

EXOGENOUS SHOCKS AND POLITICAL UNREST

by

DIDARA NURMANOVA

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Major Professor: Güneş Murat Tezcür

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## ABSTRACT

This dissertation explores the role of exogenous shocks such as economic shocks and natural disasters in producing political unrest in the form of anti-government protests and ethnic riots. It is integrated by three articles, each covering a different topic. The first article argues that economic shocks play a crucial role in protest mobilization in rentier states conditional on weaker repressive capacity or higher taxation. Empirically, it conducts a cross-national study of high-resource dependent states in the period of 1995-2014. The second article contends that there is a variation in a degree to which a country's regions are exposed to economic shocks. A higher regional exposure to economic shocks is argued to increase the likelihood of regional anti-government protest at in competitive autocracies. The argument is tested in a subnational analysis of Russia using original dataset of regional anti-government protest and regional economic data in the period of 2007-2015. The third article develops a theory of natural disasters and ethnic riots. It argues that climate-induced meteorological disasters increase chances of ethnic riots because of declined state capacity that creates uncertainty about enforcement of existing ethnic contracts, and feelings of uncertainty result in strong group categorization, stereotyping and polarization. The argument is tested in a subnational study of Hindu-Muslim riots in Indian states in the period of 1951-2015. The results of the studies in this dissertation offer three key findings: (1) higher resource rents lower protest likelihood in autocratic rentier states with higher repressive capacity; (2) regional unemployment is a strong predictor of anti-government protest; (3) natural disasters in the form of precipitation and temperature anomalies increase chances of ethnic riots. The findings suggest a conclusion that exogenous shocks are important predictors of anti-government protest and ethnic riots.

I dedicate this dissertation to the memory of my grandmother, Ulbosyn Abilova.

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## INTRODUCTION

Popular protests have challenged and toppled regimes, and ethnic riots have killed thousands of people across the globe in the past decades. The literature has attempted to uncover the causes of these events and significant advancements were made in examining these phenomena using various perspectives including the effects of exogenous shocks. Exogenous shocks are particularly important phenomena to examine for two reasons. First, we live in an increasingly interdependent world where the domestic economies are closely linked to the global commodity markets, manufacturing supply, and capital markets. Negative changes in global economy including economic crisis hit the domestic economies in the form of economic shocks resulting in reduced output, unemployment, decreased public spending, tax increases, and even austerity measures. These changes raise grievances and anti-regime sentiment among the citizenry and reduces repressive capacity of the state. Second, climate change has been a hotly debated topic both in policymaking and research communities in the past two decades. Exogenous shocks in the form of meteorological disasters inflict significant damage by disrupting the lives of the affected populations and decreasing state capacity to provide public goods including law and order, which may increase chances of communal conflict. Despite important advancements in the literature in researching the effects of exogenous shocks on protest and conflict, there are several specific issues that remain overlooked.

First, large body of literature centers on elucidating the effects of economic crisis on regime change and democratization (Haggard & Kaufman, 1997; Bermeo. 2000; Geddes, 1999; Acemoglu & Robinson, 2006). This strand of research presents two main mechanisms: state capacity and economic grievances through which economic crisis is argued to affect democratization processes. State capacity is enhanced by its ability to raise revenue either through taxation (Collier &

Hoeffler, 1998) or natural resource revenue extraction (Karl, 1997), and economic crises weaken state capacity. The exogenous shocks such as global economic crises and commodity price shocks are argued to result in severe adverse economic downturns leading to drastic fiscal responses by governments, popular protest, democratization and overthrow of authoritarian regimes (Pepinsky, 2009). Yet there is a shortage of quantitative cross-national evidence of the effects of exogenous shocks on protest. The research that explores this relationship in cross-national studies finds that oil price shocks positively affect the likelihood of social protest in rentier states and that highly repressive autocratic rentier states experience more protest than other regimes in oil-rich states (Smith, 2004). The evidence on the relationship between repression and dissent remains mixed. Lichbach (1987) finds that repression may either deter or encourage opposition activities depending on the government's repressive or accommodative tactics. This finding is further confirmed by Moore (1998). Yet the literature has suggested that repression deters dissent (Snyder & Tilly, 1972; Tilly, 1978), while other studies suggested that repression stimulates protest in democracies while deterring it in illiberal regimes (Gupta, Singh, and Sprague, 1993). Therefore, based on Smith's (2004) findings, it is not entirely clear whether the effects of economic shocks are conditional on repression in autocratic rentier states and how that conditionality affects protest in rentier states with democratic and hybrid regimes. I examine how protest likelihood is affected by commodity price shocks in high-resource dependent states with different political regimes and what specific mechanisms may trigger anti-government protest. Further, I argue that exogenous shocks play a pivotal role in protest mobilization in rentier states conditional on state's repressive and fiscal capacities. The type of political regimes of the rentier state determines whether and how specific mechanisms such as repressive capacity and fiscal capacity that induce protest are activated. The research question and analysis are important because they help to uncover the

mechanisms and establish the relevance and importance of the political regime for protest mobilization. I examine this relationship in a cross-national study of rentier states in the period of 1995-2014.

Second, the existing studies make a broad assumption when exploring the relationship between economic conditions and protest by implying that economic shocks affect the country and its population homogeneously, and offering no subnational evidence of the causal relationship between economic shocks and protest. The empirical studies (Trejo, 2014) and the events such as the spread of protests from marginal regions of Tunisia, Libya, and Syria to the entire country have shown that political change often originates at the regional level. This change may have important implications for democratization and regime stability. Therefore, it is important to analyze whether and how the exogenous economic shocks increase the likelihood of anti-government protest at the regional level. I argue that economic shocks do not affect all regions to the same extent, and anti-government protest activity is likely to vary by region based on the severity of the exposure to the shock. I analyze the relationship in hybrid regimes using the case of Russia in the period of 2007-2015.

Finally, the literature has argued that exogenous shocks in the form of natural disasters produce resource scarcity, agricultural shocks, and migration thereby increasing the risk of civil conflict. However, the empirical evidence of the effects of natural disasters on conflict remains mixed and inconclusive. Most studies only distinguish between large-scale interstate or civil war and low-scale communal conflict. Little attention has been paid to ethnic riots resulting in the aftermath of natural disasters. Few studies that analyze ethnic conflict find that natural disasters increase the risk of communal conflict in ethnically marginalized regions (Fjelde & Uexkull, 2012). Why is it important to examine the effects of natural disasters on ethnic riots? The decreased

state capacity in enforcing law and order as well as ethnic contracts following natural disasters may create feelings of uncertainty and security dilemma for ethnic groups. The social identity theories have long argued that uncertainty results in strong group categorization, identification, and out-group hostility and even make people more likely to join radical groups (Hogg, 2000; Reid & Hogg, 2005; Hogg, 2013). Therefore, the devastating effects of natural disasters are likely to increase ethnic tensions and increase the risk of ethnic riots. I test this argument empirically in a subnational study of Hindu-Muslim riots in Indian states in the period of 1951-2015.

In sum, the dissertation provides important insights into the link between exogenous shocks and contentious and ethnic politics. The empirical evidence presented in this work contributes to some of the most disputed topics in the contentious politics and conflict literatures. It sheds light on the protest dynamics in rentier states under different regimes showing how changes in state fiscal and repressive capacities affect the likelihood of protest in a cross-national study. The empirical evidence from this dissertation suggests that the effects of commodity price shocks on protest play out differently under various regime types suggesting that higher resource rents and oil exports decrease chances of protest conditional on higher repressive capacity in autocratic and hybrid regimes while increasing protest likelihood in hybrid regimes conditional on lower taxation. It also contributes to the debates in the literature on the link between repression and dissent by showing that higher repression is likely to increase dissident activity in autocratic regimes supporting the claims that repression is likely to backfire against the regime (Gurr, 1970, Lichbach, 1987, Salehyan & Stewart, 2016). The study of exogenous economic shocks and protest should go beyond making generalized arguments, and it should try to identify specific mechanisms involved in protest mobilization following shocks. Further, it shows that the analysis of shocks and protest should also go beyond cross-national studies to identify how subnational variation

contributes to our understanding of protest dynamics. It allows for a more precise identification of specific economic factors resulting from shock exposure such as unemployment and lower mining employment that serve as strong predictors of protest. Finally, it shows that ethnic politics literature should pay more attention to the effects of exogenous shocks such as natural disasters on ethnic riots. This relationship remains understudied, and this dissertation explores new ways in which ethnic identities can be activated in the aftermath of natural disasters thereby leading to ethnic violence. It also contributes to the climate change debates by showing that climate-induced meteorological disasters are capable of producing devastating effects on inter-ethnic relations by contributing to communal violence.

The exogenous shocks whether economic or climate-induced are important drivers of political processes that are likely to have strong implications for both regime durability and domestic stability. This dissertation seeks to analyze and emphasize their importance in the field of political science.

# ARTICLE 1: ECONOMIC SHOCKS AND ANTI-GOVERNMENT PROTEST IN RESOURCE-DEPENDENT STATES

## Introduction

Large anti-government protests swept over Middle East and North Africa in 2010-2012 resulting in regime change in Egypt, insurgencies and civil wars in Syria and Iraq, and civil conflict in Libya. In December 2011, large protests broke out in Russia following the legislative elections that were allegedly rigged. More protests took place in 2012 before Vladimir Putin's inauguration. Both the Arab Spring and protests in Russia were largest in decades and targeted autocratic practices of their respective regimes. The protests coincided with the economic crisis that the Middle East and Russia as resource dependent states experienced as a result of the declining petroleum prices following the global financial crisis in 2008. Oil prices fell from \$140.21 in June 2008 to \$33.87 in December of the same year and averaged \$60 and \$77 in 2009 and 2010 respectively negatively affecting fiscal revenues of resource-exporting states.

The literature has established a correlation between economic conditions and pro-democracy protests (Brancati, 2016). Empirical research has shown that low economic performance correlates positively with pro-democracy protests and that chances of pro-democracy protests are much higher in anocracies than in democratic or authoritarian states (Brancati, 2014). The external shocks such as global economic crises and commodity price shocks are argued to have the ability to produce severe adverse economic downturns in affected states leading to drastic fiscal responses by governments, popular protest and overthrow of authoritarian regimes (Pepinsky, 2009). Yet there is a shortage of quantitative cross-national studies that provide evidence of this complex relationship as most previous research uses case studies to illustrate the effects of exogenous shocks. The few studies that do examine this relationship in cross-national

studies find that oil price shocks positively affect the likelihood of social protest in rentier states and highly repressive autocratic rentier states experience more protest than other regimes in oil-rich states (Smith, 2004). Yet it is not clear what specific mechanisms affect the protest likelihood in rentier states with certain types of regimes. In this paper, I address the question of how commodity price shocks affect protest likelihood under different types of political regimes conditional on repressive and fiscal capacities of the state. I contend that protest mobilization in rentier states is contingent upon state repressive and fiscal capacity, however, the political regimes determine whether and how those mechanisms are activated.

Scholars have long argued that state capacity depends on the characteristics of the leading sector of the economy through which it is connected to the international economy (Shafer, 1997); state capacity to defend itself is enhanced through its ability to raise revenue either through taxation (Collier & Hoeffler, 1998) or natural resource revenue extraction (Karl, 1997). I contend that commodity price shocks increase the chances of protest because the fiscal capacity of resource-dependent states that generate most of their revenue through export of natural resources are likely to be low in these periods. Several factors account for the increased probability of protest. The literature finds that a lack of revenue increases the risk of political violence (Snyder & Bhavnani, 2005). State spending on military decreases and so does its repressive capacity, i.e. ability to suppress insurgency thereby lowering opportunity costs for protesters and increasing chances of protest mobilization. I expect the effect to be more pronounced in autocratic and hybrid regimes that rely on repression to suppress dissent.

Protest may also be a response to economic policy changes that raises grievances among the populace (Pepinsky, 2009). Fiscal policy changes such as tax and other payment increases necessitated by lower revenues from traditional sources may take place during the times of



economic crisis. In case these changes are implemented, they affect individual incomes negatively thereby raising grievances and chances of protest mobilization. Very few studies so far have addressed the direct effects of this mechanism on protest and there is a lack of cross-national evidence for this relationship. Fiscal policy responses to economic crises result in more anti-government protests that often threaten regime survival (Pepinsky, 2009). States are more likely to increase taxes during the times of economic downturn (Kaminski, Reinhart, and Vegh, 2004; Alesina et al. 2008). Tax increases are likely to increase grievances against the government and chances of protest mobilization. In hybrid regimes, this effect is likely to be more pronounced, because they have the highest level of protest likelihood compared to autocracies and democracies as they provide the middle level of political openness and the citizenry has highest incentives to mobilize for protest to influence decisions (Robertson, 2011).

This paper analyzes how exogenous economic shocks, specifically, commodity price shocks, affect the likelihood of protests in high resource dependent states with different political regimes. Specifically, the paper focuses on economic and political constraints in the form of state repressive capacity and fiscal policy responses to shocks that affect the likelihood of anti-government protest. I argue that commodity shocks increase chances of anti-government protest in rentier states conditional on weak fiscal capacities in these states. If a state has less resources to invest in the military and law enforcement, it weakens its repressive capacity and may increase chances of protest in hybrid regime states and autocratic states, because these regimes are likely to rely on repression to suppress opposition and social protest to remain in power. Decreased fiscal capacity also makes states seek alternative sources of revenues to cover budget deficits and avoid debt crisis. As a result, resource-dependent democracies and hybrid regimes are likely to implement fiscal policy responses to the economic crisis by increasing taxes and/or other payments

to the budget to generate revenue. This, in turn, is likely to increase grievances among the citizenry thereby raising chances of anti-government protest. Autocratic rentier states, in contrast, are likely to refrain from raising taxes as taxation is associated with increased demand for political representation, which autocrats want to avoid to remain in power. Instead, they are more likely to rely on the savings from stabilization funds, which are created by rentier states to accumulate funds for macroeconomic stabilization during the times of economic downturn. In sum, I expect autocratic and hybrid regimes to face higher chances of anti-government protest as a result of economic shocks conditional to lower repressive capacity of the state. I also expect an increased likelihood of protest in democracies and hybrid regimes following economic shocks when conditioned by higher taxation.

I test my arguments in a cross-national analysis of high-resource dependent states in the period of 1995-2014. The results show that protest in democratic regimes are not significantly affected by resource/oil rents conditioned by repressive capacity. Autocracies are less prone to protest when resource rents or net oil exports increase conditioned by higher repressive capacity. In hybrid regimes, higher oil exports increase protest likelihood conditional on high repressive capacity. Hybrid regimes are also more likely to experience protest as a result of high resource rents conditional on low taxation while the same effect is not observed in other types of regimes. In sum, although the results do not provide empirical evidence for the proposed hypotheses, they reveal other important observations that suggest that there is a significant variation in the effects of economic shocks in different regime types when conditioned by repressive capacity and taxation.

## Literature Review

A large body of literature focuses on explaining the effects of economic crisis on regime change and democratization (Haggard & Kaufman, 1997; Bermeo, 2000; Geddes, 1999; Acemoglu & Robinson, 2006). This scholarship presents two main mechanisms: state capacity and economic grievances to explain the effects of economic crisis on democratization. The first strand of research attributes the effects on democratic transition to the weakened military capacity of states to repress protests (Acemoglu & Robinson, 2006). It is argued that a state's capacity to repress and defend itself is negatively affected by economic shocks (Nieman, 2011; Savun & Tirone, 2012). Savun & Tirone (2012) argue that during the times of global agricultural price shocks, a state is weakened through decrease in fiscal capacity to finance police and military, which decreases the state's ability to defend itself against both external and internal threats. Rentier state literature suggests that that oil revenues promote regime durability as long as the economic conditions remain favorable and payments keep flowing to the recipients (Karl, 1997; Beblawi & Luciani, 1987). Regime remains strong despite social opposition because oil wealth allows for larger military spending and investment in repressive institutions (Ross, 2001). The literature also finds that oil-rich states experience significantly higher levels of social protest during bust periods when oil prices drop (Smith, 2004). These findings suggest that there may be a positive correlation between commodity prices and state repressive capacity in bust periods, which increases the likelihood of protest. Therefore, more empirical research is needed to investigate whether the effects are homogenous across all types of political regimes with high resource dependence. Also, the literature implies that the effects of economic shocks are the same in all types of illiberal regimes. It tends to treat regimes as a dichotomy of democracy and autocracy. This is a major shortcoming as protesters in competitive authoritarian regimes encounter significantly different constraints and

incentives for protest mobilization than protesters in closed autocracies (Robertson, 2011). Protests in competitive autocracies are highest among all types of regimes (Robertson, 2011), and, therefore, the effects of commodity shocks on protest may be present in hybrid regimes rather than closed autocracies. Distinguishing the effects of economic shocks on protests in various political regimes is, therefore, necessary.

The other strand of research centers on economic grievances. Haggard & Kaufman (1997) posit that democratization chances are increased by the opportunistic behavior of opposition that stimulate anti-government protests by linking popular grievances to the autocratic nature of the regime. Other scholars argue that people blame their economic problems on the nature of the regime leading to demands for democracy, mass protests, and overthrow of authoritarian regimes (Pepinsky, 2009; Brancati, 2014; 2016). Brancati (2014) posits that people blame autocratic nature of their regime for economic downturns, and, therefore, pro-democracy protests are more likely to happen when economic performance is low. Yet no studies, to my knowledge, examine the effects of unfavorable fiscal policy responses resulting from commodity shocks on protest. The scholars have studied how states respond to economic crises (Gourevitch, 1986; Kahler & Lake, 2013). Gourevitch (1986) argues that states adopt policy packages as a response to crisis by examining the historical cases of Germany, U.S., Sweden, France, and Great Britain. These policy packages depending on states' domestic factors include protectionism, stimulus spending, mercantilism, support of certain industries, and economic socialization. Kahler and Lake (2013) bring together various scholars who provide different perspectives in analyzing the political causes and consequences of the global economic crisis that began in December 2007. The crisis is explored as the outcomes of political choices made by domestic actors in the past, and, the authors conclude that there has not been a significant political realignment or policy changes across states since

2007. Brancati (2014) finds that chances of pro-democracy protests are much higher in anocracies than in democratic or authoritarian states, However, Brancati's study focuses specifically on pro-democracy protests rather than anti-government protests in general. Moreover, she does not examine the effects in high resource dependent states that are most vulnerable to commodity price shocks. Finally, her study also does not explain what makes pro-democracy protests in anocracies more likely than in other types of regimes.

Commodity price shocks may result not only in a weakened repressive capacity, but also unpopular fiscal policy responses such as tax increases in resource-dependent states that derive their revenues from the export of natural resources. Economic literature posits that commodity-exporting countries are vulnerable to price fluctuations of the world commodity prices, which affect their terms of trade; its vulnerability is determined by the exposure to these price changes, as reflected by the ratio of the affected commodity exports to GDP; and its ability to manage these shocks as they happen, i.e. resilience, also affects the degree to which the country is affected by these price fluctuations (Guillaumont, 1999). Low-income countries are argued to be more vulnerable to commodity price shocks (Combes & Guillaumont, 2002; Wibbels, 2006; Savun & Tirone, 2012). However, it is not clear whether resource dependence is implied to be correlated with low income. What are the fiscal responses to these price shocks? Economic scholarship argues that most non-G7 industrial countries and most developing countries adopt procyclical fiscal policy by increasing tax rates during economic recessions (Gavin et al. 1996; Gavin & Perotti, 1997; Talvi & Vegh, 2004; Kaminski, Reinhart, and Vegh, 2004; Alesina et al. 2008). Yet these studies do not examine the effects of these fiscal policy measures on political outcomes such as anti-government protest. The unpopular fiscal policies raise economic grievances and are likely to increase the likelihood of protest mobilization. Groups are more likely to mobilize for both violent

and non-violent politics if they have economic grievances (Cunningham, 2013). Economic grievances are linked to perceived economic discrimination, and more aggrieved groups are more likely to use violent or non-violent strategies to rebel (Cunningham, 2013). Therefore, it is important to examine the relationship between fiscal policy responses to economic shocks and anti-government protest.

In sum, political science literature focuses on democratization as an outcome of economic shocks. The research on the effects of commodity price shocks on protest in states with various types of political regimes and high resource dependence remains limited. Some studies focus on explaining pro-democracy protests with economic conditions, and find protest to be more likely in certain political regimes than others (e.g. Brancati, 2014). Other studies focus on explaining social protest in states with different levels of oil dependence and find that protest is more likely in highly repressive autocracies than in other types of regimes (e.g. Smith, 2004). As the evidence for the link between repression and dissent remains mixed and inconclusive (e.g. Gurr, 1970; Snyder & Tilly, 1972; Tilly, 1978; Lichbach, 1987; Gupta, Singh, and Sprague, 1993; Moore, 1998; Chenoweth & Stephan 2011; Salehyan & Stewart, 2016), it is not clear why highly repressive oil regimes would experience higher level of protest. Therefore, there is a need to identify specific mechanisms that produce protest as a result of economic shocks and see if the effect is conditional on repressive capacity or fiscal policy responses that trigger protest. This paper analyzes protest in rentier states as a result of commodity price shocks conditional to weak state capacity and unpopular anti-crisis fiscal policy measures such as tax increases.

## Theory and Hypotheses

The paper sets forward several theoretical expectations. First, I expect rentier states to experience higher chances of anti-government protest as a result of commodity price shocks conditional on lower fiscal capacity. If the rentier states have low fiscal capacity during the times of commodity price shocks, the chances of protest are likely to increase. Second, I expect commodity price shocks to increase chances of protest in democracies and competitive autocracies when conditioned by weakened repressive capacity. Highly authoritarian rentier states are expected not to experience increased chances of protest because of low political engagement of the population in these states. Third, in rentier states, I expect protests to be more likely during economic downturns conditional to tax increases. Tax increases are likely to cause public discontent and spill out in popular protests against the regime and its fiscal policies. However, tax increases are likely in democracies and competitive rentier autocracies, as closed rentier autocracies are likely to avoid tax increases to prevent representation and demands for democracy, which may threaten their regime survival.

### **Repressive capacity**

The first mechanism that I expect to moderate the effect of commodity price shocks on protest is low repressive capacity. States may experience low repressive capacity for various reasons including, but not limited to, commodity price shocks. Some scholars have argued that commodity price shocks reduce revenues of resource-dependent states and as a result overwhelm state capacity and disrupt its coping mechanisms (Nieman, 2011). An affected state has fewer resources to invest in army and law enforcement than when the commodity prices are favorable. Decreased revenue from price shocks puts constraints on repressive capacity of an authoritarian and hybrid regime

states, specifically, on their police and military spending, thereby decreasing the states' ability to suppress protests.

The literature suggests that resource wealth often leads to high levels of military spending, which enhances a state's capacity to easily repress any social opposition (e.g. Ross, 2001), however, reduced revenues limit the ability of the state to invest in repressive instruments. If a rentier state has low repressive capacity during the times of economic crisis due to the lack of resources to invest in military or other reasons, we should expect to see higher chances of protest mobilization.

I expect the reduced repressive capacity to lower the personal risks of state reprisal, and, therefore, facilitate the process of overcoming the collective action problem when an individual faces a decision to join a protest. Cascade models of protest suggest that perception of a lower risk of repression may be formed from the size of the protest or repression history in previous protests (Kuran, 1991; Lohmann, 1994). In protests with large number of participants, the risk of being arrested is significantly reduced than in protests with small number of participants. However, this effect may vary in rentier states with different political regimes. Rentier state literature finds that in highly authoritarian rentier states, repression lowers the number of protests (Smith, 2004).

The states with lowered repressive capacity may have fewer law enforcers to deploy to contain protests. Law enforcers may also sympathize with the protesters and even side with them if they have similar grievances against the regime resulting from adverse price shocks. This may depend on many factors including social identity of protesters and security forces, but if law enforcement shares the same grievance against the government as protesters or has its own grievances against the government they are likely to have less incentives to suppress protest. Low repression may send a signal for future protests and encourage higher participation rates among



the populace. The dampening effect of economic shocks on repressive capacity was evidenced in 2011 when the protests broke out in major Russian cities following legislative elections to the Russian Duma in December. Russia as a resource-dependent state saw its revenues decline as a result of sharp decreases in oil prices following the 2008 global financial crisis. The prime-minister Medvedev announced the reform of the law enforcement system in early 2011 citing economic crisis as one of the reasons for the reform, as a result of which 280,000 law enforcers (20% of its staff) would be laid off including the staff and high-ranking officials in the Ministry of Internal Affairs (50% of its staff). The law enforcers would be renamed from “militsiya” to “politsiya”, and the remaining staff would be required to go through attestation procedures to prove their professional abilities. The reform caused serious grievances among law enforcers, and smaller-scale protests that preceded the mass protests as well as the December uprisings and other 2012 protests did not see harsh suppressions of the protests. Instead, the regime responded with some concessions to protesters’ demands and implemented several legislative changes to the electoral process.

