Economic Systems 40 (2016) 109–119

Contents lists available at ScienceDirect

Economic Systems

journal homepage: www.elsevier.com/locate/ecosys

The geographical spillover of armed conflict in Sub-Saharan Africa

Fabrizio Carmignani*, Parvinder Kler

Griffith Business School, Griffith University, 170 Kessels Road, Brisbane, Australia

ARTICLE INFO

Article history:
Received 21 July 2014
Received in revised form 9 August 2015
Accepted 11 August 2015
Available online 14 December 2015

JEL classification:
C23
F51
H56
N47

Keywords:
Conflict onset
Conflict duration
Contagion
Sub-Saharan Africa

ABSTRACT

Anecdotal accounts of the geographical spread of war inevitably involve Sub-Saharan African (SSA) countries. But is conflict spillover effectively stronger in SSA than elsewhere? To answer this question, we estimate models of civil war onset comparing SSA against the rest of the world (RoW). We find that in SSA a neighbour at war increases the probability of civil war onset by at least 1%. This is not negligible, considering that the unconditional probability of civil war onset is 1.1% in the global sample and 1.5% in the SSA sample. The spillover effect in the RoW is three times smaller than in SSA and, in general, statistically not different from zero. The results are robust to changes in the definition of neighbourhood and the inclusion of regional variables in the estimating equations to account for clustering effects. Finally, we provide evidence that refugee inflows and the artificial separation of ethnic groups explain part, but not all, of the spillover effect in SSA.

1. Introduction

Armed conflict has a tendency to spread from country to country. Several examples come to mind immediately. In the aftermath of the Rwandan Civil War and subsequent genocide of 1994, militant sections of Hutu refugees fled to Zaire[1] and from their camps in the eastern part of the country carried out raids against both local and Rwandan Tutsi. These raids eventually triggered the First Congo War (1996), in which several other central African countries were, directly or indirectly, involved. In western Africa, the refugee camps established on the Sierra Leone–Liberia border as a result of the First Liberian Civil War (1989–1996) provided abundant manpower for Sierra Leone's rebel army, the Revolutionary United Front (RUF). The RUF, supported by the National Patriotic Front of Liberia (NPFL) of Charles Taylor, fought a decade-long civil war in Sierra Leone (1991–2002) and eventually intervened in support of Taylor during the Second Liberian Civil War (1999–2003). In southern Africa, the presence of military installations of the Zimbabwe African National Liberation Army (ZANLA) on Mozambican soil led the Rhodesian administration to conduct military operations in Mozambique and to support the creation of the Mozambican National Resistance (RENAMO), which then became one of the two key fighting organisations in the Mozambican Civil War (1975–1992).[2]

* Corresponding author. Fax: +61 737353719.
E-mail address: f.carmignani@griffith.edu.au (F. Carmignani).

[1] We refer to Zaire rather than the Democratic Republic of Congo because the country changed name in 1997; that is, after the events we are describing happened.

[2] See Prunier (2009) on the Congo War, Gberie (2005) on the wars in western Africa, and Vines (2013) on the role of Rhodesia in the Mozambique war.

http://dx.doi.org/10.1016/j.ecosys.2015.08.002
0939-3625/

It is perhaps not a coincidence that all these examples come from the Sub-Saharan African (SSA) region. Certainly, instances of geographical spread of conflict can be found globally; consider for instance the wars in the former Yugoslavia, Lebanon, Cambodia, and more recently in Syria. Nevertheless, one cannot overlook the fact that armed conflict is a frequent and often persistent event in SSA. According to the UCDP-PRIO armed conflict dataset, a total of 99 countries were involved in some form of war since 1945. Exactly one third of these war-affected countries are located in the SSA region, about 65% of the population in this region has lived in a war-affected country in the post-WWII era, and since 1960 the average SSA country has spent 6.5 years at war. These facts lead to the following question: could the high vulnerability of SSA to conflict also mean that spillover effects in SSA are stronger than elsewhere? This question is clearly important from a policy perspective. For one thing, a large body of evidence indicates that conflict has strong negative economic effects.[3] Therefore, a quantitative assessment of the strength of conflict spillover in SSA versus the rest of the world (RoW) can help inform the discussion on the causes of SSA development, or the lack thereof. For another, understanding regional conflict spillovers is instrumental to the successful operation of multilateral peace and security initiatives sponsored by regional economic communities and the Africa Union. Moreover, from an academic perspective, the regional focus adopted in this paper yields an important new result: conflict spillover exists, but it is an SSA phenomenon much more than a global one. When SSA countries are excluded from the analysis, the spillover effect is negligible, which means that statistical findings on contagion are sensitive to the geographical composition of the sample used for estimation.

While conflict spillover is the object of a lively literature (see, for instance, Ward and Gleditsch, 2002; Braithwaite, 2005; Salehyan and Gleditsch, 2006; Kathman, 2010, 2011),[4] there is no paper (to the best of our knowledge) that estimates this spillover separately for different regions of the world. However, there are papers that study under which conditions the spillover is likely to be stronger or weaker. Braithwaite (2005) finds that territorial disputes in mountainous and resource-rich countries are more likely to experience substantial geographical spread than other disputes. In a subsequent contribution, Braithwaite (2010) also shows that conflict spillover is reduced when domestic state capacity is higher. Buhaug and Gleditsch (2008), Bosker and de Ree (2014) and de Groot (2011) report that transnational ethnic linkages are a central mechanism of contagion. Beardsley (2011) provides evidence that peacekeeping reduces the propensity for neighbouring conflict to spur domestic conflict. Drawing on these findings, one might expect the spillover effect to be stronger in SSA than elsewhere, essentially because several of the factors that seem to facilitate conflict diffusion are more abundantly present in SSA than elsewhere. For instance, according to Carmignani and Chowdhury (2012), SSA, more than other regions in the world, is characterised by a combination of large natural resource endowments and weak institutions (partly resulting from a bad disease environment). Also, in SSA more than anywhere else, ethnic groups tend to be split into separate adjacent countries. This high degree of ethnic partition, which is the result of the artificial borders drawn by colonisers, implies that transnational ethnic linkages are particularly strong.[5]

In spite of these considerations, the prediction of the strength of conflict spillover in SSA is somewhat ambiguous. Most countries in SSA are at high risk of war independently from what happens in their neighbourhood. War is therefore more likely to occur (and continue) because of “internal” factors rather than as a consequence of a true spillover effect. Conceptually, this argument is akin to the point made by Sambanis (2001), Hegre and Sambanis (2006), and Gleditsch (2007), who suggest that conflicts tend to cluster geographically because the determinants of conflict are clustered geographically. In econometric terms, this would imply that after controlling for domestic determinants of conflict, the spillover effect might actually be weaker in SSA than elsewhere.

