however, cannot accommodate changes in institutions and power structures in oil producing states. It fails to explain how oil producers might grow more unstable over time, apart from the superficial fluctuations. Rather, as mentioned, Ross argues that the main negative effects for rentier states stems from the distinctive qualities of oil, namely its scale, source, secrecy and stability. Or rather: the size of oil revenue collected by the government is easy to hide, but its value fluctuates. This, Ross claims, leads to unconstrained governments which do not rely on tax income, which in turn fuels authoritarianism (2012: 105).

The economic factors, however, are only one part of what has been dubbed the «resource curse». As Karl argues, while economic explanations are powerful, they do not capture the underlying institutional processes which at the same time initiates these effects and forms barriers against readjustment (Karl, 1997: 5). These effects are most prominent in regimes without strong, established institutions. Canada, the United Kingdom and Norway did not experience the same detrimental effects of oil rents as other, weaker states.

Andersen & Aslaksen (2013: 55) also find support for this view. They show how the effect of oil resources on regime survival is present in autocratic and «indeterminate» regimes, but not in democracies (2013, see p. 98-101 for results).

Since Ross dismisses the effect of oil production and rents on institutions, as often argued by the rentier state-theorists (2012: 189), he rather claims the problem is that without «benevolent accountants», the distribution and spending of oil revenues are left in the hands of self-interested politicians. If only spent wisely, oil revenue should not cause the same problems (Ross, 2012: 62).

Ross' explanation is somewhat simplified, and a deeper, more nuanced perspective on this relationship is offered by Karl (1997). She argues that the influx of oil revenue has the same general effects on the incentives of policy-makers in most oil producing regimes. The policy choices in the wake of these junctures tend to follow the same path. These choices include, in agreement with Ross, lowering taxes and increasing expenditure (Karl, 1997: 44).

This however, does not simply originate from the self-interested politicians craving political popularity. Rather, it originates from a «domestic contradiction» facing all major oil producers. On the one hand, oil income is an engine of growth. One the other, it could exert severely negative effects on the domestic economy (Karl, 1997: 50-51).

To explain this, Karl introduce the mechanisms of «staple theory»[16]. The «links» a commodity generates with the rest of the economy might be beneficial or harmful. Oil wealth generates a fiscal link, which is the ability to tap the stream of income, but it also disrupts the production linkages.

Collecting high rents provide the means to buy abroad, and thus remove the incentives to produce at home. Ideal development should be based on staples which encourage the presence of both consumption, production, and fiscal links, working in tandem and producing synergic effects. But, because of the size of oil revenues, the fiscal link disrupts the other links (Karl, 1997: 52).

One could argue, with Ross, that the maladies would have been avoided by wise political leadership whose incentives was not predatory political survival at all costs, and that such policy-makers would not use the rents to buy abroad or to fuel unsustainable growth. But while a part of the problem might stem from opportunistic politicians, this is only scratching the surface.

The problems of petroleum, however, is intrinsic for most developing regimes since oil technology must be imported in the first place. The input requirements of oil production can rarely be satisfied solely by domestic sources. Karl contrasts oil production with the export of coffee, which requires domestic transportation, packaging, and processing. Oil, however, is moved in pipelines, making it unable to foster regional development and adjacent industries. Moreover, the extracted barrels of oil was up until the late 1990s almost always sent to refineries in advanced industrialized countries.[17] Thus, oil revenue does not generate any lateral links with the rest of the economy. (Karl, 1997: 54-55)

The ability to escape this perpetuating dependence on petroleum hinges on the capacity to create new bases of production. The incentives to favor resource-based industrialization, however, are often overwhelming. Oil producing regimes often lack strong organized interests explicitly favoring a more diversified economic model, which could be present through agriculture or manufacture. Again, Canada and Norway are cases in point. The generation of alternative fiscal bases through taxation will thus meet substantial resistance from

[16] Staple theory explains the development of states' political economy with a focus on staple commodities

[17] The more «heavy» the extracted oil is, the more advanced the refineries would need to be. Ironically, the easily refined low-sulfide «sweet» crude oil is often located in the richer parts of the world. Venezuela, for example, is rich on high-sulfide «heavy» crude oil demanding highly advanced refineries.

oil-based social forces with vested interests in continuing an oil-led development (Karl, 1997: 57).

In these instances, one can easily see how the incentives of policy makers across different regimes are quite homogeneous. The extraction of oil and uncritical use of revenues create an oil-based social contract almost impossible to alter. When in place, there is usually an expectation of a certain continuity in policies from different societal groups.

One cannot understand the increased instability of oil producers without accounting for the dependence on oil revenues. As Karl shows, this dependence goes far deeper than the immediate political need for keeping taxes low and spending high. In the latter case, we could still expect political protests - and even regime change - occurring with falling revenue, but this suppose that citizens and elites alike view regime change as a «reset»-button.

Moreover, it ultimately views the main difference between regimes with and without oil as a question of spending-to-revenue ratio. As we saw argued by Ross, there is no *prima facie* reason to expect citizens in oil producing regimes to care less about government spending than citizens in regimes without oil. I argue that Ross' argument about secrecy is not why this spending may be allowed to continue, but rather that the vested interest of the society as a whole shapes the dependency.

Moreover, given the deep dependence on oil revenue not only for political leadership, but for all societal groups, we should expect high uncertainty about the future «equlibrium» of political regimes with fluctuations in oil price. It is not just the tax rate citizens and elites are worried about, but also their future income.

My view, mainly influenced by Karl, argue that oil wealth permanently alters the relationship between the state and other groups in society. As seen in Saudi Arabia, this is not necessarily a problem for the political stability, as long as the state continue to receive income from oil. However, should state income decline, they must again find other resources to cover their expenses. Given the underlying institutions and the overall relationship between state and citizens, this might be potentially harmful for the political stability and could induce regime change.

Saudi Arabia is an extreme case, as most oil producers do not have this levels of production. They will still however be dependent on certain oil prices to maintain the status quo. Oil revenue generates non-tax revenue which has lasting effects on regime configurations, by changing the decision-framework for politicians and creating groups with a vested interest in continued oil production.

In section 6 I will argue that these traits make oil producers particularly vulnerable for oil price shocks because of sudden and massive uncertainty about the future. As Cuaresma et al. points out, the behavior of the political forces with *de facto* power[18] will most likely depend both on the present and expected rents generated by the state (2011: 513). Should the regime be faced with any form of severe crisis, this will cause widespread uncertainty, especially among the comfortably situated groups, either the military,or the political and economic elites.

3.6 Oil Revenue and Stability

As argued above, oil wealth typically halts the political development by allowing for increased government spending, reduced taxation, and depletion of political (esp. representative) institutions. These factors tend to fuel authoritarianism (Ross, 2001, 2012). However, oil wealth is also - more often than not - found to have stabilizing effects on political regimes regardless of the current regime configuration (Smith, 2004, 2015; Morrison, 2015). Wright et al. (2015) show that this also applies for autocratic transitions, where the dependent variable of interest is leadership transitions rather than regime change.

Ulfelder (2007) finds support for the claim that autocracies with natural resource abundance are typically more durable, by using survival analysis. Ulfelder discard the oft-used singular measure of the combined Polity components, and applies only the components of «Executive recruitment» and «Political competition» [19] in order to restrict the analysis to a purely Schumpeterian definition of democracy.[20] to test whether resource-wealth bolster autocratic regime stability. He finds that energy resource-income is significantly related to autocratic regime survival, while mineral resource-income is of less importance (Ulfelder, 2007: 1007).

This is contrary to the predictions following the already discussed dynamic effects of oil wealth in rentier states, where the general political deterioration should induce increased political instability over time, especially when the level of spending cannot be upheld, by for example a downturn in oil prices. How, then, are we to understand why oil producers often are found to be *more* stable than others in much of the empirical works?

Some rentier state theorists, like Karl, stresses the importance of stable flows of revenue, arguing that this could maintain regime stability for longer periods of time (1997: 20);

[18] Cuaresma et al. use the term «kingmaker», by which they mean the group with the power to oust the incumbent. This approach mirrors the selectorate theory posited by Bueno de Mesquita et al. (2003)

[19] XRREC and PARCOMP, see section 7 for details

[20] I find it hard to see what parts of Schumpeter's procedural definition of democracy excludes the measure of executive constraints. Ulfelder seems to focus more on free, competitive elections where most adults participate, rather than the political institutional arrangement and power-sharing

neither booms nor busts are positive for regime stability in this view. Karl shows that there were several oil producers (like Iran and Nigeria) which experienced regime change even before the oil price plummeted in March 1982. Moreover, the stability in other regimes (like Venezuela and Algeria) were threatened, but here the regimes managed to stay in power. Other countries, like Suharto's Indonesia or Botswana are cases where oil income had seemingly positive effects on the political stability.

As argued by Morrison (2015), non-tax revenue in general decreases the chances of regime transitions[21]. He argues that the main effect of non-tax revenue (by which oil revenues are a substantial part (Morrison, 2015: 7)) is to stabilize the current political regime through decreased tax rates and increased government spending (2015: 29-33, 47). Further, he argues that the increase of taxes leads to widespread instability.

This opposes earlier research where the credo of «taxation leads to representation», where also the effects of lowering taxes should increase authoritarianism[22], is central to understanding democratization. Morrison's theory of stability thus predicts that the incumbent regime will stay in power as long as they have a continuous flow of non-tax revenue, and contrary to Ross, not lead to any changes at all, neither autocratic nor democratic.

The main strength of Morrison's approach is that it allows him to distinguish between state-owned and privately owned oil, which, following Ross (2012) is an important factor in understanding the «resource curse». However, there are certain problematic points in his analysis.

First, while he finds clear statistical evidence for both the effect of non-tax revenue on tax rates (2015: 53), arguing that this is the reason for the effect of non-tax revenue on regime duration (2015: 74), the direct relationship between taxation and regime duration is only implied by the theoretical argument (2015: 29-33, 47), and not tested empirically.

The countries with the highest non-tax revenue are unambiguously oil-rich countries, and often both autocratic and highly stable (as the monarchies of the Middle East). It is then possible that the results are driven by a distinct group of countries. Further indication for this is found in his results, where the effect of non-tax revenue on regime duration (see model 2 in (2015: 74)) is not robust to the inclusion of an interaction term between changes in non-tax revenue and democracy (in $t-1$). This contestation might be

[21] Morrison applies the DURABLE variable from the Polity IV dataset, indicating a shift of at least 3 points on the Polity-scale (-10 to 10) (Marshall et al., 2013), for all political regimes (Morrison, 2015: 74)

[22] Mainly by reducing the number of citizens that gain from oil revenues - more on this below.

substantial or not, but Morrison does not control for it. He neither supplies any residual plots which could bolster the robustness of his analysis.

While Morrison's subject is non-tax revenue in general, other scholars have addressed oil wealth in particular. Benjamin Smith examines the contrasting claims that oil wealth is both said to enhance regime durability, and the general hypotheses of rentier state theory indicating increased instability. Following Karl (1997) and other rentier state theorists, he argues that with the deterioration of authority, weakening of state-society linkages, and the inflation induced by spending in rentier states, these states should be more unstable than others (Smith, 2004: 233).

Smith also includes a hypothesis specifically related to the boom and bust periods. Given these states' dependency on oil revenues, the different survival rates of rentier states under boom and bust period should be influenced. In this, Smith's work is what most closely resembles my research question (Smith, 2004: 235).

Smith's definition of regime failure is the same as we saw Morrison (2015) apply, and is derived from the DURABLE variable where regime failure is indicated by a shift of at least 3 points on the Polity-scale (-10 to 10) (Marshall et al., 2013), for all political regimes.

His primary explanatory variables are oil dependence and the booms and busts between 1970-1990. [23] Oil dependence is here measured as $\frac{Oil-Exports}{GDP}$, highlighting the role of oil revenue in both exports and domestic economy. As Smith notes in a recent article, this does not give any understanding of what this figure means for the governments' relationship to its citizens.

Should oil exports and GDP be at equal levels in two different regimes, differences in population would produce widely different «rent capacities» for patronage or coercion. Moreover, it leaves oil wealth endogenous to the size of the economy; poorer countries will look more oil-rich because they are less developed (ie. lower GDP) (Smith, 2015: 5).[24].

Smith tests the isolated effects of the boom and bust periods by means of two interrupted time-series variables. The first period is ranging from 1974 to 1985 and coded as a dummy variable, BOOM, which counts upwards from 1 starting in 1974. This is to account for the increasing political effect of the increase in oil price over time. BOOM is multiplied

[23] In short, the boom period lasted from 1973 to 1980, where the price in real terms went from $22 in December 1973 to $51 by the next month. The oil price fluctuated between $ 50 and $ 60 through the decade, before it again rose rapidly in the latter part of 1979, peaking at $112 in March 1980. From there, the price gradually decreased, and hit $50 by January 1985. By the next month, the price was almost cut in half, staying in the 30s through the rest of the decade.

[24] The proposed measure of this article will be discussed later, and tested in the statistical analysis

by $\frac{Oil-Exports}{GDP}$-scores above 0.1 % yielding BOOMEFFECT. The second period range from 1986 to 1999, where BUSTEFFECT is constructed by the same operation (Smith, 2004: 236). Smith also accounts for political trends in order to reduce the temporal relations among the observations, with a dummy variable starting at 1 and counting upwards for each year in the panels (Smith, 2004: 237).

Smith finds strong support for both these hypotheses by means of logistic regressions. The coefficient for $\frac{Oil-Exports}{GDP}$ is strongly negative (-3.011) and significant at the 5 %-level, indicating a negative relationship between relative oil wealth and regime failure. When accounting for the temporal relations among observations[25] the coefficient shrinks to 1.427, but with the same level of significance. Other strong results from his analysis is that Sub-Saharan countries significantly decrease the probability of regime failure, and that democracy has no effect. The sample consists of countries from 1960-1999 (2004: 238).

Furthermore, he finds no boom or bust effects on regime failure. The effect of the boom and bust periods are negative for regime survival, but only the bust period is slightly significant (at 10 %). The effects are also quite weak. In these results, the effect of oil wealth doubles (-6.606) and is also significant at the 5 %-level (2004: 239).

Oil wealth is also found to have a negative effect on social protest, as is urban growth, Sub-Saharan countries and GDP growth(2004: 241). However, in this analysis Smith finds an increased probability for social protest during the bust-years.

Smith concludes that oil-rich states are not the outliers rentier state theory claims them to be, and that the durability of regimes is independent of the constant flow of revenue enabling states to buy off competitors, co-opt the citizens, or keep revolutionary threats in check with the security apparatus. As examples, he mentions the reign of Suharto in Indonesia, which also Karl directly addressed as remarkably stable (Karl, 1997: 30), and the 35-year rule of Saddam Hussein.

The main weakness of Smith's design is that he does not apply the real-time price fluctuations, but rather use the dummies BOOM and BUST. It seems arbitrary to assume that the effects of booms and busts are proportionally rising for all countries. This measurement further assumes that countries with the greatest oil wealth (as share of GDP) should be more prone to instability and regime change than less oil-rich states. This is not necessarily what rentier state theory predicts. The negative effects of a bust-period may rather first and foremost harm smaller oil producers.

[25] The variable called TREND in his dataset accounts for this relationship.

As noted, the most oil rich countries by far are the stable monarchies in the Middle East. The boom and bust effects would in Smith's design then produce increasingly large coefficients for these countries, which presumably will remain stable in any case. As Gates et al. show (2006, autocracies with consistent institutions, like the Middle Eastern monarchies, are on average far more stable than inconsistent regimes (Gates et al., 2006). This could mask the true effect of price fluctuations on regime survival.

As Karl shows, an influx of oil wealth will skew the development of certain political institutions, making the regime increasingly dependent continued revenue and production. Of course, there could and should be a difference between countries with widely different figures of oil revenue, but it should also have some impact regardless of the revenue size. By constructing measures the way Smith does, he exaggerates these differences without properly accounting for regime type.

The outcome variable defining regime change also deserves attention. While widely used, it is not unproblematically applied in cases like these. While there is reason to investigate the regime changes as indicated by this variable, there are certain movements it does not capture.

To define regime change as any movements of 3 points on the Polity scale does not discriminate between different institutional configurations, some of which are fairly stable under all circumstances. Smith controls for democracy (defined as ¡ 7 on the Polity-scale), but autocracies are also usually more stable than inconsistent regimes (Gates et al., 2006). The stability associated with autocracies are thus excluded. Given the fact that many oil producers have consistent autocratic institutions, this could influence the results, and should be accounted for.

The use of logistic regression to compare proportion of events also ignores the time aspect. If we are interested in the specific duration of regimes, it is unfortunate to use this method. Looking at the probability of events is in this case inferior to a dependent variable measuring the timing or the rate of an event occurring (Hancock and Mueller, 2010: 413). Hosmer & Lemeshow also argues against the use of logistic regressions in these cases[26]

Furtermore, it is interesting that Smith mentions Iraq as a case in point of stable, oil-rich regime, as Saddam Hussein seized the definitive power over the ruling Baath party during the first oil boom. In July 1979, Saddam Hussein became the country's *de jure*

[26] «Now that software to fit the Cox or parametric hazards model is just as available and just as easy to use, we no longer recommend that logistic regression analysis be used to approximate a time to event analysis.» (Hosmer and Lemesho, 2000: 205)

leader when he succeeded his cousin al-Bakr as President. Once al-Bakr was out of office, Hussein orchestrated the famous purge of the Baath party (which he had videotaped [27], with subsequent execution of at least 22 party officials on the grounds of conspiracy.[28]

This is not to say that oil prices had any direct effect in this transition, but it shows that changes in political institutions are masked by setting an arbitrarily 3-point movement as the definition of regime change. Polity does not record this event as a regime change according to the DURABLE-variable, but the composite Polity-scale moved from -7 to -9 in July 1979.

Moreover, under al-Bakr's reign, the economy of Iraq prospered, and the citizens received a wide extent of public goods, albeit without political freedom. The political regime, however, was not stable. These instances might have happened short of oil wealth, but in contrast to Smith's claim, these events fit the typical instability patterns hypothesized by rentier state theory.

4 The Political Economy of Regime Change

4.1 A Historical View

Most of the empirical contributions hitherto reviewed have found that oil wealth increases regime stability. However, there is a large literature underlining the perils of economic crises for regimes in general. Since oil price fluctuations alone might induce economic crises for oil producers, there is a need to supply this literature since the performance of oil producers under crises is not properly assessed. Moreover, it is important to account for other possible mechanisms producing regime change, in order to distinguish between several possible causes.

Prior to O'Donnell (1973), Gasiorowski (1995) points out, the literature on political regimes was focused on broad structural factors which facilitated regime change. These factors were thought to be conducive to either democracy or dictatorship.

In fact, we can trace this theoretical direction back several hundred years. When Adam Smith wrote on the «progress of opulence», he emphasized how «Commerce [...] gradually introduced order and good government, and with them, the liberty and security of individuals» (Smith, 2000: 411-412). The idea that economic growth is conducive to democracy has been posited by many scholars since then.

[27] https://youtu.be/bm64E5R12s8, accessed 09/05/16

[28] Saddam ordered the remaining, «innocent» party officials to carry out the executions

One of the most well-known contributions to this field of research in later years was conducted by Lipset (1959). Here, he outlined what later became one of the most contested claims in comparative political science research:

> Perhaps the most widespread generalization linking political systems to other aspects of society has been that democracy is related to the state of economic development. Concretely, this means that the more well-to-do a nation, the greater the chances that it will sustain democracy. (1959: 75)

Echoing Adam Smith, Lipset finds that average wealth is much higher for more democratic countries. Economic growth, he thought, contributed to democratization through (1) the creation and sustaining of democratic norms provided by education, (2) the developing of people's enhanced time perspectives along with complex and gradualist views of politics, and (3) changing social conditions of the workers and the subsequent expansion of the middle class and their political values (1959: 82-83). This is summed up in what is referred to as the «modernization theory», which, simply put, claims that democratic regime change is facilitated by economic development.

