A NOTE ON DIVERSITY, INSTITUTIONS AND CONFLICT

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ABSTRACT

The economic literature has separately studied the role of ethnic diversity in civil conflict and the role of institutions on economic growth. This paper synthesizes these two literatures to examine the role of institutions on the likelihood of civil war. The findings are that institutional strength reduces the overall probability of civil war without impacting the marginal effect of diversity. **JEL Classification**: D74

INTRODUCTION

There has been a surge of interest in the economic literature both pertaining to the role of ethnic diversity in civil conflict and the role of institutions on economic growth. The general conclusions are that greater ethnic diversity is positively correlated with conflict (Esteban and Ray (1999) Estaban, Mayoral and Ray (2012), Montalvo and Reynal-Querol (2005)) while greater institutional strength reduces the likelihood of conflict (Tan (2010), Hall, Sobell, and Crowley (2010)). This paper synthesizes these two literatures to examine the role of institutions on the likelihood of civil war both directly (as a measure of opportunity cost) and indirectly (as a means of enhancing ethnic cohesion.) The study finds that institutional strength reduces the overall probability of civil war but without impacting the marginal effect of diversity.

A civil war means that one or more groups have decided that a more beneficial distribution of resources can be achieved through force instead of a peaceful alternate. This raises two important questions:

1) What is a more beneficial distribution?

2) How is the peaceful alternative allocation achieved?

The answer to the first question must depend on how different the groups consider themselves to be from one another. One can ask how much more does the utility of a member of one's own group mean in comparison to the utility of a member of another group. If they are equivalent, then civil war is pointless. If they are significantly different, then one group may be willing to impose significant penalties on another to achieve a different resource allocation.

The answer to the second question will depend on the strength of the countries formal methods of resource distribution or, its institutions. For example, a well-developed market system that allows the differing groups to trade with each other

will raise the opportunity cost of a civil war because conflict will sever the possibility of gains from trade. On the other hand, for countries with weak political institutions, inadequate public good provision may result as any given policy may seem to favor one group over another.

ETHNIC DIVERSITY

The civil conflict literature employs a range of measures of diversity. The most frequently used measure of ethnic diversity is fractionalization. It is the sum of the probabilities that two randomly chosen individuals from a given population belong to different groups.

$$F = \sum_{i=1}^{N} s_i (1 - s_i) \tag{1}$$

where F is the fractionalization value, and s_i is the population share of group i. This measure has recently received a lot of criticism for being theoretically inadequate (Montalvo and Reynal-Querol (2005)). It does not capture the idea that the effect of ethnic diversity is unlikely to be monotonic.

When the fractionalization measure is 0, the population is a single homogenous group. As F tends to 1, the society is made up of many different groups with no group making up a large fraction of the population. It is unlikely that there would be ethnically based conflict in either of these cases.

On the other hand, the worst case scenario for most theoretical models of conflict would be the case where there are two groups of roughly the same size. In that case, the fractionalization index is at its middle value (1/2).

Esteban and Ray (1994, 1999) theoretically limit the set of possible measures of diversity to P where

$$P = k \sum_{i=1}^{N} \sum_{j=1}^{N} s_i^{1+\alpha} s_j \delta_{ij} \tag{2}$$

for some constants $k > 0$ and $0 < \alpha < \alpha^*$ where α^*, the upper bound, is approximately 1.6, and where δ_{ij} is a measure of distance between groups i and j. Montalvo and Reynal-Querol (2005, 2010) further restrict this measure to $k = 4$, $\alpha = 1$, and the distance between groups is calculated by the discrete measure of "belong" or "do not belong."

$$\delta_{ij} = \begin{cases} 0 \text{ if } i = j \\ 1 \text{ if } i \neq j \end{cases} \tag{3}$$

The Reynal-Querol measure, P_{RQ} is given by:

$$P_{RQ} = 1 - \sum_{i=1}^{N} \left(\frac{1/2 - s_i}{1/2} \right)^2 \tag{4}$$

MODEL

A continuous measure of distance is more likely to be a closer approximation of the true interaction between various ethnic groups rather than simply in or out. This paper proposes that the level of formal communication between differing groups is able to, in some way, bring the groups closer together. The discrete distance measure is thus replaced with a continuous specification:

$$\delta_{ij} = \begin{cases} 0 \text{ if } i = j \\ 1 - \gamma M \text{ if } i \neq j \end{cases} \tag{5}$$

where, M is a measure of institutional strength and $0 < \gamma < 1$. The corresponding Austin-Dutt measure (Austin and Dutt 2015), P_{AD}, is given by:

$$P_{AD} = \left(1 - \sum_{i=1}^{N} \left(\frac{1/2 - s_i}{1/2}\right)^2\right)(1 - \gamma M) = P_{rq} - \gamma M P_{rq} \tag{6}$$

If $\gamma = 0$, this measure becomes the Reynal-Querol measure, but if $\gamma > 0$, the institutions are able to bring the groups together and, at best, erase the practical differences between the groups.

