

A Cooperative Labour Market Model of Diverse Ethnic Groups

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Abstract

This paper uses a simple but strategic cooperative model of labor market with ethnic divisions in which sharing of surplus is the prime objective as against the wage bill and examines the effectiveness of policies and institutions in terms of the visibility of sharable benefits. It is shown that institutions such as legal property rights and democracy apparently engender labour supply and growth as against policies of control of corruption and reduction of income inequality. Interestingly, reducing income inequality does not emerge as a favorite because the benefits may go to higher income groups and to other groups. Controlling corruption again seems to be loaded with government regulation rather than economic freedom. These results are robust for several measures of ethnic diversity along with alternative endogeneity tests for ethnic diversity. Findings would bear important implications for further research in new growth economics while assessing the relative significance of policies and institutions in augmenting labour supply in ethnically fragmented societies.

Keywords: Ethnic diversity, economic growth, economic policies, institutions, cooperative model, labour supply, corruption, income inequality, democracy

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1. Introduction

Olson (1965) argued that heterodox and complex societies see the rise of sectional conflicts that aim to grab public resources to their advantage. Easterly (2001) nevertheless found good quality institutions reducing such sectional conflicts of ethnic groups. We presume that the visibility of benefits to ethnic fractions emanating from the different channels is expected to determine their share in divisible pool that would dampen the adverse effects of ethnic diversity on labour supply decisions and growth. We extend this literature of conflict and conflict resolution by comparing the effectiveness of policies and institutions in assuring their share by employing a simple but strategic cooperative model of labour supply by ethnic groups in which redistribution of shareable surplus as against the wages bill is the primary argument. We invoke the economic theory of incomplete contracts in which unforeseen contingencies and lack of observability and renegotiation outlets may assume special significance in comparative sharing strategies (Maskin and Tirole, 1999; Tirole, 1999). It is probable that cooperative behavior may emanate if the benefits from policies and institutions are visible *ex post*. For instance, groups and communities may prefer public health institutions offering direct and greater benefits in the short run than educational policies yielding returns in the long run. What is vital is that policy is a law, regulation, procedure, administrative action, incentive, or voluntary practice of governments and other institutions. As Mark Considine (2005) states, "Policy making can best be seen as a form of intervention into specific and social and cultural contexts, and not as an engineered solution to universal problems". Policies therefore by construction are broad indicators of sharing possibilities and may not carry commitment devices to ensure their credibility. Institutions, on the other hand, are the formal and informal rules and norms that organise social, political and

economic relations (North 1990). Institutions, thus, can be thought of as technologies that more visibly carry commitment and allow society and individuals to engage in the pursuit of long-term goals, even in the face of changing circumstances (Aysan, 2005). Alesina and La Ferrara (2002) show that in American cities individuals living in more racially fragmented communities have a lower propensity to trust other people, but they do not exhibit lower levels of trust towards institutions. So, in terms of visibility of benefits and in turn preference for channels, institutions may seem to be more effective than policies. For empirical verification of preference revelation for policies and institutions, reduction in income inequality and control of corruption are taken to represent economic policy and legal property rights and democracy are economic and political institutions, respectively.

This paper contributes to the literature at cross-country level in the following ways. First, we employ a simple cooperative labour market model of ethnic diversity in which the reduced form of the model shows that income-maximizing individuals would assign greater weight on sharing the surplus rather than individual wage bills. Unlike in the earlier studies with ad hoc choice of channels, an attempt is made in this paper to develop a formal labour market framework in which an account is taken of the possibility that individuals tend to behave differently as an individual unit of labour pool but may cooperate as a member of a group or community. Second, we argue that the visibility of benefits to ethnic fractions emanating from the different channels is expected to determine their share in divisible pool and would dampen the adverse effects of ethnic diversity on economic growth. The identification of channels is based on an empirical verification of the relationships between ethnic diversity and channels and between channel and labour supply resulting in growth. Third, these behavioral dimensions are analyzed for developed and developing countries separately to ascertain whether levels of development get manifested in

preference revelation. Fourth, different measures of ethnic diversity are employed for aggregate sample and separately for developed and developing country samples. This works as robustness checks along with tests for endogeneity using innovative Lewbel (2012) technique and three-stage least squares (3SLS) method. Lastly, a distinction is made between institutional and policy channels to discern their effectiveness as a redistribution device having implications for ethnic groups' share. Our results show that diverse ethnic groups have greater preference for institutions as compared to policy channels as tools of sharing the surplus and supplying labour for growth. 'Legal property rights' is the only effective channel both in developing and developed country samples. Democracy however loses its significance in some tests in developed countries indicating that in ethnically divided developed countries, it may not generate required income redistribution in favor of ethnic groups to motivate ethnic groups to increase labour supply and growth. This result contradicts the earlier result that democracy is growth promoting in the presence of ethnic divisions, particularly in developed countries (Collier, 2000; Easterly 2001; Alesina and La Ferrara, 2005 Collier, 2000; Easterly 2001; Alesina and La Ferrara, 2005). Our study thus establishes that the power of democracy as a redistribution and growth route is more evidenced in early phases of economic development. On the policy side, control of corruption route exhibits some weak potential, but income equality does not emerge as preferred transmission channel for eliciting labour supply and growth. It may be conjectured that any improvements in overall income distribution may also indicate increased share of other groups engendering lack of cooperation from ethnic groups. These results are robust to alternative specifications as well as to alternative datasets.

The rest of the paper is organized as follows. The following section presents literature review and proposed extension. We then elaborate the cooperative model of ethnic divisions and growth

with potential channels of transmission contributing to the sharing of the divisible pool and eliciting positive response for labour supply. The next part describes our empirical modelling and estimation strategy involving identification of channels and disentangling direct impact of ethnic diversity on growth from the total impact. A discussion of pooled OLS results emanating from various measures of ethnic fractionalization follows. Subsequently, sensitivity checks employing alternate country samples and simultaneous estimation methods (Lewbel and 3SLS) are conducted. Lastly, we conclude with some implications for policy and future research. In this study, polarization as a measure of ethnic diversity, which explicitly captures conflict dimension is not our prime research interest since its negative growth impact via various transmission channels including incidence of civil wars, investment and human capital seems well established (Montalvo and Reynal-Querol, 2005; Gören, 2014).

2. Review of existing literature

The link between ethnic fractionalization and economic development is generally postulated as being negative when ethnic fractionalization poses costs for the exchange and supply of public goods and generates conflict and instability which can lead to civil unrest or wars. Positive effects can occur when ethnic differences imply greater pool of skills, manifested in increased productivity and trade opportunities. Alesina and La Ferrara (2005) contend that the costs to the economy will typically outweigh the benefits. Direct negative impact of ethnic fractionalization on economic growth finds overwhelming support in the empirical literature relying on cross-country analysis. Noteworthy studies include Mauro (1995) and Easterly and Levine (1997) using the index of ethnolinguistic fractionalization (ELF) generated with data of the Atlas Narodov Mira (Taylor and Hudson, 1992). Alesina et al. (2003) criticize the Atlas ELF measure

which relies largely on linguistic distinctions and develop new indices of ethnic, linguistic as well as religious fractionalization. They re-estimate the Easterly-Levine growth model and confirm the negative growth impact of ethnic and linguistic diversity. This significant direct effect however vanishes when the model is augmented with additional variables like infrastructure, schooling and government consumption. These may thus be viewed as potential indirect channels of ethnicity. Other researchers have argued that inequality may be driving this negative result and not ethnic diversity (e.g., Casey and Owen, 2014). However, even after controlling for inequality (usually measured by Gini), the negative impact of ethnic fractionalization is found to persist.

Formal investigation of indirect channels of transmission of ethnic diversity on growth has first been conducted by Montalvo and Reynal-Querol (2005). The authors distinguish between the notions of fractionalization and polarization and argue that indices employed in previous research generally mix these two concepts. They develop new measures of ethnic fractionalization and polarization to test the validity of three indirect channels, namely investment, government expenditure and civil wars using the Seemingly Unrelated Regression (SUR) systems of equations methodology. Ethnic fractionalization in their results impacts economic development directly (the diversity variable is insignificant determinant of these channels) whereas ethnic polarization exhibits substantial indirect effects through the channels mentioned. Gören (2014) confirms these findings by considering an expanded set of transmission mechanisms including investment, schooling, political instability, market distortions, trade openness, and the fertility rate. Papyrakis and Mo (2014), however, demonstrate that both ethnic fractionalization and polarization affect growth indirectly via the corruption channel.

It is worth noting that a substantial number of studies have investigated the impact of ethnic diversity on various institutional measures and economic variables without however explicitly modelling these as channels of transmission for ethnic diversity on economic growth. La Porta et al. (1999) for instance find that ethnically fractionalized societies exhibit inferior government performance. Nevertheless, fractionalization is typically not significant when controlling for initial income and latitude. Tavares and Wacziarg (2001) use ethnic fractionalization as cultural variable in a democracy equation while examining indirect effects of democracy on growth. Alesina et al. (2003) observe that ethnic and linguistic fractionalization have a negative effect on the quality of government whereas religious fractionalization has no effect. Collier (1999, 2000) and Alesina and Ferrara (2005) observe that democracy, as an institution, can reduce the adverse effects of ethnic diversity on growth. Alesina *et al.* (2016) find that the negative correlation between ethno-linguistic fragmentation and development documented in previous works weakens considerably when we account for ethnic (income) inequality suggesting that it is the unequal concentration of wealth across ethnic lines which is detrimental for development rather than diversity *per se*. In the absence of direct data on ethnic group incomes, they combined satellite images of nighttime luminosity with the historical homelands of ethnolinguistic groups and constructed measures of ethnic inequality for a large sample of countries. In a recent paper, Van Staveren and Pervaiz (2017) argue that the negative effect of ethnic diversity may arise due to horizontal inequality, which they capture by using a measure of social exclusion. Social exclusion not only creates differences in economic benefits but also affects social cohesion with potential impact on growth. Once controlled for social exclusion, ethnic diversity variable is shown to have no significantly negative impact on social cohesion.

