Working paper

IGC
International Growth Centre

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March 2019

When citing this paper, please use the title and the following reference number:
S-89326-CCN-1

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Executive Branch Turnover, Policy Uncertainty and Growth

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March 20, 2019

Abstract

Does political instability cause low growth? And if so, in what institutional environments is political instability – measured as turnover at the executive level of government – associated with low growth and investment. This paper provides evidence on this question using a rich newly constructed dataset measuring political instability at a monthly level going back more than 50 years. We document that there is a robust and stable negative association between executive turnover and growth, driven by shocks to capital accumulation. We document that this relationship is not exclusively driven by major episodes of political turnover between different governments, but also driven by within government political instability. Democratic institutions are a major factor weakening the negative association between political turnover and growth, suggesting that executive constraints imposed by democracy may be an important factor reducing policy uncertainty.

Keywords: political economy, government, political stability

JEL Codes: Q33, O13, N52, R11, L71

*Arezki is based at the World Bank, Fetzer is based at University of Warwick. We would like to thank Tim Besley and Hannes Mueller for helpful discussions. Shishir Garg and David Henning provided excellent research assistance.

1 Introduction

Political instability is bad for economic development. There exists a body of existing literature documents that political instability is negatively associated with growth (see for example, Alesina et al., 1996). Yet, little is known about the underlying drivers of political instability and to what extent different institutional setups can reduce the extent to which political instability is associated with negative economic outcomes potentially helping to understand the Lucas (1990) paradox.

This paper makes headway in two directions. We develop a new high frequency measure of political instability at the level of a countries executive branch of government across more than 150 countries around the world from 1960 to the present. The data measures the extent to which there are transitions in a countries' executive. The executive is typically comprised of the head of state, the head of government and cabinet positions such as government ministers. We measure political stability in three different ways: across the whole cabinet as month-on-month changes of individual position assignments. This overall month-on-month turnover can be subdivided into *within* and *between* government turnover. Defining a government by the tenure of the de-facto ruler who can appoint and dismiss cabinet members, we can break out political turnover due to cabinet reshuffles from political turnover between different governments (i.e. different heads of states). The first *within government* turnover measure captures turnover due to cabinet reshuffles, the entry- and exit of a new set of names or the changing of cabinet posts to make up a new cabinet potentially reflecting a different power sharing equilibrium within an existing overall power structure. On the other hand, the *between government* turnover measure captures the extent to which there is persistence comparing the set of individuals that make up an executive branch across different governments.

Using this data, we then document a range of descriptive patterns and perform a range of simple checks that first highlight that the political instability dataset captures meaningful variation that is contained in other data sets but also contains significant additional information. We document that our measure of political instability sharply peaks around both, successful as well as unsuccessful coups. The observation of turnover after failed coup attempts suggests that these trigger purges in the executive (see Meyersson, 2015 for a study on the economic effects of coups). While this is not surprising, we also document that political turnover is significantly higher in the months prior to a coup-attempt, suggesting that political developments within a country prior to a coup may be an important leading indicator that could help to predict coups. As a second validation, we use the well-known polity data set to measure transitions to and from democracy. Democracy here is measured as having a polity score above zero. Again, we document that transitions to and from democracy in the polity dataset meaningfully correlate with our political instability measure.

In the third step, we turn to studying the relationship between political instability and economic growth. Ignoring very plausible identification concerns pertaining to the endogeneity of political instability to the underlying economic conditions, we document a negative relationship between political instability and economic growth. This negative correlation is extremely robust and can be documented across all our three different measures of political instability. Most importantly, the results do not seem to be driven exclusively by between government political turnover; this suggest that political instability taking the form of cabinet reshuffles within a given tenure of a Head of State-/ Head of Government pair is as important a correlate of growth. Even more so, we document that our results are not driven exclusively by episodes of major political instability due to coups-or democratic transitions. Similarly, our results are robust to excluding either all countries or all country-year observation in which a country has been involved in either civil- or external conflict.

This suggests that the link between political instability and growth, albeit not causal, is present even when the type of political turnover that we document is not due to systematic political changes caused by democratic transitions, coups or the involvement in military conflict. Our preferred interpretation of the correlations we document is that political instability in itself is *causally linked* to lower levels of growth due to the impact on (economic) policy uncertainty deterring growth. While in the present paper, we are not able to make significant headway towards causal identification, we document some suggestive evidence of the underlying mechanism. First we show that the link between political instability and lower levels of growth seems to be through investment. Political instability is associated with significant contraction in capital expenditure shares; government and overall consumption shares remain unaffected, while overall macroeconomic price levels for these variables remain vastly unchanged. The second piece of evidence is also indirect: the association between political instability and low growth rates seems much more pronounced for countries that are considered to be not democratic. This observation is not surprising: in autocratic regimes where political decisions are taken by the political leaders, turnover of politicians in the executive may be associated with increased policy uncertainty. The finding directly relates to the ongoing academic debate on the extent to which democracy is a causal driver of growth (Acemoglu et al., 2014; Papaioannou and Siourounis, 2008). To the extent that democratic institutions foster cohesive institutions (see for example Besley and Persson, 2009; Besley et al., 2010), we would expect non-autocratic regimes to be subject to tighter political constraints, reducing policy uncertainty by decoupeling it from the turnover of individual politicians. In the context of developed countries, Bloom (2009) highlights that policy uncertainty is an important driver of growth. The results from our analysis suggests that uncertainty created by political turnover are more damaging in contexts of non-democratic regimes. The observation that this relationship is present both within- and between government turnover is important in the sense that most of the existing literature has focused on turnover e.g. of the head of state (see for example Jones and Olken, 2005).

The second direction that this paper makes headway lies in an in depth analysis of the underlying drivers of political instability. We assume that an existing cabinet structure is the result of a political bargaining process (see for example Diermeier et al., 2003). This bargaining process is aligned along some social cleavage that is salient in the social context of a given country. Francois et al. (2015) most prominently focus on power sharing along ethnic lines in the context of 15 African countries. This literature suggests that shocks to an existing political equilibrium can create instability as it leads to a renewed bargaining process. The shocks that destabilize a political equilibrium could be manifold. An example could be the (un) anticipated death of individual politicians (as for example exploited as source of exogenous variation by Jones and Olken, 2005), which may result in reshuffling in the cabinet across positions, without much entry of new politicians. On the other hand, an existing political equilibrium could be renegotiated in case of shocks that affect e.g. the distribution of income along the social cleavage along which the initial equilibrium has been negotiated. In the context of Africa, such a shock could be an income shock that is spatially heterogenous and affects the (economic) shares of spatially concentrated ethnic groups (see Alesina et al., 2016). In Latin America, where regional identities are well developed, inequality is an important dimension along which politics is organized. There, agricultural commodity price booms may exacerbate existing economic inequality and tensions between urban- and rural elites. Alternatively, shocks to foreign aid as e.g. explored in the case of France in Francois et al. (2015) can shock a political equilibrium by affecting the amount of aid. This can induce turnover, creating uncertainty about the policies favored by politicians in different posts, affecting investment and other development outcomes, such as economic growth.

We contribute to this growing literature by exploiting exogenous variation along a range of spatial concepts that may capture social cleavages: in particular, we focus on ethnicity, religious and administrative subdivisions (which are often relevant for power sharing). As for the types of shocks we have to rely on shocks that are well-defined in space so that we can relate them to the other spatial concepts. In particular, we focus on rainfall shocks to capture natural resource (rent) inequality which has been suggested in the context of Africa as to be a driver of ethnic conflict (see Alesina et al., 2016; Guariso and Rogall, 2017).[1]

In the next section we discuss the data that we have digitized for this study and present some stylized facts around the variation that we capture, before turning to the empirical analysis.

2 New data on political instability

This paper brings together newly digitized data to provide a high frequency measure of political instability across the globe. The data also allows us to provide several descriptive statistics that are relevant to describing the structure of executive branches around the world.

[1]There is an extensive literature that has studied the relevance of historical institutions, ethnic inequality and development Michalopoulos and Papaioannou (2013b,a) that draws upon similar concepts.

2.1 Chiefs of State & Cabinet Members of Foreign Governments

The data that we draw from is a digitized version of the publication "Chiefs of State and Cabinet Members of Foreign Governments", which has been systematically collected by the National Foreign Assessment Center of the US Central Intelligence Agency (CIA). We have obtained and digitized monthly versions of this reference compendium from 1964 until present. The depth, scale and granularity of the data is best explored through some summary statistics. The dataset currently consists of around 2.5 million rows. Each row represents a cabinet position in a given country or territory by year and month, consisting of the name of the cabinet member, his or her professional job title (Minister of Interior Affairs, Minister of Agriculture,...), along with titles (such as Doktor, military affiliation or honorary titles). In total, in excess of 220 territories are represented in the data; at present, we work with a sample of 128 countries. The raw dataset covers around 40,000 individual politicians. The bulk of the data cleaning work required name disambiguation and merging to standardize individual politicians' names: in many cases, first names, surnames and middle names are not spelled consistently over the fifty year period. Out of the whole dataset covering nearly 2.5 million rows consisted of around 450,000 unique rows representing a name and position title. However, these have been reduced down to around 150,000 genuinely unique rows after accounting for different spellings of the same individual names and slight differences in ministerial job title.

An observation for the purpose of this study comprises a cabinet. Each change in the composition of the Head of State/ Head of Government and their Ministers would be represented as a unique cabinet. Over the sample period and for the 128 countries we presently include in our sample there are 22,592 different unique cabinets. As soon as there is a change in the bag of words that makes up a cabinet, this would trigger a new cabinet. We have decomposed cabinets in two different ways.

We capture a government as being a set of cabinets that have a consistent Head of Government. We define the Head of Government as the individual person and title that has the de-facto political power to appoint cabinet ministers. To illustrate this, in Germany, the de-jure powers to appoint Ministers lies with the Federal President, but the de-facto powers rest with the Chancellor who is the Head of Government. We thus define a Government based on different cabinets with the same Chancellor (but not the same President).

2.2 Three measures of instability

We then use this concept to measure political stability in three different ways. Our first overarching measure captures variation in the whole cabinet as month-on-month changes of individual position assignments. The number of month-on-month changes are counted and then converted into a share of the executive branch that is turned over each month. This overall month-on-month turnover is further subdivided into *within* and *between* government turnover. As noted, we define a government as a sequence of cabinets under the same Head of Government who holds the de-facto power to appoint cabinet members. With that in mind we can break out political turnover due to cabinet reshuffles from political turnover between different governments (i.e. different heads of states). The first *within government* turnover measure captures turnover due to cabinet reshuffles, the entry- and exit of a new set of individuals or the changing of cabinet posts to make up a new cabinet potentially reflecting a different power sharing equilibrium within the same leadership structure. On the other hand, the between *between government* turnover measure captures the extent to which there is persistence comparing the set of individuals that make up an executive branch across different governments. Just to illustrate both of these measures they are plotted out for the United Kingdom in Figure 1. Panel A plots overall month-on-month turnover, while Panel B plots the between government turnover (that is turnover induced by transitions of Heads of Government) and lastly, panel C plots turnover in cabinets under the same Prime Minister.

The spikes in political turnover between governments in Panel B stand out and capture the transitions of Prime Ministers: the replacement of Alec Douglas-Home (Conservative) in October 1964 by the Labour party's Harold Wilson, who in turn was replaced by the Conservative party's Edward Heath in June 1970, who was in turn replaced by Harold Wilson in March 1974. The transition between Harold Wilson in 1976 to James Callaghan highlights that this transition occurred within the Labour party, resulting in a new government but with much less turnover attached to it. The same becomes apparent for the within-Conservative Party power transition at the end Margaret Thatcher's premierships from May 1979 up to the transition of power to John Major following a leadership contest within the Conservative Party in November 1990. What remains remarkable is that in Panel C there is a lot of residual month-on-month variation political turnover due to entry- and exit of Ministers and Cabinet reshuffles, whereby Ministers get assigned to different positions.

Exploring cross-sectional variation in political instability While the example for the UK may be illustrative to introduce the concept of distinguishing within- versus between government political turnover, we next show some summary statistics of these measures and other moments from the data to shed light on other aspects captured. Figure 2 presents the average size of the executive branches across different regions of the world. Panel A presents the average number of

Cabinet members within a government by continent, suggesting that European and Latin American governments are, on average, slimmer compared to Asian or African governments. Panel B presents the average number of Heads of State or Heads of Governments. This simply counts the number of Presidents, Prime Ministers as well as Vice Presidents and Deputy Prime Ministerial roles to get a sense for the extent of power sharing at the top level.

On the other hand, Figure 3 presents some statistics across continents pertaining to the average duration of a government and a cabinet in months suggesting that, on average, a government lasts between 25 to 55 months, while cabinets are much shorter lived lasting only between three to four months. We next carry out a test to assess the extent to which the data we capture here meaningfully correlates with events capturing concrete political developments to assess the quality of the data and the measure.