DATA

The data are a panel dataset with 5-year periods from 1970 – 2009. The data on ethnic shares comes were compiled by James Fearon (Fearon (2003)) and is maintained on his website. His data come primarily from the CIA World Factbook cross-referenced with the Encyclopedia Britannica and Library of Congress Country Studies. "… [M]y objective is to include those groups that would be listed most often if randomly chosen individuals in the country in question were asked 'what are the main ethnic or (racial or ascriptive) groups in this country?'" Fearon (2003).

PRIO25 is an indicator variable for the occurrence of civil war that comes from the Peace Research Institute of Oslo (the variable corresponds to their definitions 3 (Minor Civil Conflict) and 4 (Major Civil Conflict)). The Peace Research Institute considers a country to be in armed conflict once there have been at least 25 battle related deaths. The variable FREE represents institutional strength as measured by the Economic Freedom of the World index. This index is published by the Fraser Institute (Gwartney, Lawson and Hall (2012)). The index is the most widely used measure of economic freedom in peer-reviewed research. It is created from forty-two variables, which measure the degree of economic freedom in five broad areas: size of government, legal system and property rights, sound money, freedom to trade internationally and regulation. The dataset for the control variables was created by Esteban, Mayoral, and Ray (2012) and downloaded from the accompanying website. The control variables are:

GDP/CAP is the log of the per capita GDP at the beginning of the time period. High-income countries stand to lose more from conflict.

POP is the log of the population at the beginning of each period. According to the Peace Research Institute, a country is in armed conflict once there have been at least 25 battle related deaths. This definition is independent of population size. The variable POP is meant to control for the resulting bias

OIL/DIAMONDS is a measure of the level of natural resources that a country has. In particular, OIL/DIAMONDS is 1 if the country is rich in oil (average annual oil revenues are greater than $100 US dollars) or the country produces any amount of diamonds and 0 otherwise. The desire for control of a country's natural resources can be a strong impetus for civil conflict (Collier and Hoeffler (2003)).

MOUNTAINS (percent mountainous terrain) and NONCONT (an indicator variable for a non-contiguous state) are both measures of geography that may have an effect on the ability to wage war. Mountains provide a place for rebels to hide, and a non-contiguous state has a natural "barrier" that may physically separate warring factions.

PRIOLag is the lagged dependent variable. Countries already in a civil war or that have had civil conflict in the recent past are more likely to see a continuation or resumption of hostilities than those countries with a peaceful history.

DEMOCRACY: an indicator variable that takes on a value of 1 if a country's level of democracy is high (greater than 4) in the POLITY IV database and 0 otherwise.

RESULTS

The main results are given in Table 1. Six different regressions are shown with various control variables. These are logit regressions with the indicator of civil war as the dependent variable. Ethnic polarization, as measured by the Reynal-Querol measure, is significant and positive throughout. Ethnic groupings are "natural" divisions within a country, and, sadly, where there is a greater sense of division there is likely to be more violent conflict. This result is in line with prior research using polarization.

Institutional strength is significant and negative throughout all the regressions. Stronger institutions lead to less conflict. This should not be surprising. A strong legal system can provide alternative methods to conflict resolution. The ability to trade creates other channels for an ethnic group to allocate resources to itself. Sound money and a small government (or at least one that is not very large) reduces the uncertainty of the expropriation of gains by the state. Strong Institutions raise the opportunity cost of violent conflict.

What is surprising is that the coefficient on the interaction term is insignificant in all regressions. Although institutional strength reduces the overall probability of civil conflict, it seems to have no impact on the marginal effect of ethnic diversity. There is no lessening of the impact of ethnic polarization where there are stronger institutions. This suggests that sense of "otherness" remains unchanged between the ethnic groups.

Population, income and the incidence of civil war in the prior five years are all significant and have the expected sign. Of the geographic variables, non-contiguous is significant and mountains are marginally significant.

