Ethnic divisions, political institutions and the duration of declines

A political economy theory of delayed recovery

Richard Bluhm Kaj Thomsson[†]

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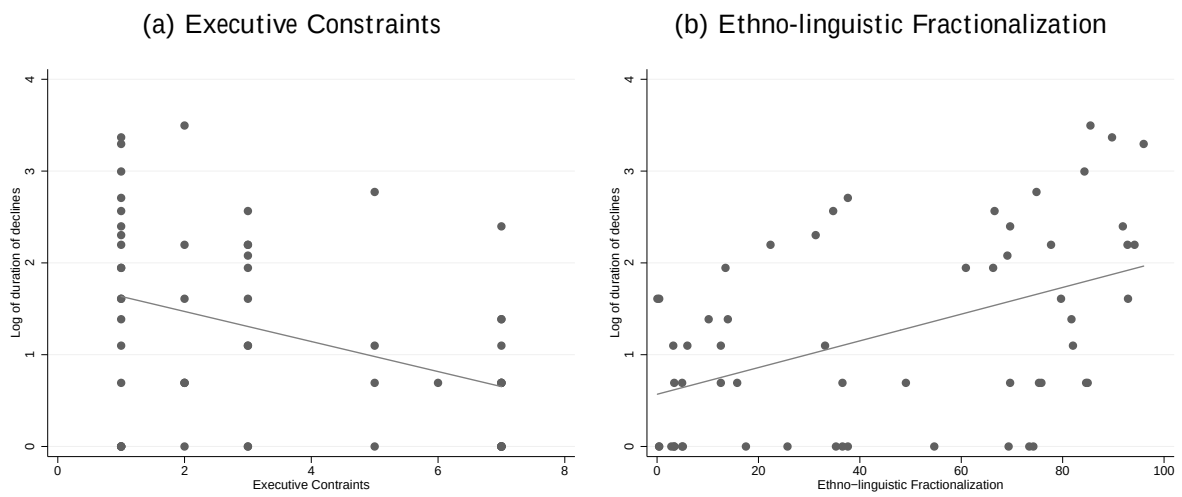
1 Introduction

Why do economic declines in Sub-Saharan Africa and some parts of the globe last so much longer than in others, say, Western Europe and North America? We propose a

Berg et al., 2012). Several years of positive growth can easily be followed by long and deep slumps. Such negative shocks can wipe out previous welfare gains and are often characterized by persistent output loss (Cerra and Saxena, 2008). In light of these findings, it becomes important to understand why some declines last so much longer than others and what factors are associated with longer (or shorter) durations.

In a recent empirical contribution (Bluhm et al., 2014), we discuss the econometric identification of the decline phase of economic slumps and then analyze its duration. We empirically examine if the duration of the decline phase of large economic slumps is, among other factors, shaped by political institutions and ethnic cleavages. In a departure from the previous literature, we specifically focus on the *duration of declines* for three reasons. First, the onset of a slump may be brought about by many factors which are not necessarily related to a country's political institutions or level of social cohesion, but the duration of declines depends on socioeconomic groups agreeing on coordinated responses. Second, the dynamics of recoveries di□er a lot from the dynamics of declines (both empirically and theoretically). Third, most of the variation in the overall depth of slumps is due to the duration of the decline phase and not due the rate of contraction.

Figure 1: Unconditional correlations with the duration of declines



Note(s): The durations are based on the 58 slumps estimated in Bluhm et al. (2014) for the panel (b), and 57 slumps for panel (a) as we lack scores on the index of executive constraints for Trinidad and Tobago in 1961. No adjustment has been made for censored observations (unfinished declines).

We first show that the duration (in years) until a recovery starts increases with greater degrees of ethnic cleavages, and that it decreases with stronger constraints on the executive. A slump is defined by a trend break or shift in the growth regime with a restricted pattern. The duration of the decline phase is simply the time from the downbreak until the trough. Institutional strength is measured by the constraints placed on the political executive using an index scaled 1 to 7 (least to most constrained). Ethnic heterogeneity is proxied for by an index of linguistic fractionalization (scaled 0 to 100). Figure 1 illustrates the unconditional correlation of the (log) duration of declines with executive constraints (−0.38) and ethno-linguistic fractionalization (0.47).

We also provide evidence of a more subtle pattern: the adverse e□ect of high ethnic heterogeneity is conditional on the quality of political institutions. A log-normal survival regression of the duration of the decline phase on executive constraints, ethno-linguistic

fractionalization and an interaction term yields the following (the standard errors are in parentheses below the coefficients):[1]

$$\ln \tilde{t} = \underset{(0.201)}{1.808} - \underset{(0.080)}{0.254} XCONST_0 + \underset{(0.004)}{0.018} ELF - \underset{(0.002)}{0.004} XCONST_0 \times ELF$$

The estimated effects are statistically significant and qualitatively meaningful. Even though this is a very naïve model of the duration process, the basic findings are robust to more demanding specifications. We centered the two explanatory variables on their sample mean, so that the interaction term only needs to be considered when both regressors change. *Ceteris paribus*, a unit increase in executive constraints away from the average leads to a 22.4% shortening of the duration until the trough and thus predicts a substantially faster exit from the decline phase. Conversely, a one percentage point increase in ethnic heterogeneity prolongs the duration by about 1.8%. Political institutions seem to moderate the effects of ethnic heterogeneity. At perfect executive constraints the negative effect of diversity is virtually zero, whereas it is very large when the political executive has unlimited powers. We also show that the effect of these two variables on the overall depth of slumps runs through the duration and not the average rate of declines.