Ultimately, the matter has yet to be settled empirically, and this paper contributes to the literature by attempting such a study. To this purpose, we estimate the determinants of civil war onset using panel data over the period 1960–2010. Our estimating equations include a large number of control variables to account for country-specific characteristics and regional factors. We also experiment with different estimators and different empirical definitions of neighbourhood. The results confirm our hypothesis that conflict spillover in SSA is stronger. In fact, in SSA a neighbour at war increases the probability of civil war onset by 1% or possibly more, depending on how the neighbourhood is defined. This is a sizeable effect considering that the unconditional probability of civil war onset is 1.5% in SSA and 1.1% world-wide (see Appendix A for the summary statistics). In the rest of the world (RoW), conflict spillover is much less strong and statistically less significant. We argue that two factors which might make SSA “special” are the large regional flows of refugees and the ethnic splits resulting from artificially drawn borders. We provide some evidence suggesting that these factors matter, albeit they do not explain the full extent of conflict spillover in SSA.

The rest of the paper is organised as follows. In Section 2 we discuss why we think that conflict spillover might be special (stronger) in SSA. Section 3 introduces the econometric model and addresses a number of methodological issues. Section 4

[3] See, inter alia, Gyimah-Brempong and Corely (2005), Bodea and Elbadawi (2008), Collier and Duponchel, (2013), and Serneels and Verpoorten (2013) for evidence on how conflict harms growth in SSA. See also Blattman and Miguel (2010) and Skaperdas (2011) for a survey of the evidence on the economic costs of armed conflict.

[4] Most of the papers provide evidence that conflict in a neighbouring state increases the risk of conflict in the domestic state. Two notable exceptions are Hegre et al. (2001) and Fearon and Laitin (2003).

[5] Alesina et al. (2011) provide data by country on the extent to which ethnic groups are cut by a political border line. The average “partition” for SSA is significantly higher than the average for the non SSA countries. Engelbert et al. (2007) and Michalopoulos and Papaioannou (2012) provide evidence of the detrimental economic effects of artificial borders and the association partition/fragmentation of ethnic groups in Africa.

presents the results for the onset of civil war. Section 5 discusses the policy implications of our findings and sets directions for future research. Descriptions of the variables and sources are provided in Appendix A.

2. Conflict spillover in SSA

Several mechanisms have been identified in the literature to explain why conflict might spill over from a country to its neighbour(s).[6] A war in a neighbouring country may provide cheap arms, knowhow, and cross-border sanctuaries to domestic insurgents, thus reducing the opportunity cost of challenging the government (Salehyan, 2007). It can also exacerbate domestic discontent, for instance by making potentially rebellious groups more aware of their grievances or by providing an example that domestic groups feel encouraged to follow. This emulation effect could be further strengthened by transnational ethnic linkages, which facilitate alliances between insurgent groups located in different countries (see, inter alia, Lake and Rothschild, 1998; and contributions therein). More generally, ethnic ties are widely viewed as a central mechanism of conflict spillover (e.g. Buhaug and Gleditsch, 2008; de Groot, 2011; Bosker and de Ree, 2014). The movement of populations caused by war is also seen as an important factor of contagion (Salehyan and Gleditsch, 2006). For instance, refugee flows may help the circulation of arms, rebels and grievances across countries. If not adequately monitored, refugee camps might lose their humanitarian character and provide rebels with a fertile ground to spread ideologies conducive to war and to recruit the manpower required for violent mobilization. Finally, the presence of refugees in large numbers can lead to socio-political tensions with the local population, which in turn increase instability in the domestic country.

The literature has also been concerned with the issue of how countries respond to the threat of contagion. On the one hand, it has been observed that domestic ruling elites might be tempted to increase repression at home (e.g. reduce the extent to which civil and human rights are protected and enforced) when civil war occurs in the neighbourhood (Danneman and Ritter, 2014). On the other hand, it seems that for a country exposed to contagion, the likelihood of being actually "infected" critically depends on its capacity to deliver timely countermeasures to patrol borders, manage refugee camps, limit the illegal traffic of weapons, and address social concerns via political institutions (as opposed to violence). In other words, the scope of the various channels through which war is transmitted across the borders is conditional on the state's capacity to mobilize and deploy the resources required to face a crisis situation (Braithwaite, 2010). State capacity, in turn, hinges on factors like sovereign integrity, quality of the bureaucracy, a stable administrative-military control, and the availability of financial means. The more these factors are available in a country, the higher state capacity and the lower the likelihood of contagion will be.

Against this background, there are two main factors that, in our opinion, contribute to increasing the risk of conflict spillover in SSA relative to the rest of the world. First, in SSA more than elsewhere, national borders are artificially drawn along arbitrary lines (often latitudinal and longitudinal lines) which do not coincide with a division of nationalities desired by the people on the ground. As a result, ethnic groups in SSA are often split into different, adjacent countries, thus giving raise to the type of transnational linkages that contribute to the spread of civil conflict. Alesina et al. (2011) present some interesting evidence in this regard. They construct an index of ethnic partition defined as the percentage of a domestic country's population that belongs to an ethnic group which is split between the domestic country and an adjacent neighbour. The average of this index in SSA countries is 53%. This compares with an average of 17.8% in the rest of the developing/ emerging world and 16.8% in industrial economies.[7] This indicates that the potential for civil war transmission along ethnic lines is stronger in SSA than in the rest of the world.

Second, many SSA states are characterised by ineffective and unresponsive central governments with little control over national territory and borders, endemic corruption and inefficient bureaucracies, undersupply of public goods and services, widespread poverty and hence very limited capacity to mobilize financial resources to fund government operations. The Fund for Peace annually develops an index of fragile states that incorporates these attributes and which can therefore be used for a comparison between SSA and the rest of the world. According to the 2014 ranking,[8] of the 20 most fragile states in the world, 14 were SSA countries; with 5 ranked as "very high alert", another 5 as "high alert", 11 as "alert", 18 as "very high warning", 7 as "high warning", and 3 as "warning"; finally, no SSA country was considered as being "stable". It is therefore our view that states in SSA tend to be weaker than elsewhere and hence less capable of resisting infection. This is particularly the case given the large flows of refugees and displaced populations that are observed in SSA. Just to give an idea of the size of these flows, the United Nations High Commission for Refugees estimates that in 2014 the number of people of concern (i.e. refugees, asylum-seekers, returnees, stateless people, and internally displaced people) in SSA was 15.1 million.