The effect is likely to be relevant to hybrid regimes and autocracies for two reasons. First, the underdevelopment of democratic institutional channels such as petitioning the state, pursuing legal action, voting in free and fair elections, lobbying the government, pursuing accountability of elected officials and transparency of government actions, and engaging in public discussion makes people more likely to express their grievances through protests. Second, the ability to repress is more relevant for autocracies and hybrid regimes that rely on it to suppress protests. Democracies are argued to provide more channels for groups to pursue their goals, which reduces the likelihood of violent protest (Cunningham, 2013). Democracies provide highest level of political openness and representation among all regime types. Because political stability in democracies rarely relies

on repression, the effect of repressive capacity is less relevant for democracies than other types of regimes. Protest in democracies is likely to take place regardless of changes in state's repressive capacity. The autocratic and hybrid regimes, however, do rely on repression to suppress protest, and, therefore, protesting may be more costly in these regimes than in democracies. Decreased repressive capacity means fewer costs for the protesters in these regimes, which is likely to increase their propensity to protest. If these arguments are correct, we would expect to find evidence for the following hypotheses:

*H1a: Commodity price shocks increase the likelihood of anti-government protests in rentier hybrid regimes conditional on weaker repression.*

*H1b: Commodity price shocks increase the likelihood of anti-government protests in rentier autocratic regimes conditional on weaker repression.*

## **Taxation**

Political economy literature has long argued that economic crises result in the shift of policy preferences and adoption of fiscal and monetary responses to the crisis (Gourevitch, 1986; Kahler & Lake, 2013). These policies are argued to increase discontent among the citizenry and lead to the overthrow of authoritarian regimes (Pepinsky, 2009). Tax increases, specifically, are argued to increase demands for democracy (Ross, 2004). This would explain why highly authoritarian rentier states are not likely to increase taxes when affected by commodity prices as taxation would mean the need to provide representation. Competitive autocracies, in contrast, provide middle level of political openness and representation, and, therefore, tax increases are more likely in rentier hybrid regimes than in autocracies. Rentier hybrid regimes already tax their citizens, and, raising taxes may not result in demands for more representation that may be voiced through protests. Therefore,

this is not likely to become a constraint in their decision to increase the levels of taxation. Democracies provide the highest level of political openness and representation and, therefore, resource-dependent democracies are likely to increase taxes when hit by commodity price shocks.

It should be noted that there are direct and indirect types of taxation that may affect the economic well-being of the affected individuals. Direct taxes, i.e. income tax, wealth tax etc. paid by individuals directly to the government as well as indirect taxes levied through the sale of goods and services may equally cause discontent among citizenry. Although it may be argued that direct taxes may have a stronger effect on popular discontent, mass protests against fuel tax in France in December 2018 serve as the evidence that indirect tax increases are very much capable of producing mass protest and chaos in modern democracies. The foreign labor force legally employed in the oil and mining industries are also affected by tax increases. However, the core argument of this paper centers on the moderating effect of higher taxes that affects citizenry in general and does not target specific industries. Therefore, the assumption built into the argument is that if tax increases affecting economic well-being of citizenry take place during the times of economic crisis, commodity price shocks are likely to increase the chances of anti-government protest.

Economic shocks in the form of commodity price shocks negatively affect state fiscal capacity of states that rely on revenues from the export of natural resources. There are three components of vulnerability to price shocks: shocks, exposure, and resilience (Combes & Guillaumont, 2002). The commodity-exporting country is thus vulnerable to price fluctuations of the world commodity prices, which affects its terms of trade; its vulnerability is also determined by the exposure to these price changes, as reflected by the ratio of the affected commodity exports to GDP; and its ability to manage these shocks as they happen, i.e. resilience, also affects the

degree to which the country is affected by these price fluctuations (Guillaumont, 1999). States with a higher exposure, i.e. higher ratio of commodity exports to GDP are more vulnerable to commodity price shocks.

It is also important to address what type of commodities are expected to affect state revenues. The literature finds that capital-intensive commodities, i.e. fuel and minerals, affect state revenues more than individual incomes, whereas labor-intensive commodities such as agricultural crops are argued to affect individual incomes more than state revenues (Bazzi & Blattman, 2014). Therefore, the effect of price shocks in capital-intensive commodities on state capacity is expected to be negative because state revenues decrease.

States with high resource dependence may seek alternative sources of revenue when the commodity revenues decrease, which may result in tax increases. This leads to my second expectation, which posits that an effect of a sharp decrease in commodity prices on protest may vary based on state fiscal capacity depending whether the level of taxation is high or low.

How does the fiscal policy of a country change when negative price shocks hit? I turn to the economics literature to answer this question. Keynesian model advises a countercyclical fiscal policy, in which a government would increase spending and lower taxes during adverse economic periods whereas models following the works of Barro (1979) suggest that the fiscal policy would be acyclical, i.e. remain unchanged regardless of the business cycle (Talvi & Vegh, 2004). However, an overwhelming evidence in the economic literature suggests that fiscal policy of the G-7 countries would be acyclical (Talvi & Vegh, 2004) while most non-G7 industrial countries and most developing countries have a procyclical fiscal policy (Alesina et al. 2008; Talvi & Vegh, 2004; Kaminski, Reinhart, and Vegh, 2004; Gavin et al. 1996; Gavin & Perotti, 1997). Procyclical fiscal policy implies that tax rates increase during recessions and decrease during booms while

spending goes up in booms (Alesina et al. 2008). This fiscal behavior is explained by the larger fluctuations of tax base in developing countries than G-7 countries and as a result there are political pressures for larger spending from state enterprises, state governments, and rent-seekers during booms because these actors want their share of the increased revenues.

An alternative and more conventional explanation holds that governments engage in procyclical behavior because they cannot borrow funds from the world capital markets as a result of being cut off from them during the times of economic recession (Riascos and Vegh, 2003; Galvin & Perotti, 1997). Based on the empirical evidence, it would be reasonable to assume that affected states may increase taxes when negative price shocks hit. Rentier states are likely to experience significant shortfalls in revenue in these periods, which they may need to address by implementing fiscal policy changes such as tax increases.

Rentier state literature argues that most rentier states do not tax their citizens or have low level of taxation. However, I argue that this depends on the type of political regime. Democracies and competitive autocracies with high resource dependence may be more likely to increase taxes than low resource dependent states because the impact of commodity shocks on the latter is significantly less than on the former. Highly authoritarian rentier states are likely to withhold from tax increases as it is likely to threaten their regime durability.

The governments of rentier democracies and competitive autocracies are likely to seek alternative sources of revenue in the form of increases of taxes and other payments to the budget in order to cover the budget deficit and avoid a debt crisis. The tax and payment increases may include income taxes that target the large parts of the population or indirect taxes and payments such as transport taxes that affect only certain parts of the population. In any of those cases, the increases are likely to raise grievances among the affected citizens and increase chances of anti-

government protest mobilization. States with low resource dependence, i.e. tax-dependent states, in contrast, rely on taxation to generate fiscal revenue, and, therefore, do not experience major changes in fiscal capacity when commodity prices decrease. Based on these arguments, we should expect to find evidence for the following hypotheses:

*H2a: Commodity price shocks increase the likelihood of anti-government protests in rentier democratic regimes conditional on higher taxation.*

*H2b: Commodity price shocks increase the likelihood of anti-government protests in rentier hybrid regimes conditional on higher taxation.*

The summary of the hypotheses are presented in Table 1-1.

Table 1-1. Summary of the hypotheses

	<b>Low repressive capacity</b>	<b>Higher taxes</b>
<b>Autocracy</b>	H1B Commodity price shocks => Protest	
<b>Hybrid</b>	H1A Commodity price shocks => Protest	H2B Commodity price shocks => Protest
<b>Democracy</b>		H2A Commodity price shocks => Protest

## Research Design

To estimate the effects of economic shocks on anti-government protest, I use Poisson regression with fixed effects and standard errors clustered by country. Using country fixed effects addresses the problem of potential omitted variable bias by focusing on the within group variation of protest in states over time rather than the across group variation of protest in different states as this variation may reflect omitted variable bias. The fixed effects method warrants that all results reflect temporal covariance, and any time-invariable characteristics of each country are accounted for by this method. Clustering standard errors by country implies that the protest residual is associated with specific conditions that exist in the country because the protest data was drawn from a sample of countries. Clustering treats observations within countries as interdependent.

The choice of using the Poisson regression was made based on the condition of overdispersion of data. If overdispersion existed, the negative binomial regressions would be used for estimation, because the negative binomial analysis is normally used to model overdispersed Poisson count data (Hilbe, 2011). Therefore, negative binomial regressions were run first to determine whether overdispersion existed. The results showed that the count data is not overdispersed with  $\alpha$  ranging between .78 and .97 in different models, and the confidence intervals for alpha overlap with one in most models. The null hypothesis is that  $\alpha$  is not significantly different than 1, and not greater than 1.25 for overdispersion (Hilbe, 2011), and with the negative binomial results the null hypothesis was not rejected. Because the data is not overdispersed, Poisson regression became the choice for testing the hypotheses.

The count dependent variables also face the problem of proportionality when estimating the effects of independent variables, and, therefore, require the use of exposure or offset variables. The exposure variable in Poisson regression is given a coefficient of 1. It is necessary to use an

exposure variable when comparing counts over different variables with different dimensions. An exposure variable models the outcome proportional to its dimension. As the protest data includes the number of protests in states with different dimensions, i.e. population, it is necessary to model the rate of protest that is proportional to the state's population. Therefore, population is used as an exposure variable in all models. Its data come from Ross-Mahdavi Oil and Gas Dataset 1932-2014).

Testing the effects of commodity price shocks on protest may also be subject to the issue of endogeneity. Anti-government protests may result in supply disruptions and lead to less resource export revenues. I run robustness test using oil prices as independent variable and present the results in Appendix H and Appendix I.

Table 1-2 provides the summary statistics for all dependent and independent variables used to test the hypotheses.



Table 1-2. Summary Statistics

Variable	Obs	Mean	Std. Dev	Min	Max	Source
Protests	3,163	26.19728	92.61132	0	1657	W-ICEWS (Worldwide Integrated Crisis Early Warning System)
Repressive capacity	3,161	3.249921	1.121223	1	5	Political Terror Scale (PTS)
Resource rents/GDP	3,076	8.693653	12.29138	.0003121	89.16611	World Bank
Net oil exports/GDP	2,708	.0499911	.2575505	-.4602627	5.171873	Ross-Mahdavi Oil and Gas Dataset 1932-2014
Taxes/GDP	2,053	16.69997	9.046731	.3211919	132.5171	World Bank
Stabilization Fund	3,163	.122036	.3273792	0	1	Truman (2009)
Democracy	3,111	3.293153	6.463517	-10	10	Polity IV
GDP per capita	3,091	9014.087	14513.45	65.01142	102910.4	World Bank

### Dependent variable

The sample includes all sovereign states for which data exist across all variables in the given period (1995-2014). The dependent variable is the number of anti-government protests in a country-year. Anti-government protest is defined as an act in which “groups of citizens who do not formally interact with government officials, but who, under certain conditions...organize on an informal, issue-specific basis to make demands on public officials through pressure processes” (Schumaker, 1975, p. 490). The data for the dependent variable comes from W-ICEWS (Worldwide Integrated Crisis Early Warning System)<sup>1</sup>, which is an event dataset. Its data come from news reports around

<sup>1</sup> The data is available at <https://dataverse.harvard.edu/dataverse/icews>. W-ICEWS v.10 (1995-2015 was used for this paper.

the world coded using the BBN ACCENT event coder. BBN ACCENT is an event coder based on BBN SERIF, “a natural language analysis engine that extracts structured information (e.g. entities, relationships, and events) from text” (BBN ACCENT Event Coding Evaluation, 2015). W-ICEWS uses CAMEO ontology (Conflict and Mediation Event Observations) to code its data.<sup>2</sup>

The included target sectors are executive, legislative, and judicial branches of the national, regional, and local governments. Parties and party leaders were not included as parties may not be represented in the government and may not necessarily have political power, which would not qualify the protests against them as anti-government protests. I also include data where source country equals target country to ensure that the data captures only anti-government protests where protesters targeted their national governments. The data are then grouped by country-year to get a count of protests in a specific country in a particular year.

### **Independent Variables**

The main independent variable of interest is economic shock resulting from price fluctuations of resource exports. I employ two separate measures for economic shock. The first measure is total natural resources rents as % of GDP (Source: World Bank 1970-2015). “Total natural resource rents are the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents” (World Bank, 2016). The estimates of this variable are calculated as the difference between the price of a commodity and the average cost of producing it. The estimated average unit costs of

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<sup>2</sup> CAMEO assigns the code that starts with “14” (ranging from 140 to 1454 to code 26 different types of protest) to capture protest and demonstrations events. Only 19 out of 26 codes are available for 1995-2014 period in the dataset. These include protest activities that demand change in institutions, regime, leadership, policy, and rights.

extraction or harvesting costs are subtracted from the estimated world price of specific commodities; then multiplied by the physical quantities countries extract or harvest.

The second measure of economic shock is the value of net oil exports as a percentage of GDP. The data for the value of net oil exports is obtained from the Ross-Mahdavi Oil and Gas Dataset 1932-2014. The value of net oil exports is calculated by subtracting imports. The data for GDP (Current US\$) come from the World Bank Data, 1960-2016. I convert the value of net oil exports to 2014 dollars using the 2014 multiplier in the dataset. This measure allows to account for a commodity price shock as we should see the value of net oil exports as % of GDP decline when price shocks hit.

These two separate measures allow to isolate the effects of oil rents from the effects of resource rents in general. Employing these measures helps identify whether the effects of oil rents on protest dynamics are different from resource rents.

Recall that the hypotheses makes the effect of economic shocks conditional on high resource dependence. The regressions are run using subsets of data based on high resource dependence and different regime types. First, the theoretical propositions advanced in the paper suggest that economic shocks affect protest in states with high resource dependence. Subsetting data allows to test the effects of economic shocks in different political regimes with high resource dependence. A state is considered to have high resource dependence if its resource rents are equal to or more than 12%<sup>3</sup> of GDP. The threshold of 12% was determined based on the evaluation of the summary statistics in the sample data. The examination of the data revealed that countries in the 75<sup>th</sup> percentile have resource rents of 12% of GDP, which means that 75% of countries have resource rents of less than 12% of GDP. Taking the top 25% of countries is a plausible way to

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<sup>3</sup> 11.56 is rounded to 12.

measure high resource dependence. The median for resource rents is 3% of GDP<sup>4</sup> in the data, which I use as another threshold for high resource dependence for robustness purposes and present the results in the Appendices. Second, H1A and H1B propose that the effect of economic shocks on protest is conditioned by repressive capacity of the state. The hypotheses state that shocks are likely to affect protest in hybrid regimes and autocracies as a result of weakened repressive capacity. Democracies typically have high level of political openness where citizens have many ways including protests to voice their grievances and influence policy and repression is rarely employed. Therefore, the first two hypotheses are tested on two subsets of data: (1) high resource dependent hybrid regimes/anocracies, and (2) high resource dependent autocracies. I employ Polity IV classification of regime types to create data subsets.<sup>5</sup>

Repressive capacity is measured by employing a proxy: Political Terror Scale (PTS) scores. The PTS measures the levels of political terror and violence on a scale of 1 to 5 (Appendix A). The scale is ordinal with higher scores representing higher levels of terror. It should be noted that this scale is not the perfect measure of repressive capacity because it assumes that higher repression levels equate to higher repressive capacity. This may not always be true, however, in the absence of a better and more precise measure of repressive capacity I employ PTS as a proxy.

The data are currently available for 210 countries and territories in the period of 1976 - 2016. The data for the score are coded using the annual country reports of Amnesty International, U.S. State Department, and Human Rights Watch. Therefore, the dataset contains three scores of political terror with the data derived from each of these reports. However, the scores based on

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<sup>4</sup> 3.29 is rounded to 3.

<sup>5</sup> The "Polity Score" classifies regime type on a 21-point scale ranging from -10 (hereditary monarchy) to +10 (consolidated democracy). The Polity scores are converted into regime categories of "autocracies" (-10 to -6), "anocracies" (-5 to +5 and three special values: -66, -77 and -88), and "democracies" (+6 to +10).

Human Rights Watch reports are available for 2013-2016 only. Therefore, I take the average score of Amnesty International and U.S. State Department reports to ensure objectivity. Taking the average of these scores is also one of the recommended procedures by the PTS creators.

H2A and H2B make the effect commodity price shocks conditional on tax increases in democracies and hybrid regimes. Tax revenue as (% of GDP), obtained from World Bank 1972-2015, is used to create an interaction effect with the independent variables. A lagged net oil exports (% of GDP) interacted by tax revenue (% of GDP) and lagged resource rents interacted by tax revenue (% of GDP) directly test H2A and H2B using two different measures of economic shock. The theoretical reason for lagging these variables is that tax increases take time to implement, and drop in resource prices in a particular year is not likely to result in an immediate increase of taxes in the same year.

Finally, I use oil price as an independent variable in robustness models to address a potential endogeneity problem. The data for annual oil prices (Europe Brent Spot Price FOB) come from U.S. Energy Information Administration (EIA) for the period of 1995-2014<sup>6</sup>. I use country fixed effects and cluster standard errors by country. I omit temporal covariance fixed effects, because global oil prices are the same for all countries within a given year.

## **Control Variables**

Control variables are informed by the literature and include GDP per capita and stabilization fund. Other important variables associated with protest such as regime type, repression, and population are already accounted for in the model specifications. Modernization theories argue that protest is more likely in states with higher level of economic development

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<sup>6</sup> The data are publicly available at <https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=rbt&f=a>

(Inglehart & Welzel, 2009; Lipset, 1959). Democratization literature argues that higher income leads to the rise of middle class with its demands for democratization (Dahl, 1971; Huntington, 1991). I include GDP per capita to control for the propositions advanced by these theories.

Stabilization funds in commodity-exporting countries are shown to be used for macroeconomic stabilization as an alternative source of revenue to taxes, natural resources, or foreign aid to cover budget deficits during the times of economic downturns. The countries with these funds may use them to avoid tax increases (Jen, 2007). A country accumulates extra resources that it has during the periods of revenue surplus from commodity exports (when commodity prices are high) into these funds. Stabilization funds are a type of sovereign wealth fund. Sovereign wealth funds may differ according to their objectives and sources of funds. The objectives of a sovereign wealth fund may include maximization of returns, saving for future generations, macroeconomic stabilization, stimulation of domestic production, or reduction of the Dutch disease, the problem of natural resource exports strengthening the currency and precipitating a decline in other export sectors. Some funds may include two or more of these objectives. The sources of funds may come from natural resources, fiscal surplus, foreign exchange reserves, employee contributions (pension funds), or government enterprises (Truman, 2009). In some cases, the funds may be accumulated from two or more sources (Truman, 2009).

The data for this variable are obtained from Truman (2009) that contains the list of forty-four sovereign wealth funds, their dates of inception, and sources of funds. Thirty-seven of them have natural resources as their source, and, therefore, they are included in my analysis. The variable is binary (1) stabilization fund and (0) no stabilization fund. I assign 1 if a country had a stabilization fund in the particular year, and 0 if it did not.

## Empirical Results

I present the results of the Poisson analysis in Table 1-3. Net oil exports as % of GDP and resource rents in Models 1 and 2 show the effects of economic shock on protest resulting from any negative change in these two variables in anocracies with high resource dependence conditional on repressive capacity. As the results show, positive changes in net oil exports/GDP increase the likelihood of protests conditional to higher repressive capacity ( $p < .05$ ). This finding contradicts H1A, which suggests that negative changes in commodity prices are likely to increase the probability of protest in hybrid regimes conditional to weaker repressive capacity. The results suggest that protests are likely to occur in hybrid regimes when oil revenues increase conditional on higher repression. The results for the individual effect of repression suggest that when the effect of economic shocks is non-existent, an increase in repression levels raises the probability of protest in hybrid regimes ( $p < .05$ ).

Table 1-3. Predicting Protest with Resource Rents and Oil Exports as % of GDP Conditional to Repressive Capacity in Rentier Hybrid Regime States, 1995-2014

<b>Variables</b>	<b>Model 1</b>	<b>Model 2</b>
Resource rents X Repression	-.002 (.01)	
Resource rents	.013 (.03)	
Repressive capacity	.61* (.26)	.94** (.22)
Net oil exports as % of GDP X Repressive capacity		-1.810* (.86)
Net oil exports as % of GDP		10.596** (3.84)
Stabilization Fund	-.681 (.39)	-.192 (.43)
GDP per capita	-.0001 (.0001)	-.0001 (.0001)
N	343	281
Pseudo R2 <sup>7</sup>	0.7537	0.7937

Note: Population was used as an exposure variable in all models. Country and year fixed effects.

Standard errors are clustered by country. Statistical significance: \*\*p< .01, \*p< .05.

<sup>7</sup> Pseudo-R2 cannot be interpreted as R2. Low values of pseudo-R2 may indicate a lack of fit, but the high values do not indicate goodness of fit (Hilbe, 2001).



Figure 1-1 based on Model 2 shows the marginal effect of net oil exports of GDP on protest at different levels of repressive capacity. The effect of net oil exports on the number of protest events increases as repressive capacity goes up in the interval of 2 and 4, i.e. where confidence intervals do not cross zero.

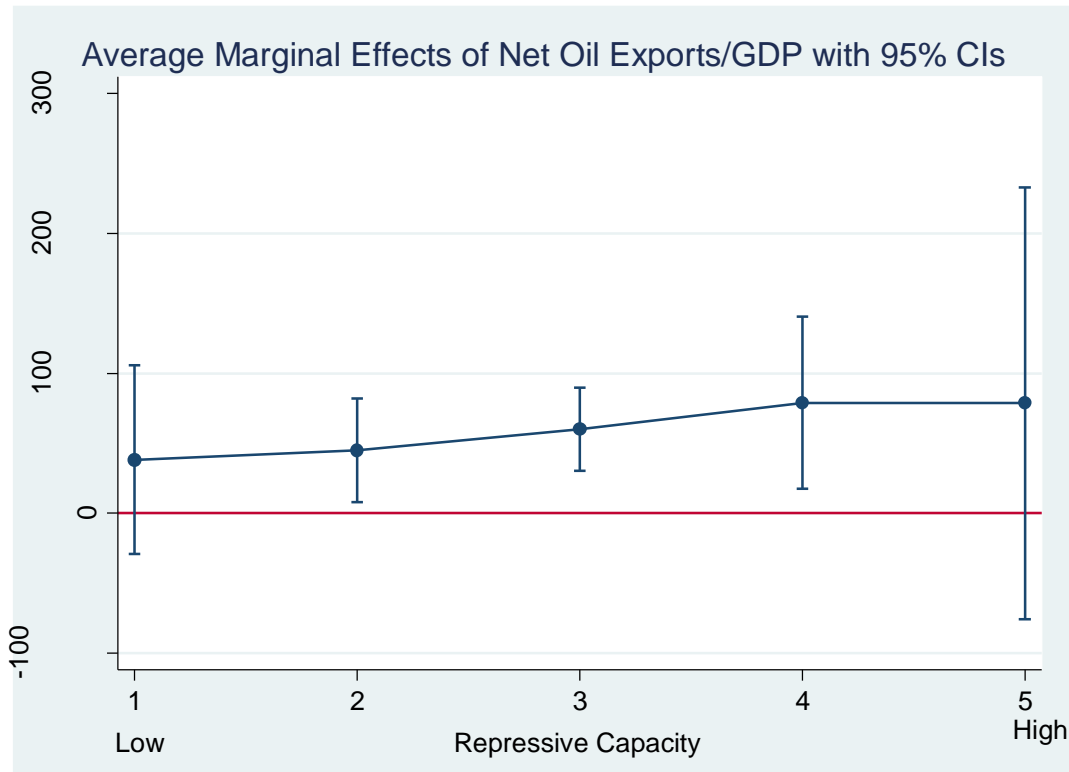


Figure 1-1. Average Marginal Effects of Repressive Capacity on Protest in Hybrid Regimes

The second hypothesis H1B proposes that commodity price shocks increase the likelihood of protest in autocratic regimes conditional on weaker repressive capacity. As can be seen in Table 1-4, positive changes in resource rents and net oil exports decrease the likelihood of protest conditional on higher repressive capacity. This finding does not provide support for H1B showing that higher resource and oil revenues are likely to decrease the likelihood of protest in autocracies at higher repressive capacity. The results in Model 2 also reveal that an increase in repressive

capacity raises the probability of protest in autocratic regimes, which resonates with the results for hybrid regimes in Table 1-3. However, Model 1 suggests that an increase in repressive capacity decreases the chances of protest in rentier autocracies. Higher GDP per capita increases protest likelihood in autocratic states as shown in Models 1 and 2. This is consistent with modernization and democratization literature that argues that protest is more likely in states with higher economic development.