In addition to the above summary statistics, we also explore the cross-sectional variation in political instability measure across countries of the world. For that purpose, we focus on *within continent* or *within region* variation in stability measures exploring a range of purely cross-sectional measures taken from the literature.

In particular, we separate between cross-sectional measures belonging roughly to three groups of variables. Those variables measuring geography, a countries colonial or institutional origin as well as measures of (ethnic) diversity. The results are presented in Appendix Tables A1, A2 and A3. and throughout quite sobering: in the cross-section, few characteristics are at all systematically correlated with higher levels of political instability, suggesting that the time-variation and the within-country dynamics (as opposed to fixed country characteristics) are key to understanding what drives the variation in political instability. We next turn to validating our political turnover measure in the panel.

2.3 Exploring panel variation in political instability

We first explore variation in political instability around known major events or political transitions: (failed) coups as well as democratic transitions as identified in the Polity dataset (Marshall and Cole, 2014). For these purposes we construct an event study dataset that captures individual coup events (successful and unsuccessful). We also study transition events to and from democracy based on the Polity dataset. In particular, we define a transition towards democracy when a country switches from a polity score below zero to one above zero. As time variable we measure the years to such an event and study the evolution of our political instability measure around that. The coup d'etats data is precise to the day and thus allows us to study political turnover at our monthly frequency. The underlying data for the coup events is coming from the Center for Systemic Peace Coup d'Etat database and we focus on two types of coup d'etat events: 1) successful coups as well as 2) attempted but failed coups; other categories include alledged coups and coups where there had been some alleged plotting. We ignore these since it is not clear whether the universe of such attempts is covered.[2]

We estimate the event study by demeaning the data by country and continent-by-time fixed effects and then study evolution of political turnover in the residuals of the measure of political instability around a time window. The estimating specification for the event study becomes:

$$y_{ict} = \alpha_i + \gamma_{ct} + \sum_{j=-\underline{w}}^{\overline{w}} \eta_j \times \mathcal{I}(j = t - T_r) + \nu_{ict} \tag{1}$$

[2]See http://www.systemicpeace.org/inscrdata.html for more detail on the Coup d'Etat coding.

where α_i captures country fixed effects and γ_{ct} captures continent by time fixed effects.

We next turn to to studying political instability around coup d'etat events. These are coded to the month and the time windows studied in the event study are months to and from the respective coup d'etat event. The results are presented in Figure 5. The results suggest that in the months prior to successful coup d'etat events, political instability is very low, but then peaks right around the the coup event and remains weakly higher for several months. Unsuccessful coup d'etat events are associated with a significantly higher level of political instability after the coup attempt, yet there also is some evidence of a peak in cabinet turnover four to five months prior to the attempted coup.

We next turn to studying political transitions in the polity dataset. We coded the polity dataset at the year level whereby countries are coded as having transitioned from democratic to non-democratic state if they transition from a strictly positive polity 2 score to a weakly negative score. Since the timing here is at the annual level, we explore the extent to which our data suggest that there is systematic turnover in the years to and from such transition events. The results are presented in Figure 6. It is quite evident that political instability peaks right around the transition to- and from- democracy. It also appears to be significantly lower following transition towards autocracy.

These exercises suggest that the data captures variation around meaningful major political events. In the next section we present some stylized facts suggestion that political instability is robustly associated with lower growth. We further can rule out that this relationship is driven by any of the above discussed major events or by periods in which a country is engaged in civil conflict.

3 Political instability and growth

We begin by documenting a robust association between our measures of political instability capturing turnover in the executive branches of government across countries. We rely on data from the Penn World Tables (PWT) to obtain annual measures of growth in GDP per capita as well as changes in the absorption of income in the national accounts through capital formation, consumption, government expenditure and net exports.

The data from the Penn World Tables is annual measures, while our measure of political instability is changing month on month. We estimate the specifications using the monthly data set up and adjust for two-way clustering by country and year to account for the the fact that our dependent variables derived from the PWT are measured at annual frequency.

We estimate several versions of the following specification

$$\Delta y_{ict} = \alpha_i + \gamma_{ct} + \beta \times I_{ict} + \nu_{ict} \tag{2}$$

whereby the dependent variable is year on year changes in growth or changes in consumption shares and we relate this to our decomposed month-on-month measure of political turnover I_{ict}. We consecutively control for more demanding fixed effects to highlight the robustness of the association between political instability and growth in a very demanding empirical setup.

The basic results pertaining to growth are presented in Table 1. The table presents three different measures of growth in GDP per capita derived from the PWT by looking at the GDP from the perspective of the national accounts, the expenditure side or the output side. In columns (1) - (3) we look at overall turnover, in columns (4) - (6) we only include the within government instability measures, while in column (7) - (9) we only explore between government turnover measures. Going from panel A to panel D we include successively more demanding additional controls and fixed effects. In particular in panel D, we control for a different set of country fixed effects for every distinct government. We also control for country specific linear time trends and region by time fixed effects.

Throughout, there is a robust negative correlation between the various measures of political instability and growth. In Table 2 we present the results from the specification with country fixed effects and trends along with region specific time fixed effects across different estimating samples. In particular, we remove data around major episodes of political instability discussed above. In Panel A, we remove the observations in a three year time window around successful- and failed coup attempts. The association between growth and political instability remains strongly negative in this subsample of observations that explicitly excludes periods of major transitions. Similarly, in Panel B we remove the data pertaining to three year time windows around transitions to and from democracy as measured by the polity2 index. Again, the relationship remains intact.

Lastly, in panel C we remove all country and year observations in which a country had an active intrastate conflict, which could be a major source of political instability. Again, the results suggest a strongly negative association between our measures of political instability and growth.

Which regions are driving the negative association between political instability and growth? In order to shed light on this question, we estimate a heterogenous effects specification of the above by estimating the extent to which the relationship between growth and instability is stronger in some parts of the world compared to others. The results are depicted visually in Figure 7 suggesting that the relationship is particularly strong and negative in Asia and Africa, representing continents with a more mixed history of democratic practice.

Drilling further into a geographic decomposition, we study the heterogenous effects of political instability on growth across the 21 world regions. The results of this analysis are presented in Figure 8. The decomposition highlights that the negative relationship between political instability and growth is most strongly driven in the Asian continent by the regions Western Asia, Central Asia and Southern Asia, while in Africa it is mostly driven by Eastern Africa, Central Africa and Northern Africa. The other regions where a negative and significant relationship is present is Melanesia and Eastern Europe.

What drives the low growth in environments of political instability? If policy uncertainty is associated with political turnover, then this should induce firms to cut spending and expansion plans. As such, we would expect that periods of instability should particularly depress investment. We study the extent to which this is the case by exploring the extent to which political instability is associated with changes in the shares of investment, consumption, government expenditure and net exports in GDP. We also study changes in the respective price levels for these variables to rule out that it is shocks to the respective price levels that may be driving any changes to the shares. We estimate the same specification as above and present the results in Table 3.

The results suggest that, year on year, the two variables that most strongly react to political instability are capital formation (investment), imports and the share of residual trade and GDP statistical discrepancy at current PPPs. The share of government consumption shows a weakly positive increase. Throughout, the respective price level indicators from the PWT remain flat and show no association with the measure of instability.

The results suggest political instability is associated with a marked worsening in the trade balance as measured by the reduction net exports, with the share of imports increasing and exports remaining flat. The contraction in investment is particularly suggestive as capital formation relies on making inference about the policy path to assess the profitability of investments. The contraction in investment suggests that capital accummulation is depressed in times with significant political changes.

We next turn to asking whether countries that are democratically governed and thus, typically have a parliament acting as souvereign over the policy path exhibit a different relationship between political turnover and growth.

Do countries with democratic institution exhibit a weaker relationship between growth and political turnover? To address this question, we use the Polity-2 variable scores to construct a dummy variable measuring whether a country is democratic or not, which is common in the literature.[3]

The coding suggests that countries that move from being democratic to being non-democratic exhibit a distinctly weaker relationship between political turnover and economic growth. Throughout the coefficients on the interaction term between democracy is positive and significant in table 4. This offsets the negative and significant coefficient on the political instability. Again, the results are remarkably robust when adding more demanding fixed effects and additional controls.

The above results suggest that there is a strong link between political instability and growth. This link is present even when the type of political turnover that we document is not due to systematic political changes caused by democratic transitions, coups or the incidence of civil conflict. The preferred interpretation

[3]See for example Acemoglu et al., 2001; Fearon and Laitin, 2003; Brückner and Ciccone, 2011; Hodler and Raschky, 2014; Bazzi and Blattman, 2014; Besley and Persson, 2011; Besley and Ghatak, 2010; Kudamatsu, 2012; Burke et al., 2010; Blattman and Miguel, 2010.

of the correlations we document is that political instability causes lower levels of growth due to the impact on (economic) policy uncertainty deterring growth. The second set of results suggest that it is particularly investment that suffers in response to instability. This is suggestive given that forward looking investment decisions may be put on hold in environments of political uncertainty; however, contractions in investment could themselves be causing instability. We also documented that the association between political instability and low growth rates seems much more pronounced for countries that are considered to be not democratic.

This is consistent with our preferred interpretation: in autocratic regimes where political decisions are taken by the political leaders, turnover of politicians in the executive may be associated with increased policy uncertainty. The finding directly relates to the ongoing academic debate on the extent to which democracy is a causal driver of growth (Acemoglu et al., 2014; Papaioannou and Siourounis, 2008). To the extent that democratic institutions foster cohesive institutions (see for example Besley and Persson, 2009; Besley et al., 2010), we would expect non-autocratic regimes to be subject to tighter political constraints, reducing policy uncertainty by decoupeling it from the turnover of individual politicians. In the context of developed countries, Bloom (2009) highlights that policy uncertainty is an important driver of growth. The results from our analysis suggests that uncertainty created by political turnover are more damaging in contexts of non-democratic regimes. The observation that this relationship is present both within- and between government turnover is important in the sense that most of the existing literature has focused on turnover e.g. of the head of state (see for example Jones and Olken, 2005).

4 What drives political instability?

What are the causal drivers of political instability? The work by Francois et al. (2015) suggests that in the African context, ethnicity is a central dimension along which power is shared. Political equilibria thus, seem to be negotiated with ethnicity being central to the social cleavages under consideration. In other sub-Saharan African countries the distribution of religious groups may be equally salient for power sharing. In the context of Lebanon that long saw a civil war between Christian and Muslim militia groups, power sharing involving the different religious groups is central for the stability of the country. This setup suggests that shocks to the relative economic standing of different ethnic or religious group may have an important impact on the stability of governments. In particular, if one group becomes more economically powerful within a country, this may trigger a renegotiation of the existing political equilibrium along the social cleavage along which it was negotiated in the first place. We study three different social cleavages and exploit geographically explicit rainfall shocks to study to what extent the unequal distribution of rainfall shocks across social groups affects political stability.

We rely on rainfall data from 1964 - 2013, which has been compiled systematically across the globe through NASA's Global Land Data Assimilation System (GLDAS). The aim of GLDAS is to combine satellite- and ground-based observational data products with an advanced land surface modeling and data assimilation techniques, in order to generate consistent data products for a range of climatic variables. The data products go back all the way to 1948 and are produced globally at a high resolution (0.25 degrees) and are available in near-real time (typically within 48 hours of the present).

In addition, we measure inequality indices using the well-known night light emission data collected from the United States Air Force Defense Meteorological Satellite Program (DMSP). These satellites have been carrying an Operational Linescan System (OLS) sensor, which can be used to detect natural light emissions from the earth. The satellites have been carrying the OLS sensors since the 1970s, a digital archive of the pictures is only available from 1992 onwards; the data for the years prior to 1992 is resting on magnetic tapes, waiting to be digitized. The DMSP satellites have been orbiting the earth 14 times per day. This ensures that for each location on the globe there exists a daily picture taken between 8:30 and 10:00 pm local time. The satellites are regularly replaced every three to four years. The raw data is processed at the Earth Observatory Group at the National Oceanic and Atmospheric Administration. The processing consists of removal of ephemeral lights, such as forest fires or gas flares and systematic distortions due to the varying lunar intensity as well as late sun-sets during summer or winter for the northern- and southern hemispheres respectively; pictures with significant cloud cover are also removed. The result is supposed to capture light emissions from human settlements; this is measured in a digital scale between 0 and 63, where 0 stands for no light emissions and 63 is the maximal value, which is top-coded. The pixel resolution is 30 arc-seconds or about 0.86 square kilometers at the equator.

Lastly, we also use a baseline population measure from the Gridded Population of the World dataset. We use this dataset for two purposes. First, we compute population figures that are used to compute per capita measures required for the inequality measurements and second, we use the same gridded population dataset to remove areas from the computation of our inequality measures that have a population density below one person per square kilometer.

Types of social cleavage We identify a range of social cleavages that we can *fix in space* at some baseline to compute our different time-varying inequality indices as in Alesina et al. (2016). We focus on three concepts which may represent cleavages along which a power sharing equilibrium within a country may be defined and which is typically well-defined in physical space.