To summarize, our hypothesis is that a high degree of ethnic partition (caused by artificial borders) and weak state capacity coupled with large refugee flows put SSA at greater risk of war contagion than other countries. To test this hypothesis, we estimate a regression of war onset on an indicator of war in the neighbourhood of the domestic country. The

[6] As also discussed below, the focus of the paper is on civil conflict and hence this discussion focuses on the spillover of civil war from one country to another. Several of the mechanisms discussed in this section are also relevant in terms of spillover of interstate conflict.

[7] As a point of comparison, consider that the region comprising the Middle East and North Africa (often regarded as an area of artificial states in the public debate) has an average partition index of 12.1%, which declines to 11% if Turkey and Israel are excluded.

[8] Available at http://ffp.statesindex.org/rankings.

estimates are produced separately for SSA and the RoW. If our hypothesis is correct, then the coefficient of war in the neighbourhood should be larger when the regression is estimated on the sample of SSA countries.

3. Econometric model and specification

Following the standard approach in the literature, we model civil war onset as a binary outcome process. Let $w_{i,t}$ take the value 1 if a civil war onset is observed in year t in country i, and 0 in all years of peace. In order to focus specifically on onset, years of war subsequent to the onset are coded as missing values.[9] Also, let $p_{i,t}$ be the probability that $w_{i,t}$ takes the value 1. The regression model is formed by parameterizing $p_{i,t}$ to depend on a vector of attributes $\mathbf{x}_{i,t}$:

$$p_{i,t} \equiv \Pr(w_{i,t} = 1|\mathbf{x}_{i,t}) = \Phi\left(\mathbf{x}'_{i,t}\boldsymbol{\beta}\right) \tag{1}$$

where $\Phi(\cdot)$ is the standard normal distribution function and $\boldsymbol{\beta}$ is a vector of coefficients to be estimated. An alternative parameterization, also commonly used in the literature, is $\Pr(w_{i,t} = 1|\mathbf{x}_{i,t}) = \Lambda\left(\mathbf{x}'_{i,t}\boldsymbol{\beta}\right)$, where $\Lambda(\cdot)$ is the logistic distribution. The results obtained from this alternative parameterization are available upon request, but they are very similar to those reported below. With model (1), the effect on the conditional mean of w of a change in a generic regressor x is given by the marginal effect $\partial p/\partial x = \varphi(\mathbf{x}'\boldsymbol{\beta})\beta$, where β is the coefficient of regressor x.

The estimation of model (1) is carried out by Maximum Likelihood. The dataset covers 150 countries over the period 1960–2010 for a total of 7650 potential observations.[10] However, the panel is unbalanced and the effective total number of observations is just short of 5000. To code the dependent variable $w_{i,t}$, we rely on information from the UCDP/PRIO database (Gleditsch et al., 2002). As already noted, we only consider civil wars. It is certainly true that the onset of an interstate war might also be due to contagion. However, we suspect that the type and relative strength of contagion mechanisms would differ significantly between civil and interstate wars. Hence, we prefer to focus on only one type of conflict. We choose civil war because since the end of World War II this is the most frequent form of large-scale violence.

The key attribute in which we are interested is “war in the neighbourhood”. In our baseline specification, this is simply defined as a dummy variable that takes the value 1 for country i in year t if any of the neighbours of country i was at war in year $t-1$. We consider two definitions of neighbourhood. One includes only countries that share a land border with country i. The other includes all countries that fall within a 900 km radius of country i. We also provide robustness checks using a more sophisticated spatial approach. Let $c_{j,t}$ be a binary variable that takes the value 1 if country j is at war in year t and zero otherwise. Country j is a generic neighbour of the domestic country i. Also, let δ_j be a non-negative weight smaller than one. Then, the neighbourhood variable is equal to $\sum_{j=1}^{N} c_{j,t}\delta_j$, where N is the total number of neighbours of country i. The weight is determined in two ways. When the neighbourhood consists of countries that share a land border with country i, then $\delta_j = l_j/\sum_{j=1}^{N} l_j$, where l_j is the length (in km) of the border between country j and country i. The weight is therefore higher for countries that share a longer border with country j. This accounts for the intuition that a longer border is more difficult to monitor and hence might be more easily crossed by refugees, rebels and weapons. When the neighbourhood consists of all countries that fall within a 900 km radius of country i instead, then $\delta_j = d_j/\sum_{j=1}^{N} d_j$, where d_j is equal to 900 minus the distance (in km) between countries i and j. The weight is therefore higher for countries that are closer to the domestic economy, reflecting the idea that geographical proximity facilitates communication and movements of people and weapons.

In the selection of other attributes to include in $\mathbf{x}$ we closely follow the existing literature. Hegre and Sambanis (2006) identify three “core” variables that are almost always used in models of civil war onset: the natural log of real per capita GDP, the natural log of population, and the length of peacetime until the outbreak. Per capita GDP captures the stage of a country’s economic development. The theoretical expectation is that both the opportunity cost of civil war and state capacity increase as the country grows richer. This in turn should reduce the probability of onset. Population size matters because in the UCDP/PRIO database a conflict is classified as a civil war only if there is a high threshold of deaths. Therefore, everything else being equal, civil wars are more likely to occur in more populous countries. Both per capita GDP and population are sourced from the Penn World Tables. Peacetime, measured as the number of years since the end of the previous war, accounts for the effect of peace duration on the risk of a new conflict. When a country is at peace, conflict-specific capital should remain unused

[9] Years of ongoing war are coded as missing values. This is common practice in the literature (see Hegre and Sambanis, 2006). However, two alternative approaches could be considered. One is to code ongoing war years as 1; the other is to code ongoing war years as 0. In the first case, the dependent variable reflects the incidence of war, which is a mix of onset and duration. In the second case, the dependent variable accounts for wars that start while another war is ongoing in the same country. We re-estimate our model using these two alternative definitions and find that results concerning the strength of the spillover effect are qualitatively unchanged (see Section 4.1).

[10] See the Appendix A for the list of countries. Of the 193 sovereign states that are members of the United Nations, we have to drop 43 because we miss observations on at least one variable. Nevertheless, as information on war is generally available for all countries, these 43 states are included in the definition of war in the neighbourhood. The estimation results do not change qualitatively when the 43 countries are dropped from the definition of neighbourhood.

Table 1
Baseline estimates.