In Bluhm et al. (2014) we are primarily concerned with the econometrics of identifying declines and establishing this stylized fact. The main objective of this paper is twofold: first, to propose a theory that can generate such an interaction effect, and, second, to then empirically examine additional theoretical predictions using much more detailed data on ethnic groups and their political power.

3 Related literature

Ethnic heterogeneity is a fundamental determinant of prosperity. It is typically associated with low growth (Easterly and Levine, 1997), the undersupply of public goods (Alesina et al., 1999), and civil conflict (Fearon and Laitin, 2003;

et al., 2010). On the other hand, diversity affects the (endogenous) choice of institutions governing the executive power of such leaders (Aghion et al., 2004).

There is some empirical evidence consistent with the view that ethnicity and political institutions interact. Collier (2000), for example, argues that ethnicity plays no role in democracies but is growth reducing in autocracies and provides evidence along these lines. Easterly (2001) empirically investigates an interaction effect between institutions and ethnicity in determining growth and conflict. However, the precise mechanisms behind how these two jointly determine the length of crises have not been investigated and may explain substantial parts of the robust negative correlation between ethnicity and growth. While there is plenty of anecdotal evidence, we are only aware of a paper by Rodrik (1999) which explicitly considers ethnicity and *negative* growth empirically (and more formally in the working paper version).

The theoretical literature on delayed reform and policy non-adoption offers important insights. Ethnic groups may be engaged in "wars of attrition" over the burden of reform, so that groups are trying to shift the costs of, say, a debt consolidation onto competing groups (Alesina and Drazen, 1991). In these models, agreement on a particular policy is required for stabilization and veto power lies either with groups represented within the executive or an effective parliamentary or non-parliamentary opposition. Stabilization occurs only once one of the groups concedes. Drazen and Grilli (1993) use this set-up to show that crises can be welfare improving by reducing delay and Spolaore (2004) examines the impact of different government systems on the expected time until a stabilization occurs. Alternatively, a socially optimal reform may not be undertaken at all because it is *ex ante* not known to which (ethnic or other political) groups the benefits will accrue (Fernandez and Rodrik, 1991). Labán and Sturzenegger (1994a,b) show that such a model can also generate delay and an endogenous economic deterioration. Both approaches have two key elements in common: 1) *uncertainty* about the expected outcomes, and 2) an *ex ante commitment problem* between (*ex post*) beneficiaries and losers of the reform. However, while instructive, this literature does not explicitly focus on ethnic diversity and constraints on the executive. As a result, it does not capture an interaction between these two factors in determining the length of declines.

Our paper also relates to the veto player literature in political science. These contributions generally find that policy stability is greater, the more numerous the players in the political system that are required to agree (Tsebelis, 1995, 2002). Veto player arguments have been used to explain why governments may not reform during an economic shock (Cox and McCubbins, 1997; Haggard, 2000), but recently Gehlbach and Malesky (2010) turn the argument on its head by demonstrating that (more) veto players weaken the power of special interest groups which encourages wholesale reform. Using a different setup based on the selectorate framework by Bueno de Mesquita et al. (2005), Hicken et al. (2005) stress an alternative mechanism which suggests that accountability of the executive matters in response to exchange-rate devaluations. They conclude that greater checks on the executive do not aid the recovery which stands in sharp contrast to the results developed in this paper.

The degree of ethnic diversity is entirely endogenous in the (very) long run. Heterogeneity is related to migratory distance from Africa (Ashraf and Galor, 2013), the duration of settlements and the history of the state (Ahlerup and Olsson, 2012), and variation in terrain and land endowments (Michalopoulos, 2012). At the micro-level, people may choose their group affiliation and switch groups depending on how discernible the individual features are which identify group membership (Caselli and Coleman, 2013).

Slumps: uncertainty.

politics, the threshold mechanism symbolizes the potential of some ethnic groups to exclude other groups from the political process and capture the rents of those that have been excessively weakened by the slump. Alternatively, it may even represent physical extinction due to ethnic conflict. In democratic politics, assuming that ethnic or other identity groups are represented by parties reflecting their interests, it captures the existence of thresholds that allow minorities to block political change (e.g. the filibuster rule used in the U.S. Senate as well as several state legislatures, or the 5% minority threshold used in the German *Bundestag*).

Delay. We assume that groups are able to fortify their position through non-cooperation. This implies that a group can (in part) counterbalance the uncertainty introduced by weak institutions through not cooperating, and thus potentially avoid falling below the threshold. Both groups would cooperate and the recovery would be immediate if there were no gains from delay.

In terms of the model, delay limits how likely it is that a particular group will be expropriated. The parameter x is a measure of how much a group can reduce the risk of expropriation by holding out in each period. We assume that the probability of landing on either side outside the safe zone follows a linear process, so that $p^t = c - (t-1)x$ at each t when the groups can chose to cooperate or delay. Furthermore, we assume that expected utility conditional upon being in the "safe zone" is independent of p^t.

Figure 2 gives an example of a distribution of w_j and illustrates the relevant regions.

Timing. The following timing summarizes the structure of the game. At $t = 0$, the economy is in its initial state. Output $\sum_j y_j = 1$ is produced and shared equally.

1. At $t = 1$, the slump occurs, and incomes decline to $(1 - \Delta)y_j$. Both groups simultaneously choose to cooperate C or delay D.

