

Disarming Fears of Diversity: Ethnic Heterogeneity and State Militarization, 1988–2002*

INDRA DE SOYSA

Department of Sociology and Political Science, Norwegian University of Science and Technology (NTNU); and Centre for the Study of Civil War, International Peace Research Institute, Oslo (PRIO)

ERIC NEUMAYER

Department of Geography and Environment, London School of Economics and Political Science; and Centre for the Study of Civil War, International Peace Research Institute, Oslo (PRIO)

This study investigates whether ethnic and other forms of social diversity affect militarization of society. Recent scholarship in economics finds that high diversity leads to lower provision of public goods. At the same time, many conflict studies find that highly diverse societies face a lower risk of civil war, as opposed to relatively more homogenous populations. The authors explore whether diversity prompts governments to militarize heavily in order to prevent armed conflict, which would then crowd out spending on other public goods in a 'guns versus butter' trade-off. Thus, 'preventive militarization' would explain both outcomes. Yet the authors find the opposite: higher levels of ethnic diversity predict *lower* levels of militarization. If high diversity lowers the hazard of civil war, as many find, then it does not happen via preventive militarization. If diverse societies spend less on public goods, then this is not because they are crowded out by security spending. The results support those who suggest that diversity may, in fact, pose a lower security threat to states, since it is highly likely that states facing potential social strife would prioritize state militarization.

Introduction

There are two important strands of theoretical and empirical scholarship on the effects

of ethnic, linguistic and religious diversity on state behaviour. First, scholars interested in governance and public spending find that heterogeneity leads to lower provision of public goods, such as education, health and infrastructure. Since diversity apparently poses problems for arriving at a consensus for cooperative solutions (a question of governance under diverse preferences), the greater the diversity, the worse the policy outcomes (Alesina, Baqir & Easterly, 1999; Alesina et al., 2003; Easterly, 2001). Second, cultural heterogeneity takes a prominent place in

* Equal authorship. Corresponding author: Indra de Soysa (indra.de.soyasa@svt.ntnu.no). We would like to thank Norman Loayza, Jim Fearon, Nils Petter Gleditsch, Halvard Buhaug, Dawood Mamoon, the editors and several anonymous referees for many helpful comments. Any errors are our fault. The research was supported by the World Bank research project on 'Political Institutions, Development, and Domestic Civil Peace', funded by the government of Norway. Eric Neumayer acknowledges financial assistance from the Leverhulme Trust. The data used in this article and an appendix are posted at <http://www.prio.no/jpr/datasets>.

debates over the causes of violent conflict (Cederman & Girardin, 2007; Ellingsen, 2000; Fearon, Kasara & Laitin, 2007; Fox, 2004; Gagnon, 2004; Gilley, 2004; Reynal-Querol, 2002; Sambanis, 2001; Varshney, 2001).¹ The focus on religion, in particular, intensified following the 9/11 terrorist attacks in the United States, although the tradition of explaining violent conflict in developing countries, in the years after World War II, as ethno-nationalist rebellion has deep roots (Drake, 1957; Gurr, 1970; Huntington, 1968). The popular wisdom is that ethnic and, if less so, religious conflict is 'endemic' and 'everywhere on the rise'.² The vast majority of empirical evidence suggests, however, that ethnic and religious fractionalization does not predict a higher risk of civil war (Fearon & Laitin, 2003; Mueller, 2000). If anything, high diversity makes countries safer (Wimmer & Min, 2006). In other words, what matters for the hazard of civil war is ethnic dominance (Collier & Hoeffler, 2004) or ethnic and religious polarization (Montalvo & Reynal-Querol, 2003, 2005), rather than ethnic fractionalization. Nonetheless, theories built around such concepts as ethnic hatred and ethnic security dilemmas are prominent in the literature (Kaufmann, 1996; Petersen, 2001; Posen, 1993; Snyder & Jervis, 1999; Walter & Snyder, 1999). Ethnic and religious conflict occurs because groups are unable to coordinate mutual security fears (Woodward,

1995), manage underlying social frictions and accommodate nationalist demands (Wimmer, 1997; Wolff, 2006).³ Clearly, the issue of ethnic diversity's effect on state behaviour is interesting not just for theory-building. Much international and local policy is currently focused on achieving viable peace and development strategies in heterogeneous populations, most notably in Iraq and Afghanistan, where issues of cultural representation dominate political discourse.

We explore whether there is a link between the two strands of the literature. Specifically, ethnic diversity could lead to security concerns to which governments respond with higher 'preventive militarization'. Since high fractionalization might pose a readily observable security threat, perhaps governments overcompensate for the security risks, neglecting other public goods? This may account for why some countries have high diversity and no conflict, while simultaneously having lower public goods. In other words, does ethnic diversity lead to higher militarization, thus crowding out the provision of non-security public goods in a special kind of guns-versus-butter trade-off? We test this issue empirically, employing several measures of ethnic and cultural diversity and polarization on three indicators of state militarization, namely, military expenditures, the share of military personnel in the labour force and arms imports. Additionally, we employ a measure of ethnic exclusion, currently available for only a limited group of countries (Cederman & Girardin, 2007).

¹ It is reported that one English-language scholarly journal database records 249 articles published since 1990 containing 'ethnic conflict' in the title as opposed to just 23 with 'class conflict' (Gilley, 2004: 1155). Some argue that 'ethnic conflict' is a myth and that the role of ethnicity in conflict is highly exaggerated, leading to flawed policy prescriptions with dangerous consequences (Gagnon, 2004).

² See Kaplan (1994) for a recent explication of the primordialist argument that suggests ethnic and, more broadly, cultural conflict to be endemic. Huntington's (1993) hypothesis of a 'clash of civilizations' provides a related argument. Others report that the incidence of ethnic conflict and intercommunal violence is declining (Gurr, 2001).

³ Some find a monotonic positive effect between ethnic diversity and conflict in some estimations (Ellingsen, 2000; Sambanis, 2001). We are in no position to evaluate the reasons for the discrepant findings, but we note that the vast majority of evidence points in the direction that ethnic diversity lowers the hazard of civil war. The debate between those who see ethnicity as crucial for understanding conflict and those who see it as epiphenomenal further justifies why one needs to test the effect of ethnic diversity on other important outcomes, such as militarization.

Our results are easily summarized. We find that heterogeneity predicts lower, rather than higher, levels of military spending relative to GDP between 1988 and 2002, controlling for several salient factors, such as country size, income, regime type, security risks, armed conflict, etc. If states fear ethnic diversity, or if heterogeneity drives dangerous social frictions, it does not show in terms of how states prepare to deal with this. The results are robust to sample size and several different specifications and testing procedures. Ethnic heterogeneity is also negatively related to the share of military personnel in the total labour force. Since most poor countries are likely to follow more labour-intensive security strategies, this result too is instructive. Ethnic diversity also reduces the share of arms imports in total imports. Religious heterogeneity has no statistically significant effect in any of the tests, which confirms existing studies that fail to find an effect of religious heterogeneity on either growth or institutional quality. In one set of estimations, it seems to be linguistic rather than ethnic heterogeneity that diminishes militarization, but Alesina et al.'s (2003) measure of linguistic fractionalization is highly correlated with ethnic fractionalization. In the case of militarization, we find that it is heterogeneity that matters, and not polarization, as some have argued (e.g. Montalvo & Reynal-Querol, 2005).

The results taken together do not suggest that governments 'run scared' because of ethnic and other diversity – quite the opposite. The results throw into doubt the notion that minority ethnic groups in ethnically diverse societies need to fear high state militarization when they rebel for autonomy. Nor do the results support a conjecture that heterogeneous societies remain peaceful because states militarize to prevent violent conflict. Realist theories, in particular, argue that ethnic conflict in Eastern and Central Europe was kept in check by Soviet military might,

only to erupt with the withdrawal of Soviet power (Huntington, 1993; Mearsheimer, 1990). If, in fact, diversity is a source of potential violent conflict, it does not seem likely that peace prevails because of a 'garrison state' effect. We find exactly the opposite of this expectation regarding state behaviour under conditions of ethnic and other diversity. Our results, therefore, do not suggest that militarization crowds out public goods under conditions of diversity. Similar to the problems diverse societies encounter for the provision of public goods, it seems that they may have difficulties collecting the taxes, forging political support or reaching the social consensus required for militarization. This does not mean we would advocate militarization as a solution, but rather that governments do not seem to act in the way we think would be a rational response to real and/or perceived threats emanating from ethnic diversity.