The decades after WWII were dominated by a general optimism regarding developing «third world» countries.[29] This period of economic growth, and the simultaneous wave of decolonization of European colonies, spurred renewed interest in the question of democratization (Knutsen, 2011: 98), and the modernization theory was thought to predict how these modernizing countries would eventually reach the liberal democracy

4.2 Alternative Explanations

However, as the modernization theory was built up after a typical «British» path of development (Fukuyama (2014: 47), see also Acemoglu and Robinson (2006: 2-5))[30], it generally failed to explain regime change in the following decades. Huntington (1968), for example, pointed out the significant increase of political violence during the 1950s and 1960s in many developing countries and former colonies could not be predicted from their annual growth rates.

Furthermore, contrary to the modernization theory, Huntington claimed that «countries with underdeveloped economies may have highly developed political systems, and

[29] 42 of these countries experienced annual growth rates over 2.5 % in GDP per capita. 12 of these were in South America, 6 in the Middle East and Northern Africa, and 15 in Sub-Saharan Africa. In fact, 6 out of the 20 fastest growing economies overall were Sub-Saharan African countries, to give one example (Rodrik, 1999: 68-70).

[30] This path can be simplistically summarized: changes in technologies lead to economic growth, which then encourage demands for political participation, and ultimately the liberal democracy emerged

countries which have achieved high levels of economic welfare may still have disorganized and chaotic politics» (1968: 3); while Sovjet and the US had different political institutions, they were both highly functioning states.

Przeworski et al. (2000) argue that while economic development tends to stabilize existing democracies, the modernization theory is an explanation void of historical knowledge, heavily influenced by the correlation that economically advanced societies in our time tend to be liberal democracies. They question the relative importance of economic growth, compared to factors such as political legacy and history, social structure and institutional framework (2000: 79).

An example is given by the fact that the Western democratic regimes did not democratize because of this modernization, but rather from wars (Therborn, in Przeworski and Limongi (1997: 158). Karl (1997) elaborates this point. The wars over definitions of national borders required expensive professional armies which had to be payed through taxation. This required an administrative and coercive apparatus. (1997: 60). As Tilly (1990:64)[31] writes: «Kings of England did not *want* a Parliament to form and assume ever-greater power; they conceded to barons, and then to the clergy, gentry, and bourgeois, in the course of persuading them to raise money for warfare».

As shown by Acemoglu & Robinson, the institutional changes following the Glorious Revolution of 1688 emerged from the conflict between Parliament and the Stuart monarchs over political power. The changes severely limited the monarchy's power, allowing Parliament to gain control over fiscal matters. This was also well before periods of sustained growth (Acemoglu and Robinson, 2006: 2, 178).

It seems clear, then, that the modernization theory might have been a typical example of inductive, *ex post* explanation. When scholars observed that the western world was stable, democratic and significantly richer than other parts of the world, the explanation had to be that one caused the other. Thus, while there for the last 100 years has been a general correlation between income and democracy, the question of what causes what is not fully answered by the modernization theory.

These studies also run the danger of being overly reductionist in that the political performance is solely a product of economic development. Indeed, as mentioned above, there are many counter-examples to both modernization theory and the rentier state theory alike. Rather than be viewed simply as outliers, these cases warrant further inquiries into the underlying connection between structure and performance.

[31] Cited in Morrison (2015: 16)

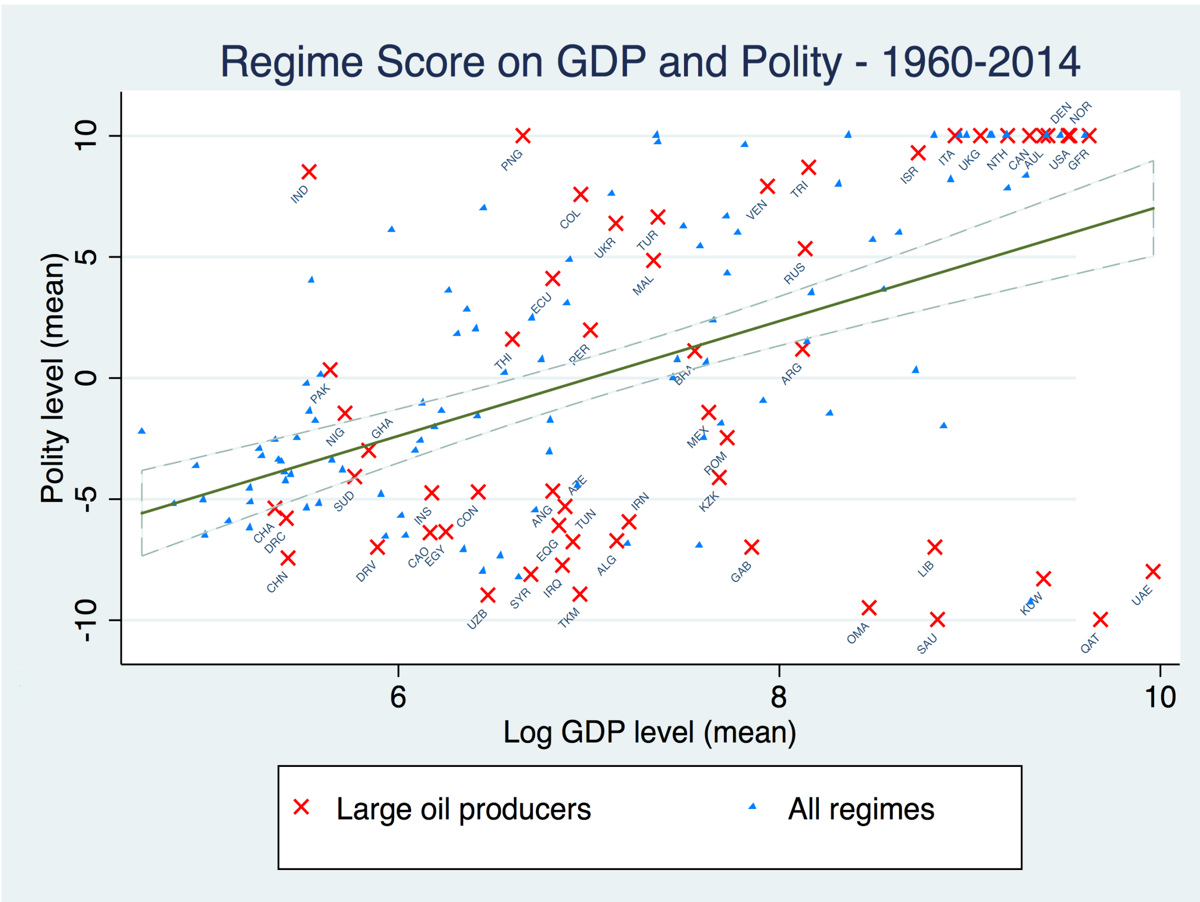


Figure 2: Means in polity score and GDP over the years 1970-2000. Countries with oil production above average marked in red.

In later years, Acemoglu & Robinson have done much work in alleviating this particular problem. By underscoring the importance of highly heterogenous historical backgrounds, different institutional paths, and the notion of «critical junctures» into political science-related questions, they have generated thoughtful insights into the deeper relationship between political and economical factors, and regime types.

In relation to this, Acemoglu & Robinson claim the modernization theory suffers from what in statistical parlance is known as «omitted variable bias». That is, there are omitted variables which at the same time might explain political and economic development paths.

Acemoglu et al. shows how the modern growth process took off at the same time as the "second wave" of democratization, and thus pose several questions about the causality between income and democracy (Acemoglu et al., 2008a: 809-810). Here, they investigate the relationship between income and democracy between 1900-2000, addressing the «within-country variation» rather than just «between-country variation» (2008a: 810) and find no evidence of a positive impact of income on democracy (Acemoglu et al., 2008a: 812). They conclude that the correlation between income and democracy probably stems from interwoven development paths, and that the historical sources for variations in these paths are responsible for the statistical association (Acemoglu et al., 2008a: 836).

In another article, Acemoglu et al. further assert that there is no any indication of stabilizing effects of increased income outside of cross-sectional data (Acemoglu et al., 2009: 1044). This is contrary to the conclusions of Przeworski (2000).

Rather than favoring the teleological explanation given by modernization theory, Acemoglu et al. underline the importance of «critical junctures». These are points or periods in states' history where different development paths are decided. Of course, these are not necessarily active choices, but the main point is that they are junctures where some path is taken instead of others.

4.3 Conclusion

Accounting for these diverse explanations of regime change contributes by sharpening the proposed mechanisms in my following argument. In addition, I argue that the following analysis will contribute to the field of research investigating economic determinants of regime change.

Following the orthodox explanations such as the modernization theory, oil wealth should facilitate changes towards democracy. However, as already seen, rather than developing sound democratic institutions, many newly rich oil countries followed a path towards political decay after the windfall of oil rents starting with the first oil shock of 1973.

Moreover, while this literature identifies different economic determinants for regime types and how they change, these explanations breaks down in explaining oil rich regimes, both in terms of type and change. As Acemoglu & Robinson argues, there is a need to take a closer look at the underlying institutions and incentives of different actors, in different settings.

4.4 Hypotheses

As argued, research on regimes with considerable oil wealth has uncovered how windfalls of resource rents affect the institutional development in a particular direction, making these countries heavily dependent on the constant flow of revenue, while the government's capacity for taxation tends to wither. With fluctuations in oil price, these countries should be especially vulnerable.

Since the 1970s the oil price has fluctuated between $20 and $ 140, including many sharp drops. For oil producing countries, these price shocks undoubtedly led to economic difficulties. For many, they induced economic crises for longer periods of time (As shown by Karl (1997), Venezuela is a relevant example). Following the literature on economic determinants for regime change, this should induce political instability and regime change.

The empirical literature on stability, however, contends that this is not the case for oil producers, partly contradicting the research on both fields. I contend that these studies do not have the research design to conclude in this question. Furthermore, almost no studies regard the oil price as a possible factor in this equation.

This constitutes a gap in the literature which this thesis hopes to alleviate. Taking the current situation into account, providing research to this field is of paramount importance as several oil producing regimes per 2016 are in serious economic difficulties due to the oil price.

To conclude, this discussion has led me to state the following hypotheses.

H_1 Oil production increases regime survival, supporting the existing literature on oil and political stability.

H_2 Negative price shocks have negative effects on regime survival for oil producing regimes.

H_3 Negative price shocks have negative effects on regime survival, but only for highly oil dependent regimes.

5 Theoretical Framework

The gist of my argument is that increased uncertainty over future income provides different actors with the incentive to seek institutional change. This uncertainty will for oil dependent regimes be induced by shocks in oil price. Before detailing the proposed mechanisms behind this claim, I will present the theoretical framework.

5.1 Who Gets What and How?

The distribution of scarce resources is the foundation of politics. The answer to the question «who gets what and how» (Lasswell, 1936) is tentatively solved by policy choices made by the political leadership. These choices will at the same time both settle and spur conflict over resources. Given the shifts in budget constraints following oil price fluctuations, choices about who will get less or more must necessarily cause distributional disruptions. These disruptions alter the allocation of resources in the future.

The new allocation of resources after disruptions is assumed to be decided by the political power in $t = 0$. Following (Acemoglu and Robinson, 2006: 21) I make the distinction between *de jure* and *de facto* political power. *De facto* political power is what most closely resembles «standard» definitions of power. One of the most cited of these definitions comes from Max Weber:

> Power is the probability that one actor within a social relationship will be in a position to carry out his own will despite resistance, regardless of the basis on which this probability rests. (Weber, cited in Uphoff (1989: 299))

There are many groups in society with *de facto* political power. The military is one example, but the citizens might also hold *de facto* political power by posing a revolutionary threat. If the executive powers are dependent on the support of rich oligarchs, they too have *de facto* power.

However, modern democracies do not work solely as a function of *de facto* power, and neither does autocracies. Short of an anarchical state of nature, all political states have additional mechanisms for resolving conflicts over resources.

De jure political power, as the word implies, pertains to the political power assigned by law. These laws determine how the political system is to be organized by detailing, among others, the executive constraints through separations of power, the procedures for alternations in political office, and electoral rules. Following Acemoglu and Robinson, I regard *de jure* political power as the power allocated through «institutions» Acemoglu and Robinson (2006: 21).

Following North (1990) I define institutions more precisely as the «humanly devised constraints that shape human interaction. [They] structure incentives in human exchange, either political, social, or economic» (1990: 3).

Because of the inherent conflict over scarce resources, different groups in society have different preferences over which political institutions to adopt or keep Acemoglu and Robinson (2006: 16). Distribution of resources, then, is a function of the underlying balance of power between different groups in society. If they change, it is because of shifting power structures in the political regime.

5.2 Why Institutions Matter for Distribution

Gains and losses from shifts in budget constraints must be distributed. Here, the incumbent political leadership decides any new allocation at their own discretion. Following Gates et al. (2006), I assume that the primary incentive of the political leadership is to maximize their current and future power. While this is a simplifying assumption, it provides analytical clarity. The leadership will then have incentives to distribute resources to actors who might keep them in power. Thus, since institutions allocate political power, they also affect the current and future distribution.

Should the citizens have institutionalized *de jure* political power, the leadership will make sure they allocate enough resources to keep them content. If the citizens have the power to vote, this will influence policy choices. They will react to changes in society by voting for whoever they find suitable to run the country to their benefit.

Political elections, however, are not binary nor necessarily powerful. Certain groups might be eligible to vote, excluding others, usually women, minorities, or the poorer groups of society. Elections might also be adopted as mere «window-dressing» by an authoritarian leadership, posing as *de jure* power sharing.

If the entrance into political life is barred by institutional constraints, voting rights do not necessarily help the citizens achieve what they want. They might get to vote, but not for whoever they want. In these cases the incumbent leadership and other elite groups would wield significant power over political life. Constraints like these affect the outcome of who gets what, and provides incentives for some groups to keep status quo, and for some to change it.

In the case of oil price fluctuations, citizens without any *de jure* political power will not have the possibility to protest policy-decisions unfavorable to them through the political system. The leadership may then cut social spending to pay off their *de facto* powerful political supporters in order to keep their political power.

5.3 Institutional Change

Since the arrangement of political institutions decides the future allocation of resources, there will be groups with the incentive to change them. Given a situation where the citizens do not have *de jure* political power, they would want to influence the executive power in order to maximize their future access to resources.

To bring about change, they thus need *de facto* power in order to pose a credible threat to the political leadership. By protesting, causing unrest or threaten revolution, they might attain the required momentum needed to challenge the system (Acemoglu and Robinson, 2001: 939). This political power is by definition transitory, so the citizens would need to «lock in» the momentum by demanding better terms while they still pose a credible threat (Acemoglu and Robinson, 2006: 25). If the leadership feels sufficiently threatened, they could promise to bring about changes in the allocation of resources.

Such changes, however, are usually not credible without a permanent redistribution of power. Establishing political institutions allowing for citizens to vote would be a credible promise to cede power, given that the elections will be relatively free and fair.

However, while certain allocations of resources might be unfavorable to the citizens, institutional change does not come without a fight. Attempts to distort the current institutions will be met by resistance from other groups favoring the status quo. This again is echoing Acemoglu and Robinson's claim that different groups have different preferences over which institutions to adopt or keep (Acemoglu and Robinson, 2006: 16).

To sum up, my following argument will be based on the assumption that all actors in society can be defined through their preferences. Should they receive a perceived sub-optimal allocation of resources, they would be compelled to alter the political environment. Since their current allocation is decided by the current distribution of political power, they would want to bring about institutional change in order to maximize their utility in the future.

6 The Argument

My argument will answer the question of how the effects of oil price shocks provide the incentives necessary to upset the institutional status quo, given the assumptions from the theoretical framework. This argument will thus relate solely to oil producing countries.

6.1 Initial Impact and Implications

Shocks in the price of key commodities lead to shifts in state budgets either increasing or decreasing their economic constraints [32]. Decreasing economic constraints allow for higher spending than before, and the ability to cut tax rates. This is what happens when regimes discover oil.

With increased economic constraints, keeping the same level of public spending is impossible without higher taxation. If the regime can not change the tax rate, they must cut public spending. They can also periodically rely on savings or loans.

Loans, however, must be paid back and funds will be depleted. This is thus short term solutions, and will not help if the oil price remains at a low level over longer periods. They must then resort to the former strategies of cutting spending or increase taxes.

With decreased constraints, the case is completely opposite. As mentioned in section 2.1, India benefits greatly from today's falling oil prices. Here, a potential windfall of saved expenses may now be allocated to other means. Regimes with decreased constraints have the possibility to cut budget deficits, increase public spending, or cut taxes.

Shifts in budget constraints, no matter the magnitude, will then lead to a «new» distributions of resources in the future. It is assumed that all actors of society have sufficient information about these shifts and how they affect the economic status quo.[33] The implication of this is widespread uncertainty for all groups about their future income, given a certain magnitude of shifts.

6.2 The Actors

I will here explain the behavior of actors in oil producing regimes, where I argue that price shocks induce uncertainty about all individuals' future output. This will apply both to civil society, the military, and the civil authority. I follow Nygård et al. (2011) with regard

[32] Note that decreased constraints allow for higher spending, and vice verca

[33] This assumption departs from Ross (2012) who assumes that governmental secrecy is influential in understanding how oil revenue affects regimes.

to this partitioning of groups within a regime. This includes relaxing the assumption about civil society as a unitary actor.

To implement Karl's theory in the argument, I assume the groups within civil society to fall along the lines of different economic sectors.[34] Since the configurations and implications should be relatively clear from the outset, I develop this model informally.

The Environment

In all societies there will be an established balance of power between the actors in time $t = 0$. In my model, institutional consistency and oil production will be the factors which decide the current stability.

The consistency of institutions is shown to have the utmost importance for regime survival by Gates et al (2006). Should a dictator exert harsh repressive measures to any form of deviant behavior, both in political circles and civil society, mere macroeconomic fluctuations should not be expected to topple these regimes.

The other extreme is found in the case of political regimes like Norway, where widespread political freedom is sustained by consolidated political institutions. In this case, even severe financial crisis will most probably not lead to regime change.

The semi-democracies and semi-autocracies, or «anocracies», are here thought to be the most unstable regimes, due to the inconsistency of institutions (See also Goldstone et al. (2010); Epstein et al. (2006)). For example, authoritative regimes which allow certain political freedoms are often found to be highly unstable by Gates et al. (2006: 903).

In contrast with Ross (2012) and Smith (2004), but in agreement with Karl (1997), regimes with oil production are taken to be more prone to instability than regimes without oil.

The hypothesized reason for this instability is the dependency oil production creates, not only for the civil authority and their continuous need to collect rents to keep the revenue/expenditure ratio above unity, but also for the citizens' future income prospects. As argued in the literature review, oil production creates groups with vested interest in the continuous production of oil. The action-space is thus much smaller than for regimes without oil production.

[34] This is recognized as a crude assumption. There are also ethnolinguistic, ethnosomatic, religious, cultural and geographic groups within societies which will fall outside of this consideration

The Citizens

With decreasing oil price, the workers in the oil sector will be especially uncertain about the future, and could demand special treatment from the civil authority. In a regime which relies $< 50\%$ on the petroleum sector, the civil authority could here maintain their political power by appealing to other groups of citizens in other sectors to keep them in power. The citizens whose future income relies on oil production will thus represent a smaller portion of society without the *de facto* power to pose a threat to the incumbent regime.

Moreover, regimes where oil production makes up a smaller faction of the total industry, the uncertainty for citizens' future income will be manageable because they know there are jobs in other sectors as well.

However, as Karl argues (1997), economic diversification is unusually difficult for oil producers. In this model, the oil sector in regimes with oil production is assumed to be an important sector for the overall economy, and the citizens will thus present a credible threat should this sector come under financial distress. The civil authority could set different groups up against each other in order to discourage unity against the incumbent, but this is harder to implement without differing economic interests between the groups in civil society.

Should oil producing regimes experience price shocks, the uncertainty over future income for citizens would be massive. Because citizens are assumed to have perfect information of the economic dependency both for the financial status and future job prospects, they will expect austerity measures, with higher taxes, lower state expenditure, in addition to the uncertainty over future income because they know their jobs could be at risk.

Here, the political institutions will matter. Using an overly simplified example of Norway, the uncertainty would first be dampened by a diversified economy, but also because the Norwegian citizens have the power to replace the civil authority should the leadership not take the desired measures to secure the median voters' future income. However, the citizens still will expect certain benefits from the oil wealth, and strong democracies like Norway are no exception (Listhaug, 2005).