Also noteworthy is that findings of ethnic diversity as ‘debit’ in cross-country studies is typically not validated in exercises conducted at sub-national level. Ethnic richness as a ‘dividend’ appears to be predominantly in these studies. In a quantitative review encompassing 172 studies and 480 findings from both developed and developing countries, Schaeffer's (2013) finds that 60 percent of the studies and 56 percent of their findings confirm a diversity debit. Only Australia, Canada and New Zealand (the historical immigration countries) appear to have been less affected by diversity than developing countries. Second, he confirms that as the level of analysis decreases (national to sub-national), evidence on diversity debit increases. However, cross-national studies do explain adequately how diversity’s negative effects often work. Finally, diversity is found to have most negative effect on trust, a lesser but still large effect on civic and collective actions, and a marginally smaller effect on public good provision. More recently, several studies at sub-national level also confirm ethnic diversity dividend (see Kirk et al., 2018 for an extensive review). Gisselquist et al. (2016), for instance, using a sub-national dataset of Zambian budget, survey and administrative data, find a positive relationship between ethnic diversity, public goods provision and welfare outcomes. Gerring et al. (2015) find that although diversity may have negative ramifications on human development at national levels but not necessarily to have same effects at subnational levels. Awaworyi Churchill et al. (2020) examine the effects of ethnic, linguistic and religious diversity calculated for 30 Indian States and 557 districts on various measures of human capital development in India such as infant mortality, education and health. Their findings suggest that, on average, ethnic diversity contributes to some elements of development. Specifically, evidence supports development enhancing effects of diversity on education and health. Gershman and Rivera (2018) however obtain inconclusive evidence on the

link between diversity and development indicators when employing data from 400 first-level administrative units from 36 Sub-Saharan African countries.

This study takes a different route and unravels channels that protect the share of divergent ethnic groups in the divisible pool. We posit that ethnic groups would have some built-in preference for channels in terms of effective sharing outcome that emanate from the visibility of benefits to ethnic fractions arising from these channels. Persson and Tabellini (1994) argue that in a society where distributional conflict is important, political decisions are more likely to produce suboptimal policies and thereby emphasizing the role of political institutions, for it is through the political process that conflicting interests ultimately are aggregated into public policy decisions. The gist of the story is how different ethnic fractions perceive or trust the workings of these policy and institutional mechanisms in terms of the immediate benefits they can enjoy from the divisible pool and take decisions about labour supply for growth. Unlike in the earlier studies with ad hoc choice of channels, an attempt is made in this paper to develop a formal labour market framework in which an account is taken of the possibility that individuals tend to behave differently as an individual unit of labour pool but may cooperate as a member of a group or community. Selection of these channels and their impacts are empirically determined in the following sections.

3. A simple model of cooperative labour market

In a cooperative framework, individuals in different groups and communities would compare the benefits and costs of social harmony and conflict and would like to ensure their economic position in the distributive politics and governance before taking economic or extra-economic decisions. Given the biological nature of the human resource, it can be assumed that humans are

by nature cooperative in a group subject to constraints, namely market forces and social factors. Rubin and Somanathan (1998) argue that pressures arising from conflict and competition between groups would have provided evolutionary incentives in the Darwinian sense for individuals to be able to cooperate in groups with others, which in turn depends on the ability to avoid cheating, or defection in a prisoner's dilemma setting. Furthermore, this selection pressure can explain human abilities to form large extra-familial and extra-ethnic groups utilizing skill differences for productive activity. Fearon and Laitin (1996) explain how in the spiral equilibrium in a game setting, the disputes between individuals are correctly expected to spiral rapidly beyond the two parties, and fear of this induces cooperation on the equilibrium path. Gangopadhyay and Nath (2001) discuss conditions for grand coalitions eliciting cooperation in a local legislative assembly represented by three diverse groups. The threat that two other groups may club together induces each group to converge and maximize the benefits through the provision of public goods.

Heyer et al. (2002) discuss the efficiency, equity and welfare dimensions of group behavior and growth and find that most obstacles to cooperation among groups stem from market forces resulting in adverse impacts on different ethnic groups and growth. Keefer and Knack (2002) argue that trust is more pronounced, *ceteris paribus*, when incomes are more equally distributed. Desmet et al. (2009) show that redistribution by the government is lower in countries having higher levels of linguistic diversity, thereby emphasizing redistribution channel. Similarly, lower level of social trust is witnessed in more fractionalized societies; this effect however is less severe in higher income and non-African countries (Wang and Steiner, 2015). In an interesting paper, Alesina et al. (2016) document that the negative correlation between ethnolinguistic fragmentation and development in previous works weakens considerably when we account for

ethnic (income) inequality suggesting that it is the unequal concentration of wealth across ethnic lines which is detrimental for development rather than diversity *per se*. This would imply that the positive effects of functional policies and institutions may highlight the positive effects of skill, educational and cultural differences of human resource.

We employ the following cooperative framework to model the behavior of ethnic groups. Given the growth function $Y = (L, K)$; $L = (y)$

where Y denotes total output, L and K are labor and capital respectively, and labor supply depends on y , that is, per labor income.

Following Laidler and Estrin (1989), it is postulated that in a cooperative environment, each member of the (ethnic) group is expected to maximize his/her income (y), that is,

$$\text{Max } y = w + (Y - wL - rK) / L$$

where w is wage rate, wL is wage bill, rK is share of capital, given rate of return, r and wage payment, w . After manipulation, we get

$$y = (wL + Y - wL - rK) / L$$

$$\Rightarrow (Y - rK) / L = s_i$$

where s_i is share of i^{th} individual in an ethnic group in total output. Now, for the supply of work effort to produce growth, wage rate is not relevant, it is sharing of total output that is more important. At the macro level, individual's share will rise with ethnic group share (s_i^*) in total output and the following relationships will hold:

The total growth effect of ethnic diversity, $EF^*(g)$ is now given by

$$EF^*(g) = EF(g) + s_i^* \cdot EF(g)$$

where, $EF(g)$ is growth due to ethnic diversity of labour force, call it *direct effect*, $s_i \cdot EF(g)$ is *indirect effect* and represents growth due to channels determining shares of ethnic groups in total divisible pool. After controlling for $s_i EF$,

$$\partial g / \partial (EF) < 0$$

This would imply that if we ignore the ethnic group preference for redistribution through policies and institutions, the effect of heterogeneity on growth is negative. The important relationships can be summarized as follows:

$$\partial g / \partial L > 0; \partial L / \partial (s_i * EF) > 0$$

$$\partial g / \partial (s_i * EF) > 0 < 0$$

The emerging implications of this model are empirically verified in the following sections.

4. Empirical strategy

The reduced form of the model is:

$$Gr_{it} = \alpha_1 + \beta_1 \ln Y_0 + \sum \phi_{1jit} X_{jit} + \theta_1 ETHNIC_i + \mu_{1it} \quad (1)$$

where Gr_{it} is average growth of real GDP per capita (at constant 2010 prices) of country i in period t ; and $\ln Y_0$ is natural log ($\ln$) of per capita income in the initial year of each five-year subperiod starting 1960 to 2014. Our sample includes 132 developed and developing countries including transition economies (see list in Appendix A). The set of X variables that ethnic diversity does not use as transmission channels for growth include the ratio of investment to GDP (INV), years of schooling ($\ln SCHOOL$), and the pool of economically active population ($\ln POPEa$). $ETHNIC$ is our measure of ethnic diversity which focusses on ethnic and linguistic fractions as well as cultural diversity. Since equation (1) does not include the transmission channels, the coefficient θ_1 captures the total effect of ethnicity on economic growth. It is worth

noting at this stage that investment and schooling have been tested as potential transmission channels for ethnolinguistic fractionalization on growth without yielding significant results in the recent literature (Montalvo and Reynal-Querol, 2005; Gören, 2014). Conversely, these researchers find that polarization with inherent conflict dimension (not the focus of our paper) rather than fractionalization uses the channel of investment to reduce growth rate.

In the next stage, we augment the baseline equation with the transmission variables having additive impact on growth as follows:

$$Gr_{it} = \alpha_2 + \beta_2 \ln Y_0 + \sum \varphi_{2jit} X_{it} + \theta_2 \text{ETHNIC} + \sum \pi_{kit} TC_{it} + \mu_{2it} \quad (2)$$

TC in equation (2) represents ‘k’ potential transmission channels for ethnicity. We consider legal structure and security of property rights (P_RIGHS), transparency / control of corruption (C_CORR), democracy (DEM) and income distribution (EQUALITY). The coefficient θ_2 on ETHNIC captures the direct impact of ethnic diversity on growth. The aggregate indirect impact of ethnic diversity using the different transmission channels may be derived as the difference between the total impact (θ_1) and the direct impact (θ_2).