2. For all $t > 1$, incomes remain at $(1 - \Delta)y_j$ if both groups did not cooperate in the previous period. They once again simultaneously choose whether to cooperate C or delay D. If, instead, there was cooperation in the previous period, incomes recover within one period, but are subject to a random shock and groups can land outside the political safe zone with twice the probability p^t. After a recovery, each group receives the same payoff as in the first post-recovery period forever.

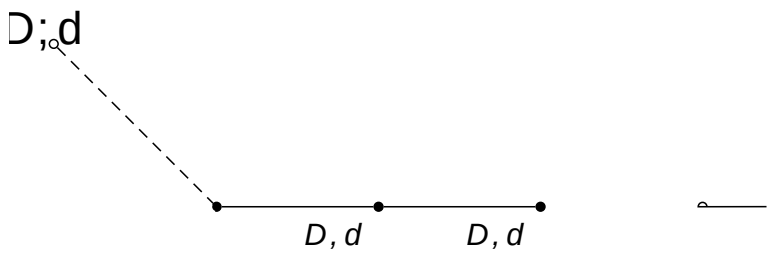
The present discounted value of the lifetime utility for each group is

$$v_j = \sum_{\tau=1}^{\infty} \delta^{\tau-1} \mathbb{E} g(\cdot) \tag{1}$$

where $g(\cdot)$ is $g((1 - \Delta)y_j)$ if the recovery has not yet occurred and $(1 - 2c)\mathbb{E}[g(w_j)|w_j \in A] + c(g(0) + g(1))$ otherwise. The discounted utility has two components: 1) if the economy has not recovered, groups are on a delay path, and 2) once the slump is over, they remain on a post-recovery path.

Figure 3 sketches how the economy evolves over time given different choices and presents a stylized view of the process we envision. Note that the action pair (D, d) has the same implication as

Figure 3: A sketch of decisions and timing



The game has a symmetric structure. At each choice node (solid nodes), the comparison between any two adjacent periods always looks alike. The utility from cooperating in a particular period t when the other group cooperates in period t is

$$v_j^t(C,c) = \frac{1}{1-\delta}\left[(1-2p^t)\mathbb{E}[g(w_j)|w_j \quad A] + p^t(g(0)+g(1))\right] \tag{2}$$

and the utility from cooperating in the next period when the other group cooperates in period t is

$$v_j^t(D,c) = g((1-\Delta)y_j) + \frac{\delta}{1-\delta}\left[(1-2p^{t+1})\mathbb{E}[g(w_j)|w_j \quad A] + p^{t+1}(g(0)+g(1))\right]. \tag{3}$$

It is useful to establish the social optimum before we characterize the non-cooperative equilibrium. Our first comment summarizes two key aspects of the planner's solution.

Comment 0. *i) The utilitarian welfare-maximizing outcome involves no delay.*

To see this, note that due to the concavity of the utility function the sum of the group's utilities is maximized when their share is equal. At equal shares, the total welfare from any non-delay path dominates any delay path.

ii) Any outcome with delay is Pareto dominated by some outcome without delay.

To see why this is the case, take any path with delay, give the groups the same shares in every period, but let the recovery happen immediately. In this case, all groups receive more in the period before the recovery than they did with delay, and the same in every period after the recovery.

The intuition behind this comment is straightforward. Given that there are two groups in the economy, a social planner would give both the same shares and avoid delay; only then is their combined utility maximized. Even if these two groups have unequal shares, an immediate recovery is beneficial to both. The social planner is unconstrained, in the sense that the solution involves no uncertainty towards the post-recovery utilities or political boundary effects. This benchmark is particularly interesting when contrasted to the non-cooperative equilibrium of the game, where groups face a trade-off between immediately recovering and falling below the threshold c, or recovering later and reducing future uncertainty.

By comparing the utilities from cooperating in the first period and in the second period it is relatively straightforward to show that delay can occur in equilibrium. Our first result establishes this.

Proposition 1. *There exist parameter values, such that all equilibria involve delay.*

Proof. See Appendix.

The proof to the proposition shows that all components that make the immediate cooperation scenario less attractive are conducive to delay. The key issue rendering the cooperative equilibrium inaccessible is the *ex ante* commitment problem among potential winners and losers. Hence, worse institutions, or less ability to commit to not expropriate the loser (larger c), larger gains from holding out (larger x) and a larger value placed on the future (higher δ) make immediate cooperation less likely. Conversely, a larger shock (Δ) makes cooperation more attractive since a (potentially sizable) one period loss is avoided. The concavity of $g(\cdot)$ matters in the sense that it implicitly captures how averse groups are to negative events (falling below c) or how much they value expropriating other groups (landing above c).

Note that the proposition is formally true only in a weak sense; it does not rule out that equilibria with immediate recovery could exist for some parameter values.[3] Rather, the result should be viewed in light of Comment 0. What Proposition 1 establishes is that for some parameter values *all* equilibria are ine□cient and welfare-suboptimal.

While still in the two-group case, we can already highlight an interesting comparison to the homogeneous (one group) case.

Comment 1. *Without heterogeneity, there always exists an equilibrium with immediate recovery.*

Note that if the groups were to pool their resources as one, then all the elements inducing delay – except pure miscoordination – are absent. In other words, we need antagonistic political (ethnic) groups for the proposed mechanism to work, i.e. for the model developed here to provide a theory of why there is delay. A more careful analysis of group asymmetries and multiple groups follows in the model extensions.