Consider then a regime like Norway, only more dependent on oil production for the overall performance of the economy. The economy would then not be sufficiently diversified to alleviate the uncertainty from price shocks, and the future income of citizens would be at risk. The civil authority might decide to ignore the structural problem, boost the production to make up for lost income, and implement austerity measures to cover the rest. The people might not see this as an optimal move, rather wanting the government to borrow from abroad.

Because of the citizens' solid *de jure* power in these democratic regimes, they have the power to replace the incumbent civil authority. Note that I do not assume the citizens act or react with regards to what is optimal for the regime in the long-term; to boost production and implement austerity measures could be the optimal move for the economy in the future, while expansive borrowing might be disastrous. The point is that the citizens are unhappy.

In most cases, as described in the introduction, there is a high probability for demonstrations and protests following shocks. This in itself is not dangerous for the survival of the regime. However, this illustrates that in the absence of diversified economies and the lacking ability for citizens to alter the new situations in any way (like through free elections, free press, etc.), there will be a high degree of uncertainty.

This increased uncertainty among the citizens, however, might be alleviated for all sorts of reasons. The civil authority could enjoy widespread popularity, and the president's call to unity and calm might resonate in the public. Another often used tactic is blaming the other guys.[35] The citizens might subsequently endure some additional hardship, accepting some extra taxes and slight increases in expenses.

Or, the citizens might be unhappy with the increasing tax rate, but they do not have any incentive to make their private preferences publicly known (Kuran, 1989). This will happen when the citizens are sufficiently subdued by the security apparatus working for the regimes. They accept the situation, and nothing happens, although they might privately wish for a revolution.

Since there are several groups of citizens in a regime, the civil authority might set groups up against each other, should one of the groups protest. The most prominent example of this might be in cases of dramatic shifts in power constellations, especially among different ethnic groups. Chad, Liberia and Afghanistan are here cases in point (Cederman et al., 2010: 91).

Because of the relative difficulty of organizing popular revolution, the instances are quite rare, and could not alone explain regime change. However, the citizens will always to a certain degree represent a potential political threat for all incumbent authorities

[35] This has been done repeatedly by president Maduro of Venezuela, arguing that the US are trying to destabilize the regime. See `http://reut.rs/13FNXgI` and `http://n.pr/1MjmPWs`, accessed 18/05/2016

(Acemoglu and Robinson, 2006: 25).

While revolutions are rare, regime changes are not. I thus perceive the *potential* threat as often being sufficient to induce changes in the regimes, short of popular revolutions. If the incumbent regime perceives this threat as credible, they might make concessions or restrictions of political power, or increase the repression and transgressions towards them, relative to $t = 0$.

While the citizens represent a potential political threat – where price shocks could present solutions to collective action problems in repressive regimes – the military will in most regimes hold a larger proportion of the «immediate» *de facto* political power. As argued by Acemoglu et al. (2008b), the collective action problems for the military are much smaller for the military than for citizens.

The Military

In an oil producing regime without stable and well-defined political institutions, a shock will present the military with an extreme increase of political leverage should the incumbent regime feel threatened by the new situation. When different groups of citizens voice their discontent, the military will be a key player for the incumbent regime in avoiding further uprisings, short of the possibility to co-opt these groups in different ways.

I assume that the civil authority only sees co-optation, in the form of increased *de jure* power to the citizens, as a last resort; they would first use their financial muscles to calm unrest. In the case of falling oil prices, this opportunity quickly fades. They are the assumed to use other measures for remaining in power. The military is then in a unique position to set the demands.

In addition, increased repressive measures demands increased payment. The military may have to increase recruitment to keep protesters at bay, as well as keeping salaries high enough to maintain loyalty.

At this juncture, they have the power to topple the regime. The threat posed by the citizens renders the incumbent civil authority relatively weak. The military does not necessarily have this power in the status quo. Even generals are dependent on the loyalty of the soldiers, and a military coup will not necessarily last if the people were content under the previous regime. After all, soldiers are also citizens.

Should, however, the people be unhappy with the current regime, the military could justify a coup promising the citizens better conditions than they have in status quo. Egypt after the Arab Spring is a case of interest.

Thus, in the case of price shocks for oil producing regimes, the military is in my model assumed to be the first mover. They will then maximize their utility by assessing the *de facto* power of the citizens.

If this power is found to be weak relative to their own *de facto* power, they will support the regime. In this case they are able to state their demands at their own discretion. This is assumed to be more rewarding for the military than staging coups, since they discount the value of possible political power tomorrow. This is mainly because of the uncertainty that follows coups. They can not necessarily foresee the reaction from the citizens, or if the soldiers will agree to the decision.

Should, however, the military calculate the *de facto* power of the citizens to be stronger than their own, they most likely will not go up against them. In this case, it is more likely that the military would tap into the momentum of the social forces, rather toppling the incumbent regime than doing their bidding. In this case they have the possibility to claim to represent the people's revolution, where they would promise the citizens better terms and higher income.

One point should be added here: Intuitively, one would think that the military is always the strongest force in society. However, in face of widespread popular uprisings, their ability to repress is limited. They do not have the capability to beat up hundreds of thousands of citizens (Nygård et al., 2011: 14). Moreover, should they go up against a sufficiently large and angry mob, there is a large possibility that soldiers would defect, rather joining the band-wagon for regime change. Again I will stress that soldiers are also part of the citizenry.

The Civil Authority

We have now introduced the two extreme outcomes of popular revolution - where the citizens are responsible for regime change - and military coups - where the military uses its power to transform regimes. This leaves the role of the incumbent civil authority.

Following my definition of regime change, there are several mechanisms through which these changes might occur. To recap, regime change is regarded as changes in one of three underlying political institutions. Should there be a change of a certain magnitude in political participation, this would constitute a regime change. The second institution relates to the recruitment procedures for executive power. If this process is altered, it is also indicate regime change. Lastly, changes in the constraints on executive power will lead to regime change. This typically relates to the presence and power of the legislature in constraining political power.

The power to make changes in these institutions resides solely with the civil authority, short of military coups or popular revolutions. Since we assume that the main goal of the incumbent leadership is to stay in power, they will be willing to make concessions of power through these institutions if some group has sufficient *de facto* power threatening the survival of the political elite. As mentioned, this will be the last resort, after exhausting all possibilities of shifting the tide by means of financial muscles.

On the other hand, they could also preempt any perceived threats through restrictions of the same institutions. What decides the different actions will reside on many factors, and this model will remain agnostic to the direction of change. As Karl (1997: 20) argues, there were seemingly no prior indications to the direction of change for many of the regime failures following windfalls of oil revenue of the 1970s, so this model will focus on change *per se*.

Actions and Incentives in the Presence of Shocks

When an oil producing regime experiences a price shock, the civil authority will seek to maximize the probability of staying in power contingent on the perceived threat of the other groups. Should the citizens protest, they could deploy the military to offset any further rioting. The military may be satisfied by economic means, which will secure their distribution of wealth and thus decrease their uncertainty about the future.

When money is in short supply, these solutions are not credible. The military must be paid for their services, and even more so with looming revolutionary threats from citizens. The citizens could be bought by upholding the same economic benefits as before, but this will often be too expensive. Since the military and the groups of citizens are assumed to have information about the financial status of the state, promises about future payment will not be credible.

The citizens could then, following Acemoglu and Robinson (2006), demand credible concessions of political power, if their transitory *de facto* power allows for it. This will only happen through the ceding of political power through institutions.

The military, however, is in a different situation. The main reason for this difference is that the military do not face the same collective action problems as do citizens (Acemoglu et al., 2008b). Thus, I assume that the military will react quickly should the civil authority renege on their promises. For the citizens, this reaction is much harder to facilitate.

There are reasons to believe that the relationship between the civil authority and their security apparatus are especially contentious in the wake of price shocks, especially in non-consolidated democracies and dictatorships.

While all groups in the explanations above are influenced by different preferences, the fight for resources is basically the same. With negative shocks the value of the main commodity would then decrease for both groups. What could be the consequences of this fact?

Garfinkel & Skaperdas (2000) develop an argument which originally addresses why two parts engage in warfare when there is no rational reason to do so (Fearon, 1995). While fighting is more costly than settlement, fighting also grants the opportunity to weaken the enemy in the future, which by Garfinkel & Skaperdas is argued to be a rational reason for war; the dependence on resources tomorrow might influence the choice today, even if this choice involves an absolute loss.

For oil producing regimes, this effect could be potent. The main logic of their work regarding relative gains in the future might be applied to this model. Not only is the future power and income at risk during negative shocks, but the source of both is rapidly shrinking. This should lead to even higher tensions between the two groups, resembling a typical stand-off where the first to draw his weapon, wins.

While the citizens also might perceive their source of income to be shrinking, possibly enabling them to overcome collective action problems under dictatorships (Kuran, 1989) see also Acemoglu and Robinson (2006: Ch. 4), the civil authority/military relationship is also contentious for another reason. As Acemoglu et al. (2008b) argues, natural resources might make the elite more willing to use repression to prevent democratization (as also argued by Ross (2012)). On the other hand, this forming and subsequent fostering of a strong security apparatus increase the chances of military coups in all situations presenting the civil authority with a moral hazard problem.

6.3 Summarizing the Argument

Given the assumptions in this argument, we could expect to see regime change following sharp downturns of oil price in oil producing regimes. There will then be a need to control for different types of regimes, as is done by Gates et al. (2006).

Again, in strong democracies we would not expect any changes because of the consolidated institutions and diversified economy. While Listhaug (2005) argues that oil wealth exerts some of the classical rentier state-symptoms even in Norway, but that these effects are rather mild in a relative context (2005: 835).

Given oil dependence and less consolidated democratic institutions, the uncertainty rising from falling oil prices are more perilous. When the future is uncertain and the perceived end is near, the environment will thus be highly unstable. Different groups will have different preferences for a range of outcomes. While these preferences might be known among the actors, there will be incomplete information about each group's resolve. This establishes regime change as a probable outcome.

This argument is developed in order to explain and justify why I expect support for H_2. However, while support for H_3 also would include some support for H_2, it would in this case be unclear what the underlying mechanisms are. This proposed theory would then be indistinguishable form «ordinary» economic crises as seen in the literature on economic crises and regime change. The following statistical analyses should provide answers to all these questions.

7 Data and Method

7.1 Survival Analysis

Since the proposed hypotheses have an explicit interest of the timing and change of regime failure, event history modeling, usually referred to as survival analysis, is well suited for the task (Box-Steffensmeier and Jones, 2004: 2).

The notion of survival relates to how long a particular regime stays the same before an «event» occurs. The events in my dataset are regime change. At this point the regime fails because it represents a change or transition from one state to another (Box-Steffensmeier and Jones, 2004: 7-8). If the regime never experiences an event or failure, it is censored.

With this method we are able to assess the average survival rates of regimes given certain covariates. The covariates may either decrease or increase the risk of failure, and the analyses look for common denominators correlated in time with moments of regime failure.

This allow us to investigate whether oil related variables have any effect on the survival time of regimes. As shown in earlier research, democracies exert high survival rates (Gates et al., 2006), while regimes experiencing negative economic performance often fails (Gasiorowski, 1995).

There are additional assumptions pertaining to this method of analysis, but they are best explained while commenting on the results.

7.2 Gathering Data

To conduct the analysis, I had to vastly improve some data sources. I found the operationalization of regime change presented in Gates et al. (2006) to be closest the underlying phenomenon of interest (I argue why in the next section). This measure disaggregates several measures from the Polity IV dataset, and deploys the Polyarchy dataset for its measuring of political participation and competition.

The Polyarchy dataset records observations on number of votes, vote share for election winner, and population in order to evaluate the political participation and the competitiveness of the political system. While the Polity IV dataset is updated each year, the Polyarchy dataset only comprised observation throughout year 2000.

I thus collected the rest of the data myself in order to strengthen the conclusions of my analysis. The dataset was expanded to 2014, including observations on 600 additional elections. This collection allowed me to analyze an additional 2,300 country-years from

2000 to 2014. In addition to the existing data, this sums up to 5,000 country-years[36] from 1960-2014.

These data were recorded on a daily basis making them compatible with the monthly observations in Polity IV. I am thus able to track changes on a monthly basis and analyze the effect of oil price shocks on regime survival. It is important to note that $\delta t = 1$ refer to a change in one *month*, and not one year. For example, when I lag the variables by one year, I do so by observing the value of X at $t - 12$.

While the main period of analysis will stretch from 1960 to 2014, some of the control variables used in the analysis are first recorded from the 1970s and some as late as 1980. Because of my extension of the data source, I am able to more than double the time-range on these variables, arguably tipping them over from unreliability.

7.3 Operationalization of «Regime Change»

Many are Called, but Few are Chosen

A political regime is a system of relations between the civil society and the state. This system consists of rules and practices that define who has political rights and how these rights are to be exercised (Przeworski, 2000: 18).

I view the rules and practices that define political regimes as «political institutions». A recap of the definition might be in order: «Institutions are humanly devised constraints that shape human interaction. [They] structure incentives in human exchange, either political, social, or economic» (1990: 3). Changes in political regimes will be viewed as a function of the underlying institutions.

How do we determine what constitutes regime change? The most common subject of interest in the literature on regime changes is democratic transitions. The definitions of «democracy», however, is highly contested, and there are both broad and narrow definitions applied in the literature.

One example of a narrow definition is found in Przeworski (2000: 20-22) who define democracies as regimes with the political institutions of freely elected executives and legislatures, with more than one party. However, Przeworski et al. (2000) also include Przeworski's (1991 claim that «democracy is a system in which parties lose election» (1991: 10), and thus include the criteria of alternation of political office.

If a former dictatorship at a point introduces free multi-party elections, it is difficult to

[36] Or, more precisely, 59,669 country-months

know whether this is done as a genuine move towards democracy, or if the incumbent know he is going to win and has no intention of stepping down if he were to lose. They claim it is first when political office alternates that we can define it as a democracy (2000: 28-29). This is done to eliminate the possibility of false positives (a type I-error, in statistical parlance).

Following this definition, regime transitions are fairly rare. Thus, there might occur substantial regime *changes* that do not fall under the category of regime *transitions*.

One instructive example is Mozambique. In 1994, the country held its first multi-party elections, after president Chissano allowed other parties than the Marxist-Leninist Frelimo Party to run for office. However, in every consecutive election up until today, Frelimo has kept the legislative majority. Because there has not been an alternation in the political office, Przeworski's dataset[37] did not classify the general election of 1994 as a regime change, even though the first three criteria were fulfilled.

This is problematic because it leaves out the possibility of distinguishing «partial democracy» from the data. Epstein et al. (2006) argue that this group is among the most important and least understood of all regime types, because of their high volatility (2006: 555). This argument finds further support in Goldstone et al. (2010) and Knutsen and Nygård (2015).

Another widely used measure of democracy is the Polity IV Project (Marshall et al., 2013). Here, political systems are categorized on a set of six indicators grouped on three variables measuring three distinct dimensions of authority (Gates et al., 2006: 897). Scores on these indicators make up a composite measure from -10 to 10, thus offering data with conceptually higher resolution allowing for easy identification of «partial democracies», or «anocracies». It is also easy to track changes within these regime typologies. Related to the subject at hand, these advantages are important.

In the literature making use of the Polity dataset, regime transitions are often defined as certain movements[38] on this scale (See for example Smith (2004); Rodrik and Wacziarg (2005); Kennedy (2010)), or the passing of certain thresholds[39] (Epstein et al., 2006; Heid et al., 2012). Returning to the example of Mozambique, the composite polity-measure rose from -6 to +6 in 1995[40], indicating an important regime change, but not a full democratic

[37] Updated by to 2008 by Cheibub et al. (2013)

[38] The Polity project defines regime changes as a 3-point movement in either direction (Marshall et al., 2013: 17), and this is the definition applied by most research using this measure

[39] Usually defined as +8 or above. A score of +8 indicates maximum score on at least one of the three measured dimensions.

[40] The score of +6 indicates «transitional or restricted elections», «moderate constraints on chief execu-

transition.[41]

Choice of Definition

In their investigation of institutional consistency and regime durability, Gates et al. (2006) disaggregate the measures of the Polity index and operationalize regime change as changes in one of the three dimensions of authority (2006: 897). They also use the Polyarchy dataset to measure political participation (I explain why below).

Here, they define regime change, or «polity change», as changes in at least one of the three dimensions of authority (Gates et al., 2006: 898). Specifically, this happens when at least one of these changes occur:

1. There is a movement between categories in the executive dimension[42]
2. A two-unit change on the executive constraints dimension[43]
3. A 50 % decrease or 100 % increase on the participation dimension[44]

This definition is superior because it captures changes in institutional configurations that a simple 3-point movement on the polity scale would not get. Moreover, by implementing the Polyarchy dataset, it gains a far better grasp on measuring political participation and competition.

To better understand the «dimension»-aspect of their operationalization, Gates et al. (2006) visualize these through a three dimensional cube with the three dimensions of political authority comprise one dimension each. They further argue that the ideal regimes (pure autocracies and pure democracies, which would translate to -8 to -10, and +8 to +10 on the polity scale) are located in diametrically different corners. All other regimes would then have a specific coordinate within the cube, with «ideal» inconsistent regimes located near the center of the cube (Gates et al., 2006: 896-898).

tive», and «limited and/or decreasing overt coercion». For example, the ruling party enjoys structural advantages, in addition to exploiting these advantages(Polity IV Project, 2010).

[41] While Przewoski et al. recognize this change by a recoding of variables measuring number of legislative parties, and the move from non-elective selection to direct election, they still do not categorize this as a regime transition. It should thus be pointed out that the main divergence between the two approaches are mainly theoretical, and not empirical.

[42] These variables are named XRREG, XRCOMP, or XROPEN in the Polity dataset. See Marshall et al. (2013) for additional information

[43] XCONST in Polity

[44] Derived from the Polyarchy dataset

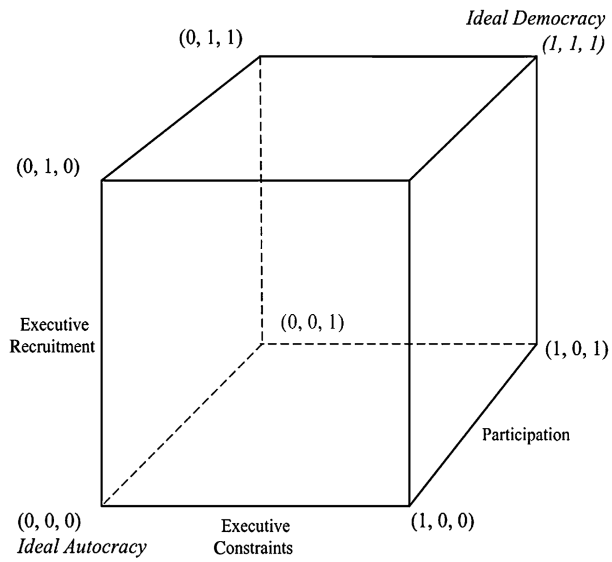


Figure 3: The three dimensions of political authority

As argued by Morrison (2015: 111), there are clear benefits of investigating all regime changes, not just to or from democracy. This entails an important conceptual difference. Rather than interpreting the effect of oil price fluctuations on the representativeness of government, this thesis will interpret the association between fluctuations and regime instability. By defining regime change this way, I reap the same benefits.

As Gates et al. (2006), I also employ the Polyarchy dataset as a basis for measuring political participation, because of the problems with the Polity participation index. These problems stems from the overly subjective components and, the failure to distinguish between different degrees of suffrage, and the coding of «factional» system which includes violent competition between factions. As Gates et al. (2006: 897) argue, this is rather an outcome of an institutional agreement rather than a configuration.

To conclude, this definition of regime change as the dependent variable is neither too narrow nor broad. Changes in these institutions do not happen easily, but they still capture a number of serious changes in the political regime. In table 1 I have listed all regime failures per regime type, in addition to regime types following oil price shocks.

7.4 Independent Variables

Main Explanatory Variables

The main explanatory variable of this analysis will be oil price fluctuations. These fluctuations are operationalized through tracing the largest changes occurring within the last n months. Because of the data structure, I am able to investigate changes occurring from one month to the next.