Administrative divisions Countries are subdivided into administrative areas. In most contexts, the administrative subdivisions reflect some concept of power sharing due, e.g. to the federal structure of countries. A federal structure implies that power sharing in national governments may be closely aligned with representation of the different regions of a country. These regions may represent either different ethnic groups or cultural backgrounds or other social cleavages that are specific to each countries history. We take the maps from the Global Administrative Database for the first level administrative subdivisions, which in the case of the US would represent states.[4] Figure 9 presents the first level administrative boundaries which are used for the analysis of spatial inequality.

Ethnolinguistic divisions As a basis for the *between ethnic group* inequality measures, we use the maps of language groups to proxy for ethnic make ups of countries as in Alesina et al. (2016). The data is visually presented in Figure 11. Each different colour represents a different group within a country. The apparent diversity is quite evident in the context of Sub-Saharan Africa and across Asia.

Religious group decomposition Religious affiliation represents an important social cleavage. Economists have studied the impact of religious polarisation within countries on civil conflict (see e.g. Montalvo and Reynal-Querol, 2005).

[4] The data is available here `http://www.gadm.org`

Turning to the distribution of religious groups across the globe, there are distinct spatial patterns to the predominance of different religious groups. Especially in Sub-Saharan Africa, many countries constitute of a mixed Muslim and Christian population and especially countries such as Nigeria are known for power sharing to be aligned along religious groups with typically, the vice president of the country being of Muslim faith. Typically, the Sub-Saharan African countries exhibit a distinct spatial distribution of the majority religious groups with the North of the respective countries being Muslim majority, while the south tends to be dominated by Christians.

We use these three spatial concepts to compute time-varying *between group* measures of inequality as in Alesina et al. (2016) and similar to Guariso and Rogall (2017). We will use these measures to explore the extent to which these measures are correlated with political turnover and instability. In particular, we measure mean value of luminosity per capita or the mean value of rainfall per capita over populated land within a spatially defined area (ethnic homeland, administrative division or religious group) and then we then construct a Gini coefficient for each country that reflects inequality across groups within that country over time. Specifically, the Gini coefficient for a country's population consisting of n groups with values of luminosity or rainfall per capita within the populated area of the group i, y_i, where $i = 1$ to n are indexed in non-decreasing order such that ($y_i \leq y_{i+1}$) and then compute the Gini index as follows:

$$G = \frac{1}{n}(n + 1 - 2\frac{\sum_{i=1}^{n}(n+1-i)y_i}{\sum_{i=1}^{n} y_i})$$

The resulting Gini indices are produced for two spatially-explicit variables. In particular, we will measure between group rainfall inequality as in Guariso and Rogall (2017). In addition, we also measure between group inequality in night lights per capita as is done in Alesina et al. (2016). Especially for agrarian economies we would expect that the measure of rainfall inequality serves as a potential driver of political instability that is, at least, exogenous compared to the night light measure.[5]

We study the relationship between these inequality measures and political instability using the following specification:

$$I_{ict} = \alpha_i + \gamma_{ct} + \xi_i \times t + \beta \times G_{ict} + \nu_{ict} \tag{3}$$

where G_{ict} is the respective inequality measure for country i at time t; we also control for country fixed effects α_i, along with continent by time fixed effects γ_{ct} and country specific linear time trends.

The results from this analysis are presented in Table 5. The results suggest that, in particular, rainfall inequality between administrative areas and between ethnic groups within a country is a significant driver of political instability. Rainfall inequality across administrative areas is mostly associated with between government instability (see column 7), while between ethnic group rainfall inequality is associated both, with between- and within government political instability (compare column 2, 5 and 8).

Column (2) of panel A suggests that a one standard deviation increase in between ethnic group rainfall inequality is associated with an increase in political instability by around 30%. Panel B-D perform the same sample refinements ex-

[5] Appendix Figure A1 highlights that the measure of lights inequality strongly correlate with the corresponding measure in Alesina et al. (2016) for the administrative- and the ethnic group night lights inequality. The correlation coefficient in the cross section between the measures is 94% for the ethnic inequality measure, while it is 81% for the administrative area based measure. The differences between the two data sets could be due to the different underlying population data that has been used as well as different satellite year data being used for years in which there are multiple measurements from different satellites; further, the administrative boundaries database is constantly updated which may have added to the measurement differences.

plored before, removing periods of major political instability from the data in turn. The signs and most of the point estimates remain broadly similar in these restrictive estimating samples.

We estimate a heterogenous effects version of this regression that sheds light on which continents are driving these underlying associations. The results are presented in Figure 12. For the administrative area measure, the rainfall inequality measure drives political instability in the Asian continent. For the ethnicity based inequality measure, between group rainfall inequality is associated with higher political instability in Africa and Asia, while for the religious group based measure there is a negative association suggesting that higher between religious group rainfall inequality is associated with lower political turnover in Africa.

We perform the same analysis studying inequality measures based on night lights across these three concepts of spatial groups. The results are presented in Table 6 and follow the same structure. Note that the estimating sample is significantly smaller since the data for the light emissions is only available from 1992. Throughout, there exist only very few cases where any statistically significant coefficients emerge. The night light measures are particularly noisy as the instruments on the satellites were not originally designed to pick up light emissions, but rather were design to measure residual moon light reflectance.

*Commodity price shocks*Lastly, we also study the role of commodity price shocks. The literature studying civil conflict has long contested that commodity price shocks and the exposure to international trade are another main source of instability (see Fetzer and Kyburz, 2017; Bazzi and Blattman, 2014; Dube and Vargas, 2013; Bruckner and Ciccone, 2010). We rely on data constructed in Bazzi and Blattman (2014) to study the extent to which commodity price shocks are associated with political instability. We estimate the same specification as above, differentiating between

The results are presented in Table 7. Throughout, there is a strong *negative association* between the commodity price shocks and political stability that is lagged by one year. Positive commodity price shocks are increasing political stability or reduce the likelihood of both, within- and between government political turnover. A one standard deviation increase in the commodity price index, decreases political instability by around 4% across the different estimating samples and frameworks. This suggests that the terms of trade are a key input to political stability of countries and to some extent highlights that the underlying economic structure and diversification may play a central role in understanding the institutional and political instability of many developing countries with not broadly diversified economies.[6]

The exercises performed here highlights that those sources of exogenous variation (rainfall- and commodity prices shocks) can be used to study political instability and growth in a framework where the latter causally drives the former. In ongoing work, we expand on this work with the aim to decompose further the variation in political instability in the panel more broadly to shed further light on non-regular political turnover and how this may be a causal driver of low GDP growth.

5 Conclusion

This paper sheds light on the question on whether political instability is associated with low growth, drawing in a new high frequency measure of political instability at the level of a countries executive branch of government across more

[6]In ongoing work, we break down the commodity price shocks *within countries* along the spatial concepts discussed above.

than 150 countries around the world from 1960 to the present. We measure political stability focusing on *within* and *between* government turnover. We document that our measure of political instability dataset captures meaningful variation that is contained in other data sets e.g. tracking democratic transitions or coup d'etats.

We document a strong negative association between political instability and economic growth. Ignoring very plausible identification concerns pertaining to the endogeneity of political instability to the underlying economic conditions, we document a negative relationship between political instability and economic growth. This negative correlation is extremely robust and can be documented across all our three different measures of political instability. Most importantly, the results do not seem to be driven exclusively by between government political turnover; this suggest that political instability taking the form of cabinet reshuffles within a given tenure of a Head of State-/ Head of Government pair is as important a correlate of growth. Even more so, we document that our results are not driven exclusively by episodes of major political instability due to coups- or democratic transitions. Similarly, our results are robust to excluding either all countries or all country-year observation in which a country has been involved in either civil- or external conflict.

This suggests that the link between political instability and growth, albeit not causal, is present even when the type of political turnover that we document is not due to systematic political changes caused by democratic transitions, coups or the involvement in military conflict. Our preferred interpretation of the correlations we document is that political instability in itself is *causally linked* to lower levels of growth due to the impact on (economic) policy uncertainty deterring growth. While in the present paper, we are not able to make significant headway towards causal identification, we document some suggestive evidence of the underlying mechanism. First we show that the link between political instability and lower levels of growth seems to be through investment. Political instability is associated with significant contraction in capital expenditure shares; government and overall consumption shares remain unaffected, while overall macroeconomic price levels for these variables remain vastly unchanged. The second piece of evidence is also indirect: the association between political instability and low growth rates seems much more pronounced for countries that are considered to be not democratic. This observation is not surprising: in autocratic regimes where political decisions are taken by the political leaders, turnover of politicians in the executive may be associated with increased policy uncertainty. The finding directly relates to the ongoing academic debate on the extent to which democracy is a causal driver of growth (Acemoglu et al., 2014; Papaioannou and Siourounis, 2008). To the extent that democratic institutions foster cohesive institutions (see for example Besley and Persson, 2009; Besley et al., 2010), we would expect non-autocratic regimes to be subject to tighter political constraints, reducing policy uncertainty by decoupeling it from the turnover of individual politicians. In the context of developed countries, Bloom (2009) highlights that policy uncertainty is an important driver of growth. The results from our analysis suggests that uncertainty created by political turnover are more damaging in contexts of non-democratic regimes. The observation that this relationship is present both within- and between government turnover is important in the sense that most of the existing literature has focused on turnover e.g. of the head of state (see for example Jones and Olken, 2005).

We then turn to study what are the drivers of political instability. We assume that an existing cabinet structure is the result of a political bargaining process (see for example Diermeier et al., 2003) along some social cleavage that is salient in the social context of a given country. We develop measures of between administrative, ethnic- and religious group rainfall inequality and document that inequality is a predictor of political turnover, especially in Africa and Asia, where rainfall is a central input in the agricultural production function. We further document a strong association between lagged commodity price shocks and political instability, providing further suggestive evidence that trade integration may come at a cost of increased political instability especially for less diversified economies.

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Figure 1: Political instability and turnover measures for the case of the United Kingdom

Panel A: Overall measure | *Panel B:* Between Government | *Panel C:* Within Government

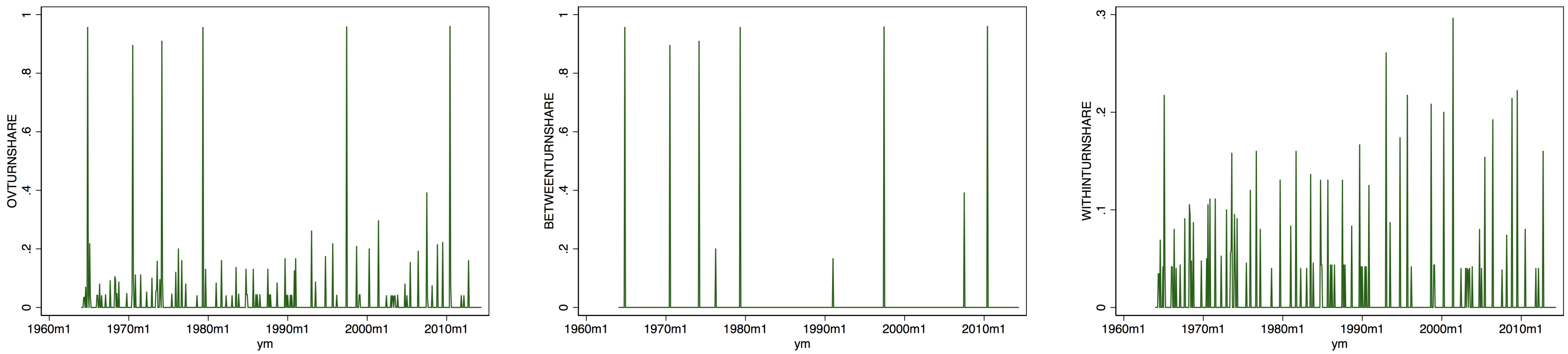


Figure 2: Summary Statistics: Government Size and Executive Size across continents