For the identification of transmission channels, there should be a significant association between the transmission channel and ethnic diversity, and a significant relationship between the transmission channel and growth. To test the first condition, for each channel, we estimate the following model hypothesizing that θ_3 is significantly different from zero.

$$TC^k_{it} = \alpha_3 + \beta_3 \ln Y_0 + \theta_3 \text{ETHNIC}_i + \mu_{3it} \quad (3)$$

To begin our empirical investigation, we use the ordinary least squares procedure with pooled data (POLS) to assess the validity and effects of the four channels of transmission. The channel variables in the growth equation are measured at the beginning of each sub-period so as to avoid endogeneity problem. The estimation of total effect from the baseline model (eqn. 1) spans over

years 1660-2014. Due to long time horizon, ethnicity may be endogenous causing bias in the estimates. We address this problem in our sensitivity analysis using the 3-stage least squares (3SLS) method. Nevertheless, endogeneity of ethnic variable is less likely to affect our estimates of direct effect, that is, when all four transmission variables are included in the growth model. This is due to constrained observations on corruption starting from period 1995 onwards. As noted by Alesina et al. (2003), ethnic diversity is not likely to be endogenous as it changes in the long run. Moreover, Gershman and Rivera (2018) in their study on some African economies observe persistence of subnational ethnic divisions over time that appears unresponsive to regional economic performance.

We use various measures of ethnicity developed in the literature to test the robustness of the results and ascertain whether some aspects of ethnic divisions e.g., ethnic vs. linguistic vs. cultural diversity matter more than others. Additional sensitivity tests include tackling endogeneity of investment in the growth model. The innovative Lewbel (2012) technique is employed to solve the identification problem in a structural model and endogeneity. Identification requires a heteroscedastic covariance restriction that is apparent in some panel data, simultaneous relationships or models involving measurement errors. The Lewbel approach resolves the identification issue by assuming heteroscedastic error terms. After defining appropriate instrumental variables to formulate sample moment conditions, the parameters of interest can be identified and estimated using the Generalized Method of Moments (GMM) technique. In another round of sensitivity check, we disaggregate ethnic effects according to the level of economic development of countries. These estimates would also provide interesting insight on whether channels in developing economies differ from that of high-income nations. Finally, 3SLS methodology is employed to address the endogeneity of both investment and

ethnicity. A comparison of growth impacts of ethnicity and important transmission channels emerging from all these approaches highlights the stability of our findings.

4.1 Variables used and sources of data

The variables used, sources of data and summary statistics are presented in Appendix B. We experiment 7 measures of diversity capturing ethnic, language and cultural dimensions, namely Montalvo-Querol (2005) ethnic fractionalization index (denoted as $m_ethfrac$); Alesina et al. (2003) measures of ethnic and language fractionalization (al_ethnic and al_lang , respectively); Fearon's (2003) ethnic fractionalization index (fe_etfrac) and cultural diversity index ($fe_cultdiv$) that uses a measure of the structural relationship between languages to take into account the cultural distance between groups; ethnolinguistic fractionalization in 1985 (r_elf85) from Atlas Mirova reported by Roeder (2001). As additional robustness test, we also use the Montalvo-Querol (2005) polarization measure (m_ethpol).

5. Empirical Results and Discussion

This section contains results emanating from the baseline and augmented specifications on total, direct and indirect effects of ethnic diversity and growth via perceived channels of sharing the surplus. Robustness test results confirming and refuting the findings are presented in the following section.

5.1 Baseline results: Total effect of ethnic diversity on growth

Panel A of Table 1 reports heteroscedastic robust POLS estimators of the total impact of ethnic diversity on growth (baseline model, eqn. 1). Strong negative impact of all diversity measures (generally at the 1 percent level of significance) except polarization (not significant) is observed, after controlling for initial income per capita ($\ln Y_0$), pool of economically active population ($\ln$

POPea), percent of investment in GDP (INV), and years of schooling (ln SCHOOL). This supports the findings in the mainstream literature. The average impact of ethnic fractionalization is -1.97, -1.46 for language diversity, and -1.38 for cultural diversity. Insignificance of ethnic polarization may be due to the inclusion of investment, which is an important channel for this aspect of diversity (Montalvo and Reynal-Querol, 2005; Gören, 2014). Thus, investment would appear a primary channel for polarization due to its insignificant direct impact on growth in all the models. As regards the control variables, all are significant with expected signs on the coefficients: positive for INV, POPea and SCHOOLING; negative for Y_0 , supporting convergence.

Table 1: Ethnic impact on growth: Total effect and controlling for each transmission channel (POLS estimates)

	m_ethfrac (1)	al_ethnic (2)	al_lang (3)	fe_etfra (4)	fe_cultdiv (5)	r_elf85 (6)	m_ethpol (7)
Panel A: Base – Total effect							
ln Y_0	-0.56*** (-4.43)	-0.67*** (-5.91)	-0.62*** (-5.55)	-0.63*** (-5.21)	-0.58*** (-4.83)	-0.67*** (-5.67)	-0.44*** (-3.41)
ln POPea	0.18*** (2.88)	0.11** (2.17)	0.13** (2.45)	0.18*** (2.85)	0.19*** (3.01)	0.25*** (3.75)	0.13** (2.21)
INV	0.15*** (5.96)	0.14*** (6.22)	0.15*** (6.47)	0.15*** (6.33)	0.15*** (6.49)	0.14*** (4.86)	0.15*** (6.05)
ln SCHOOL	0.73*** (2.59)	0.91*** (3.50)	0.94*** (3.62)	0.91*** (3.52)	0.96*** (3.64)	1.51*** (4.50)	0.83*** (2.97)
Ethnic	-2.01*** (-4.38)	-2.68*** (-5.37)	-1.46*** (-3.63)	-1.79*** (-4.05)	-1.38** (-2.57)	-1.39*** (-3.09)	-0.60 (-1.41)
N	933	1057	1032	1007	1000	699	933
adj. R-sq	0.142	0.146	0.132	0.140	0.131	0.149	0.124
Panel B: Property rights channel (P_RIGHTS)							
ln Y_0	-0.98*** (-8.63)	-0.97*** (-9.48)	-0.97*** (-9.41)	-0.98*** (-9.49)	-0.95*** (-9.17)	-0.98*** (-7.47)	-0.84*** (-7.82)
ln POPea	0.14*** (2.65)	0.065 (1.30)	0.079+ (1.59)	0.13** (2.24)	0.13** (2.30)	0.098* (1.75)	0.10* (1.94)
INV	0.16*** (8.42)	0.16*** (9.04)	0.17*** (9.60)	0.16*** (8.83)	0.16*** (8.99)	0.16*** (7.98)	0.16*** (8.37)
ln SCHOOL	0.94*** (3.07)	1.03*** (3.61)	1.00*** (3.48)	1.05*** (3.63)	1.05*** (3.60)	1.40*** (4.06)	1.00*** (3.17)
P_RIGHTS	0.44***	0.45***	0.48***	0.45***	0.48***	0.41***	0.45***

	(6.39)	(6.62)	(6.98)	(6.50)	(6.84)	(4.78)	(6.14)
Ethnic	-1.89***	-1.70***	-1.32***	-1.47***	-1.21**	-1.16***	-0.46
	(-4.80)	(-4.40)	(-4.01)	(-3.69)	(-2.51)	(-3.00)	(-1.27)
N	751	827	814	793	787	609	751
adj. R-sq	0.240	0.249	0.253	0.254	0.247	0.254	0.217

Panel C: Democracy channel (DEM)

lnY ₀	-0.59***	-0.69***	-0.64***	-0.67***	-0.62***	-0.70***	-0.47***
	(-4.32)	(-5.52)	(-5.27)	(-5.15)	(-4.81)	(-5.78)	(-3.34)
ln POPea	0.20***	0.11*	0.15**	0.16***	0.18***	0.25***	0.17**
	(2.92)	(1.85)	(2.37)	(2.61)	(2.73)	(3.29)	(2.46)
INV	0.16***	0.15***	0.16***	0.15***	0.16***	0.15***	0.16***
	(5.97)	(6.22)	(6.58)	(6.38)	(6.55)	(4.98)	(6.07)
ln SCHOOL	0.47*	0.69***	0.64**	0.70***	0.73***	1.13***	0.53*
	(1.73)	(2.62)	(2.40)	(2.74)	(2.80)	(3.26)	(1.94)
DEM	0.05**	0.05**	0.06**	0.05**	0.05**	0.07***	0.05**
	(2.23)	(2.10)	(2.54)	(2.11)	(2.26)	(2.79)	(2.20)
Ethnic	-1.85***	-2.44***	-1.27***	-1.73***	-1.35**	-1.14**	-0.28
	(-4.01)	(-4.74)	(-3.12)	(-3.88)	(-2.51)	(-2.47)	(-0.59)
N	899	1011	986	1004	997	670	899
adj. R-sq	0.152	0.152	0.144	0.146	0.138	0.166	0.135

Panel D: Control of corruption channel (C_CORR)

lnY ₀	-1.00***	-1.33***	-1.37***	-1.32***	-1.32***	-1.28***	-0.89***
	(-5.06)	(-4.36)	(-4.72)	(-4.33)	(-4.22)	(-4.29)	(-4.80)
ln POPea	0.25***	0.17**	0.19**	0.19**	0.20**	0.24***	0.22***
	(3.51)	(2.37)	(2.50)	(2.01)	(2.10)	(2.81)	(3.21)
INV	0.14***	0.13***	0.15***	0.14***	0.14***	0.13***	0.14***
	(5.09)	(5.10)	(5.73)	(5.08)	(5.20)	(5.08)	(5.07)
ln SCHOOL	1.38***	2.24***	2.39***	2.52***	2.63***	1.91***	1.40***
	(2.73)	(4.76)	(4.58)	(4.56)	(4.81)	(3.72)	(2.78)
C_CORR	0.02**	0.02	0.03+	0.02	0.02	0.03*	0.02**
	(2.50)	(1.29)	(1.64)	(1.31)	(1.40)	(1.78)	(2.42)
Ethnic	-1.08**	-2.14***	-0.97**	-0.69	-0.61	-0.81*	0.003
	(-2.25)	(-2.84)	(-1.99)	(-1.07)	(-0.89)	(-1.89)	(0.01)
N	319	385	378	372	370	341	319
adj. R-sq	0.243	0.214	0.206	0.194	0.195	0.192	0.232