	I World	II RoW	III SSA	IV RoW	V SSA	VI RoW	VII SSA	VIII SSA	IX SSA
War in neighbourhood	.0024*	.0034	.0104**	.0033	.0102**	.003	.0102**	.0051*	.0012
	(.0015)	(.0027)	(.0052)	(.0026)	(.0052)	(.0024)	(.0047)	(.003)	(.0016)
Log GDP per capita$_{t-1}$	−.0039***	−.0047***	−.0066*	.0081	.0226	−.0058***	−.0072**	−.0061*	−.0058*
	(.001)	(.0015)	(.0037)	(.023)	(.0575)	(.0021)	(.0042)	(.0037)	(.0035)
Log GDP per capita$^2{}_{t-1}$	..	..	..	−0.0008	−0.002	..	..	..	..
				(.0015)	(.0039)				
Log population$_{t-1}$	.0012**	.0021**	.0039*	.0021**	.0041*	.0018**	.0032*	.0037*	.0035
	(.0006)	(.0009)	(.0022)	(.0009)	(.0022)	(.0008)	(.0018)	(.0022)	(.0021)
Polity$_{t-1}$	0.0004	0.0007	0.0015	0.0013	−0.0035	−0.0003	0.0011	0.0015	0.0015
	(.0004)	(.0006)	(.0012)	(.0045)	(.0107)	(.0008)	(.0012)	(.0012)	(.0015)
Polity$^2{}_{t-1}$	..	..	..	−.0001	.0005	..	..	..	..
				(.0004)	(.0010)				
Peace duration	−.0002***	−.0003***	−.0003**	−.0003***	−.0004**	−.0004***	−.0004***	−.0004**	−.0003**
	(.0001)	(.0001)	(.0001)	(.0001)	(.0001)	(.0001)	(.0001)	(.0002)	(.0001)
Growth previous 5 years	−.0058*	−.0088*	−0.0081	−.0085*	−0.0073	−.0092**	−0.0075	−0.0078	−0.0074
	(.0033)	(.0047)	(.0090)	(.0046)	(.0088)	(.0045)	(.0087)	(.0088)	(.0089)
Oil reserves per capita	.0001	.0000	.0006	.0002	.0002	.0001	.0005	.0004	.0003
	(.0002)	(.0004)	(.0006)	(.0005)	(.0002)	(.0004)	(.0005)	(.0006)	(.0003)
Ores and minerals per capita	.0011*	.0048***	.0069***	.0047***	.0079***	.0043***	.0073***	.0080***	.0083***
	(.0006)	(.0017)	(.0025)	(.0016)	(.0024)	(.0016)	(.0024)	(.0025)	(.0026)
Ethnic fragmentation	.0029	.0023	−.0092	.0021	−.0088	.0022	−.0084	−.0114	−.0112
	(.003)	(.0044)	(.0108)	(.0043)	(.0104)	(.0043)	(.0111)	(.0106)	(.0103)
Mountainous terrain	.0001**	.0001**	.0000	.0001**	.0000	.0001**	.0001	.0000	.0002
	(.0000)	(.0000)	(.0001)	(.0000)	(.0001)	(.0000)	(.0001)	(.0001)	(.0002)
Observations	4987	3548	1439	3548	1439	3475	1408	1439	1439

Notes: The dependent variable is the onset of civil war. War in the neighbourhood is a binary variable that takes the value 1 if a neighbouring country is in a civil war in year $t-1$ ($t-2$ in Column VIII and $t-3$ in Column IX). The neighbourhood consists of all countries that share a land border with the domestic country. The models are estimated by Maximum Likelihood and Instrumental variables in Columns VI and VII. *, **, *** denote statistical significance at the 10%, 5%, and 1% confidence level, respectively.

while peace-specific capital is accumulated. This suggests that peace should be characterised by positive duration dependence; that is, a country is less likely to experience a new conflict the longer it has been at peace.

Previous studies have also often looked at characteristics of the polity (e.g. level of democracy, degree of political competition, strength of checks and balances in decision-making) as a potentially relevant determinant of the risk of civil war. On the one hand, it can be argued that democratic and representative institutions, by giving citizens the opportunity to raise their concerns and demands in a peaceful setting, should be better able to pre-empt conflict. On the other hand, authoritarian regimes may be in a better position to impose restrictions on civil and human rights and hence suppress attempts at rebellion. The theoretical prediction of the impact of democracy on the risk of onset is therefore ambiguous. In fact, previous work (see, for instance, Hegre et al., 2001) has also pointed out that while the likelihood of conflict does not differ much between harshly authoritarian states and institutionally consistent democracies, "intermediate" regimes are at greater risk of civil war. Empirically, this would imply that the relationship between democracy (or polity quality) and the probability of war is inverted U-shaped. To capture the effect of polity's features, we add to our set of regressions a measure of democracy based on the degree of openness and competitiveness in the executive recruitment process. This variable is taken from the Polity IV database.

Geography is another factor that has received some considerable attention in the literature. In this paper, we focus on two aspects. One concerns the geomorphological characteristics of the terrain. A rougher terrain provides rebels with better opportunities to hide and escape the control of the central authority; hence it should increase the likelihood of war. We measure geomorphological roughness by the share of mountainous terrain in a country (CIA World Factbook). The other relevant aspect of geography is the abundance of natural resources, measured by the estimated value of oil and mineral and ores reserves per capita (Norman, 2009). The appropriation of rents from the extraction and commercialization of mineral wealth can be a powerful motive to fight. Moreover, by controlling natural resources, fighting parties can more easily finance their war efforts. One can therefore expect resource abundance to increase the risk of war.

Our model also controls for ethnic fragmentation and average economic growth. Ethnic fragmentation is measured by the probability that two randomly selected citizens do not belong to the same ethnic group (the data are from Alesina et al., 2003).[11] Intuitively, inequality and grievances along ethnic lines may lead to conflict, so that more ethnically fragmented countries should be at higher risk of violence. Economic growth is measured by the five-year average change in real aggregate GDP (sourced from the Penn World Tables). Faster growth, by creating more jobs and hence income opportunities,

[11] We perform some sensitivity analyses using the indices of fragmentation available from La Porta et al. (1999) and Wimmer et al. (2009). We also estimate a model without ethnic fragmentation to check if possible measurement errors in the construction of ethnic data affect our findings on conflict spillover. As noted in Section 4, our results are robust to all these changes.

should make civil war a less attractive option to a broader share of the population, especially younger individuals for whom rebellion is often the only alternative to a life of unemployment and poverty.

In addition to war in the neighbourhood, other regional factors might determine the onset of civil war. For instance, widespread poverty, recession, and/or political repression in neighbouring countries might result in a destabilizing inflow of migrants into the domestic country. In this case, the risk of civil war in the domestic country increases even if the neighbouring countries are not necessarily at war and independently from any contagion or spillover effect. To control for these regional effects, the baseline specification will be extended to include neighbourhood-level averages of per capita GDP, economic growth, and quality of the polity.