Table 1-4. Predicting Protest with Resource Rents and Net Oil Exports as % of GDP Conditional to Repressive Capacity in Rentier Autocratic States, 1995-2014

<b>Variables</b>	<b>Model 1</b>	<b>Model 2</b>
Resource rents X Repression	-.081** (.02)	
Resource rents	.236** (.08)	
Repressive capacity	-2.802** (.76)	1.28** (.35)
Net oil exports as % of GDP X Repressive capacity		-3.614** (.78)
Net oil exports as % of GDP		.494 (3.08)
Stabilization Fund	.47 (1.14)	.157 (.55)
GDP per capita	.0002** (.0001)	.0003** (.0001)
N	227	207
Pseudo R2	0.7219	0.7510

Note: Population was used as an exposure variable in all models. Country and year fixed effects.

Standard errors are clustered by country. Statistical significance: \*\*p< .01, \*p< .05.

Figure 1-2 based on Model 1 shows the marginal effects of resource rents/GDP on protest in autocracies. The graph shows that the marginal effect of resource rents on protest decreases as repressive capacity increases in autocratic regimes.

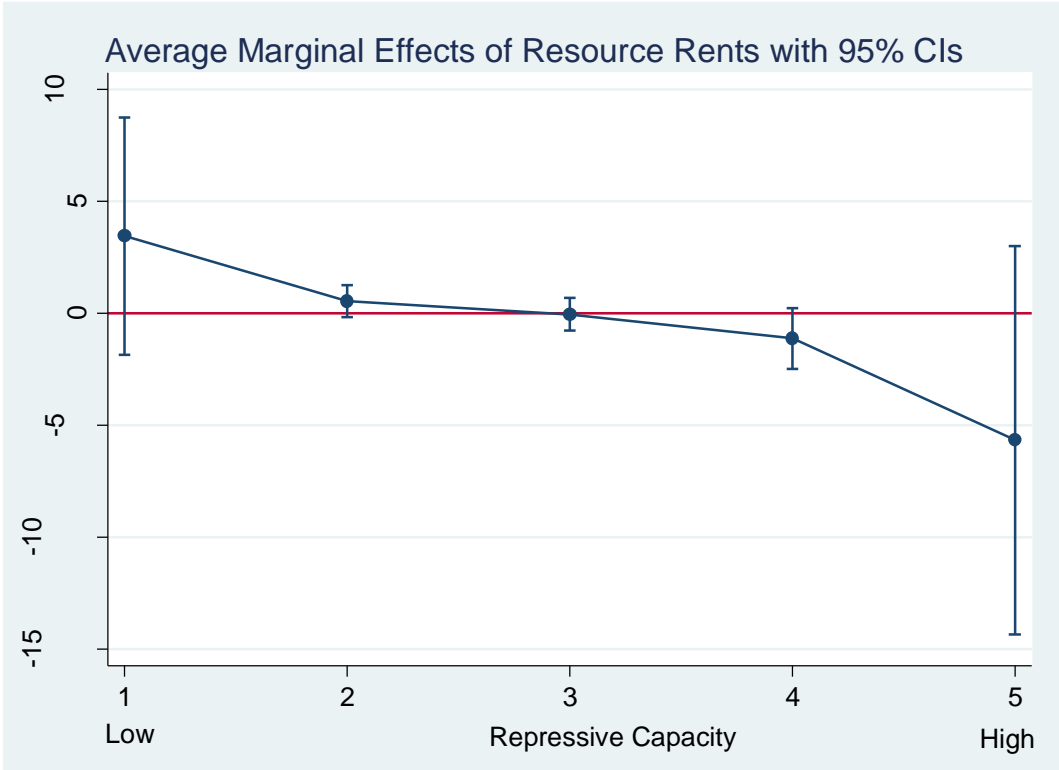


Figure 1-2. Average Marginal Effects of Resource Rents/GDP on Protest in Rentier Autocratic States

Figure 1-3 based on Model 2 shows the marginal effects of net oil exports/GDP on protest in autocracies. The effect of net oil exports/GDP on protest is higher at lower levels of repression.

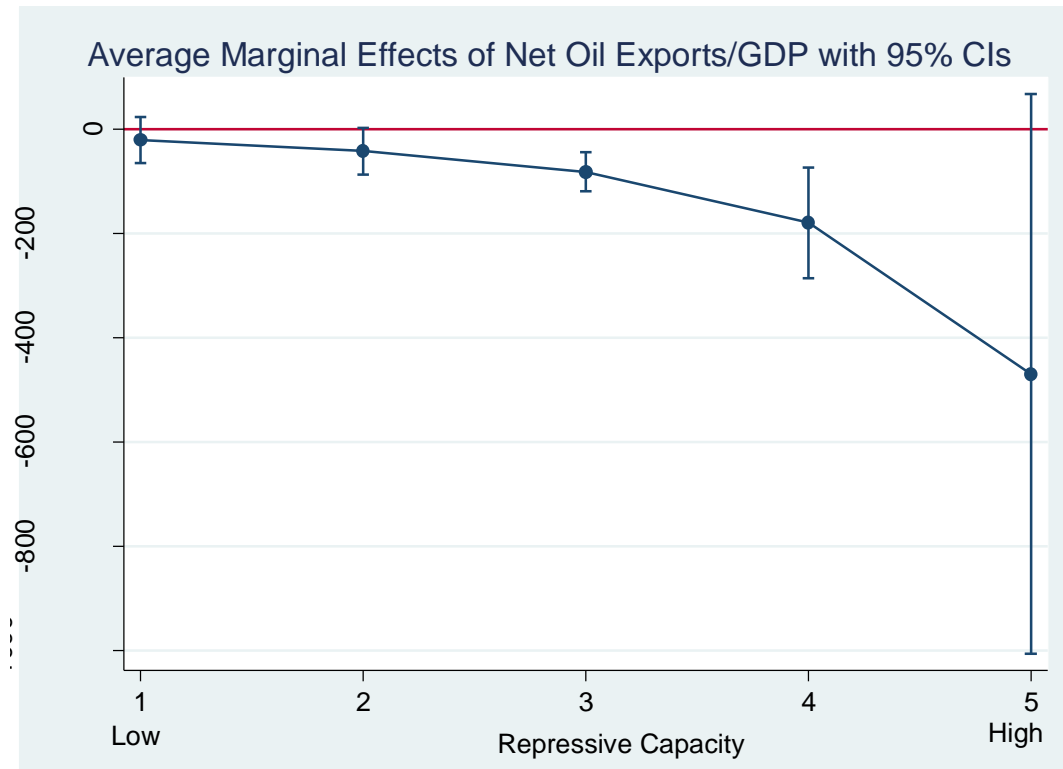


Figure 1-3. Average Marginal Effects of Net Oil Exports/GDP on Protest in Autocracies

Further, I run additional models (Appendix B) to test the effects of commodity price shocks on protest conditional on repressive capacity in democracies. The results in Model 1 and Model 2 (Appendix B) show no significant effects of the interaction variables on protest. Model 1 shows that higher repression decreases protest likelihood when the effect of economic shocks is absent. Model 2 shows that the individual effect of higher net oil exports/GDP on protest is positive ( $p < .05$ ).

The models presented in Table 1-5 test the propositions made in H2A, which makes the positive effect of economic shocks on protest conditional on tax changes in high-resource dependent states with democratic regimes. The interaction variables in both models are not statistically significant providing no support for H2A. The independent effect of taxes/GDP is positive on protest ( $p < .05$ ) when the economic shocks effects are not present.

Table 1-5. Predicting Protest with Resource Rents, Net Oil Exports as % of GDP, and Taxes as % of GDP in Rentier Democratic States, 1995-2014

<b>Variables</b>	<b>Model 1</b>	<b>Model 2</b>
Resource rents $t-1$ X Taxes/GDP	-.002 (.003)	
Resource rents $t-1$	-.013 (.08)	
Net oil exports as % of GDP $t-1$ X Taxes/GDP		-1.23 (2.66)
Net oil exports as % of GDP $t-1$		24.16 (39.75)
Taxes/GDP	.134* (.07)	.083* (.04)
Stabilization Fund	1.60** (.27)	1.53** (.38)
GDP per capita	-.0001 (.0001)	-.0001 (.0001)
N	71	72
Pseudo R2	0.8017	0.7966

Note: Population was used as an exposure variable in all models. Country and year fixed effects.

Standard errors are clustered by country. Statistical significance: \*\* $p < .01$ , \* $p < .05$ .

The final hypothesis H2B proposes that the likelihood of protest in high resource dependent hybrid regimes increases as a result of economic shocks conditional to higher taxation. As can be seen in Table 1-6, higher resource rents raise the chances of protest conditional to lower taxes in rentier hybrid regimes ( $p < .01$ ), which is opposite to the expectations in H2B. The interaction of net oil exports and taxes do not reach statistical significance suggesting the effects of resource rents and taxes rather than those of oil exports and taxes are predictive of anti-government protest in rentier anocracies. The individual effect of net oil exports is significant suggesting that higher net oil exports increase protest likelihood regardless of the presence of economic shocks in rentier hybrid regimes. This finding is contrary to my theoretical expectations.

Table 1-6. Predicting Protest with Resource Rents, Net Oil Exports as % of GDP, and Taxes as % of GDP in Rentier Hybrid Regime States, 1995-2014

<b>Variables</b>	<b>Model 1</b>	<b>Model 2</b>
Resource rents $t-1$ X Taxes/GDP	-.003* (.002)	
Resource rents $t-1$	.084* (.03)	
Net oil exports as % of GDP $t-1$ X Taxes/GDP		-.155 (.08)
Net oil exports as % of GDP $t-1$		5.577** (1.70)
Taxes/GDP	.019 (.06)	-.023 (.05)
Stabilization Fund	-1.744** (.61)	-1.316* (.54)
GDP per capita	-.0001 (.0001)	-.0001 (.0001)
N	161	143
Pseudo R2	0.8071	0.8509

Note: Population was used as an exposure variable in all models. Country and year fixed effects.

Standard errors are clustered by country. Statistical significance: \*\* $p < .01$ , \* $p < .05$ .



Figure 4 based on Model 1 in Table 1-6 shows the marginal effects of lagged resource rents/GDP on protest likelihood in hybrid regimes. The marginal effect of lagged resource rents on anti-government protest is higher at lower levels of taxation.

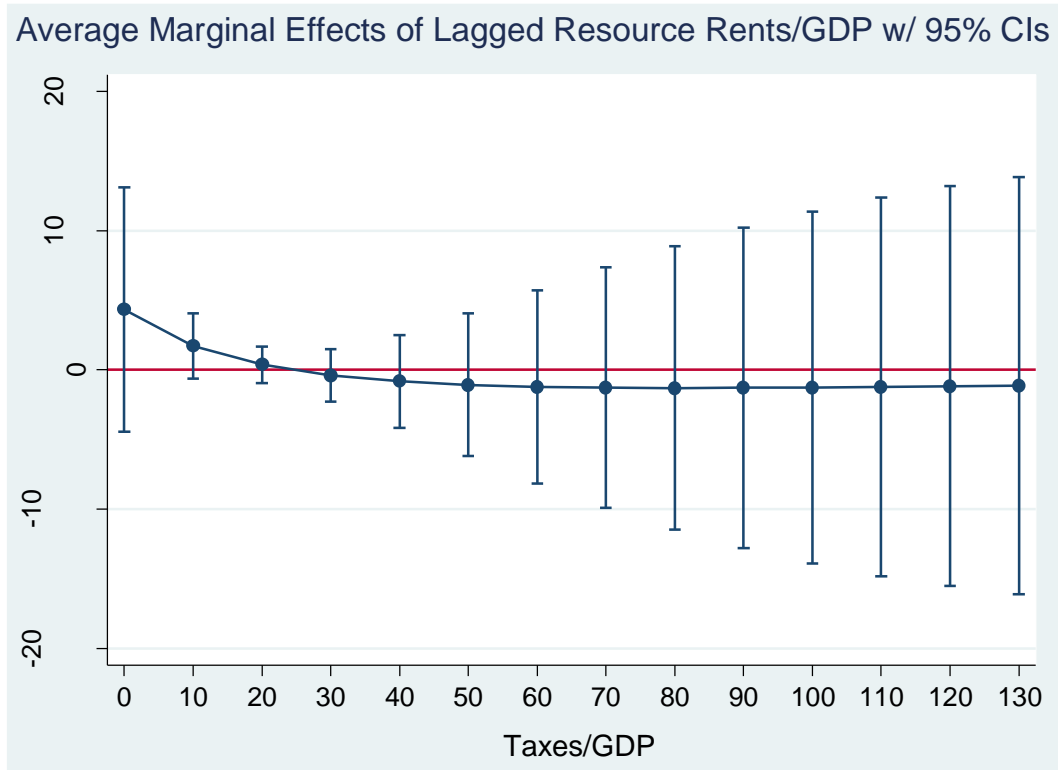


Figure 1-4. Average Marginal Effects of Resource Rents/GDP on Protest in Rentier Hybrid Regime States

Next, I run additional models testing the effects commodity price shocks conditional to higher taxation on protest in autocratic regimes. The models in Appendix C yield no significant effects for the variables of interest showing that the effects are not predictive of protest in autocracies. Furthermore, additional robust models were run at lower resource dependence threshold of 3%. The results are presented in Appendices D, E, F and G. The findings are consistent for the most part with the results presented in the main models at 12% resource dependence

threshold. However, the interaction effect between resource rents and taxation is not significant in robustness models.

Tables 1-7 and 1-8 provide the summary of the empirical results testing the four hypotheses. As can be seen in Table 1-7 the empirical results do not support the hypotheses H1A and H1B. Specifically, the empirical evidence suggests that higher resource rents and oil exports decrease the protest likelihood at higher levels of repressive capacity in autocracies whereas H1B expects low resource rents and oil exports lead to more protests at lower levels of repressive capacity. In hybrid regimes, more oil exports are shown to lead to more protests at higher repressive capacity opposite to H1A that suggests that lower resource revenues should increase protest likelihood at lower repressive capacity. Similarly, Table 1-8 shows that the empirical results do not provide support for hypotheses H2A and H2B. The evidence suggests that high resource rents increase protest likelihood at lower levels of taxation in hybrid regimes. This finding is opposite to the expectations in H2B that suggests the positive effect of lower resource rents on protest at higher levels of taxation in hybrid regimes.

Table 1-7. Summary of the empirical results testing H1A and H1B

	<b>Higher repressive capacity</b>	<b>Lower repressive capacity</b>
<b>Autocracy</b>	More resource rents => Less protest More oil exports=> Less protest	H1B
<b>Hybrid</b>	More oil exports => More protest	H1A
<b>Democracy</b>		

Table 1-8. Summary of the empirical results testing H2A and H2B

	<b>Higher taxes</b>	<b>Lower taxes</b>
<b>Autocracy</b>		
<b>Hybrid</b>	H2B	High resource rents => More protest
<b>Democracy</b>	H2A	

Finally, I run robustness models to control for possible endogeneity. I replace the resource rents and oil exports variables with oil prices and test their effects on protest conditional on repressive capacity (Appendix H) in rentier hybrid regimes and rentier autocracies and on taxation (Appendix I) in rentier hybrid regimes and rentier democracies. Models 1 and 2 in Appendix H do not reveal any significant results suggesting that oil prices moderated by repressive capacity do not affect chances of protest.

Model 2 in Appendix I that tests the effect of oil prices on protest in rentier democracies shows that the individual effect of taxes/GDP on protest is positive when the effect of oil prices is absent. This is consistent with the results in Table 1-5 showing the same effect of taxes/GDP on protest with oil exports/GDP as the main independent variable. Model 1 that tests the effect of oil prices on protest in rentier hybrid regimes do not yield any significant results.

The robustness models in Appendix H and Appendix I that control for endogeneity do not reproduce the same effects as the main models. However, the absence of time fixed effects in the robustness models could explain the difference in the results from the main models. The oil series are not country-specific, and invariant across countries.

In sum, the results do not provide empirical evidence for the proposed hypotheses, but reveal some interesting findings. Higher resource rents and oil exports lower protest likelihood in rentier autocratic states at higher repressive capacity. Higher oil exports increase chances of protest

in rentier hybrid regimes at higher repressive capacity. This could be explained by the fact that economic development resulting from higher oil revenues may lead to changes in class structure and rise of middle class that will serve as a force for democratization (Dahl, 1971; Huntington, 1991). In the conditions of increased economic development and high repression, calls for democratizations may increase among the rising middle class. Rentier democracies are not prone to these effects suggesting that the effects of changes in rents on protest conditioned by higher repressive capacity is relevant to autocratic and hybrid regimes only. Higher resource rents increase protest likelihood conditional to lower taxes in hybrid regimes.

### Conclusion

This paper explored the question of how economic shocks affect the likelihood of protest in high resource dependent states with different political regimes. Several studies that address this topic have suggested a correlation between economic crisis/shocks and protests (e.g. Smith, 2004; Brancati, 2014). Yet the implications of economic shocks such as commodity price shocks on anti-government protest are likely to be subject to regime type in rentier states. The research exploring these links is limited, and this paper sheds light into this topic by finding that the effects of economic shocks are indeed conditioned by regime type. Using the theoretical and empirical insights from democratization and rentier state literatures, I have argued that (1) commodity price shocks increase chances of anti-state protest in rentier autocratic and hybrid regimes conditional on weaker repressive capacity; (2) commodity price shocks increase chances of anti-state protest in rentier democratic and hybrid regimes conditional on higher taxation.

Although the empirical results do not provide support for these expectations, they reveal other significant findings. These findings contribute to the literature by providing new important insights to the relationship between economic shocks and protest in various political regimes with high resource dependency. Protest in rentier democratic regimes are not likely to be affected by resource/oil rents conditioned by repressive capacity. In rentier autocracies the protest is less likely when resource rents or net oil exports increase conditioned by higher repressive capacity. In rentier hybrid regimes, higher net oil exports increase chances of protest suggesting that oil revenues play a more important role in protest mobilization when conditioned by higher repression. People in hybrid regimes are also more likely to protest when resource rents are higher conditional to lower taxation. The findings for hybrid regimes are consistent with modernization and democratization literature arguments that link higher economic development to protest. The empirical results for autocratic and democratic regimes are rather counterintuitive suggesting new ways of thinking about economic shocks and anti-government protest. The individual effect of high repressive capacity is shown to increase protest likelihood providing support to the arguments in the literature that repression increases protest proclivity and dissident activity.

## ARTICLE 2: ECONOMIC SHOCKS AND ANTI-GOVERNMENT PROTEST MOBILIZATION IN COMPETITIVE AUTOCRACIES: THE CASE OF RUSSIA

### Introduction

How do economic shocks such as global economic crises affect anti-government protests in competitive autocracies? Protest literature connects economic grievances associated with income inequality (Alesina & Perotti, 1996; Gupta, 1990; Hibbs, 1973) or relative deprivation (Berkowitz, 1972; Gurr, 1970; Major, 1994) to political protest activity. Democratization literature proposes that weaker state capacity and grievances resulting from economic shocks lead to democratization of regimes, which often involves the overthrow of authoritarian regimes (Acemoglu & Robinson, 2006; Bermeo, 2000; Geddes, 1999; Haggard & Kaufman, 1997; Pepinsky, 2009). More recent theories that link economic conditions to anti-government protests emphasize the role of economic crises in fostering pro-democracy protests (Brancati, 2016). This scholarship centers on democracy protests that make demands on their respective governments to adopt and uphold fair and democratic elections. Economic crises are argued to increase discontent in society and raise support for opposition candidates, who are likely to mobilize protests, especially in election periods (Brancati, 2016). Yet these studies make a broad assumption in examining the link between economic conditions and protest by implying that economic shocks affect a country and its population homogeneously, and offering no sub-national evidence of the causal relationship between economic shocks and protest. In contrast, I contend that a country's regions may not be affected by economic shocks to the same extent, and anti-government protest activity will vary by region based on the severity of the exposure to the shock. This has important implications for understanding protest dynamics, democratization, and regime stability in competitive autocracies. Recent studies have shown that important political changes originate at the subnational level

(Trejo, 2014); and ignoring regional protest dynamics prevents observing important protest trends that may contribute to significant political change (Lankina, 2015). Furthermore, in electoral authoritarian systems, the incumbent party support directly depend on both objective changes in regional GDP and voters' perceptions of regional economic performance (Rosenfeld, 2018). In this paper, I expect that the worsening regional economic conditions as a result of economic shocks are likely to lead to the discontent with the incumbent regime in the form of anti-government protest in the affected regions. Regions with more integration to the global economy are likely to be affected more negatively by exogenous economic shocks than regions with less pronounced ties to the global economy. As a result, I expect the regions that have greater exposure to economic shocks to experience larger number of anti-government protests. This suggestion has important implications for democratization processes and regime survival. Regions with high protest activities are found to have more contested elections in competitive autocracies (Gorokhovskaia, 2017). Furthermore, economic shocks have implications for state fiscal capacity of rentier states as these states have to find alternative sources of revenue to cover the budget deficit and avoid the debt crisis. In doing so, the state is likely to increase taxes and other forms of payments to the budget thereby increasing grievances among population and raising chances of protest.

The Russian case is representative of this scenario. The regime in Russia has been mainly characterized as competitive authoritarianism (Koesel & Bunce, 2013; Levitsky & Way, 2002; Remington, 2012). Its 85 federal subjects diverge greatly in the structure of their economies and levels of economic development, and, therefore, have varying degrees of resilience to economic crises. Global economic crises are generally accompanied by a sharp reduction of demand for energy resources, and the subsequent drop in prices of oil. Commodity-exporting countries are vulnerable to price fluctuations of the world commodity prices, which affect their terms of trade;

its vulnerability to economic shocks is determined by the exposure to these price changes (Guillaumont, 1999). Oil revenues on average constituted 46% of Russia's federal budget revenues and 9% of its GDP in the 2007-2015 period<sup>8</sup>. The commodity regions of Russia are likely to be hit most severely by the shock as it manifests itself in the form of higher unemployment and decreased gross regional product. This effect, however, is not limited to resource states and their resource-exporting regions. In today's world of high economic interdependence, all countries are affected and "a crisis is a stimulus to which all must respond" (Gourevitch, 1986, p.19). In non-resource states, the severity of the effect depends on the level of integration of local economies in the global manufacturing supply, domestic financial regulation and links to global finance (Kahler & Lake, 2013).

In sum, I argue that economic shocks play a crucial role in facilitating collective action in the form of protest in competitive autocracies as state fiscal capacity weakens and economic grievances increase the public demand on the regional and national governments. The effects, however, depend on the severity of the exposure of a country's regions to the exogenous shock – the higher regional exposure increases chances of anti-government protests. My argument that rests on economic grievances is not novel as others have already studied this relationship. My study is unique, though, because I apply and test this argument at the subnational level in a competitive autocracy where my outcome variable of interest is protest in a given region, which provides important implications for regime stability and protest research in general.

With the aim of testing my argument, I employ an original dataset of anti-government protests in Russia that I constructed for the period of 2007-2015 using Russian-language articles.