Panel A: Overall size of cabinet

Panel B: Number of Head of State/ Head of Governments

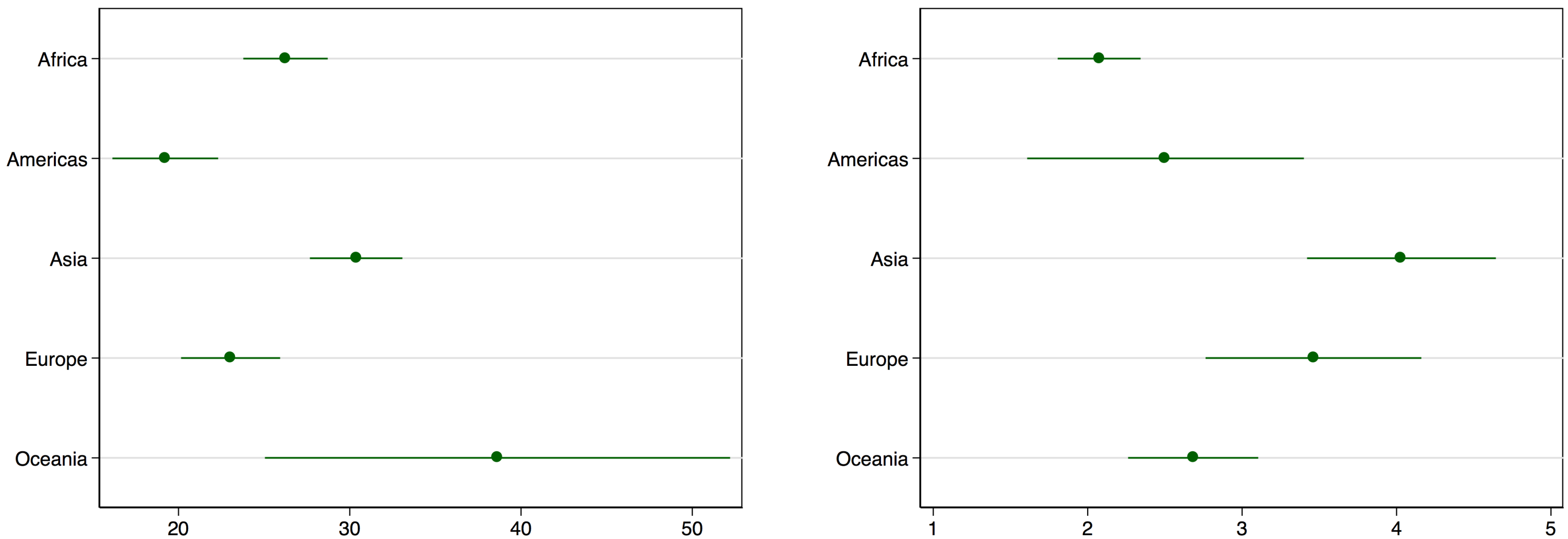


Figure 3: Summary Statistics: Average duration of Governments and duration of Cabinets in months

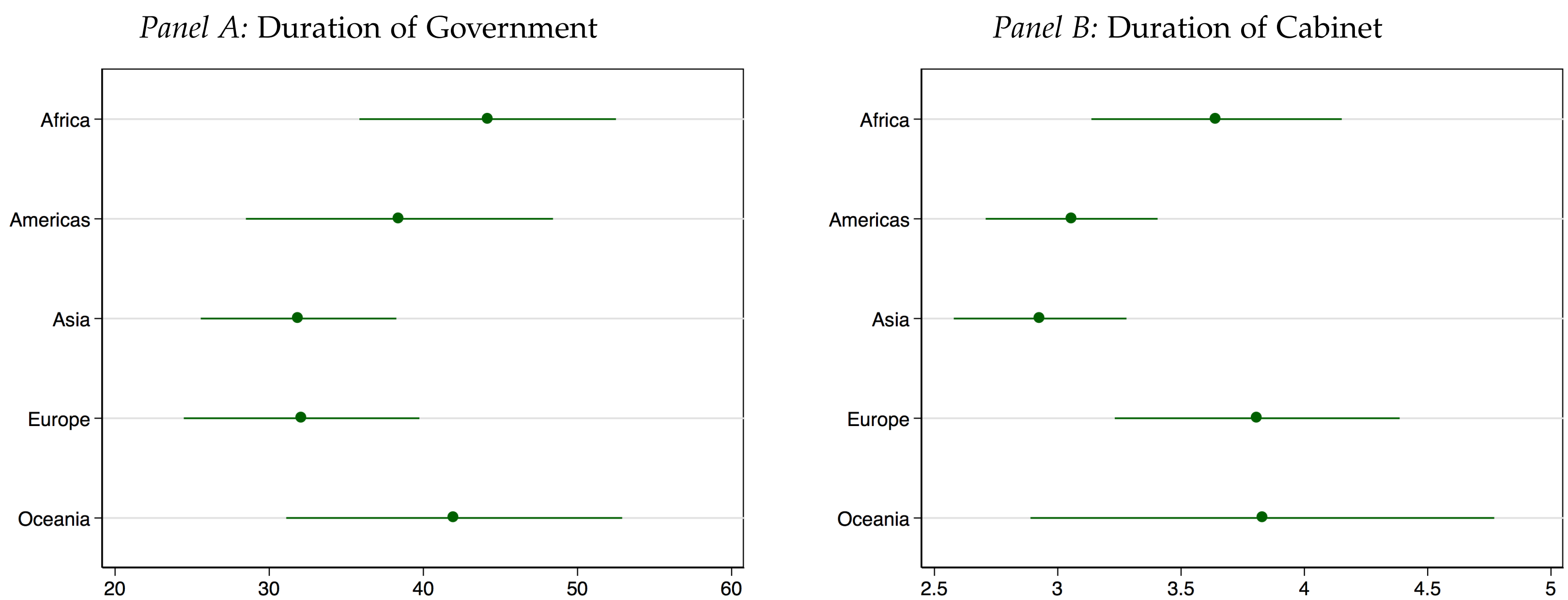


Figure 4: Summary Statistics: Turnover measures

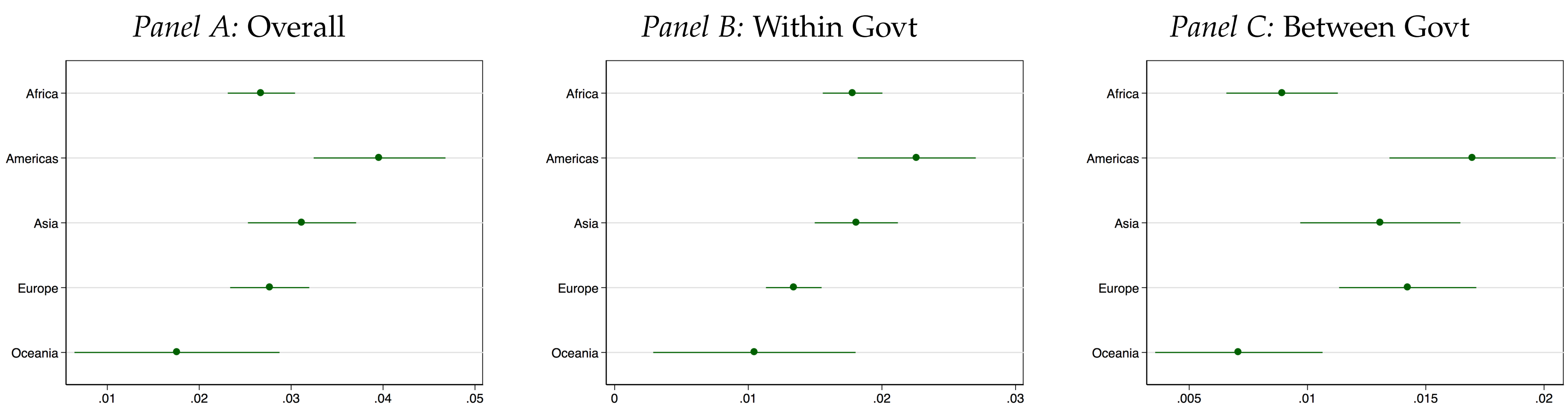
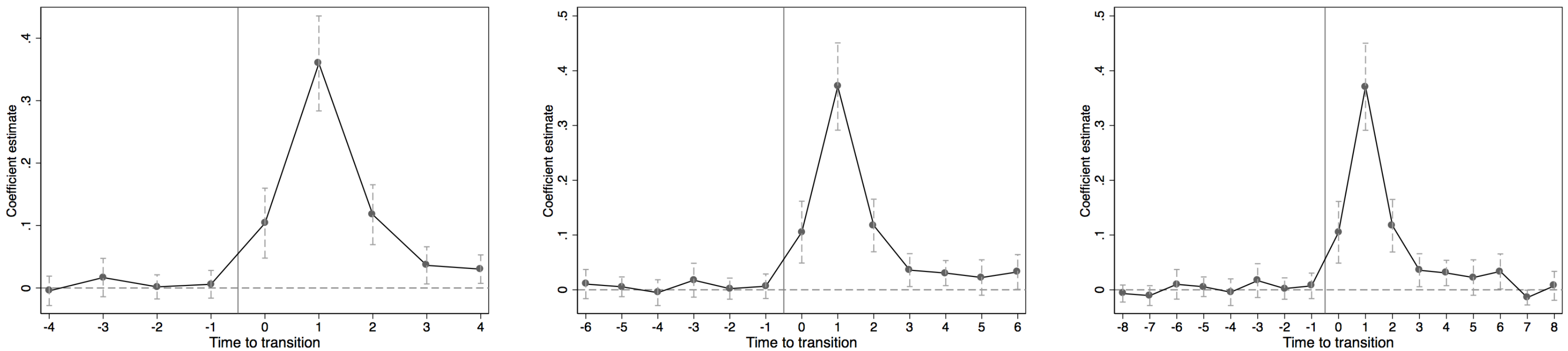
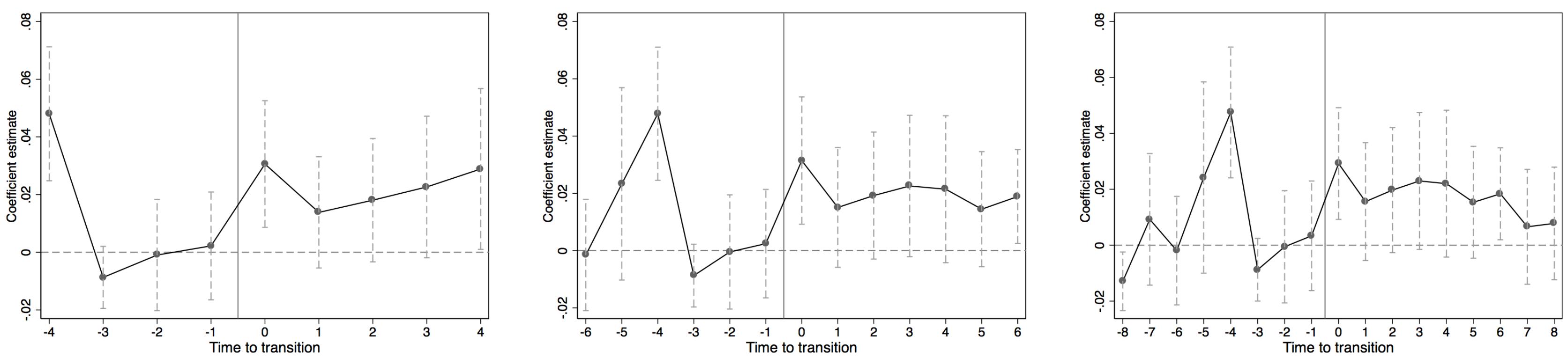


Figure 5: Politician turnover relative to (failed) coups

Panel A: Successful coups



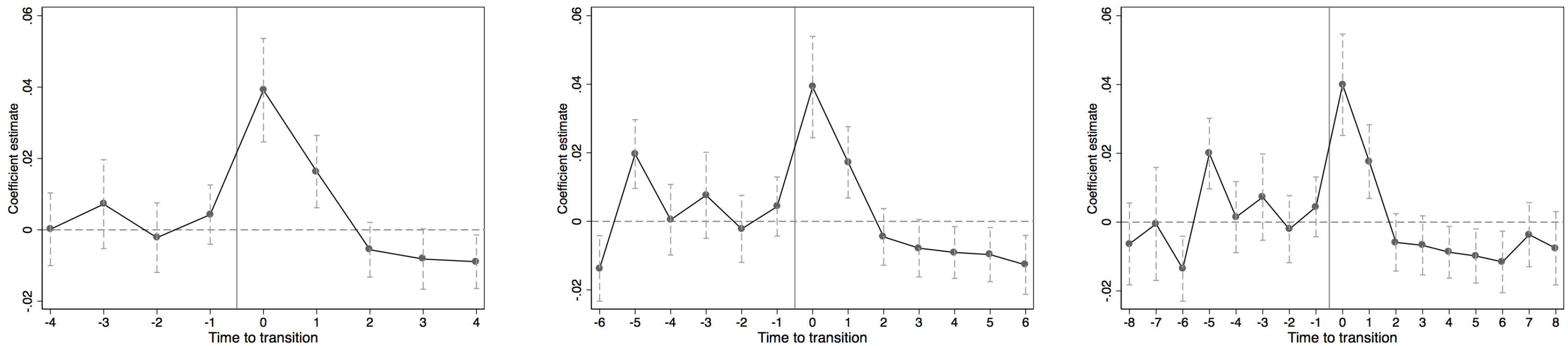
Panel B: Failed coups



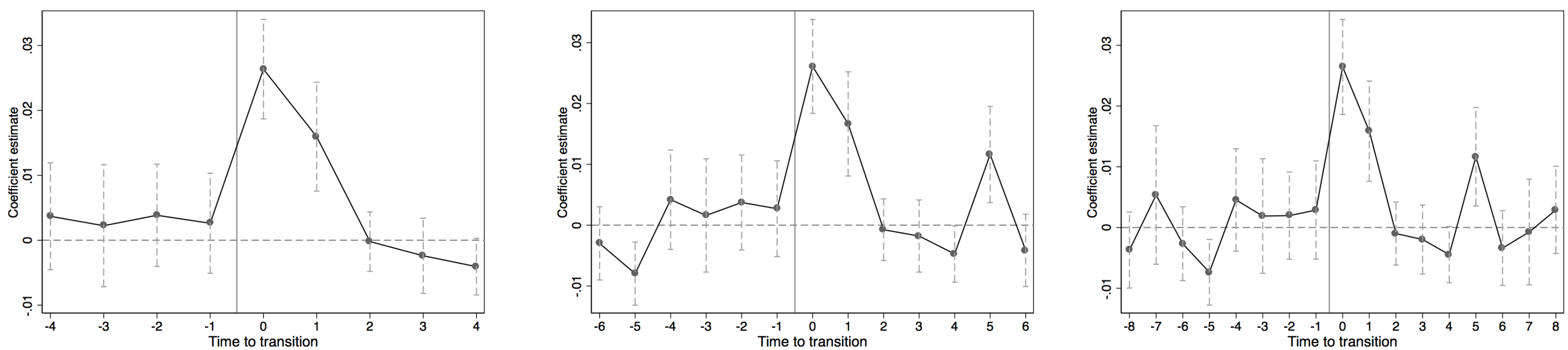
Notes: Figures presents results from a regression with country and continent by time controls. The dependent variable is a measure of month-on-month political turnover, the independent variables measure time to/ from a failed coup attempt in months. 90% confidence intervals are indicated with standard errors obtained from two-way clustering by country and year.