Regional conditions can also cause a domestic civil war indirectly by affecting the domestic determinants of civil war (e.g. poverty in the region can determine domestic GDP per capita, which in turn influences the onset of domestic civil war). This indirect effect is accounted for by controlling for domestic factors in Eq. (1). Future work could look at estimating a system of two equations that explicitly models the direct and indirect effects of regional conditions. Furthermore, because of the tendency of civil war determinants to cluster geographically (e.g. Buhaug and Gleditsch, 2008), civil war could also cluster geographically independently from any contagion or spillover. However, controlling for (i) domestic factors that are likely to be geographically clustered (e.g. country income and political institutions) and (ii) regional factors will ensure that the estimated coefficient of war in the neighbourhood picks the actual extent of conflict spillover.

Finally, our discussion in Section 2 suggests that refugee flows and ethnic partition across countries are two likely channels of war contagion. To check whether these are also the reasons why conflict spillover in SSA is stronger than elsewhere, we will estimate a version of model (1) that includes the total number of refugees received by country i from countries in the neighbourhood (the data are taken from the UNHCR database) and the percent of country i's population that belongs to a partitioned group (Alesina et al., 2011). If SSA is special because of its greater vulnerability to transnational ethnic linkages and/or movements of refugees, then the inclusion of these two variables should eliminate (or at least reduce) the difference in the effect of war in the neighbourhood between SSA and RoW.

4. Onset of civil war

4.1. Baseline estimates

Table 1 shows some baseline results. Time varying attributes, such as per capita GDP and quality of the polity, are one period lagged, as indicated in the table. The sample on which the regression is estimated is indicated at the top of each column. We start with full sample estimates in Column I. War in the neighbourhood increases the likelihood of domestic civil war onset by 0.2%. Note that the unconditional probability of conflict in the full sample is 1.1%, so the conflict spillover, while statistically different from zero, qualitatively appears to be rather small. All other coefficients have the expected sign, with the exception of that of the polity variable, which however fails to pass a zero restriction test. The risk of conflict is inversely related to the level of domestic GDP per capita and the rate of economic growth. Conversely, a bigger population, larger reserves of ores and minerals, and a rougher terrain are all factors that increase conflict risk. Moreover, peace appears to exhibit positive time dependence, meaning that the risk of war tends to be higher in the years that immediately follow the conclusion of a previous conflict. Finally, the impact of ethnic fragmentation seems to be negligible, at least in statistical terms.

In Columns II and III the sample is split between RoW (Column II) and SSA (Column III). The key finding is that the coefficient of war in the neighbourhood is quite large and statistically highly significant in the SSA sample, but not in the RoW sample. So, as we hypothesized, conflict spillover in SSA is stronger than in the RoW. Quantitatively, in SSA, having a neighbour at war increases the probability of domestic war onset by just over 1%. This is a sizeable effect considering that in the SSA sample the unconditional probability of civil war onset is 1.5%. Most of the other results are similar across the two samples and not qualitatively different from those in Column I. Perhaps the only notable difference is that in SSA a rougher terrain and slower economic growth do not seem to have any significant impact on the risk of civil war onset.

In the rest of Table 1 we check the robustness of our key finding to changes in the model specification and estimation method. In Columns IV and V we allow for a non-linear effect of economic and institutional development on the risk of war by adding the square of per capita GDP and polity quality to the set of regressors. These squared terms are however insignificant in both samples. More importantly, the evidence on the relative strength of the conflict spillover effect in the two sub-samples of countries is unchanged. In Columns VI and VII we exploit lagged values to instrument potentially endogenous variables (per capita GDP, population, polity, and growth). Again, the results are very similar to those shown in Columns II and III. Finally, in Columns VIII and IX war in the neighbourhood is lagged by one and two years respectively.[12] This allows us to gain some insight on the persistence of the spillover effect in SSA. It appears that SSA countries are still exposed to contagion in year t if a neighbour was at war in year $t-2$, but the extent of this contagion is halved compared to the case where a neighbour is at war in year $t-1$. There is no evidence of contagion arising from having a neighbour at war in year $t-3$.

[12] One-year lagging means that the war in the neighbourhood variable takes the value 1 if a neighbour was at war in year $t-2$. Two-year lagging means that the variable takes the value 1 if a neighbour was at war in year $t-3$.

Further sensitivity checks on our baseline specification are not reported here, but are available on request. In particular, we (i) re-estimated the model using a full set of country fixed effects (hence dropping all time-invariant regressors) and time fixed effects, (ii) used alternative empirical measures of polity quality, resource abundance and ethnic fragmentation, (iii) made the specification of the model more parsimonious through the exclusion of all variables whose coefficient is not significant in Columns II and III, and (iv) re-coded years of ongoing war as one (to capture the incidence of war) and as zero (to allow for wars that start while another war is ongoing in the same country). In all these instances, the coefficient of war in the neighbourhood turns out to be about three times larger in SSA than in the RoW.

4.2. Alternative definitions of neighbourhood

Table 2 presents the results for different definitions of the war in the neighbourhood variable, as discussed in Section 3. To start with, in Columns I and II neighbourhood includes all countries that fall within a 900 km radius of the domestic country. War in the neighbourhood is still defined as a binary variable that takes the value 1 if at least one country in the neighbourhood is in a civil war at time $t-1$. There is now evidence of significant conflict spillover in both subsamples. Similarly to what was observed in Table 1, the spillover is significantly larger, and statistically stronger, in SSA than in RoW. The estimated coefficient implies that if a country within a 900 km radius is in a civil war, then the likelihood of civil war onset in the domestic country increases by 1.5%. This alternative definition of neighbourhood therefore yields a conflict spillover that is about 50% stronger than what is obtained from the baseline definition.

In Columns III–VI, war in the neighbourhood is defined as the weighted average of binary indicators that pick the occurrence of war in each neighbouring country, with weights that are proportional to the length of land borders (Columns III and IV) or inversely proportional to distance from the domestic country (Columns V and VI); see Section 3 for details. The estimated coefficient of the neighbourhood variable continues to be approximately three times larger in SSA than in RoW. This finding is confirmed in Columns VII and VIII, where we also account for international wars taking place in the neighbourhood. In fact, it turns out that having a neighbourhood involved in an international war against a third country does not significantly increase the likelihood of a civil war in the domestic country. In other words, after controlling for contagion from civil war to civil war, there is no evidence of contagion from international war to civil war.

Similarly to what we did for the baseline estimates, we ran additional sensitivity checks by further changing the definition of neighbourhood. More specifically, we experimented with different radius lengths (i.e. 100 km, 300 km, and 800 km) and different weighting systems. The results, which are available upon request, are qualitatively analogous to those reported in

Table 2
Alternative definitions of neighbourhood.