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<sup>8</sup> Estimations are made based on the reports of the Ministry of Finance of the Russian Federation



The dataset contains all protests including marches, rallies, pickets, sit-ins, strikes, gatherings, and other acts of protest, which target the federal, regional and/or local governments. It also includes protests that make demands on state enterprises. The data is collected at the regional level and includes the number of anti-government protests by federal subject per year. Using the regional economic data such as gross regional product, unemployment, mining employment, and tax increases as measures of economic shock, I test their effects on anti-government protest. Economic literature has shown that there exists a correlation between oil prices and economic performance in rentier states. Empirical evidence suggests that higher oil prices have a positive effect on economic growth in oil exporting states (Berument, Ceylan, & Dogan, 2010). Furthermore, 10% decrease in oil prices is associated with 2.2% decline in GDP and 4.6% decrease in federal government revenues in Russia (Rautava, 2004). The projections of economic growth and fiscal plans are made with the estimations of future oil prices in rentier states like Russia. Based on this suggestive evidence, I make a plausible assumption that economic performance in rentier states is significantly associated with commodity prices. Negative changes in the economy are assumed to be resulting from oil price shocks in the analyzed case of Russia.

Controlling for a variety of other factors, I find that economic conditions that affect individuals directly such as unemployment are important predictors of protest mobilization whereas broad economic indicators such as gross regional product do not have a significant effect on anti-government protest. Lower employment in the mining sector has a significant lagged effect on protest while regional indirect tax increases are not shown to contribute to higher protest likelihood. The results hold in several robustness tests and have several important implications for the literature. First, the findings highlight the importance of exogenous economic shocks for protest. Second, the findings reveal that specific economic conditions that affect the populace on

an individual level such as job loss correlate positively with protest emphasizing the importance of individual preferences in protest participation. Finally, the findings demonstrate that ignoring subnational variation in protest dynamics in examining the effect of economic crises obscures the sub-national level mechanisms and variables, and oversimplifies the effect of economic shocks on anti-government protest mobilization.

### Literature Review

Political economy literature centers on explaining policy responses to economic crisis (Gourevitch, 1986; Kahler & Lake, 2013; Pepinsky, 2009) and the effects of economic crisis on regime change and democratization (Acemoglu & Robinson, 2006; Bermeo, 2000; Geddes, 1999; Haggard & Kaufman, 1997). Most scholarship focused on income inequality to explain protest from economic perspective (Alesina & Perotti, 1996; Gupta, 1990; Hibbs, 1973) and relative deprivation (Berkowitz, 1972; Gurr, 1970; Major, 1994). Yet this research is dated, and the review of the studies suggests that economic inequality is neither a necessary nor sufficient condition for dissent; nor that inequality may be actually associated with less political violence because elites in these societies have the power to suppress all instances of dissent (Lichbach, 1989).

The later studies suggested that political violence is more likely to occur in societies with both high inequality and mostly immobile capital, i.e. economies with a large share of fixed assets where the poor has substantial incentives to expropriate the assets (Boix, 2003). Acemoglu and Robinson (2006) have argued that transition to democracy is more likely to occur in societies with middle levels of inter-group inequality, because in highly unequal societies, the elites have a lot to lose from the new system that places a greater redistributive burden on them thereby making them

resort to repression as a response to the demands for democratization. Yet the study does not provide systematic empirical evidence to support these arguments (Haggard & Kaufmann, 2016). Some studies find that lower rural inequality is associated with more chances for democratization (Ansell & Samuels, 2010). Other studies find that inequality does not affect chances of transition to democracy, but may harm political stability (Dutt & Mitra, 2008) and democratic consolidation (Houle, 2009). Haggard and Kaufmann (2016) have done the most comprehensive empirical analysis to date by performing not only cross-national regression analysis but also by considering all cases of democratic transitions and reversions in the period of 1980 and 2008. They find that inequality does not drive democratic transitions and reversions even in the cases where these events are associated with distributive conflict. The authors suggest that the authoritarian regime's co-optive or exclusionary policies as well as the public's ability to manifest their grievances are likely to determine chances of transitions. The differences in regime's policies and characteristics can directly influence chances of protest mobilization. This claim is in line with the arguments on the importance of various political constraints and incentives that exist in different types of illiberal regimes (Robertson, 2011). Brancati (2014) conducted a cross-national analysis on the link between economic conditions and pro-democracy protests and found that anocracies are more likely to experience these protests than democracies and autocracies (Brancati, 2014). This finding confirms Robertson's (2011) argument that chances of protest are highest in hybrid regimes. Brancati (2014, 2016) further argues that pro-democracy protests become more likely if economic conditions deteriorate in illiberal regimes as people blame the autocratic nature of their regime for economic downturns. However, it remains unclear whether it is the economic conditions or the political factors associated with the regime type and its policies that make protest most likely in

hybrid regimes during the periods of economic crisis. The conclusion is hard to reach without a subnational analysis examining the effects of economic conditions on protest in hybrid regimes.

The protest literature suggests that economic grievances are still at the center of most protests (Salehyan & Stewart, 2016). Groups are more likely to mobilize for both violent and non-violent politics if they have economic grievances (Cunningham, 2013). In this regard, exogenous economic shocks play a pivotal role in anti-government protest mobilization and even the breakdown of authoritarian regimes (Pepinsky, 2009). Indeed, global financial crisis led to mass protests, violence, and breakdown of authoritarian regime in Indonesia in 1998; a sharp drop in oil prices triggered deep economic recession in Venezuela and 2014-2017 protests (largest in the history of Venezuela) that called for the end of the authoritarian rule of President Maduro and early elections. Some studies have pointed that in electoral autocracies, exogenous shocks in the form of economic crises usually serve as an initial motivation for protest, and economic crisis is a powerful predictor of indigenous protest (Trejo, 2014). Yet the existing studies offer no extensive sub-national level evidence on the causal relationship between economic shocks and anti-government protest, which may be due to the lack of rich empirical evidence on economic and demographic characteristics as well as anti-government protest variation across localities. Without such evidence, the literature tends to assume that the effect of economic crisis on protest is homogenous – suggesting that economic shocks affect every region of the given country in the same ways thereby increasing the overall likelihood of anti-government protest. This assumption makes it difficult to trace the causes of anti-government protest specifically to economic crises, which may easily conflate with other factors behind protest mobilization.

## Theory and Hypotheses

Political scientists have long argued that economic grievances breed anti-government protests. Here I define anti-government protest as an act in which “groups of citizens who do not formally interact with government officials, but who, under certain conditions...organize on an informal, issue-specific basis to make demands on public officials through pressure processes” (Schumaker, 1975, p. 490). These acts include pickets, rallies, marches, hunger strikes, sit-ins etc.

As Tilly (2004) pointed out, the type of contentious politics that the populace engages in depends on the type of regime in which protest takes place. This study focuses on explaining protest mobilization in competitive autocracies when affected by economic shocks, which increase grievances against the government. It is logical to expect that economic grievances significantly increase the likelihood of protest mobilization in competitive autocracies, because the populace does not face high levels of repression as in closed autocracies and has higher levels of belief that it can reach the goals of protest than in all other types of regimes including democracies (Robertson, 2011). However, it would be too simple to assume that economic shocks affect the citizenry in competitive autocracies to the same degree increasing economic grievances equally across the board and thereby raising the chances of anti-government protest. I take a more nuanced approach to argue that the likelihood of protest varies with the level of regional exposure to economic shocks. The level of economic grievances resulting from economic shocks and the subsequent protest mobilization depend on how severely the regional economies are affected by the crisis, especially in large states where regional differences may be salient. The higher exposure to the crisis should result in more anti-government protests in competitive autocracies where people make demands on the regional and national governments to resolve their grievances and/or

resign and democratize. In line with the above suggestions, I further lay out arguments that apply to protest mobilization in competitive autocracies.

Exogenous economic shocks can take the form of global financial or economic crises resulting in global economic slowdown, decreased demand for goods and services, decreased production and the subsequent drop in energy and commodity prices. The level of exposure to the crisis depends on how deeply the national and regional economies are integrated into the global manufacturing supply and/or their level of dependency on the revenues from commodity exports. The oil and mining sectors are likely to be hit the hardest when commodity prices fall resulting in decreased industrial output, wage arrears, and layoffs in the affected regions. In competitive autocracies, affected citizens are likely to engage in various forms of protest to make demands on their employers. If their employers do not meet the demands, protesters can pressure their regional governments through pickets, rallies, and hunger strikes with the expectation that the governments can either exert influence on employers through negotiations, formal investigations, and penalties, or that the government compensates unpaid wages to the protesters in case of enterprise bankruptcies. In some cases, employees of bankrupt enterprises may demand that the government takes the ownership of the enterprise and keeps them employed or provides them with alternative employment through creation of new workplaces. This sentiment is likely to be further fueled by opposition forces that get actively involved in organizing anti-government protests with the goal of achieving their own long-term political goals. Scholars have argued that opposition has incentives to mobilize protest (Reuter & Robertson, 2015; Robertson, 2011; Trejo, 2014) and may take advantage of the increased discontent in the times of economic crisis to claim electoral fraud even when it is not present (Brancati, 2016). To the extent that grievances motivate protest (Gurr, 1970), the spatial variation of these protests within a competitive autocracy will depend on the

severity of regional exposure to economic shocks. If this argument is correct, we would expect to find evidence for the following hypotheses.

*H1: Regions that see higher levels of decreased output over time are more likely to experience larger number of anti-government protests.*

*H2: Regions that see higher levels of unemployment over time are more likely to experience larger number of anti-government protests.*

The first and second hypotheses are based on grievance arguments. In some cases, however, the protests may also be stimulated by fiscal policy changes that governments implement as a response to these exogenous shocks. Governments respond to international economic crises through various economic and fiscal policy changes (Gourevitch, 1986; Kahler & Lake, 2013; Pepinsky, 2009). An overwhelming evidence in the economic literature suggests that most non-G7 industrial countries and most developing countries implement a procyclical fiscal policy when affected by economic shocks (Alesina, Tabellini, & Campante, 2008; Gavin & Perotti, 1997; Kaminski, Reinhart, & Vegh, 2004; Talvi & Vegh, 2004). Procyclical fiscal policy implies that tax rates increase during recessions and decrease during booms while spending goes up in booms (Alesina et al., 2008). Therefore, we can expect that in competitive autocracies, national and/or regional governments are likely to increase taxes to cover a budget deficit and avoid a debt crisis. Several factors may account for this increase. First, decreased revenues of corporations and businesses that suffered from economic shocks are likely to result in lower tax revenues for the governments at regional levels. Second, the governments are likely to see income tax revenues decline as a result of decreased regional employment. Finally, regional government spending needs to increase during economic recessions due to higher claims for unemployment benefits and other benefits that arise due to rising inflation and other adverse economic conditions. National

governments may see the need to increase subsidies for the economically disadvantaged regions to bail them out or give them autonomy to raise regional taxes to raise revenues for their budgets. Moreover, in rentier autocracies, economic shocks decrease government revenues from commodity exports. In these conditions, the national and regional governments are likely to raise revenues through increases in taxes, duties and other payments to the budget. In keeping with my general arguments though, I posit that economic shocks do not affect all regional budgets equally, and adverse fiscal changes are stipulated by the structure of the regional economy and the level of integration of regional economy into the global economy. This suggestion would explain why we would expect to see spatial variation in tax increases within an affected state. The regions that increase taxes that negatively affect the individual incomes of its residents are likely to see economic grievances rise that are likely to spill out in protests. The evidence from economic literature suggests that workers' income is affected proportionately by weak economic conditions, which should lead to a relatively larger participation of people in public protests (Campante & Chor, 2012). In these protests, citizens pursue the goal of policy changes that would address their grievances. Specifically, they expect concessions from the regional governments in the form of abolition of tax increases. This suggestion is based on the assumption that regions have the power to determine their own tax policy as in federal systems of government. This leads to my next proposition:

*H3: Regions that increase taxes that affect individual income negatively are more likely to experience larger number of anti-government protests.*



## **The role of economic grievances in Russian politics**

In the poll conducted by Levada Center in November 2017, 49% of Russians said that President Putin was responsible for the problems in the country and for the increase in the cost of living, 45% blamed the government, 30% thought Dmitry Medvedev was responsible, and 27% thought that the governors and local authorities were to blame.<sup>9</sup> Treisman (2011) finds that public assessment of economic performance determines the levels of presidential ratings in Russia. While elections present an opportunity to change the status quo for the citizenry and to gain power for the opposition candidates, anti-government protests may occur in any given period when economic, political and/or social conditions become unacceptable for the populace.

How important are economic grievances in fostering protest mobilization in Russia? Most scholars on Russian politics agree that material values that benefit individuals directly are prioritized over abstract freedoms in Russia (Remington, 2012), and that Russians are more likely to participate in protests if the issue at the center of protests directly affects them or their families (Evans, 2012). In a poll conducted in 2010, more than half of the respondents said that the freedom to be protected by the state in case of illness, loss of work or poverty and the freedom to purchase what I want as the most important personal freedoms (Remington, 2012). This could be explained by socialist legacy of Russia. Large body of literature posits that socialist legacy creates strong individual preferences for greater income equality and state redistributive policies in the post-socialist states (Andreß & Heien, 2001; Boeri, Börsch-Supan, Tabellini, Moene, & Lockwood, 2001; Corneo & Gruner, 2002; Lipsmeyer & Nordstrom, 2003; Shiller, Boycko, & Korobov, 1991). The results of multiple public opinion surveys over the past twelve years have consistently

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<sup>9</sup> Respondents could choose several options when answering the question. The results of the survey are available at <https://www.levada.ru/2017/12/11/17232/>

shown that rising prices, poverty, unemployment and economic crises are the top issues that respondents considered to be the most critical and personally concerning to them.<sup>10</sup> Only 1-4% of the respondents in these surveys said that restriction of civil rights and democratic freedoms (freedom of speech and press) was an important issue. This evidence demonstrates the importance of economic issues over others and pragmatic views of democracy in Russia. Moreover, more people are likely to associate democracy with economic well-being in the times of economic crises. Public opinion surveys showed that most respondents in Russia defined democracy as economic well-being in 2008 and 2009 whereas in all previous years the majority of the respondents said that democracy was freedom of speech, press, and religion.<sup>11</sup> The recent studies find that the demands made in the 2011-2013 protests in Russia were too diverse; they did not necessarily represent democratic claims; and a few protesters actually rallied for democracy (Chaisty & Whitefield, 2013; Rosenberg, 2017). The results of election monitoring in Russia show that the 2011 and 2012 election campaigns were dominated by the sentiments of uncertainty resulting from the economic crisis, lack of organizational consensus (conditions of public sentiments concerning the hopes of better living standards, better living conditions, increase of optimism etc.), decreased approval ratings of the parties in power, president and prime-minister during 2011, and unfavorable election campaign of United Russia, which could not mobilize its supporters (Volkov, 2012). There were also prevailing sentiments of the lack of perception of economic stability, which was the main achievement of Putin's government that was used as a trump card in 2007-2008 elections (Volkov, 2012). This evidence suggests that seemingly pro-democracy protests that take

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<sup>10</sup> The results of the surveys are available at <https://www.levada.ru/2017/03/07/samye-ostrye-problemy/>

<sup>11</sup> Respondents could choose several options when answering the question. The results of the survey are available at <https://www.levada.ru/2010/01/20/cto-takoe-demokratiya-i-nuzhna-li-ona-rossii/>

place in Russia still center on the inability of the government to remedy the economic grievances of the populace.

### **Economic shocks and protest in Russia**

On March 11, 2009, over one thousand employees of the mining sector enterprises, former employees of the mining sector who lost their jobs as a result of the economic crisis, and the trade union representatives took the streets in the city of Dalnegorsk of the Primorskiy Kray demanding lower utility tariffs and compensation of wage arrears. The demands targeted the regional authorities. The chairman of the regional committee of the "Roskhimprofsoyuz", the chemical industry workers' union, Maxim Saenko stated: "Because of the crisis, it was the mining enterprises of Primorye that suffered the most, since their products are export-oriented. The demand has fallen, people are left without work and wages, people are in despair!" The city-forming enterprise of Dalnegorsk "Dalpolimetall" had long been idle, more than three thousand people were left without work. Employees of the enterprise were receiving only a small part of their salaries, which already did not exceed nine thousand rubles. A similar situation existed in other enterprises of the mining industry. In the Svetlogorsk settlement of Primorskiy Kray at the "Russian Wolfram" enterprise about 200 people were left without work. The Yaroslavl Mining Plant transferred 700 people, which is half of the company's employees, to a four-day working week. People lost twenty percent in salary. Wage arrears had persisted at the "BOR" mining enterprise in Dalnegorsk. At the same time, tariffs for housing and utilities services had increased by an average of 20-25 percent since January 2009. For those who pay for an apartment and electricity, there was no money left for food. Moreover, their cost had significantly increased due to the depreciation of the ruble.

The Dalnegorsk protest is representative of the situation that had developed in the Russian mining sector as a result of the global economic crisis. Unemployment, wage arrears, and rising cost of living made people protest making demands on the federal and regional governments in the affected regions of the Russian Federation.

On January 30th, 2010, about 7,000-12,000 people in Kaliningrad protested against the 50% increase in transport tax in the region and higher customs duties for imported cars. It was the largest of the series of related protests that occurred in the region in the 2009-2010 period. The regional transport tax increase in Kaliningrad made the transport tax one of the highest in the Russian Federation. The protesters demanded the resignation of the federal government and the resignation of the United Russia party in the State Duma. In November 2009, Russia allowed its federal subjects to increase the base rate of transport tax by no more than ten times to raise additional revenues to the regional budgets following a sharp decline of oil prices as a result of the global economic crisis. President Putin also signed the decree to increase customs duties for imported cars at the federal level in December 2008 with the purpose to help the Russian auto industry that suffered losses as a result of the economic crisis as well as to help the assembly plants of the foreign automobile manufacturers that employ thousands of Russian citizens. These changes resulted in all-Russian campaigns of mass protests. Not all regions opted to increase regional taxes, but some regions that increased taxes experienced large protests such as those in Kaliningrad. As a result of mass protests, Kaliningrad's regional legislative body adopted the new law reversing the previous increases. Under the new legislation, the tax increases of 15-20% affected only the owners of motorcycles, autobuses, and heavy trucks. Kaliningrad, a city located in an exclave bordered by Poland and Lithuania, has a population of 941,873 people, which means that about 1% of its population participated in the protest. The protest size was unprecedented for Kaliningrad

and revealed the ability of adverse economic changes to mobilize citizens for protests against the government.

Two large-scale anti-regime uprisings in 2011 and 2012 both described as the largest since the early 1990s received the attention of all major international media outlets because about 80,000-100,000 people took on the streets in Moscow, which, although large, is still less than 1% of Moscow's population of 11.5 million. However, despite the size and scale of the 2011 and 2012 protests, the total number of anti-government protests across Russia in these years was significantly lower than in previous periods as shown in Figure 2-1. Therefore, the common perception that Russian protest movement was dormant until the 2011 elections is flawed. According to the new protest dataset, Russia experienced the largest number of anti-government protests in 2008-2010 period following the global financial crisis and a sharp drop in oil prices in the second half of 2008; the number of protests steadily declined from 2010 to 2015 period reaching its minimum in 2015 as shown in Figure 2-1.

Global economic crises are accompanied by a sharp reduction of demand for energy resources, and the subsequent drop in prices of oil. Russia, a rentier competitive autocracy, saw its GDP and state revenues decline as a result of sharp decreases in oil prices following the 2008 global financial crisis. Oil revenues on average constituted 46% of Russia's federal budget revenues and 9% of its GDP in the 2007-2015 period<sup>12</sup>. The country recorded GDP growth of 8.5% in 2007, 5.3% in 2008, and -7.8% in 2009 (World Bank, 2016). The data from the new dataset of anti-government protests, 2007-2015 shows that the number of anti-government protests in Russia

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<sup>12</sup> Estimations are made based on the reports of the Ministry of Finance of the Russian Federation

was highest in the 2008-2010 period (Figure 2-1). This evidence is in line with my expectation that we should see more anti-government protests in the times of economic crisis.

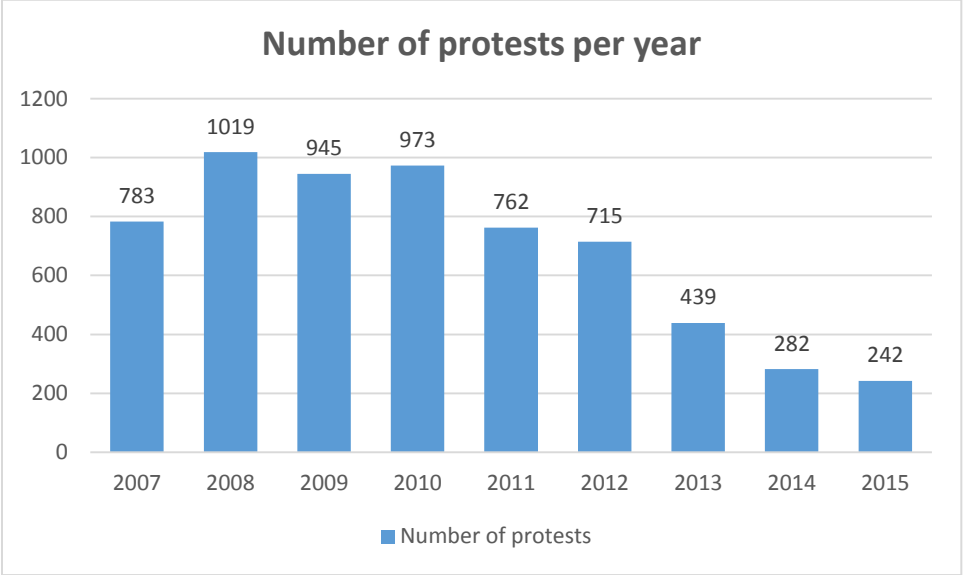


Figure 2-1. Number of anti-government protests in Russia, 2007-2015

Further, the regional distribution of anti-government protests in Russian Federation in 2007-2015 is depicted in Figure 2-2. The map reveals that Moscow (1,703 protests) and Saint Petersburg (509 protests) had the largest number of protests during this period, which is not surprising as these two cities have always been Russia’s center of political life and civil society. It is more interesting to see how the distribution of protests varied across the remaining regions of the Russian Federation during this period. The third largest protest-prone region is Samara (299 protests) marked as orange zone on the map. Samara is located in the Volga economic district that produces 14% of Russia’s oil. Russia has eleven economic districts (Appendix J). The yellow zone (108-187 protests) include the regions belonging to the Volga, Volga-Vyatka, Ural, West Siberian, North Caucasus, and Central Black Earth economic districts. Most of the regions in the yellow zone are major centers of Russia’s fuel and energy (oil and gas), mining, and metallurgy industries.

The regions in the green zone (48-101 protests) belong to the same economic districts as the regions in the yellow zone as well as to the East Siberian, Northern, and Far Eastern economic districts.

The Northwestern (excluding Saint Petersburg) and Central districts (excluding Moscow City) are in the zone with the least number of protests. Despite being the most populous, the Central economic district (excluding Moscow City) has a small number of protests. The Central district is not endowed with natural resources, and its economy is mostly based on machinery and engineering; it is also the most prosperous economic district in Russia. Both of these facts can explain its low protest activity. The Northwestern region is also poor in natural resources; its economy is mostly based on engineering and metalworking.

It should be noted that the Far Eastern district (with the exception of Primor'ye) and parts of the East and West Siberian districts have a very low protest activity (blue zone). These regions are less populous than others and have a low population density. Most of them are ethnic subjects of Russia (Yamalo-Nenets, Khanty-Mansi, Tuva, Sakha, Chukotka, Buryatiya, and Jewish Autonomous Region). Similarly, the low protest activity regions of the Northern economic district such as Komi, Karelia, and Nenets Autonomous Region are also ethnic regions of the district. Finally, all ethnic federal subjects of the North Caucasus regions with the exception of Dagestan are also in the blue zone of low protest. In general, the ethnic regions in Russia are known to have a very small presence of mainstream opposition that views them as regions with low protest potential.