The oil price data is downloaded from MacroTrends (2016), providing month-end prices on West Texas Intermediate Crude (WTI) from 1946 to 2016. The values indicate price-per-barrel in US dollars, and are adjusted for inflation.

Table 1: Dependent variable

Regime Type	Freq (Months)	Failures	Failures after Shock
Inconsistent	21.792	391	24 (6.2 %)
Caesaristic	12,788	175	17 (10.8 %)
Autocracy	29,525	192	10 (5.5 %)
Democracy	36,793	102	6 (6.3 %)
SUM	100,898	860	57 (6.6 %

To construct the explanatory variables of interest, I list all differences in oil price between $t = 0$ and $t = n$ in the dataset, and mark the observations as ”1” if the difference in oil price is among the largest changes in the data within n months.

These thresholds are set at the 90th and 95th percentile (see figure 4). If there is a change in oil price which amounts to one of the 5 % or 10 % largest recorded differences from one month ($t = 0$) and the next ($t = 1$), it will be coded as a shock. Similarly, this is done for all changes between $t = 0$ and $t = 12$.

There is an ongoing debate about how to best measure oil dependency. Smith (2015: 11) provides a great presentation of the measures typically used in the literature, and outlines their advantages and disadvantages. The most commonly used measure is arguably oil export revenue as share of GDP (see for example Jensen and Wantchekon (2004)). As Smith explains, this does not account for domestic consumption, or differences in purchasing power between regimes.

Two regimes with a figure of 50 % share of total exports could here be highly heterogenous. One might rely on exports for 80 % of GDP, while a richer regime might only rely on exports for 10 % of their total GDP. The figure would also be skewed where state bud-

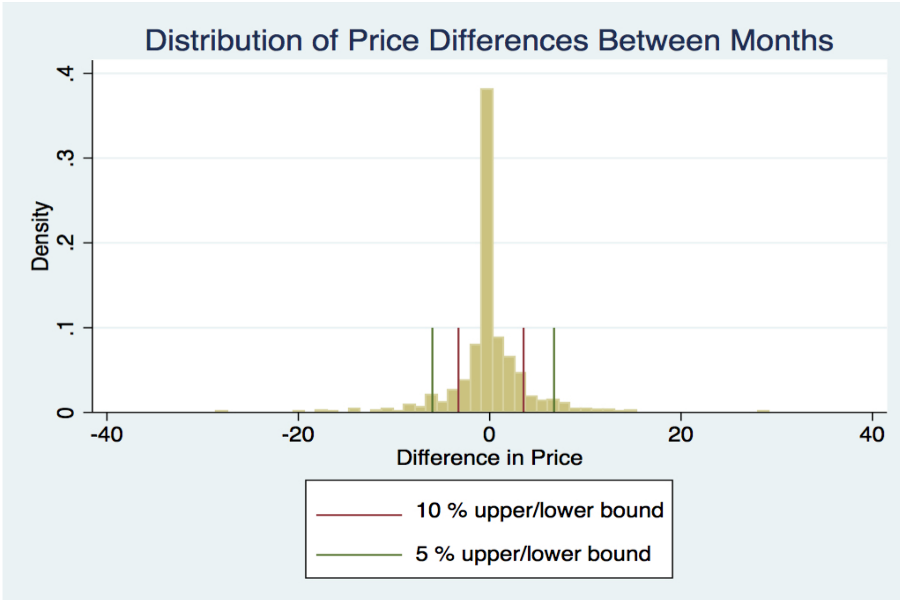


Figure 4: Distribution of Price Differences between t and $t+1$

gets partly rely on the domestic revenue produced by oil. Price levels also vary between regimes, meaning that the importance of $ 1 is not the same in Norway as in Nigeria.

I follow Smith in controlling for oil dependency with the measure of oil exports as share of GDP. To account for price levels, I generate this measure with purchasing power parity-adjusted GDP data (per capita). The main problem with this measure is the availability of data. Data on oil exports are only available from 1980, systematically missing data on poorer regimes. The implications of this is a seriously reduced sample, without the same reliability. For this reason I rely on the most available data for oil production in many of the analyses.

I argue that the only real way to account for the problems underlined by Smith is by using several measures and observe the varying explanatory power of each of them. Thus, in addition to scale of production and oil exports as share of GDP, I use data on log oil value and net exports to increase the robustness of the analysis. Since the values on these variables are highly unequal, they will also be log-transformed. In sum, I view increased values on each of these different variables as expressions of oil dependency, albeit with different relative importance.

I also include dummy variables indicating whether a regime produces oil or not. This is done to exclude the possibility that many big oil producers are fairly stable under any circumstances, like the Middle Eastern monarchies.

Control Variables

As argued in the literature review, there are several other factors affecting the duration of regimes. In my analysis I focus on the economic factors known to impact regime survival. All following measures are from the dataset World Development Indicators (World Bank, 2015).

GDP levels are shown by Przeworski (2000) to affect regime survival, and are included in the analysis. This measure is lagged to show the GDP level per capita at $t-12$ in order to prevent endogeneity. I log-transform the GDP variable in order to make it normally distributed. The measure is reported in constant 2005 dollars.

Likewise, the growth rate of GDP is included, measured at $t-12$. This has by several authors been linked to the survival of regimes. Przeworski et al (2000) find that decreasing growth are the most common reason for regime breakdown in democratic regimes. This measure is also reported in constant 2005 dollars.

Similarly, Gasiorowski (1995) also argues for how economic factors might lead to regime breakdown. This study also shows how inflation is particularly damaging for regimes. Thus, I include a lagged measure of inflation, indicating the level of inflation at $t-12$.

This vector of control variables will for simplicity sometimes be referred to as $\mathbf{X}$ in the following.

Table 2: Summary Statistics of Independent Variables

Variable	Mean	Std. Dev.	Min.	Max.	N
Control Variables:					
GDP	4666	8909	37.5	93587	74,419
Log GDP	7.13	1.63	3.63	11.45	74,419
GDP Growth	1.97	6.12	-50.29	92.59	70,167
Log Population	15.92	1.54	11.68	20.97	81,694
Log Inflation	1.99	1.41	-13.5	10.2	74,063
Oil Related Variables:					
Oil Producer Dummy (PWT)	0.52	0.5	0	1	81,719
Oil Producer Dummy (Ross)	0.53	0.5	0	1	97,536
Log Oil Value	10.94	10.46	0	26.88	97,536
Log Oil Production	7.94	7.72	0	20.24	97,536
Exports (% of PPP GDP per capita)	0.07	0.18	0	0.99	70,265
Rent Leverage (Smith, 2015)	0.20	0.58	0	5.13	77,381
Net Exports ($100)	-0.05	11.61	-114.4	74.77	49,506
Top Exporter (75 %)	0.25	0.43	0	1	49,506
Top Exporter (90 %)	0.1	0.3	0	1	49,506
Top Producer (75 %)	0.25	0.43	0	1	97,536
Top Producer (90 %)	0.1	0.3	0	1	97,536
Shock Variables:					
Real Price of Oil	46.76	27.57	16.25	144.51	105263
Shock 5 % (t+1)	0.04	0.21	0	1	105,263
Shock 5 % (t+2)	0.05	0.23	0	1	105,263
Shock 5 % (t+3)	0.05	0.22	0	1	105,263
Shock 10 % (t+1)	0.1	0.30	0	1	105,263
Shock 10 % (t+2)	0.1	0.30	0	1	105,263
Shock 10 % (t+3)	0.1	0.29	0	1	105,263

8 Statistical analyses

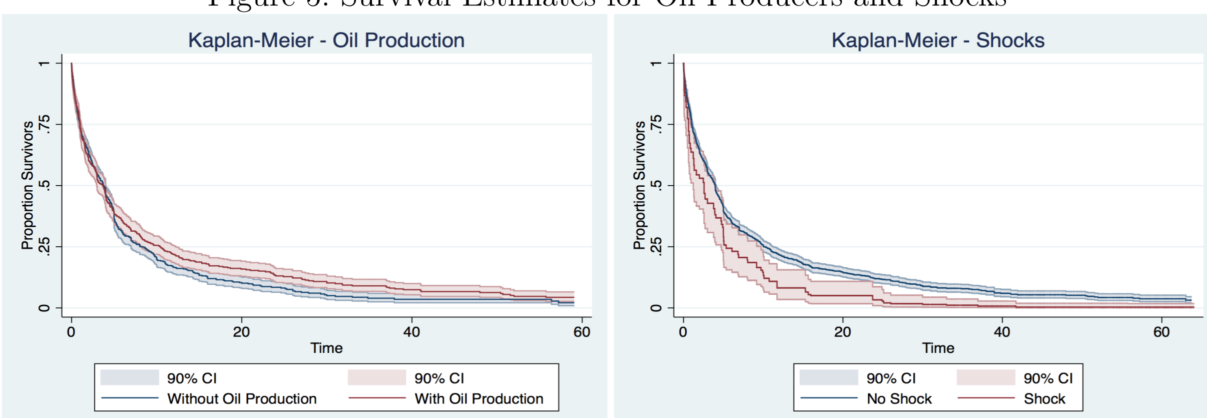
8.1 Assessing Survival Rates

As we see in figure 5, the hypothesis that oil production increases survival rate find immediate support in a cross-country estimate of regime survival in oil producing regimes. The trend shows these regimes to be somewhat more stable than other regimes, *ceteris paribus*. This gives some support to hypothesis H_1.

It is not surprising, then, that several of the discussed works (like Smith (2004)) reach the conclusion of increased regime survival rates for oil producers. Note that this survival estimate perfectly echoes the survival estimates of dictators with and without oil production in Cuaresma et al's article (2011: 515)[45] which lends some credence to the robustness of the claim.

Figure 5 also shows the impact of oil price shocks on survival. There is on average more regimes failing following price shocks. From the literature on economic crises and regime survival, this is not unexpected (see for example Gasiorowski (1995)). However, as mentioned, no prior studies show the effect of oil price fluctuations.

Figure 5: Survival Estimates for Oil Producers and Shocks



8.2 Cox Regression Models

In table 3 we see the first regression results. There is a clear and consistent effect of shocks on political regime duration. In the month following shocks, there is an increased chance

[45] See also the similarity with the Kaplan-Meier estimates for oil-rich countries in Andersen and Aslaksen (2013: 90)

of regime failure, indicated by hazard rates above 1. A hazard rate of 1.56 indicates a 56 % increase in hazard rate relative to periods without price shocks.

The coefficients for regime types show the same results as they do in Gates et al. (2006); all political configurations are more stable than inconsistent regimes. Democracies are the most stable regime type, and is related to a 76 % decrease in hazard relative to inconsistent regimes.

Table 3: Cox Regression Estimates of Hazard Rates on Proximity to Shocks, 1960-2014

	Model 1
Caesaristic	0.76**
	(-2.40)
Autocracy	0.55***
	(-5.09)
Democracy	0.24***
	(-8.94)
Shock t-1 (5 %)	1.56**
	(2.47)
Oil Producers	1.11
	(0.94)
Log GDP (t-12)	0.93*
	(-1.82)
Log Inflation (t-12)	1.01
	(0.36)
Growth (t-12)	0.98**
	(-2.36)
Log Population	1.01
	(0.17)
Log lik.	-2735.66
No. of subjects	702.00
No. of failures	517.00
Observations	59669

Exponentiated coefficients; t statistics in parentheses
Hazard rates for regime type are relative to the baseline category Inconsistent"."
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Further, we observe that both GDP levels and growth have a positive effect on regime survival. A one point increase in log GDP indicates 7 % decreased chance of regime failure. This supports the literature reviewed in section 4, where increasing income is found to have positive effects on regime survival. The level of inflation do not seem to exert a strong effect, and thus contradicts the results from Gasiorowski (1995).

Moreover, in contradiction with the baseline survival estimate, being an oil producer seemingly increase the chance of regime failure by 11 %, but the standard error is here to large to assert any definitive effect. However, since this is a dichotomous measure the effect is quite strong. The reason for the difference between figure 5 and these estimates is due to the inclusion of covariates, indicating that oil producers are less stable when we control for other economic factors. On the face of it, this supports H_2.

These estimates indicate that the short term effect of price shocks do have a negative effect on regime survival, controlled **X**. However, we must both widen the definition of shocks and see whether the coefficients are connected to oil producers in order to substantiate this claim.

Expanding the Time Frame of Shocks

When expanding the shock variable over several months, as seen in table 4, we see the hazard rate dropping with time. This indicates two things. First, it substantiates the claim that shocks seem to have a short term effect on political stability. Second, the shocks are not statistical anomalies, but behave in an orderly manner.

If the coefficients had fluctuated from one month to the next, it would have been hard to interpret any clear indications from them. Moreover, it could indicate that shocks were poorly measured. However, since hazard rates following shocks shrink successively each month, this is a clear indication that the shock-variables actually capture the phenomenon of interest. In table 13 (Appendix B), I have further expanded the shock variables up to months $t + 12$. Here, the effect is decreasing monotonically, and passes a hazard rate of 1 after 5-6 months.

In table 4, the dummy variable «Oil Producer» is replaced by log oil production in order to implement a continuous measure of oil dependency. This measure does not have any effect on the hazard rate. In the next section I will include other operationalizations of oil dependency.

Measures of Oil Dependency

As mentioned, all available measures of oil dependency have inherent weaknesses, and the data restriction usually sets the terms for what measures we may develop. While oil production offers the data with a minimum of missing values, it is not necessarily a good measure for oil dependency.

To account for this, I test the effects of shocks on additional operationalizations. While I in table 3 used a dichotomous measure of oil producers (ie. producing versus not producing) and in and table 4 the scale of production, I further test the robustness on the inclusion of net oil exports and oil exports as share of GDP (see 14 and 15 in Appendix B).

The inclusion of these measures somewhat alter the standard errors the shock-variables, but the effect is more or less the same. Oil exports as share of GDP seems to stabilize

Table 4: Cox Regression Estimates of Hazard Rates on Proximity to Shocks, 1960-2014

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Caesaristic	0.76**	0.76**	0.76**	0.76**	0.76**	0.76**
	(-2.39)	(-2.34)	(-2.39)	(-2.39)	(-2.38)	(-2.36)
Autocracy	0.55***	0.56***	0.55***	0.55***	0.55***	0.55***
	(-5.06)	(-5.00)	(-5.08)	(-5.08)	(-5.10)	(-5.12)
Democracy	0.24***	0.25***	0.24***	0.25***	0.24***	0.24***
	(-8.93)	(-8.86)	(-8.94)	(-8.88)	(-8.94)	(-8.95)
Log Oil Production	1.00	1.00	1.00	1.00	1.00	1.00
	(0.55)	(0.61)	(0.58)	(0.63)	(0.56)	(0.51)
Log GDP (t-12)	0.93*	0.92*	0.93*	0.92*	0.93	0.94
	(-1.66)	(-1.83)	(-1.66)	(-1.80)	(-1.60)	(-1.51)
Log Inflation (t-12)	1.01	1.01	1.01	1.01	1.01	1.01
	(0.38)	(0.33)	(0.38)	(0.29)	(0.37)	(0.38)
Growth (t-12)	0.98**	0.98**	0.98**	0.98**	0.98**	0.98**
	(-2.36)	(-2.37)	(-2.36)	(-2.29)	(-2.33)	(-2.33)
Log Population	1.01	1.01	1.01	1.01	1.01	1.01
	(0.32)	(0.25)	(0.31)	(0.28)	(0.35)	(0.39)
Shocks:						
Shock t-1 (5 %)	1.56**					
	(2.46)					
Shock t-1 (10 %)		1.57***				
		(3.61)				
Shock t-2 (5 %)			1.46**			
			(2.04)			
Shock t-2 (10 %)				1.45***		
				(3.00)		
Shock t-3 (5 %)					1.24	
					(1.14)	
Shock t-3 (10 %)						1.02
						(0.10)
Log lik.	-2730.33	-2727.25	-2731.02	-2728.92	-2731.92	-2732.46
No. of subjects	702.00	702.00	702.00	702.00	702.00	702.00
No. of failures	516.00	516.00	516.00	516.00	516.00	516.00
Observations	59641	59641	59641	59641	59641	59641

Exponentiated coefficients; t statistics in parentheses
Hazard rates for regime type are relative to the baseline category
Inconsistent”.”
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

regimes, while there is no significant effects of net exports. While the inclusion of these terms do not substantially alter the effect or standard errors of shocks, the sample is cut in half due to the aforementioned lack of oil export data. These results are more in line with the previous literature on the field, and lends support to H_1

I also test Smith's proposed *panacea* for oil measurement, which he labels «rent leverage» (Smith, 2015). This measure consists of the fraction fuel income per capita over PPP-adjusted GDP per capita. While this measure is conceptually quite ingenious, taking account for both oil income per capita, exports, and the relative purchasing power of different regimes, the measure has several problems.

In table 16, I present a regression table using his measure. See also the descriptive statistics on this measure in table 2. While the measure of rent leverage should normalize to a value between 0 and 1 (Smith, 2015: 7), it has values stretching up to 5.13. The coefficient indicates a weak decrease in hazard rate, but is not significant. Moreover, it does not alter the effect of shocks, indicating that the hypothesized stability of oil dependent regimes is not enough to offset the effect of shocks.

Values above 1 on this measure is fundamentally unreliable, for obvious reasons. There are no regimes with 5 times more fuel income per capita than GDP per capita. I thus removed all observations above 1, which further lowered the hazard rate, but without any precision in terms of p-values (see Appendix B, table 17).

Proportional-Hazard Assumption

These first models were estimated by a Cox semi-parametric regression model. The advantage of these models is that they do not assume any distribution of the baseline hazard rate. However, we must still assume proportional hazard rates. This term refers to «the effect of a covariate having a proportional and constant effect that is invariant to when in the process the value of the covariate changes» (Box-Steffensmeier and Jones, 2004: 132).

If the proportional hazard models are misspecified, the impact of variables associated with increased hazard will be overestimated. Likewise, variables associated with converging hazard rates will be biased towards zero. In other words, wrongly assuming proportionality might invalidate all results.

One way to assess the proportionality is by so called «log-log»-plots. The figure plots the -ln of the -ln(survival)-curves (hence the name) for the covariate of interest versus versus ln(analysis time). The reason for this relatively complicated procedure is the ability to plot the survival curves of interest in a linear fashion. Parallel curves indicate that the

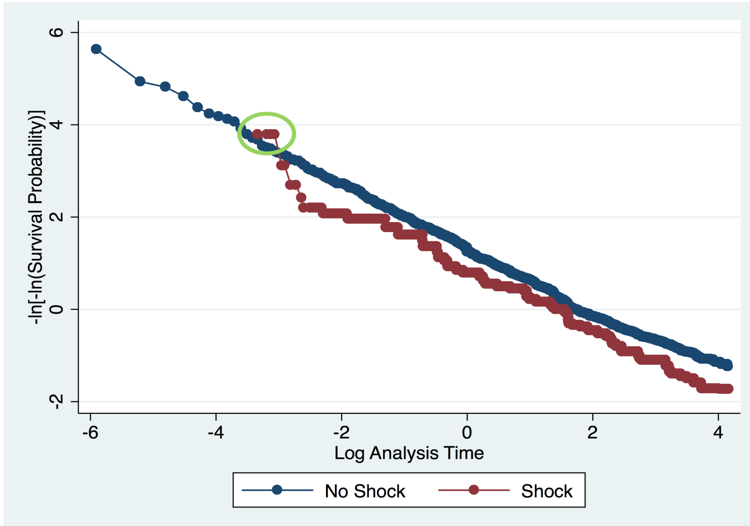


Figure 6: Log-log plot - Cox Propotionality assessment of shock variable

proportional-hazard assumption holds.

Figure 6 shows that the lines are parallel, but that there are some uncertainties at the «start» of the shock-variable. The green circle indicates the problematic part. While I contend that the proportionality assumption holds based on this plot, the observations within the circle are indicative of the inherent problems with Cox regression models.

Cox models require an extremely high degree of certainty with regards to the timing of observations. If there should be overlapping observations, this alone could invalidate the proportionality assumption. If a regime change occur in the real world, but we do not know exactly when, coding it more or less haphazardly, this could result in overlapping observations. While the dataset I use is mostly correct, it is still likely that some coding errors occur, particularly since I implement older datasets as well.