To better understand when we are likely to see delay, we now characterize the subgame perfect equilibrium with (the earliest possible) recovery, if such an equilibrium exists. Given the symmetric structure of the game an interior solution exits and the optimal time to recovery can be derived using equations eq. (2) and eq. (3). Our second result summarizes a central insight of the model.

Proposition 2. *Stronger constraints on the executive shorten the time to recovery.*

Proof. See Appendix.

[3] There are many "coordination failure" equilibria where neither group cooperates simply because they believe the other group will not. Such equilibria always exist, including an equilibrium with infinite delay. Our analysis, however, is focused on the more interesting scenarios (equilibria) where delay does not happen *only* as a result of this type coordination failure.

The proof shows that the optimal time to recovery is

$$t = g((1 - \Delta)y_j) - \mathbb{E}[g(w_j)$$

matters and political groups are assumed to be willing to cooperate once it is optimal to do so. Entrenched distrust would only increase delay.

We abstract from several other features, such as modeling slumps in a more realistic manner (both in terms of the decline and the recovery phase) or the precise nature of the policy response. Clearly, some policies can prolong the decline phase and make recovery more difficult. We also do not differentiate between democratic and autocratic regimes, or examine the impact of particular political constitutions (presidential or parliamentary). The exact form of the boundary events is also left open and could, for example, also represent the exclusion from public goods. Nor do we differentiate between political and economic power. Such specificities are not essential to the main argument, but clearly our contribution is particularly relevant for understanding declines in Africa where political divisions are often ethnic and executive power is shared (Francois et al., 2012).

The mechanism we propose is different than those suggested in the policy reform literature, which has previously focused on shifting the burden of reform (Alesina and Drazen, 1991) and status-quo bias (Fernandez and Rodrik, 1991

utility in the delay scenario. Both work in favor of cooperation. On the other hand, the group now has more to lose if it gets expropriated and is thus less likely to cooperate. Without imposing further restrictions, the overall direction of the effect is undetermined and depends on the parameter values. We consider this an empirical issue and return to it in the next section. The following result gives the condition that has to hold for greater symmetry to lead to more delay.

Proposition 3. *A decrease in (political) concentration makes delay more likely, if the following condition holds*

$$\Delta + \frac{1}{1-\delta}\left[\frac{dp_1(y_j)}{dy_j}(z-y_j) - p_1(y_j)\right] < 0. \tag{8}$$

Proof. See Appendix.

Using this condition, we can summarize the circumstances that determine the direction of this effect.

Comment 3. *A decrease in concentration is more likely to work in favor of delay, if the shock is smaller, the future is less heavily discounted, the negative consequence of*

This algorithm yields 58 slumps from 1950 to 2008. The basic correlations are as expected. Poorer countries have longer and deeper declines than richer countries; countries in Africa have the longest and deepest spells while OECD countries experience only few, shallow and short spells. Table 1 provides some basic summary statistics.

Table 1: Summary Statistics of Slumps

	Africa	Americas	Asia	Europe	Oceania	World
Slumps	14	16	16	9	3	58
Total years in decline	178	78	60	23	9	348
Duration of decline:						
- Min	1	1	1	1	2	1
- Median	16	2	2	1	3	3
- Mean	12.71	4.88	3.75	2.56	3.00	6.00
- Max	33	15	13	9	4	33
Incidence Rate	0.04	0.19	0.22	0.39	0.33	0.14

Note(s): The incidence rate is defined as the number of exits from the decline period over the total years in decline.

Measuring institutions. Our core measure of political institutions is the variable *Executive Constraints* from the Polity IV data set. The variable directly measures the degree of institutionalized constraints placed on the political executive. It is coded unity when there is "unlimited executive authority" and seven when there is "executive parity or subordination"; intermediate values represent some constraints. We believe that this variable corresponds well with the parameter c in our model. The Polity IV project has information on executive constraints annually from 1800 (or the year of independence) until 2010. We do not use this wealth of time variation, since political institutions may endogenously respond to the slump. We only rely on the degree of executive constraints in the last year *before* the slump and denote this variable $XCONST_0$.[6]

Measuring heterogeneity. We rely on two data sources to capture very different aspects of ethnic heterogeneity. The first source is a set of measures computed by Desmet et al. (2012) on the basis of the *Ethnologue* data. This data does not measure ethnicity directly but captures *linguistic* diversity. Fearon (2003) shows that linguistic (cultural) diversity coincides well with ethnic heterogeneity in some regions, notably Sub-Saharan Africa, but not so well in others. Together with the *Atlas Narodov Mira* data gathered by Soviet ethnographers in the 1960s, it is a standard source for data on ethnic heterogeneity and considerably more up-to-date than the former. Desmet et al. (2012) compute linguistic diversity at different levels of the language tree to capture the historical depth of ethnic divisions. We only make use of the most disaggregate level, since they also show that current divisions are correlated with economic growth more strongly than historical cleavages. The second data source is the

presented in Wimmer et al. (2009), as well as Cederman et al. (2010). The EPR data has several advantages over other measures of linguistic or ethnic diversity, particularly for our application. It provides time series information on the degree of access to *executive* power of ethno-political groups from 1946 to 2010. Contrary to the *Ethnologue* data, it is not restricted to linguistic cleavages existing today. Instead, expert coders identified the most relevant division which may be ethnic, linguistic, racial or religious depending on the country and time period. The data contains information on the power status of each group, so that it allows us to focus on politically relevant groups; that is, groups with some form of representation in the presidency, cabinet, or other senior posts in the administration or army.