**Number of protests by federal subject, 2007-2015**

- 0 - 41
- 48 - 101
- 108 - 187
- 299 - 509
- 1703

**Federal subject<sup>13</sup>**

- ★ Moscow City
- ★ Samara
- ★ St. Petersburg

Figure 2-2. Regional distribution of anti-government protests in the Russian Federation, 2007-2015

<sup>13</sup> Labels for three federal subjects with the highest number of protests, i.e. Moscow City is in the red zone (1,703), St. Petersburg and Samara are in orange zone (299-509).



## Research Design

Table 2-1 provides the summary statistics for all dependent and independent variables used to test the hypotheses.

Table 2-1. Summary Statistics

<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev</b>	<b>Min</b>	<b>Max</b>
Protests	720	8.502778	25.64397	0	295
GRP per capita	720	259.9029	215.6466	40.5726	1699.933
Unemployment (FSLE)	720	2.48625	5.154065	.3	66
Unemployment (labor surveys)	720	7.845556	6.046759	.8	53.3
Mining Employment	720	1.835833	3.001297	0	18.9
CPI	720	109.7872	3.121272	101.4	120.5
State employment	719	.0148326	.0068516	.0060066	.0618889
Ethnic population	720	26.12989	24.87109	5.027225	99.22066
Higher education	720	19.81767	3.761131	11.53101	40.11212
Population	720	1785707	1710068	50526	1.15e+07

### **Anti-government protest dataset**

To test my argument, I use the dataset of anti-government protests in Russia, 2007-2015 that I constructed using <http://www.namarsh.ru/> website that contains daily information in Russian language on all protests from every region of the Russian Federation from 2007 to present. The website is founded and funded by a prominent opposition activist Gary Kasparov. It is run by a team of activists who rely on a large network of regional reporters for protest dispatches, and it also reports protests events from other news and media outlets. One can expect the opposition to exaggerate the scale of protests. However, this issue should not be of concern for the purposes of

this paper, because the dependent variable is the number of protests rather than the number of participants. In most cases, the website reports each protest giving the details about organizers, scale, and police presence complemented by photos. Therefore, there is a minimal chance that the reported story on protest is fabricated.

My dataset contains all protests including marches, rallies, pickets, sit-ins, strikes, gatherings, and other acts of protest, which target the federal, regional and/or local governments. It also includes protests that make demands on state enterprises. The data is collected at the federal subject level and includes information on the date, target, target level (federal, regional, and/or local government), actor, actor type, number of protesters, demands, repression and repression level including number of people arrested and use of force by police.

### **Dependent variable**

I create a count variable of anti-government protests in each federal subject in a given year, which is the dependent variable in my analysis. The sample data includes 80 federal subjects for which data are available across all variables.<sup>14</sup>

### **Independent variable**

The independent variable is relative exposure to economic shock at regional level. I use four different measures of exposure: (1) gross regional product per capita (GRP per capita)

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<sup>14</sup> The Republic of Crimea and Sevastopol are not included in the analysis as they became federal subjects of the Russian Federation in 2014 and there is a lack of data across most of the analyzed variables. The Federal State Statistics Service (FSSS) does not report the gross regional product per capita (GRP per capita) data for the Khanty-Mansi Autonomous Region and the Yamalo-Nenets Autonomous Region, but their data are subsumed by Tyumen Oblast, and the data for the Nenets Autonomous Region are part of the data reported by Arkhangelsk Oblast. The data for these three federal subjects are consolidated in the data of the larger federal subjects.

denominated in Russian rubles, (2) regional unemployment rate, (3) regional employment rate in the mining sector, and (4) regional tax increase. The Federal State Statistics Service (FSSS) does not provide data on regional dependence on commodity exports, which presents a limitation in the measures of exposure to commodity price shocks. One may argue that the changes in the measures that are used in this paper may not be true representations of the exposure to external economic shocks, and the changes may result from domestic sources. However, based on empirical evidence presented earlier in the paper, decreases in commodity prices have significant negative impacts on the economies of Russia and MENA countries (Berument, Ceylan, & Dogan, 2010; Rautava, 2004). Moreover, in the today's world of high economic interdependence, even the economies of non-resource exporting countries are directly linked and deeply integrated into the global system of manufacturing and finance (Kahler & Lake, 2013). Therefore, it is plausible to assume that the external economic shocks result in decreased output and layoffs, and we should see the negative changes reflected in the regional output levels per capita and unemployment rates. The literature finds that unemployment is one of the factors that is correlated with the mass protests of the Arab Spring (Campanti & Chor, 2012). The Federal State Statistics Service (FSSS) reports two different estimates of unemployment rate: (1) unemployment rate for the end of year according to the data provided by the Federal Service of Labor and Employment (FSLE), and (2) average unemployment rate for the year according to the selected labor force surveys on employment problems. I use the first measure of unemployment rate reported by the FSLE in main models. I use the second estimate of unemployment reported in labor surveys in robustness models and report the results in the Appendices.

We should also expect to see more layoffs in the mining sector as economic shocks are normally associated with the sharp drops in commodity prices. The effects of the economic shocks

on Russia are, however, mostly expected to be associated with decreases in oil prices because of the heavy dependency of the Russian economy on oil and gas exports. The data for the mining sector employment include the employment in the energy and fuel industries as well as other extracting industries. Although the mining employment includes employment in production of other commodities besides oil and gas, it is still a good proxy as oil and gas production dominate Russia's exports among other commodities.

Finally, the qualitative evidence presented in the theoretical section shows that Russia experienced large protests following transport tax increases as a result of global economic crisis and drop in oil prices. The increases were associated with the need to generate revenue for the regional budgets. I record the transport tax increases for each federal subject coding them as 1 or 0.<sup>15</sup>

### **Control variables**

I rely on the data reported by the Federal State Statistics Service (FSSS) for all of my control variables. Control variables include CPI, higher education, ethnic makeup, and state sector employment. High prices, operationalized as consumer price index (CPI), is an economic issue that Russians consistently rank the highest in public opinion surveys among the most important problems<sup>16</sup>.

Higher education is another factor that have shown to affect protest behavior in Russia. The survey data on the 2011-2012 protests in Moscow revealed that most protesters were college-

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<sup>15</sup> All transport tax increases in the period of 2008-2014. Data obtained from each region's government website and <http://taxpravo.ru>

<sup>16</sup> The results of the surveys are available at <https://www.levada.ru/2017/03/07/samye-ostrye-problemy/>

educated professionals (Rosenfeld, 2017; Volkov, 2012). For this measure, I take the percent of population with university degree in each federal subject.

I also control for ethnic makeup of the Russia's federal subjects. My protest data shows that Russia's ethnic republics tend to have fewer protests than regions where ethnic majority is Russian. For example, in the examined period of 2007-2015, there were 581 anti-government protest events (26% of all observations and 9% of total protest events) in ethnic regions of Russia where the ethnic population composed at least 40%. In comparison, 5,541 protest events took place in regions (74% of all observations and 91% of all protest events) where ethnic population was less than 40%.<sup>17</sup> This can be explained by small presence of mainstream opposition groups that see ethnic republics as regions with low protest potential, economic dependence of economically disadvantaged ethnic regions on federal subsidies and transfers, as well as more repressive nature of the local governments in some ethnic republics like Chechnya and Dagestan. I create the ethnic population variable by subtracting the percentage of ethnic Russian population from 100 in each federal subject. Finally, I control for employment in state-sector as it has been found to directly affect anti-government protest participation (Rosenfeld, 2017). I take the percentage of state-sector employment of total population as it allows for a more precise estimation than taking the sheer number of people employed in state sector as each federal subject has different population size.

The count dependent variables face the problem of proportionality when estimating the effects of independent variables, and this problem can be rectified with the use of exposure variables. An exposure or offset variable is used to compare counts over different variables with different dimensions. Because the protest data includes number of protests in federal subjects with

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<sup>17</sup> At the lower threshold of 25% of ethnic population, the number of protests in ethnic regions was 781 (30% of total observations and 12% of total protest events), and in predominantly Russian regions the number of protests equaled 5,399 (70% of total observations and 88% of total protest events).

different dimensions, i.e. population, it is necessary to model the rate of protest that is proportional to the subject's population. I model the rate of protest that is proportional to the federal subject's population using population as an exposure variable.

### **Statistical estimation**

The number of anti-government protests is a count data requiring the use of count models. Poisson regression is normally understood to be the basic model for count data on which other count models are based (Hilbe, 2011). However, Poisson models are subject to the condition of equidispersion that assumes that mean and variance of the Poisson PDF are equal, i.e.  $\alpha=1$  (Hilbe, 2011). The regression results showed overdispersion as  $\alpha=1.32$ , which violates the equidispersion assumption of Poisson models. Therefore, I test my argument with negative binomial regression analysis, which is normally used to model overdispersed Poisson count data when  $\alpha$  is greater than 1.25 (Hilbe, 2011). I use the year and federal district fixed effects and cluster the results by eight federal districts to account for unobserved heterogeneity at the year and district level and restrict analysis to within a given district. There are no excess zeroes in the dependent variable, which alleviates the need to use zero inflated negative binomial models.

Including different measures of exposure to economic shocks in the same regression model may create the problem of collinearity and make the individual effect of each measure unidentifiable. Table 2-2 shows the correlation matrix of these variables. The matrix reveals that GRP per capita and mining employment are highly correlated, and, therefore, I separate mining employment into the second model.

Table 2-2. Correlation matrix of exposure to economic shock measures

	GRP per capita	Unemployment	Mining employment	Tax increase
GRP per capita	1			
Unemployment	-0.28	1		
Mining employment	0.59	-0.02	1	
Tax increase	-0.04	0.05	-0.02	1

### Empirical Results

I present the results of the regression testing the effects of economic shocks on anti-government protests in Table 2-3. The first model includes four measures of exposure to economic shock: regional GRP per capita, regional unemployment, and regional transport tax increase. The results show that regional unemployment ( $p < 0.05$ ) is a powerful predictor of anti-government protest. Higher levels of unemployment are shown to result in more protests. This is consistent with the expectation that economic shocks result in layoffs and directly affect the personal well-being of individuals, which contributes to the increased level of grievances against the government that is generally blamed for its ineffectiveness in dealing with economic problems. Russia's socialist legacy also contributes to the increased expectations of the affected populace on the government

in providing or creating jobs for the unemployed. These expectations can take the form of demands expressed through protest activities. Unemployment also increases propensity to protest as unemployed become more vulnerable in dealing with economic issues and often struggle in paying for utilities and food items.

Regional transport tax increases are not shown to have a significant impact on protest mobilization. Transport tax increases and the level of the increases in Russia were left at each region's discretion, which means that in some regions the hikes did not take place, in some regions they were significant whereas in others increases were incremental or very low and may have gone unnoticed. The variation in the level of increases could explain why transport tax increases do not reach a statistical significance in regression models. In the case of Kaliningrad protests, the tax increases were very large making them one of the highest in Russia, which explains why the increase resulted in mass protests in the region. The effects of regional transport tax on protest are difficult to capture with a binary variable used in this paper due to the regional variation based on the magnitude of the increases, which are determined by the local authorities. However, creating a continuous variable for a single tax rate increase for each region presents a challenge. There are different vehicle types in Russia's transport tax code that include cars, motorcycles, snowmobiles, hydrocycles, yachts etc., subdivided by engine power accounting for about thirty different items taxed at different rates. In most cases the increases were not uniform and may have affected only certain vehicle types with certain engine powers. Moreover, an impact of the yacht tax increase on protest is not likely to be the same as an impact of the automobile tax increase making the comparison difficult. It is also possible that indirect tax increases, i.e. transport tax increase, may have a limited negative impact on the individual economic well-being of citizenry as opposed to direct tax increases, i.e. income tax increase. Therefore, unemployment may be a better measure



of economic shock as its measure is a continuous variable, and its negative effects on economic well-being of an individual may be more direct and pronounced than indirect tax increases.

A decrease in GRP per capita is not found to be a significant predictor of anti-government protest. Although this variable does reflect the decrease in output per capita, it has a less tangible effect on population than unemployment, and, therefore, its effects are not likely to be felt on an individual level. Unemployment, therefore, may be a more precise measure of economic shock, as it allows to better gauge the localized effects of economic shocks on the individual economic well-being, which is necessary to motivate protest participation.

Higher education is the only control variable that shows statistical significance ( $p < 0.01$ ) in Model 1, as regions with more college-educated populace are more likely to be politically active and engage in public protests. This finding is consistent with the democratization literature arguments that identifies middle class as the main force behind democratization processes (e.g. Acemoglu & Robinson, 2006; Huntington, 1991). Similarly, modernization theories also emphasized the role of the middle class (e.g. Dahl, 1971). Middle class is associated with and defined by scholars as the “university-educated white-collar strata” (Rosenfeld, 2017, p. 638). Acemoglu and Robinson (2006) argue that middle class acts as a driving force for democratization because unlike the poor they are less in favor of radical policies, and, therefore, the rich becomes less fearful of democracy and is less likely to rely on repression as the middle-class grows in size. Middle class may also place demands on elites for democratization (Dahl, 1971; Huntington, 1991). Moreover, in case of hybrid regimes such as Russia, the educated and informed citizens are more likely to take interest in politics, become active participants of civil society, and make demands on the government, and therefore, the correlation of the higher education variable with protest in the results of this study is not surprising.

The second model tests the hypothesis with unemployment, mining employment, and tax increase as independent variables. Tax increase and GRP per capita remain not significant while unemployment ( $p < 0.05$ ) stays statistically significant, further providing support for the hypothesis and reinforcing the results reported in the first model. The lower mining employment is also shown to result in larger number of anti-government protests, however, the p-value in this finding equals 0.05 almost reaching statistical significance. Although it does not reach the statistical significance at  $p < 0.05$  by a very small margin, it is still an important finding. It is consistent with the expectation that lower oil and commodity prices lead to decreased production resulting in less people employed in the sector. This measure may be even a more precise measure of economic shock than unemployment rate in general, because it allows to gauge the effects of decreased commodity exports on protest. Like unemployment, it also affects people on individual level as people who lose jobs as a result of oil and commodity price crisis experience economic hardships and grievances that spill out in protests demanding that the government rectify the economic problems of the affected individuals. The protests in Dalnegorsk in the Primorskiy Kray region of Russia in March 2009 are an example of the global economic crisis having a devastating impact on the mining industry leaving thousands of people unemployed and on the brink of poverty.

Higher education again shows ( $p < 0.01$ ) that propensity to protest increases with more educated citizenry. In both Models 1 and 2, CPI, state sector employment, and ethnicity do not demonstrate an effect on anti-government protest in Russia.

Table 2-3. Negative binomial analysis of economic shocks and anti-government protest, 2007-2015

Variable	Model 1	Model 2
<i>Clustered by federal district</i>		
GRP per capita	-.001 (.001)	
Unemployment	.04** (.01)	.04** (.01)
Mining employment		-.08 (.04)
Tax increase	.12 (.43)	.12 (.45)
CPI	-.04 (.02)	-.05** (.02)
State sector employment	-2.96 (21.95)	-2.82 (19.91)
Ethnic population	-.01 (.01)	-.01 (.01)
Higher education	.08** (.02)	.07** (.01)

Notes: Robust standard errors in parentheses. Population used as an exposure variable.

\*\*p < .01; \*p < .05; Obs=719.

Although these results provide strong support for H2 ( $p < 0.01$ ) and limited support for H4 at a lower statistical significance threshold ( $p < .10$ ), the business cycle models of protest suggest that the effects of economic shocks on protest may not be immediate. Therefore, I run another set of regressions lagging the economic variables by one year. The results are presented in Table 2-4. Again, in both models higher levels of lagged unemployment are shown to result in more anti-

government protests ( $p < 0.01$ ). Lagged mining employment is significant as well ( $p < 0.05$ ) suggesting that decreased employment in the mining sector in the previous year is likely to result in more anti-government protests in the following year. Transport tax increases have no effect on anti-government protest in both models.

These results suggest that the effects of economic shock that affect the population on the individual level such as unemployment and lower employment in mining sector result in grievances that persist over longer periods of time leading to increased protest activity. The mining sector employment reaches statistical significance at  $p < 0.05$  level in lagged models. The coefficient also becomes larger when the variable is lagged. Unlike other occupation types, people employed in the mining sector may find it more difficult to find alternative employment due to the very specific nature of their jobs. This may be particularly applicable to the uneducated workers in the mining sector; the literature suggests that unskilled workers are less easily moved from one kind of production to another than skilled workers (Krasner, 1976). Therefore, it does make sense that we may actually see grievances of the unemployed from the mining sector increase over time as people may become more frustrated the longer they remain unemployed, which exacerbates their economic hardships and grievances and increases their proclivity to protest against the government.

GRP per capita and transport tax increases do not reach statistical significance as in previous models suggesting that the lagged effect of these variable does not have an effect on anti-government protest. This finding further reinforces the argument made in the previous section that the decreased output and indirect taxation do not have the strong individual level effects that unemployment does. Higher education is the only control variable that persistently shows high level of impact ( $p < 0.01$ ) on anti-government protest in all regression models suggesting to be a

very powerful predictor of protest. Overall, the results suggest that the effects of economic shocks, specifically measured by unemployment, on protest are enduring. Economic shock caused by a sharp and prolonged drop in oil prices results in deteriorated economic conditions in Russia until the prices return to previous levels, which means that its effect on anti-government protest can also persist over time.

Table 2-4. Negative binomial analysis of economic shocks and anti-government protest, 2007-2015 with time lags

Variable	Model 1	Model 2
<i>Clustered by federal district</i>		
GRP per capita $t-1$	-.001 (.001)	
Unemployment $t-1$	.02* (.01)	.02* (.01)
Mining employment $t-1$		-.09* (.04)
Tax increases $t-1$	-.15 (.31)	-.21 (.30)
CPI $t-1$	-.03 (.04)	-.04 (.04)
State sector employment $t-1$	-1.49 (22.44)	6.96 (20.16)
Ethnic population	-.01 (.01)	-.01 (.01)
Higher education	.09** (.02)	.07** (.01)

Notes: Robust standard errors in parentheses. Population used as an exposure variable.  
 \*\*p < .01; \*p < .05; Obs=639.

As mentioned in the research design section of this paper, Russia reports two different estimates of unemployment rate. For robustness purposes, I use the second estimate of unemployment rate according to the selected labor force surveys on employment problems and report the results in the Appendices. The reported numbers in the second estimate of unemployment rate are higher than those in the first estimate. Unemployment remains statistically

significant ( $p < 0.01$ ) in all models (Appendix K and Appendix L) further reinforcing the main results. Mining employment is significant at ( $p < 0.05$ ) in lagged models (Appendix L), but reaches  $p < 0.10$  significance in Appendix K models that do not lag the variables. This is also in line with the results reported in the main models.

Further, as an additional robustness test, I employ logit analysis to see if my argument holds when protests are coded as binary variables rather than counts of protest events. I code whether there was a protest event regardless of the number of protests in each federal subject in the 2007-2015 period and test the argument using the same independent and control variables as previously except I include population as a control variable because logit models do not allow the use of exposure variables. I present the results of the logit regression analysis in Appendix M. Yet again, unemployment is shown to increase the likelihood of anti-government protest in both models. However, in contrast to the expectations and the results of the negative binomial models, mining employment does not appear to affect chances of protest in logit regression models. This finding suggests that mining employment may not affect chances of protests but rather the number of protests. This could mean that the regions with low protest potential such as the ethnic republics of Russia may not be affected by negative changes in the mining employment, however, changes in mining employment may increase the number of protests in regions with medium-to-high protest potential. In fact, the regression results in Appendix M show that non-Russian ethnicity is associated with less chances of anti-government protest ( $p < 0.01$ ), which does indicate that ethnic regions tend to protest less than the regions where the majority population is Russian. Another possible explanation is that the negative changes in mining employment increase the number of protests in the regions where mining sector dominates the economy, while other regions with the absence of mining sector or its low presence will not be affected by this factor. State sector

employment also appears to reduce chances of anti-government protest, which is consistent with the previous findings in the literature (e.g. Rosenfeld, 2017). GRP per capita, higher education, CPI, and population fail to achieve statistical significance in logit regression models.

Next, I lag the variables by one year similar to what I did in the main part of the analysis and present the results in Appendix N. The same variables reach statistical significance as in the models without time lags in Appendix M suggesting that the effects of unemployment are enduring.

In additional robustness tests, I use the second measure of unemployment with and without time lags in logit regression models as in the main analysis to see how the results are affected. Appendices O and P show the results of these tests. All variables perform the same as in the logit analysis using the first measure of unemployment.

Overall, the empirical results strongly support the hypothesis that economic shocks increase the likelihood of anti-government protests in Russia. The findings suggest that economic conditions that affect individuals directly such as unemployment and lagged lower mining employment that escalate grievances in these periods are important predictors of protest mobilization in Russia. Changes in employment levels in the mining sector of Russia are especially important given that this particular sector is impacted more than other sectors as oil prices drop resulting in decreased production and layoffs thereby increasing the pool of aggrieved citizens that blame the government for its ineffectiveness in dealing with the economic crisis. On the other hand, regional transport tax increases and GRP per capita are not shown to be strong predictors of anti-government protest. Mobilizing protest events that cite vague economic factors such lower growth of regional product may not stimulate enough interest or motivate protest participation among the Russian populace unless protesters can feel the negative effects of these conditions on



their personal well-being. Indirect tax increases in the form of transport tax may not also have a sufficient force to stimulate anti-government protest mobilization. Grievances among the vehicle owners may vary based on the level of increases left at the discretion of regional authorities. Small increases are not likely to result in anti-government sentiment whereas large increases may, and that variation may need to be incorporated into and accounted for in the analysis to better gauge the effects of indirect tax increases on protest.

### Conclusion

The findings in this paper provide empirical evidence that economic grievances resulting from exogenous shocks increase anti-government protest mobilization in Russia. This effect is based on the assumption and empirical evidence in the literature that external economic shocks have significant negative effects on regional economies considering high level of economic interdependence and exposure to price shocks for commodity exporting countries. These findings not only confirm the results of public opinion surveys that have consistently shown that economic issues are at the forefront of the individual priorities of the Russian citizenry, but also reveal the specific factors and mechanisms through which these grievances manifest themselves in the form of anti-government protests. This paper's framework suggests several reasons why we should see more anti-government protests in the times of economic crises in Russia. Russia as a resource-dependent country relies on oil and commodity exports for a large share of its state revenues. A sharp drop in global oil and commodity prices adversely affects the Russian economy and economic well-being of its citizens. Economic shock manifests itself in the form of decreased production, layoffs, and tax increases causing mass grievances and protests. Decreased production levels translate into reduced number of work shifts, less wages, wage arrears, and even bankruptcy

and layoffs thereby increasing the pool of aggrieved citizens that blame the government for its ineffectiveness in dealing with economic crisis. The effects on protest, however, depend on the exposure of the region to the economic shocks. Again, even though the effects are not directly observed, the assumption of economic interdependence and exposure to commodity prices in rentier economies provide strong reasons to believe the effects are driven by economic shocks. Unemployment is found to be a strong predictor of anti-government protest at the regional level, while decreased output and regional tax increases do not seem to affect regional protest mobilization in significant ways. Mining employment has also shown to be significant lagged effect on protest mobilization.

The findings have implications not only for Russia but for other competitive authoritarian regimes as well because they have similar levels of political openness and political participation constraints. Moreover, the findings contribute to the larger protest literature by showing that local economic conditions increase chances of all types of anti-government protests at the regional level. It shows that the effects of shocks on protest are not homogenous and regional exposure to the shock is a determinant factor for protest mobilization. This paper demonstrates that economic shocks have a strong impact on fueling protest mobilization in competitive autocracies as economic grievances become acute in the times of economic crisis, and chances of protest increase with greater regional exposure to the shock.

Future research may further explore the effects of regional tax increases by distinguishing between direct and indirect tax increases as well as incorporating the regional variation in the magnitude of tax increases into the analysis. This would help to delve deeper into the exploration of the effects of higher taxation on protest likelihood. Another avenue for future research lies with exploring the scope of protests. The focus of this paper is concerned with exploring the effects of

regional exposure to outside shocks on the frequency of protests. Therefore, the protests are treated the same regardless of their size. However, investigating the effects of the same variables on the scale of anti-government protest would shed the light on whether these effects are significant in producing large-scale anti-government protests, which may have important implications for democratization literature.