Ethnic Diversity, Public Goods and Armed Conflict

Ethnic and other forms of diversity are interesting not only because of their supposed links to violent conflict. Research suggests that diversity adversely affects economic development and public policy outcomes as well. Ethnic heterogeneity (and polarization) is seen as the underlying cause of the failure of collective action, particularly as it generates incentives for rent-seeking (Alesina, 1994; Alesina & Drazen, 1991; Alesina & Rodrik, 1994; Montalvo & Reynal-Querol, 2005; Posner, 2004). Political economy models suggest that heterogeneity is 'prone to competitive rent-seeking by the different groups that have difficulty agreeing on public goods like infrastructure, education, and good policies' (Easterly & Levine, 1997: 2). This phenomenon has been demonstrated at various levels of aggregation – see, for example, Alesina, Baqir & Easterly's (1999) study of

the negative impact of ethnic fractionalization on public good spending in US cities and Easterly & Levine's (1997) cross-national study explaining Africa's growth tragedy.⁴ Africa's economic woes are seen as being directly related to the bad public policies that result from ethnic heterogeneity, where political conflicts driven by ethnic frictions impede good governance and sound public goods provision (Easterly & Levine, 1997; Kimenyi, 1997). Cross-national studies show that ethnic polarization lowers investment, whereas religious polarization increases government consumption relative to GDP (Montalvo & Reynal-Querol, 2005). Alesina et al. (2003), however, find that it is diversity that matters more than polarization on the question of poor economic policy and public goods provision, largely because of coordination failure arising from social frictions. Possibly, the negative effects of fractionalization are mitigated in democracies (Collier, 2001) or rather, as Easterly (2001) argues, where institutional quality is high, this being only weakly correlated with democracy. However, some find that institutional quality is itself negatively affected by ethnic fractionalization (Alesina et al., 2003; Easterly, Ritzen & Woolcock, 2006; Keefer & Knack, 2002).

Recent studies of civil war onset show that, contrary to conventional wisdom, ethnic diversity's role in violent conflict is not straightforward. Ethnicity is important, of course, for organization and mobilization of support, but conflict occurs when the opportunity for using large-scale violence is maximized (Collier et al., 2003). In highly homogeneous societies, there is little ethnic strife, whereas a high degree of fractionalization prevents effective mobilization. Collier (2001) argues that highly fractionalized societies hinder the formation of minimum

winning coalitions that are large enough to effectively challenge a state's monopoly on force. Many empirical studies suggest that there is 'more murder in the middle', with moderately fractionalized societies facing the greatest danger (Collier & Hoeffler, 2004; de Soysa, 2002; Reynal-Querol, 2002). Others call this polarization, where two equally sized groups are the most dangerous or, in other words, where moderate fractionalization prevails, since measures of polarization are at a maximum when society is made up of two groups containing 50% of the population each (Alesina et al., 2003; Montalvo & Reynal-Querol, 2002). Moreover, if the largest minority is large enough, it is a more attractive target for expropriation by a majority, leading to polarized conflict and violence (Caselli & Coleman, 2006).

Yet, there is a mechanism other than Collier's (2001) minimum winning coalition argument by which ethnically diverse societies might achieve civil peace. If states anticipate a high probability of violence or ethnic challenges under conditions of heterogeneity (social frictions), they might be prone to deter large-scale violence through preventive militarization.⁵ It is this aspect of the debate we test on militarization, discussing the question of violent conflict only as a backdrop for why militarization should matter. If diverse societies in fact engage in preventive militarization, then this could also be one of the reasons why these societies underprovide public goods, thus giving a possible causal link between the two strands of literature regarding the effects of diversity on state behaviour.

Our study is mainly motivated by two interrelated concerns. The first is theoretical

⁴ Posner (2004) corrects Easterly & Levine's (1997) measure for ethnic groups that are politically relevant and comes to the same conclusion.

⁵ Collier & Hoeffler (2007) do not find that higher military spending deters civil conflict, while Collier & Hoeffler (2006) even show that higher spending might increase rather than reduce the risk of renewed conflict in post-conflict societies. Yet, many policymakers all over the world seem to think that militarization is needed for conflict prevention.

from the perspective of conflict studies. If ethnic diversity is inherently dangerous, then do states prepare to meet it via militarization? If ethnic heterogeneity does not seem to matter in terms of the outbreak of civil war, is this because states suppress conflict effectively by increasing military capacity? Second, is the strong empirical association relating ethnic divisions to lower levels of public good provision related to higher militarization? Do states respond to the ethnic diversity 'threat' via militarization, thus crowding out other public goods? In fact, several scholars treat military spending as a public good, both regionally and within countries, because if it does buy security, then others benefit from having to spend less, given the regional nature of the consequences (Collier & Hoeffler, 2006, 2007; Olson, 1982). Our analysis is designed to answer these questions.

Research Design

We employ a pooled time-series cross-section (TSCS) dataset. Our main dependent variable consists of military expenditures over GDP (*military expenditures*). We keep this variable in its level form, but our main results are hardly affected if it is logged instead. Others also report this finding (Collier & Hoeffler, 2006). The data are taken from the World Development Indicators CD-ROM (World Bank, 2004), which is also the source for the other variables, unless noted otherwise. They are available annually from 1988 up to 2002, a total of 15 years. Combining various sources, one could, in principle, construct a panel that reaches further back in time. However, given measurement and international and intertemporal comparability problems with military expenditure data, particularly during the period of the Cold War (Brzoska, 1995), we prefer to use one single data source that largely covers only the post-Cold War period. The recent data are

also much more reliable, given improved standards for collecting data and higher levels of transparency due to democratization and international pressure (Omitoogun, 2003). The World Bank data are almost identical to data supplied to us directly by SIPRI ($r = 0.98$).

In addition, we use two other variables capturing aspects of militarization to build robustness. The second dependent variable is military personnel as a share of the total labour force (*military personnel*). The advantage of using the share of military personnel is that poor countries may simply use labour-intensive (rather than capital-intensive) forms of militarization. Finally, we use arms imports relative to total imports (*arms imports*). This variable is available only up to 1999, and, in principle, arms import expenditures should be included in total military expenditures. However, for some countries, arms imports are not accounted for in military expenditures (Brzoska, 1995), and a high arms-to-total-imports ratio provides yet another feature of militarization. These data are from World Bank (2003).⁶

Our primary independent variable is ethnic heterogeneity (Alesina et al., 2003; Fearon, 2003). This measure is defined as the probability that two randomly selected individuals from the same country belong to different ethnic or linguistic groups, computed as

$$ELF = 1 - \sum_{i=1}^n p_i^2, \text{ where } p_i \text{ is the population}$$

share of ethnic or linguistic group i , and n is the number of existing groups. These data are based on more current, updated sources, and do not conflate ethnic, religious and linguistic characteristics in a single measure as blatantly as the old ELF measure that was based on Soviet ethnographic studies during the 1960s

⁶ There is one data point of more than 100% (Ethiopia 1989), which can happen if there are inconsistencies in the reporting and measurement of arms as well as total imports. Dropping this observation from the sample had little impact on the results.

(Fearon, 2003). They also rely on survey-based studies that have examined several African countries, where distinction of groups is not always straightforward. Fearon (2003: 196) claims that his measure is 'broadly similar' to Alesina et al.'s (2003) measure. Both these measures are highly similar to Montalvo & Reynal-Querol's (2005). In addition to these three sources, Roeder (2001) has developed an ethnolinguistic fractionalization index, which is mainly based on the original Soviet sources from the 1960s, together with other Soviet ethnographic studies from the 1980s.

Additionally, Montalvo & Reynal-Querol (2005) argue that it is polarization rather than fractionalization that matters. Polarization measures 'the normalized distance of a particular distribution of ethnic and religious groups from a bimodal distribution' (see Montalvo & Reynal-Querol, 2005: 301 for details). It is computed as

$$p \equiv 1 - \sum_{i=1}^n \left(\frac{.5 - p_i}{.5} \right) p_i, \text{ where } p_i \text{ is again the}$$

population share of group i , and n is the number of existing groups. Polarization approaches unity when the population is made up of two equally sized groups and then declines as the number of groups increases further, whereas fractionalization increases monotonically with the number of groups. Empirically, across countries, ethnic polarization is related to ethnic fractionalization in a non-linear way: ethnic polarization first rises with increasing fractionalization but then falls at an intermediate level of fractionalization. Religious polarization is somewhat different. It first increases as fractionalization increases and then, at higher levels of fractionalization, there is no relationship to polarization. See Montalvo & Reynal-Querol (2005) for a detailed discussion. Table I provides a correlation matrix for the various measures of fractionalization and polarization used. There is clearly often strong correlation among the various measures, but they are far

from identical. We use the conservative strategy of testing all these measures to ensure robustness of our results, a strategy advocated by both Fearon (2003) and Alesina et al. (2003).