Our primary measure of heterogeneity is the commonly used index of ethno-linguistic fractionalization (e.g. Easterly and Levine, 1997). It is defined as

$$ELF_i = 1 - \sum_{j=1}^{J} \left(\frac{n_{ij}}{N_i} \right)^2 \tag{9}$$

where n_{ij}/N_i is the population share of group j in country i ($j = 1, 2, \ldots, J$, n_{ij} is the number of people in group j, and N_i the size of the population in country i). We employ two versions of this index: one computed by Desmet et al. (2012) and one computed using the EPR data (denoted ELF_0). We scale all heterogeneity indices by 100 to give changes on the right hand side a percentage point interpretation.

Another important dimension of diversity is the degree of polarization of a society into two (opposing) groups. The literature on ethnic conflict often stresses that fractionalization and polarization have very different effects (e.g. see Esteban and Ray, 2011). We capture polarization with an index developed by Esteban and Ray (1994):

$$POL_i = k \sum_{j=1}^{J} \left(\frac{n_{ij}}{N_i} \right)^{1+\alpha} \left(1 - \frac{n_{ij}}{N_i} \right) \tag{10}$$

where $\alpha = 1$

Table 2: Definitions of Variables

Symbol	Description	Source and Notes
	Dependent Variable	
$\tilde{t}$	Duration of decline segment	From Bluhm et al. (2014) computed using structural break model with a significance level of 10%. Underlying GDP per capita data is from the Penn World Table 7.0.
	Independent Variables	
$XCONST_0$	Constraints on the executive	From Polity IV data. Measures *de facto* independence of the executive. Scaled from 1 (no constraints) to 7 (fully constrained). Fixed at last year before slump.
ELF	Ethno-linguistic fractionalization	From Desmet et al. (2012), the original source is the Ethnologue data (15^{th} edition). Cross-section.
ELF_0	Fractionalization of ethno-political groups	From Ethnic Power Relations data version 3.01 (Wimmer et al., 2009). Fixed at last year before slump.
POL	Ethno-linguistic polarization	From Desmet et al. (2012) using the Esteban and Ray (1994) measure with $\alpha = 1$ and $k = 4$. The original source is the Ethnologue data (15^{th} edition). Cross-section.
POL_0	Ethno-political polarization	Computed using Ethnic Power Relations data version 3.01 (Wimmer et al., 2009) and Esteban and Ray (1994) measure with $\alpha = 1$ and $k = 4$. Fixed at last year before slump.
ELA_0	Asymmetries between ethno-political groups (relative to fractionalization at equal sizes).	Computed using Ethnic Power Relations data version 3.01 (Wimmer et al., 2009). Fixed at last year before slump.
$GROUPS_0$	Number of groups	———
$EGIPGRPS_0$	Number of included groups	———
$EXCLGRPS_0$	Number of excluded groups	———
$DOMPOP_0$	Dominant population (in %)	———
$MONPOP_0$	Monopoly population (in %)	———
	Control Variables	
GDP per capita	Log of initial real GDP per capita	From the Penn World Table D48(e 13.55 and)]TJ4aa8Pc

equal sizes and approaches unity as a single group becomes dominant. For the empirical analysis that follows, using the index of group asymmetries together with the number of groups allows us to analyze the effect of these two components of ethnic heterogeneity separately and investigate the more subtle aspects of the theoretical model.

Table 3: Summary Statistics of Independent Variables

Variables	Obs	Mean	Std. Dev.	Min	Max
$XCONST_0$	57	3.42	2.47	1.00	7.00
ELF	58	45.39	33.71	0.07	95.98
ELF_0	57	36.00	25.71	0.00	80.39
POL	58	40.04	24.98	0.14	85.99
POL_0	57	19.35	16.42	0.00	56.95
ELA_0	57	48.75	33.40	0.10	100.00
$GROUPS_0$	57	4.19	6.43	0.00	47.00
$EGIPGRPS_0$	57	1.37	1.33	0.00	7.00
$EXCLGRPS_0$	57	2.33	6.17	0.00	46.00
$MONPOP_0$	57	0.21	0.36	0.00	0.97
$DOMPOP_0$	57	0.21	0.34	0.00	0.98
(Log) GDP per capita	58	8.53	1.21	5.87	10.63

We also obtain several additional variables from the EPR data. $GROUPS_0$ is the number of relevant (active) ethno-political groups. $EGIPGRPS_0$ is the number of included ethno-political groups at the last year before the slump; that is, groups with have some level access to executive power. $EXCLGRPS_0$ is the number of ethno-political groups without access to the political executive. Finally, $DOMPOP_0$ and $MONPOP_0$ are the population shares of the dominant or monopoly groups (the two highest levels of political power). All of these variables are fixed at the last year before the slump to rule out any feedback from the duration to the group composition. Table 2 describes all variables and lists the underlying data sources. Table 3 presents the associated summary statistics.

Empirical approach. Our approach is to examine partial correlations and test whether these are consistent with the proposed theory. While we cannot rule out all forms of endogeneity, we do take care to ensure temporal precedence. We employ standard event history techniques to study the duration of the decline phase.