This is could be the reason behind the horizontal string of observations in the green circle. When we assume a certain distribution of failure times in a parametrized regression model, the model are better equipped to handle these inconsistencies. The main disadvantage with these models, however, is the very real chance of assuming the wrong distribution.

Because of these challenges, it is important to run several different models and compare the results. Should the model specifications yield similar coefficients, this would be an indication of robust and substantial results.

8.3 Assuming a Distribution of Failure Times

Since we are interested in predictions, and regard the duration dependency as important, Cox regressions might not be the best choice. Cox models do not assume any distribution of the duration dependency parameters (Box-Steffensmeier and Jones, 2004: 83), and could then be the wrong specification of the survival model.

The notion of «assuming distributions» is not intuitive, and a simple heuristic is to think of this as picking a tool for a certain task. Without the tool, you are in this case able to analyze and understand the problem, and the wrong tool might bring disastrous results. You might here assume that no tool is better than the wrong tool. However, should you pick the right tool for the job, the results will be thereafter. Here, I will argue that a loglogistic distribution of the hazard rate is (in some ways) better than no tool at all.

While Cox models should generally be preferred in social science, according to Box-Steffensmeier & Jones (2004: 47), the main advantage of parametric duration models is their ability to provide parameter estimates, and at the same time provide baseline hazard rates which are easily interpreted.

Parametrized models should be chosen in cases where explicit inferences regarding duration dependency is sought, and where there is reason to believe that time dependency is substantially meaningful (Box-Steffensmeier and Jones, 2004: 86). These criteria are fulfilled in this design, and I will provide results from parametrized loglogistic models.

Furthermore, it is of the highest importance to have valid theoretical assumptions before choosing the distribution. The Cox regression models indicate strong increases in the baseline hazard rates over the first 5-10 years, before decreasing afterwards. This indicates that a loglogistic distribution is a fair assumption (see Gates et al. (2006: 899)). The nature of regime duration is also intuitively available; while many new regimes subsequently fall in an unstable environment, those that survive the first turbulent years tend to be long lived.

Results from Parameterized Models

In table 5, I retain the same variables as in table 4, with the added assumption of a loglogistic distribution function. Formally, this distribution assumes the hazard rate to be

$$h(t) = \frac{\lambda^{\frac{1}{y}} t^{\frac{1}{y}-1}}{\gamma(1+(\lambda t)^{\frac{1}{\gamma}}}$$

Here, $\lambda = e^{-xj\beta}$ indicates the shape of the distribution, while the scale is estimated from the data. When $\gamma < 1$ the hazard function is non-monotonic, meaning that it increases at first before decreasing (Gates et al., 2006: 899). The initial increase «lasts longer» if it is closer to 1. Values of γ are reported in all tables.

The models largely resembles the results from table 4, and regimes show decreased survival time (coefficients below 1) the first months following shocks, before the effect disappears after some time. Note that the log likelihood is significantly improved, indicating that the parametric model is a better fit.

Interestingly, the effects of oil production is now significant, and indicates a negative relationship with regime survival. Given that this measure reaches from 0 to 20, with a mean of 7,94, the coefficient of 0.98 indicates a relatively strong negative effect. The assumption of a loglogistic distribution parameter is what changed this result, and indicates that oil producers in fact are more unstable given this certain distribution of the baseline hazard.

In table 18 (Appendix B), I provide the same regression estimates with longer time horizons, similar to the Cox models in table 13. The results are as expected, with no effect of shocks after 3 months. The control variables also behave as expected. I also run the same regressions with other measures of oil dependency in table 19 and 20 (Appendix B). Neither oil exports as share of GDP nor net exports have any significant effects, but the former still exerts a stabilizing, but imprecise, effect on regimes.

Introducing Interaction Terms

My hypotheses are distinctively conditional, meaning that I am interested in the survival of oil dependent regimes in particular, given the presence of shocks. Formally, this can be stated as X being correlated with Y when condition Z is present, but not when condition Z is absent (Brambor et al., 2006: 64). Short of interaction terms, the coefficients only indicate the constant effect of X and Z on Y.

As Brambor, Clark & Golder (2006) argue, the interpretation of interaction terms is fraught with difficulties. If we are interested in the marginal effects on different values of X, the regression estimates of multiplicative terms will not be sufficient as these only report the average effect of X on Y, given Z.

To account for this, I will supply all regression estimates of these interaction terms with plots of predictive margins, allowing to visualize the standard errors at different levels of X. Since the largest shocks in $t-1$ have proven to exert the greatest effects, I will discontinue the use of other shocks. The fact that the effect of shocks decay rapidly

Table 5: Loglogistic Regression Estimates of Survival Time Ratios in Proximity to Shocks, 1960-2014

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
analysis time when record ends						
Caesaristic	1.46*	1.45*	1.43*	1.45*	1.42*	1.42*
	(1.88)	(1.88)	(1.80)	(1.86)	(1.79)	(1.77)
Autocracy	2.19***	2.22***	2.20***	2.24***	2.19***	2.21***
	(4.16)	(4.19)	(4.20)	(4.25)	(4.17)	(4.22)
Democracy	5.61***	5.64***	5.61***	5.60***	5.59***	5.61***
	(8.47)	(8.51)	(8.50)	(8.50)	(8.51)	(8.49)
Log Oil Production	0.98**	0.97**	0.97**	0.97**	0.97**	0.97**
	(-2.05)	(-2.11)	(-2.09)	(-2.10)	(-2.11)	(-2.08)
Log GDP (t-12)	1.23***	1.24***	1.23***	1.24***	1.23***	1.22***
	(3.22)	(3.37)	(3.24)	(3.37)	(3.21)	(3.14)
Log Inflation (t-12)	0.96	0.96	0.96	0.96	0.96	0.96
	(-0.97)	(-0.98)	(-0.97)	(-0.96)	(-0.96)	(-0.94)
Growth (t-12)	1.00	1.00	1.00	1.00	1.00	1.00
	(0.21)	(0.14)	(0.21)	(0.10)	(0.22)	(0.22)
Log Population	1.05	1.05	1.05	1.06	1.05	1.05
	(0.86)	(0.86)	(0.84)	(0.91)	(0.82)	(0.77)
Shocks:						
Shock t-1 (5 %)	0.51**					
	(-2.30)					
Shock t-1 (10 %)		0.56***				
		(-3.07)				
Shock t-2 (5 %)			0.61*			
			(-1.83)			
Shock t-2 (10 %)				0.59***		
				(-2.92)		
Shock t-3 (5 %)					0.69	
					(-1.31)	
Shock t-3 (10 %)						0.87
						(-0.62)
Log lik.	-1023.97	-1022.68	-1024.95	-1023.05	-1025.46	-1025.95
No. of subjects	702.00	702.00	702.00	702.00	702.00	702.00
No. of failures	516.00	516.00	516.00	516.00	516.00	516.00
Gamma	0.94	0.94	0.94	0.94	0.94	0.94
Observations	59641	59641	59641	59641	59641	59641

Exponentiated coefficients; t statistics in parentheses
Time ratio for regime type are relative to the baseline category
Inconsistent”.”
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

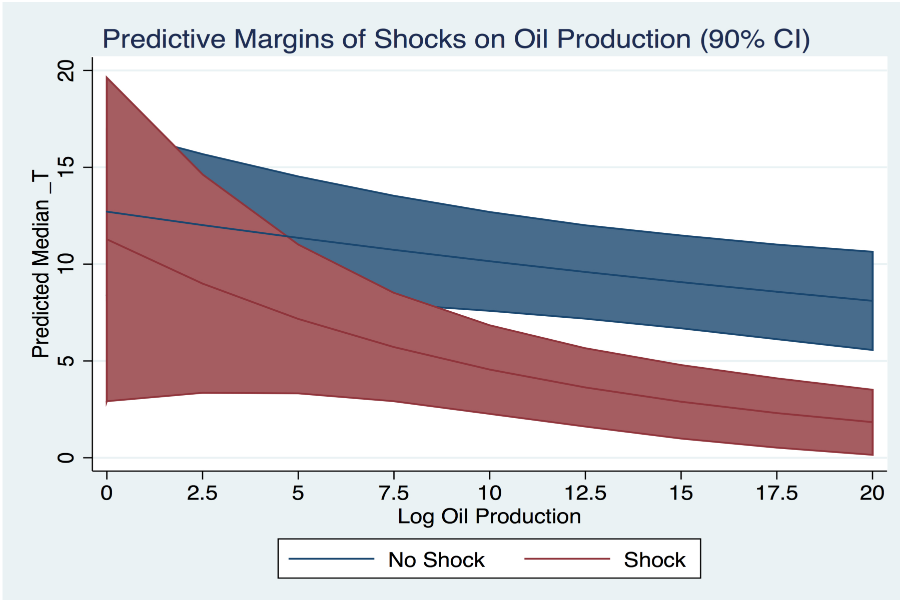


Figure 7: Predictive Margins plot - Oil Production

should have been established by now.

Table 6 provides the results of regression estimates with interaction terms. In model 6.1 we see shocks interacted with log oil production. Here, the effect is consistent with earlier estimates, but with larger standard errors. The coefficient still indicate a relatively strong effect on regime failure in regimes with higher oil income, with a 7 % difference in time ratio.

More importantly, the negative effect connected to shocks is *more* negative than the effect of oil value in itself, indicating that shocks do make a difference.

In figure 7 the interaction term is presented graphically. The plot indicates that the effect is steadily more pronounced with higher values on the x-axis. This supports the claim that higher dependence on oil renders regimes more vulnerable following price shocks. Both the regression estimates and the plotted interaction term supports H_3. Given that the mean value of oil production is 7, there is also reason to suspect that shocks have destabilizing effects well before the x-axis reaches the biggest producers, thus partially supporting H_2.

In model 6.2 I interact shocks with log oil value. Since oil production and oil value is correlated, there is no surprise that these estimates are roughly the same. As a result, the interaction plots are also fairly similar. However, this interaction term seem to have a slightly weaker effect on regime survival, indicating that the revenue from oil production

Table 6: Loglogistic Regression Estimates of Survival Time Ratios with Continuous Interaction Terms, 1960-2014

	Model 1	Model 2	Model 3	Model 4	Model 5
Caesaristic	1.45*	1.45*	0.77	0.78	1.30
	(1.87)	(1.89)	(-1.04)	(-1.03)	(1.30)
Autocracy	2.18***	2.17***	1.10	1.11	1.93***
	(4.12)	(4.12)	(0.34)	(0.43)	(3.44)
Democracy	5.62***	5.63***	5.41***	5.22***	5.77***
	(8.50)	(8.51)	(6.31)	(6.68)	(8.23)
Log GDP (t-12)	1.23***	1.23***	1.14	1.10	1.16**
	(3.23)	(3.27)	(1.58)	(1.43)	(2.28)
Log Inflation (t-12)	0.95	0.95	0.96	0.94	0.95
	(-1.02)	(-1.03)	(-0.77)	(-1.23)	(-1.04)
Growth (t-12)	1.00	1.00	1.00	1.00	1.00
	(0.20)	(0.20)	(-0.18)	(-0.08)	(0.06)
Log Population	1.05	1.06	1.07	1.06	0.98
	(0.89)	(0.94)	(0.92)	(0.98)	(-0.46)
Shock t-1 (5 %)	0.89	0.95	0.48**	0.55*	0.47**
	(-0.28)	(-0.11)	(-1.98)	(-1.86)	(-2.50)
Log Oil Production	0.98*				
	(-1.80)				
Shock × Log Oil Production	0.93*				
	(-1.67)				
Log Oil Value (2014-USD)		0.98*			
		(-1.84)			
Shock × Log Oil Value (2014-USD)		0.95*			
		(-1.83)			
Oil Exports (% of GDP)			0.75		
			(-0.62)		
Shock × Oil Exports (% of GDP)			5.22		
			(1.62)		
Net Oil Exports ($100)				0.99	
				(-0.69)	
Shock × Net Oil Exports ($100)				1.29**	
				(2.03)	
Rent Leverage					0.87
					(-1.31)
Shock × Rent Leverage					4.58**
					(2.00)
Log lik.	-1021.42	-1021.01	-546.20	-586.92	-969.65
No. of subjects	702.00	702.00	460.00	487.00	682.00
No. of failure	517.00	517.00	296.00	323.00	496.00
Gamma	0.94	0.94	0.86	0.84	0.93
Observations	59669	59669	32670	35684	56993

Exponentiated coefficients; t statistics in parentheses
Time ratio for regime type are relative to the baseline category
Inconsistent”.”
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

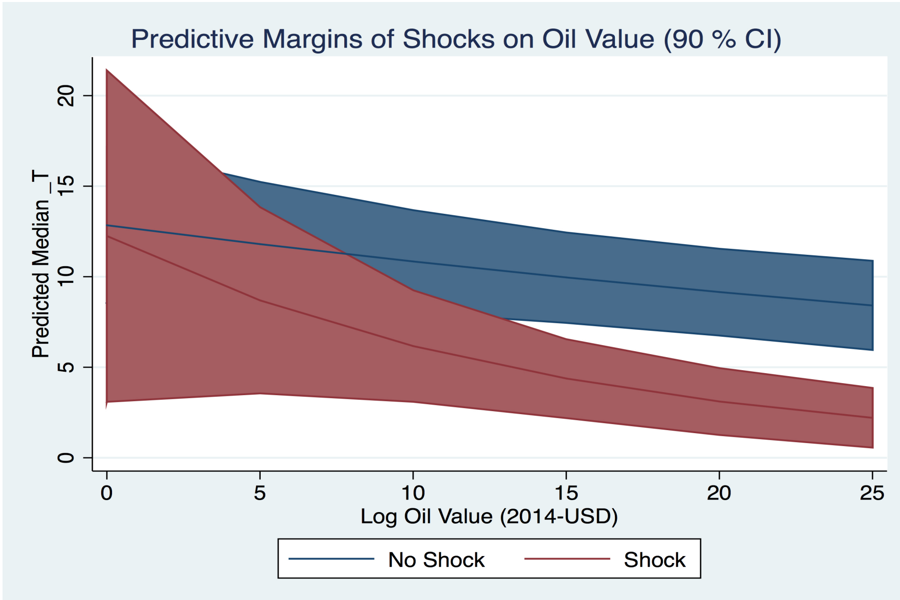


Figure 8: Predictive Margins plot - Oil Value per capita

could offset the destabilizing effect of price shocks. However, the difference between the two coefficients are too small to interpret in a certain direction.

The reported coefficients in model 6.1 (and 6.2) shows support for both H_2 and especially H_3. However, since these terms are correlated, the evidence is by no means additive. We should also estimate the effects for different levels of exports, which is a better, or more direct, measurement of the financial dependence on oil.

In model 6.3, oil export (% of GDP) is interacted with shocks. Here, the coefficient is well above 1, indicating increased survival during shocks. This is counterintuitive, and contrasts to the other results. However, the coefficient is quite suspicious. A time ratio of 5 usually indicates that regimes never fail. To assert that oil exporting regimes become invincible in the presence of shocks is improbable.

The plotting of this term reveals that the effect is indeed increasing, but at no point is it significantly different from the «No shock» line.

Model 6.4 deploys net oil exports ($ 100), and this term is also significantly connected to an increased survival rate, but without the extreme coefficient. The suspicious difference, however, is the same as in model 6.3. There is no reason to expect increased survival rates specifically in the presence of shocks.

While both the models with export-terms increases the log likelihood, the sample size is almost half as big, again underlining the problems with these data. The value of gamma

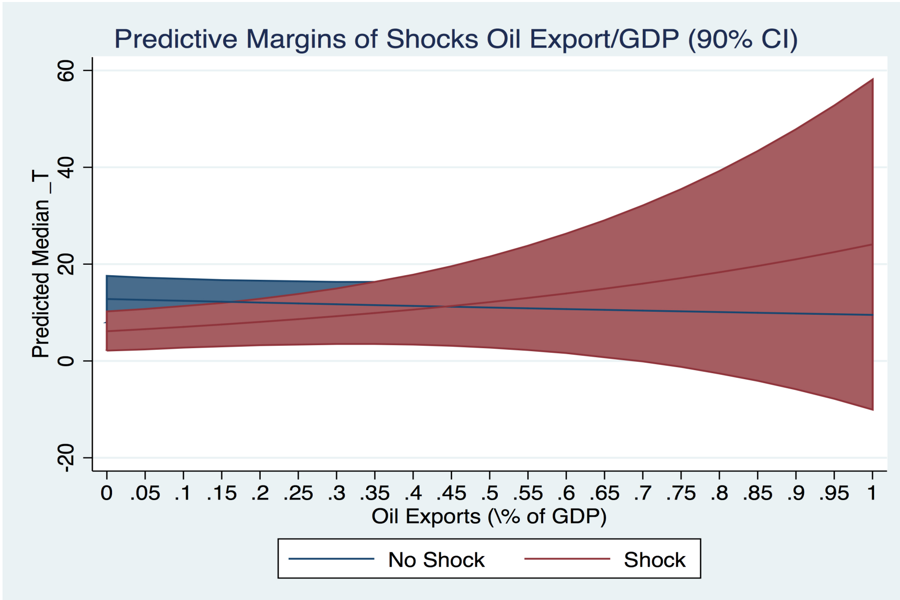


Figure 9: Predictive Margins plot - Export (% of GDP)

is also lower, indicating that regimes fail less rapidly at first, relative to the other models with gamma closer to 0. This indicates that some oil rich regimes, by being remarkably stable, might «drag» the gamma-parameter in a certain direction. Still, it takes some relative influence to alter the gamma-parameter by this much, indicating the possible presence of outliers.

When we plot the predictive margins of this interaction term, in figure 10, we see a clear, but highly insignificant, increase in survival for net exporters. This further indicates that net oil export is not a good predictor for which regimes fail following shocks.

Note that we do observe a clear effect before and after point 0, indicating that shocks are indeed tied to the presence of oil. This strengthens the belief that the measure is correctly specified.

While the coefficients from model 6.1 and 6.3 indicated increased failure rates with oil dependency following shocks, the measure of oil export contradicts it. Holding these interactions against each other, it gives ambiguous support for all hypotheses. While H_1 might find support in the export-related interaction terms, it is not likely that shocks are a significantly stabilizing agent. As for H_2, the two first models and plots do support the claim that oil producers are less stable following shocks, albeit with an increasing hazard along the x-axis which to a larger degree support H_3.

In model 6.5 I am deploying Smith's rent leverage in the interaction term. Here, the

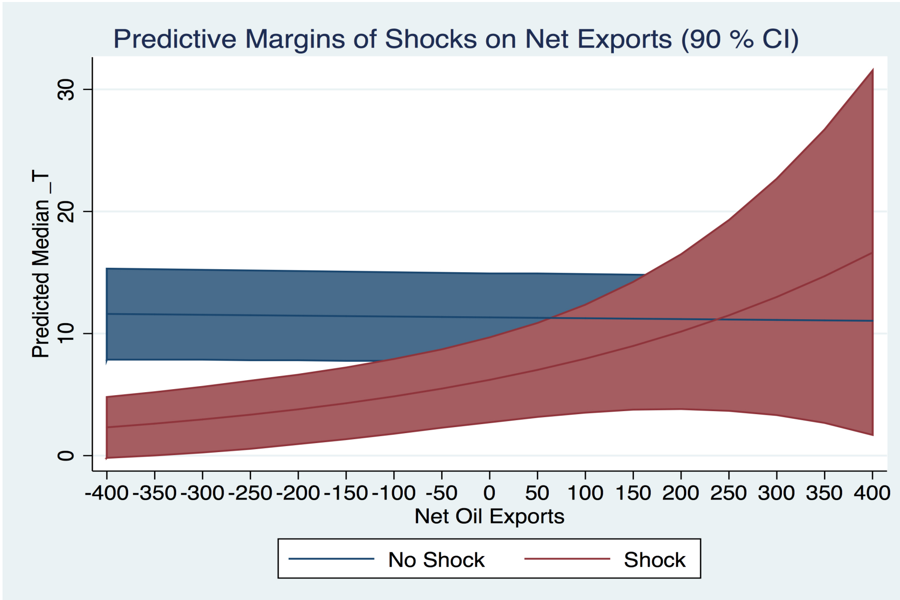


Figure 10: Predictive Margins plot - Net Oil Export

result indicates the same direction as in model 6.4, although with the same massive increase in magnitude as we saw in model 6.3. The interaction term indicates that increases in rent leverage has the same stabilizing effects as being a democracy, in the presence of shocks. This, too, does not make sense.