In a recent debate on the importance of ethnicity for predicting conflict, Cederman & Girardin (2007) argued that fractionalization measures are not a good way of capturing why ethnic grievances matter for conflict (Cederman & Girardin, 2007; Fearon, Kasara & Laitin, 2007). They propose that what matters is not ethnic diversity as such, but the exclusion of ethnic groups from state power. They construct a measure of ethnic exclusion based on the size of the ethnic groups that do not share in government, which they call N -star. The smaller the size of the ethnic group in power, the greater the chances of violence. We use their measure of N -star to test also this aspect of ethnicity on state militarization in sensitivity analysis. Do ethnic minorities in power use their access to state resources to ensure their predominance through militarization?

There is an enormous theoretical and empirical literature that has accumulated on the causes and consequences of military spending (Gleditsch et al., 2000; Hartley & Hooper, 1990). Most of these studies have focused on arms races between the superpowers or are case studies of single countries over time. We rely primarily on two recent empirical studies addressing the determinants of military spending, namely, Collier & Hoeffler's (2007) study of military expenditures in five-year averaged periods from 1960 to 1999 and Goldsmith's (2003) study of military spending over the period 1886 to 1989, neither of which addresses ethnic and other diversity.

We control for the level of per capita income in purchasing power parity (*gross national income per capita*) as well as its growth rate (*economic growth per capita*), which are commonly used variables

Table I. Correlation Matrix of Fractionalization and Polarization Measures

	1	2	3	4	5	6	7	8	9	10	11
1: Ethnic fractionalization (Fearon & Laitin)	1.00										
2: Religious fractionalization (Fearon & Laitin)	0.39	1.00									
3: Cultural fractionalization (Fearon)	0.82	0.33	1.00								
4: Ethnic fractionalization (Alesina et al.)	0.76	0.31	0.74	1.00							
5: Religious fractionalization (Alesina et al.)	0.31	0.89	0.20	0.23	1.00						
6: Linguistic fractionalization (Alesina et al.)	0.88	0.40	0.74	0.68	0.31	1.00					
7: Ethnolinguistic fractionalization (Roeder)	0.85	0.43	0.70	0.83	0.36	0.76	1.00				
8: Ethnic fractionalization (Montalvo & Reynal-Querol)	0.84	0.36	0.68	0.81	0.29	0.73	0.86	1.00			
9: Religious fractionalization (Montalvo & Reynal-Querol)	0.51	0.50	0.50	0.53	0.51	0.48	0.52	0.54	1.00		
10: Ethnic polarization (Montalvo & Reynal-Querol)	0.42	0.12	0.39	0.55	0.11	0.28	0.51	0.58	0.32	1.00	
11: Religious polarization (Montalvo & Reynal-Querol)	0.54	0.46	0.51	0.59	0.47	0.50	0.58	0.57	0.96	0.40	1.00

(Davoodi et al., 2001; Goldsmith, 2003; Gupta, de Melo & Sharan, 2001). We log *gross national income per capita* to reduce skewness. Most find that income is positively related to higher expenditures, arguing that wealth allows governments the greater luxury of stronger defence (Collier & Hoeffler, 2007). In economic terms, military spending is likely to be a normal good, that is, a good with a positive income elasticity (Sandler & Hartley, 1995). High economic growth rates might make it easier for governments to impose a greater defence burden on society. We use total population (logged) to control for country size, because this influences both ethnic heterogeneity and militarization (*population size*). Collier & Hoeffler (2007) report a negative effect of country size as measured by population on military budgets, arguing that large countries deter external threats. We control for regime type (*democracy*) using the POLITY IV dataset's polity2 indicator, which uses a weighting scheme to treat periods of transition (<http://www.cidcm.umd.edu/inscr/polity/>). We expect autocracies to have higher military spending than democracies (Goldsmith, 2003). Many have argued that autocracies are dependent on military force to sustain their rule, whereas democracies command a greater degree of legitimacy and are less in need of a strong military (Kimenyi & Mbaku, 1995; Maizels & Nissanke, 1986). We additionally control for overall government spending per GDP (*government expenditures*), since high government consumption generally will have the same causes as high military spending.

Next, we control for internal and external security threats, which should impact militarization (Collier & Hoeffler, 2007). We enter a term for *civil war*, which is a dummy variable for years in which a country experiences armed conflict with over 25 battle-related deaths (Gleditsch et al., 2002). Following Goldsmith (2003), the international war variable is a dummy for years in which a

country engages in conflict between states with at least 1,000 deaths (*international war*). These data are taken from Gleditsch et al. (2002). We also compute a count of civil and international peace years (*peace years [civil war]* and *peace years [int. war]*), or the simple count of the number of years since the last civil and international war since 1946. It is well established that, for civil wars at least, there is a high risk of revival, which suggests that militarization after the end of civil war is likely to diminish only slowly over time (Collier & Hoeffler, 2006). Civil wars could also be endogenous to militarization. High military expenditures can deter international conflicts, but can also provoke them, owing to fears among neighbours (Fordham & Walker, 2005). High military expenditures can signal to rebels that the initiation of a civil war is likely to end in defeat, but, particularly in fragile post-conflict societies, high expenditures can also increase the risk of renewed conflict, if the former rebels take such expenditures as a signal of the bad faith of a government (Collier & Hoeffler, 2006). For these reasons, we run tests with and without the civil war variables (incidence and peace years) included.

Similar to Collier & Hoeffler (2006), we take a weighted average level of militarization of countries that are 'contiguous' (*neighbourhood militarization*). The weight is GDP and contiguity is defined as either land contiguity or water contiguity (up to 400 miles of water) (Bennett & Stam, 2003). In a context of rivalry, the level of militarization of contiguous countries can capture local arms-race phenomena. In a context of non-rivalry, it can capture emulation, imitation and coordination effects. The contiguous militarization variable is not without problems, however. In effect, it introduces a spatial lag into the model (Anselin, 1998) and often captures variables omitted from the model (Simmons & Elkins, 2004). We believe our model is relatively comprehensive, but it would be

difficult to say with confidence that there are no omitted variables. For this reason, we run tests with and without the contiguous militarization variables.

Contrary to Collier & Hoeffler (2007), we do not include a measure of predicted civil war. Instead, we directly control for the risk of civil war by our range of explanatory variables, which will capture the risk of civil war under the assumption that the factors triggering such war are time-persistent. Finally, we include year-specific dummies, to capture any trends over time, and year-specific international tension that influences defence spending globally, such as the end of the Cold War, the Gulf War and NATO action in the Balkans. Table II provides descriptive statistics of the variables.

The estimation of TSCS data presents some special problems, particularly because of complex correlation patterns between and across panels (Beck & Katz, 1995). Since our data are unbalanced to an extent that no time periods are common to all countries in the sample, the standard version of the Panel Corrected Standard Errors (PCSE) method of Beck & Katz cannot be used. As an alternative, we use a random-effects estimator with robust standard errors, assuming that observations are independent across countries, but not necessarily within countries over time; that is, observations are clustered by units. The robust-cluster option produces consistent standard errors even in the presence of serial correlation and heteroskedasticity, but it is potentially inefficient in

Table II. Summary Statistics

<i>Variable</i>	<i>Obs.</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min.</i>	<i>Max.</i>
Military expenditures/GDP (%)	1,589	2.90	2.82	0	29.00
Military personnel/labour force (%)	1,393	1.39	1.72	0	23.68
Arms imports/total imports (%)	1,406	2.85	5.32	0	36.86
Ethfrac (Fearon & Laitin)	1,587	0.40	0.27	0	0.93
Relfrac (Fearon & Laitin)	1,587	0.36	0.21	0	0.78
Cultfrac (Fearon)	1,561	0.30	0.20	0	0.73
Ethfrac (Alesina et al.)	1,589	0.44	0.25	0	0.93
Relfrac (Alesina et al.)	1,589	0.42	0.23	0	0.86
Linfrac (Alesina et al.)	1,560	0.39	0.28	0	0.92
Ethlinfrac (Roeder)	1,589	0.46	0.27	0	0.98
Ethfrac (Montalvo & Reynal-Querol)	1,307	0.44	0.28	0.01	0.96
Relfrac (Montalvo & Reynal-Querol)	1,321	0.28	0.23	0.00	0.78
Ethpol (Montalvo & Reynal-Querol)	1,307	0.51	0.24	0.02	0.98
Relpol (Montalvo & Reynal-Querol)	1,321	0.46	0.34	0	1.00
Gross national income per capita (ln)	1,589	8.34	1.15	5.94	10.49
Economic growth per capita	1,589	0.04	0.06	-0.51	0.33
Democracy (Polity IV)	1,589	2.92	6.97	-10.00	10.00
Government expenditures	1,589	16.24	6.64	2.98	56.51
Population size (ln)	1,589	16.30	1.46	12.87	20.97
Neighbourhood military expenditures	1,589	2.97	2.28	0	24.46
Neighbourhood military personnel	1,393	1.21	1.14	0	9.43
Neighbourhood arms imports	1,406	2.85	5.32	0	36.86
Peace years (civil war)	1,589	20.14	18.95	0	56.00
Peace years (international conflict)	1,589	26.77	17.31	0.00	56.00
Civil war	1,589	0.19	0.39	0.00	1.00
International war	1,589	0.02	0.13	0.00	1.00

estimation (Wiggins, 1999). To ensure that results are not specific to our estimation technique, we additionally use the Generalized Estimation Equation method (GEE) (Zorn, 2001), also under the assumption of clustered observations.