	I RoW	II SSA	III RoW	IV SSA	V RoW	VI SSA	VII RoW	VIII SSA
War in neighbourhood	.0038*	.0151***	.0101*	.0302**	.0086	.027*	.0032	.0097*
	(.0021)	(.0058)	(.006)	(.0144)	(.0061)	(.015)	(.0027)	(.0052)
Log GDP per capita$_{t-1}$	−.0044***	−.0054*	−.0046***	−.0066*	−.0046***	−.0061**	−.0047***	−.0065*
	(.0015)	(.0027)	(.0015)	(.0039)	(.0015)	(.0030)	(.0015)	(.0037)
Log population$_{t-1}$	.0017**	.0040*	.0018**	.0036*	.0021**	.0047**	.0020**	.0036*
	(.0009)	(.0024)	(.0009)	(.0022)	(.0009)	(.0021)	(.0009)	(.0022)
Polity$_{t-1}$	.0007	.0017	.0007	.0016	.0007	.0014	.0007	.0015
	(.0006)	(.0012)	(.0006)	(.0012)	(.0006)	(.0013)	(.0006)	(.0012)
Peace duration	−.0003***	−.0006***	−.0003***	−.0005**	−.0003***	−.0006***	−.0003***	−.0004**
	(.0001)	(.0002)	(.0001)	(.0002)	(.0001)	(.0002)	(.0001)	(.0002)
Growth previous 5 years	−.0089*	−.0085	−.0088*	−.0081	−.0087*	−.0076	−.0088*	−.0070
	(.0049)	(.0084)	(.0047)	(.0093)	(.0047)	(.0097)	(.0047)	(.0091)
Oil reserves per capita	−.0000	.0012	.0000	.0018	.0000	.0016	.0000	.0016
	(.0004)	(.0016)	(.0004)	(.0016)	(.0004)	(.0017)	(.0004)	(.0016)
Ores and minerals per capita	.0047***	.0077***	.0472***	.0078***	.0046***	.0074***	.0048***	.0077***
	(.0017)	(.0024)	(.0171)	(.0025)	(.0017)	(.0025)	(.0017)	(.0024)
Ethnic fragmentation	.0033	−.0113	.0024	−.0088	.0026	−.0072	.0027	−.0096
	(.0046)	(.0101)	(.0044)	(.0108)	(.0044)	(.0116)	(.0045)	(.0107)
Mountainous terrain	.0001*	.0000	.0001*	.00001	.0001**	.0001	.0001	.0000
	(.0000)	(.0001)	(.0000)	(.0001)	(.0000)	(.0001)	(.0000)	(.0001)
Interstate war in neighbourhood	..	..	..	..	..	..	.0022	.0074
							(.0031)	(.0084)
Observations	3548	1439	3548	1439	3548	1439	3548	1439

Notes: The dependent variable is the onset of civil war. War in neighbourhood is measured as follows. In Columns I and II it is a binary indicator that takes the value 1 if a neighbouring country is in a civil war in year $t-1$; the neighbourhood includes all countries within a 900 km radius of the domestic country. In Columns III–VI, war in the neighbourhood is a weighted average of binary indicators that take the value 1 if a neighbouring country is in a civil war at time $t-1$; the weights are proportional to the length of the land border (Columns III and IV) and inversely proportional to the distance from the domestic country (Columns V and VI). In Columns VII and VIII, war in the neighbourhood is defined as in Table 1; interwar in the neighbourhood is a binary indicator that takes the value 1 if a neighbouring country is involved in an international war (not with the domestic country) in year $t-1$. Estimation is by Maximum Likelihood. *, **, *** denote statistical significance at the 10%, 5%, and 1% confidence level, respectively.

Table 2. We also coded a variable that takes the value 1 if at least one neighbouring country is involved in any type of war (civil or international) at time $t-1$. In line with the results reported above, the estimated coefficient of this variable turns out to be 0.091 in SSA (significant at the 5% confidence level) and 0.029 in the RoW (not significantly different from zero at the usual confidence levels).

4.3. Regional factors

The next step in our analysis is to control for the effect of regional-level factors. To this purpose, in Columns I and II of Table 3, we extend the baseline specification by adding average GDP per capita, polity quality, and economic growth in the neighbourhood of the domestic country. The estimates suggest that having neighbours with better polities reduces the risk of domestic civil war in both SSA and the RoW. Higher regional growth also reduces the probability of domestic conflict in SSA (but not in the RoW). These regional effects do not, however, alter the picture with respect to war contagion: the conflict spillover in SSA remains statistically significant and stronger than in the RoW. The inclusion of regional variables does however complicate the interpretation of the role of domestic polity quality. Taken at face value, the positive coefficient of the polity variable implies that better polities are more exposed to conflict. This suggests that when a country is surrounded by high quality polities, the domestic government has an incentive to reduce the quality of the domestic polity (e.g. move towards a more authoritarian and possibly repressive regime) as a way to suppress rebellion.

From an econometric standpoint, the question arises why domestic polity goes from being insignificant when regional polity is not controlled for to being positive and significant when regional polity is included in the regression. Multicollinearity between domestic and regional polity is a possible explanation. However, the correlation coefficient between the two variables is 0.73, which high, but not utterly so. Moreover, when domestic polity is dropped from the model, regional polity retains its negative and significant coefficient. This confirms that a better institutional environment in the region is conducive to domestic stability. Overall, factors other than simple multicollinearity seem to be driving this finding;

Table 3
Contagion v. regional clusters.