Panel E: Income distribution channel (EQUALITY)

lnY ₀	-0.65***	-0.80***	-0.77***	-0.85***	-0.84***	-0.65***	-0.62***
	(-5.56)	(-7.29)	(-6.99)	(-7.49)	(-7.58)	(-6.17)	(-5.58)
ln POPea	0.20***	0.11*	0.11*	0.13*	0.13*	0.14**	0.18***
	(3.27)	(1.89)	(1.88)	(1.96)	(1.95)	(2.25)	(3.07)
INV	0.10***	0.12***	0.13***	0.12***	0.12***	0.13***	0.11***
	(5.01)	(5.85)	(6.05)	(5.94)	(5.89)	(6.14)	(5.10)
ln SCHOOL	1.58***	1.97***	1.98***	2.12***	2.12***	1.53***	1.60***
	(3.96)	(5.16)	(5.21)	(5.54)	(5.52)	(3.94)	(4.00)
EQUALITY	0.002	0.02	0.02**	0.01	0.01	0.003	0.01

	(0.18)	(1.51)	(2.03)	(1.23)	(1.28)	(0.25)	(0.58)
Ethnic	-0.46	-0.38	0.05	-0.17	-0.11	-0.35	0.26
	(-1.14)	(-0.89)	(0.15)	(-0.40)	(-0.22)	(-0.93)	(0.64)
N	438	514	507	501	499	451	438
adj. R-sq	0.176	0.210	0.218	0.220	0.218	0.224	0.174

Source: Computed. Heteroscedastic robust t statistics in parentheses. + p<0.12, * p<0.10, ** p<0.05, *** p<0.01.

Notes: Data are arranged as five period averages from 1960 to 2014. Dependent variable: Real growth rate (5 period averages, 1960-2014). The four transmission channels are measured at initial of the period to avoid potential endogeneity problem. Intercepts are not reported due to space constraint. ln: natural log; Y0: initial income; POPea: Economically active population; SCHOOL: Average years of schooling (measured at initial of the period).

5.2 Disentangling the direct and indirect effects of ethnic diversity on growth

Panels B to E in Table 1 estimate eqn. (2) where each of the transmission channels is added independently to the basic model. We report results of models using the initial values of legal property rights (Panel B), democracy (Panel C), control of corruption or transparency (Panel D), and redistribution (Panel E) in the growth models so as to reduce endogeneity, which would bias the results. Table 2 reports the direct growth impact of ethnic divisions in the presence of all transmission channels. Finally, Table 3 conducts tests for the identification condition as transmission channel, that is, ethnicity should significantly impact each of these channels.

Table 2: Direct impact of ethnicity on growth after controlling for all transmission channels

	m_ethfrac	al_ethnic	al_lang	fe_etfra	fe_cultdiv	r_elf85	m_ethpol
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
lnY ₀	-1.10***	-1.02***	-1.03***	-1.08***	-1.09***	-1.12***	-1.01***
	(-6.35)	(-6.13)	(-5.86)	(-6.19)	(-6.24)	(-6.39)	(-5.73)
ln POPea	0.22**	0.08	0.10	0.12	0.12	0.17**	0.17*
	(2.44)	(0.97)	(1.11)	(1.41)	(1.47)	(2.00)	(1.96)
INV	0.14***	0.13***	0.14***	0.14***	0.14***	0.15***	0.14***
	(6.05)	(6.08)	(6.10)	(6.23)	(6.25)	(6.59)	(5.91)
ln SCHOOL	1.75***	1.93***	2.02***	2.10***	2.19***	1.92***	1.81***
	(3.43)	(4.50)	(4.55)	(4.75)	(4.96)	(3.95)	(3.55)
P_RIGHTS	0.14	0.41***	0.43***	0.42***	0.44***	0.17	0.18
	(0.95)	(2.88)	(2.98)	(2.94)	(3.10)	(1.20)	(1.21)
DEM	0.04	0.04	0.05*	0.05*	0.05*	0.06**	0.05+
	(1.48)	(1.55)	(1.93)	(1.82)	(1.78)	(2.03)	(1.57)
C_CORR	0.01	-0.02*	-0.02*	-0.02+	-0.02+	0.01	0.01
	(0.77)	(-1.78)	(-1.70)	(-1.59)	(-1.59)	(0.39)	(0.37)
EQUALITY	-0.02	-0.01	-0.004	-0.01	-0.01	-0.01	-0.01

	(-1.35)	(-0.92)	(-0.39)	(-0.94)	(-0.67)	(-1.00)	(-0.69)
Ethnic	-1.16**	-1.16**	-0.57	-0.66	-0.70	-0.86*	0.22
	(-2.53)	(-2.47)	(-1.46)	(-1.36)	(-1.34)	(-1.95)	(0.42)
N	261	307	303	305	304	272	261
adj. R-sq	0.308	0.343	0.338	0.342	0.345	0.345	0.292

Source: Computed. Heteroscedastic robust t statistics in parentheses. + p<0.12, * p<0.10, ** p<0.05, *** p<0.01
Notes: As for Table 1.

Table 3: Impact of ethnic diversity on transmission channels – Identification condition

	m_ethfrac	al_ethnic	al_lang	fe_etfra	fe_cultdiv	r_elf85	m_ethpol
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Property rights (Dependent variable)							
lnY ₀	0.81***	0.75***	0.77***	0.74***	0.75***	0.80***	0.81***
	(19.7)	(19.6)	(19.6)	(18.5)	(18.6)	(20.4)	(20.3)
SSA	-0.18	-0.056	-0.26*	-0.12	-0.27*	-0.23	-0.23
	(-1.13)	(-0.38)	(-1.82)	(-0.80)	(-1.87)	(-1.44)	(-1.51)
LAC	-1.01***	-1.01***	-1.17***	-1.07***	-1.17***	-1.03***	-0.93***
	(-9.26)	(-9.95)	(-11.0)	(-10.0)	(-10.8)	(-9.75)	(-8.22)
Ethnic	-0.30+	-0.97***	-0.50***	-0.84***	-0.72***	-0.48**	-0.52***
	(-1.58)	(-4.53)	(-2.63)	(-3.91)	(-2.98)	(-2.52)	(-2.77)
N	801	897	883	854	848	660	801
adj. R-sq	0.57	0.57	0.56	0.55	0.55	0.63	0.57
Panel B: Democracy							
lnY ₀	2.05***	1.99***	2.07***	2.14***	2.19***	1.79***	2.06***
	(13.0)	(13.4)	(13.9)	(14.3)	(14.6)	(9.55)	(13.0)
SSA	-0.45	0.51	-0.54	0.39	-0.097	0.041	-0.58
	(-0.72)	(0.87)	(-0.95)	(0.65)	(-0.18)	(0.056)	(-1.00)
LAC	1.93***	1.93***	1.67***	1.79***	1.47***	3.80***	2.26***
	(3.85)	(3.99)	(3.39)	(3.66)	(3.10)	(7.14)	(4.34)
Ethnic	-1.03	-4.42***	-0.90	-3.03***	-2.74***	0.01	-2.26***
	(-1.26)	(-4.94)	(-1.11)	(-3.29)	(-2.70)	(0.01)	(-2.60)
N	1113	1284	1250	1242	1235	759	1113
adj. R-sq	0.25	0.25	0.24	0.25	0.25	0.22	0.25
Panel C: Control of corruption							
lnY ₀	12.2***	11.7***	12.2***	12.0***	12.1***	12.0***	12.4***
	(26.9)	(27.3)	(28.4)	(28.1)	(28.0)	(25.0)	(28.9)
SSA	6.05***	9.58***	6.81***	10.6***	8.76***	5.73***	5.12***
	(3.78)	(5.48)	(4.21)	(7.12)	(6.14)	(2.99)	(3.24)
LAC	-6.82***	-3.51**	-4.91***	-5.81***	-6.53***	-7.11***	-6.75***
	(-4.33)	(-2.50)	(-3.06)	(-4.16)	(-4.63)	(-4.71)	(-4.21)
Ethnic	-4.83**	-10.3***	-0.40	-8.01***	-4.91*	-3.34	-2.49
	(-2.04)	(-4.09)	(-0.19)	(-3.31)	(-1.83)	(-1.54)	(-1.01)
Obs	439	575	563	527	524	471	439

adj. R-sq	0.71	0.67	0.66	0.68	0.67	0.68	0.71
Panel D: Income Equality							
ln Y0	0.48*	0.41*	0.39*	0.19	0.23	0.50**	0.50**
	(1.91)	(1.92)	(1.80)	(0.87)	(1.04)	(2.23)	(2.09)
SSA	-8.56***	-9.26***	-8.99***	-9.07***	-10.1***	-8.23***	-8.62***
	(-7.88)	(-9.03)	(-9.35)	(-8.07)	(-10.4)	(-7.51)	(-8.64)
LAC	-14.7***	-15.4***	-16.4***	-15.3***	-15.8***	-14.7***	-13.6***
	(-21.4)	(-24.4)	(-24.5)	(-24.4)	(-24.8)	(-22.5)	(-19.4)
Ethnic	-2.20*	-2.64*	-3.38***	-3.83**	-2.09	-4.13***	-6.32***
	(-1.89)	(-1.90)	(-2.93)	(-2.44)	(-1.35)	(-3.15)	(-5.38)
N	479	584	577	554	552	491	479
adj. R-sq	0.49	0.52	0.52	0.51	0.52	0.52	0.51

Source: Computed. Heteroscedastic robust t statistics in parentheses. + p<0.12, * p<0.10, ** p<0.05, *** p<0.01
Notes: As for Table 1. SSA, LCN: Regional dummies for Sub-Saharan Africa and Latin America and Caribbean, respectively.