Results

Table III presents the results for militarization with Fearon & Laitin's (2003) measures of ethnic and religious heterogeneity. Note that year-specific time dummies are included in the estimations, but their coefficients are not reported. Column 1 reports results with random effects (cluster option), and column 2 reports results using the GEE method.⁷ As seen there, ethnic heterogeneity is negatively related to militarization across all three measures of militarization. Religious heterogeneity is not statistically significantly different from zero in any of the estimations. Substantively, holding all other variables at their mean values, raising ethnic heterogeneity by one standard deviation would reduce the share of military expenditures in GDP by almost three-quarters of a percentage point (0.71), which is quite large, given that the global average military burden is only 2.9% of GDP.

What about our control variables? Contrary to Goldsmith (2003), who tests a longer time period, we do not find that higher per capita income predicts higher defence spending, but a higher economic growth rate allows countries to engage in higher military spending. This difference in results might suggest some influence from the Cold War period that dominates other tests. Developed and Eastern European countries have, on average, reduced their military spending since the end of the Cold

War, whereas developing countries have reduced it by smaller degrees or not at all. Democracy has a negative and statistically significant impact on military spending, supporting Goldsmith's (2003) and Collier & Hoeffler's (2006) findings. Democratic governments are able, independently of the level of fractionalization, wealth and other controls, to focus a larger share of resources on other priorities than security. This result is not likely to be driven mainly by the fact that democracies thrive in peaceful neighbourhoods and autocrats thrive in violent ones, which can be deduced from the fact that we control for violent conflict.⁸ Larger government consumption is also positively related to higher military expenditure. Military spending by contiguous countries and the incidence of civil war show the expected positive sign and are statistically significant, results that are also consistent with other studies (Goldsmith, 2003; Gupta, de Melo & Sharan, 2001). Military expenditures decrease with a longer history of civil peace. Perhaps surprisingly, neither the incidence nor the history of international conflict seems to matter for military spending.

With respect to military personnel as a share of the labour force, neither per capita income nor the economic growth rate has a statistically significant impact. Democracy shows a statistically significant negative effect on the share of labour devoted to security. Not surprisingly, population size is negatively related to military personnel as a share of the labour force, since countries with a large population need to allocate a smaller share of the labour force to military duties, while still retaining a large military in absolute numbers. Higher militarization by contiguous neighbours leads to higher

⁷ Collinearity among the variables does not seem to be a problem. The average Variance Inflation Factor (VIF) score is around 2 in column 1.

⁸ There is a large literature on the democratic peace (Russett & Oneal, 2001) and questions relating to spatial effects of neighbourhoods and the diffusion of democracy (Gleditsch & Ward, 2006).

Table III. Militarization and Fearon & Laitin's (2003) Measures of Fractionalization, 1988–2002

	(1) <i>XTREG</i> <i>Mil. expenditure</i>	(2) <i>XTGEE</i> <i>Mil. expenditure</i>	(3) <i>XTREG</i> <i>Mil. personnel</i>	(4) <i>XTGEE</i> <i>Mil. personnel</i>	(5) <i>XTREG</i> <i>Arms imports</i>	(6) <i>XTGEE</i> <i>Arms imports</i>
Ethnic fractionalization	−2.523*** (4.15)	−2.545*** (4.15)	−0.903** (2.46)	−0.940** (2.46)	−3.307** (2.41)	−3.311** (2.46)
Religious fractionalization	0.877 (1.20)	0.880 (1.21)	−0.541 (1.31)	−0.559 (1.34)	0.611 (0.40)	0.647 (0.43)
Gross national income per capita (ln)	−0.328 (1.39)	−0.338 (1.43)	0.050 (0.46)	0.035 (0.31)	−0.690* (1.93)	−0.647* (1.86)
Economic growth per capita	1.293** (2.08)	1.281** (2.09)	0.093 (0.14)	0.064 (0.10)	−0.208 (0.08)	−0.097 (0.04)
Democracy (Polity IV)	−0.040** (2.28)	−0.039** (2.25)	−0.012* (1.89)	−0.012* (1.79)	−0.105 (1.62)	−0.112* (1.72)
Government expenditures	0.158*** (4.52)	0.157*** (4.56)	0.028** (2.17)	0.028** (2.15)	0.161** (2.52)	0.164*** (2.69)
Population size (ln)	−0.034 (0.30)	−0.044 (0.38)	−0.150** (2.35)	−0.164** (2.30)	0.375 (1.49)	0.390 (1.57)
Neighbourhood militarization	0.130** (2.52)	0.126** (2.48)	0.568** (2.23)	0.557** (2.17)	0.110 (1.55)	0.118* (1.72)
Peace years (civil war)	−0.020*** (3.74)	−0.020*** (3.74)	−0.004* (1.81)	−0.004** (2.02)	−0.024* (1.84)	−0.024* (1.89)
Peace years (intern. conflict)	0.006 (0.72)	0.007 (0.74)	−0.009 (1.56)	−0.009 (1.53)	−0.035** (2.30)	−0.031** (2.20)
Civil war	0.639*** (3.24)	0.639*** (3.26)	0.055 (0.77)	0.053 (0.76)	2.375** (2.55)	2.391*** (2.60)
International war	0.763 (1.24)	0.761 (1.25)	0.608* (1.79)	0.612* (1.80)	3.232** (2.19)	3.160** (2.18)
Observations	1,587	1,587	1,383	1,383	1,396	1,396
Countries	131	131	138	138	139	139

Absolute values of *t*- and *z*-statistics in brackets. Constant and year-specific time-dummies included, but coefficients not reported. *, **, *** significant at .1, .05 and .01 level, respectively.

militarization within the country. A longer history of civil peace leads to lower military personnel, whereas the opposite is true for the incidence of international war. This result is reasonable, as it is the rich countries that largely fight international wars (as in Kosovo and the Persian Gulf) and simultaneously maintain more capital-intensive defence postures.

Finally, regarding arms imports as a share of total imports, we find that higher arms imports by contiguous neighbours as well as the incidence and history of civil and international war have the predicted effect on a country's arms imports. Democracies import fewer arms than autocracies, but the effect is marginally insignificant in random-effects estimation. Surprisingly, arms imports are lower in countries with a higher per capita income. An explanation could be that richer countries are able to produce a larger share of their armaments domestically. Government expenditure is positively associated with arms imports, whereas population size and the economic growth rate do not matter.

In Tables IV to VI, we repeat the tests conducted above, but this time using alternative measures of heterogeneity. Estimations using Montalvo & Reynal-Querol's (2005) measures of ethnic and religious fractionalization are reported in Table IV. These results are similar to the results using Fearon's (2003) and Fearon & Laitin's (2003) measures: more ethnically fractionalized societies have lower military spending and lower arms imports, whereas religious fractionalization does not matter. The substantive effect of a standard deviation increase in fractionalization reduces the defence burden by almost one-half of one percent. The main difference from results in Table III is that ethnic fractionalization, while being negatively signed, has no statistically significant effect on military personnel as a share of the labour force. Results from the main estimations reported in Table III hold if Roeder's (2001)

ethnolinguistic fractionalization index is used instead, with results reported in Table V.

Alesina et al.'s (2003) measures of ethnic, linguistic and religious fractionalization are tested in Table VI. As seen there, it is linguistic fractionalization that has the strongest negative and statistically significant effect on military expenditures and arms imports, although it is not statistically significant for military personnel.