## ARTICLE 3: NATURAL DISASTERS AND ETHNIC VIOLENCE: AN EMPIRICAL STUDY OF HINDU-MUSLIM RIOTS IN INDIA

### Introduction

Climate change has been a much disputed topic among policymakers in the past two decades. Currently there is no consensus in policymaking and research communities whether climate change directly contributes or triggers violent conflict. This paper aims to contribute to the debate in the literature by examining the effects of climate-induced meteorological disasters on ethnic riots in Indian states in the period of 1951-2015.

The effects of exogenous climate-related disasters such as floods and droughts on political violence is a much disputed topic in the literature. Most studies stress the effects of disaster-induced economic and social variables such as resource scarcity, declines in agricultural output and migration that induce the onset of violent conflict. Yet the existing empirical literature was unsuccessful in identifying systematic and causal relationship between these events (Bernauer, Boehmelt, & Koubi, 2012). Moreover, most research tends to categorize various forms of political violence ranging from riots to civil war as civil conflict without distinguishing how climate-related disasters may affect each particular type of violence. In fact, the effects of natural disasters may be contingent on the type of civil conflict. The literature has established that conflict is more likely when ethnic marginalization exists (Fjelde & Uexkull, 2012; Horowitz, 2001), and, therefore, the natural disasters are more likely to increase chances of ethnic violence than other types of violence if ethnic marginalization exists. Although there are some studies that examine the relationship between disasters and low-scale communal conflict such as riots, the research that focuses specifically on the effects of natural disasters on ethnic riots is very scarce (e.g. Slettebak, 2013).

How do natural disasters such as floods affect the likelihood of ethnic riots? I argue that floods caused by excess precipitation increase the likelihood of ethnic riots because (1) they result in declined state capacity creating uncertainty about enforcement of existing ethnic contracts and prevention of violence using police forces, (2) feelings of uncertainty create strong group categorization, stereotyping and polarization increasing group tensions and chances of ethnic violence. I posit that both of the proposed mechanisms may explain the positive effects of natural disasters on ethnic violence. The literature has suggested that natural disasters put a strain on state resources through decreased tax revenues and increased disaster management expenditures, and weaken state capacity and its ability to provide enforcement of law (Homer-Dixon, 1999; Kahl, 2002). A decreased state capacity also limits state's ability to arbitrate between groups and enforce ethnic contracts, which creates uncertainty and increases chances of ethnic conflict (Lake & Rothchild, 1996). However, as Fearon & Laitin (2000) point out that people pay extravagant costs when they engage in ethnic violence. Therefore, it is important to determine why people choose to engage in costly conflict under the circumstances of uncertainty resulting from declined state capacity following natural disasters. Here, I turn to social identity theories that provide important insights to human behavior when they face uncertainty. The social identity mechanisms such as strong group categorization and group conspiracy are activated in situations of distress and uncertainty resulting from natural disasters. Strong in-group identification and blaming the out-group are likely to raise hostilities and increase chances of ethnic violence. Investigating whether and how the state capacity and social identity mechanisms contribute to ethnic riots in the aftermath of natural disasters could reveal important implications for environmental security and conflict literature in general. Recent research posits that group categorization is a cognitive process (Hale, 2004); and "the ways in which ethnic – and non-ethnic – ways of seeing, interpreting, and

experiencing social relations are unselfconsciously “triggered” or activated by proximate situational cues” (Brubaker, Loveman, & Stamatov, 2004, p. 51). Furthermore, strong evidence presented by prominent research in social identity theories shows that stronger group identification, group stereotyping, and group conspiracy occur in situations of uncertainty such as economic collapse or social unrest (Hogg & Mullin, 1999 as cited in Hale, 2004). In this paper, I argue that natural disasters induced by meteorological factors result in declined state capacity and limits state’s ability to arbitrate, prevent or stop violence as well as guarantee ethnic contracts thereby creating situations of great uncertainty among ethnic groups that are likely to facilitate stronger group identification along ethnic lines and group conspiracy that views the out-group as a threat to its own survival. Under these conditions, groups are likely to reason that they have to rely on their group as the state does not have the ability to protect them. This is likely to increase animosity, tension and the likelihood of ethnic violence.

I test this argument by examining the link between climate-induced disasters caused by precipitation and precipitation anomalies, and Hindu-Muslim riots in India at the state level in the period of 1951-2015. Specifically, I aim to examine whether the likelihood of ethnic riots increases in areas that have recently been affected by climate-induced meteorological disasters.

Ethnic riot is defined as “intense, sudden, though not necessarily wholly unplanned, lethal attack by civilian members of one ethnic group on civilian members of another ethnic group, the victims chosen because of their group membership” (Horowitz, 2001, p. 1). I use geo-referenced climate data from the Climate Research Unit (CRU) to obtain average annual precipitation levels and temperature in each state of India and the events data of violent conflicts in India from the Center of Systemic Peace (CSP), Varshney and Wilkinson Dataset on Hindu-Muslim Violence in India, 1950-1995, and W-ICEWS (Worldwide Integrated Crisis Early Warning System).

The Indian case is chosen for several reasons. First, India has experienced deadly ethnic violence between Hindus and Muslims with tragic consequences for the most of its history making it an intrinsically important case to study (Varshney, 2002). Second, over the last decade India has been in the top five countries most frequently affected by natural disasters (Guha-Sapir, Hoyois, & Below, 2014). Finally, India has poor economic infrastructure (Raghuvanshi, 2014), which makes it more vulnerable to natural disaster effects.

The next section examines the literature that provides theoretical mechanisms and empirical evidence supporting the above arguments. It also identifies the theoretical mechanisms that are relevant for Hindu-Muslim riots in India and develops hypothesis on the link between natural disasters and Hindu-Muslim riots. The section is followed by research design that outlines variables, data, and methods used to test the hypotheses. The hypotheses are tested in the empirical results section that delivers the results of the quantitative analysis followed by the discussion of the findings and conclusion.

### Literature Review

The largest set of literature focuses on resource scarcity as a mechanism linking disasters to conflict. The proponents of the resource scarcity-induced conflict arguments posit that scarcity of renewable resources such as water and arable land could lead to conflict in three different ways: (1) competition over renewable resources; (2) “sons of the soil” conflicts, i.e. scarcity-induced migration and competition over the resources in the receiving communities (Cote & Mitchell, 2015); and (3) variations in rainfall that undermines the economic activity in agricultural societies (Fjelde & Uexkull, 2012). Under the first mechanism, the resource scarcity undermines the day-to-day livelihoods of the populations, and, therefore, produces competition for the resources,

which may lead to violent conflicts as groups try to establish the equilibrium of resource distribution (Homer-Dixon, 1994; 1999; Kahl, 2006). The most renowned proponent of this theory, Homer-Dixon (1994) in his analysis of various case studies on environmental degradation finds that environmental scarcity causes violence. He further argues that population growth and unequal distribution of resources make the effect of scarcity on conflict more severe. Homer-Dixon & Blitt (1998) posit that populations around the world depend on fresh water, forests, fisheries and agricultural lands for their livelihoods, and, therefore, the scarcity of any of these key resources could lead to violent conflict. Kahl (2002) supports this notion by stating that conflicts are likelier to happen in developing countries that have limited capabilities in dealing with the issues of scarcity. Although the resource-scarcity propositions provide interesting insights based on mostly qualitative evidence, the results of large-N studies remain mixed and inconclusive (Bernauer, Boehmelt, & Koubi, 2012). Most of these studies link water scarcity to low-scale conflict (Toset, Gleditsch, & Hegre, 2000; Gleditsch et al., 2006; Gleick, 2014). Others find no strong support for the resource scarcity and conflict relationship, but provide some evidence that land scarcity combined with high population growth increases the likelihood of armed conflict (e.g. Urdal, 2005). Yet most of these studies focus on civil conflict in general only distinguishing between large-scale interstate or civil war and low-scale communal conflict. The mixed and inconclusive results of large-N studies may indicate that it is necessary to further parse out the effects of natural disasters on different types of conflict including ethnic violence rather than civil conflict in general. It is an important distinction to make in order to see whether competition over scarce resources is more likely in multi-ethnic communities where political competition has ethnic characteristics. However, even when these distinctions are made it is not clear why competition over scarce resources would lead to violence rather than peaceful agreement of resource division. As Lake &



Rothchild (1996) point out, violence is often misattributed to competition over scarce resources, which alone is not sufficient to explain conflict, because violence is costly for all parties to conflict.

In the second scenario, the migration from the areas with dwindling resources to other areas may cause conflict as the receiving communities may find themselves struggling to maintain the previous level of access to resources (Homer-Dixon, 1999; Gleditsch, Nordas, & Salehyan, 2007; Reuveny, 2007; Raleigh, 2010). In his 1999 study, Homer-Dixon outlines the second type of mechanism through which scarcities lead to conflict. Limited agricultural and economic productivity result in migration, poverty and grievances. These grievances cause violence if two conditions are met: (1) there is a collective action based on religious, ethnic, or social class identities (Habyarimana et al., 2007); (2) there is no peaceful alternative to expressing these grievances (Homer-Dixon, 1999). Further, grievances and relative deprivation can be exploited by political and community leaders who may create conflict between groups with different identities, i.e. ethnic, religious etc. (Homer-Dixon, 1999). Reuveny (2007) posits that scarcity-induced migration leads to competition over resources, ethnic tensions, distrust, socioeconomic fault lines, which all may result in intrastate conflict in the migrant receiving areas. He further notes that environmental migration is likelier to occur in lesser developed countries. Although these studies provide an alternative mechanism in the form of migration, the arguments still center on resource competition and scarcity. Yet again similar to the scarcity-induced conflict arguments, the migration arguments do not explain why groups prefer to engage in conflict, which may be costly in most contexts. The literature also does not delve into the question of whether these mechanisms increase specific types of low-scale conflict and whether group differences between migrants and receivers matter for conflict likelihood.

Variation in rainfall is a third mechanism that was identified in the environmental literature as the underlying cause of climate-induced conflicts (Miguel, Satyanath, & Sergenti, 2004; Fjelde & Uexkull, 2012; Wischnath & Buhaug, 2014). Fjelde & Uexkull (2012) provide one of the strongest evidence in the literature of scarcity-induced conflicts by analyzing the link between rainfall and communal conflict in Sub-Saharan Africa between 1990 and 2008. The authors find that significant abnormalities in rainfall from the historical average increases the risk of communal conflict. The risk is amplified in regions with politically marginalized ethnic groups (Fjelde & Uexkull, 2012). The mechanisms leading to conflict include economic hardships and desperation that makes a group to attack other communities in an effort to change the allocation of the scarce resources (Fjelde & Uexkull, 2012). Rainfall variability may lead to drought-induced agricultural shocks that result in income loss and lower the opportunity costs of joining insurgency thereby increasing the risk of violent civil conflict (Miguel, Satyanath, & Sergenti, 2004; Wischnath & Buhaug, 2014; Fjelde, 2015). Unlike resource-scarcity and migration centered studies, this strand of research empirically examines the ethnic factor to find that the risk of conflict is higher in ethnically marginalized regions. Yet they do not specifically investigate the effects of disasters on one form ethnic violence, which is riots.

Some scholars have suggested that political and economic marginalization play a crucial role in conflict onset while environmental scarcities can contribute to low-level conflict in marginalized communities (Raleigh, 2010). Others posit that environmental scarcities may only intensify existing conflicts (Barnett, 2001; Purvis & Busby, 2004). More recent research has provided some evidence that drought and its duration are likely to increase civil conflict for politically marginalized and agriculturally dependent groups (von Uexkul et al., 2016). Schleussler et al. (2016) report that 23% of conflicts in ethnically fractionalized societies coincided with

climate-induced disasters in the period of 1980-2010. Yet again these studies do not provide the mechanisms that link disasters to ethnic conflict.

Another interesting set of research centers on sociological aspects of disasters on the affected communities providing alternative mechanisms to the traditional environmental arguments discussed above. Slettebak (2012) provides a comprehensive review of this literature, which argues that natural disasters can increase social cohesion in the affected communities thereby decreasing the likelihood of violent conflict. The stronger social cohesion is attributed to a common identity of disaster victims regardless of ethnic or class identities and increased sense of unity in the face of adversity (Fritz, 1961; Durkheim, 1952 as cited in Slettebak, 2012). This strand of research shows that identity is an important mechanism in conflict propensity. Yet these studies focus on social cohesion ignoring the negative aspects of identity divisions resulting from natural disasters in ethnically heterogeneous societies. Rich empirical evidence from social identity theory studies has shown that events that produce uncertainty result in strong group categorization, group stereotyping, and group conspiracy (Jetten, Hogg & Mullin, 2000; Reid & Hogg, 2005). This suggests that identity may be divisive rather than cohesive meaning that under conditions of uncertainty, people are more likely to show strong group identification along ethnic lines through categorization and intergroup discrimination, and show hostility towards other ethnic groups based on stereotyping. This is mainly used as a mechanism for uncertainty reduction (Hogg & Adelman, 2013).

Ethnic conflict literature mainly links identity to ethnic violence through constructivist explanations that merge themselves either with rationalist explanations or with discursive approaches (Fearon and Laitin, 2000). The former emphasizes the role of elites who manipulate ethnic publics to incite violence (Woodward, 1995; Brass, 1997, 2003; Wilkinson, 2004).

However, as Fearon and Laitin (2000) note, these studies do not systematically address why ethnic publics follow. The discursive approach stresses the role of cultural discourses of ethnicity such as symbols, myths, and narratives to explain eruption of ethnic violence (Geertz, 1973; Kapferer, 1988). This approach, despite being constructivist, has primordialist elements to it, because it treats “ethnic discourses as unchanging essences that strongly determine individuals’ actions” (Fearon and Laitin, 2000, p. 846). Based on these propositions and evidence from ethnic conflict literature, it can be inferred that ethnic identity plays an important role in ethnic violence. However, the question of how and why these ethnic identities are activated, which makes the public see and interpret things in ethnic context and act violently against another ethnic group could be explored from the perspectives offered by social identity theories. These theories propose that conditions of uncertainty create strong in-group identification and favoritism and out-group hostility. The uncertainty that arises from decreased state capacity in the form of law enforcement lowers state’s ability to enforce ethnic contracts (Lake and Rothchild, 1996) and creates a security dilemma in which groups compete for security and makes it more likely for an insecure group to act offensively against the competing group (Posen, 1993). Natural disasters that result in decreased state capacity and create uncertainty may activate ethnic identity mechanisms thereby making ethnic conflict more likely. Therefore, engaging both ethnic conflict and social identity theories could shed light on why and how people may engage in ethnic violence following natural disasters.

### **Hindu-Muslim violence**

The exact causes of the Hindu-Muslim riots in India remain multifaceted. The most common causes that have been suggested by social scientists include (1) primordial antagonism, i.e. historical prejudices and hostilities between these religious groups that escalate trivial incidents

into major riots; (2) spontaneous quarrels that turn into large riots as a result of rumors and exaggeration of the preceding incidents (Brass, 2003). An alternative cause proposed by Brass (2003) emphasizes the role of agents who ultimately decide whether a trivial incident gets exaggerated and erupt into a riot based on the political calculations and interests of these agents. Varshney (2002) argues against the primordial antagonism as an explanation of violence as riots are endemic in certain Hindu-Muslim communities and absent in others. He posits that civil society, specifically, organizations of interethnic and intercommunal engagement, play a crucial role in preserving peace in interreligious urban settings.

Some scholars have challenged this notion of riots being spontaneous outbursts of primordial hatred. Wilkinson (2004) explains the state and town level variation of Hindu-Muslim violence by arguing that it is the electoral incentives that drive ethnic violence in India. Specifically, he argues that "high levels of party competition lead to lower levels of antiminority violence and that bipolar competition is generally associated with higher levels of violence" (p. 147). In highly fractionalized party systems, politicians have to rely on minority votes to win elections or form coalitions and therefore, they will quell ethnic riots before they will become violent. In contrast to bipolar competition the elite-dominated party politicians use anti-minority rhetoric and polarization as a tactic to get the majority votes and sway the voters of their wider ethnic category by using the anti-minority polarization. This argument is based on political manipulation of voter identity with the goal of swaying the voters' preferences using ethnic wedge.

There are some important insights that Wilkinson's (2004) study provides. He tests alternative explanations of subnational variability in Hindu-Muslim violence such as economic division of labor, demographic balance – security dilemma, embittered refugees, and violence-begets-violence arguments and finds that all of these socio-economic variables are weak

explanations of ethnic violence in India. His political manipulation arguments are, in contrast, are fully supported in statistical models suggesting that electoral competition can both increase or decrease ethnic violence depending on elite manipulation goals. Nonetheless, Wilkinson's (2004) argument makes two strong assumptions. First, riots are argued to be not spontaneous but deliberately planned events resulting from elite manipulation. This assumption is in line with Brass's (2003) concept of "institutionalized riot system" based on elites' inflammatory role in riots. At the same time, it discounts Varshney's (2002) argument of the role of civic engagement in preventing riots. Second, the author takes a constructivist approach positing that voters have many identities, and, therefore, those identities can be shifted by elites for electoral purpose. This assumption supports earlier claims that ethnicity is multidimensional and thus manipulable (Okamura, 1981), and that manipulation of identities is an important factor in ethnic politics (Okamura, 1981; Nagel, 1994; Brass, 1991, 1997). However, it should be noted that there is not enough empirical evidence for this argument in the literature, and the role of political entrepreneurs in igniting ethnic violence is often exaggerated (Lake & Rothchild, 1996).

Furthermore, both of Wilkinson's (2004) assumptions are downplayed by cognitive models in social identity theories, which posit that cognition is "unselfconscious and quasi-automatic rather than deliberate and controlled", and, therefore, "the explicit, deliberate, and calculated deployment of an ethnic frame in pursuit of instrumental advantage may be less important, in explaining the situational variability of ethnicity" (Brubaker, Loveman, & Stamatov, 2004, p. 51). Instead, the authors argue, more attention should be paid to why people use ethnic interpretive scheme, a cognitive process that is activated by situational cues. Cognitive models do not reject the idea that deliberate manipulation by political entrepreneurs may occur, but the questions of why people decide to follow the political entrepreneurs that incite ethnic violence and why people

see, interpret, and act in ethnic rather than non-ethnic context remain open. Cognitive models suggest that categorization is a mental process through which our brain structures, sorts, and orders everything we see, hear, think, and experience. This allows for making sense of the world by processing the massive amount information with minimal effort. Social categorization occurs as a result of cognitive construction, which in itself, is a social construction formed by knowledge and culture. Social categorization, stereotyping in particular, is also an automatic and unselfconscious process that is activated by situational triggers, which are based on past recurrent events and/or social experience. Therefore, race and ethnicity are not things but perspectives on the world based on our perceptions and shaped by our social experiences, which suggests that race and ethnicity are our subjective perceptions. The way we choose to see something in ethnic or non-ethnic contexts depends on our unique perspectives, which makes manipulation by political entrepreneurs difficult unless their framing can activate and trigger certain cues in our cognition that makes us see and interpret things in an ethnic context.

The empirical work of whether specifically climate-related natural disasters increase the likelihood of riots and politically motivated violence in Indian states in the period of 1956-2002 was studied by Slettebak (2013). His findings indicate that natural disasters can affect the likelihood of conflict under certain conditions. Natural disasters increase the likelihood of riots at higher levels of literacy, and floods are found to be more linked to riots at higher levels of literacy than other disaster types. The attempted analysis of this paper is different from the Slettebak's analysis in several ways. First, Slettebak (2013) examines all reported riot incidents, while this paper focuses specifically on Hindu-Muslim riots, which allows to distinguish ethnic violence from other types of political violence and test the effects of natural disasters on inter-group violence using identity categorization as a mechanism. Second, Slettebak's (2013) measure of

natural disaster includes droughts, storms, floods, extreme temperatures, wildfires, and precipitation-induced landslides that resulted in “ten or more people reported killed, hundred or more reported affected, a declaration of state of emergency, or a call for international assistance” (p. 268). This paper focuses on meteorological disasters caused by precipitation and temperature anomalies as these disasters are truly exogenous whereas wildfires and landslides can be manmade.

### Theory and Hypotheses

Natural disasters such as floods and droughts disrupt the lives of people by causing damage, suffering, and uncertainty. The immediate effects may include death, damage of infrastructure, crop failure, and disruption of public goods delivery. Political science scholars suggest that state capacity is important as it determines the state control of violence, repression, and the likelihood of civil conflict and regime survival (Collier & Hoeffler, 2004; Humphreys, 2005; Fearon & Laitin, 2003). The existing research posits that natural disasters decrease state capacity and its ability to provide enforcement of law because of decreased tax revenues and increased disaster management expenditures (Homer-Dixon, 1999; Kahl, 2002). Disasters in the form of floods may also destroy or damage the infrastructure hindering state’s ability to effectively deploy the military and law enforcement forces to the affected areas where violence may arise. In the conditions of damage and disruption of public goods delivery following natural disasters, law enforcement becomes crucial in sustaining order. In the absence of sufficient levels of law enforcement, the chaos and anarchy may prevail and result in communal violence. Law enforcement is a serious deterrent force in preventing riots as people are generally unwilling to oppose the military and law enforcement forces regardless of the strength of the motivations to engage in violence (Horowitz, 2001).



Therefore, it is logical to assume that the chances of ethnic riots increase as the ability of state to sustain order using military and law enforcement decreases in the aftermath of natural disaster events. Moreover, as evidence of ethnic violence from around the world shows, the chances of looting the property of the minority significantly increases when there is a little risk of being confronted by police, and, specifically in India, deployment of police determines whether violence breaks out or not (Wilkinson, 2004). However, if law enforcement is necessary in preventing ethnic violence from breaking out, the question of why the ethnic violence breaks out in the first place should be addressed. Lake and Rothchild (1996) argue that decreased state capacity lowers state's ability to enforce ethnic contracts, to mediate between groups in resolving differences, and to provide protection for minorities. This raises collective fears of the future and create a security dilemma. People suddenly find themselves responsible for their own security in the absence of a strong state, which creates competition for security among groups (Posen, 1993). Furthermore, according to Posen (1993), an insecure group will prefer offensive strategy against a competing group, which increases chances of ethnic conflict. The aftermath of natural disasters often creates anarchy when a state is not able to maintain law and order in the affected communities. Ethnic groups may have increased concerns for their security preferring to engage in violence against another group to obtain more security. However, ethnic conflict inflicts extravagant costs on the participants (Fearon and Laitin, 2000). What makes a group to overcome the cost dilemma to engage in violence when state capacity declines as a result of natural disasters? I turn to social identity theories to answer this question. Empirical evidence from this social identity research indicates that events that produce uncertainty lead to strong group categorization, group stereotyping, and group conspiracy (Hale, 2004). Before I turn to explaining the role of this mechanism in producing conflict, I provide a cursory overview of the concept of group

categorization. Tajfel and Turner (1979) find that people categorize themselves and others in specific social groups. Once they place themselves in a category to which they belong, they identify in-group (us) members, who they view positively, and out-group (them) members, who they view negatively. The categorization occurs on various grounds such as religious affiliation, ethnicity, race, gender and others. Strong group identification results in in-group favoritism, distrust of out-group members, and preference for centralized group leadership (Tajfel, 1982; Forsyth, 1999). Brewer (1999) argues that in-group preference serves as a basis for out-group hate, which is fostered by perceived threat by the in-group that sees the out-group as dangerous for their interests or survival.

I argue that uncertainty created by natural disasters results in strong group identification. The strong group categorization allows people to reduce feelings of uncertainty; and uncertainty reduction is a precondition for fulfillment of major human aspirations such as survival (Hale, 2004). Furthermore, uncertainty reduction is one of the main individual-level motivations that lies at the core of intergroup behavior, and circumstantial uncertainty can be reduced by group affiliation and group action (Hogg, 2000; Reid & Hogg, 2005). Therefore, when affected by natural disasters people strive to reduce uncertainty through self-categorization and group membership in order to realize their motivation for survival. High levels of uncertainty are shown to increase identification with groups that are pertinent to reducing uncertainty (Reid & Hogg, 2005). As Hogg & Adelman (2013) put it “when, for example, people feel their security, prosperity, and lifestyle are threatened,...they yearn to identify strongly with a group that can actually get things done to remove or buffer the threat—a radical group that has a forceful behavioral agenda” (p. 441). The higher the level of uncertainty, the more likely are the people to identify with homogenous groups; and “groups are homogenous when there is marked similarity among members” (Jetten, Hogg, &

Mullin, 2000, p.187). Social categorization may occur based different group similarities including ethnicity, gender, economic class etc. Ethnicity is the one of the most common and basic ways of social identity categorization, especially in countries like India where social polarization leading to violence often occurs on ethnic grounds, i.e. Hindu-Muslim. Most scholarship in political science follows Weber (1978) in defining ethnicity as personal “perceptions of common descent, history, fate, and culture, which usually indicates some mix of language, physical appearance, and the ritual regulation of life, especially religion” (Hale, 2004). Because natural disasters produce high levels of uncertainty, we can expect an increased group identification among affected people who are likely to identify highly with their ethnic group. They are also more likely to favor and join in-groups that engage in extremist or radical behavior against out-groups that they view as dangerous for their interests or survival.