As I already discussed, the measure of rent leverage from Smith's dataset should normalize between 0 and 1 because it measures fuel income as part of GDP. Smith explicitly points this out himself (2015: 7)[46]. Since this measure in his dataset does not behave the way it was supposed to, I tried to generate the measure myself without any luck[47].

Interactions with Oil Producers

Given the ambiguous results from several of the interaction terms in table 6, I deploy simpler, but more inefficient, measures in table 7. The main consequence of this inefficiency is that the estimates might yield higher standard errors than more nuanced measures, since the variables do not exploit the information from the continuous measure, but rather converges to "0" or "1". I first estimate Cox regressions before parameterizing the distribution

[46] All data is downloaded from Smith's own dataverse, and the variables deployed is from his Stata do-file. I only criticize the variables deployed in this replication file. All files are found here: `https://dataverse.harvard.edu/dataverse/bensmith`

[47] All possible combinations of fuel income measures divided by GDP measures have been tried. The different variables are seemingly denoted in very different terms, making it impossible to fit an equation yielding standardized values between 0 and 1. I also tried to standardize and log-transform his variables.

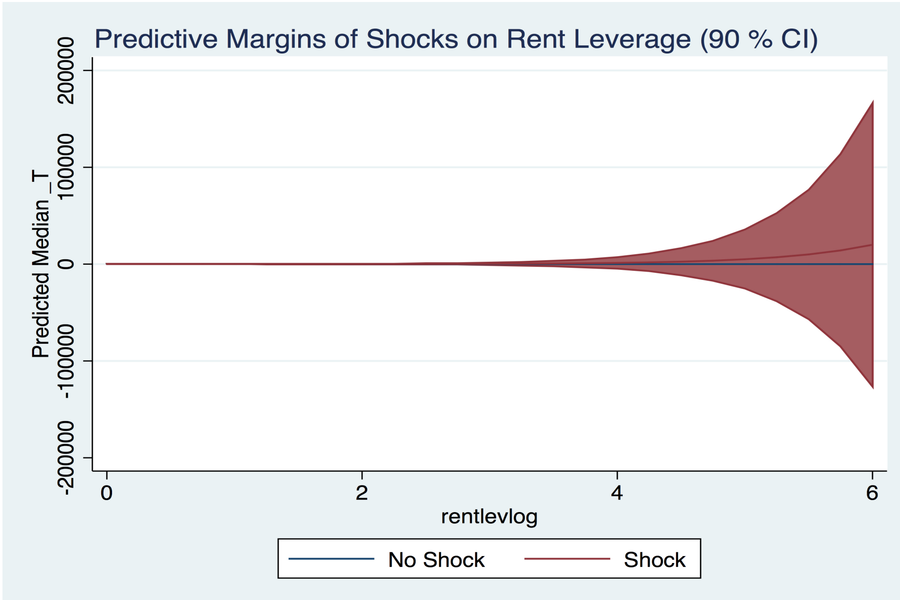


Figure 11: Predictive Margins plot - Rent Leverage

in loglogistic regressions.

In spite of the inefficiency, these models show some significant effects of shocks on regime survival. Model 7.1 shows an interaction term between shocks and the dichotomous variable indicating whether the regime an oil producer. The hazard rate is 1.87 with a z-value of 1.67, indicating p ¡ 0.10. Model 7.2 is a replication of model 1, only with a different underlying data source for measuring oil producers (still dichotomous), for robustness. This model yields similar results, with slightly lower effect and slightly larger standard errors.

When estimating parametrized models, the results are strengthened. Model 8.1 indicate 72 % decrease in expected survival following shocks, relative to regimes without oil[48].

Again, I expand the shock measure over 5 months following price shocks. Here, the models show that the effect of shocks on oil producers stretches over approximately three months, indicating that this model specification to a larger extent captures the negative effects for oil producers over longer periods than one month. Also note that the log likelihood also here is significantly improved from the Cox model, indicating a better fit.

This is expected from the theory. While shocks are detrimental for regime survival on average, controlling for oil production isolates and increases the effect, also showing that oil price shocks exert negative effects for some time after $t = 0$. It is important to note

[48] The two different measures deployed in table 6 yield almost exact same results. See table 21 in appendix B

Table 7: Cox Regression Estimates of Hazard Rates - Dichotomous Interaction Terms, 1960-2014

	Model 1	Model 2
Caesaristic	0.76**	0.76**
	(-2.37)	(-2.41)
Autocracy	0.56***	0.55***
	(-5.05)	(-5.12)
Democracy	0.24***	0.24***
	(-8.95)	(-8.93)
Log GDP (t-12)	0.94	0.93*
	(-1.54)	(-1.83)
Log Inflation (t-12)	1.01	1.01
	(0.45)	(0.39)
Growth (t-12)	0.98**	0.98**
	(-2.36)	(-2.36)
Log Population	1.02	1.01
	(0.54)	(0.19)
Shock t-1 (5 %)	1.10	1.09
	(0.31)	(0.28)
Oil Producers (Ross)	1.06	
	(0.57	
Shock × Oil Producers (Ross)	1.87*	
	(1.67)	
Oil Producers (WDI)		0.98
		(-0.15)
Shock × Oil Producers (WDI)		1.82
		(1.61)
Log lik.	-2739.87	-2734.28
No. of subjects	703.00	702.00
No. of failures	518.00	517.00
Observations	59950	59669

Exponentiated coefficients; t statistics in parentheses
Hazard rates for regime type are relative to the baseline category Inconsistent”.”
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Loglogistic Regression Estimates of Survival Time Ratios - Dichotomous Interaction Term, 1960-2014

	Model 1	Model 2	Model 3	Model 4	Model 5
Caesaristic	1.46*	1.42*	1.43*	1.43*	1.43*
	(1.91)	(1.80)	(1.83)	(1.81)	(1.83)
Autocracy	2.14***	2.15***	2.15***	2.16***	2.17***
	(4.07)	(4.11)	(4.11)	(4.11)	(4.15)
Democracy	5.65***	5.62***	5.62***	5.66***	5.68***
	(8.49)	(8.49)	(8.51)	(8.50)	(8.50)
Log GDP (t-12)	1.21***	1.22***	1.21***	1.22***	1.21***
	(3.23)	(3.29)	(3.26)	(3.29)	(3.25)
Log Inflation (t-12)	0.95	0.95	0.95	0.95	0.95
	(-1.10)	(-1.15)	(-1.09)	(-1.01)	(-1.03)
Growth (t-12)	1.00	1.00	1.00	1.00	1.00
	(0.21)	(0.18)	(0.24)	(0.29)	(0.30)
Log Population	1.06	1.05	1.05	1.05	1.05
	(0.90)	(0.90)	(0.87)	(0.80)	(0.85)
Oil Producers	0.73*	0.72*	0.71*	0.69**	0.70*
	(-1.76)	(-1.81)	(-1.90)	(-2.02)	(-1.96)
Shock t-1 (5 %)	1.11				
	(0.24)				
Shock t-1 × Oil Producers	0.28**				
	(-2.24)				
Shock t-2 (5 %)		1.19			
		(0.49)			
Shock t-2 × Oil Producers		0.31**			
		(-2.29)			
Shock t-3 (5 %)			1.15		
			(0.37)		
Shock t-3 × Oil Producers			0.39*		
			(-1.75)		
Shock t-4 (5 %)				0.91	
				(-0.23)	
Shock t-4 × Oil Producers				0.61	
				(-0.92)	
Shock t-5					1.08
					(0.19)
Shock t-5 × Oil Producers					0.50
					(-1.25)
Log lik.	-1020.35	-1021.22	-1022.37	-1023.28	-1023.08
No. of subjects	702.00	702.00	702.00	702.00	702.00
No. of failures	517.00	517.00	517.00	517.00	517.00
gamma	0.94	0.94	0.94	0.94	0.94
Observations	59669	59669	59669	59669	59669

Exponentiated coefficients; t statistics in parentheses
Time ratio for regime type are relative to the baseline category
Inconsistent”.”
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

that the effect of shocks is without effect or significance outside the interaction terms. This indicates that the effect is strictly tied to oil producers, as should be expected.

Moreover, this highlights the advantages of my design. While the effects of oil price shocks and enduring low prices will be devastating for oil producers also after 5 months, or 2 years, the *average effects* are not traceable after 3 months.

To clarify, my analyses show a clear effect on regime survival directly following shocks. It is still highly probable that shocks also affect regime duration after the initial shock, but since failures then might happen after 8 months or 2 years, it is extremely difficult to isolate the events; there is not enough regime failures at the same time to influence the regression estimates. This problem is alleviated by my design.

This also highlights the problem of yearly data, used in for example Smith (2004), when the variable of interest works within a year. In observational data, it is impossible to evaluate the average effect should it not occur outside the time span of one year. If all regime failures induced by oil price shocks happened after exactly 2 years, this would be observable. If they generally happen within 3 months, this type of data structure will miss it.

With monthly data we can observe these effects at much higher resolution. As argued by this analysis, the proximity to shocks is of great importance in understanding price shock-induced regime change.

Effects for Largest Oil Producers

The rate of regime failures are both found to increase and decrease with different measures of oil dependency. When assessing the average effects of oil production, this measure seems to increase the rate of regime failure in the reported tables, contradicting the simple Kaplan-Meier plots in figure 5. With data on oil exports, the most wealthy oil producers seem to be quite stable.

In table 9, I further investigate the effects on survival rates when regimes are highly oil dependent in the wake of price shocks. The idea behind the next models is to isolate the top exporters and top importers in order to seek clearer support for H_3.

Model 9.1 shows the effect of shocks on oil exporters above the 90th percentile. The coefficient is here too high to interpret in a satisfying manner, again pointing to the possibility of extreme observations driving the results. Model 9.2 reports the effect of shocks for regimes above the 75th percentile. The coefficients are here somewhat more sensible, albeit with large standard errors. The same results are reported for top producers.

Table 9: Loglogistic Regression Estimates - Top Exporters and Producers, 1960-2014

	Model 1	Model 2	Model 3	Model 4
Caesaristic	0.79	0.79	1.42*	1.41*
	(-0.96)	(-0.97)	(1.77)	(1.73)
Autocracy	1.12	1.22	2.06***	2.13***
	(0.46)	(0.76)	(3.87)	(3.91)
Democracy	5.21***	5.18***	5.63***	5.60***
	(6.66)	(6.74)	(8.32)	(8.38)
Log GDP (t-12)	1.10	1.11	1.15**	1.16**
	(1.37)	(1.50)	(2.33)	(2.50)
Log Inflation (t-12)	0.94	0.94	0.95	0.95
	(-1.20)	(-1.25)	(-1.15)	(-1.12)
Growth (t-12)	1.00	1.00	1.00	1.00
	(-0.11)	(-0.13)	(0.36)	(0.29)
Log Population	1.06	1.07	0.99	1.00
	(0.96)	(1.12)	(-0.18)	(-0.02)
Shock t-1 (5 %)	0.50**	0.46*	0.46**	0.43***
	(-1.99)	(-1.94)	(-2.51)	(-2.63)
Oil Exporters (top 10 %)	0.88			
	(-0.40)			
Shock × Oil Exporters (top 10 %)	8.21**			
	(2.31)			
Oil Exporters (top 25 %)		0.82		
		(-0.75)		
Shock × Oil Exporters (top 25 %)		2.43		
		(1.01)		
Oil Producers (top 25 %)			0.96	
			(-0.13)	
Shock × Oil Producers (top 25 %)			7.81**	
			(2.10)	
Oil Producers (top 25 %)				0.88
				(-0.59)
Shock × Oil Producers (top 25 %)				2.80
				(1.16)
Log lik.	-588.37	-588.57	-1023.69	-1023.90
No. of subjects	487.00	487.00	702.00	702.00
No. of failures	323.00	323.00	517.00	517.00
Gamma	0.84	0.85	0.94	0.94
Observations	35684	35684	59669	59669

Exponentiated coefficients; t statistics in parentheses
Time ratio for regime type are relative to the baseline category
Inconsistent"."
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Given the correlation between these variables, this is not surprising.

Again, I interpret these results as being affected by a group of highly stable, oil rich regimes like the Middle Eastern monarchies. As we saw in the regression estimates of net oil exports interacted with price shocks, it very well could be that extreme observations are influencing the estimates of the interaction terms.

8.4 Robustness Tests

While some of the reported results implicitly test the robustness of others, by for example using different measures for oil dependency, a more systematic approach is needed. In this section I will conduct several tests in order to validate the reported results.

Stratified Log Rank Test

A stratified log rank test is a simple way of assessing the equality of survival functions. In simpler terms, I will test whether there is a significant difference in observed versus expected events given price shocks.

This test is also stratified by period, in order to test whether some time-spans are more influential than others. The decade between 1974 and 1984 saw a significant surge in oil prices, while the next ten years saw a similar decrease (see figure 1). It is thus interesting to test whether there were fewer or more expected versus observed events in these different periods of time.

Table 10 reports a log rank test. First, we note that in the period between 1960 and 1973 there where no negative price shocks. This is not surprising, as the oil price first started fluctuating after 1973. The next period from 1974 to 1980 includes the boom years, where only one instance of shock induced failure was expected, but this was also observed.

The next period accounts for the bust-years, previously tested by Smith (2004). Here the data expected 5.25 events, but observed 11. The number of expected events given no-shock is also higher than the observed rates. The chi-squared test indicates a significant difference in the presence of shocks.

The period stretching from 1988 to 1999 is longer than the previous periods, but still expect the same number of failures in the aftermath of shocks. Here, the same number, coincidentally, is observed. The log rank test still reports this as a significant difference between observed and expected events.

Table 10: Stratified Log Rank Test, Boom and Bust Periods

Shock	**Observed**	**Expected**	**Chi^2 (1)**	**Pr > Chi^2**
1960 - 1973				
No shock	306	306	0	0
1974 - 1980				
Shock	1	1.08	0.01	0.938
No Shock	99	98.92		
1981 - 1987				
Shock	11	5.25	7.10	0.008
No Shock	59	64.75		
1988 - 1999				
Shock	11	5.54	5.73	0.017
No Shock	265	270.46		
2000 - 2014				
Shock	41	36.24	0.75	0.386
No Shock	232	236.76		
Total				
Shock	64	48.10	6.16	0.013
No Shock	961	976.9		

The last period from 2000 to 2014 was dominated by a successively increasing oil price, with the abrupt drop following the financial crisis of 2008, where the oil price recovered shortly after. There is here no significant difference between observed and expected events.

These results confirm that there were more failures than expected during the periods of falling oil price. It also indicates that the few shocks in oil price between 1974 and 1980 were offset by the boom period as such. This indicates that the rising oil prices of this period stabilized the oil producing regimes.

In the oil price drop lasting from march 1981 to 1988, there were probably many subsequent observations in the data being coded as ”1” on the shock variable. This indicates that failures correlated with shocks in this period might stem from shocks that happened *more* than one month ago.

This does not, however, invalidate my results as much as it serves as a strong argument against Smith’s (2004) main finding that the bust period of the 1980s did not affect regime survival. Moreover, the summary of the log rank test also lends credence to my main hypothesis that price shocks are detrimental for regimes, regardless of timing or period.

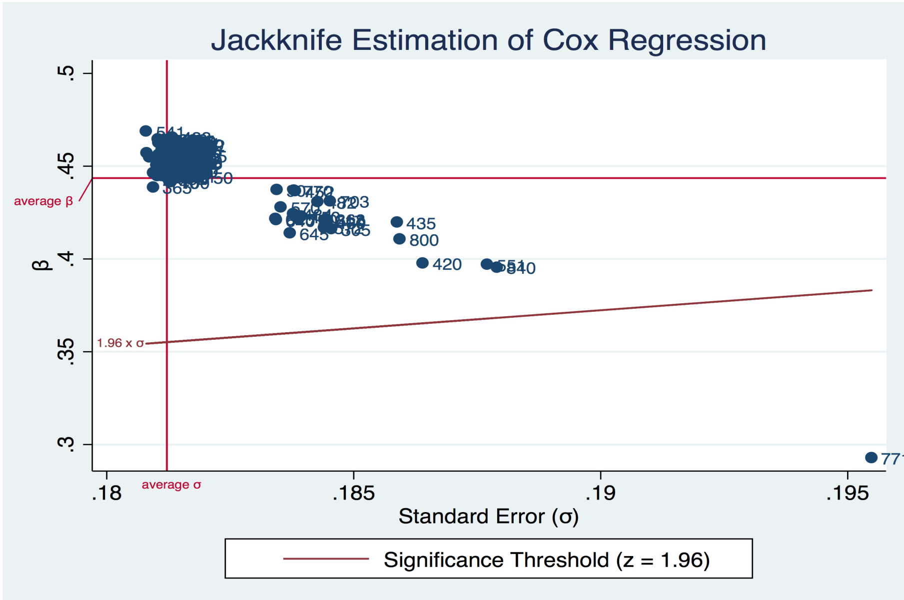


Figure 12: Jackknife Estimates of model 3

Identifying Outliers

In all regression analyses there are possibilities for highly influential observations, or «outliers». Outliers are observations wielding significant power over the regression estimates. This works both ways. Single observations might render the standard errors both inflated and deflated.

A very effective way of identifying the relative weight of specific observations is by the process called «jackknifing». This process «cuts» out one observation at the time, then rerun the analysis, recording the β-coefficient (ie. the regression estimate of the investigated variable) and the standard error (σ) of each observation.

The observations are cut per regime, meaning that rather than cutting out all single observations, the process is done per regime. The main advantage of jackknife estimations is the ability to portray the final results graphically, providing easy identification of outliers.

I will conduct this procedure on some of the previously reported regression results, focusing on estimations in support of my main findings. Figure 12 plots jackknife-estimates of the Cox model specified in table 3, while figure 13 shows the same estimates form the parametric regression model in table 5. The original results from these two models both support the general effect proposed by H_2 in that price shocks significantly increase the failure rate, controlled for oil producers.

In figure 12 we see the plot of each regimes' β and σ from this specific regression estimate. These are interesting results. There are two clear clusters forming, indicating that while the main cluster is unaffected by shocks, there is a smaller cluster with vulnerable regimes. We also identify regime number 771, which is Bangladesh. Since Bangladesh seems to have a heavy influence on the estimates, we re-run some of the regression models excluding this observation. The results are reported in table 11. Model 11.1 and 11.2 re-estimate the results from model 3.1 and model 5.1, respectively. The original outputs from these model specifications provide support for my main claim.

The re-estimations decrease the precision of the shock-variable, indicating that Bangladesh indeed is an influential observation. The control variables are also slightly different. The standard error of Log GDP increase relative to the first model, while GDP growth lose some effect in the second. Apart form that, the results are similar.

Figure 13 plots the jackknife-estimation of the parametrized regression model. Here, the results are somewhat more ambiguous. The outliers are more scattered, and we still identify observation 771, Bangladesh, as the most extreme observation. In model 11.3 and 11.4, I re-estimate the interaction terms reported in model 7.1 and 8.1. To recap, the coefficients of the interaction terms originally yield a hazard rate of 1.87 (t-value: 1.67) and a survival time ratio of 0.28 (t-value: -2.24), respectively. The re-estimation significantly decreases the hazard rate in the Cox model, reporting a coefficient of 1.49 (t-value: 1.02), whereas the same term in the parametric model retains the significance (t-value: - 1.66), but still indicates a strong and negative effect on regime survival.

Upon further scrutiny, Bangladesh experienced 6 failures during the years between 1971 and 1991, following several military coups. While these failures happened without the presence of shocks, there were 3 additional failures (in 1982, 1985, 1990) which did. While Bangladesh is a relatively large producer of natural gas, they have since the 1980s consumed most of it domestically. Whether or not there are theoretical support to exclude this observation, I leave to further discussion.

While the re-estimations generally revealed some loss of the original effect, they also presented some support for the general effect hypothesized by H_2. The relative coherence of the smaller clusters in both plots are very interesting. Moreover, the re-estimated interaction term in model 11.4 did not change from the original result, indicating a high degree of robustness.