Figure 6: Politician turnover relative to transition to and from democracy as measured by Polity2

Panel A: Transition away from democracy

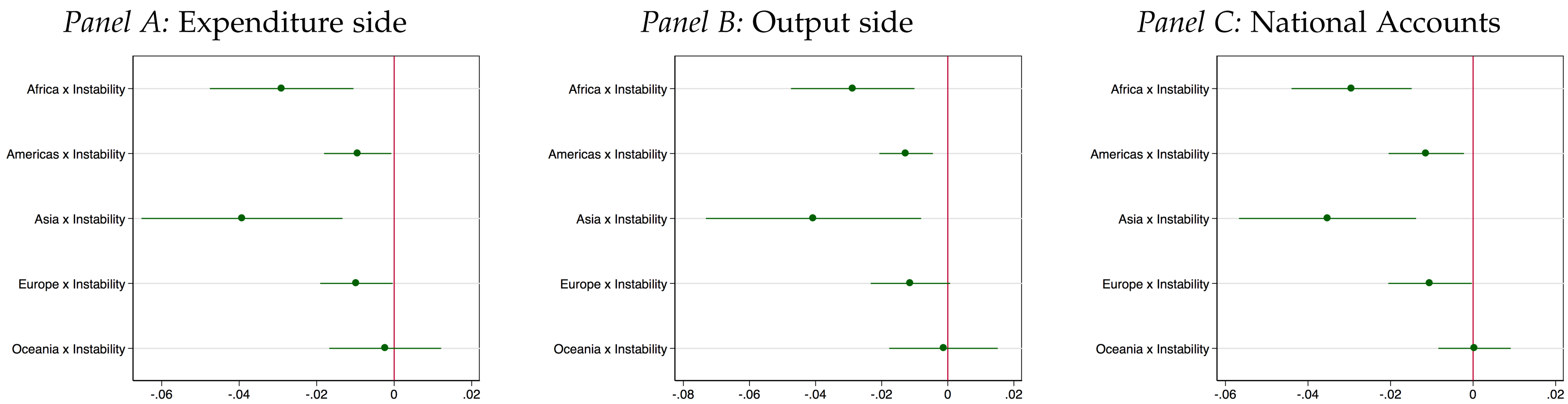


Panel B: Transition towards democracy



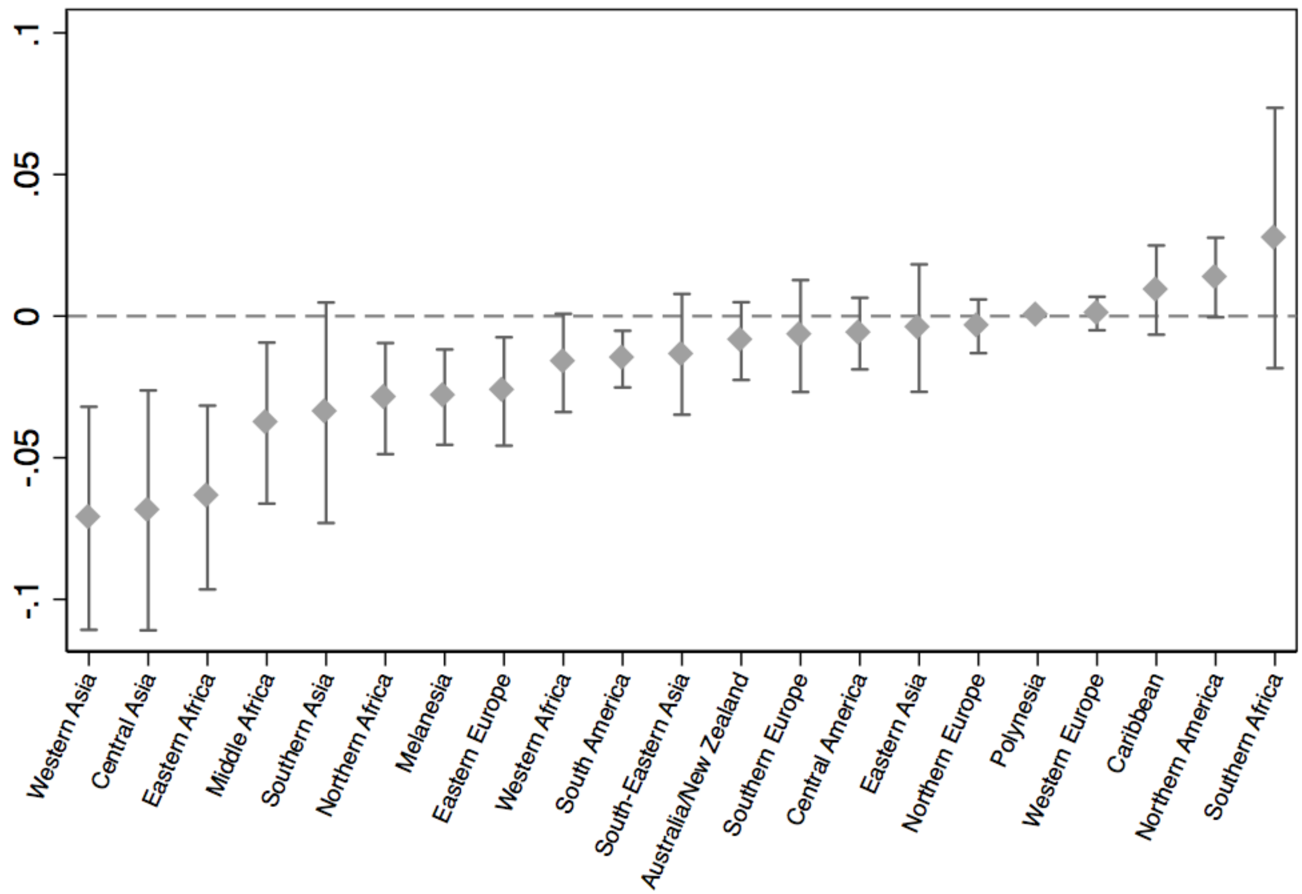
Notes: Figures presents results from a regression with country and continent by time controls. The dependent variable is a measure of month-on-month political turnover, the independent variables measures time to / from democracy in years. 90% confidence intervals are indicated with standard errors obtained from two-way clustering by country and year.

Figure 7: Political Instability and Growth in real GDP per capita across different continents



Notes: Figures present results from a regression with country and region by time fixed effects. The dependent variable is a measure of year-on-year growth in GDP per capita, the independent variable is an interaction of the political instability measure with a set of continent fixed effects thus capturing heterogenous effects of the relationship between political instability and growth by continent. 90% confidence intervals are indicated with standard errors obtained from two-way clustering by country and year.

Figure 8: Political Instability and Growth in real GDP per capita across different regions



Notes: Figures present results from a regression with country and continent by time effects. The dependent variable is a measure of year-on-year growth in GDP per capita, the independent variable is an interaction of the political instability measure with a set of region fixed effects thus capturing heterogenous effects of the relationship between political instability and growth by region. 90% confidence intervals are indicated with standard errors obtained from two-way clustering by country and year.