5.2.1 Legal structure and security of property rights

Panel B of Table 1 shows highly significant and positive impact of legal structure and security of property rights (P_RIGHTS) on growth in all regressions except the one where polarization is used as measure of diversity. Interestingly, the coefficients on ethnic fractionalization have reduced significantly to an average of -1.45 (as compared to -1.97, that is, the magnitude of the total effects estimate). Similarly, coefficients on language diversity and cultural diversity are also lower: -1.32 and -1.21, respectively vs. the total effects of -1.46 and -1.38. Thus, the property rights channel appears in consonance with postulated expectation. In other words, the visibility of benefits looks clear and ethnic groups seem to consider this channel as an instrument that play an important role in sharing the divisible pool. The existence of this transmission mechanism obtains additional support from the identification test in Table 3, where significant (negative) impact of all ethnicity measures on P_RIGHTS is evidenced. Ethnic divisions tend to reduce the effectiveness of property rights in attempts to extract rents for own groups. Nevertheless, higher level of property rights would foster a more cooperative environment between groups conducive to investment and economic growth due perceptions of credible security of benefits, enforceable

contracts (Keefer and Knack, 2002), increased cost of cheating and defection (Rubin and Somanathan, 1998), protection from ‘unfair’ market practices (Heyer et al., 2002), and equitable judgement from the judiciary. In such scenario, the adverse effects of ethnicity on growth are dampened substantially but not totally overpowered. Negative effect of ethnicity on growth persists in the presence of P_RIGHTS (Panel B, Table 1). When the specification includes all four channels, property rights generally retain significance (reg. 2-5) while negative growth impact of ethnicity is greatly reduced or neutralized (Table 2). Thus, the channel would seem valid.

5.2.2 Participatory democracy

In Panel D of Table 1, the indirect growth impact of ethnic diversity using the democracy channel is investigated. As in the case of legal property rights, we obtain strong positive effect of democracy on economic growth in all specifications while ethnic diversity maintains a significant negative sign on its coefficients with an average magnitude of -1.59 for the ethnic fractionalization measures, -1.27 for language diversity and -1.35 for cultural diversity. In the augmented growth specifications in Table 2, the significance of the democracy channel on growth subsists. Reduced impact of ethnicity fractionalization on growth in the presence of democracy has also been evidenced by previous research (e.g. Collier, 1999, 2000; Alesina and Ferrara, 2005) although these studies do not formally test for the identification condition establishing the validity of the channel. Table 3 conducts such tests for each ethnicity measure. Predominantly significant impact of ethnicity on democracy (4 cases out of 7) is obtained lending support to democracy as transmission mechanism.

It is generally perceived that embedded in democracy are institutional checks that constrain unconstitutional use of political powers, promote political competition, restrain rent seeking /

corrupt behavior of officials and promote higher rule of law and enforcement of contracts. There is considerable evidence that democracy also improves the provision of public goods relative to an authoritarian regime possibly indicating higher levels of cooperation amongst groups and higher levels of rule of law in democratic environment (Olken, 2008; Keefer and Khemani, 2005). Some evidence moreover indicates that the growth dampening impact of ethnic diversity gets moderated if countries are at higher income level with diversified production structure (Alesina and La Ferrara, 2005), and if they are blessed with quality institutions, particularly participatory democracy (Collier, 2000; Easterly 2001; Alesina and La Ferrara, 2005). The latter finding however is subject to controversy. Bluedorn (2001), for instance, does not obtain strong evidence in support of the positive impact of democracy in ethnically diverse societies.

The general findings in this study would tend to support increased cooperation between groups in more democratic settings probably due to perceptions of greater and fairer opportunities in getting a share of benefits of the common pool. While political competition can accentuate ethnic divisions, costs of strife are also higher in democracies in terms of loss of opportunities, trust and hence magnitude of expected gains.

5.2.3 Control of corruption

Control of corruption (C_CORR) as potential channel for ethnicity does not emerge robustly as with the institutional routes. When adding C_CORR to the baseline model (Panel D of Table 1), significantly positive effect of transparency on growth is evidenced in 4 out of 7 specifications (m_ethfrac, al_lang, r_elf85 and m_ethpol). Interestingly, in first three of these growth regressions, the magnitude of the coefficient on ethnicity is substantially reduced as compared to total effects estimates in Panel A (Table 1). Elsewhere, however, both ethnicity and transparency are typically insignificant. Nevertheless, identification tests conducted in Table 3 reveal general

adverse impact of diversity on transparency. Moreover, while controlling for all posited transmission channels (Table 2), C_CORR shows weak but significant impact on growth (at 10-12%) in regressions 2-5. Altogether, we find some indication that groups may use the transparency channel to improve their share in divisible pool.

It is important to note that while rent-seeking is higher in countries with greater fragmentation, Yehoue (2007) empirically establish that corruption occurs through ethnicity, which appears as a rent-extracting technology in a democratic society. Extending the model into a dynamic framework, the author finds that this technology of extraction operates only at the early stage of democracy and that its impact tends to phase out as democracy matures. Cerqueti et al. (2007) show that a non-linear relationship between fractionalization and corruption exists: corruption is high in homogeneous or very fragmented countries, but low where fractionalization is intermediate. Consequently, the relationship between fractionalization and growth rate is also non-linear: growth is high in the middle range of ethnic diversity, low in homogeneous or very fragmented countries.

Low effectiveness of the control of corruption channel in divided societies along ethnic lines can be attributed to coordination and cooperation problems with increased transaction costs. This would be compounded in countries with insufficient infrastructural development or supporting institutions, characterizing many developing countries. Thus, people may feel compelled to resort to corruption to reduce transaction costs (time) while conducting business even when reform measures are in force. The argument is that an inefficient bureaucracy may constitute an impediment to investment that some “speed” or “grease” money may help circumvent. In a nutshell, the “grease the wheels” hypothesis states that graft may act as a trouble-saving device thereby raising efficiency, and hence investment, and eventually growth (Méon and Sekkat,

2005). This situation may effectively emerge when government regulation acts as a drag on investment and enterprise. It may happen when reform actions by governments entail more regulation rather than provide incentives and facilitation. In a recent article, Holcombe and Boudreux (2015) argue that is the regulatory state rather than productive or distributive state would be associated with corruption. In other words, control of corruption loaded with more regulation may be growth-retarding. The authors also argue that bigger size of government may give opportunity to engage in more corruption. Erickson and Hill (2007) discuss extensively the lack of effective corruption control measures in many countries due to failure of implementing agencies with very few exceptions such as Singapore and Hong Kong.

5.2.4 Policy of reducing income inequality

Table 1 (Panel E) tests for improved income redistribution as likely channel to mitigate the constraints posed by ethnic divisions on growth. Surprisingly, both ethnic divisions and income redistribution enter insignificantly in the growth models. The insignificance of equality channel persists in the expanded specifications including all the channels (Table 2) and where some measures of ethnicity display significant growth impact. Do these findings invalidate income redistribution as a transmission channel? To establish the effectiveness of income distribution policy as an important channel for improved ethnic income distribution, there should be significant positive links between them. From Table 3, robust significant negative association between the measures of ethnic fractions and income equality is obtained supporting Becker (1957) who argues that individuals generally have strong feelings of empathy toward their own group so that countries with greater degree of fractionalization would exhibit lower levels of redistribution.

While the evidence generally indicates a negative association between ethnolinguistic fractionalization and redistribution, this finding would appear sensitive to alternative measures of diversity (Desmet et al., 2009, 2012) and to the inclusion of controls (Alesina et al., 2003). Sturm and Haan (2015) find that the impact of ethno-linguistic fractionalization is conditional on the level of economic freedom: a country with high degree of fractionalization will have less income redistribution, while capitalist countries with low degree of fractionalization have more income distribution. Alesina and Ferrara (2005) show how redistributive policies are deeply affected by racial politics. In more racially fragmented communities, people are less willing to redistribute income because the white majority feels that redistributive flows would favour a racial minority. Survey evidence suggests that those respondents who express attitudes less favorable to racial integration and are more averse to government intervention on redistributive matters. Moreover, Alesina et al. (2016) have obtained that ethnic income inequality is weakly correlated with the standard measures of income inequality (here Gini, for instance) and only modestly correlated with ethnolinguistic fractionalization, polarization, and segregation. The progressive distribution of total income across income groups does not ensure improved income distribution across ethnic groups.

Given that income distribution in ethnically diverse societies does not significantly impact growth in our findings (Tables 1 and 2), we may derive the following possible messages: (i) overall improved income distribution may not be perceived as channel for containing uncooperative and counter-productive behavior by ethnic groups because these benefits may accrue to richer segments of ethnic groups (vertical ethnic inequality), or (ii) income equality may not adequately reflect inequality between ethnic fractions (horizontal inequality). Our empirical results that redistribution policy is not significant in our estimations may therefore

contribute to the contention that conventional channel of income redistribution may not be as effective as a targeted policy having visible linkages for reducing ethnic income inequality.

5.3 Integrating the results

It would appear from the above results that legal property rights channel outperforms that of democracy channel except in the case of groups categorized in terms of language differences. This finding would further imply that while democracy may tend to assure their share in divisible pool, its visibility is apparently lower than that of legal property rights. These results also get support from the condition for existence of a channel that the channel should have a significant impact on growth. While property rights and democracy appear to strongly satisfy this condition, control of corruption seems to be weak, and redistribution variable is insignificant. These results may be interpreted to mean that institutional channels (legal property rights and democracy) are apparently more effective than policy channels (redistribution and transparency). The upshot of the discussion is that visibility of benefits is greater in institutional channel than in policy channel.