To estimate the partial correlations, we run log-normal accelerated failure time (AFT) regressions of the form:

$$\ln \tilde{t} \equiv \ln(t - t_0) = \beta_0 + \beta_1 XCONST_0 + \beta_2 H + \beta_3 (XCONST_0 \times H) + \mathrm{x}_0 \xi + \quad _t \qquad (12)$$

where $\tilde{t}$ is analysis time, t_0 is the last year before the slump, $XCONST_0$ is executive constraints, H is a measure of group (ethnic) heterogeneity, x_0 is a vector of controls, and $_t \quad N(0, \sigma)$. Variables which could endogenously react to a prolonged duration of declines are kept fixed at t_0 to rule out any such feedback; if they have no time dimension, then we drop the subscript. All parameters are estimated using Maximum Likelihood and the standard errors are clustered on the country level to account for repeated spells.

Our main parameters of interest are β_1, β_2, and β_3. In several regressions, we impose $\beta_3 = 0$

Table 4: Baseline – Executive Constraints, Heterogeneity and Interactions

	Dependent Variable: $\ln \tilde{t}$					
Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Ethnologue			*Ethnic Power Relations*		
$XCONST_0$	-0.187***	-0.291***	-0.171***	-0.187***	-0.262***	-0.170**
	(0.063)	(0.092)	(0.064)	(0.067)	(0.085)	(0.067)
ELF	0.017***	0.019***	0.023***			
	(0.004)	(0.004)	(0.006)			
$XCONST_0 \times ELF$		-0.004**				
		(0.002)				
POL			-0.011			
			(0.007)			
ELF_0				0.020***	0.023***	0.025***
				(0.007)	(0.007)	(0.007)
$XCONST_0 \times ELF_0$					-0.004*	
					(0.002)	
POL_0						0.012
						(0.009)
	Control sets					
GDP per capita	Yes	Yes	Yes	Yes	Yes	Yes
	Summary stats					
Exits	47	47	47	47	47	47
Spells	57	57	57	57	57	57
Years of Decline	346	346	346	346	346	346
Log-L	-73.677	-71.621	-72.679	-76.294	-74.952	-75.597
Pseudo-R^2	0.149	0.173	0.161	0.119	0.134	0.127

Note(s): The standard errors are clustered on the country level to account for repeated spells. All specifications include a constant (not shown). *** p<0.01, ** p<0.05, * p<0.1.

comparison to other regions than alternative diversity measures. This begs the question

the duration of declines, just as with linguistic polarization. Contrasting these results to the *Ethnologue* data, it seems safe to conclude that we are not only explaining that declines in Sub-Saharan Africa last longer than elsewhere because the subcontinent is the most linguistically diverse, but that this holds try when we account for political relevance and the prevalence of di□erent divisions in di□erent parts of the world.

Overall,

Table 5: Extensions – Number of Groups, Political Relevance, and Asymmetries

	Dependent Variable: $\ln \tilde{t}$					
Variables	(1)	(2)	(3)	(4)	(5)	(6)
$XCONST_0$	-0.225***	-0.241***	-0.215***	-0.179***	-0.210***	-0.196***
	(0.070)	(0.063)	(0.065)	(0.066)	(0.070)	(0.066)
$GROUPS_0$						

Table 6: Robustness – Region and time effects

	Dependent Variable: $\ln \tilde{t}$					
Variables	(1)	(2)	(3)	(4)	(5)	(6)
$XCONST_0$	-0.245***	-0.216***	-0.211***	-0.171**	-0.181***	-0.145**
	(0.079)	(0.065)	(0.077)	(0.068)	(0.066)	(0.064)
ELF	0.020***	0.021***				
	(0.004)	(0.003)				
$XCONST_0 \times ELF$	-0.003**	-0.004***				
	(0.001)	(0.001)				
ELF_0			0.017**	0.015**		
			(0.007)	(0.006)		
$XCONST_0 \times ELF_0$			-0.003	-0.003*		
			(0.002)	(0.002)		
$EGIPGRPS_0$					0.298***	0.212*
					(0.097)	(0.119)
$EXCLGRPS_0$					0.024*	0.009
					(0.013)	(0.026)
	Control sets					
GDP per capita	Yes	Yes	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes
Decade dummies	No	Yes	No	Yes	No	Yes
	Summary stats					
Exits	47	47	47	47	47	47
Spells	57	57	57	57	57	57
Years of Decline	346	346	346	346	346	346
Log-L	-62.777	-55.812	-67.966	-64.108	-68.705	-66.701
Pseudo-R^2	0.275	0.355	0.215	0.260	0.207	0.2375r.56 cm[]0 47mn

heterogeneity (on top of duration dependence).[8] Throughout Table 6 the coefficient of political institutions and the coefficients of the various measures of ethnic heterogeneity remain statistically significant at conventional levels and well within their usual range.

We report further robustness checks in the appendix. Table A-1 uses a more lenient threshold for the identification of slumps (a significance level of 0.2). Our main results hold in this larger set of episodes. Table A-2 exchanges the fractionalization data with data on ethnic, linguistic and religious heterogeneity from Alesina et al. (2003), data on ethnic and cultural distance from Fearon (2003), and the original *Atlas Narodov Mira* data. For all but religious fractionalization, we find very similar interaction effects. Table A-3 switches the Polity IV data with the political constraints data from Henisz (2000). Here too, the main results remain intact for the alternate measures of executive constraints. Finally, Table A-4 shows that the results do not depend on the specific functional form of the survival process.