Figure 9: First level administrative divisions of countries

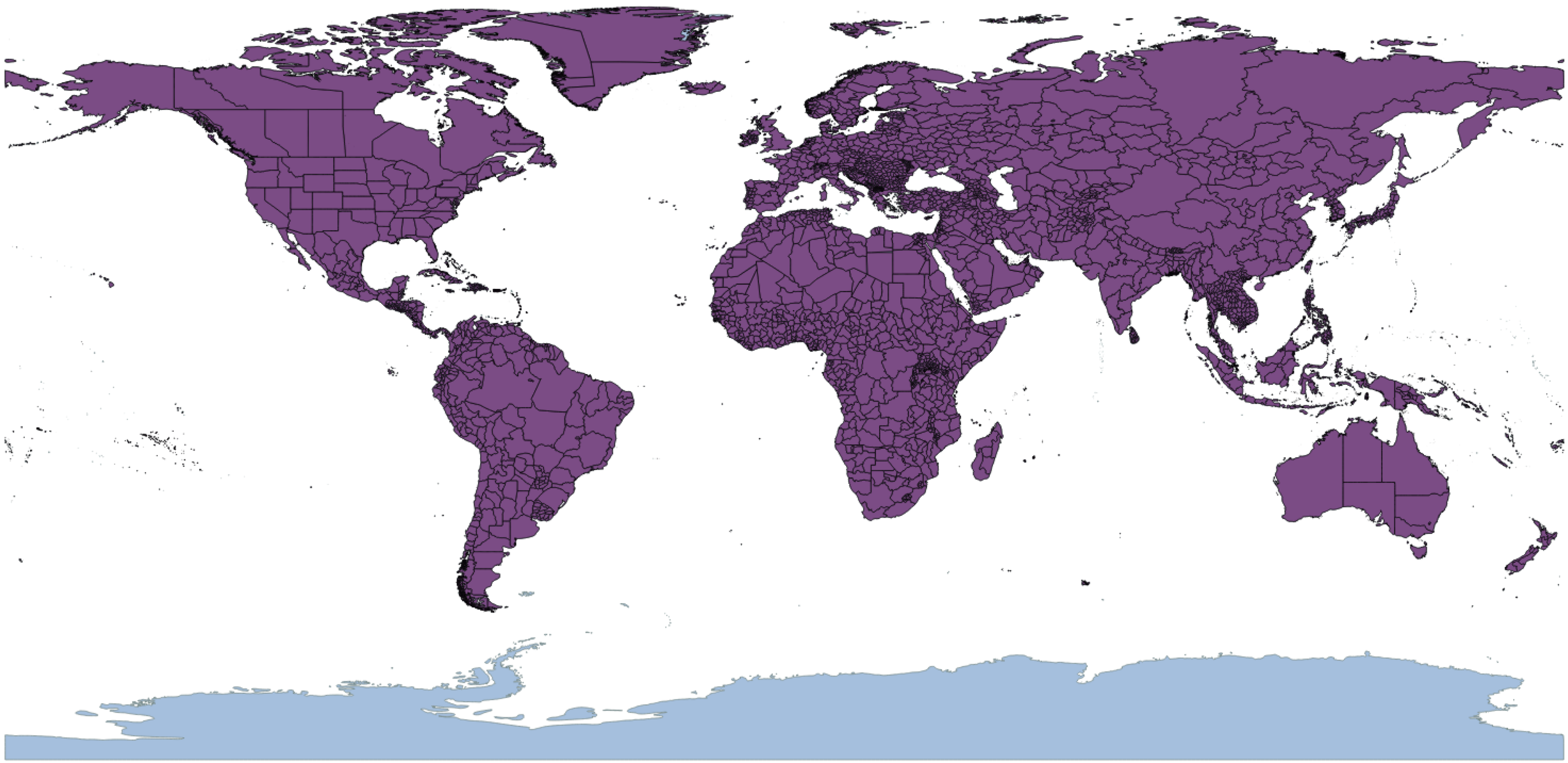


Figure 10: Dominant Religious Groups at Subnational Level

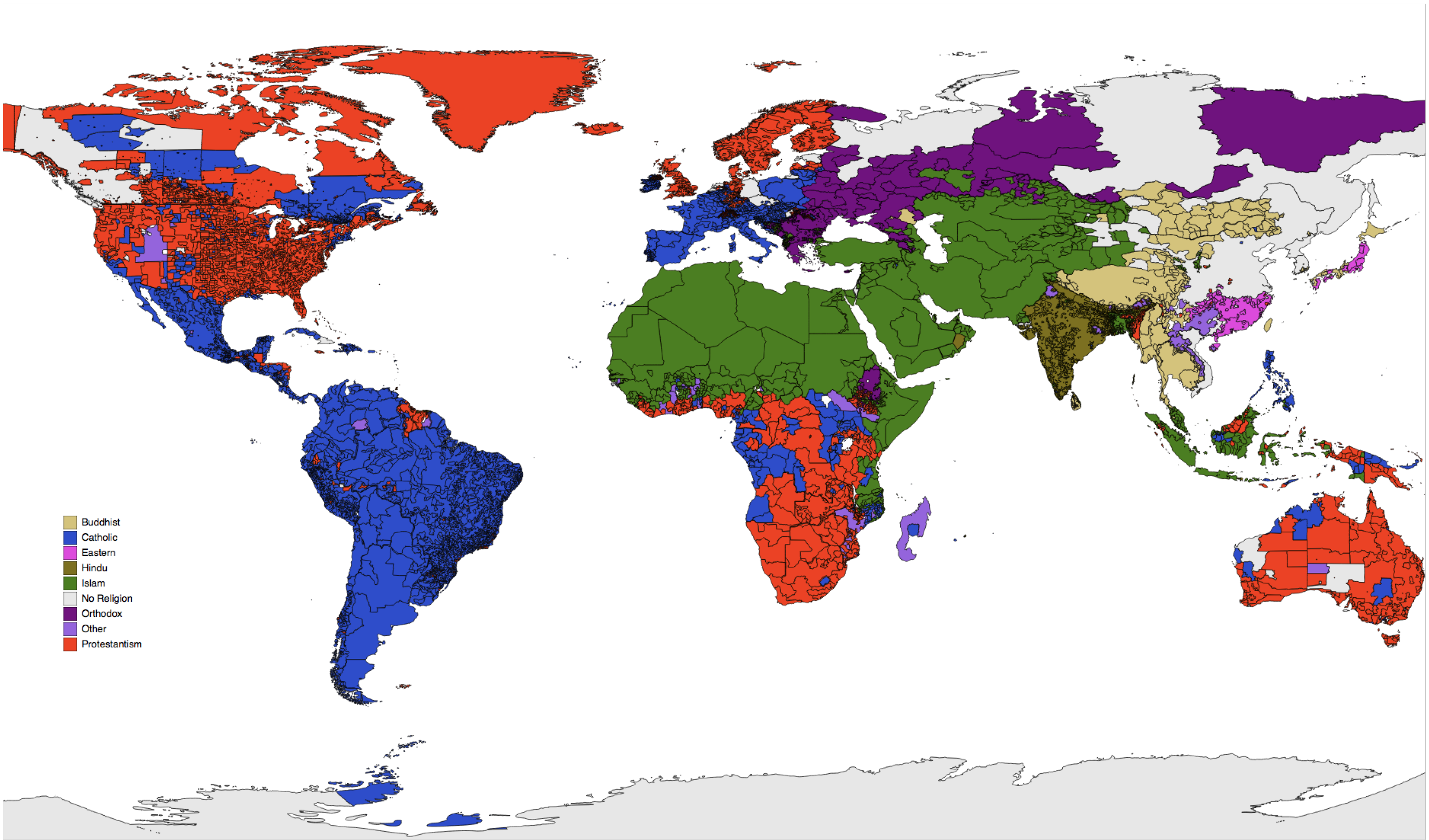


Figure 11: Major ethnic-language groups as in Alesina et al. (2016)

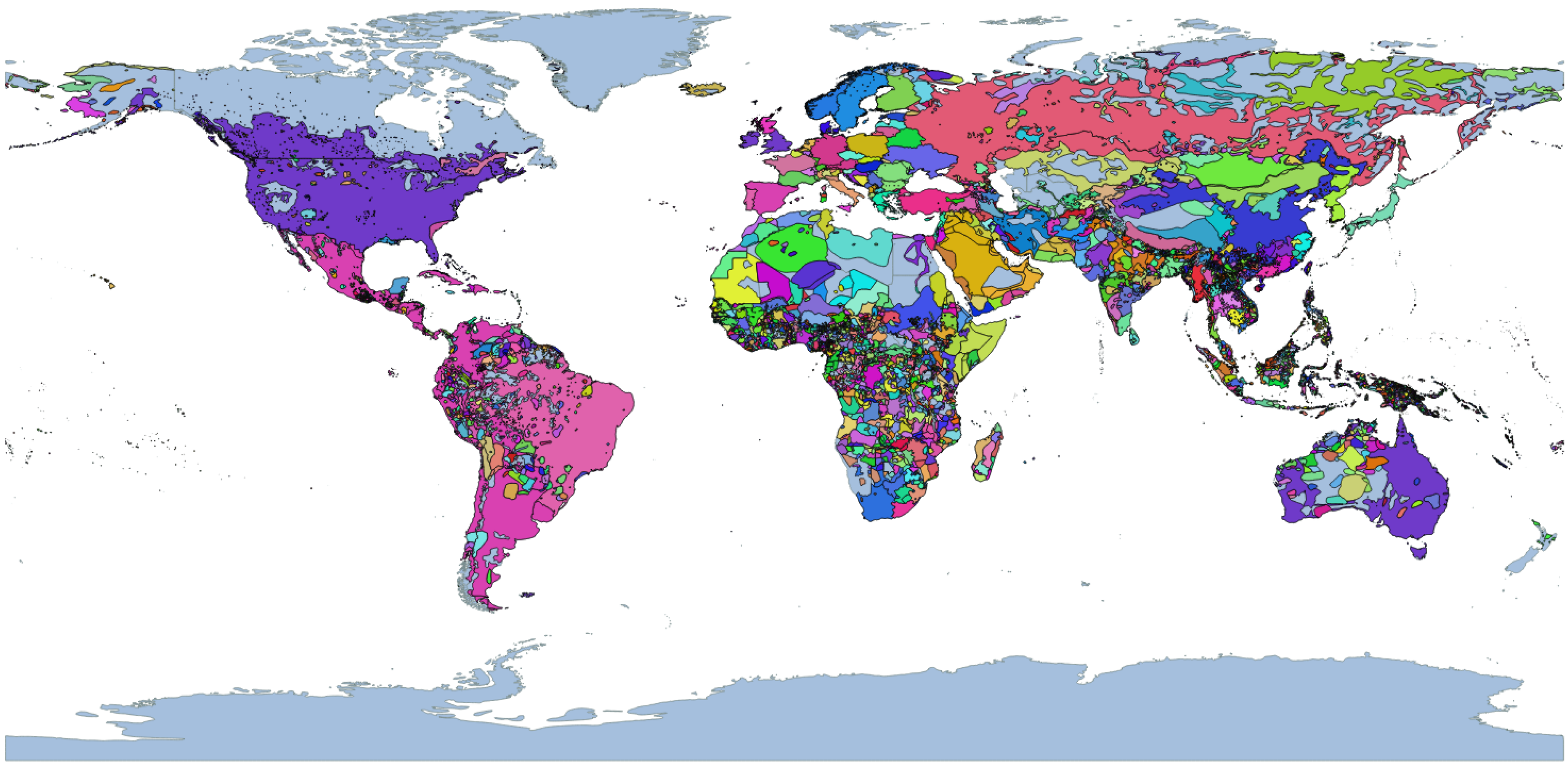


Figure 12: Political Instability and rainfall inequality

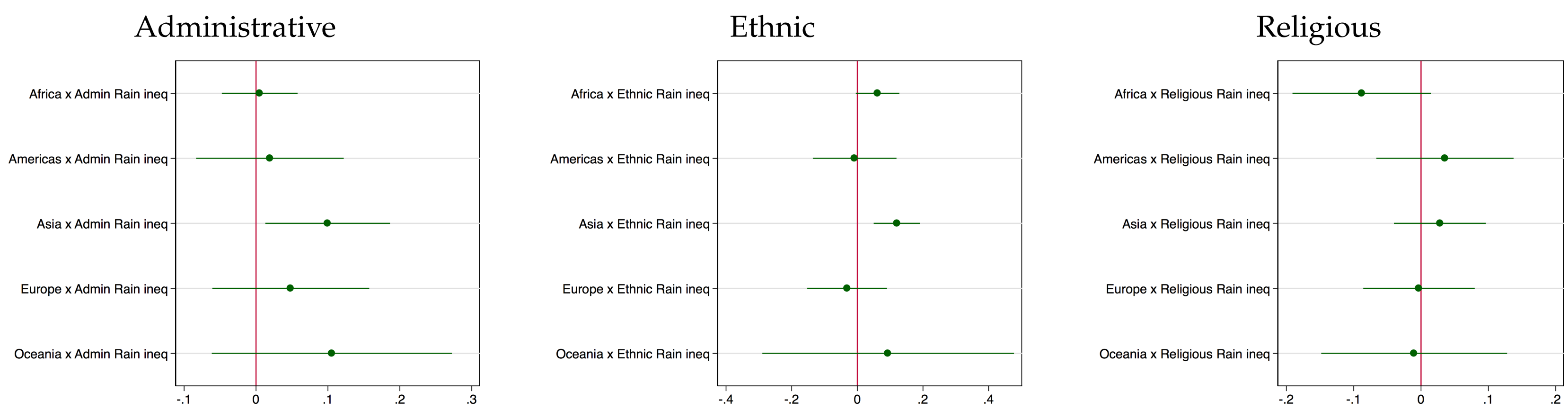


Table 1: Political Instability and Real GDP per capita growth

	Overall turnover			Within government turnover			Between government turnover		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: No controls									
Political instability	-0.021***	-0.022***	-0.021***	-0.024***	-0.022**	-0.020***	-0.018***	-0.021***	-0.020***
	(0.005)	(0.006)	(0.005)	(0.008)	(0.009)	(0.007)	(0.005)	(0.006)	(0.004)
Observations	63025	63025	63025	63025	63025	63025	63025	63025	63025
Countries	122	122	122	122	122	122	122	122	122
Mean of DV	.0237	.0241	.0192	.0237	.0241	.0192	.0237	.0241	.0192
Panel B: Country FE & Continent x Time FE									
Political instability	-0.022***	-0.023***	-0.021***	-0.024***	-0.023***	-0.021***	-0.018***	-0.021***	-0.019***
	(0.005)	(0.005)	(0.004)	(0.007)	(0.007)	(0.005)	(0.004)	(0.005)	(0.004)
Observations	62432	62432	62432	62432	62432	62432	62432	62432	62432
Countries	121	121	121	121	121	121	121	121	121
Mean of DV	.0234	.0238	.0188	.0234	.0238	.0188	.0234	.0238	.0188
Panel C: Country FE & Trend & Region x Time FE									
Political instability	-0.021***	-0.021***	-0.021***	-0.020***	-0.019***	-0.021***	-0.019***	-0.020***	-0.019***
	(0.004)	(0.005)	(0.004)	(0.006)	(0.006)	(0.004)	(0.005)	(0.005)	(0.004)
Observations	61313	61313	61313	61313	61313	61313	61313	61313	61313
Countries	119	119	119	119	119	119	119	119	119
Mean of DV	.0235	.0239	.0188	.0235	.0239	.0188	.0235	.0239	.0188
Panel D: Country x Gov FE, Country Trend & Region x Time FE									
Political instability	-0.008**	-0.010***	-0.011***	-0.009*	-0.009*	-0.011***	-0.006*	-0.009**	-0.010***
	(0.003)	(0.004)	(0.003)	(0.005)	(0.005)	(0.004)	(0.004)	(0.005)	(0.003)
Observations	61275	61275	61275	61275	61275	61275	61275	61275	61275
Countries	119	119	119	119	119	119	119	119	119
Mean of DV	.0235	.0239	.0189	.0235	.0239	.0189	.0235	.0239	.0189
Growth Variable	Exp.	Output	Nat. Accounts	Exp.	Output	Nat. Accounts	Exp.	Output	Nat. Accounts
Observations	57504	57504	57504	57504	57504	57504	57504	57504	57504
Countries	110	110	110	110	110	110	110	110	110
Mean of DV	.0238	.0241	.0194	.0238	.0241	.0194	.0238	.0241	.0194

Notes: Dependent variable are year-on-year growth in GDP per capita from the Penn World Tables dataset using the Expenditure, the Output and the National Accounts variable definitions for real GDP. Independent variable measures political turnover in terms of share of cabinet position changing from month to month. Standard errors adjusted for two-way clustering at the country- and year level with stars indicating *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 2: Political Instability and Real GDP per capita growth: Robustness to excluding major episodes of instability