Table 2 presents the results of a regional analysis. The four regions considered are Asia, Africa, Latin America, and Europe and North America. The full specification (6) from table 1 is used. The results for the separate regions are all in line with the major findings in table 1; Ethnic polarization is significant and positive, Institutional strength is significant and negative, and the coefficient on the interaction term is insignificant in all regressions.

Table 3 shows some alternate specifications as a robustness check. Column 1 is the full specification from Table 1 for comparison. Tan (2010), and Hall, Sobel, and Crowley (2010) suggest in the growth literature that there may be a threshold level of institutional strength. Tan, in particular, finds that for countries with high level institutions, ethnic diversity has little or no effect. This possibility is examined by splitting the sample in two ways. Column 2 shows the outcome from splitting the sample into quartiles by institutional strength. The variables, $P_{RQ}|Q2$, $P_{RQ}|Q3$ and $P_{RQ}|Q4$are the polarization for countries that fall into the second, third, and fourth quartile respectively. Column 3 shows the result of separating the sample by the top 20% of institutional strength. $P_{RQ}|TOP20$ is polarization for these countries. As an additional robustness check, columns 4, 5, and 6 repeat these regressions using an alternate continuous measure of civil conflict as the dependent variable in a series of linear regressions. CONF is the index of social conflict from the Cross-National Time-Series Data Archive (Banks 2008). Nine of the ten interaction variables in Table 2 are insignificant and the exception, $P_{RQ}|TOP20$ is just significant at the 10 % level. Overall, there is scant evidence of any threshold effect and the main results stand.

CONCLUSION

This study first confirms that ethnic diversity increases the chances of civil conflict, while institutional strength reduces the probability of civil conflict. However, in addition, the results also indicate that although stronger institutions are able to somewhat offset the effect of ethnic diversity (perhaps by raising the opportunity costs of warfare) it does not change the marginal effect of diversity on the likelihood of civil war. Different groups may be willing to pursue mutually advantageous trade, do business with one another, and formally communicate with one another, this, however, apparently does not lead to a lessening of the sense of "foreignness" or "otherness." There are clearly some differences that are just too fundamental to erase with a veneer of civility. In the recent past the former Yugoslavia and Rwanda during the 1990s and more recently Iraq were multiethnic societies that coexisted reasonably peacefully until there was some significant institutional breakdown at which point differing ethnic groups quickly turned on one another. These results suggest that there is a need for greater emphasis on research into the sociological underpinnings of cultural differences and perhaps the creation of institutions that deal directly with these differences.

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TABLE 1

Dependent Variable is PRIO25 using a Logit Model

	(1)	(2)	(3)	(4)	(5)	(6)
P_{RQ}	0.52***	0.41***	0.46***	0.46***	0.54***	0.54***
	(0.16)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)
FREE	-0.70***	-0.57***	-0.35**	-0.37**	-0.61***	-0.62***
	(0.13)	(0.11)	(0.16)	(0.17)	(0.18)	(0.18)
P_{RQ} ×FREE	0.21	0.18	0.11	0.12	0.20	0.21
	(0.18)	(0.14)	(0.14)	(0.14)	(0.13)	(0.13)
POP	0.42***	0.30***	0.31***	0.32***	0.18**	0.18**
	(0.11)	*(0.08)*	*(0.08)*	*(0.08)*	*(0.08)*	*(0.08)*
PRIO25 Lag		2.72***	2.67***	2.67***	2.53***	2.52***
		(0.22)	(0.22)	(0.22)	(0.22)	(0.22)
GDP/Cap			-0.29**	-0.28*	-0.28*	-0.32**
			(0.14)	(0.15)	(0.15)	(0.16)
OILDIAMOND				-0.07	-0.17	-0.14
				(0.22)	(0.24)	(0.24)
MOUNTAINS					0.01	0.01*
					(0.00)	(0.00)
NONCONT					1.37***	1.36***
					(0.39)	(0.39)
DEMOCRACY						0.22
						(0.27)

CONSTANT	-8.23*** (1.77)	-7.16*** (1.26)	-5.06*** (1.52)	-5.20*** (1.54)	-3.27** (1.55)	-3.00* (1.54)
Pseudo	0.15	0.36	0.36	0.36	0.38	0.38
N	1181	1053	1029	1029	1029	1029
***	Significant at the 1% level					
**	Significant at the 5% level					
*	Significant at the 10% level					
Standard errors are robust standard errors adjusted for clustering						