These last sets of empirical findings reveal the following: first, ethnic heterogeneity and constraints on the political executive are robust determinants of the length of the decline phase during major economic slumps. Second, this result is not due to regional differences in ethnic heterogeneity but holds when we only use within region variation. Third, the results are robust to a variety of perturbations in the dependent and independent variables. Taken as a whole, we believe that our empirical approach operationalizes the key parameters of the model and demonstrates that there is robust evidence consistent with the theory outlined here.

6 Concluding remarks

This paper presents a political economy theory of declines, highlighting a commitment problem between winners and losers of the recovery process after a crisis, and then analyzes empirical implications of this theory. We show that ethno-political heterogeneity coupled with weak constraints on the political executive can bring about delayed cooperation during the decline phase of a slump and hence explain why we observe such long declines in some countries and relatively short declines in others.

Both the theory and the empirical analysis suggest that ethnic heterogeneity is indeed harmful for getting groups to agree on a response to a crisis when political institutions are weak. More subtle predictions show that this is mostly an issue of having many powerful groups in the society and does not apply to the same degree when there is a politically dominant group. The overarching policy implication here is not that ethnic diversity is necessarily a problem, but that political institutions can be designed to contain the adversarial element of ethnic heterogeneity in particular and political heterogeneity in general. While not restricted to understanding declines in Sub-Saharan Africa, we would like to once again emphasize that we believe these insights are particularly important for understanding the political economy of declines on the subcontinent. Sub-Saharan Africa is home to the longest and deepest declines, politics shaped by ethnicity, and weak institutions governing executive power. While we still need to better understand why ethnic diversity tends to coincide with weak political institutions and how one shapes the other, we find that there is ample room for managing this heterogeneity better so that welfare gains are not lost in the next crisis.

[8] A χ^2-test rejects the null of no temporal heterogeneity at the 1%-level in column (1), at the 5%-level but not the 1%-level in column (4), and fails to reject the null at conventional levels in column (6).

This line of research is far from complete. Fruitful avenues for future research would be to extend these models further by integrating a richer description of the executive decision-making process, altering the decision rules, treating the quality of political institutions as endogenous to the decline, or modeling details of the policy response. On the empirical side, richer data on cabinet allocations, ethnicity and executive power would help to trace out the proposed mechanism more carefully.

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Appendix

Proof of Proposition 1. The utility from cooperation in the first period when the other group cooperates is

$$v_j^1(C,c) = \frac{1}{1-\delta}\{(1-2c)\mathbb{E}[g(w_j)|w_j \quad A] + c(g(0)+g(1))\} \tag{A-1}$$

and the utility from choosing to delay cooperation one period when the other group cooperates is

$$v_j^1(D,c) = g((1-\Delta)y_j) + \frac{\delta}{1-\delta}\left[(1-2p^2)\mathbb{E}[g(w_j)|w_j \quad A] + p^2(g(0)+g(1))\right] \tag{A-2}$$

where $p^2 = c - x$; that is, half the probability of landing outside the safe zone in the second period.

The proof is by contradiction. We conjecture an equilibrium with immediate recovery, such that $v_j^1(C,c) \geq v_j^1(D,c)$. Using $p^2 = c - x$ and rearranging terms, we get

$$g((1-\Delta)y_j) \leq \mathbb{E}[g(w_j)|w_j \quad A] - \left[c + \frac{\delta}{1-\delta}x\right]\{2\mathbb{E}[g(w_j)|w_j \quad A] - g(0) - g(1)\}. \tag{A-3}$$

Note that concavity implies that $\{2\mathbb{E}[g(w_j)|w_j \quad A] - g(0) - g(1)\} > 0$. Inequality (A-3) is contradicted whenever c, x or δ are large enough in relation to Δ, depending on the shape of the utility function $g(y_j)$ and its range, which completes the proof.

Proof of Proposition 2. First of all, it is useful to demonstrate that the difference in utility between recovery at any time period (t) and recovery at the subsequent period ($t+1$) decreases over time. For all $s > t$, we need to check whether

$$v_j^{t+1}(C,c) - v_j^t(C,c) > v_j^{s+1}(C,c) - v_j^s(C,c). \tag{A-4}$$

Note that $v_j^{t+1}(C,c) = v_j^t(D,c)$.

Substituting the utilities and rearranging the inequality, we get

$$g((1-\Delta)y_j) - (1-2p^t)\mathbb{E}[g(w_j)|w_j \quad A]$$

always satisfied when $s > t$.

Having established this, setting the utility of choosing to cooperate in period t equal to the utility of recovering in period

Proof of Proposition 3. Recall that for the asymmetric case only one group risks falling outside the political safe zone. Hence, for there to exist an equilibrium with recovery in the first period, the following condition needs to be true

$$\frac{1}{1-\delta}\{(1-p_1(y_j))y_j + p_1(y_j)z\} \geq (1-\Delta)y_j + \frac{\delta}{1-\delta}y_j \qquad \text{(A-13)}$$

which simplifies to

$$\Delta y_j + \frac{1}{1-\delta}\{p_1(y_j)(z-y_j)\} \geq 0. \qquad \text{(A-14)}$$

An decrease in concentration (asymmetry) makes delay more likely if the left hand side of the inequality is a decreasing function of y_j. This is true when the derivative of the left hand side is negative:

$$\Delta + \frac{1}{1-\delta}\frac{dp_1(y_j)}{dy_j}(z-y_j) - j$$

Table A-1: Robustness – Sample of Slumps

	Dependent Variable: $\ln \tilde{t}$					
Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Ethnologue			*Ethnic Power Relations*		
$XCONST_0$	-0.195***	-0.245***	-0.187***	-0.180***	-0.220***	-0.173***