	Overall turnover			Within government turnover			Between government turnover		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Removing data around coups									
Political instability	-0.017***	-0.017***	-0.015***	-0.018**	-0.017**	-0.013**	-0.015**	-0.016**	-0.015***
	(0.005)	(0.005)	(0.004)	(0.008)	(0.007)	(0.005)	(0.005)	(0.006)	(0.004)
Observations	50710	50710	50710	50710	50710	50710	50710	50710	50710
Countries	119	119	119	119	119	119	119	119	119
Mean of DV	.0278	.028	.0214	.0278	.028	.0214	.0278	.028	.0214
Panel B: Removing data around democratic transitions									
Political instability	-0.019***	-0.017***	-0.017***	-0.022***	-0.018**	-0.018***	-0.016***	-0.015***	-0.015***
	(0.004)	(0.005)	(0.004)	(0.007)	(0.007)	(0.005)	(0.005)	(0.005)	(0.004)
Observations	54466	54466	54466	54466	54466	54466	54466	54466	54466
Countries	119	119	119	119	119	119	119	119	119
Mean of DV	.0251	.0253	.0202	.0251	.0253	.0202	.0251	.0253	.0202
Panel C: Removing any data with intrastate conflict									
Political instability	-0.011**	-0.009**	-0.011***	-0.010	-0.007	-0.013***	-0.010***	-0.009**	-0.009***
	(0.004)	(0.004)	(0.003)	(0.007)	(0.006)	(0.005)	(0.004)	(0.003)	(0.002)
Observations	49374	49374	49374	49374	49374	49374	49374	49374	49374
Countries	116	116	116	116	116	116	116	116	116
Mean of DV	.0266	.0268	.0212	.0266	.0268	.0212	.0266	.0268	.0212
Country FE	X	X	X	X	X	X	X	X	X
Region x Time FE	X	X	X	X	X	X	X	X	X
Country Trend	X	X	X	X	X	X	X	X	X
Growth Variable	Exp.	Output	Nat. Accounts	Exp.	Output	Nat. Accounts	Exp.	Output	Nat. Accounts

Notes: Dependent variable are year-on-year growth in GDP per capita from the Penn World Tables dataset using the Expenditure, the Output and the National Accounts variable definitions for real GDP. Independent variable measures political turnover in terms of share of cabinet position changing from month to month. Standard errors adjusted for two-way clustering at the country- and year level with stars indicating *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 3: Political Turnover and Consumption Shares

	(1) C	(2) I	(3) G	(4) X	(5) M	(6) Residual
***Panel A*: Consumption shares**						
Political instability	0.002	-0.005***	0.004*	-0.001	0.007***	-0.007***
	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
***Panel B*: Prices**						
Political instability	0.001	0.001	-0.004	0.001	0.001	
	(0.002)	(0.004)	(0.003)	(0.001)	(0.002)	
Observations	61313	61313	61313	61313	61313	61313
Countries	119	119	119	119	119	119

Notes: Dependent variable is the shares (level) or year-on-year changes in consumption shares of GDP per capita from the Penn World Tables. Standard errors adjusted for two-way clustering at the country- and year level with stars indicating *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 4: Democracy, Political Instability and Real GDP per capita growth

	Overall turnover			Within government turnover			Between government turnover		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: No controls									
Political instability	-0.044***	-0.049***	-0.036***	-0.037**	-0.037**	-0.024**	-0.047***	-0.056***	-0.045***
	(0.011)	(0.013)	(0.009)	(0.014)	(0.016)	(0.011)	(0.012)	(0.014)	(0.011)
democracy × Political instability	0.034***	0.040***	0.024***	0.031*	0.035**	0.013	0.037***	0.045***	0.032***
	(0.011)	(0.012)	(0.008)	(0.016)	(0.017)	(0.012)	(0.012)	(0.015)	(0.010)
democracy	0.012**	0.012**	0.009**	0.012**	0.012**	0.009**	0.013**	0.013**	0.009**
	(0.006)	(0.005)	(0.003)	(0.005)	(0.005)	(0.003)	(0.005)	(0.005)	(0.003)
Observations	59691	59691	59691	59691	59691	59691	59691	59691	59691
Countries	120	120	120	120	120	120	120	120	120
Mean of DV	.0235	.0238	.019	.0235	.0238	.019	.0235	.0238	.019
Panel B: Country FE & Continent x Time FE									
Political instability	-0.042***	-0.047***	-0.036***	-0.036***	-0.037***	-0.027***	-0.043***	-0.051***	-0.040***
	(0.009)	(0.011)	(0.008)	(0.012)	(0.013)	(0.009)	(0.010)	(0.012)	(0.009)
democracy × Political instability	0.033***	0.039***	0.025***	0.027*	0.031**	0.016	0.035***	0.043***	0.030***
	(0.009)	(0.012)	(0.007)	(0.014)	(0.015)	(0.010)	(0.011)	(0.013)	(0.009)
democracy	0.003	0.002	0.002	0.004	0.003	0.002	0.004	0.003	0.002
	(0.006)	(0.006)	(0.004)	(0.006)	(0.006)	(0.004)	(0.006)	(0.006)	(0.004)
Observations	59115	59115	59115	59115	59115	59115	59115	59115	59115
Countries	119	119	119	119	119	119	119	119	119
Mean of DV	.0232	.0235	.0187	.0232	.0235	.0187	.0232	.0235	.0187
Panel C: Country FE & Trend & Region x Time FE									
Political instability	-0.032***	-0.037***	-0.032***	-0.023**	-0.024**	-0.021***	-0.036***	-0.044***	-0.038***
	(0.008)	(0.009)	(0.007)	(0.010)	(0.011)	(0.007)	(0.009)	(0.010)	(0.009)
democracy × Political instability	0.025***	0.029***	0.021***	0.018	0.021	0.013	0.029***	0.036***	0.028***
	(0.008)	(0.009)	(0.006)	(0.012)	(0.013)	(0.009)	(0.010)	(0.012)	(0.008)
democracy	0.002	0.001	-0.001	0.002	0.002	-0.000	0.002	0.002	-0.000
	(0.008)	(0.007)	(0.004)	(0.008)	(0.007)	(0.004)	(0.008)	(0.007)	(0.004)
Observations	59115	59115	59115	59115	59115	59115	59115	59115	59115
Countries	119	119	119	119	119	119	119	119	119
Mean of DV	.0232	.0235	.0187	.0232	.0235	.0187	.0232	.0235	.0187
Panel D: Country x Gov FE, Country Trend & Region x Time FE									
Political instability	-0.015**	-0.019***	-0.017***	-0.010	-0.013	-0.013*	-0.017**	-0.022***	-0.019***
	(0.006)	(0.006)	(0.004)	(0.009)	(0.009)	(0.007)	(0.008)	(0.007)	(0.006)
democracy × Political instability	0.012*	0.014**	0.011***	0.005	0.010	0.006	0.016**	0.017**	0.014***
	(0.007)	(0.006)	(0.004)	(0.011)	(0.011)	(0.008)	(0.007)	(0.007)	(0.005)
democracy	-0.012	-0.023	-0.005	-0.011	-0.023	-0.005	-0.011	-0.023	-0.005
	(0.013)	(0.017)	(0.012)	(0.013)	(0.017)	(0.012)	(0.013)	(0.017)	(0.012)
Observations	57962	57962	57962	57962	57962	57962	57962	57962	57962
Countries	117	117	117	117	117	117	117	117	117
Mean of DV	.0233	.0237	.0187	.0233	.0237	.0187	.0233	.0237	.0187
Growth Variable	Exp.	Output	Nat. Accounts	Exp.	Output	Nat. Accounts	Exp.	Output	Nat. Accounts

Notes: Dependent variable are year-on-year growth in GDP per capita from the Penn World Tables dataset using the Expenditure, the Output and the National Accounts variable definitions for real GDP. Standard errors adjusted for two-way clustering at the country- and year level with stars indicating *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5: What drives political instability? Between Ethnic-, Religious and Administrative Area rainfall inequality

	Overall turnover			Within government turnover			Between government turnover		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: All data									
Between Administrative areas rainfall inequality	0.047**			0.004			0.043**		
	(0.020)			(0.011)			(0.020)		
Between Ethnic groups rainfall inequality		0.055**			0.027*			0.027	
		(0.026)			(0.014)			(0.021)	
Between Religious groups rainfall inequality			-0.005			-0.015			0.010
			(0.026)			(0.012)			(0.023)
Observations	67148	66947	66955	67274	67071	67080	67148	66947	66955
Countries	127	125	126	127	125	126	127	125	126
Mean of DV	.0302	.0302	.0301	.0179	.0179	.0179	.0123	.0123	.0122
Panel B: Removing data around coups									
Between Administrative areas rainfall inequality	0.048**			0.015			0.034*		
	(0.022)			(0.013)			(0.019)		
Between Ethnic groups rainfall inequality		0.046			0.029*			0.016	
		(0.029)			(0.016)			(0.023)	
Between Religious groups rainfall inequality			0.007			-0.002			0.009
			(0.028)			(0.014)			(0.026)
Observations	55557	55356	55364	55653	55450	55459	55557	55356	55364
Countries	127	125	126	127	125	126	127	125	126
Mean of DV	.0273	.0273	.0272	.0162	.0162	.0161	.0111	.0111	.0111
Panel C: Removing data around democratic transitions									
Between Administrative areas rainfall inequality	0.039*			0.014			0.025		
	(0.021)			(0.011)			(0.019)		
Between Ethnic groups rainfall inequality		0.054**			0.036**			0.017	
		(0.026)			(0.015)			(0.021)	
Between Religious groups rainfall inequality			0.002			-0.014			0.016
			(0.027)			(0.014)			(0.022)
Observations	60321	60120	60277	60433	60230	60388	60321	60120	60277
Countries	127	125	126	127	125	126	127	125	126
Mean of DV	.0282	.0282	.0281	.0173	.0173	.0172	.0109	.0109	.0108
Panel D: Removing any data with intrastate conflict									
Between Administrative areas rainfall inequality	0.063***			0.004			0.059***		
	(0.021)			(0.013)			(0.020)		
Between Ethnic groups rainfall inequality		0.054*			0.019			0.034	
		(0.028)			(0.014)			(0.022)	
Between Religious groups rainfall inequality			0.022			-0.000			0.021
			(0.029)			(0.015)			(0.024)
Observations	53964	53964	53440	54068	54068	53543	53964	53964	53440
Countries	123	123	122	123	123	122	123	123	122
Mean of DV	.0295	.0295	.0295	.0178	.0178	.0178	.0116	.0116	.0117
Country FE	X	X	X	X	X	X	X	X	X
Country Time Trend	X	X	X	X	X	X	X	X	X
Continent x Time FE	X	X	X	X	X	X	X	X	X

Notes: All regressions include country and continent by time fixed effects. Standard errors adjusted for two-way clustering at the country- and year level with stars indicating *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 6: What drives political instability? Between Ethnic-, Religious and Administrative Area nightlights inequality

	Overall turnover			Within government turnover			Between government turnover		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: All data									
Between Administrative areas lights inequality	-0.013			-0.002			-0.011		
	(0.011)			(0.008)			(0.010)		
Between Ethnic groups lights inequality		0.017			-0.000			0.018	
		(0.014)			(0.010)			(0.012)	
Between Religious groups lights inequality			0.011			0.001			0.010
			(0.012)			(0.008)			(0.011)
Observations	32913	33272	32898	32930	33287	32914	32913	33272	32898
Countries	127	128	126	127	128	126	127	128	126
Mean of DV	.0293	.0291	.0292	.0162	.016	.0162	.013	.013	.013
Panel B: Removing data around coups									
Between Administrative areas lights inequality	-0.017			-0.004			-0.012		
	(0.012)			(0.009)			(0.009)		
Between Ethnic groups lights inequality		0.016			-0.003			0.020	
		(0.015)			(0.010)			(0.012)	
Between Religious groups lights inequality			0.012			0.000			0.012
			(0.015)			(0.010)			(0.013)
Observations	29499	29858	29484	29515	29872	29499	29499	29858	29484
Countries	127	128	126	127	128	126	127	128	126
Mean of DV	.0283	.0281	.0282	.0159	.0157	.0159	.0124	.0124	.0123
Panel C: Removing data around democratic transitions									
Between Administrative areas lights inequality	-0.020*			0.000			-0.020**		
	(0.010)			(0.009)			(0.008)		
Between Ethnic groups lights inequality		0.011			0.000			0.011	
		(0.014)			(0.010)			(0.012)	
Between Religious groups lights inequality			0.016			0.002			0.014
			(0.015)			(0.009)			(0.013)
Observations	29522	29881	29603	29537	29894	29617	29522	29881	29603
Countries	127	128	126	127	128	126	127	128	126
Mean of DV	.0283	.028	.0281	.0161	.0159	.016	.0122	.0122	.0121
Panel D: Removing any data with intrastate conflict									
Between Administrative areas lights inequality	-0.009			0.006			-0.015		
	(0.013)			(0.009)			(0.011)		
Between Ethnic groups lights inequality		0.029**			0.003			0.027**	
		(0.014)			(0.011)			(0.012)	
Between Religious groups lights inequality			0.025*			0.006			0.019
			(0.013)			(0.011)			(0.011)
Observations	26680	26680	26428	26691	26691	26439	26680	26680	26428
Countries	119	119	118	119	119	118	119	119	118
Mean of DV	.0285	.0285	.0286	.0161	.0161	.0161	.0124	.0124	.0124
Country FE	X	X	X	X	X	X	X	X	X
Country Time Trend	X	X	X	X	X	X	X	X	X
Continent x Time FE	X	X	X	X	X	X	X	X	X