Table 11: Regression Estimates - Excluded Outlier, 1960-2014

	Model 1	Model 2	Model 3	Model 4
Caesaristic	0.75**	1.47*	0.75**	1.45*
	(-2.51)	(1.89)	(-2.51)	(1.84)
Autocracy	0.56***	2.16***	0.56***	2.12***
	(-4.99)	(4.09)	(-5.01)	(3.99)
Democracy	0.24***	5.61***	0.24***	5.64***
	(-8.85)	(8.28)	(-8.84)	(8.29)
Shock t-1 (5 %)	1.34	0.64		
	(1.50)	(-1.44)		
Log GDP (t-12)	0.94	1.21***	0.94	1.19***
	(-1.46)	(2.93)	(-1.47)	(2.90)
Log Inflation (t-12)	1.01	0.96	1.01	0.96
	(0.28)	(-0.79)	(0.30)	(-0.91)
Growth (t-12)	0.98**	1.01	0.98**	1.01
	(-2.55)	(0.47)	(-2.55)	(0.47)
Log Population	1.00	1.07	1.00	1.06
	(-0.07)	(1.06)	(-0.06)	(0.95)
Oil Producers	1.08			
	(0.68)			
Log Oil Production		0.98**		
		(-2.04)		
Oil Producers			1.05	0.74*
			(0.46)	(-1.67)
Shock t-1 (5 %)			1.08	1.12
			(0.25)	(0.25)
Shock × Oil Producers			1.49	0.38*
			(1.02)	(-1.66)
Log lik.	-2669.08	-1003.54	-2668.58	-1002.51
No. of subjects	689.00	689.00	689.00	689.00
No. of failures	506.00	506.00	506.00	506.00
Gamma		0.94		0.94
Observations	59232	59232	59232	59232

Exponentiated coefficients; t statistics in parentheses
Coefficients for regime type are relative to the baseline category Inconsistent”.”
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

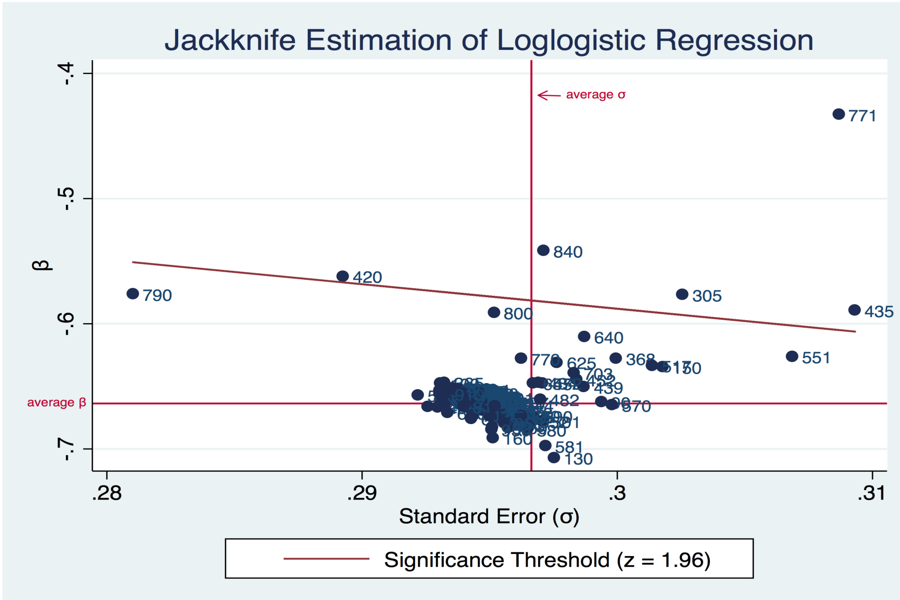


Figure 13: Jackknife Estimates of model 5.1

8.5 Discussion

Throughout this analysis I have produced and presented a large number of regression estimates through different model specifications. The main difference in these regressions is between the Cox model and parametrized model. Both these models make assumptions which, if erroneous, may invalidate the analysis.

The Cox model assumes proportional hazard rates. If this assumption does not hold, the estimates could be exaggerated. Since I hypothesize that oil price shocks are detrimental to regime survival, wrongly assuming proportionality could result in type-I errors. As argued in section 8.3, the effect of shocks seem to be proportional. Still, there was some indication of data points not being correctly recorded in the dataset. This point alone could invalidate the results produced by the Cox model.

The main challenge of parametrized models is to assume the right distribution of the baseline hazard. While I presented several arguments justifying the choice of loglogistic parametrization, there is no way to conclude with certainty. Again, this assumption alone could invalidate the results should it not hold. Taken together, the analysis is a hazardous boat ride between Scylla and Charybdis.

As presented in the regression tables, the average effects of oil price shocks on regime survival were consistently negative in both models, and over many different model specifications. This supports H_2, and the claim that price shocks are on average negative for all oil producers. While some of the precision disappeared through several robustness tests, the average effect was still clearly in direction of decreased regime survival.

Moreover, the effect of shocks declined after some months, showing that the short-term hazard following shocks was quickly passing. Combined with the interaction plots showing the marginal effects of oil exports, this indicate that shocks are reasonably operationalized in that they only affect oil producers.

Results from model specifications with interaction terms were more ambiguous, providing mixed support for all three hypotheses. While the estimates from table 6 gave clear indication of decreased regime survival for oil producers following shocks, the effect was opposite for export-related variables. Even though some of these models yielded coefficients to high to be reliable, in addition to cutting the sample size, others were more reasonable. Model 4 in table 6 is a good example. While model 1 and 2 in the same table produced evidence in support of H_2, I do not find the support to credibly rule out H_1.

The robustness test produced interesting results. The stratified log-rank test indicated that regime failures following price shocks occurred more often than expected in the sample period as a whole. Contrary to the conclusions of Smith (2004), there was indeed several regime failures following the bust-period throughout the 1980s. Since this analysis also established the link between shocks and oil producers, there is reason to believe that oil production might make regimes more unstable. This indicates a re-evaluation of the claim in H_1, and much of the empirical literature.

The interaction terms deploying dichotomous variables of oil production further supports this claim. Here, oil producing regimes in general were found to be in increased danger following price shocks, regardless of production levels. While results from dichotomous measures should be interpreted with caution, this still supports the general claim put forth by H_2.

While the jackknife-estimations rendered some of the original results inconclusive, we also identified a clear cluster of regimes all affected by shocks, diverging from the main cluster. This indicates that the covariates deployed in this analysis fail to isolate this cluster perfectly, posing additional questions into the nature of oil wealth and regime survival. However, the research design of this analysis were chosen explicitly to identify these general effects. While the disadvantage of this design is the lack of precision into the specific mechanisms, the analysis revealed several promising path for further research on this topic.

To conclude, I argue that these analyses have revealed a general pattern of regime failures that is correlated with the presence of price shocks. While there are several disadvantages with the different regression models, the results consistently supported the claim that oil price shocks are negative for regime survival.

While there was no substantive evidence connecting this effect to any specific subgroups in terms of oil dependency, the results rather indicate that price shocks put all oil producers at risk. While there is not enough evidence to completely rule out H_1, I have presented clear indications that several of the existing studies lack precision by not taking account of the fluctuations in oil price. In total, I argue that the results give support for H_2, but more research is needed to isolate the aforementioned sub-group. This also indicates that the effects are not only produced through the «ordinary» mechanisms proposed by H_3, and that the increased uncertainty coupled with the inherent instability of oil producers give rise to conflicting actors of society.

9 Conclusion and Suggestions for Further Research

Thoughtful insights from scholars investigating regime duration have provided the field of political science with a vast base of knowledge. This thesis have sought to contribute to this base by bridging a conspicuous gap in the research literature.

Oil wealth has long been known to be a potential curse, often resulting in contradictory effects on political and economic performance. This «resource curse» often further lead to unstable political configurations through its impact on economical and political institutions. Following other studies, this should render oil producing regimes vulnerable for oil price shocks. Contrary to this hypothesis, the existing empirical research rather finds oil wealth to be correlated with increased stability.

The lack of research assessing the impact of oil price fluctuations in this relationship has rendered this field of research incomplete. One important reason for this gap has been the lack of data with the sufficient accuracy to tackle these questions in a satisfying manner. Given the nature of oil price fluctuations, it has been impossible to observe the impact of price shocks through existing datasets, usually recording variables on a yearly basis.

To bridge this gap it was therefore necessary to collect and construct a new dataset better suited for the task. This dataset made it possible to analyze the effects of oil price shocks with unprecedented precision. By combining the dataset with the advantages of survival analysis, I have presented a thorough investigation into the relationship between oil price shocks and regime failure.

This investigation produced interesting result. My main finding is that oil price shocks on average decrease the probability of regime survival. This result is robust over a number of different settings, differing both in specification and regression models. Moreover, the different settings consistently linked the price shocks solely to oil producing regimes, indicating a high degree of measurement validity.

The results further indicate that the negative effects shocks do not increase or decrease monotonically with the ordinary measures of oil dependency. Several robustness tests indicated the there indeed was a sub-group of affected regimes, but my proposed variables failed in isolating this group. I view the revealing of this difficulty as one of the most interesting contributions of this thesis, and is the main path for further research suggested by this student.

These further studies could for example use the underlying definition of regimes, provided by Gates et al. (2006), as a starting point. Their framework includes the possibility of locating each political regime on a defined point in the three dimensional cube presented in figure 3. Should the mechanisms suggested by my theoretical argument be valid, I would suspect this to produce interesting results, possibly revealing further insights into the nature of different regime types.

While this has been the first analysis using this dataset, it is my hope that other scholars view this work as a valuable contribution. Although the dataset was specifically constructed to answer the research question posed by this study, I think the resolution and precision of the data also could benefit similar studies and projects. Studies addressing the effects and consequences of food price fluctuations would be an interesting and fruitful venue for future research.

10 Appendices

10.1 A.1 Descriptive Statistics

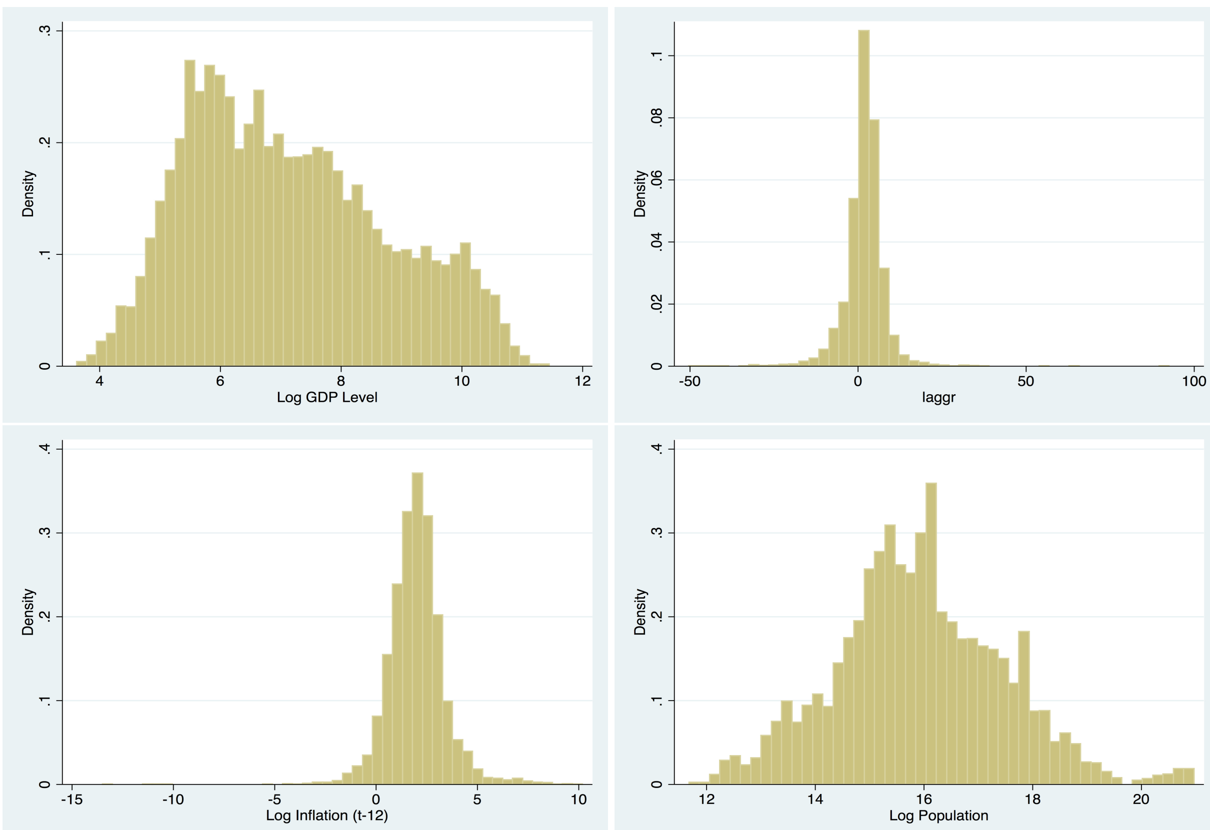


Figure 14: Distribution of Control Variables I

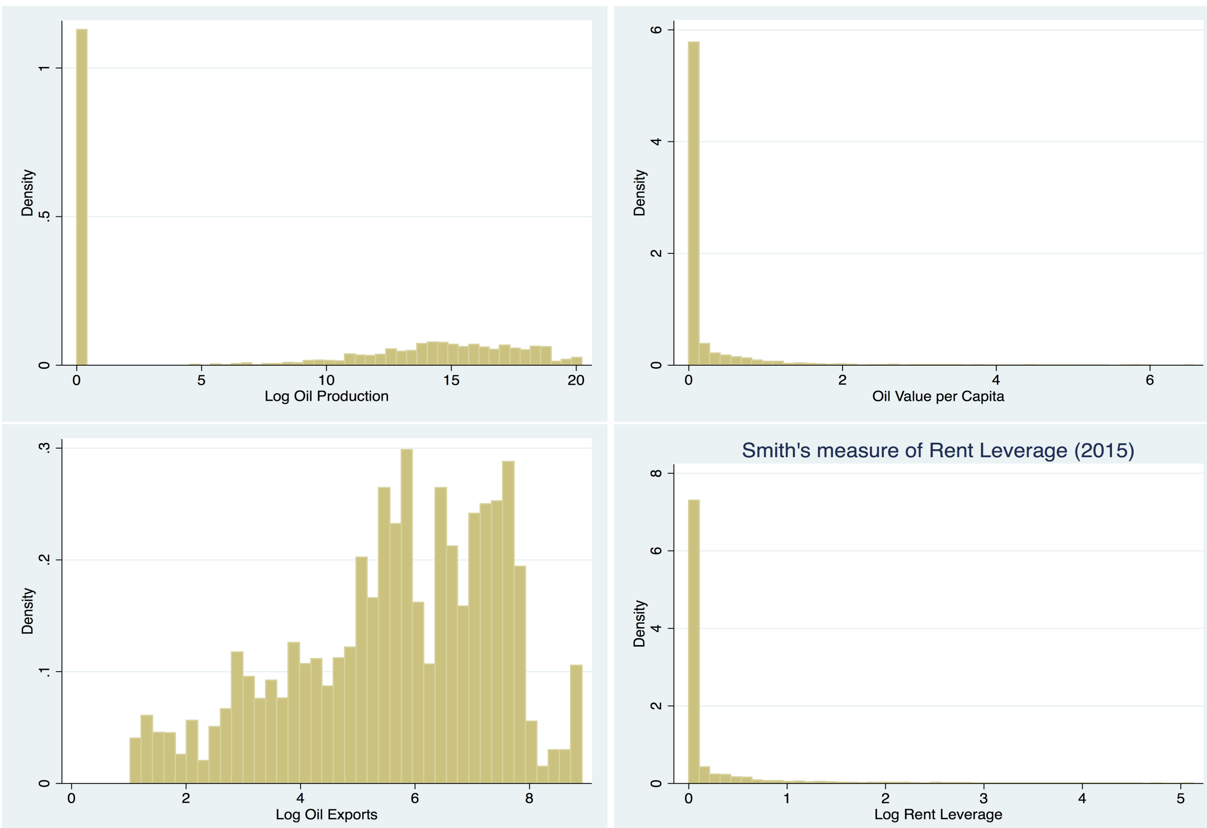


Figure 15: Distribution of Control Variables - II

Table 12: Correlation Matrix

	(1)									
	Log GDP	Inflation	Growth	Log Population	Oil Producers	Log Oil Prod	Oil Exports (% of GDP)	Net Exports ($100)	Rent Leverage	Shock t-1 (5 %)
Log GDP	1									
Log Inflation	-0.170***	1								
Growth	0.0548***	-0.196***	1							
Log Population	-0.0000723	0.0682***	0.0339***	1						
Oil Producers	0.366***	0.0652***	0.0404***	0.441***	1					
Log Oil Production	0.360***	0.0819***	0.0318***	0.461***	0.924***	1				
Oil Exports (% of GDP)	0.0961***	0.0664***	0.0320***	0.129***	0.426***	0.580***	1			
Net Oil Exports ($100)	-0.120***	0.165***	-0.0173***	-0.149***	0.0529***	0.121***	0.379***	1		
Rent Leverage	0.307***	0.0202***	-0.0135***	-0.113***	0.328***	0.427***	0.619***	0.323***	1	
Shock t-1 (5 %)	0.0730***	-0.0404***	0.0153***	0.0196***	0.0212***	0.0145***	-0.000122	-0.00120	0.0112**	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

10.2 B.1 Tables

Tables for section 8.2

Table 13: Cox Regression Estimates of Hazard Rates - Extended Shocks, 1960-2014

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Caesaristic	0.76**	0.76**	0.76**	0.76**	0.76**	0.76**	0.76**	0.76**
	(-2.39)	(-2.38)	(-2.39)	(-2.36)	(-2.37)	(-2.35)	(-2.35)	(-2.37)
Autocracy	0.55***	0.55***	0.55***	0.55***	0.55***	0.55***	0.55***	0.55***
	(-5.09)	(-5.08)	(-5.11)	(-5.12)	(-5.11)	(-5.12)	(-5.06)	(-5.11)
Democracy	0.24***	0.24***	0.24***	0.24***	0.24***	0.24***	0.24***	0.24***
	(-8.94)	(-8.91)	(-8.96)	(-8.96)	(-8.97)	(-8.97)	(-8.96)	(-8.97)
Log Oil Production	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	(0.56)	(0.58)	(0.56)	(0.52)	(0.53)	(0.49)	(0.52)	(0.52)
Log GDP (t-12)	0.93	0.93*	0.93	0.94	0.93	0.94	0.93	0.94
	(-1.62)	(-1.65)	(-1.61)	(-1.52)	(-1.54)	(-1.47)	(-1.58)	(-1.55)
Log Inflation (t-12)	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
	(0.35)	(0.34)	(0.36)	(0.37)	(0.37)	(0.39)	(0.41)	(0.39)
Growth (t-12)	0.98**	0.98**	0.98**	0.98**	0.98**	0.98**	0.98**	0.98**
	(-2.34)	(-2.34)	(-2.34)	(-2.33)	(-2.33)	(-2.33)	(-2.38)	(-2.35)
Log Population	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
	(0.34)	(0.33)	(0.35)	(0.38)	(0.37)	(0.40)	(0.35)	(0.37)
Shock t-4 (5 %)	1.31							
	(1.43)							
Shock t-4 (10 %)		1.22						
		(1.47)						
sh5_5			1.26					
			(1.23)					
sh10_5				1.03				
				(0.23)				
sh5_6					1.10			
					(0.45)			
sh10_6						0.97		
						(-0.24)		
sh5_12							0.90	
							(-0.88)	
sh10_12								0.93
								(-0.55)
Log lik.	-2731.59	-2731.54	-2731.79	-2732.45	-2732.40	-2732.42	-2731.96	-2732.25
No. of subjects	702.00	702.00	702.00	702.00	702.00	702.00	702.00	702.00
No. of failures	516.00	516.00	516.00	516.00	516.00	516.00	516.00	516.00
Observations	59641	59641	59641	59641	59641	59641	59641	59641

Exponentiated coefficients; t statistics in parentheses
Hazard rates for regime type are relative to the baseline category
Inconsistent"."
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 14: Cox Regression Estimates of Hazard Rates - Oil Exports (% of GDP), 1960-2014