	I RoW	II SSA	III RoW	IV SSA	V RoW	VI SSA	VII RoW	VIII SSA
War in neighbourhood	.0026	.0096**	.0023	.0069*	.0023	.0070*	.0023	.0077*
	(.0024)	(.0047)	(.0024)	(.0040)	(.0024)	(.0040)	(.0024)	(.0045)
Log GDP per capita$_{t-1}$	−.0040**	−.0032	−.0069***	−.0122*	−.0069***	−.0133**	−.0068***	−.0126**
	(.0017)	(.0036)	(.0023)	(.0073)	(.0023)	(.0063)	(.0023)	(.0053)
Log Population$_{t-1}$	.0021***	.0041**	.0022***	.0041**	.0021***	.0026*	.0023***	.0028*
	(.0008)	(.0019)	(.0008)	(.0018)	(.0008)	(.0013)	(.0009)	(.0015)
Polity$_{t-1}$	.0033***	.0042**	.0033***	.0041**	.0033***	.0037**	.0033***	.0040**
	(.0012)	(.0020)	(.0012)	(.0020)	(.0012)	(.0017)	(.0012)	(.0019)
Peace duration	−.0003***	−.0004**	−.0002***	−.0003**	−.0003***	−.0003**	−.0002***	−.0003*
	(.0001)	(.0002)	(.0001)	(.0001)	(.0001)	(.0001)	(.0001)	(.0001)
Growth previous 5 years	−.0034	−.0041	−.0036	−.0043	−.0037	.0040	−.0036	.0042
	(.0051)	(.0084)	(.0049)	(.0080)	(.0048)	(.0077)	(.0049)	(.0079)
Oil reserves per capita$_{t-1}$	.0001	.0007	.0000	.002	.0000	.0021	.0000	.0021
	(.0004)	(.0015)	(.0000)	(.0017)	(.0000)	(.0016)	(.0000)	(.0017)
Ores per capita$_{t-1}$	.0036**	.0054***	.0033**	.0042**	.0033**	.0041**	.0033**	.0041**
	(.0016)	(.0019)	(.0016)	(.0021)	(.0015)	(.0020)	(.0015)	(.0021)
Ethnic fragmentation	.0029	−.0133*	.0015	−.0114	.0015	−.0119	.0015	−.0116
	(.0041)	(.0082)	(.0040)	(.0081)	(.0040)	(.0077)	(.0040)	(.0079)
Mountainous terrain	.0001*	−.0000	.0001*	−.0000	.0001*	−.0000	.0001*	−.0001
	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0001)
Regional GDP per capita	.0003	−.0034	.0015	−.0047	.0015	−.0536	.0015	.0024
	(.0011)	(.0036)	(.0077)	(.0034)	(.0077)	(.0341)	(.0077)	(.0054)
Regional polity	−.0032**	−.0037*	−.0032***	−.0043**	−.0032***	−.0040**	−.0033***	−.0042**
	(.0012)	(.0021)	(.0012)	(.0020)	(.0012)	(.0021)	(.0012)	(.0021)
Regional economic growth	−.0101	−.0227*	−.0114	−.0266	−.0116	−.027	−.0115	−.0271
	(.0156)	(.0104)	(.0152)	(.0221)	(.0152)	(.0213)	(.0151)	(.0219)
Inflow of refuges from region	..	..	.0061*	.0091*	.0062*	.0102*	.0061*	.0191*
			(.0031)	(.0040)	(.0032)	(.0064)	(.0031)	(.0106)
Ethnic partition	..	..	..	..	.0035	.0356	..	..
					(.0145)	(.0279)		
Ethnic partition at war	..	..	..	..	..	..	.0006	.0189**
							(.0015)	(.0073)
Observations	3548	1439	3275	1254	3275	1254	3275	1254

Notes: The dependent variable is the onset of civil war. War in the neighbourhood is a binary variable that takes the value 1 if a neighbouring country is in a civil war in year $t-1$ ($t-2$ in Column VIII and $t-3$ in Column IX). The neighbourhood consists of all countries that share a land border with the domestic country. The models are estimated by Maximum Likelihood. *, **, *** denote statistical significance at the 10%, 5%, and 1% confidence level, respectively.

therefore, we believe that more work should be undertaken in the future to understand the interaction between domestic and regional effects of polity quality.

In line with the discussion in Section 2, we further extend our model specification to account for the inflow of refugees from neighbouring countries (Columns III and IV) and the proportion of population that belongs to a partitioned ethnic group (that is, an ethnic group that is split between two or more countries) (Columns V and VI). While ethnic partition does not seem to produce any significant effect, the inflow of refugees clearly increases the risk of conflict. Interestingly, the inclusion of refugee inflows reduces the size and statistical significance of war in the neighbourhood, whose coefficient remains significant at the 10% confidence level, however. This finding suggests that refugee inflows explain some, but not all, of the conflict spillover in SSA.

The lack of significance of ethnic partition is a bit surprising given the voluminous previous evidence on the importance of transnational ethnic linkages in the transmission of civil war. To shed some additional light on this point, we define an alternative indicator (which we call ethnic partition at war) as follows. The original indicator measures the proportion of domestic population which belongs to ethnic groups that are split between the domestic country and any other country. Our alternative indicator only considers ethnic groups that are split between the domestic country and neighbour countries that are in a civil war. Because countries continuously change status from war to peace, this indicator varies over time and is therefore lagged by one period (as we have done for other time-varying indicators). As an example, consider Senegal. Its population consists of the following ethnicities: 45% Wolof, 24% Fula, 15% Serer, 4% Jola, 3% Mandinka, and 10% other local tribes. Wolof, Fula, Serer, Jola, and Mandinka are all partitioned ethnic groups, as they can be found in several other countries in Western and Central Africa. Therefore, the original ethnic partition measure is 91%. To compute our partition measure, we start by restricting our attention to the countries that share a land border with Senegal: Gambia, Guinea-Bissau, Guinea, Mali, and Mauritania. Not all of these countries were in a civil war all of the time. For instance, in 1980, none of them was in a civil war, hence our modified version of ethnic partition takes the value 0 in 1980. On the other hand, Mali was at war in 1990. As Fula and Mandinka can be found in Mali, our measure takes the value 27% (24% Fula and 3% Mandinka) in 1990.

The results obtained with this modified definition of ethnic partition are shown in Columns VII and VIII. The coefficient of the modified variable is positive and strongly significant in SSA, meaning that ethnic partition matters when ethnic groups are split with war-prone neighbours. The coefficient of the refugees variable retains its level of statistical significance in both subsamples, which implies that ethnic partition at war and refugee inflows work as complementary mechanisms of destabilization of the domestic country. However, they do not fully explain war contagion, as is evident from the fact that the coefficient of war in the neighbourhood remains significant in the SSA sample. Thus, even after controlling for the movement of refugees and transnational ethnic linkages, conflict spillover in SSA is stronger than in the RoW.[13]

5. Directions of future research and conclusions

Our estimates indicate that the spillover of civil conflict across countries is significantly stronger in SSA than in the RoW. A high degree of ethnic partition and weak state capacity combined with large refugee flows are some of the factors that may contribute to making SSA countries particularly vulnerable to conflict contagion. Still, the evidence suggests that conflict spillover in SSA is not fully explained by these factors. Future research should therefore extend the analysis to other potential transmission mechanisms. In particular, a hypothesis that we believe would be worth testing is whether conflict spillover in SSA is related to the geographical distribution of natural resources.

Another direction of future research that we believe worth considering is the analysis of contagion across different forms of violence, rather than just across different countries. Our paper shows that SSA is more vulnerable to contagion from civil war to civil war. But recent events in the Middle East, Nigeria, and Kenya/Somalia suggest that civil conflict in one country might spill over to another country in the form of terrorism and/or other types of violence that, while not technically classified as civil war, can still significantly destabilize the socio-political system. The question is therefore whether SSA is also more vulnerable to these other forms of contagion than the rest of the world.