Notes: All regressions include country and continent by time fixed effects. Standard errors adjusted for two-way clustering at the country- and year level with stars indicating *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 7: What drives political instability? Commodity Price Shocks and Political Instability

	Overall turnover			Within government turnover			Between government turnover		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: All data									
Price shocks	0.000			0.000			0.000		
	(0.001)			(0.000)			(0.000)		
Price shocks (t-1)		-0.001***			-0.001**			-0.001*	
		(0.001)			(0.000)			(0.000)	
Price shocks (t-2)			-0.000			0.000			-0.000*
			(0.000)			(0.000)			(0.000)
Observations	41605	41605	41605	41688	41688	41688	41605	41605	41605
Countries	85	85	85	85	85	85	85	85	85
Mean of DV	.0322	.0322	.0322	.02	.02	.02	.0122	.0122	.0122
Panel B: Removing data around coups									
Price shocks	0.000			0.000			0.000		
	(0.000)			(0.000)			(0.000)		
Price shocks (t-1)		-0.001**			-0.001***			-0.000	
		(0.000)			(0.000)			(0.000)	
Price shocks (t-2)			0.000			0.000			-0.000
			(0.000)			(0.000)			(0.000)
Observations	31556	31556	31556	31610	31610	31610	31556	31556	31556
Countries	85	85	85	85	85	85	85	85	85
Mean of DV	.0282	.0282	.0282	.0178	.0178	.0178	.0104	.0104	.0104
Panel C: Removing data around democratic transitions									
Price shocks	0.000			-0.000			0.000		
	(0.001)			(0.000)			(0.000)		
Price shocks (t-1)		-0.001**			-0.001***			-0.001*	
		(0.001)			(0.000)			(0.000)	
Price shocks (t-2)			-0.000			0.000			-0.000
			(0.000)			(0.000)			(0.000)
Observations	36348	36348	36348	36423	36423	36423	36348	36348	36348
Countries	85	85	85	85	85	85	85	85	85
Mean of DV	.0298	.0298	.0298	.0193	.0193	.0193	.0105	.0105	.0105
Panel D: Removing any data with intrastate conflict									
Price shocks	0.001			0.000			0.000		
	(0.001)			(0.000)			(0.001)		
Price shocks (t-1)		-0.002***			-0.001***			-0.001**	
		(0.001)			(0.000)			(0.000)	
Price shocks (t-2)			0.000			0.000			-0.000
			(0.001)			(0.000)			(0.000)
Observations	32217	32217	32217	32287	32287	32287	32217	32217	32217
Countries	84	84	84	84	84	84	84	84	84
Mean of DV	.031	.031	.031	.0199	.0199	.0199	.011	.011	.011
Country FE	X	X	X	X	X	X	X	X	X
Country Time Trend	X	X	X	X	X	X	X	X	X
Continent x Time FE	X	X	X	X	X	X	X	X	X

Notes: Dependent variable are month-on-month measures of political turnover. The commodity price shock measure is from Bazzi and Blattman (2014). Standard errors adjusted for two-way clustering at the country- and year level with stars indicating *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

A Data Appendix

- Read in Files from various formats OCR, different quality results in different adjustments needed
- Initial processing to remove small text fragments, random letters and random punctuation.
- Identify country rows and assign country to the rows following, use ISO2-country codes for classification and refer to historic country codes, e.g. to deal with countries that changed like Czechoslovakia, Soviet Union, ...
- This results in roughly 400,000 unique country - format - rows.

Two processing steps to identify and match identical rows. First part involves correcting OCR errors and minor spelling errors, as well as word order issues.

- Standardise type-face to title case (i.e. uppercase of first character of words), reduce dimensionality to 350,000
- Fuzzy string matching to reduce the dimensionality and remove typos that are due to the OCR processing, use Levensthein similarity measure with a cut-off of 90%. Examples: Chief Of State Zahir Shah Mohammed King versus Chief Of State Zahir Shah Muhammad King or Min Of Education Pupal Al Ahmed versus Min Of Education Popal Ali Ahmad. Assign the more frequently occurring spelling variation.
- Cosine Similarity to standardise items by word order: angle between vectors representing rows of texts is zero, as word order does not matter. Assign more frequent identical row with different word order. Reduces diemnsionality to 170,000. Reduces dimensionality to 180,000. Example: President

Asad Bashar Al, President Al Asad Bashar or President Bashar Al Asad are the identical person, just the word order is wrong. Again, assign the more frequently occurring spelling variation.

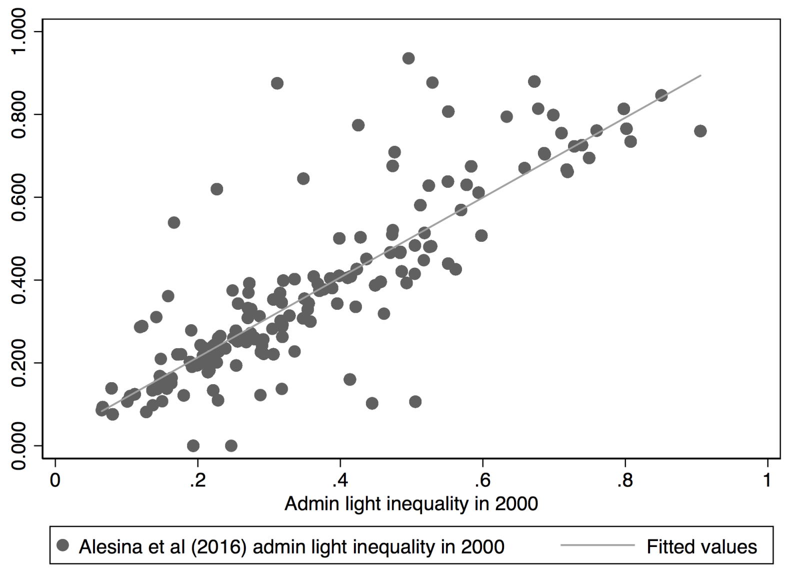
- Ensemble agreement on cases with Levensthein similarity exceeding 0.8. Compute Jaro Winkler, Jaccard and Cosine similarity and require (unweighted) average similarity score of at least 0.9. Set of candidates to match against are derived from within the same country and within a time-window; further candidates can be at most 25% shorter or longer, respectively.

Second step focuses on matching and standardising rows based on the phonetic similarity.

- (key collision) fingerprinting (mainly fixing typos)
- (key collision) n-gram fingerprinting for whole (mainly words wrongly split or additional words,...)
- (key collision) Cologne Phonetic - fixing different spellings of same name, e.g. Muhamad versus Mohamed
- by country: leventsthein similarity

Figure A1: Validation of night lights based inequality measures against the Alesina et al. (2016)

Panel A: Administrative areas



Panel B: Ethnic groups

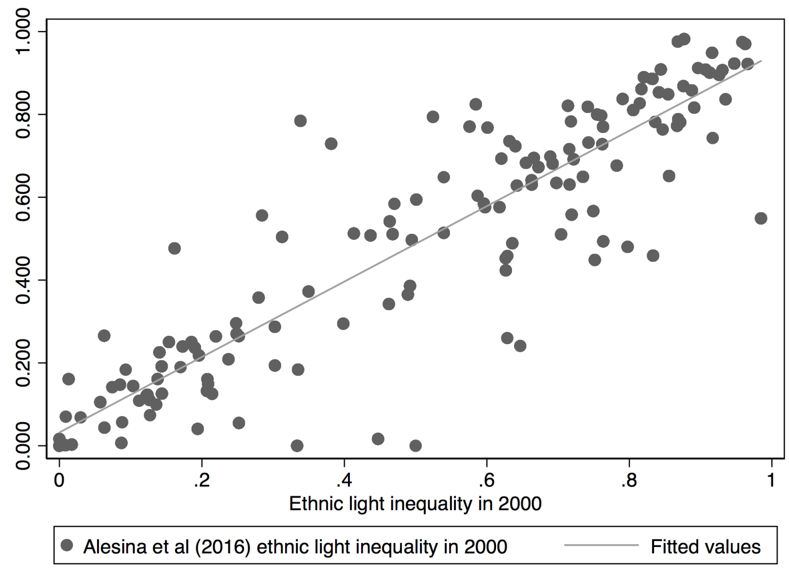


Table A1: Within continent variation in political stability across countries: the role of colonial origins

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: All data								
Percentage of population of European descent	-0.018**							
	(0.009)							
order artificality measure - border lines. Alesina et al. JEEA2010		0.051						
		(0.062)						
Border artificality measure - partitioned ethnicities. Alesina et al. JEEA2010			0.000					
			(0.000)					
Ln of original settler mortality; Source: AJR (AER 2001)				0.003**				
				(0.001)				
Urbanization rate around 1500; Source: AJR (2002) taken from Albou					0.001			
					(0.001)			
Population density around 1500; Source: AJR (2002) taken from Albouy						0.000*		
						(0.000)		
France							0.007**	
							(0.003)	
NA							0.012***	
							(0.004)	
Other Europpe							0.005	
							(0.005)	
No Colonial origin							ref.	
Portugal							0.001	
							(0.005)	
Spain							0.011*	
							(0.006)	
British Legal origin								ref.
France								0.007**
								(0.003)
German								0.007
								(0.011)
Scandinavian								0.002
								(0.005)
Soviet								0.006
								(0.004)
Observations	125	110	104	50	31	50	125	125
Countries	125	110	104	50	31	50	125	125
Mean of DV	.0305	.0309	.0308	.0311	.0347	.0311	.0305	.0305
Continent FE	X	X	X	X	X	X	X	X

Notes: Dependent variable is mean month-on-month measures of political turnover. The covariates are taken from Alesina et al. (2016). Robust standard errors are shwon with with stars indicating *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A2: Within continent variation in political stability across countries: the role of colonial origins

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ruggedness (Terrain Ruggedness Index, 100 m.). Source: Nunn and Puga (2012)	0.001							
	(0.001)							
Alternative ruggedness (pop. weighted TRI, 100 m.)		0.001						
		(0.002)						
Alternative ruggedness (% moderately to highly rugged)			0.000					
			(0.000)					
% Fertile soil. Source: Nunn and Puga (2012)				0.000				
				(0.000)				
% Desert. Source: Nunn and Puga (2012)					-0.000			
					(0.000)			
% Tropical Climate. Source: Nunn and Puga (2012)						-0.000		
						(0.000)		
Dummy for landlocked countries. Source: Global Development Network Growth Dtbse							0.002	
							(0.003)	
ln wheat-sugar ratio. Source: Easterly (2008)								0.003
								(0.008)
Observations	125	125	125	125	125	125	125	98
Countries	125	125	125	125	125	125	125	98
Mean of DV	.0305	.0305	.0305	.0305	.0305	.0305	.0305	.0327
Continent FE	X	X	X	X	X	X	X	X

Notes: Dependent variable is mean month-on-month measures of political turnover. The covariates are taken from Alesina et al. (2016). Robust standard errors are shwon with with stars indicating *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A3: Within continent variation in political stability across countries: the role of ethnic diversity origins

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Ethnical fragmentation (from Alesina et al. 2003)	0.000												
	(0.006)												
Ethnic Fragmentation Index (Fearon JEG2003)		0.004											
		(0.006)											
Reynal Querol (2002) polarization index. Source: Desmet et al. JEEA			-0.025										
			(0.026)										
Linguistic fragmentation (from Alesina et al. 2003)				-0.008									
				(0.005)									
Religious fragmentation (from Alesina et al. 2003)					-0.012**								
					(0.005)								
altrnative ethnic fragmentation index (Fearon JEG2003)						-0.002							
						(0.006)							
Cultural Fragmentation Index (Fearon JEG2003)							0.004						
							(0.008)						
Ethnic Seggregation. [ethnicity$_{Sh}at].Source.AlesinaandZhuravskaya(2011)$								0.008					
								(0.013)					
Linguistic Seggregation. [language$_{Sh}at].Source.AlesinaandZhuravskaya(2011$									0.008				
									(0.010)				
Religious Seggregation. [religion$_{Sh}at].Source.AlesinaandZhuravskaya(2011)$										-0.025			
										(0.022)			
Predicted genetic diversity squared. Source: Ashraf and Galor (2012)											-0.016		
											(0.067)		
Predicted genetic diversity (ancestry adjusted). Source: Ashraf and Galor (2012)												-0.105	
												(0.085)	
Predicted genetic diversity (ancestry adjusted) square													-0.069
													(0.059)
Observations	125	121	124	121	125	99	120	83	78	66	125	125	125
Countries	125	121	124	121	125	99	120	83	78	66	125	125	125
Mean of DV	.0305	.0308	.0305	.0306	.0305	.0307	.0308	.032	.0323	.0309	.0305	.0305	.0305
Continent FE	X	X	X	X	X	X	X	X	X	X	X	X	X

Notes: Dependent variable is mean month-on-month measures of political turnover. The covariates are taken from Alesina et al. (2016). Robust standard errors are shwon with with stars indicating *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

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