Religious fractionalization exerts a negative and statistically significant impact on military personnel, however. Ethnic fractionalization remains insignificant across the dimensions. We reran all tests by dropping linguistic fractionalization, because it is highly correlated with ethnic fractionalization, but the results do not change much. This result is plausible, because it is Alesina et al.'s (2003) linguistic rather than ethnic fractionalization that is most highly correlated with Fearon & Laitin's ethnic fractionalization measure ($r = 0.88$ as compared with $r = 0.76$).

Linguistic issues are potentially most explosive, because questions concerning national language and school curricula determine the economic chances of people (Horowitz, 2000), but the fact that states do not militarize under linguistic diversity suggests that the consensus necessary for military spending is unlikely to occur when linguistic differences exist. To test whether the linguistic difference between the two largest groups matters, we now test Fearon's (2003) measure of cultural fractionalization that adjusts his measure of ethnic fractionalization for the cultural distance between the ethnic groups, using linguistic classifications of distance between major language families. For example, if ethnic groups belong to two distinct language families, such as Greek and Turkish, then the cultural distance is greater compared with two groups speaking Slavic East branch and Slavic West branch. Indeed, Fearon (2003: 215) argues that

Table IV. Militarization and Montalvo & Reynal-Querol's (2005) Measures of Fractionalization, 1988–2002

	(1) <i>XTREG</i> <i>Mil. expenditure</i>	(2) <i>XTGEE</i> <i>Mil. expenditure</i>	(3) <i>XTREG</i> <i>Mil. personnel</i>	(4) <i>XTGEE</i> <i>Mil. personnel</i>	(5) <i>XTREG</i> <i>Arms imports</i>	(6) <i>XTGEE</i> <i>Arms imports</i>
Ethnic fractionalization	−1.580** (2.02)	−1.688** (2.03)	−0.771 (1.22)	−0.777 (1.21)	−2.985* (1.68)	−2.979* (1.68)
Religious fractionalization	1.173 (1.40)	1.002 (1.11)	0.786 (1.37)	0.769 (1.35)	0.670 (0.37)	0.684 (0.38)
Gross national income per capita (ln)	0.062 (0.25)	−0.026 (0.08)	0.218* (1.76)	0.213* (1.69)	−0.406 (1.10)	−0.407 (1.10)
Economic growth per capita	0.848 (1.21)	0.855 (1.22)	−0.967 (0.86)	−0.968 (0.87)	−4.458 (1.14)	−4.354 (1.12)
Democracy (Polity IV)	−0.036** (1.98)	−0.032* (1.80)	−0.005 (0.76)	−0.005 (0.74)	−0.160** (2.09)	−0.160** (2.12)
Government expenditures	0.135*** (5.01)	0.128*** (4.84)	0.016** (2.01)	0.016** (2.00)	0.208*** (2.60)	0.205*** (2.58)
Population size (ln)	−0.121 (0.84)	−0.204 (1.21)	−0.223** (2.49)	−0.231** (2.49)	0.370 (1.31)	0.361 (1.28)
Neighbourhood militarization	0.104** (1.99)	0.090* (1.80)	0.579** (2.13)	0.574** (2.12)	0.115 (1.37)	0.113 (1.35)
Peace years (civil war)	−0.023*** (4.07)	−0.023*** (3.95)	−0.006*** (2.94)	−0.006*** (2.97)	−0.039** (2.56)	−0.039*** (2.60)
Peace years (intern. conflict)	0.010 (1.19)	0.011 (1.36)	−0.007 (1.23)	−0.007 (1.21)	−0.036** (2.33)	−0.036** (2.36)
Civil war	0.598*** (2.92)	0.603*** (2.96)	0.068 (0.93)	0.068 (0.94)	2.185** (2.16)	2.191** (2.18)
International war	0.254 (0.87)	0.233 (0.81)	0.300* (1.76)	0.298* (1.76)	1.886** (2.16)	1.903** (2.21)
Observations	1,307	1,307	1,161	1,161	1,164	1,164
Countries	102	102	109	109	109	109

Absolute values of t - and z -statistics in brackets. Constant and year-specific time-dummies included, but coefficients not reported. *, **, *** significant at .1, .05 and .01 level, respectively.

Table V. Militarization and Roeder's (2001) Measure of Fractionalization, 1988–2002

	(1) <i>XTREG</i> <i>Mil. expenditure</i>	(2) <i>XTGEE</i> <i>Mil. expenditure</i>	(3) <i>XTREG</i> <i>Mil. personnel</i>	(4) <i>XTGEE</i> <i>Mil. personnel</i>	(5) <i>XTREG</i> <i>Arms imports</i>	(6) <i>XTGEE</i> <i>Arms imports</i>
Ethnolinguistic fractionalization	−1.612** (2.20)	−1.634** (2.21)	−0.940** (2.05)	−0.978** (2.05)	−2.300* (1.71)	−2.306* (1.78)
Gross national income per capita (ln)	−0.241 (0.98)	−0.252 (1.02)	0.086 (0.87)	0.074 (0.72)	−0.541 (1.35)	−0.509 (1.28)
Economic growth per capita	1.282** (2.07)	1.271** (2.07)	0.137 (0.22)	0.112 (0.18)	−0.457 (0.19)	−0.379 (0.16)
Democracy (Polity IV)	−0.038** (2.18)	−0.037** (2.16)	−0.012* (1.83)	−0.011* (1.74)	−0.097 (1.51)	−0.102 (1.58)
Government expenditures	0.158*** (4.51)	0.157*** (4.55)	0.025** (2.06)	0.025** (2.03)	0.150** (2.46)	0.153*** (2.61)
Population size (ln)	−0.024 (0.21)	−0.033 (0.29)	−0.140** (2.18)	−0.154** (2.13)	0.367 (1.52)	0.383 (1.61)
Contiguous militarization	0.130** (2.54)	0.126** (2.50)	0.574** (2.22)	0.562** (2.15)	0.120 (1.63)	0.129* (1.81)
Peace years (civil war)	−0.020*** (3.60)	−0.020*** (3.60)	−0.004* (1.75)	−0.004** (2.00)	−0.022* (1.72)	−0.022* (1.74)
Peace years (intern. conflict)	0.007 (0.74)	0.007 (0.75)	−0.009 (1.50)	−0.009 (1.48)	−0.034** (2.26)	−0.030** (2.17)
Civil war	0.642*** (3.24)	0.642*** (3.27)	0.062 (0.88)	0.060 (0.87)	2.389** (2.57)	2.403*** (2.62)
International war	0.753 (1.23)	0.753 (1.24)	0.607* (1.76)	0.612* (1.77)	3.249** (2.17)	3.176** (2.16)
Observations	1,589	1,589	1,393	1,393	1,406	1,406
Countries	132	132	139	139	140	140

Absolute values of t - and z -statistics in brackets. Constant and year-specific time-dummies included, but coefficients not reported. *, **, *** significant at .1, .05 and .01 level, respectively.

Table VI. Militarization and Alesina et al.'s (2003) Measures of Fractionalization, 1988–2002

	(1) <i>XREG</i> <i>Mil. expenditure</i>	(2) <i>XTGEE</i> <i>Mil. expenditure</i>	(3) <i>XREG</i> <i>Mil. personnel</i>	(4) <i>XTGEE</i> <i>Mil. personnel</i>	(5) <i>XREG</i> <i>Arms imports</i>	(6) <i>XTGEE</i> <i>Arms imports</i>
Ethnic fractionalization	0.517 (0.51)	0.486 (0.48)	0.901 (1.12)	0.867 (1.06)	1.590 (1.01)	1.470 (0.95)
Religious fractionalization	−0.321 (0.47)	−0.314 (0.46)	−0.794* (1.88)	−0.801* (1.89)	−0.498 (0.34)	−0.428 (0.30)
Linguistic fractionalization	−1.464* (1.77)	−1.473* (1.78)	−0.943 (1.53)	−0.961 (1.57)	−2.688* (1.96)	−2.698** (1.99)
Gross national income per capita (ln)	−0.187 (0.73)	−0.203 (0.78)	0.155 (1.40)	0.140 (1.24)	−0.437 (1.13)	−0.414 (1.11)
Economic growth per capita	1.197* (1.83)	1.182* (1.83)	0.028 (0.04)	0.006 (0.01)	0.330 (0.14)	0.414 (0.18)
Democracy (Polity IV)	−0.037** (2.15)	−0.037** (2.11)	−0.012* (1.77)	−0.011* (1.69)	−0.108 (1.63)	−0.115* (1.72)
Government expenditures	0.159*** (4.50)	0.158*** (4.54)	0.025** (2.11)	0.025** (2.08)	0.154** (2.49)	0.157*** (2.65)
Population size (ln)	−0.022 (0.19)	−0.033 (0.28)	−0.129** (2.08)	−0.141** (2.05)	0.393 (1.63)	0.405* (1.70)
Neighbourhood militarization	0.129** (2.49)	0.124** (2.44)	0.569** (2.24)	0.558** (2.17)	0.114 (1.51)	0.123* (1.69)
Peace years (civil war)	−0.018*** (3.33)	−0.018*** (3.32)	−0.003 (1.51)	−0.004* (1.71)	−0.016 (1.16)	−0.016 (1.21)
Peace years (intern. conflict)	0.006 (0.64)	0.006 (0.67)	−0.009 (1.51)	−0.009 (1.49)	−0.039** (2.47)	−0.035** (2.40)
Civil war	0.629*** (2.95)	0.629*** (2.98)	0.034 (0.51)	0.032 (0.49)	2.482** (2.44)	2.501** (2.49)
International war	0.797 (1.30)	0.794 (1.30)	0.629* (1.81)	0.632* (1.82)	3.284** (2.17)	3.208** (2.16)
Observations	1,560	1,560	1,360	1,360	1,373	1,373
Countries	130	130	136	136	137	137

Absolute values of t- and z-statistics in brackets. Constant and year-specific time-dummies included, but coefficients not reported. *, **, *** significant at .1, .05 and .01 level, respectively.