From a policymaking perspective, our paper is a warning bell: conflict spillover is mainly a Sub-Saharan African problem, which therefore requires interventions specifically tailored to the reality of SSA. General recommendations on the importance of managing refugee camps to prevent their militarization and to facilitate the integration of refugees among domestic citizens are certainly relevant to SSA. However, a more specific area of intervention concerns the strengthening of regional cooperation and diplomacy. SSA, much more than the rest of the world, is populated with a large number of regional economic communities (RECs). These were originally established to foster intra-regional trade, but some of them have progressively evolved into more encompassing organizations that also aim at promoting peace and security. Making RECs fully operational and credible could therefore be a way to address the risk of war contagion in SSA.

[13] The lack of significance of ethnic partition in Columns V and VI of Table 3 might be due to the correlation with the refugee variable. Intuitively, the presence of a partitioned ethnic group might be a factor leading to greater refugee flows. The statistical correlation between the two variables is indeed positive, but not too strong (0.4). Nevertheless, we have re-estimated the models in Columns V and VI without the refugee variable and the coefficient of ethnic partition remains statistically insignificant. Similarly, we have re-estimated the models in Columns VII and VIII without the refugee variable and the coefficient of ethnic partition at war is qualitatively very similar to the one reported in the table.

Acknowledgements

We gratefully acknowledge comments from the editor, an anonymous referee, and participants in the Australian Society for Quantitative Political Science (Sydney, 9–10 December 2013) and seminars at Griffith University. Chris Ambrey provided excellent research assistance. The usual caveats apply.

Appendix A.

See Table A1.

Table A1
Variables description, sources and summary statistics.

Variable name	Definition	Source	Mean (full sample)	Mean (SSA)	Std dev. (full sample)	Std dev. (SSA)
Civil war onset	Dummy variable taking the value 1 in the first year of a new domestic civil year and 0 in every year of peace. Years of civil war subsequent to the first one are coded as missing values.	UCDP/PRIO Conflict Database.	.011	.015	.107	.134
War in the	neighbourhood	Definition 1: Binary indicator taking the value 1 in year t if at least one neighbour of the domestic country was at war in year $t-1$	Authors' calculations from data in the UCDP/ PRIO	.365		
	(definition 1, land border)	.387	Conflict	.452	.465	
	Definition 2: Weighted average of binary indicators, each taking the value 1 if a neighbouring country was at war in year $t-1$	.461 (definition 1, 900 km radius)	Database	.557	.498	.496
	For each of the two definitions, two concepts of	.275 (definition 2, land lengths)		.296	.301	.308
.287 (definition 2, distance)	neighbourhood are used: (i) all countries that share a land border with the domestic country and (ii) all countries that fall within a 900 km radius of the domestic country	.299	.315	.317		
Log GDP per capita	Log of GDP per capita at constant prices	Penn World Tables	8.299	7.172	1.259	.781
Log Population	Log of total country's population	Penn World Tables	15.757	15.407	1.654	1.302
Polity	Index of competitiveness in the recruitment of the executive	Polity IV database	5.6	4.694	2.425	1.939
Peace duration	Number of years since the end of the previous conflict	Authors' calculations from data in the UCDP/PRIO Conflict Database	8422	1861	11680	2961
Growth previous 5 years	Real GDP per capita growth over the period $t-5$ to $t-1$.	Penn World Tables	.076	.015	.256	.243
Oil reserves per capita	Stock value of oil reserves per individual around 1970. Starting period stocks are estimated by adding past production data to current reserves.	Norman (2009)	1081	957	5325	3245
Ores and minerals per capita	Stock value of ores and nonfuel minerals per individual around 1970. Starting period stocks are estimated by adding past production data to current reserves.	Norman (2009)	2091	2532	8743	9923
Ethnic	fragmentation	Probability that two randomly selected individuals do not belong to the same ethnic groups	Alesina et al. (2003)	.379	.625	.288
.276						
Mountainous terrain	Proportion of mountains in total land	CIA World Factbook	.172	.128	.221	.225
Regional GDP per capita	Total real GDP in neighbouring countries divided by total population of neighbouring countries	Authors' calculations from data in the Penn World Tables	8.254	7.076	1.232	.779
Regional polity	Simple average of Polity indicators in neighbouring countries	Authors' calculations from data in the Polity IV Database	5.578	4.765	2.434	1.949
Regional economic growth	Rate of growth of regional GDP per capita over the period $t-5$ to $t-1$	Authors' calculations from data in the Penn World Tables	.072	.017	.265	.233
Inflow of refugees from region	Total number of refugees to domestic country from neighbouring countries	UNHCR database	66007	74031	240017	166143

Table A1 (*Continued*)

Variable name	Definition	Source	Mean (full sample)	Mean (SSA)	Std dev. (full sample)	Std dev. (SSA)
Ethnic partition	Proportion of population that belongs to partitioned ethnic groups	Alesina et al. (2011)	.277	.576	.289	.27
Ethnic partition at war	Proportion of population that belongs to ethnic groups that are partly hosted in countries where there is an ongoing civil war	Authors' calculations from data in Alesina et al. (2011) integrated by CIA World Factbook	.123	.391	.093	.101

List of countries

Albania, Angola, Argentina, Armenia, Australia, Austria, Azerbaijan, Bangladesh, Belarus, Belgium, Belize, Benin, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Canada, Central African Republic, Chad, Chile, China, Colombia, Comoros, Congo, Costa Rica, Cote d'Ivoire, Croatia, Cuba, Cyprus, Czech Republic, Democratic Republic of Congo, Denmark, Djibouti, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Estonia, Ethiopia, Fiji, Finland, France, Gabon, Gambia, Georgia, Germany, Ghana, Greece, Guatemala, Guinea, Guinea-Bissau, Honduras, Hungary, Iceland, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kuwait, Kyrgyzstan, Laos, Latvia, Lesotho, Liberia, Libya, Lithuania, Madagascar, Malawi, Malaysia, Mali, Mauritania, Mexico, Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Republic of Korea, Republic of Moldova, Romania, Russian Federation, Rwanda, Saudi Arabia, Senegal, Serbia, Sierra Leone, Singapore, Slovakia, Slovenia, Somalia, South Africa, Spain, Sri Lanka, Sudan, Suriname, Swaziland, Sweden, Switzerland, Syria, Tajikistan, Thailand, FYR Macedonia, Togo, Trinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, United Arab Emirates, United Kingdom, United Republic of Tanzania, United States, Uruguay, Uzbekistan, Venezuela, Vietnam, Yemen, Zambia, Zimbabwe.

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