It is important to note that both self-categorization and stereotyping are cognitive processes, and cognitive models of social identity theory suggest that they occur unconsciously and effortlessly because both are automatic mental processes by which our brain processes and makes sense of the world (Brubaker, Loveman, & Stamatov, 2004). Categories represent the collection of memories, people, myths, and discourses, and they are activated through situational cues (Brubaker, Loveman, & Stamatov, 2004). Furthermore, Lake and Rothchild (1996) argue that ethnic polarization is amplified by “political memories and myths and emotions” thereby increasing chances of ethnic rivalry and violence (p. 56). I argue that high levels of uncertainty in the aftermath of natural disasters activate cognitive social categorization and stereotyping of ethnicity and strong in-group identification in the effort to reduce uncertainty. However, social categorization and stereotyping do not need to lead to communal violence. The violence occurs in the context of the security dilemma arising from natural disaster induced uncertainty caused by the

lack or decreased capacity of the state to enforce ethnic contracts. Categorization and stereotyping explain why violence is likely to take on the ethnic context.

In sum, I contend that decreased state capacity in the aftermath of natural disasters results in the absence of sufficient levels of law enforcement, which increases the chances of communal conflict. The communal conflict is likely to be along ethnic lines because (1) lowered state capacity from natural disasters decreases enforcement of ethnic contracts and provision of protection for minorities creating the security dilemma for ethnic groups, (2) uncertainty created by natural disasters results in strong ethnic group identification and makes people more likely to join in-groups that engage in extremist or radical behavior against out-groups.

Based on these arguments and evidence above, I theorize that decreased state capacity, increased group categorization, and security dilemma resulting from disaster-induced uncertainty are likely to result in ethnic riots.

*H1: Natural disasters in the form of precipitation and temperature anomalies increase the likelihood of ethnic riots in the affected areas.*

Although natural disasters are expected to have a significant effect on ethnic violence, there are socioeconomic and political factors that can arguably produce ethnic violence or moderate the effects of other variables on such violence. The importance of these factors may be especially relevant in countries such as India where the issues of poverty and political manipulation are prevalent. The literature has long argued that socioeconomic inequality and poverty produce civil conflict and political violence (Gurr, 1970; Berkowitz, 1972; Collier & Hoeffler, 1998, 2004; Fearon & Laitin, 2003). Some scholars have specifically linked economic conditions to ethnic riots. Bohlken & Sergenti (2010) find that economic growth has a significant effect on decreasing Hindu-Muslim violence in India. The authors contend that there are three potential mechanisms

that link slow economic growth to ethnic violence. First, party leaders may try to distract voters' attention from economic problems by emphasizing the salience of ethnic issues. Second, economic problems increase ethnic competition thereby increasing chances of violence. Third, the opportunity costs of engaging in riot is higher when economic conditions are favorable.

The economic deprivation may increase feelings of marginalization in disaster-affected regions thereby increasing chances of communal violence (Fjelde & Ostby, 2010 as cited in Fjelde & Uexkull, 2012). The areas where poverty is widespread may be more susceptible to ethnic violence in the aftermath of natural disasters, and, therefore, the effect of natural disasters on ethnic violence may be conditional on economic conditions of the given region. Poor regions may experience more incidents of communal violence when hit by disastrous climatic anomalies than the wealthier ones. If this argument is correct, we would expect to find evidence for the following hypothesis.

*H2: Natural disasters in the form of precipitation and temperature anomalies increase the likelihood of ethnic riots conditional on poverty levels in the affected areas.*

Another important factor that could moderate the effect of natural disasters on ethnic riots in India is electoral manipulation by elite-dominated parties. Electoral manipulation using ethnic wedge is commonplace in India, and the Hindu party leaders' rhetoric is known to incite violence against minorities (Wilkinson, 2004). Bharatiya Janata Party (BJP) is a Hindu nationalist party. BJP was founded in 1980 and after 1998 elections it led a coalition known as the National Democratic Alliance (NDA), which was in power until 2004. The NDA suffered a defeat in 2004 elections, however, BJP steadily gained ground in the majority of Indian states over the next decade until its landslide victory in the national legislative elections in 2014. Although the party leaders and prominent members had been accused of religious prejudice and inciting violence, the

party was able to draw support from lower castes and even Muslim communities in the 2014 elections through the promises of economic opportunities and restoration of cultural sites. However, the traditional supporters of the party are the Hindu and upper-caste voters. The areas with large support for Hindu nationalist policies are likely to be more prone to backlash against minorities if such communities exist. Therefore, I expect the effect of natural disasters on ethnic violence to be more pronounced in areas with large support for the Hindu nationalist parties, specifically BJP.

*H3: Natural disasters in the form of precipitation and temperature anomalies increase the likelihood of ethnic riots conditional on high electoral support of Hindu nationalist parties in the affected areas.*

### Research Design

Fixed effects Poisson regression models are used to test the hypotheses. Year and state fixed effects are used, and standard errors are clustered by state. The empirical analysis consists of two parts. The first part focuses on the effects of precipitation and temperature anomalies on ethnic riots. The research design of this analysis does not use control variables because rainfall and temperature are as good as random in fixed effects models at the subnational level; control variables would be endogenous if they can be affected by climate factors (Hsiang, 2016). Therefore, using standard control variables for ethnic conflict such as population, poverty and electoral dynamics would bias the results.

The second part of the empirical analysis tests the effect of precipitation and temperature anomalies on ethnic riot conditional on economic and political factors, i.e. poverty and electoral

support for Bharatiya Janata Party (BJP), the Hindu nationalist party. The models that test the effects conditional on poverty, the electoral support for BJP is used as a control variable whereas the models that use BJP support in the interaction term use poverty as a control variable.

### **Sample and Unit of Analysis**

The unit of analysis is state year, where the values are recorded for dependent and independent variables in a given year. The first part of the empirical analysis uses the period of 1951-2015. The second part of the analysis focuses on the period of 1984-2005. The periods were determined based on the availability of data across all variables.

### **Dependent Variable**

The dependent variable is the number of ethnic riots operationalized as the count variable of riots in each state per annum. The data for the dependent variable come from three sources: (1) India Sub-National Problem Set, 1960-2004, which is the events data of violent conflicts in India from the Center of Systemic Peace (CSP) compiled from the Keesings Record of World Events, (2) Varshney and Wilkinson Dataset on Hindu-Muslim Violence in India, 1950-1995, and (3) ICEWS Coded Event Data from W-ICEWS (Worldwide Integrated Crisis Early Warning System)<sup>18</sup>, an event dataset with data from news reports around the world coded using the BBN ACCENT event coder. The data from the CSP and ICEWS include all types of violent conflicts, and, therefore, I filter out the spontaneous ethnic violent events by excluding the following actors: government, rebel, insurgent and terrorist organizations as the involvement of these actors violates the condition

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<sup>18</sup> The data is available at <https://dataverse.harvard.edu/dataverse/icews>. W-ICEWS v.10 (1995-2015) was used for this paper.

of spontaneity of a conflict event such as riot. I then include a condition of an involvement of an ethnic actor (e.g. Hindu, Muslim, ethnic, religious) either as a source actor or a target actor.

### **Independent Variable**

The independent variable is natural disaster operationalized as the anomalies in precipitation and temperature in each analyzed state of India. The anomalies are annual deviations from the mean precipitation and temperature in each state in the analyzed period. The data come from the CRU TS v. 4.00 gridded time series data set (1901-2015)<sup>19</sup> that contains geo-referenced data on global monthly precipitation levels (includes all land areas excluding Antarctica at 0.5° resolution) and temperature.

The data set is provided by the Climate Research Unit (CRU). The CRU TS v. 4.00 dataset includes the following variables: mean temperature (TMP), diurnal temperature range, precipitation, vapor pressure, cloud cover and wet-day frequency. The data for each of these variables are provided in separate files in NetCDF format. The data for Climatic Research Unit (CRU) monthly climate archives come from the World Meteorological Organisation (WMO) in collaboration with the US National Oceanographic and Atmospheric Administration (NOAA, via its National Climatic Data Center, NCDC) (Harris et al., 2014). CRU accesses this information through the Met Office Hadley Centre in the UK and NCDC in the USA (Harris et al., 2014). I process these data using ArcGIS software to produce zonal statistics on average precipitation and temperature in Indian districts in the period of 1951-2015.<sup>20</sup>

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<sup>19</sup> The dataset is available through CRU website <https://crudata.uea.ac.uk/cru/data/hrg/>

<sup>20</sup> I excluded 1950 from the analysis because the NetCDF climate file for that year is corrupted and I was not able to download it from the CRU website.



## **Interaction and control variables**

The first interaction variable is poverty level in each observed state. The poverty data comes from the Government of India Planning Commission 2014 report<sup>21</sup>. The data is obtained for the period of 1984-2005 using Lakdawala calculation method for poverty line. India started using the Tendulkar methodology for calculating poverty line after 2005. The data after 2005 is, therefore, different from the previous periods, which is likely to cause inconsistencies in the analysis. Therefore, the analysis includes only the periods before 2005 that uses the Lakdawala methodology.

The second interaction variable is the electoral support for Bharatiya Janata Party (BJP) by state. The BJP support serves as a measure of support for Hindu nationalist policies and leaders, some of which have allegedly incited communal violence against minorities. The data is obtained for the period of 1984-2005 from the Election Commission of India<sup>22</sup>.

Both variables serve as control variables in models in which they are not used as interaction variables.

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<sup>21</sup> The report is available on the Planning Commission website [http://planningcommission.nic.in/reports/genrep/pov\\_rep0707.pdf](http://planningcommission.nic.in/reports/genrep/pov_rep0707.pdf)

<sup>22</sup> The data is available on the Election Commission of India website <https://eci.gov.in/statistical-report/statistical-reports/>

## Empirical Results

I present the results of the regression that test the effects of natural disasters on ethnic riots in Table 3-1. As the results show, positive deviation from the norm in precipitation and temperature levels have significant effects on ethnic riots in Models 1 and 2 suggesting that natural disasters in the form of floods or droughts increase the likelihood of ethnic violence in India. Model 2 uses the interaction term of temperature and precipitation anomalies in order to test the marginal effect of precipitation anomaly on ethnic riots. The interaction term and the individual effects of anomalous precipitation and temperature on Hindu-Muslim riots are statistically significant ( $p < .01$ ).

Table 3-1. Effects of natural disasters on ethnic riots in India, 1951-2015

Variable	Model 1	Model 2
Temperature anomaly	.361** (.137)	.344* (.141)
Precipitation anomaly	.004* (.002)	.013** (.004)
Temperature*precipitation anomaly		-.017** (.004)

Notes: Robust standard errors in parentheses. State and year fixed effects. Standard errors clustered by state. \*\* $p < .01$ ; \* $p < .05$ . Obs=2,210.

The interaction effects from Model 2 can be best observed in Figure 1 that shows the marginal effects of precipitation anomalies on the onset of ethnic riots. As can be seen on the graph, the effects of floods on the likelihood of ethnic riot increase as temperatures go up, and the effects are more positive during the periods of anomalously high temperatures.

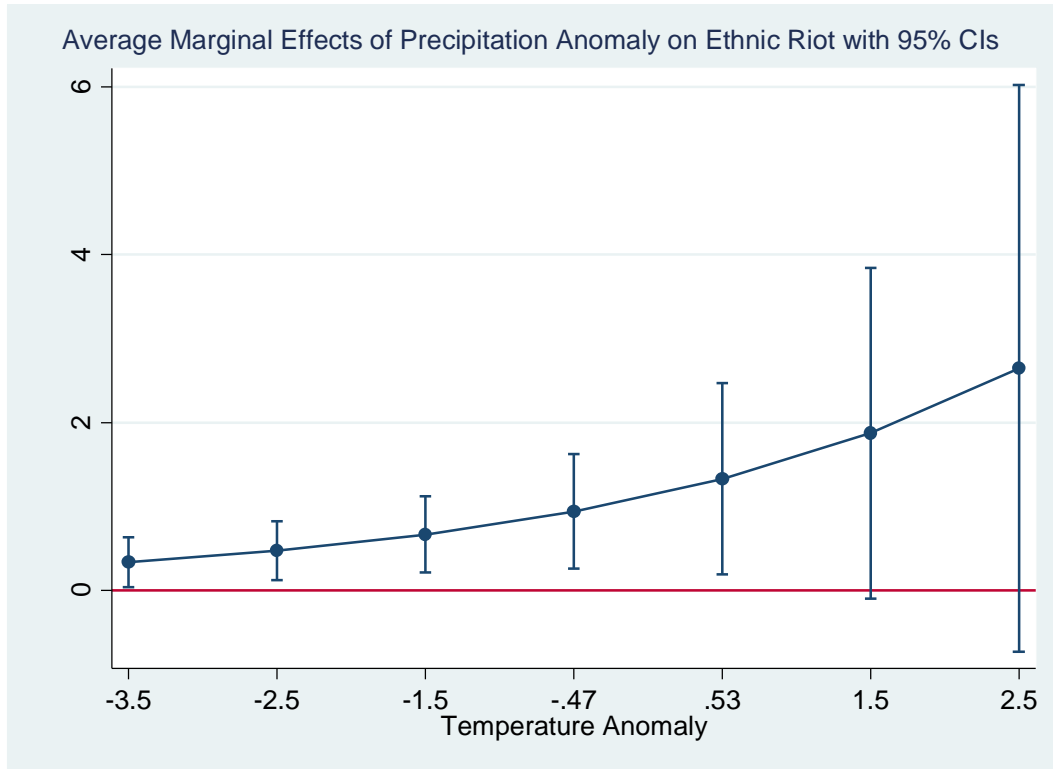


Figure 3-1. Average Marginal Effects of Precipitation Anomaly on Ethnic Riot

Next, I examine the effects of the absolute values of precipitation and temperature deviations from the norm, which allows to see the net effects of anomalies on riots. I present the results in Table 3-2 that shows that absolute deviations of precipitation from the norm increase the likelihood of ethnic riots ( $p < .01$ ). Furthermore, the marginal effect of absolute deviations of precipitation on riots is also statistically significant ( $p < .01$ ) further confirming the results from Table 3-1. Temperature anomaly, however, is only significant in Model 1 suggesting that absolute deviations in temperature increase chances of ethnic conflict ( $p < .01$ ).

Table 3-2. Effects of absolute deviations of precipitation and temperature on ethnic riots in India, 1951-2015

Variable	Model 1	Model 2
Temperature anomaly	-.251** (.077)	.269 (.202)
Precipitation anomaly	.029** (.009)	.042** (.013)
Temperature*precipitation anomalies		-.020** (.006)

Notes: Robust standard errors in parentheses. State and year fixed effects. Standard errors clustered by state. \*\*p< .01; \*p< .05. Obs=2,210.

The marginal effect of absolute precipitation anomaly is illustrated in Figure 3-2. The graph shows that the effects of absolute anomalous precipitation on chances of ethnic riot increase at more anomalous temperatures whether positive or negative. This suggests that the marginal effect of any deviation from the norm in precipitation levels positively affect chances of ethnic riot at more anomalous temperatures.

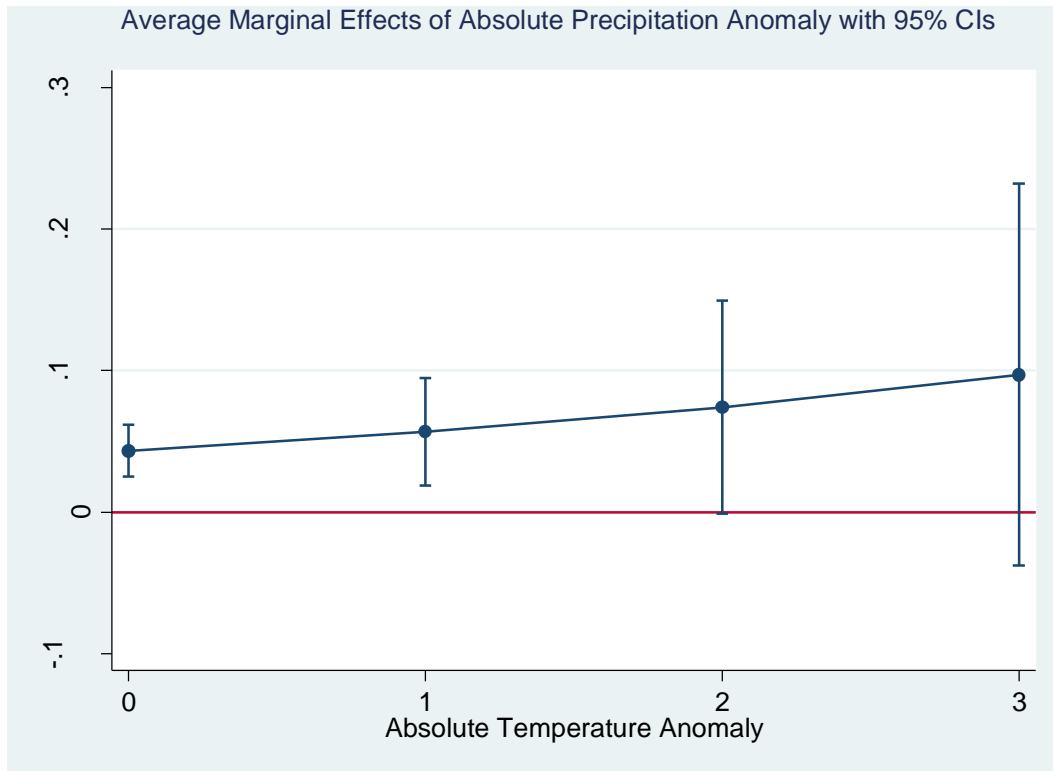


Figure 3-2. Average Marginal Effects of Absolute Precipitation Anomaly on Ethnic Riot

Finally, I run a set of regressions to analyze the effects of temperature and precipitation rather than their anomalies on ethnic riots. This approach allows to see whether increases in temperature or precipitation that are not necessarily anomalous can have an effect on ethnic riots. The results presented in Model 1 in Table 3-3 show that higher precipitation and temperature levels have positive effects on chances of ethnic riots. This is consistent with the results of the effects of temperature and precipitation anomalies on ethnic riots suggesting that increases in these variables have significant effects on ethnic riots. The interaction of temperature and precipitation in Model 2 is not statistically significant, but the individual effects of higher precipitation and temperature are shown to be powerful predictors of ethnic riots.

Table 3-3. Effects of precipitation and temperature on ethnic riots in India, 1951-2015

Variable	Model 1	Model 2
Temperature	.361** (.137)	.368** (.139)
Precipitation	.005* (.002)	.005** (.002)
Temperature*precipitation		-.0003 (.0004)

Notes: Robust standard errors in parentheses. State and year fixed effects. Standard errors clustered by state. \*\*p< .01; \*p< .05. Obs=2,210.

Overall, the results demonstrate that natural disasters in the form of meteorological anomalies, i.e. floods and droughts, and higher precipitation and temperature levels are strong predictors of Hindu-Muslim riots in India, which provides significant support to the hypothesis that natural disasters increase the likelihood of ethnic riots.

It should be noted that the analysis was done at the state level, and the district level analysis may reveal different results. However, the district level analysis would limit the ability to perform the second part of the empirical analysis that makes the effect of natural disasters conditional on support for nationalist parties and poverty. The data for electoral support and poverty are not readily available at the district level, which is why the state level analysis is most appropriate for conducting the comprehensive study.

The second part of the empirical analysis makes the effect of natural disasters conditional on socioeconomic and political factors such as poverty and support for Bharatiya Janata Party (BJP), the Hindu nationalist party. Table 3-4 presents the results of models in which precipitation anomalies are interacted with poverty in Model 1 and BJP support in Model 2. The results in Model 2 show that interaction effect of precipitation anomaly and BJP support is statistically

significant and the individual effect of precipitation anomaly on ethnic riot is positive. The interaction effect can be best observed in Figure 3-3, which shows that the effect of precipitation anomaly on ethnic riot decreases at higher levels of vote share for BJP. This finding suggests that areas with high levels of support for Hindu nationalist policies are less likely to experience ethnic riots following floods than those with smaller BJP vote share. These results are contrary to H3 that expects natural disasters to increase the likelihood of ethnic riots conditional on high electoral support of Hindu nationalist parties in the affected areas. The finding may seem counter-intuitive, but it is not illogical. It may indicate that areas with large support for Hindu nationalist policies are inhabited by mostly Hindu population with no or small presence of Muslim communities decreasing the chances of communal violence. Poverty levels, on the other hand, are shown not to affect chances of ethnic riots independently or when interacted with precipitation anomalies as can be seen in Model 1.

Table 3-4. Predicting Ethnic Riots with Precipitation Anomalies Conditional on Poverty and BJP Support, 1984-2005

Variable	Model 1	Model 2
Precipitation	.002 (.005)	.037** (.013)
Poverty	-.150 (.126)	-.128 (.116)
Precipitation*poverty	.001 (.0004)	
BJP support	.040 (.047)	.033 (.044)
Precipitation*BJP support		-.001* (.001)

Notes: Robust standard errors in parentheses. State and year fixed effects. Standard errors clustered by state. \*\*p< .01; \*p< .05. Obs=635.



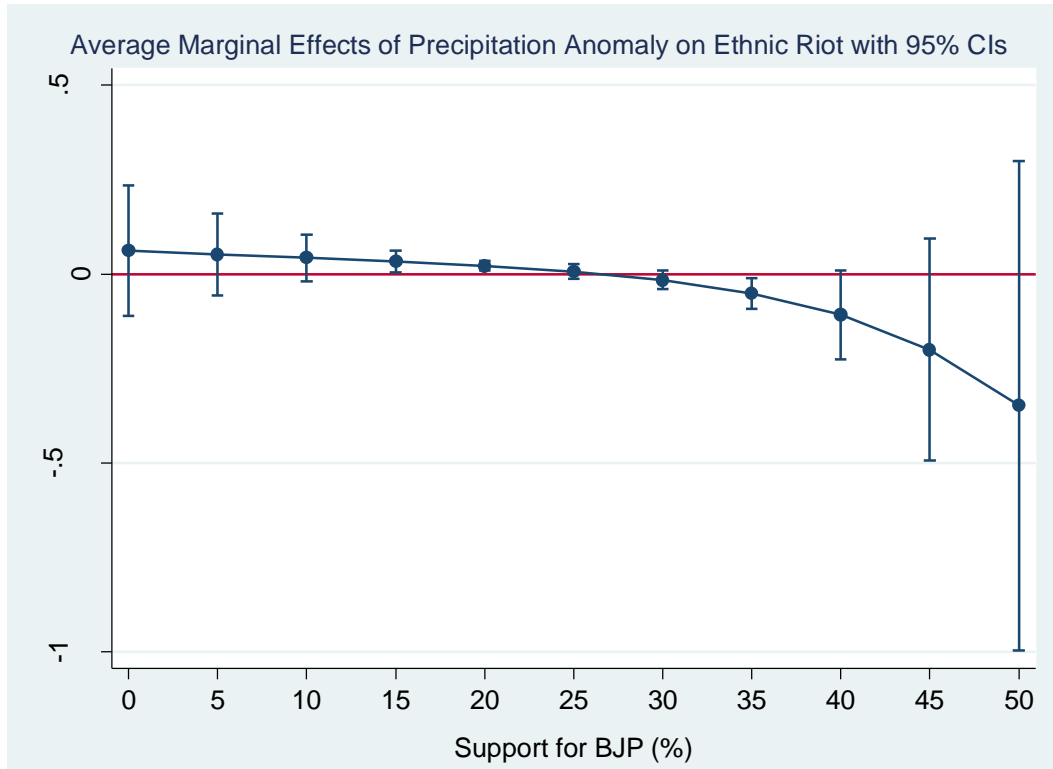


Figure 3-3. Average Marginal Effects of Precipitation Anomaly on Ethnic Riot

Next, I interact the temperature anomalies with poverty and BJP support variables and present the results in Table 3-5. Model 1 yields no statistically significant results suggesting that temperature anomalies conditional on poverty levels are not likely to affect chances of ethnic riots. Model 2 shows that temperature anomalies have a positive effect on ethnic riot, however, interacting temperature anomalies with BJP support does not yield any significant results. Similar to the results in Table 3-4, poverty levels do not produce significant effects on ethnic riots nor does the interaction term between the temperature anomalies and poverty levels as can be seen in Model 1.