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Caesaristic	1.13	1.13	1.12	1.13	1.12	1.13
	(0.82)	(0.86)	(0.80)	(0.85)	(0.80)	(0.86)
Autocracy	1.01	1.01	1.01	1.00	1.02	1.02
	(0.10)	(0.05)	(0.09)	(0.03)	(0.10)	(0.11)
Democracy	0.20***	0.20***	0.20***	0.20***	0.20***	0.20***
	(-7.06)	(-7.07)	(-7.07)	(-7.08)	(-7.06)	(-7.07)
Oil Exports (% of GDP)	0.66*	0.66*	0.67	0.66*	0.67	0.66*
	(-1.65)	(-1.66)	(-1.62)	(-1.66)	(-1.63)	(-1.65)
Log GDP (t-12)	0.96	0.96	0.96	0.96	0.96	0.97
	(-0.69)	(-0.67)	(-0.68)	(-0.67)	(-0.70)	(-0.65)
Log Inflation (t-12)	0.99	0.99	0.99	0.99	0.99	0.99
	(-0.22)	(-0.21)	(-0.24)	(-0.27)	(-0.25)	(-0.25)
Growth (t-12)	0.98*	0.98*	0.98*	0.98*	0.98*	0.98*
	(-1.80)	(-1.88)	(-1.79)	(-1.82)	(-1.78)	(-1.75)
Log Population	1.00	1.00	1.00	1.00	1.00	1.00
	(0.02)	(-0.01)	(0.00)	(0.01)	(-0.00)	(0.03)
Shocks:						
Shock t-1 (5 %)	1.48*					
	(1.88)					
Shock t-1 (10 %)		1.64***				
		(3.53)				
Shock t-2 (5 %)			1.36			
			(1.47)			
Shock t-2 (10 %)				1.65***		
				(3.50)		
Shock t-3 (5 %)					1.40*	
					(1.66)	
Shock t-3 (10 %)						1.07
						(0.41)
Log lik.	-1346.68	-1342.81	-1347.20	-1342.83	-1346.96	-1348.06
No. of subjects	460.00	460.00	460.00	460.00	460.00	460.00
No. of failures	296.00	296.00	296.00	296.00	296.00	296.00
Observations	32670	32670	32670	32670	32670	32670

Exponentiated coefficients; t statistics in parentheses
Hazard rates for regime type are relative to the baseline category
Inconsistent”.”
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 15: Cox Regression Estimates of Hazard Rates - Net Oil Exports ($100), 1960-2014

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Caesaristic	1.09	1.10	1.09	1.09	1.09	1.10
	(0.61)	(0.64)	(0.60)	(0.62)	(0.60)	(0.64)
Autocracy	0.87	0.86	0.87	0.86	0.87	0.87
	(-0.92)	(-0.96)	(-0.92)	(-0.99)	(-0.92)	(-0.91)
Democracy	0.22***	0.22***	0.22***	0.22***	0.22***	0.22***
	(-7.40)	(-7.40)	(-7.42)	(-7.42)	(-7.41)	(-7.41)
Net Oil Exports ($100)	0.99	0.99	0.99	0.99	0.99	0.99
	(-0.93)	(-0.94)	(-0.92)	(-0.93)	(-0.92)	(-0.92)
Log GDP (t-12)	0.96	0.96	0.96	0.96	0.96	0.96
	(-0.86)	(-0.87)	(-0.85)	(-0.86)	(-0.86)	(-0.82)
Log Inflation (t-12)	1.00	1.00	1.00	1.00	1.00	1.00
	(0.06)	(0.08)	(0.04)	(0.03)	(0.04)	(0.03)
Growth (t-12)	0.98**	0.98**	0.98**	0.98**	0.98**	0.98**
	(-2.03)	(-2.10)	(-2.02)	(-2.05)	(-2.01)	(-1.97)
Log Population	0.98	0.98	0.98	0.98	0.98	0.98
	(-0.49)	(-0.49)	(-0.50)	(-0.47)	(-0.50)	(-0.49)
Shocks:						
Shock t-1 (5 %)	1.42*					
	(1.73)					
Shock t-1 (10 %)		1.58***				
		(3.35)				
Shock t-2 (5 %)			1.30			
			(1.32)			
Shock t-2 (10 %)				1.56***		
				(3.17)		
Shock t-3 (5 %)					1.29	
					(1.26)	
Shock t-3 (10 %)						0.97
						(-0.16)
Log lik.	-1501.37	-1497.83	-1501.87	-1498.22	-1501.94	-1502.62
No. of subjects	487.00	487.00	487.00	487.00	487.00	487.00
No. of failures	323.00	323.00	323.00	323.00	323.00	323.00
Observations	35684	35684	35684	35684	35684	35684

Exponentiated coefficients; t statistics in parentheses
Hazard rates for regime type are relative to the baseline category
Inconsistent”.”
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 16: Cox Regression Estimates of Hazard Rates - Rent Leverage, 1960-2014

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Caesaristic	0.79**	0.79*	0.79**	0.79**	0.79**	0.79*
	(-1.98)	(-1.94)	(-1.98)	(-1.98)	(-1.98)	(-1.96)
Autocracy	0.59***	0.59***	0.59***	0.59***	0.59***	0.59***
	(-4.44)	(-4.37)	(-4.45)	(-4.44)	(-4.47)	(-4.49)
Democracy	0.22***	0.23***	0.22***	0.23***	0.22***	0.22***
	(-8.98)	(-8.92)	(-8.99)	(-8.93)	(-8.99)	(-8.98)
Log Rent Leverage	0.96	0.96	0.96	0.96	0.96	0.96
	(-0.53)	(-0.48)	(-0.52)	(-0.45)	(-0.51)	(-0.51)
Log GDP (t-12)	0.95	0.95	0.95	0.95	0.96	0.96
	(-1.12)	(-1.29)	(-1.12)	(-1.27)	(-1.07)	(-1.01)
Log Inflation (t-12)	1.01	1.01	1.01	1.01	1.01	1.01
	(0.34)	(0.30)	(0.35)	(0.26)	(0.34)	(0.34)
Growth (t-12)	0.98**	0.98**	0.98**	0.98**	0.98**	0.98**
	(-2.08)	(-2.08)	(-2.07)	(-2.00)	(-2.04)	(-2.04)
Log Population	1.03	1.03	1.03	1.03	1.03	1.03
	(0.98)	(0.93)	(0.98)	(0.97)	(1.00)	(1.02)
Shocks:						
Shock t-1 (5 %)	1.54**					
	(2.35)					
Shock t-1 (10 %)		1.57***				
		(3.59)				
Shock t-2 (5 %)			1.48**			
			(2.14)			
Shock t-2 (10 %)				1.47***		
				(3.12)		
Shock t-3 (5 %)					1.27	
					(1.25)	
Shock t-3 (10 %)						1.04
						(0.30)
Log lik.	-2593.67	-2590.37	-2593.97	-2591.69	-2595.29	-2595.97
No. of subjects	682.00	682.00	682.00	682.00	682.00	682.00
No. of failures	496.00	496.00	496.00	496.00	496.00	496.00
Observations	56993	56993	56993	56993	56993	56993

Exponentiated coefficients; t statistics in parentheses
Hazard rates for regime type are relative to the baseline category
Inconsistent”.”
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 17: Cox Regression Estimates of Hazard Rates - Alternative Rent Leverage, 1960-2014

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Caesaristic	0.79*	0.80*	0.79*	0.79*	0.79*	0.79*
	(-1.94)	(-1.89)	(-1.95)	(-1.94)	(-1.94)	(-1.92)
Autocracy	0.60***	0.60***	0.60***	0.60***	0.60***	0.60***
	(-4.12)	(-4.05)	(-4.13)	(-4.11)	(-4.15)	(-4.17)
Democracy	0.23***	0.23***	0.23***	0.23***	0.23***	0.23***
	(-8.57)	(-8.52)	(-8.59)	(-8.52)	(-8.57)	(-8.57)
Log Rent Leverage (0-1)	0.89	0.89	0.89	0.90	0.89	0.89
	(-0.34)	(-0.33)	(-0.32)	(-0.29)	(-0.32)	(-0.33)
Log GDP (t-12)	0.95	0.94	0.95	0.94	0.95	0.95
	(-1.16)	(-1.32)	(-1.16)	(-1.32)	(-1.12)	(-1.07)
Log Inflation (t-12)	1.01	1.00	1.01	1.00	1.00	1.00
	(0.16)	(0.11)	(0.16)	(0.07)	(0.15)	(0.15)
Growth (t-12)	0.98**	0.98**	0.98**	0.98**	0.98**	0.98**
	(-2.04)	(-2.04)	(-2.04)	(-1.97)	(-2.01)	(-2.00)
Log Population	1.02	1.02	1.02	1.02	1.02	1.02
	(0.74)	(0.69)	(0.74)	(0.73)	(0.76)	(0.78)
Shocks:						
Shock t-1 (5 %)	1.60**					
	(2.52)					
Shock t-1 (10 %)		1.59***				
		(3.60)				
Shock t-2 (5 %)			1.49**			
			(2.08)			
Shock t-2 (10 %)				1.52***		
				(3.30)		
Shock t-3 (5 %)					1.30	
					(1.38)	
Shock t-3 (10 %)						1.08
						(0.53)
Log lik.	-2489.77	-2486.69	-2490.47	-2487.62	-2491.54	-2492.26
No. of subjects	665.00	665.00	665.00	665.00	665.00	665.00
No. of failures	478.00	478.00	478.00	478.00	478.00	478.00
Observations	53824	53824	53824	53824	53824	53824

Exponentiated coefficients; t statistics in parentheses
Hazard rates for regime type are relative to the baseline category Inconsistent"."
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Tables for section 8.3

Table 18: Loglogistic Regression Estimates of Survival Time Ratios - Extended Shocks, 1960-2014

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	ll_noxi_5_4	ll_noxi_10_4
Caesaristic	1.42*	1.43*	1.42*	1.41*	1.42*	1.42*	1.40*	1.41*
	(1.76)	(1.79)	(1.78)	(1.74)	(1.76)	(1.75)	(1.68)	(1.72)
Autocracy	2.18***	2.20***	2.19***	2.22***	2.22***	2.22***	2.21***	2.23***
	(4.14)	(4.20)	(4.17)	(4.25)	(4.23)	(4.25)	(4.24)	(4.28)
Democracy	5.61***	5.60***	5.61***	5.61***	5.61***	5.61***	5.56***	5.59***
	(8.52)	(8.49)	(8.51)	(8.47)	(8.46)	(8.46)	(8.49)	(8.51)
Log Oil Production	0.97**	0.97**	0.97**	0.98**	0.97**	0.98**	0.97**	0.97**
	(-2.08)	(-2.12)	(-2.09)	(-2.05)	(-2.06)	(-2.05)	(-2.10)	(-2.11)
Log GDP (t-12)	1.22***	1.23***	1.22***	1.21***	1.21***	1.21***	1.23***	1.22***
	(3.21)	(3.21)	(3.20)	(3.03)	(3.07)	(3.03)	(3.25)	(3.19)
Log Inflation (t-12)	0.96	0.96	0.96	0.96	0.96	0.96	0.95	0.96
	(-0.93)	(-0.95)	(-0.94)	(-0.94)	(-0.94)	(-0.95)	(-1.04)	(-0.99)
Growth (t-12)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	(0.26)	(0.23)	(0.25)	(0.24)	(0.23)	(0.23)	(0.29)	(0.28)
Log Population	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
	(0.77)	(0.81)	(0.80)	(0.73)	(0.74)	(0.73)	(0.83)	(0.80)
Shock t-4 (5 %)	0.70							
	(-1.29)							
Shock t-4 (10 %)		0.80						
		(-1.19)						
sh5_5			0.73					
			(-1.15)					
sh10_5				1.05				
				(0.26)				
sh5_6					1.02			
					(0.06)			
sh10_6						1.09		
						(0.41)		
sh5_12							1.23	
							(1.06)	
sh10_12								1.22
								(0.83)
Log lik.	-1025.43	-1025.66	-1025.56	-1025.99	-1026.04	-1025.94	-1025.53	-1025.75
No. of subjects	702.00	702.00	702.00	702.00	702.00	702.00	702.00	702.00
No. of failures	516.00	516.00	516.00	516.00	516.00	516.00	516.00	516.00
gamma	0.94	0.94	0.94	0.95	0.95	0.95	0.94	0.94
Observations	59641	59641	59641	59641	59641	59641	59641	59641

Exponentiated coefficients; t statistics in parentheses
Time ratio for regime type are relative to the baseline category
Inconsistent”.”
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 19: Loglogistic Regression Estimates of Survival Time Ratios - Oil Exports, 1960-2014

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Caesaristic	0.78	0.77	0.77	0.77	0.77	0.76
	(-1.01)	(-1.03)	(-1.06)	(-1.05)	(-1.05)	(-1.12)
Autocracy	1.09	1.11	1.08	1.14	1.08	1.08
	(0.30)	(0.39)	(0.29)	(0.47)	(0.26)	(0.29)
Democracy	5.40***	5.53***	5.40***	5.51***	5.39***	5.41***
	(6.31)	(6.40)	(6.34)	(6.43)	(6.39)	(6.35)
Oil Exports (% of GDP)	0.82	0.80	0.82	0.80	0.82	0.83
	(-0.44)	(-0.47)	(-0.43)	(-0.47)	(-0.42)	(-0.39)
Log GDP (t-12)	1.13	1.13	1.13	1.14	1.14	1.13
	(1.56)	(1.53)	(1.55)	(1.56)	(1.58)	(1.53)
Log Inflation (t-12)	0.96	0.96	0.96	0.96	0.96	0.96
	(-0.76)	(-0.82)	(-0.75)	(-0.82)	(-0.76)	(-0.75)
Growth (t-12)	1.00	1.00	1.00	1.00	1.00	1.00
	(-0.21)	(-0.22)	(-0.21)	(-0.27)	(-0.21)	(-0.23)
Log Population	1.06	1.06	1.06	1.07	1.06	1.06
	(0.86)	(0.85)	(0.87)	(1.00)	(0.87)	(0.81)
Shocks:						
Shock t-1 (5 %)	0.56*					
	(-1.76)					
Shock t-1 (10 %)		0.54***				
		(-2.80)				
Shock t-2 (5 %)			0.62			
			(-1.44)			
Shock t-2 (10 %)				0.48***		
				(-3.26)		
Shock t-3 (5 %)					0.58*	
					(-1.68)	
Shock t-3 (10 %)						0.74
						(-1.18)
Log lik.	-546.72	-544.68	-547.15	-543.29	-546.74	-547.43
No. of subjects	460.00	460.00	460.00	460.00	460.00	460.00
No. of failures	296.00	296.00	296.00	296.00	296.00	296.00
gamma	0.86	0.86	0.86	0.85	0.86	0.86
Observations	32670	32670	32670	32670	32670	32670

Exponentiated coefficients; t statistics in parentheses

Time ratio for regime type are relative to the baseline category

Inconsistent”.”

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 20: Loglogistic Regression Estimates of Survival Time Ratios - Net Export ($ 100), 1960-2014

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Caesaristic	0.79	0.78	0.77	0.78	0.77	0.76
	(-0.99)	(-1.03)	(-1.06)	(-1.05)	(-1.05)	(-1.10)
Autocracy	1.15	1.17	1.15	1.20	1.14	1.16
	(0.55)	(0.62)	(0.55)	(0.72)	(0.54)	(0.58)
Democracy	5.22^{***}	5.27^{***}	5.21^{***}	5.24^{***}	5.21^{***}	5.22^{***}
	(6.68)	(6.76)	(6.71)	(6.78)	(6.76)	(6.72)
Net Oil Exports ($100)	1.00	0.99	1.00	0.99	1.00	1.00
	(-0.47)	(-0.72)	(-0.44)	(-0.74)	(-0.45)	(-0.43)
Log GDP (t-12)	1.10	1.10	1.10	1.10	1.10	1.09
	(1.42)	(1.46)	(1.43)	(1.49)	(1.43)	(1.38)
Log Inflation (t-12)	0.94	0.94	0.94	0.94	0.94	0.94
	(-1.23)	(-1.31)	(-1.23)	(-1.30)	(-1.22)	(-1.21)
Growth (t-12)	1.00	1.00	1.00	1.00	1.00	1.00
	(-0.14)	(-0.19)	(-0.17)	(-0.22)	(-0.15)	(-0.17)
Log Population	1.06	1.06	1.06	1.07	1.06	1.06
	(0.93)	(0.90)	(0.92)	(1.03)	(0.92)	(0.88)
Shocks:						
Shock t-1 (5 %)	0.54^{*}					
	(-1.78)					
Shock t-1 (10 %)		0.56^{***}				
		(-2.77)				
Shock t-2 (5 %)			0.67			
			(-1.27)			
Shock t-2 (10 %)				0.53^{***}		
				(-3.04)		
Shock t-3 (5 %)					0.64	
					(-1.39)	
Shock t-3 (10 %)						0.84
						(-0.71)
Log lik.	-589.15	-587.34	-590.04	-586.67	-589.85	-590.54
No. of subjects	487.00	487.00	487.00	487.00	487.00	487.00
No. of failures	323.00	323.00	323.00	323.00	323.00	323.00
Gamma	0.85	0.85	0.85	0.84	0.85	0.85
Observations	35684	35684	35684	35684	35684	35684

Exponentiated coefficients; t statistics in parentheses
Time ratio for regime type are relative to the baseline category
Inconsistent"."
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 21: Loglogistic Regression Estimates of Survival Time Ratios - Dichotomous Interaction Term, 1960-2014 (Alternative Dummy Variable)

	Model 1	Model 2	Model 3	Model 4	Model 5
Caesaristic	1.44*	1.41*	1.41*	1.41*	1.42*
	(1.84)	(1.73)	(1.77)	(1.75)	(1.77)
Autocracy	2.11***	2.12***	2.12***	2.13***	2.14***
	(4.00)	(4.04)	(4.04)	(4.05)	(4.08)
Democracy	5.65***	5.63***	5.64***	5.68***	5.69***
	(8.46)	(8.47)	(8.49)	(8.48)	(8.48)
Log GDP (t-12)	1.20***	1.20***	1.20***	1.20***	1.20***
	(2.92)	(2.98)	(2.95)	(2.99)	(2.94)
Log Inflation (t-12)	0.95	0.95	0.95	0.95	0.95
	(-1.16)	(-1.21)	(-1.14)	(-1.06)	(-1.08)
Growth (t-12)	1.00	1.00	1.00	1.00	1.00
	(0.23)	(0.20)	(0.25)	(0.31)	(0.32)
Log Population	1.03	1.03	1.03	1.03	1.03
	(0.56)	(0.55)	(0.53)	(0.46)	(0.51)
Oil Producers (alt)=1	0.82	0.81	0.80	0.78	0.79
	(-1.08)	(-1.13)	(-1.21)	(-1.35)	(-1.28)
Shock t-1 (5 %)=1	1.12				
	(0.27)				
Oil Producers (alt)=1 × Shock t-1 (5 %)=1	0.28**				
	(-2.25)				
Shock t-2 (5 %)=1		1.21			
		(0.53)			
Oil Producers (alt)=1 × Shock t-2 (5 %)=1		0.31**			
		(-2.31)			
Shock t-3 (5 %)=1			1.17		
			(0.43)		
Oil Producers (alt)=1 × Shock t-3 (5 %)=1			0.38*		
			(-1.80)		
Shock t-4 (5 %)=1				0.93	
				(-0.18)	
Oil Producers (alt)=1 × Shock t-4 (5 %)=1				0.59	
				(-0.97)	
sh5_5=1					1.10
					(0.22)
Oil Producers (alt)=1 × Shock t-5 (5 %)=1					0.49
					(-1.28)
Log lik.	-1022.43	-1023.36	-1024.43	-1025.37	-1025.17
N_sub	703.00	703.00	703.00	703.00	703.00
N_fail	518.00	518.00	518.00	518.00	518.00
gamma	0.94	0.94	0.94	0.94	0.94
Observations	59950	59950	59950	59950	59950

Exponentiated coefficients; t statistics in parentheses

Time ratio for regime type are relative to the baseline category

Inconsistent"."

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

llapp

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