Table A-2: Robustness – Measures of Fractionalization

	Dependent Variable: $\ln \tilde{t}$					
Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Alesina et al.			*Fearon*		*Atlas*
$XCONST_0$	-0.230***	-0.293***	-0.184**	-0.239***	-0.243***	-0.284***
	(0.069)	(0.082)	(0.073)	(0.073)	(0.053)	(0.073)
Ethnic (H^A)	0.020***					
	(0.006)					
$XCONST_0 \times H^A$	-0.004**					
	(0.002)					
Linguistic (H^B)		0.021***				
		(0.006)				
$XCONST_0 \times H^B$		-0.004***				
		(0.002)				
Religious (H^C)			0.005			
			(0.008)			
$XCONST_0 \times H^C$			-0.004*			
			(0.002)			
Ethnic (H^D)				0.019***		
				(0.006)		
$XCONST_0 \times H^D$				-0.005***		
				(0.002)		
Cultural (H^E)					0.028***	
					(0.005)	
$XCONST_0 \times H^E$					-0.008***	
					(0.002)	
Ethnic (H^F)						0.020***
						(0.005)
$XCONST_0 \times H^F$						-0.005***
						(0.002)
	Control sets					
GDP per capita	Yes	Yes	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes
Decade dummies	Yes	Yes	Yes	Yes	Yes	Yes
	Summary stats					
Exits	48	45	48	48	48	45
Spells	58	55	58	58	58	55
Years of Decline	348	337	348	348	348	333
Log-L	-63.681	-55.225	-67.932	-63.073	-58.602	-58.670
Pseudo-R^2	0.275	0.341	0.227	0.282	0.333	0.298

Note(s)

Table A-3: Robustness – Measures of Political Contraints

Variables	(1) $\ln \tilde{t}$	(2) $\ln \tilde{t}$	(3) $\ln \tilde{t}$	(4) $\ln \tilde{t}$	(5) $\ln \tilde{t}$	(6) $\ln \tilde{t}$
	Henisz Political Constraints Data					
ELF	0.017***	0.020***	0.021***	0.021***	0.022***	0.022***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
POLCON III	-1.317**	-2.130***				
	(0.568)	(0.631)				
POLCON III × ELF		-0.041***				
		(0.016)				
POLCON V			-0.901**	-1.092**		
			(0.399)	(0.477)		
POLCON V × ELF				-0.009		
				(0.010)		
POLCON VJ					-1.076	-2.289**
					(0.730)	(1.019)
POLCON VJ × ELF						-0.027*
						(0.016)
	Control sets					
GDP per capita	Yes	Yes	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes
Decade dummies	Yes	Yes	Yes	Yes	Yes	Yes
	Summary stats					
Exits	47	47	39	39	34	34
Spells	57	57	49	49	44	44
Years of Decline	347	347	335	335	325	325
Log-*L*	-62.983	-60.722	-50.894	-50.602	-45.363	-44.934
Pseudo-R^2	0.269	0.295	0.304	0.308	0.305	0.311

Note(s): Executive constraints are now measured using the data from Henisz (2000). *POLCONIII* is derived from a structural veto-player model. *POLCONV* adds two additional veto points for the judiciary and sub-federal entities. *POLCONVJ* includes measures of alignment and fractionalization of the High Court. Only *POLCONIII* is still remotely related to the parameter *c* in our model. However, these measures always include legislative fractionalization, while we are concerned with ethnic fractionalizaton of the executive. The standard errors are clustered on the country level to account for repeated spells. All specifications include a constant (not shown). *** p<0.01, ** p<0.05, * p<0.1.

Table A-4: Robustness – Functional Form

Variables	(1) $\ln \tilde{t}$	(2) $\ln \tilde{t}$	(3) $\ln \tilde{t}$	(4) $\ln \tilde{t}$	(5) $\ln \tilde{t}$	(6) $\ln \tilde{t}$
	Coefficients ($\mathbb{H}_0 = 0$)		*Hazard Ratios* ($\mathbb{H}_0 = 1$)			
	Log-logistic		*Weibull*		*Cox*	
$XCONST_0$	-0.270***	-0.253***	1.455***	1.547***	1.323***	1.352***
	(0.084)	(0.075)	(0.126)	(0.147)	(0.099)	(0.097)
ELF	0.020***	0.020***	0.968***	0.963***	0.976***	0.974***
	(0.004)	(0.004)	(0.008)	(0.009)	(0.006)	(0.006)
$XCONST_0 \times ELF$	-0.004**	-0.004***	1.004*	1.008***	1.004**	1.005***
	(0.001)	(0.001)	(0.002)	(0.003)	(0.002)	(0.002)
	Control sets					
GDP per capita	Yes	Yes	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes
Decade dummies	No	Yes	No	Yes	No	Yes
	Summary stats					
Exits	48	48	48	48	48	48
Spells	58	58	58	58	58	58
Years of Decline	348	348	348	348	348	348
Log-L	-64.578	-59.569	-66.091	-59.615	-148.403	-145.124
Pseudo-R^2	0.274	0.330	0.306	0.374	0.103	0.123

Note(s): The standard errors are clustered on the country level to account for repeated spells. All specifications include a constant (not shown). *** p<0.01, ** p<0.05, * p<0.1.