'if a researcher's theory is that ethnic fractionalization matters because it makes for diverse preferences and consequent difficulties cooperating, then the measure of cultural fractionalisation ... may be more appropriate.' Alesina et al. (2003) concur. Table VII repeats the estimations from Table III, but replacing ethnic with cultural fractionalization (*cultural fraction*). This variable is negatively signed, but statistically significant only for military personnel, and then only in GEE estimation. It is marginally insignificant in columns 1 through 3, however ($p < 0.11$). These results, too, however, do not suggest that cultural distance based on language similarity matters for predicting the degree of state militarization.

Sensitivity Analysis

We ran our models with several alternative conceptualizations of ethnicity, followed by a number of robustness checks on our basic results.⁹ We test ethnic and religious polarization and a measure of ethnic exclusion from state power. First, we replaced the fractionalization with Montalvo & Reynal-Querol's (2005) polarization measures. Neither ethnic nor religious polarization has any impact on militarization, regardless of the dependent variable used. These results do not support the proposition that it is polarization rather than fractionalization that really matters for predicting militarization. Next, we entered Cederman & Girardin's (2007) measure of ethnic exclusion (N-star). If ethnic groups excluded from state power are most likely to rebel, as Cederman & Girardin (2007) argue, then do ethnic minority governments respond to this threat via increased militarization? The coefficients of this variable switched between positive and negative in the models tested, but none

of them at any time came close to being statistically significant. Thus, we find no association between ethnic exclusion from state power and militarization. Others have shown that this measure is not a robust predictor of civil war either (Fearon, Kasara & Laitin, 2007). However, it is too early to come to a definite conclusion on this measure, as the N-star variable is currently available only for Eurasia and North Africa and does not yet account for changes in the ethnic composition of state power over time. We intend to revisit this important question with an updated measure that is spatially and temporally more comprehensive.¹⁰

We dropped the contiguous militarization and conflict variables, to assess the effects of ethnic heterogeneity without them in the model, since these variables might suffer from endogeneity bias. When these variables are dropped, the basic results on most of the heterogeneity variables change little, but the heterogeneity variables from Montalvo & Reynal-Querol (2003) and the linguistic fractionalization variable from Alesina et al. (2003) become statistically insignificant, while maintaining their negative coefficient sign. The government expenditure variable suffers from partial identity bias, since current military expenditures form part of general government expenditure. Unfortunately, current military expenditures cannot be netted out from general government expenditure, since the available military expenditure data include both capital formation and current expenditures for military purposes. If we drop government expenditures from the model, then our results are hardly affected. To see whether ethnic and religious heterogeneity exerts a non-linear influence on military spending, we repeated the estimations with squared and, in separate estimations, even cubic heterogeneity terms

⁹ These results are available as a web appendix at <http://www.prio.no/jpr/datasets>.

¹⁰ Cederman & Girardin are working on such an update (personal communication).

Table VII. Militarization and Fearon & Laitin's (2003) Measures of Ethnic Fractionalization Adjusted for Cultural/Linguistic Distance

	(1) <i>XTREG</i> <i>Mil. expenditure</i>	(2) <i>XTGEE</i> <i>Mil. expenditure</i>	(3) <i>XTREG</i> <i>Mil. personnel</i>	(4) <i>XTGEE</i> <i>Mil. personnel</i>	(5) <i>XTREG</i> <i>Arms imports</i>	(6) <i>XTGEE</i> <i>Arms imports</i>
Cultural fractionalization ^a	-1.447 (1.54)	-1.488 (1.55)	-0.906 (1.62)	-0.939* (1.68)	-1.703 (0.95)	-1.731 (1.00)
Religious fractionalization ^b	0.473 (0.61)	0.469 (0.60)	-0.620 (1.62)	-0.651* (1.70)	0.012 (0.01)	0.046 (0.02)
Gross national income per capita (ln)	-0.169 (0.67)	-0.196 (0.77)	0.081 (0.70)	0.062 (0.54)	-0.432 (1.10)	-0.393 (1.00)
Economic growth per capita	1.394** (2.24)	1.369** (2.22)	0.097 (0.15)	0.066 (0.10)	-0.311 (0.12)	-0.211 (0.08)
Democracy (Polity IV)	-0.037*** (2.16)	-0.036** (2.08)	-0.012* (1.81)	-0.011* (1.70)	-0.098 (1.55)	-0.104* (1.65)
Government expenditures	0.160*** (4.52)	0.158*** (4.56)	0.029** (2.24)	0.029** (2.22)	0.160** (2.44)	0.162*** (2.61)
Population size (ln)	-0.064 (0.54)	-0.086 (0.70)	-0.166*** (2.62)	-0.185** (2.55)	0.323 (1.35)	0.338 (1.44)
Neighbourhood militarization	0.131** (2.55)	0.122** (2.44)	0.579** (2.29)	0.565** (2.21)	0.117 (1.56)	0.126* (1.73)
Peace years (civil war)	-0.019*** (3.51)	-0.019*** (3.48)	-0.004 (1.55)	-0.004* (1.77)	-0.021 (1.55)	-0.020 (1.58)
Peace years (intern. confl.)	0.006 (0.65)	0.006 (0.68)	-0.011* (1.82)	-0.011* (1.79)	-0.035** (2.21)	-0.031** (2.12)
Civil war	0.676*** (3.35)	0.675*** (3.37)	0.066 (0.90)	0.064 (0.89)	2.472** (2.55)	2.487*** (2.59)
International war	0.778 (1.24)	0.776 (1.25)	0.623* (1.80)	0.630* (1.81)	3.299** (2.17)	3.234** (2.16)
Observations	1,561	1,561	1,362	1,362	1,374	1,374
Countries	129	129	136	136	137	137

Absolute t-statistics in brackets. Constant and year-specific time-dummies included, but coefficients not reported. *, **, *** significant at .1, .05 and .01 level, respectively.
^a Fearon (2003). ^b Fearon & Laitin (2003).

included. However, we found no evidence for non-linear relationships.

We followed Goldsmith (2003) and controlled for the previous year's value of the dependent variable. One can argue that military budget decisions are subject to bureaucratic inertia (Goldsmith, 2003; Gupta, de Melo & Sharan, 2001). Results on our main variables of interest are little affected in terms of the sign of the coefficient and statistical significance when entering a lagged dependent variable. We tried to capture some crude cross-regional heterogeneity by employing regional dummies. We use the regional classification provided in the World Development Indicators CD-ROM version (World Bank, 2004). With the exception of North Africa and the Middle East, which often showed a higher level of militarization, there was little evidence for systematic regional differences. Our main results were hardly affected, with the exception of the heterogeneity variables derived from Montalvo & Reynal-Querol (2003) and Alesina et al. (2003), which sometimes became (marginally) insignificant, while maintaining their negative coefficient sign.

Next, we added further control variables. Contrary to the findings of others, the share of the population urbanized had little effect on the results (Davoodi et al., 2001). The same is true for the level of aid to gross national income, which might ease the budget constraint. One might wonder whether oil wealth might allow governments to achieve greater levels of militarization. Adding a dummy variable taking the value of 1 if oil exports reach one-third of total GDP (Fearon & Laitin, 2003) suggests no impact on military expenditures or military personnel, but oil has a positive and statistically significant effect on arms imports. This result is reasonable, because major oil exporters, such as the Persian Gulf countries, have been major arms importers during the study period. The results on the remaining variables

were hardly affected, however. The same is true if we add a dummy variable for the 20 largest arms-producing countries, based on information from SIPRI, to the arms imports regressions (SIPRI, 2002). Major arms producers import fewer arms, as expected. Our main results remain valid. Finally, we limited our analyses to a subsample of only developing countries. The results on diversity remain very similar. In sum, there is no indication from any of the tests that fractionalization increases militarization. The same is true for polarization.