6. Robustness tests

Additional sensitivity checks on our results are conducted in three ways. First, we address the endogeneity of investment using the Lewbel (2012) IV-GMM approach. The attractiveness of this technique is that it tackles both endogeneity and identification issues in simultaneous systems by assuming heteroscedastic errors. The method identifies the structural parameters through imposing a heteroscedastic covariance restriction on the disturbances that is a feature of many models of endogeneity or mismeasurement. Furthermore, the GMM technique is

simultaneously capable of solving the endogeneity problem if sufficient additional instrumental variables are provided to create valid moment conditions. We use the Lewbel approach combining both internal and external instruments generated by STATA 15 econometric software to increase the predictive power of our instruments (Baum and Schaeffer, 2013; Baum and Lewbel, 2019) and obtain robust estimators.

Second, we disaggregate the sample according to countries' level of income (developed and developing) in order to ascertain whether average behavioral patterns are evenly distributed across these samples. Here again Lewbel method is used, investment being endogenous. Third, we relax the assumption that ethnicity is exogenous. It is good to note that Lewbel technique cannot be applied in a simultaneous system with more than 2 endogenous variables. In this case, 3SLS estimators are generated assuming growth, investment and ethnicity are endogenous. Earlier estimates of total effect of ethnicity may be biased due to probable endogeneity of ethnic over the long-time horizon (over 3 decades). As noted earlier, estimates of direct effect would be less affected by endogeneity since the time horizon is conditioned by availability of information on all the channels, starting from 1995 onwards. Ethnic diversity in our analysis is typically measured close to year 2000 (Alesina et al., 2003; Fearon, 2003; Montalvo and Reynal-Querol, 2005) except for ELF, which relates to year 1985. While we do not report the detailed 3SLS results due to space limitation, a synthesis of the results from all methods and relevant channels of transmission is undertaken.

6.1 Endogeneity of investment

Lewbel IV-GMM estimators are detailed in Table 4. Robust negative total impact of all ethnicity measures (except polarization) on growth is evidenced in Panel A. Interestingly, when controlling for the transmission channels (Panel B), ethnic fractionalization remains important

(reg. 1, 2, 4, 6) while language and cultural diversity lose their significance. Our earlier findings on property rights and democracy as transmission channels persist. Control of corruption, however, does not display significant impact on growth except where `al_ethnic` is used (reg. 2). Other controls in our baseline model including `INV`, `SCHOOLING` and `POPea` are significant with the expected signs on the coefficients.

Table 4: Sensitivity test: Total and direct impact of ethnicity on growth – `INV` endogenous (Lewbel IV-GMM estimates)

	<code>m_ethfrac</code>	<code>al_ethnic</code>	<code>al_lang</code>	<code>fe_etfra</code>	<code>fe_culture</code>	<code>r_elf85</code>	<code>m_ethpol</code>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Base - Total effect							
<code>INV</code>	0.08*** (2.67)	0.05* (1.72)	0.06** (2.13)	0.05* (1.76)	0.06** (2.01)	0.19** (2.14)	0.20*** (3.69)
<code>lnY₀</code>	-0.69*** (-5.84)	-0.76*** (-7.16)	-0.70*** (-6.75)	-0.74*** (-6.75)	-0.68*** (-6.29)	-0.67*** (-5.56)	-0.39*** (-3.60)
<code>ln POPea</code>	0.26*** (4.14)	0.18*** (3.39)	0.20*** (3.63)	0.25*** (3.88)	0.27*** (4.05)	0.24*** (3.25)	0.12** (2.07)
<code>ln SCHOOL</code>	1.52*** (5.05)	1.70*** (6.13)	1.76*** (6.33)	1.71*** (6.09)	1.79*** (6.29)	1.72*** (4.91)	0.65** (2.16)
<code>Ethnic</code>	-1.97*** (-4.43)	-2.62*** (-5.06)	-1.23*** (-3.02)	-1.92*** (-4.17)	-1.30** (-2.32)	-1.25*** (-3.44)	-0.63 (-1.53)
<code>N</code>	843	966	943	918	911	699	880
<code>adj. R-sq</code>	0.155	0.144	0.134	0.139	0.132	0.137	0.110
<code>Hansen jp</code>	0.168	0.277	0.16	0.435	0.156	0.107	0.375
<code>Ortho p</code>	0.981	0.708	0.511	0.456	0.121	0.627	0.204
Panel B: With transmission channels – Direct effect							
<code>INV</code>	0.15*** (4.05)	0.14*** (3.75)	0.15*** (4.03)	0.14*** (4.04)	0.14*** (3.96)	0.16*** (4.57)	0.15*** (4.09)
<code>lnY₀</code>	-1.12*** (-6.49)	-1.03*** (-5.93)	-1.03*** (-5.91)	-1.10*** (-6.39)	-1.09*** (-6.27)	-1.15*** (-6.64)	-1.02*** (-5.88)
<code>ln POPea</code>	0.23** (2.57)	0.10 (1.14)	0.10 (1.23)	0.12 (1.54)	0.12 (1.49)	0.19** (2.22)	0.18** (2.12)
<code>ln SCHOOL</code>	1.81*** (3.56)	2.04*** (4.60)	2.07*** (4.67)	2.17*** (4.90)	2.18*** (4.98)	1.97*** (4.07)	1.86*** (3.67)
<code>P_RIGHTS</code>	0.10 (0.67)	0.42*** (2.76)	0.40*** (2.67)	0.40*** (2.63)	0.43*** (2.85)	0.13 (0.86)	0.15 (0.98)
<code>DEM</code>	0.05+ (1.60)	0.05* (1.65)	0.05** (1.98)	0.05* (1.84)	0.05* (1.82)	0.06** (2.14)	0.05+ (1.63)
<code>C_CORR</code>	0.01 (1.07)	-0.02* (-1.73)	-0.02 (-1.52)	-0.02 (-1.38)	-0.02 (-1.50)	0.01 (0.76)	0.01 (0.65)
<code>EQUALITY</code>	-0.02	-0.01	-0.01	-0.01	-0.01	-0.02	-0.01

	(-1.40)	(-0.98)	(-0.43)	(-1.05)	(-0.70)	(-1.14)	(-0.77)
Ethnic	-1.14**	-1.08**	-0.53	-0.79*	-0.71	-1.01**	0.15
	(-2.53)	(-2.28)	(-1.40)	(-1.65)	(-1.35)	(-2.38)	(0.30)
N	259	299	301	303	303	270	259
adj. R-sq	0.309	0.349	0.340	0.346	0.344	0.351	0.295
Hansen jp	0.747	0.749	0.685	0.643	0.950	0.790	0.704
Ortho p	0.504	0.242	0.262	0.121	0.528	0.394	0.314

Source: Computed. Heteroscedastic robust t statistics in parentheses. + p<0.12, * p<0.10, ** p<0.05, *** p<0.01

Notes: As for Table 1. Hansen jp: p-value for Hansen j-test for overidentification of instruments. Ortho p-value for orthogonality/exogeneity of suspected instruments. Instruments used include absolute latitude, tertiary education completion rate (at beginning of each sub-period), log of lagged investment and international trade flows, area and instruments generated using the Lewbel methodology.

6.2 Accounting for level of economic development

The baseline and augmented growth models are re-estimated by applying the Lewbel methodology on sub-samples of developing economies (LDCs) and developed ones (DCs), identified according to World Bank 2016 classification. Table 5 reports results for LDCs and Table 6, for DCs. Striking comparisons emanate from these findings. First, when analyzing growth impacts of ethnicity, we observe that (i) total effect of ethnicity in LDCs is significantly higher in magnitude than in aggregate/world sample (Table 2) and DCs (Table 5); (ii) weak total effect of fractionalization prevails in DCs where language and cultural diversity do not appear to matter; (iii) estimated direct effect of all ethnicity measures in LDCs is significant (except polarization) and exceeds estimates in world sample; and (iv) all ethnicity variables in DCs do not display significant direct impact on growth. One can conjecture that greater sophistication in the operations of developed economies minimizes cultural, language and ethnic barriers to growth of output. Developing countries, on the other hand, face the brunt of economic and social costs posed by different fractions and political compulsions. Overall, findings generated using the aggregate sample would appear to be driven significantly by the dominant relationships existing in LDCs.