Table 3-5. Predicting Ethnic Riots with Temperature Anomalies Conditional on Poverty and BJP Support, 1984-2005

Variable	Model 1	Model 2
Temperature	.948 (.580)	.378** (.074)
Poverty	-.082 (.104)	-.147 (.110)
Temperature*Poverty	.029 (.021)	
BJP support	.037 (.041)	.040 (.045)
Temperature*BJP support		-.010 (.006)

Notes: Robust standard errors in parentheses. Standard errors clustered by state. \*\*p< .01; \*p< .05. Obs=635.

In sum, the empirical evidence presented in this article suggests that natural disasters measured as precipitation and temperature anomalies have a positive effect on ethnic riots. Excess precipitation anomalies and abnormally high temperatures increase chances of ethnic riots suggesting that floods and droughts can be powerful predictors of ethnic conflict. The marginal effect of floods on riots is shown to increase at abnormally high temperatures. The absolute deviations from the norm in precipitation and temperature are also shown to increase chances of ethnic riots, and the effects of absolute anomalous precipitation on ethnic riot are higher at more anomalous temperatures whether positive or negative. Furthermore, the support for nationalist parties is shown to moderate the effects of floods on ethnic riots while poverty levels do not produce any significant independent or moderating effects on violence.

## Conclusion

This paper examined the link between natural disasters in the form of floods and ethnic violence by exploring Hindu-Muslim riots in India. The findings provide strong empirical evidence that natural disasters in the form of precipitation and temperature anomalies increase the likelihood of ethnic riots. These findings contribute to the environmental security literature that links natural disasters to civil conflict by showing that floods and droughts are strong predictors of Hindu-Muslim violence in Indian states. Moreover, the effect of floods on ethnic riots is shown to be higher at anomalously high temperatures suggesting that climate change and global warming may increase chances of ethnic violence.

Explaining ethnic riots in India presents a challenge as the causal factors are diverse and there is no consensus on causality of ethnic violence. This paper offers an alternative perspective to existing theories about Hindu-Muslim violence in India by proposing that natural disasters decrease state capacity thereby lowering state guarantees of ethnic contract and minority protection. They also activate feelings of uncertainty resulting in strong group identification with their ethnicity and stereotyping of the out-group ethnicity. Ethnic conflict results from security dilemma in the conditions of anarchy when groups view the rival group as a threat to their security and choose to rely on their in-group to reduce uncertainty, obtain or increase security, and survive.

Further, the results of the analysis involving poverty levels and support for Hindu nationalist policies suggest that the effect of precipitation anomalies conditional on support for Hindu nationalist policies decreases at higher levels of support for Hindu nationalist policies whereas the same effect is not observed when precipitation and temperature anomalies are interacted with poverty levels.

The study contributes to the extant environmental security and ethnic conflict literatures by showing that climactic factors are capable of increasing chances of ethnic conflict. This is particularly important, because existing studies explore the effects of natural disasters on civil conflict in general without examining the effects on ethnic conflict, which is often driven by distinct factors that involve identity. Another important facet of the findings in this paper is its implications for the contemporary debates on the effects of climate change. It shows that the effects of climate change that result in meteorological anomalies are capable of contributing to higher frequencies of violence and deaths. Therefore, combating climate change is an important task for policymakers in maintaining stability, peace, and security.

One of the questions that remains to be explored is whether meteorological anomalies are unique in having positive effects on ethnic riot. One can argue that other types of natural disasters, i.e. earthquakes, landslides etc. could also result in decreased state capacity, increased uncertainty and propensity for conflict among ethnic groups. The future research could explore this question to see whether the effects are specific to climatic factors.

## CONCLUSION

The empirical analysis in the three studies of this dissertation reveal diverse and interesting findings. Both positive and negative price shocks have significant effects on protest mobilization in rentier autocracies and hybrid regimes when conditioned by repressive capacity and taxation. Specifically, in rentier autocracies higher resource rents or net oil exports decrease protest likelihood when conditioned by stronger repressive capacity. In rentier hybrid regimes, increases in net oil exports have a positive effect on protest conditional on higher repressive capacity. Furthermore, in rentier hybrid regimes, the anti-government protest is also more likely when resource rents are higher conditional on lower taxation. The findings for hybrid regimes resonate with modernization and democratization literature arguments that attribute protest mobilization to higher economic development, which gives rise to the middle class with its demands for democratization.

The subnational analysis of anti-government protest in Russia, a rentier competitive autocracy, showed that the regional exposure to economic shocks in the form of unemployment and lower mining employment increases have shown to be strong predictors of regional protest. The results remain robust across several models and suggest that regional exposure to shocks does play an important role in the likelihood of protest. This empirical evidence indicates the importance of regional economic conditions resulting from exogenous shocks on protest mobilization in rentier competitive autocracies. There are important inferences for contentious politics as well as rentier state literatures that can be taken away from these empirical results. The extant literature has not paid attention on the effects of economic shocks on the subnational variation of anti-government protest. As the empirical results of this study have demonstrated, regional economic conditions affected by external shocks can have significant effects on local anti-government

protests, which potentially could challenge the national government if protests erupt across several regions. This has important implications for both rentier state and democratization literatures. Of course, the scale of these protests would also play a crucial role, and future studies could explore how exogenous economic shocks affect the scale of regional protests. Moreover, the positive effects of higher education on protest has further implications for democratization literature by showing that middle class can serve as the force for democratization in hybrid regimes. This finding further reinforces the findings of the cross-national analysis where more wealth is associated with protest in hybrid regimes, which can possibly be attributed to the rise of middle class. The importance of higher resource rents and the expansion of middle class in protest mobilization is especially high in hybrid regimes.

Finally, the empirical analysis of natural disasters in the form of floods and Hindu-Muslim riots in India provides statistically significant evidence of this relationship suggesting that meteorological disasters in the form of excess precipitation increase chances of ethnic riots and that areas with higher vote share for Hindu nationalist parties are less likely to experience ethnic riots as a result of meteorological anomalies in the form of excess precipitation than those with smaller nationalist vote share. The paper contributes to the latest environmental security and conflict literatures as well as contemporary debates on climate change and provides some suggestions for future research that includes exploring the effects of other types of natural disasters on ethnic conflict.

The avenues for further research should include examining the effects of regional direct and indirect tax increases and including the size of regional tax increases into the analysis. Doing so would allow to observe effects of higher taxation on protest likelihood more precisely. Exploring the effects of commodity shocks on the scope of regional protests is another interesting

avenue that should be considered. Expanding the analysis to investigate the effects on the scale of anti-government protest would help better understand whether the commodity price shocks could seriously threaten regime stability in hybrid regimes.

As far as ethnic conflict concerned, future studies should examine the effects of non-meteorological disasters such as earthquakes and landslides on communal violence. It is reasonable to expect that these calamities should also hinder state capacity, increase uncertainty and chances of ethnic conflict. The results of that research could shed light on whether the effects are specific to meteorological events. This is especially important in the light of the contemporary debates on the devastating effects of climate change on conflict and the future of human livelihood.

## APPENDIX A: POLITICAL TERROR SCALE LEVELS<sup>23</sup>

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<sup>23</sup> The table is from Political Terror Scale coding rules <http://www.politicalterror scale.org/Data/Documentation.html>



<u>Score</u>	<u>Interpretation</u>
<u>1</u>	<u>Countries under a secure rule of law, people are not imprisoned for their views, and torture is rare or exceptional. Political murders are extremely rare.</u>
<u>2</u>	<u>There is a limited amount of imprisonment for nonviolent political activity. However, few persons are affected, torture and beatings are exceptional. Political murder is rare.</u>
<u>3</u>	<u>There is extensive political imprisonment, or a recent history of such imprisonment. Execution or other political murders and brutality may be common. Unlimited detention, with or without a trial, for political views is accepted.</u>
<u>4</u>	<u>Civil and political rights violations have expanded to large numbers of the population. Murders, disappearances, and torture are a common part of life. In spite of its generality, on this level terror affects those who interest themselves in politics or ideas.</u>
<u>5</u>	<u>Terror has expanded to the whole population. The leaders of these societies place no limits on the means or thoroughness with which they pursue personal or ideological goals.</u>

APPENDIX B: PREDICTING PROTEST WITH RESOURCE RENTS AND NET  
OIL EXPORTS AS % OF GDP CONDITIONAL TO REPRESSIVE  
CAPACITY IN RENTIER DEMOCRACIES, 1995-2014

<b>Variables</b>	<b>Model 1</b>	<b>Model 2</b>
Resource rents X Repressive capacity	.016 (.01)	
Resource rents	.095** (.03)	
Repression	-.903** (.30)	.584 (.30)
Net oil exports as % of GDP X Repressive capacity		.113 (.07)
Net oil exports as % of GDP		.058 (.24)
Stabilization Fund	.344 (.29)	.804** (.31)
GDP per capita	.0001 (.0001)	.0001 (.0001)
N	159	143
Pseudo R2	0.7213	0.7554

Note: Population was used as an exposure variable in all models. Country and year fixed effects.

Standard errors are clustered by country. Statistical significance: \*\*p< .01, \*p< .05.

APPENDIX C: PREDICTING PROTEST WITH RESOURCE RENTS AND NET  
OIL EXPORTS AS % OF GDP CONDITIONAL TO TAX INCREASES IN  
RENTIER AUTOCRACIES, 1995-2014

<b>Variables</b>	<b>Model 1</b>	<b>Model 2</b>
Resource rents $t-1$ X Taxes/GDP	.004 (.002)	
Resource rents $t-1$	-.050 (.04)	
Oil exports as % of GDP $t-1$ X Taxes/GDP		-.106 (.35)
Oil exports as % of GDP $t-1$		-4.77 (3.52)
Taxes/GDP	-.058 (.14)	.219 (.28)
Stabilization Fund	-2.629 (8.34)	-1.969 (17.04)
GDP per capita	.0001** (.00002)	-.0001** (.00002)
N	96	90
Pseudo R2	0.8709	0.8739

Note: Population was used as an exposure variable in all models. Country and year fixed effects.

Standard errors are clustered by country. Statistical significance: \*\* $p < .01$ , \* $p < .05$ .

APPENDIX D: PREDICTING PROTEST WITH RESOURCE RENTS AND NET  
OIL EXPORTS AS % OF GDP CONDITIONAL TO REPRESSIVE  
CAPACITY IN RENTIER HYRID REGIMES, 1995-2014 (AT 3%  
THRESHOLD FOR RESOURCE RENTS)

<u>Variables</u>	<u>Model 1</u>	<u>Model 2<sup>24</sup></u>
<u>Resource rents X Repressive capacity</u>	<u>.002</u> <u>(.01)</u>	
<u>Resource rents</u>	<u>.001</u> <u>(.03)</u>	
<u>Repressive capacity</u>	<u>-.468*</u> <u>(.23)</u>	
<u>Net oil exports as % of GDP X Repressive capacity</u>		
<u>Net oil exports as % of GDP</u>		
<u>Stabilization Fund</u>	<u>.151</u> <u>(.54)</u>	
<u>GDP per capita</u>	<u>-.00003</u> <u>(.00004)</u>	
<u>N</u>	<u>663</u>	
Pseudo R2	0.7930	

Note: Population was used as an exposure variable in all models. Standard errors are clustered by country. Statistical significance: \*\*p< .01, \*p< .05.

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<sup>24</sup> The statistical results did not converge.

APPENDIX E: PREDICTING PROTEST WITH RESOURCE RENTS AND NET OIL EXPORTS AS % OF GDP CONDITIONAL TO REPRESSIVE CAPACITY IN RENTIER AUTOCRACIES, 1995-2014 (AT 3% THRESHOLD FOR RESOURCE RENTS)



<u>Variables</u>	<u>Model 1</u>	<u>Model 2</u>
<u>Resource rents X Repression</u>	<u>.042*</u> <u>(.02)</u>	
<u>Resource rents</u>	<u>-.144*</u> <u>(.07)</u>	
<u>Repressive capacity</u>	<u>-1.572**</u> <u>(.40)</u>	<u>-.999**</u> <u>(.26)</u>
<u>Net oil exports as % of GDP X Repressive capacity</u>		<u>2.701*</u> <u>(1.06)</u>
<u>Net oil exports as % of GDP</u>		<u>-16.627**</u> <u>(4.76)</u>
<u>Stabilization Fund</u>	<u>.779</u> <u>(.40)</u>	<u>1.106**</u> <u>(.35)</u>
<u>GDP per capita</u>	<u>.0001*</u> <u>(.0001)</u>	<u>.0001**</u> <u>(.00005)</u>
<u>N</u>	<u>383</u>	<u>337</u>
Pseudo R2	0.7764	0.7797

Note: Population was used as an exposure variable in all models. Standard errors are clustered by country. Statistical significance: \*\*p< .01, \*p< .05.

APPENDIX F: PREDICTING PROTEST WITH RESOURCE RENTS AND NET  
OIL EXPORTS AS % OF GDP CONDITIONAL TO REPRESSIVE  
CAPACITY IN RENTIER DEMOCRACIES, 1995-2014 (AT 3%  
THRESHOLD FOR RESOURCE RENTS)

<u>Variables</u>	<u>Model 1</u>	<u>Model 2</u>
<u>Resource rents<sub>t-1</sub> X Taxes/GDP</u>	<u>.002</u> <u>(.003)</u>	
<u>Resource rents<sub>t-1</sub></u>	<u>.005</u> <u>(.07)</u>	
<u>Net oil exports as % of GDP<sub>t-1</sub> X Taxes/GDP</u>		<u>-.068</u> <u>(.07)</u>
<u>Net oil exports as % of GDP<sub>t-1</sub></u>		<u>6.014</u> <u>(5.94)</u>
<u>Taxes/GDP</u>	<u>.040</u> <u>(.08)</u>	<u>.063</u> <u>(.06)</u>
<u>Stabilization Fund</u>	<u>.530**</u> <u>(.19)</u>	<u>.689**</u> <u>(.17)</u>
<u>GDP per capita</u>	<u>-1.90e-06</u> <u>(.00001)</u>	<u>1.93e-06</u> <u>(.00001)</u>
<u>N</u>	<u>346</u>	<u>335</u>
Pseudo R2	0.6037	0.6192

Note: Population was used as an exposure variable in all models. Standard errors are clustered by country. Statistical significance: \*\*p< .01, \*p< .05.

APPENDIX G: PREDICTING PROTEST WITH RESOURCE RENTS AND NET OIL EXPORTS AS % OF GDP, AND TAXES AS % OF GDP IN RENTIER HYBRID REGIMES, 1995-2014 (AT 3% THRESHOLD FOR RESOURCE RENTS)

<u>Variables</u>	<u>Model 1</u>	<u>Model 2</u>
<u>Resource rents<sub>t-1</sub> X Taxes/GDP</u>	<u>-.003</u> <u>(.002)</u>	
<u>Resource rents<sub>t-1</sub></u>	<u>.074*</u> <u>(.04)</u>	
<u>Net oil exports as % of GDP<sub>t-1</sub> X Taxes/GDP</u>		<u>-.071</u> <u>(.08)</u>
<u>Net oil exports as % of GDP<sub>t-1</sub></u>		<u>5.648**</u> <u>(1.84)</u>
<u>Taxes/GDP</u>	<u>.040</u> <u>(.07)</u>	<u>-.019</u> <u>(.05)</u>
<u>Stabilization Fund</u>	<u>-.305</u> <u>(.80)</u>	<u>-.117</u> <u>(.72)</u>
<u>GDP per capita</u>	<u>-.0002*</u> <u>(.0001)</u>	<u>-.0001</u> <u>(.0001)</u>
<u>N</u>	<u>314</u>	<u>285</u>
Pseudo R2	0.8355	0.8276

Note: Population was used as an exposure variable in all models. Standard errors are clustered by country. Statistical significance: \*\*p< .01, \*p< .05.

APPENDIX H: PREDICTING PROTEST WITH OIL PRICES CONDITIONAL  
TO REPRESSIVE CAPACITY IN RENTIER HYBRID REGIME STATES  
AND RENTIER AUTOCRACIES, 1995-2014

<b>Variables</b>	<b>Model 1</b>	<b>Model 2</b>
	<b>Hybrid Regimes</b>	<b>Autocracies</b>
Oil prices X Repressive capacity	.006 (.005)	-.010 (.01)
Oil prices	.0005 (.02)	.017 (.04)
Repressive capacity	-.017 (.37)	1.245 (.68)
Stabilization Fund	-.521 (.45)	3.576** (1.21)
GDP per capita	.00001 (.0001)	.0002 (.0001)
N	343	231
Pseudo R2	0.6694	0.4735

Note: Population was used as an exposure variable in all models. Country fixed effects. Standard errors are clustered by country. Statistical significance: \*\*p< .01, \*p< .05.

APPENDIX I: PREDICTING PROTEST WITH OIL PRICES CONDITIONAL  
TO TAXES/GDP IN RENTIER HYBRID REGIME STATES AND RENTIER  
DEMOCRACIES, 1995-2014



Variables	Model 1	Model 2
	Hybrid Regimes	Democracies
Oil prices $t-1$ X Taxes/GDP	.001 (.001)	.0005 (.001)
Oil prices $t-1$	.001 (.01)	-.022 (.01)
Taxes/GDP	-.297 (.26)	.120* (.05)
Stabilization Fund	-1.355 (1.14)	.684** (.21)
GDP per capita	.0002 (.0001)	.0002* (.0001)
N	161	76
Pseudo R2	0.6124	0.7058

Note: Population was used as an exposure variable in all models. Country fixed effects. Standard errors are clustered by country. Statistical significance: \*\* $p < .01$ , \* $p < .05$ .

APPENDIX J: ECONOMIC DISTRICTS OF THE RUSSIAN FEDERATION



### Economic districts of the Russian Federation

- Central
- Central Black Earth
- East Siberian
- Far Eastern
- North Caucasus
- Northern
- Northwestern
- Ural
- Volga
- Volga
- Volga-Vyatka
- West Siberian

APPENDIX K: ECONOMIC SHOCKS AND ANTI-GOVERNMENT PROTEST,  
2007-2015. NEGATIVE BINOMIAL ANALYSIS USING THE SECOND  
ESTIMATE OF UNEMPLOYMENT RATE

Variable	Model 1	Model 2
<i>Clustered by federal district</i>		
GRP per capita	-.001 (.001)	
Unemployment	.04** (.01)	.04** (.01)
Mining employment		-.07 (.03)
Tax increase	.14 (.43)	.14 (.45)
CPI	-.04 (.03)	-.05* (.02)
State sector employment	-5.99 (19.83)	-1.04 (18.20)
Ethnic population	-.01 (.01)	-.01 (.01)
Higher education	.09** (.02)	.07** (.01)

Note: Robust standard errors in parentheses. Population used as an exposure variable.

\*\*p < .01; \*p < .05; Obs=640.

APPENDIX L: ECONOMIC SHOCKS AND ANTI-GOVERNMENT PROTEST,  
2007-2015. NEGATIVE BINOMIAL ANALYSIS USING TIME LAGS AND  
THE SECOND ESTIMATE OF UNEMPLOYMENT RATE

Variable	Model 1	Model 2
<i>Clustered by federal district</i>		
GRP per capita $t-1$	-.001 (.001)	
Unemployment $t-1$	.03** (.01)	.03** (.01)
Mining employment $t-1$		-.09* (.04)
Tax increase $t-1$	-.15 (.30)	-.20 (.30)
CPI $t-1$	-.03 (.04)	-.04 (.04)
State sector employment $t-1$	-3.64 (20.79)	4.31 (18.87)
Ethnic population	-.01 (.01)	-.01 (.01)
Higher education	.10** (.02)	.08** (.01)

Note: Robust standard errors in parentheses. Population used as an exposure variable.

\*\*p < .01; \*p < .05; Obs=639.

APPENDIX M: LOGIT ANALYSIS OF ECONOMIC SHOCKS AND ANTI-  
GOVERNMENT PROTEST, 2007-2015



Variable	Model 1	Model 2
<i>Clustered by federal district</i>		
GRP per capita	.0003 (.001)	
Unemployment	.06* (.03)	.06* (.03)
Mining employment		.06 (.05)
Tax increases $t-1$	-.13 (.37)	-.14 (.36)
CPI	-.10 (.09)	-.10 (.09)
State sector employment	-151.95** (41.38)	-158.50** (39.45)
Ethnic population	-.03** (.01)	-.03** (.01)
Higher education	.10 (.07)	.10 (.07)
Population	.0002 (.0003)	.0002 (.0003)

Note: Robust standard errors in parentheses. Population used as an exposure variable.  
 \*\*p < .01; \*p < .05; Obs=640.

APPENDIX N: LOGIT ANALYSIS OF ECONOMIC SHOCKS AND ANTI-  
GOVERNMENT PROTEST, 2007-2015 USING TIME LAGS

Variable	Model 1	Model 2
<i>Clustered by federal district</i>		
GRP per capita $t-1$	-.0002 (.001)	
Unemployment $t-1$	.04* (.02)	.04* (.02)
Mining employment $t-1$		.02 (.04)
Tax increases	-.26 (.38)	-.26 (.38)
CPI $t-1$	-.04 (.04)	-.04 (.04)
State sector employment $t-1$	-172.05** (41.67)	-174.04** (39.97)
Ethnic population	-.03** (.01)	-.03** (.01)
Higher education	.12 (.08)	.12 (.07)
Population	.0002 (.0003)	.0002 (.0003)

Notes: Robust standard errors in parentheses. Population used as an exposure variable.  
 \*\*p< .01; \*p< .05; Obs=639.

APPENDIX O: LOGIT ANALYSIS OF ECONOMIC SHOCKS AND ANTI-  
GOVERNMENT PROTEST, 2007-2015 USING THE SECOND MEASURE  
OF UNEMPLOYMENT

Variable	Model 1	Model 2
<i>Clustered by federal district</i>		
GRP per capita	.0003 (.001)	
Unemployment	.05* (.02)	.05* (.02)
Mining employment		.07 (.05)
Tax increase	-.14 (.36)	-.15 (.35)
CPI	-.09 (.10)	-.08 (.10)
State sector employment	-154.31** (41.02)	-161.32** (38.13)
Ethnic population	-.03** (.01)	-.04** (.01)
Higher education	.10 (.07)	.10 (.07)
Population	.0002 (.0003)	.0002 (.0003)

Note: Robust standard errors in parentheses. Population used as an exposure variable.  
 \*\*p < .01; \*p < .05; Obs=640.

APPENDIX P: LOGIT ANALYSIS OF ECONOMIC SHOCKS AND ANTI-  
GOVERNMENT PROTEST, 2007-2015 USING TIME LAGS AND THE  
SECOND MEASURE OF UNEMPLOYMENT

Variable	Model 1	Model 2
<i>Clustered by federal district</i>		
GRP per capita $t-1$	-.0003 (.001)	
Unemployment $t-1$	.05** (.02)	.05** (.02)
Mining employment $t-1$		-.03 (.05)
Tax increase $t-1$	-.26 (.38)	-.26 (.38)
CPI $t-1$	-.02 (.06)	-.02 (.06)
State sector employment $t-1$	-175.97** (41.16)	-178.51** (38.90)
Ethnic population	-.04** (.01)	-.04** (.01)
Higher education	.13 (.07)	.13 (.07)
Population	.0002 (.0003)	.0002 (.0003)

Note: Robust standard errors in parentheses. Population used as an exposure variable.  
 \*\*p < .01; \*p < .05; Obs=639.

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