Conclusions

Several disciplines use ethnic diversity as an explanation for societal outcomes, ranging from democratization and governance to violent political conflict and economic performance. Recent empirical studies show that ethnic diversity hampers public goods provision, because consensus and coordination are difficult under conditions of competing preferences. In addition, explanations of violent conflict see ethnic diversity as problematic, because it can lead to mutual hatred stemming from historic legacies and the fear of domination by cultural others. Recent cross-national quantitative studies show, however, that ethnic diversity makes countries safer. The question our study was concerned with is: do states in ethnically diverse societies engage in preventive militarization? If they did, then this could provide both a mechanism through which diverse societies achieve civil peace and an explanation for why diversity leads to underprovision of such public goods as education and infrastructure (crowding out).

Our results simply do not support this view. Militarization is actually lower under conditions of greater diversity measured by several different indicators. Ethno-linguistic diversity, in particular, seems to be what matters, rather than polarization. If in fact,

as some find, ethnicized armed violence is most likely when two groups are of similar size, then it is not likely that militarization is the link that explains why heterogeneous societies are better able to maintain peace. In fact, empirical studies that have tested the direct effect of ethnic and other diversity on political terror have found that ethnic fractionalization has no effect or even that it leads to lower levels of state repression (de Soysa & Nordås, 2007; Lee et al., 2004; Walker & Poe, 2002).

If preventive militarization cannot explain why ethnically diverse societies are surprisingly peaceful, what can? Fearon & Laitin (1996) developed theories of interethnic cooperation built on in-group policing and fear of spirals of conflict. Ethnic elites are able to cauterize the spread of group conflict by policing their respective groups. Our estimations of government behaviour in the security sector under conditions of diversity support those views that suggest ways in which diversity may, in fact, promote peaceful conflict resolution (Collier, 2001; Fearon & Laitin, 1996; Gagnon, 2004; Varshney, 2001). Most importantly, our results suggest that if greater diversity is a constraint on organizing violence, then this is not a result of higher state militarization. Also, high fractionalization may make elite consensus around a high-spending equilibrium in the defence sector harder to maintain. The exact mechanism that drives lower defence spending under conditions of ethnic fractionalization should be tested more directly in future work. On the whole, these results tentatively support those who advocate promoting democracy and diversity, not secession, as the antidote to the so-called development tragedy in Africa (Collier, 2001).

References

- Alesina, Alberto, 1994. 'Political Models of Macroeconomic Policy and Fiscal Reforms', in Stephan Haggard & Steven B. Webb, eds, *Voting for Reform: Democracy, Political Liberalization, and Economic Reform*. Oxford: Oxford University Press (37–60).
- Alesina, Alberto & Allan Drazen, 1991. 'Why Are Stabilizations Delayed?', *American Economic Review* 81(5): 1170–1188.
- Alesina, Alberto & Dani Rodrik, 1994. 'Distributive Politics and Economic Growth', *Quarterly Journal of Economics* 109(2): 465–490.
- Alesina, Alberto; Reza Baqir & William Easterly, 1999. 'Public Goods and Ethnic Divisions', *Quarterly Journal of Economics* 114(4): 1243–1284.
- Alesina, Alberto; Arnaud Devleeschauwer, William Easterly, Sergio Kurlat & Romain Wacziarg, 2003. 'Fractionalization', *Journal of Economic Growth* 8(2): 155–194.
- Anselin, Luc, 1998. *Spatial Econometrics: Methods and Models*. Dordrecht: Kluwer.
- Beck, Nathaniel & Jonathan N. Katz, 1995. 'What To Do (and Not To Do) with Time-Series Cross-Section Data', *American Political Science Review* 89(3): 634–647.
- Bennett, D. Scott & Allen C. Stam, 2003. *EUGene v3.0: Expected Utility Generation and Data Management Program* (<http://www.eugenesoftware.org>).
- Brzoska, Michael, 1995. 'World Military Expenditures', in Keith Hartley & Todd Sandler, eds, *Handbook of Defense Economics*. Oxford: Elsevier (46–67).
- Caselli, Francesco & Wilbur John Coleman II, 2006. 'On the Theory of Ethnic Conflict'. Working paper no. 12125. Cambridge, MA: National Bureau of Economic Research.
- Cederman, Lars-Erik & Luc Girardin, 2007. 'Beyond Fractionalization: Mapping Ethnicity onto Nationalist Insurgencies', *American Political Science Review* 101(1): 173–185.
- Collier, Paul, 2001. 'Implications of Ethnic Diversity', *Economic Policy* 32 (April): 127–155.
- Collier, Paul & Anke Hoeffler, 2004. 'Greed and Grievance in Civil War', *Oxford Economic Papers* 56(4): 563–595.
- Collier, Paul & Anke Hoeffler, 2006. 'Military Expenditure in Post-Conflict Societies', *Economics of Governance* 7(1): 89–107.

- Collier, Paul & Anke Hoeffler, 2007. 'Unintended Consequences: Does Aid Promote Arms Races?', *Oxford Bulletin of Economics and Statistics* 69(1): 1–27.
- Collier, Paul; Lani Elliot, Håvard Hegre, Anke Hoeffler, Marta Reynal-Querol & Nicholas Sambanis, 2003. *Breaking the Conflict Trap: Civil War and Development Policy*. Oxford: Oxford University Press.
- Davoodi, Hamid; Benedict Clements, Jerald Schiff & Peter Debaere, 2001. 'Military Spending, the Peace Dividend, and Fiscal Adjustment', *IMF Staff Papers* 48(2): 290–316.
- de Soysa, Indra, 2002. 'Paradise Is a Bazaar? Greed, Creed, and Governance in Civil War, 1989–1999', *Journal of Peace Research* 39(4): 395–416.
- de Soysa, Indra & Ragnhild Nordås, 2007. 'Islam's Bloody Innards? Religion and Political Terror, 1981–2000', *International Studies Quarterly* 51(4): 927–943.
- Drake, St. Claire, 1957. 'Some Observations on Interethnic Conflicts as One Type of Intergroup Conflict', *Journal of Conflict Resolution* 1(2): 155–178.
- Easterly, William, 2001. 'Can Institutions Resolve Ethnic Conflict?', *Economic Development and Cultural Change* 49(4): 687–706.
- Easterly, William & Ross Levine, 1997. *Africa's Growth Tragedy: Policies and Ethnic Divisions*. Washington, DC: World Bank.
- Easterly, William; Jozef Ritzen & Michael Woolcock, 2006. 'Social Cohesion, Institutions, and Growth', *Economics and Politics* 18(2): 103–120.
- Ellingsen, Tanja, 2000. 'Colorful Community or Ethnic Witches' Brew? Multiethnicity and Domestic Conflict During and After the Cold War', *Journal of Conflict Resolution* 44(2): 228–249.
- Fearon, James D., 2003. 'Ethnic and Cultural Diversity by Country', *Journal of Economic Growth* 8(2): 195–222.
- Fearon, James D. & David D. Laitin, 1996. 'Explaining Interethnic Cooperation', *American Political Science Review* 90(4): 715–735.
- Fearon, James D. & David D. Laitin, 2003. 'Ethnicity, Insurgency, and Civil War', *American Political Science Review* 97(1): 1–16.
- Fearon, James D.; Kimuli Kasara & David D. Laitin, 2007. 'Ethnic Minority Rule and Civil War Onset', *American Political Science Review* 101(1): 187–193.
- Fordham, Benjamin O. & Thomas C. Walker, 2005. 'Kantian Liberalism, Regime Type, and Military Resource Allocation: Do Democracies Spend Less?', *International Studies Quarterly* 49(1): 141–157.
- Fox, Jonathan, 2004. 'The Rise of Religious Nationalism and Conflict: Ethnic Conflict and Revolutionary Wars, 1945–2001', *Journal of Peace Research* 41(6): 715–731.
- Gagnon, V. P., Jr, 2004. *The Myth of Ethnic War: Serbia and Croatia in the 1990s*. London: Cornell University Press.
- Gilley, Bruce, 2004. 'Against the Concept of Ethnic Conflict', *Third World Quarterly* 25(6): 1155–1166.
- Gleditsch, Kristian S. & Michael D. Ward, 2006. 'Diffusion and the International Context of Democratization', *International Organization* 60(4): 911–933.
- Gleditsch, Nils Petter; Göran Lindgren, Naima Mouhle, Sjoerd Smit & Indra de Soysa, 2000. *Making Peace Pay: A Bibliography on Disarmament and Conversion*. Claremont, CA: Regina.
- Gleditsch, Nils Petter; Peter Wallensteen, Mikael Eriksson, Margareta Sollenberg & Håvard Strand, 2002. 'Armed Conflict 1946–2001: A New Dataset', *Journal of Peace Research* 39(5): 615–637.
- Goldsmith, Benjamin E., 2003. 'Bearing the Defence Burden, 1886–1989: Why Spend More?', *Journal of Conflict Resolution* 47(5): 551–573.
- Gupta, Sanjeev; Luiz de Melo & Raju Sharan, 2001. 'Corruption and Military Spending', *European Journal of Political Economy* 17(4): 749–777.
- Gurr, Ted R., 1970. *Why Men Rebel*. Princeton, NJ: Princeton University Press.
- Gurr, Ted R., 2001. *People Versus States: Minorities at Risk in the New Century*. Washington, DC: United States Institute of Peace.
- Hartley, Keith & Nicholas Hooper, 1990. *The Economics of Defence, Disarmament, and Peace: An Annotated Bibliography*. Aldershot: Elgar.