Table 5: Sensitivity analysis: Total and direct impact of ethnicity on growth in LDC sample (Lewbel IV-GMM)

	m_ethfrac (1)	al_ethnic (2)	al_lang (3)	fe_etfra (4)	fe_cultdiv (5)	r_elf85 (6)	m_ethpol (7)
Panel A: Base - Total effect							
INV	0.21* (1.95)	0.15** (2.49)	0.23*** (2.77)	0.16** (2.02)	0.15** (2.47)	0.16** (2.45)	0.13** (2.11)
lnY ₀	-0.72** (-2.09)	-0.70*** (-2.87)	-0.99*** (-3.45)	-0.88*** (-3.44)	-0.72*** (-2.89)	-0.80*** (-3.19)	-0.44* (-1.78)
ln POPea	0.33*** (3.45)	0.27*** (3.64)	0.26*** (3.51)	0.25*** (3.07)	0.32*** (3.83)	0.44*** (4.38)	0.32*** (3.60)
ln SCHOOL	0.50* (1.84)	0.78*** (2.98)	0.82*** (3.04)	0.89*** (3.29)	0.87*** (3.22)	1.36*** (3.23)	0.59** (2.16)
Ethnic	-1.77*** (-2.94)	-2.73*** (-4.03)	-1.43*** (-3.11)	-1.58*** (-2.85)	-1.64** (-2.56)	-1.46** (-2.09)	0.47 (0.85)
N	600	653	628	660	639	438	572
adj. R-sq	0.158	0.167	0.142	0.172	0.149	0.176	0.151
Hansen jp	0.111	0.212	0.231	0.253	0.495	0.137	0.329
Ortho p	0.366	0.503	0.154	0.162	0.576	0.992	0.707
Panel B: With transmission channels							
INV	0.093** (2.01)	0.10** (2.46)	0.12*** (2.67)	0.10** (2.24)	0.11** (2.41)	0.11** (2.54)	0.10* (1.87)
lnY ₀	-1.04*** (-4.17)	-0.93*** (-3.99)	-0.95*** (-3.77)	-0.94*** (-3.91)	-0.90*** (-3.73)	-1.08*** (-4.31)	-0.89*** (-3.56)
ln POPea	0.37*** (2.83)	0.25** (2.38)	0.29*** (2.61)	0.27** (2.45)	0.28** (2.42)	0.30** (2.56)	0.31** (2.44)
ln SCHOOL	0.34*** (2.93)	0.32*** (3.93)	0.34*** (3.96)	0.34*** (4.01)	0.34*** (4.02)	0.38*** (3.77)	0.30** (2.57)
P_RIGHTS	0.25 (1.42)	0.44** (2.41)	0.45** (2.39)	0.47** (2.54)	0.50*** (2.63)	0.29 (1.50)	0.30+ (1.61)
DEM	0.06* (1.83)	0.05* (1.75)	0.07** (2.36)	0.05* (1.92)	0.06* (1.95)	0.07** (2.55)	0.06+ (1.56)
C_CORR	0.01 (0.41)	-0.02 (-1.10)	-0.02 (-0.77)	-0.02 (-0.83)	-0.02 (-0.83)	0.003 (0.13)	0.01 (0.42)
EQUALITY	0.01 (0.30)	0.01 (0.52)	0.02 (1.23)	0.01 (0.60)	0.02 (1.07)	0.01 (0.48)	0.02 (0.68)
Ethnic	-1.32* (-1.94)	-2.05*** (-3.30)	-0.85* (-1.90)	-1.25** (-2.05)	-1.06* (-1.71)	-1.41** (-2.56)	0.22 (0.28)
N	157	184	180	185	186	168	159
adj. R-sq	0.305	0.366	0.356	0.353	0.346	0.361	0.274
Hansen jp	0.668	0.991	0.787	0.962	0.685	0.955	0.560
Ortho p	0.863	0.950	0.669	0.755	0.395	0.404	0.744

Source: Computed. Heteroscedastic robust t statistics in parentheses. + p<0.12, * p<0.10, ** p<0.05, *** p<0.01.

Notes: As for Table 4.

As regards channels of transmission, property rights and democracy appear relevant in LDCs for moderating the economic and social costs due to ethnic fractions and improving their share in the divisible pool while transparency and income redistribution are insignificant. In upper-income nations, ‘P_RIGHTS’ predominates as transmission channel and effectively overpowers ethnicity effects. Interestingly, democracy loses its force in mitigating the negative effects on growth. Democracies may create more ethnic cleavages on the issue of public goods provision as competition between political groups increases (Eifert et al. 2010; Posner, 2004), which may find more relevance in developed countries. Contrary to the POLS findings, however, transparency does not seem to be significantly growth promoting in all samples. Thus, control of corruption as a channel does not seem robust.

Table 6: Total and direct impact of ethnicity on growth – High-income countries (Lewbel estimates)

	m_ethfrac	al_ethnic	al_lang	fe_etfra	fe_cultdiv	r_elf85	m_ethpol
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Base - Total effect							
INV	0.20*** (3.00)	0.23*** (3.61)	0.24*** (3.47)	0.23*** (4.02)	0.24*** (3.94)	0.23*** (3.16)	0.20*** (3.01)
lnY ₀	-1.54*** (-5.73)	-1.57*** (-6.67)	-1.51*** (-6.32)	-1.46*** (-6.14)	-1.37*** (-6.04)	-1.65*** (-6.35)	-1.57*** (-5.84)
ln POPea	-0.11 (-1.38)	-0.11+ (-1.57)	-0.11 (-1.55)	-0.08 (-0.88)	-0.08 (-0.83)	-0.04 (-0.56)	-0.12+ (-1.56)
ln SCHOOL	3.66*** (3.48)	3.33*** (3.61)	3.46*** (3.69)	3.28*** (3.77)	3.29*** (3.71)	2.83*** (2.89)	3.61*** (3.41)
Ethnic	-0.91 (-1.30)	-1.50** (-2.25)	-1.16+ (-1.58)	-1.40* (-1.96)	-1.18 (-1.17)	-0.63 (-1.02)	-1.03* (-1.76)
N	273	301	301	272	272	224	273
adj. R-sq	0.234	0.238	0.220	0.257	0.241	0.260	0.241
Hansen jp	0.287	0.665	0.611	0.958	0.469	0.368	0.261
Ortho p	0.204	0.359	0.280	0.861	0.687	0.302	0.168
Panel B: With transmission channels							
INV	0.20***	0.15***	0.15***	0.16***	0.16***	0.19***	0.20***

	(3.19)	(2.90)	(2.97)	(3.22)	(3.21)	(3.30)	(3.19)
lnY ₀	-1.55***	-2.18***	-2.26***	-2.52***	-2.51***	-1.62***	-1.55***
	(-4.17)	(-5.23)	(-5.23)	(-5.63)	(-5.63)	(-4.22)	(-4.17)
ln POPea	-0.11	-0.14	-0.11	-0.025	-0.021	-0.12	-0.11
	(-0.87)	(-1.15)	(-0.87)	(-0.19)	(-0.16)	(-0.96)	(-0.87)
SCHOOL	1.53	0.55	0.58	0.88	0.95	1.41	1.53
	(1.24)	(0.44)	(0.47)	(0.70)	(0.78)	(1.15)	(1.24)
P RIGHTS	-0.05	0.54*	0.57*	0.62*	0.58*	0.01	-0.05
	(-0.13)	(1.74)	(1.83)	(1.92)	(1.87)	(0.033)	(-0.13)
DEM	-0.02	-0.05	-0.03	-0.06	-0.05	-0.03	-0.02
	(-0.28)	(-0.49)	(-0.33)	(-0.66)	(-0.59)	(-0.38)	(-0.28)
C_CORR	0.031	0.003	0.001	0.004	0.006	0.021	0.025
	(1.31)	(0.15)	(0.079)	(0.24)	(0.31)	(1.05)	(1.31)
EQUALITY	-0.02	-0.01	-0.01	-0.003	-0.01	-0.01	-0.02
	(-0.64)	(-0.33)	(-0.54)	(-0.11)	(-0.32)	(-0.36)	(-0.64)
Ethnic	-0.22	1.04	1.29	0.53	0.58	0.25	-0.22
	(-0.31)	(1.48)	(1.55)	(0.67)	(0.60)	(0.32)	(-0.31)
N	102	121	121	118	118	102	102
adj. R-sq	0.333	0.442	0.446	0.460	0.459	0.336	0.333
Hansen jp	0.204	0.252	0.212	0.431	0.458	0.176	0.169
Ortho p	0.580	0.409	0.537	0.534	0.589	0.562	0.680

Source: Computed. Heteroscedastic robust statistics in parentheses. + p<0.12, * p<0.10, ** p<0.05, *** p<0.01

Notes: As for Table 4.

6.3 Testing endogeneity of ethnicity and synthesizing the results

The estimates generated above would still be biased if ethnicity is endogenous in the system. To address this possibility, we develop a simultaneous system where growth, INV and ethnicity are endogenous. Growth models are as specified in Section 4. Investment is posited to be a function of growth and a series of variables not included in the growth model, namely lagged investment and trade volume, initial tertiary education completion rate, latitude (absolute value) and terrain ruggedness. Determinants of ethnicity function include growth, regional dummies, land area (or share of arable land), and latitude. The full 3SLS results are not reported. What is more instructive is a comparison of total and direct ethnicity effects estimators generated by 3SLS, Lewbel and POLS summarized in Table 7 along with findings on significant transmission channels.

Table 7. Summary of ethnicity effects and channels by estimation method and income category

	m ethfrac	al ethnic	al lang	fe etfra	fe cultdiv	r elf85	m ethpol	Sig. Channels
POLs: Aggregate sample								
TE	-2.01 ***	-2.68***	-1.46***	-1.79***	-1.38**	-1.39***	-0.60	P_RIGHTS, C_CORR (weak) & DEM
DE	-1.16**	-1.16**	-0.57	-0.66	-0.70	-0.86*	0.22	
Lewbel IV GMM (INV endog)								
Aggregate								
TE	-1.97***	-2.62***	-1.23***	-1.92***	-1.30**	-1.25***	-0.63	P_RIGHTS & DEM
DE	-1.14**	-1.08**	-0.53	-0.79*	-0.71	-1.01**	0.15	
LDC								
TE	-1.77***	-2.73***	-1.43***	-1.58***	-1.64**	-1.46**	0.47	P_RIGHTS & DEM
DE	-1.32*	-2.05***	-0.85*	-1.25**	-1.06*	-1.41**	0.22	
DC								
TE	-0.91	-1.50**	-1.16+	-1.40*	-1.18	-0.63	-1.03*	P_RIGHTS
DE	-0.22	1.04	1.29	0.53	0.58	0.25	-0.40	
3SLS (INV and ethnic diversity endogenous)								
Aggregate								
TE	-2.86***	-3.33	-1.57***	-3.01***	-2.75***	-3.26***	-3.20***	P_RIGHTS, C_CORR (weak) & DEM
DE	-1.12*	-1.23***	-0.79	-0.7	-0.81	-1.57**	-1.16	
LDC								
TE	-3.02***	-4.02***	-1.20**	-3.14***	-3.07*	-2.29**	-1.57	P_RIGHTS & DEM
DE	-1.70*	-1.68***	-0.75**	-1.08**	-1.03**	-1.62***	-1.04	
DC								
TE	-2.28***	-3.15***	0.10	-2.80**	-2.58***	-2.12***	-2.35***	P_RIGHTS & DEM
DE	0.61	1.32	1.95	-1.30	1.07	1.14	0.07	

Source: Computed. * p<0.10, ** p<0.05, *** p<0.01

Notes: Lewbel estimators assume investment is endogenous, 3SLS estimates produces estimates using structural models where both investment and ethnic diversity are endogenous. TE: Total effect; DE: Direct effect (controlling for all transmission channels).