Table 2

Dependent Variable is PRIO25 using a Logit Model

	Latin America	Asia	Europe/N.A.	Africa
P_{RQ}	1.00*	0.76*	0.86***	0.43***
	(0.55)	(0.42)	(0.22)	(0.12)
FREE	-1.03***	-1.07**	-0.83***	-0.98**
	(0.36)	(0.49)	(0.27)	(0.16)
P_{RQ} ×FREE	0.33	-0.17	0.26	0.15
	(0.23)	(0.40)	(0.24)	(0.11)
POP	0.00	0.05	0.25	0.27***
	(0.15)	*(0.25)*	*(0.16)*	*(0.08)*
PRIO25 Lag	1.31***	2.58***	3.2***	2.53***
	(0.42)	(0.42)	(0.45)	(0.24)
GDP/Cap	-0.20	-0.09	-0.01	-0.03
	(0.37)	(0.30)	(0.47)	(0.16)
OILDIAMOND	-0.44	-0.61	0.52	-0.10
	(0.60)	(1.06)	(0.52)	(0.24)
MOUNTAINS	0.00	-0.05	0.01	0.01
	(0.02)	(0.01)	(0.01)	(0.01)
NONCONT		1.54	0.85	
		(1.10)	(0.47)	
DEMOCRACY	-0.57	1.09	0.07	0.07
	(0.56)	(0.77)	(0.70)	(0.27)

CONSTANT	0.05	-2.31	-7.32	-6.76***
	(4.16)	(3.81)	(5.06)	(1.75)
Pseudo	0.17	0.51	0.50	0.29
N	180	144	402	288

***	Significant at the 1% level			
**	Significant at the 5% level			
*	Significant at the 10% level			
Standard errors are robust standard errors adjusted for clustering				

TABLE 3

	Dependent Variable is PRIO25 Logit Model			Dependent Variable is CONF OLS Model		
PRIO25A	(1)	(2)	(3)	(4)	(5)	(6)
P_{RQ}	0.54***	0.39	0.45***	1.24***	1.64**	1.17***
	(0.12)	(0.24)	(0.12)	(0.33)	(0.79)	(0.34)
FREE	-0.62***	-0.60***	-0.56***	-0.85*	-0.73	-0.84*
	(0.18)	(0.19)	(0.17)	(0.49)	(0.50)	(0.49)
P_{RQ} ×FREE	0.21			0.09		
	(0.13)			(0.32)		
P_{RQ} |*Q2*		-0.07			-0.57	
		(0.32)			(1.06)	
P_{RQ} |*Q3*		0.18			-0.7	
		(0.33)			(0.97)	
P_{RQ} |*Q4*		0.59			-0.21	
		(0.39)			(0.98)	
P_{RQ} |*TOP20*			0.89*			1.06
			(0.46)			(0.99)
POP	0.18**	0.18**	0.18**	1.07***	1.09***	1.09***
	(0.08)	(0.08)	(0.08)	(0.24)	(0.24)	(0.24)
PRIO25 Lag/CON Lag	2.52***	2.52***	2.54***	0.49***	0.49***	0.49***
	(0.22)	(0.22)	(0.22)	(0.04)	(0.04)	(0.04)
GDP/Cap	-0.32**	-0.33**	-0.36**	-1.12*	-1.17*	-1.13*
	(0.16)	(0.16)	(0.15)	(0.61)	(0.62)	(0.61)
OILDIAMOND	-0.14	-0.14	-0.12	-0.94	-0.86	-0.98
	(0.24)	(0.24)	(0.23)	(0.79)	(0.80)	(0.80)

MOUNTAINS	0.01*	0.01*	0.01*	0.04***	0.04***	0.04**
	(0.00)	(0.00)	(0.00)	(0.01)	(0.02)	(0.01)
NONCONT	1.36***	1.29***	1.3***	5.22***	4.99***	5.31***
	(0.39)	(0.41)	(0.37)	(1.42)	(1.39)	(1.43)
DEMOCRACY	0.22	0.22	0.19	0.34	0.32	0.34
	(0.27)	(0.26)	(0.27)	(0.94)	(0.97)	(0.93)
CONSTANT	-3.00*	-2.92	-2.65*	-5.05	-4.95	-5.18
	(1.54)	(1.56)	(1.53)	(4.36)	(4.43)	(4.43)
Pseudo	0.377	0.378	0.377	0.407	0.408	0.408
N	1029	1029	1029	1015	1015	1015
***	Significant at the 1% level					
**	Significant at the 5% level					
*	Significant at the 10% level					
Standard errors are robust standard errors adjusted for clustering						