- Horowitz, Donald L., 2000. *Ethnic Groups in Conflict*. Berkeley, CA: University of California Press.
- Huntington, Samuel P., 1968. *Political Order in Changing Societies*. New Haven, CT: Yale University Press.
- Huntington, Samuel P., 1993. 'The Clash of Civilizations', *Foreign Affairs* 72(3): 22–49.
- Kaplan, Robert D., 1994. 'The Coming Anarchy', *Atlantic Monthly* 273(2): 44–76.
- Kaufmann, Chaim, 1996. 'Possible and Impossible Solutions to Ethnic Civil Wars', *International Security* 20(4): 136–175.
- Keefer, Philip & Stephen Knack, 2002. 'Polarization, Politics and Property Rights: Links Between Inequality and Growth', *Public Choice* 111(1–2): 127–154.
- Kimenyi, Mwangi S., 1997. *Ethnic Diversity, Liberty and the State: The African Dilemma*. Cheltenham: Edward Elgar.
- Kimenyi, Mwangi S. & Mukum John Mbatia, 1995. 'Rents, Military Elites, and Political Democracy', *European Journal of Political Economy* 11(4): 699–708.
- Lee, Chris; Ronny Lindström, Will H. Moore & Kürsad Turan, 2004. 'Ethnicity and Repression: The Ethnic Composition of Countries and Human Rights Violations', in Sabine Carey & Steven C. Poe, eds, *Understanding Human Rights Violations: New Systematic Studies*. Aldershot: Ashgate (186–201).
- Maizels, Alfred & Machiko K. Nissanke, 1986. 'The Determinants of Military Expenditures in Developing Countries', *World Development* 14(9): 1125–1140.
- Mearsheimer, John J., 1990. 'Back to the Future: Instability in Europe After the Cold War', *International Security* 15(1): 5–56.
- Montalvo, José G. & Marta Reynal-Querol, 2002. *Why Ethnic Fractionalization? Polarization, Ethnic Conflict, and Growth*. Barcelona: Universitat Pompeu Fabra.
- Montalvo, José G. & Marta Reynal-Querol, 2003. 'Religious Polarization and Economic Development', *Economic Letters* 80(2): 201–210.
- Montalvo, José G. & Marta Reynal-Querol, 2005. 'Ethnic Polarization, Potential Conflict, and Civil Wars', *American Economic Review* 95(3): 796–816.
- Mueller, John, 2000. 'The Banality of Ethnic War', *International Security* 25(1): 42–70.
- Olson, Mancur, 1982. *The Rise and Decline of Nations: Economic Growth, Stagflation, and Social Rigidities*. New Haven, CT: Yale University Press.
- Omitoogun, Wuyi, 2003. *Military Expenditure Data in Africa: A Survey of Cameroon, Ethiopia, Ghana, Kenya, Nigeria, and Uganda*. Oxford: Oxford University Press, for SIPRI.
- Petersen, Roger, 2001. *Understanding Ethnic Violence: Fear, Hatred, Resentment in Twentieth Century Eastern Europe*. Cambridge: Cambridge University Press.
- Posen, Barry, 1993. 'The Security Dilemma and Ethnic Conflict', *Survival* 35(1): 27–47.
- Posner, Daniel N., 2004. 'Measuring Ethnic Fractionalization in Africa', *American Journal of Political Science* 48(4): 849–863.
- Reynal-Querol, Marta, 2002. 'Ethnicity, Political Systems, and Civil Wars', *Journal of Conflict Resolution* 46(1): 29–54.
- Roeder, Phillip G., 2001. 'Ethnolinguistic Fractionalization Indices, 1961 and 1985'. La Jolla, CA: University of California, San Diego (<http://weber.ucsd.edu/~proeader/elf.htm>).
- Russett, Bruce & John Oneal, 2001. *Triangulating Peace: Democracy, Interdependence, and International Organizations*. New York: Norton.
- Sambanis, Nicholas, 2001. 'Do Ethnic and Nonethnic Civil Wars Have the Same Causes? A Theoretical and Empirical Inquiry (Part 1)', *Journal of Conflict Resolution* 45(3): 259–282.
- Sandler, Todd & Keith Hartley, 1995. *The Economics of Defense*. Cambridge: Cambridge University Press.
- Simmons, Beth A. & Zachary Elkins, 2004. 'The Globalization of Liberalization: Policy Diffusion in the International Political Economy', *American Political Science Review* 98(1): 171–189.
- SIPRI, 2002. 'Military Expenditure and Arms Production Project'. Stockholm: Stockholm International Peace Research Institute (http://www.sipri.org/contents/milap/milex/a_prod/nationaldata/summary.pdf).
- Snyder, Jack & Robert Jervis, 1999. 'Civil War and the Security Dilemma', in Barbara F. Walter & Jack Snyder, eds, *Civil Wars*,

- Insecurity, and Intervention*. New York: Columbia University Press (15–37).
- Varshney, Ashutosh, 2001. 'Ethnic Conflict and Civil Society: India and Beyond', *World Politics* 53(3): 362–398.
- Walker, Scott & Steven C. Poe, 2002. 'Does Cultural Diversity Affect Countries' Respect for Human Rights?', *Human Rights Quarterly* 24(1): 237–263.
- Walter, Barbara F. & Jack Snyder, eds, 1999. *Civil Wars, Insecurity, and Intervention*. New York: Columbia University Press.
- Wiggins, Vince, 1999. *Comparing XTGLS with Regress Cluster* (http://www.stata.com/support/faqs/stgls_rob.html).
- Wimmer, Andreas, 1997. 'Who Owns the State? Understanding Ethnic Conflict in Post-Colonial Societies', *Nations and Nationalism* 3(4): 631–665.
- Wimmer, Andreas & Brian Min, 2006. 'From Empire to Nationstate: Explaining Wars in the Modern World, 1860–2001', *American Sociological Review* 71(6): 867–897.
- Wolff, Stefan, 2006. *Ethnic Conflict: A Global Perspective*. Oxford: Oxford University Press.
- Woodward, Susan, 1995. *Balkan Tragedy: Chaos and Dissolution After the Cold War*. Washington, DC: Brookings.
- World Bank, 2003. *World Development Indicators, CD ROM*. Washington, DC: World Bank.
- World Bank, 2004. *World Development Indicators, CD ROM*. Washington, DC: World Bank.
- Zorn, Christopher, 2001. 'Generalized Estimation Equation Models for Correlated Data: A Review with Applications', *American Journal of Political Science* 45(2): 470–490.
- INDRA DE SOYSA, b. 1964, PhD in Political Science (University of Alabama, 1998). Professor of Political Science, Norwegian University of Science and Technology (NTNU), Trondheim, Norway (2003–); associate scholar, Centre for the Study of Civil War (CSCW), International Peace Research Institute, Oslo (PRIO). Co-editor, *Informal Institutions: How Social Norms Help or Hinder Development* (OECD, 2007).
- ERIC NEUMAYER, b. 1970, PhD in Development Studies (London School of Economics and Political Science, 1998); Professor of Environment and Development, LSE; associate scholar, Centre for the Study of Civil War (CSCW), International Peace Research Institute, Oslo (PRIO). Most recent book (co-edited with Giles Atkinson & Simon Dietz): *Handbook of Sustainable Development* (Edward Elgar, 2007).