In the world sample, irrespective of estimation procedure, significant total impact of ethnicity on growth is evidenced in all specifications, excepting the one with polarization. In the presence of potential transmission channels, the direct impact of ethnicity vanishes or is substantially reduced, depending on ethnic measures tested. Conversely, LDCs are characterized by persistent direct negative growth impact of ethnicity. The magnitude of ethnicity effects in LDCs typically exceeds those in aggregate sample and DCs. Estimates of total effect in the latter are sensitive to

estimation method and ethnic measures used. Overwhelmingly, however, ethnic fractions cease to have direct effect on growth in these high-income nations when controlling for the channel variables. Thus, the research findings at the aggregate (world) level seem strongly influenced by mechanisms existing in developing countries.

Coming to the transmission channels, in the world sample, irrespective of estimation strategy used, both property rights and democracy appear successful in dampening negative ethnicity impacts on growth. Interestingly, POLS and 3SLS estimates also indicate transparency as weak transmission mechanism (at low levels of significance and sensitive to ethnicity measures used) unlike the Lewbel approach. In LDCs, property rights and democracy are important channels for moderating economic and social costs due to ethnic fractions and improving their share in the divisible pool while transparency and income redistribution are statistically insignificant. In developed countries, property rights channel predominates (3SLS and Lewbel) and democracy is left behind. From the 3SLS findings, democracy loses its relevance in these nations as transmission channel.

7. Conclusion and some policy issues

This paper adds to the existing literature by focusing on the behavioural dimensions of diverse ethnic groups on sharing the surplus output after meeting the aggregate cost in the economy and its implication for economic growth. A simple cooperative labour market model of ethnic diversity is developed in which income maximizing individuals would assign greater weight on sharing the surplus rather than individual wages bills. Thus, the visibility of benefits to ethnic fractions emanating from different channels would seem to play major role and significantly reduce the negative impact of ethnic diversity on economic growth.

Unlike in the earlier studies with ad hoc choice of channels, an attempt is made in this paper to develop a formal labour market framework in which an account is taken of the fact that individuals tend to behave differently as an individual unit of labour pool and as a member of a group or community. Moreover, choice of channels is empirically determined after checking for identification condition. We formally investigate four plausible channels of impact of ethnic and linguistic fractions on growth, namely, economic channel captured by system of legal property rights and control of corruption/transparency; a political channel measured by democracy; and a redistributive channel, that is, extent of income redistribution. The gist of the story is how different ethnic fractions perceive or trust the workings of these policy and institutional mechanisms in terms of the immediate benefits they can enjoy from the divisible pool and take decisions about labour supply for growth.

The empirical results generated from our model structure establish that total effect of ethnic diversity on growth is invariably negative. While the direct and indirect effects bear positive sign, the magnitude of these effects is overwhelmed by the negative total effects. The channels that are expected to reduce the negativity of these effects differ in terms of their effectiveness as a sharing instrument. Legal property rights, democracy and control of corruption (weak) as institutional channels are effective but income redistribution as policy tool loses its significance in direct effect estimations. These results are firm after mitigating endogeneity problem and undertaking robustness tests. But while checking the endogeneity of investment in growth equation, the coefficient on control of corruption becomes insignificant. The institution of legal property rights and democracy come out very clearly to show the visibility of benefits to ethnic groups having consequences for growth.

These finding may contribute to the contention that institutions are more effective than policies in conveying the visibility of benefits to ethnic groups. That is, policies seem to offer broad guidelines and institutions that are created to implement policies are close to the reality. The insignificance of control of corruption can be attributed to reform actions by governments that entail more regulation rather than provide incentives and facilitation. In other words, control of corruption loaded with more regulation resulting in failure of implementing agencies may be growth-retarding. Similarly, an overall improvement in income distribution may not ensure improved income distribution across ethnic groups that would be necessary for cooperation and growth promoting outcomes. This would imply that lower strata of ethnic groups may not be connected to benefits, which reduces the effectiveness of redistribution channel. These results would have important implications for further research in new growth economics while assessing the relative significance of policies and institutions in augmenting labour supply in ethnically fragmented societies.

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Appendix

Table A.1: List of countries

Argentina	New Zealand	Albania	Gambia	Myanmar	Ukraine
Australia	Norway	Algeria	Ghana	Namibia	Venezuela
Austria	Panama	Armenia	Guatemala	Nepal	Vietnam
Bahrain	Poland	Bangladesh	Guyana	Nicaragua	Yemen
Belgium	Portugal	Benin	Haiti	Niger	Zambia
Canada	Qatar	Bolivia	Honduras	Nigeria	Zimbabwe
Chile	Saudi Arabia	Botswana	India	Pakistan	
Croatia	Singapore	Brazil	Indonesia	Papua New Guinea	
Cyprus	Slovakia	Bulgaria	Iran	Paraguay	
Czech Republic	Slovenia	Burkina Faso	Iraq	Peru	
Denmark	Spain	Burundi	Jamaica	Philippines	
Estonia	Sweden	Cambodia	Jordan	Romania	
Finland	Switzerland	Cameroon	Kazakhstan	Russia	
France	Trinidad and Tobago	Central African Rep.	Kenya	Rwanda	
Germany	United Arab Emirates	China	Kyrgyzstan	Senegal	
Greece	United Kingdom	Colombia	Laos	Sierra Leone	
Hungary	United States	Congo	Lesotho	South Africa	
Ireland	Uruguay	Congo, Dem. Rep.	Malawi	Sri Lanka	
Israel		Costa Rica	Malaysia	Swaziland	
Italy		Cote d'Ivoire	Mali	Syria	
Japan		Cuba	Mauritania	Tajikistan	
Korea, South		Dominican Rep.	Mauritius	Tanzania	
Kuwait		Ecuador	Mexico	Thailand	
Latvia		Egypt	Moldova	Togo	
Lithuania		El Salvador	Mongolia	Tunisia	
Luxembourg		Fiji	Morocco	Turkey	
Netherlands		Gabon	Mozambique	Uganda	

Table A.2.: Summary statistics and sources of data

Variable	Obs	Mean	Std. Dev.	Definition	Source of data
Growth	1,223	2.10	3.43	Real growth rate per capita (2010)	World Bank (2017) UN Statistics reproduced by Dahlberg et al. (2018)
INV	1,159	22.01	7.46	Share of investment in GDP.	World Bank (2017)
lnY0	1,190	8.23	1.55	ln Initial income	World Bank (2017)
ln PO _{Pea}	1,335	15.38	1.67	Economically active pop. ages 15-64	World Bank (2017)
lbl_asy15mf	1,335	1.59	0.72	ln average years of schooling	Barro and Lee (2013)
P_Rights	853	4.98	1.87	Legal Structure and Security of Property Rights. Index ranges from 0-10 where 10 measures highest “degree of judicial independence”, “trusted legal framework exists”, “protection of intellectual property”, “no military interference in rule of law”, and “integrity of the legal system”. (Years available: 1970 -2015).	Dahlberg et al. (2018)
C_CORR	390	45.48	23.35	Transparency International Corruption Perceptions Index. ranges between 10 (highly clean) and 0 (highly corrupt). (Years available: 1995 -2015).	Dahlberg et al. (2018)
DEM	1,266	1.40	7.50	Polity IV Project Level of democracy. Ranges from +10 (strongly democratic) to -10 (strongly autocratic). (Years: 1960-2017).	Dahlberg et al. (2018)
EQUALITY	522	59.51	9.58	Initial income equality (measured at/close to start of period). Computed as 100-Gini.	Computed from Gini reported in World Bank (2016)
m_ethfrac	1,150	0.44	0.28	Ethnic fractionalization	Montalvo and Querol (2005)
m_ethpol	1,150	0.51	0.24	Ethnic polarization	
al_ethnic	1,321	0.44	0.26	Ethnic fractionalization	
al_language	1,283	0.38	0.29	Language fractionalization	Alesina et al. (2003)
fe_elfra	1,256	0.45	0.27	Ethnic fractionalization	
fe_cultdiv	1,249	0.29	0.21	Cultural diversity	Fearon (2003)
r_elf85	729	0.45	0.28	Ethnic fractionalization	Roeder (2001)
Latitude	1,335	0.29	0.19	Latitude (absolute value)	La Porta et al. (1999) and CIA (2018)
bl_lhc_15mf	1,335	4.31	4.92	Tertiary schooling completion rate	Barro and Lee (2013)
ln Area	1,335	12.05	2.09	ln land area	World Bank (2017)
ln Arable land	1,335	2.26	1.20	ln share of arable land	
Tropical	1,335	39.40	44.79	Percent of country in tropics	
Rugged	1,335	1.24	1.09	Terrain ruggedness index	Nunn and Puga (2012)
LDC	1,335	0.66	0.47	Developing countries	
UIC	1,335	0.34	0.47	Upper income countries	Work Bank (2017)